MARKETING STATUS AND DEALERS OUTLOOK FOR *Bt* COTTON SEED COMPANIES IN BANASKANTHA DISTRICT

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BY

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ABSTRACT

Cotton is the most important commercial crop of our country contributing up to 75 per cent of total raw material needs to textile industry and provides employment to about 60 million people. Area wise, India ranks first in the world, whereas it ranks second in production next to China. It is popularly known as the “white gold” and “fiber king”. The present study has been undertaken in Deodar, Kankrej, Bhabhar and Deesa talukas of Banaskantha district, as all four taluka have higher area under *Bt* cotton cultivation. Multistage random sampling technique was adopted to select the districts, talukas and villages. The study was mainly based on primary data, which were collected through personal interview with the help of structured schedule. The results showed that highest percentage of *Bt* cotton seed growers belonged to 18 to 35 age group and having primary education. Majority of the *Bt* cotton growers belonged to small and marginal land holding groups and have annual income between Rs. 1, 00,001 to 2, 50,000 lakh. Bore well was observed the main source of irrigation in the study area. More than 50 per cent *Bt* cotton growers belonged to joint family. Majority of *Bt* cotton growers have more than 15-years farming experience. The study revealed that highest market share was captured by Rasi Seeds Company followed by Ankur Seeds Company and Western Agri Seeds Company. Majority of *Bt* cotton growers purchased *Bt* cotton seeds on cash payment from retailer’s shop at the time of sowing as per dealer’s suggestion. The study also pointed out that large number of *Bt* cotton growers found satisfied from the quality of previous year seed purchased. It was also observed that across the different *Bt* cotton seeds companies dealer's margin varied from 12 to 16 per cent. Majority of *Bt* cotton dealers were associated with companies from 5 to 10 years. The majority of the dealers considered *Bt* cotton seeds quality as a most important factor for selling *Bt* cotton seeds, followed by brand image, demand and price. *Bt* cotton seed dealer`s

major expectations from the seed companies were reported as higher margin, high yielding varieties and farmer satisfaction. The *Bt* cotton grower faced major constraint of high price of seeds followed by low yield, whereas dealers faced major constraint *i.e.,* lack of awareness of use of seed by farmer followed by competition among dealers. From the results it is suggested that companies should provide quality seed materials on time and in sufficient quantity at reasonable price, companies should invest more in research and development activities to develop new high yielding varieties, whereas Government institutes, agriculture universities, and seed companies should provides better knowledge and awareness to the farmers about the use of seeds and improved farming techniques.

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CERTIFICATE – I

Date: 17 / 02 / 2023

This is to certify that the project entitled **"MARKETING STATUS AND DEALERS OUTLOOK FOR *Bt* COTTON SEED COMPANIES IN BANASKANTHA DISTRICT"** submitted for the degree of **MBA (Agribusiness Management)** is a record of bonafide research work carried out by **SUNDESHA UTTAMKUMAR CHHAGANLAL** under my guidance and supervision and that no part of this project has been submitted for any other degree, diploma, associateship, fellowship or other similar titles. The assistance and help received during the course of investigation have been fully acknowledged.

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Place: Sardarkrushinagar

Date: 17/02/ 2023 **(Sundesha Uttam C.)**

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LIST OF ABBREVIATIONS AND SYMBOLS

ICAR	**:**	Indian Council of Agricultural Research
GDP	**:**	Gross Domestic Product
NSC	**:**	National Seed Corporation
SSC	**:**	State Seed Corporation
NSAI	**:**	National Seeds Association of India
R & D	**:**	Research and Development
MT	**:**	Million Tons
BG	**:**	Boll Guard
Bt	**:**	*Bacillus thuringiensis*
Kg	**:**	Kilogram
ha	**:**	Hectare
GM	**:**	Genetically Modified
GEAC	**:**	Genetic Engineering Approval Committee
Mahyco	**:**	Maharashtra Hybrid Seed Company
GOT	**:**	Grow Out Test
CEO	**:**	Chief Executive Officer
ISTA	**:**	International Seed Testing Association
CCI	**:**	Cotton Corporation of India
CGR	**:**	Compound Growth Rate
Pvt. Ltd.	**:**	Private Limited
°C	**:**	Degree Celsius
Viz.	**:**	Videlicet
etc.	**:**	Etcetera
et al.	**:**	*Et allii* (and others)
R & D	**:**	Research and Development
ISCR	**:**	Indian Society for Cotton Research
CICR	**:**	Central Institute of Cotton Research
DSIR	**:**	Department of Scientific and Industrial Research
IPM	**:**	Integrated Pest Management
MNCs	**:**	Multi National Companies
CAGR	**:**	Compound Annual Growth Rate

SYMBOLS

=	:	is equal to
.	:	Full stop
×	:	Multiply
&	:	And
-	:	Minus
( )	:	Bracket
[ ]	:	Square bracket
,	:	Comma
%	:	Per cent
>	:	Greater than
<	:	Less than
₹	:	Rupees
@	:	At the rate of
/	:	Per
;	:	Semi colon
:	:	Colon
“ ”	:	Quotation Marks

I. INTRODUCTION

Seed is the most important input component for productive agriculture. The role of the seed sector has been substantial, in the significant advances that India has made in agriculture in the last four decades. The expansion of the seed industry has occurred in parallel with growth in agricultural productivity. India is one of the few countries where the seed sector is reasonably advanced. The private seed industry is no longer confined to just production and marketing of seed. It also has well acquired technological strength to cater the varietal needs of tomorrow.

1.1 Structure of the Indian Seed Industry

The Indian seed industry is one of the most mature and vibrant industry in the world and currently occupying the 6^{th} position with nearly 9000 crore turnover. During the last five years, the Indian Seed Industry has been growing at a CAGR of 12 per cent, compared to global growth of six to seven per cent. Several companies have the Government of India recognized research and development departments and have produced and released a large number of varieties and hybrids on several crops. The contribution of private research in terms of value is steadily increasing.

Although the Indian seed market is one of the largest, it is almost exclusively supplied by locally produced seeds. Farmers retain the seed of major food crops (wheat, rice, sorghum, millet, corn, and pulses) and commercial crops for many years, and the largest volume of seed trade involves local exchanges of established self-pollinating varieties. The seed replacement rate in most of the crops is very low, except for cotton and some vegetables. The use of hybrid seeds is mostly confined to cotton, and to some extent to corn, millet, sunflower, and a few vegetables. However, awareness about the high yield and quality of produce from hybrid seeds, attracting farmers to switch over to hybrids, is growing. The Indian seed industry used to be dominated by public-sector seed companies. However, following the easing of government regulations and the implementation of a new seed policy in 1988, private-sector seed companies have started playing a major role in seed development and marketing. More recently, the government's decision to embrace biotechnology as a means of achieving food security has attracted several leaders in biotechnology-focused multinational seed companies to India. The composition of the seed industry, by volume of turnover, has reportedly reached a ratio of 60:40 between the private and public sectors.

In India, hybrid seed penetration is high in cotton (90-95 %), corn (50 %), limited cereals, such as sorghum and pearl millet, and oilseeds, such as sunflower (hybridization 80 %). However, penetration is still very low in major cereals, such as paddy and wheat (5 %). Cotton hybridization is almost reaching saturation, as *Bt* cotton is sown over 90% of the cotton-producing area in the country. Hybridizations in corn, paddy, and vegetables are estimated to drive the sector's growth during the forecast period.

Table1.1:Crop-wise penetration of hybrid seeds in India for the year 2018

Crop	**Hybrid Seed Penetration (Percentage)**
Cotton	90-95
Maize	50
Paddy	05
Vegetables	70

(Source: Morder Intelligence Analysis, DAC, Govt. of India)

1.2 Public Sector Seed Companies

Public sector involvement in the seed industry on a national scale began at the beginning of the "green revolution" with the establishment of the National Seed Corporation (NSC) in 1963, which was charged with the responsibility of promoting seed industry development from production through processing, storage and marketing, and establishing a system of quality control. Before that, the Indian seed industry was little developed apart from a small number of private companies dealing with high-value vegetable and flower seeds. In the initial years of operation, the NSC concerned itself mainly with foundation seed production and with seed certification after the enactment of the Seed Act in 1966. The State Seed Corporations (SSC) were established later with support from the World Bank, initially in nine states, and later expanded to cover 13 states, for the production and handling of seed in their respective states.

The role of public sector seed companies is now mostly confined to certified seeds of high volume, low-value segment of high-yielding varieties of cereals, pulses, and cotton with a limited presence in the high-value hybrid sectors of cotton, cereals, and vegetables. Wheat and paddy seed constitutes a major share of the seeds handled by them. The NSC and SSCs work closely together to coordinate procurement and sales prices as well as variety, demand, and supply. Their presence is considered necessary by the government to ensure the availability of reasonably priced seeds of major crops throughout the country and to make sure that private-sector seed companies do not enjoy and exploit unreasonable market power.

Using the breeder seeds supplied by government research institutes, the public sector seed companies produce foundation seeds on government farms or reliable, well-trained contract farms. These are further multiplied in contract farmer's fields next year as certified seeds for commercial distribution. If for some reason (drought or other weather calamities) the supply of certified seeds falls short of requirements, the public sector seed companies source commercial grain from the markets, upgrade the quality, and after proper testing distribute it as quality seeds.

1.3 Private Sector Seed Companies

The easing of government regulations in the late 1980s spurred enormous development within the seed industry by attracting several foreign seed companies to India. While some of them (like Cargill) entered through joint venture partnerships with Indian seed companies, some others already had a presence in India through affiliate companies (like Hindustan Lever).

They identified potential crops for hybridization and started research and development activities. Typically, they concentrated on hybrids, mainly corn, cotton, sunflower, vegetables, and flowers (more recently on rice), and they now account for a major share of commercial production of these seeds in India. The basic reason for the private sector's focus on these crops is that it involves low production volume and higher margins. Concomitantly, they had little interest in developing self-pollinated crops which involve high volume and low margin and are more prone to piracy in the absence of an effective Plant Variety Protection regime in India. Furthermore, there is no significant government intervention in the pricing of these hybrids, and the Indian seed regulations permit marketing of truthfully labeled seeds.

Currently, some 500 hybrids of field crops and vegetables are being marketed, as truthfully labeled seeds, mostly by private seed companies. The private seed sector now comprises some twenty or so large players (with sales turnover exceeding Rs. 200million), several medium companies (sales turn over between Rs. 200 million and 20million), and a large number of small, unorganized players (sales turnover less than Rs. 20 million) with local presence.

The private seed industry is now undergoing a transition following the Indian Government's focus on biotechnology research, as a means of increasing agricultural production and also driven by trends in the domestic and world seed market. Intensifying international competition, increasing R & D costs, and the complexity of biotechnology

have led to increased consolidation of the Indian seed industry with several of the large and medium companies merging or being taken over by multinational seed companies (MNC). Most large multinational seed companies now have their presence in India (either as a joint venture or with 100 % equity) with their main focus on biotechnology. These include Monsanto, Bayer Crop Science, Syngenta, Advanta, Hicks-Muse-Tate, Emergent Genetics, Tokita Seed Co, and Nunhems Zaden BV.

Seed industry is represented at the national level by two associations "The Seed Association of India" based in New Delhi and the "Association of Seed Industries" based in Mumbai. Recently, a third association called All India Crop Biotechnology Association (AICBA) was formed with members from mostly hybrid seed producers and Multinationals like Monsanto and Dow Chemicals.

1.4 Legal and Institutional Setup

The National Seed Corporation was established in 1963. The Government of India enacted the Seeds Act in 1966 to regulate the growing seed industry. The sixties were most eventful times for Indian agriculture, not only because of introduction of high-yielding cereals, particularly wheat and rice but also for many other positive developments related to seed such as, constitution of Seed Review Team, enactment of Seeds Act, 1966 and formation of National Commission on Agriculture. This was the period, during which the private sector significantly stepped into the seed business. The Seeds Act stipulated that seeds should conform to a minimum stipulated level of physical and genetic purity and assured percentage germination either by compulsory labeling or voluntary certification. Further, the act provided a system for seed quality control through independent State Seed Certification Agencies which were placed under the control of state departments of agriculture. The eighties witnessed two more important policy developments for the seed industry, *viz.* granting of permission to MRTP/FERA companies for investment in the seed sector in 1987 and the introduction of 'New Policy' on seed development in 1988. The 1991 Industrial Policy made a radical departure from the earlier policy on foreign investment. Under this policy seed production was identified as a 'high priority industry'. The new policy on seed development greatly liberalized import of vegetable and flower seeds in general and seeds of other commodities in a restricted manner and also encouraged multinational seed companies to enter the seed business.

1.5 Introduction to Crop

1.5.1 Cotton

Cotton is the most important commercial crop of our country contributing up to 75 per cent of total raw material needs of textile industry and provides employment to about 60 million people. India has the largest area under cotton cultivation with relatively low productivity primarily due to the large area under rain-fed cultivation with inadequate supply of inputs. Area wise, India ranks first in the world, whereas it ranks second in production next to China. Only in India, all the four spinnable fiber yielding species of *Gossypium viz., Gossypium hirsutum, G. barbadense, G. arboreum and G. herbaceum* are cultivated commercially. Cotton is as ancient as the human civilization exclusive cotton fabrics have become a status symbol and are becoming increasingly costlier. Cotton the 'White Gold' and 'King of Fiber's is a crop of prosperity and is considered to be an industrial commodity of worldwide importance. Cotton is the most vital crop of commerce to many countries such as USA, China, India, Pakistan, Uzbekistan, and Australia, few African and South American countries. About eighty countries of the world are growing cotton. Cotton occupies a pre-eminent place among cash crops touching country's economy at several points. Cotton occupies a place of pride being the prime supplier of raw material (85 %) for textile industry, which is one of the leading industries in the country. Cotton industries provides means of livelihood for about 250 million people in the world and about 60 million people through its cultivation, trade and industries in India (Basu, 1995). Commercially cotton is one of the best export-earning commodities in the country.

1.5.2 *Bt* Cotton

Bt cotton is genetically modified cotton crop that expresses an insecticidal protein whose gene has been derived from a soil bacterium called *Bacillus thuringiensis*, commonly referred as *Bt*. Many subspecies of *Bacillus thuringiensis* are found in soils and are in general known to be toxic to various genera of insects but safe to other living organisms. Agronomic benefits of *Bt* cotton are good control of bollworm species in different growing areas, significantly higher yield and boll retention compared to non-*Bt* cotton, reduction in the expense of insecticide application, additional revenue (Rs. 2,500-4,000/ acre) in farm income compared to non-*Bt* cotton, no adverse effect on any target insects or adjacent non-*Bt* cotton.

1.6 Global Scenario of *Bt* cotton in the World

Bt was first discovered by a Japanese scientist Ishiwata in the year 1901. *Bt* has been used as an insecticide for control of stored grain pests since 1938 in France and from 1961 as a registered pesticide in the USA and later in many other countries including India as sprays in cotton IPM programs to control insects. *Bt* toxins thus has several decades of proven selective toxicity to insect. Currently there are 67 recognized subspecies of *Bacillus thuringiensis* most of which produce spores and insecticidal proteins.

Cotton is attacked by several insect pests reducing the crop yield to a greater extent. The insect pests that attack cotton crop may be classified into sap sucking insects (aphids, jassids and whiteflies) or chewing insects (bollworms, leaf eating caterpillars *etc*.). Out of the total pesticides used in Indian Agriculture, about 45 per cent is sprayed on cotton crop alone. To reduce pesticide usage in cotton, several strategies like use of Genetic Resistance to insect pests, Integrated Pest Management (IPM), Insecticide Resistance Management (IRM) *etc*. are advocated. In recent times, *Bt* cotton technology is found to be one of the best strategies to manage bollworms, the most important pest of cotton.

The first commercial *Bt* cotton variety was released in USA by M/S. Monsanto (Bollgard), which contains Cry 1Ac gene of *Bacillus thuringiensis*. *Bt* cotton is commercially grown in several countries like China, Australia, Mexico, South Africa, Argentina, India, Indonesia etc. Worldwide the area under *Bt* cotton keep increasing year by year. Overall, about 12 per cent of the world cotton is now planted with genetically modified varieties/ hybrids (GMO) and ICAC has estimated that his may rise to 50 per cent in 5-7 years.

Global 2021-22 cotton area and production are projected as 32.90 million hectares (81.29 million acres) and 119.60 million bales of 217.72 kg each. Cotton productions in most of the major producing countries are expected to increase except China in 2021-22. India is projected to produce 28.50 million bales followed by China (26.80 million bales), United States (18.50 million bales), Brazil (12.50 million bales) and Pakistan (5 million bales).

1.7 Export and import of cotton from India

India's major export destinations in 2018-19 were Bangladesh, China and Pakistan. Countries such as Bangladesh, China, Pakistan, Vietnam and Indonesia are scaling up their cotton imports from India to meet the requirements of their export-focused garment

industries. It is observed that the average exports of cotton from India are 73.98 lakh bales from the year 2006-07 to 2020-21, whereas the average imports are 13.98 lakh bales. The compound growth rate of exports showed a negative and significant growth -1.46 per cent, whereas imports from India showed a positive and significant growth rate of 11.40 per cent. Even though, the growth rate of exports showed negative from 2014-15 to 2020-21 exports in absolute terms have increased from 57.72 lakh bales to 77.59 lakh bales whereas imports have decreased from 22.79 lakh bales to 11 lakh bales, signaling the better terms of trade for cotton. The data of export-import of cotton in India since 2014-15 to 2018-19 have been presented in Table 1.2.

Table 1.2: Export and Import of cotton from India during the year 2006-07 to 2020-21

Year	Exports		Imports	
	Quantity in lakh bales of 170 Kgs	Value in Rs. Crores	Quantity in lakh bales of 170 Kgs	Value in Rs. Crores
2006-07	58.00	5267.08	05.53	752.29
2007-08	88.50	8365.98	06.83	978.54
2008-09	35.00	3837.13	10.00	1377.80
2009-10	83.00	10270.21	06.00	1195.64
2010-11	76.50	14483.31	02.38	1709.11
2011-12	129.57	23488.59	07.51	1059.20
2012-13	101.43	17462.87	14.59	2057.77
2013-14	116.96	23153.24	11.51	2746.16
2014-15	57.72	9499.87	14.39	2848.50
2015-16	69.07	11434.80	22.79	4230.00
2016-17	58.21	11676.00	30.94	7268.00
2017-18	67.59	13976.71	15.80	4224.84
2018-19	43.55	9502.72	35.37	8339.26
2019-20	47.04	8731.32	15.50	3588.38
2020-21	77.59	17753.83	11.00	3482.72
Average	73.98	12224.99	13.98	3026.82
CAGR (%)	-1.46***	3.78***	11.40***	17.76***

(Source: Cotton Corporation of India, Maharashtra, India)

1.8 Present Scenario of Cotton in India

Cotton is an important crop for diversification of agricultural production and offers a good source of cash income to Indian farmers. However, still India suffers from relatively low productivity. This low productivity can be primarily attributed to the fact that nearly 65

per cent cotton area is under rain fed condition, where there is no control over distribution of water and outcome. Hence, production and productivity are subject to vagaries of weather/monsoon rain.

In India during 2020-21, production of cotton was 371.00 lakh bales cultivated under an area of 129.57 lakh hectares with a productivity of 487 kg per hectare (Cotton Corporation of India). According to 3rd advance estimates 2020-21, cotton cultivation in Gujarat was 22.51 lakh hectares cultivated under area with a productivity of 671.95 kg per hectare. In India, there are nine major cotton growing states which fall under three zones *viz.* the North Zone (Punjab, Haryana and Rajasthan), the Central Zone (Maharashtra, Madhya Pradesh and Gujarat), and the Southern Zone (Andhra Pradesh, Karnataka and Tamil Nadu). Nearly 65 per cent of the cotton crop is cultivated under rain fed conditions in the country. Nearly 2/3rd of the cotton production in India comes from the states of Maharashtra, Gujarat, Andhra Pradesh, and Telangana collectively known as Cotton Basket of India.

The data of area, production and productivity of cotton in India since 2001-02 to 2021-22 have been presented in Table 1.3. It indicates that, after introducing *Bt* cotton area, production and yield increased of cotton.

Table 1.3: Area, Production and Productivity of cotton in India during the year 2001-02 to 2021-22

Year	Area (Million hectares)	Production* (Million bales)	Yield (Kg/ha)
2001-02	09.13	10.00	186
2002-03	07.67	08.62	191
2003-04	07.60	13.73	307
2004-05	08.79	16.43	318
2005-06	08.68	18.50	362
2006-07	09.14	22.63	421
2007-08	09.41	25.88	467
2008-09	09.41	22.28	403
2009-10	10.13	24.02	403
2010-11	11.24	33.00	499
2011-12	12.18	35.20	491
2012-13	11.98	34.22	486
2013-14	11.96	35.90	510
2014-15	12.82	34.80	462
2015-16	12.29	30.01	415
2016-17	10.83	32.58	542

2017-18	12.43	34.89	500
2018-19	12.61	33.30	449
2019-20	13.47	36.50	460
2020-21	13.00	35.38	455
2021-22	12.10	36.21	462

(Source: Directorate of Economics and Statistics, Government of India)
*(Production in million bales of 170 kg each)

Table1.4: State wise area under cotton in India from 2020-21 to 2021-22

State	2020-21			2021-22		
	Area (lakh ha)	Area (lakh acres)	% to total area	Area (lakh ha)	Area (lakh acres)	% to total area
Maharashtra	42.25	104.40	33.28	39.41	97.38	32.93
Gujarat	22.79	56.32	17.95	22.51	55.62	18.81
Telangana	24.13	59.63	19.00	18.78	46.42	15.69
Rajasthan	06.68	16.51	05.26	07.08	17.50	05.92
Haryana	07.37	18.21	05.80	06.88	17.00	05.75
Others	23.75	58.69	18.71	25.00	61.78	20.89
All India	126.97	313.75	100.00	119.66	295.69	100.00

(Source: www.agricoop.nic.in)

During the year 2020-21, the highest area under cultivation was recorded for the Maharashtra (42.25 lakh ha) state followed by Telangana (24.13 lakh ha) and Gujarat state (22.79 lakh ha).

During the year 2021-22, the highest area under cotton cultivation was observed for the Maharashtra state (39.41 lakh ha) followed by Gujarat state (22.51 lakh ha) and shared 18.81 per cent of the total area of India under the cotton cultivation.

1.9 Cotton Status in North Gujarat

Banaskantha district was ranked 4th under cotton cultivation area after Ahmedabad, Sabarkantha and Patan. In case of production, Banaskantha district was ranked 1st in lint (616.35 kg/ha) and kapas (22.00 mound/Bigha) yield production from North Gujarat cotton cultivation area during the year 2020-21.

Table 1.5: District-wise Area, Production and Yield of cotton crop in North Gujarat during the year 2020-21

District	Area in Hectare	Yield		Crop in 170 Kgs Bales
		Lint Kg/Ha	Kapas Mound/Bigha	
Banaskantha	43,800	616.35	22.00	1,58,801
Patan	44,700	560.32	20.00	1,47,331
Mehsana	38,200	504.28	18.00	1,13,316
Sabarkantha	57,700	280.16	10.00	95,090
Gandhinagar	23,600	420.24	15.00	58,339
Aravali	32,400	504.28	18.00	96,111
Ahmadabad	1,13,400	336.19	12.00	2,24,260
Total	**3,53,800**	**429.204**	**15.32**	**8,93,249**

(Source: Department of Agriculture- Government of Gujarat)
(Note: 1 Hectare=4.12 Bigha, 1 Mound=20 Kg)

1.10 Profile of the Companies Majorly Involved in Marketing of *Bt* cotton Seed

1.10.1 Utsav Seeds Pvt. Ltd.

Utsav Seeds Company is located at Palanpur. Company is actively involved in research, production, processing and marketing of high-quality seeds of castor, pearl millet, cotton, cereals, pulses, oil seeds and vegetable seeds. Backed by technical expertise in the field of breeding for genetically improved hybrids. The company improve the productivity levels of farming community through quality seeds. With an instilled philosophy of "Seed of Gujarat". The company presents its wide range of cereals, pulses and vegetable seed portfolio.

Table 1.6: Details of Utsav Seeds Company

Name of Company	Utsav Seeds Pvt. Ltd.
Managing Director	Mr. H. G. Patel
Establishment Year	2013
Location of Company	Near Dr. Ambedkar Bhavan, Gurunanak Chowk, Palanpur-385001, Gujarat.
Contact Number	9426578751
GST No.	24AABCU6683M1ZT
Mail Id	Utsavseeds0077@gmail.com

(Source: www.utsavseeds.com)

- **Establishment**

➢ Initially started as Utsav Seeds Farm at Jodnapura, District- Banaskantha in the year 2003, then firm was renamed as Utsav Seeds Pvt. Ltd., from 2013. The company is actively engaged in seed industry since last 12 years.

- **Mission of the company**

➢ To bring the best of science into the Indian fields, it is the socio-economic vision of the company to empower the farmers with the best of seeds and to enhance the agricultural productivity of our country.

- **Vision of company**

➢ Innovativeness and incorporation of new technologies for simplified and eco- friendly farming for better productivity, adaptability and sustainability of crops is the vision of Utsav Seeds. They hope to do constant and dedicated efforts and an uncompromising attitude towards quality of the product and being responsive to needs of the Indian and abroad farmer.

- **Products**

➢ Utsav Seeds Pvt. Ltd. is actively engaged in developing high yielding superior 30 hybrids with better food quality for grain production. Their product quality would be the testimonial for farmer's acceptances

Table1.7: Different varieties of various crops produced by Utsav Seeds Company

Name of Crops	**Name of Varieties**
Castor	Jay,CastorGreen-11,Utsav-333,Raj
Bajra	Utsav-11, Utsav-41,Utsav-61
Mustard	Utsav-21, Utsav- 51,Utsav-Raj-31, Thinguji-100
Sesamum	Utsav –Siddhi
Maize	Utsav – 3551
Cumin	Utsav – Vrunda
Green gram	Utsav – Vinayak
Black gram	Utsav – Urja
Gum guar	Utsav–2,Utsav-Kanak
Wheat	Utsav –Varun
Groundnut	Utsav-Avinash
Fodder Bajra	UTSAV–Judwano:1,UTSAV–Evergreenno.1,UTSAV SSG

(Source:www.utsavseeds.com)

Table 1.8: Different varieties of *Bt* cotton seed produced by Utsav Seeds Company

Name of varieties	Characteristics
Siddhi-61 Bg II	Duration : Late Plant habit : Tall, open, indeterminate Ball weight (g) : 3.0-5.5 Staple length (mm) : 29.5-32.5 Ginning (%) : 34.0-38.0
Siddhi-51 Bg II	Duration : Medium Plant habit : Tall, semi open, determinate Ball weight (g) : 3.1-5.0 Staple length (mm) : 29.5-33.5 Ginning (%) : 36.0-40.0
Siddhi-61+Bg II	Duration : Late Plant habit : Tall, open, indeterminate Ball weight (g) : 5.0-6.0 Staple length (mm) : 29.5-33.5 Ginning (%) : 32.0-36.0
Siddhi-51 Gold Bg II	Duration : Medium Plant habit : Very tall, open, determinate Ball weight (g) : 5.5-6.0 Staple length (mm) : 29.5-33.5 Ginning (%) : 30.0-33.0

(Source: www.utsavseeds.com)

1.10.2 Rasi Seeds (P) Ltd.

Rasi Seeds (P) Ltd. has made rapid advance from seed production and supply ventures to a commendable position in Research and Development and transformed as Rasi Seeds (P) Ltd. in 1986. Having 600 qualified workforces we enthusiastically serve over 4 million Indian farmers.

Rasi Seeds has been recognized as the leader in cotton hybrids, besides hybrids in maize, pearl millet and vegetables. When the company launched its first research cotton hybrid, RCH 2 in 1992, the agricultural industry was overwhelmed by the tremendous yield of this hybrid.

This has been achieved by the excellent guidance of Mr. R. Krishnamurthy, a well-known cotton breeder in India. RCH 2 cotton hybrid is one among the few proprietary research hybrids that has been notified by the Government of India.

Table 1.9: Details of Rasi Seeds Company

Name of Company	Rasi Seeds Pvt. Ltd.
Managing Director	Dr. M. Ramasami
Establishment Year	1986
E-mail Id	customercare@rasiseeds.com
Location of Company	Rasi Enclave, Green Fields 737 C, Puliyakulam Road, Coimbatore – 641045, Tamil Nadu, India
Contact Number	9944686531
Crops	Castor, Pearl millet, Cotton, Cereals, Pulses, Oil seeds and Vegetable seeds

(Source: www.rasiseeds.com)

- **Mission of the company**

➢ To revolutionize the field of agriculture through research and development with integrated viable technologies.

➢ To consistently upgrade the economic and technological aspects of the farming community.

➢ To be a vibrant force in the agri based industries and facilitate sustainable prosperity for all its participants.

- **Vision of company**

➢ The consummation of our enterprise as a local leader and a global competitor.

➢ The culmination of an enterprise endorsed with technological reference for agriculture-based industries.

Table 1.10: Different varieties of various crops produced by Rasi Seeds Company

Name of Crops	**Name of Varieties**
Wheat	Prabal, Pratap, Spark Gold, Thunder
Bajra	1836, RBX002, RBX001, 1818, 1827
Mustard	1604, Karuna Gold, Jalsa, Bullet, Anmol
Maize	4558, 4595, 3499, 5454, 3033, Sx-38
Paddy	Heera, Laxmi, Padmini, Poonam Gold, Hy. Paddy-RRX 117, Hy. Paddy-RRX 138, Hy. Paddy-RRX 4007, Hy. Paddy-RHR 333

(Source: www.rasiseeds.com)

Table1.11: Different varieties of *Bt* cotton seed produced by Rasi Seeds Company

Name of varieties	Characteristics
Alto *Bt* (RCH 377 *Bt*)	Duration : Medium Plant habit : Medium, Tall, Bushy Ball weight (g) : 4.5-5.0 Staple length (mm) : 31.0-31.5 Ginning (%) : 33.0 Cotton Zone : Central
Sai *Bt* (RCH 118 *Bt*)	Duration : Medium Plant habit : Medium, Tall, Open Ball weight (g) : 5.0-5.5 Staple length (mm) : 30.2 Ginning (%) : 35.9 Cotton Zone : Central
Rasi 2 *Bt* (RCH 2 *Bt*)	Duration : Medium Plant habit : Medium, Tall, Bushy Ball weight (g) : 4.5-5.0 Staple length (mm) : 30.2 Ginning (%) : 34.9 Cotton Zone : South and Central
RCH 515 BG II	Duration : Medium Plant habit : Tall, Open Ball weight (g) : 4.0-4.5 Staple length (mm) : 27.0-28.0 Ginning (%) : 37.2 Cotton Zone : Central
RCH 530 BG II	Duration : Late Plant habit : Tall, Open Ball weight (g) : 5.0-5.5 Staple length (mm) : 32.8 Ginning (%) : 34.5 Cotton Zone : Central

(Source:www.rasiseeds.com)

1.10.3 Akshay Seed Tech Company

Akshay Seed Tech Company has commenced Research and Development work in collaboration with an Israeli Seed Company Hazera Ltd. with prime objective to develop superior high yielding of insect-pest and disease resistant genotypes (varieties) of cotton and vegetable crops.

Akshay Seed Tech Company is pioneer in the Indian seed industry who brought seed film coating technology from Netherland based multinational company Incotec Ltd. Now, it has become popular among all seed companies due to realization of its beneficial effect and wide acceptance by Indian farmers. Since from its beginning company has developed nearly 75 products in 18 crop species including cotton, vegetables, oilseeds,

cereals, pulses and spices with the application of various most advanced plant breeding methods.

Table 1.12: Details of Akshay Seed Tech Company

Name of Company	Akshay Seed Tech Company
Managing Director	Shri. Natubhai G. Makadia
Establishment Year	1992
E-mail Id	info@akshayseed.com
Location of Company	31 dada estate, sarkhej sanand cross road, sarkhej, ahmedabad - 382210
Contact Number	9825429589
Crops	Castor, Pearl millet, Cotton, Cereals, Pulses, Oil seeds and Vegetable seeds

(Source: www.akshayseed.com)

- **Vision and Mission of Company**

- Provides healthy and vigorous seeds
- Provides superior quality seeds at affordable price to strengthening our growers with best innovation and technology
- Well timed supply of seeds at door step of growers through our distributors channel
- Develop early maturing varieties /hybrids
- Develop varieties /hybrids with high oil content in oil seeds crops
- Develop geographical location specific breed
- Breeding crops for high input responsive

Table 1.13: Different varieties of various crops produced by Akshay Seed Tech Company

Name of Crops	**Name of Varieties**
Groundnut	Akshay Amber, Akshay-99, Akshay Sweta
Mung bean	Akshay Bold
Urd bean	Akshay Black Gold
Pigeon pea	Akshay Hazari, Akshay Varsha, Akshay-1515
Cowpea	Akshay-102
Okra	Akshay Komal, Akshay Hira
Cluster bean	Akshay-7

(Source: www.akshayseed.com)

Table 1.14: Different varieties of *Bt* cotton seed produced by Akshay Seed Tech Company

Name of varieties	Characteristics
PRCH 102 *Bt*	Fiber quality : Superior Fiber length (mm) : 30.5-31.0 Ginning (%) : 37.0 Fiber strength (g/tax) : 38.2 Yield (q/ha) : 35-40
Rudra *Bt*	Fiber quality : Excellent Fiber length (mm) : 31.5 Ginning (%) : 36.5 Fiber strength (g/tax) : 33.5 Yield (q/ha) : 40-45
PRCH-31 *Bt*	Fiber quality : Good Fiber length (mm) : 27.0-28.0 Ginning (%) : 37.0 Fiber strength (g/tax) : 31.0-32.0 Yield (q/ha) : Rain fed:15–20 Irrigated:20–25

(Source: www.akshayseed.com)

1.10.4 Western Agri Seeds Ltd.

Western Agri Seeds Ltd. is a Limited Seeds Company located at Gandhinagar, Gujarat. It is registered under Companies Act 1956. It is a research based Agri Scientific Seed Company. It is one of the leading seed company with research base in Gujarat. It is the first an ISO-9001-2008 certified seed company in the state of Gujarat.

The prime activities of company are to develop new seed varieties of various crops and commercialize the research varieties and hybrids through seed production and marketing. Research and development division of the company is recognized by Department of Science and Industrial Research (DSIR), Ministry of Science and Technology, Government of India, New Delhi, since 2000.

Table1.15: Details of Western Agri Seeds Company

Name of the Company	Western Agri Seeds Ltd.
Establishment Year	1995
Managing Director	Mr. N. P. Patel
Marketing Manager	Mr. P. D. Patel
Contact Number	079-23212427, 079-23211891
E-mail Id	info@westernagriseeds.com
Website	https://www.westernagriseeds.com
Location of Company	802/11, Western House, G I D C Engg Estate, Western Road, Sector-28, Gandhinagar, Gujarat

(Source: - www.westernagriseed.com)

- **Agricultural extension activities**

- WASL participates in Agricultural Fairs organized by Government of Gujarat during Krushi Mahotsav every year since 2005
- WASL also participates in Agricultural Fairs organized by NGO and religious trusts in Gujarat

- **Mission of the Company**

To constantly innovate and improve crop production by providing quality seed to farmers by maintaining excellent genetic purity and germination and also keeping ourselves vigilant on purity of the seed. Company provides scientific and improved cultivation technology of the crop to the farmers through exhibition and also direct demonstration on the farm to enhance the crop production.

- **Vision of Company**

Being pioneer in seed production in the country and remain national level supplier of quality seed of oil seeds, cereals, pulses, spices and fiber crops.

Table 1.16: Different varieties of various crops produced by Western Agri Seeds Company

Name of Crops	**Name of Varieties**
Bajra	WESTERN-M-45, WESTERN- M-46
Castor	GCH-4, GCH-7
Cumin	WESTERN-C 45
Coriander	WESTERN SUGANDHA, WESTERN SWAD
Green Gram	WESTERN PROTO, WESTERN SHURVIR
Wheat	WESTERN DOUBLE ONE

Cotton	WESTERN KASTURI 666 BGII
Soya bean	WESTERN 101
Okra	WESTERN-007
Urad	WERERN AMUL
Mustard	WESTERN VEER

(Source: - www.westernagriseed.com)

Table1.17: Different varieties of *Bt* cotton crop produced by Western Agri Seeds Company

Name of varieties	Characteristics
Western Kasturi-555	Duration : Medium Plant habit : Tall, semi open, determinate Ball weight (g) : 3.1-5.0 Staple length (mm) : 29.5-33.5 Ginning (%) : 36.0-40.0
Western Kasturi 666 BGII	Duration : Medium Plant habit : Tall, semi open, determinate Ball weight (g) : 3.1-5.0 Staple length (mm) : 29.5-33.5 Ginning (%) : 36.0-40.0
Western Nirogi 108 BGII	Duration : Late Plant habit : Tall, open, indeterminate Ball weight (g) : 5.0-6.0 Staple length (mm) : 29.5-33.5 Ginning (%) : 31.0-35.0
Western Nirogi-151	Duration : Medium Plant habit : Very tall, open, determinate Ball weight (g) : 5.0-5.5 Staple length (mm) : 29.5-33.5 Ginning (%) : 31.0-35.0
Western Nirogi-51	Duration : Medium Plant habit : Very tall, open, determinate Ball weight (g) : 5.0-5.5 Staple length (mm) : 29.5-33.5 Ginning (%) : 31.0-35.0

(Source: - www.westernagriseed.com)

1.10.5 Ankur Seeds Pvt. Ltd.

Ankur Seeds Pvt. Ltd. was founded in the year 1976 by three visionary agriculturists: Shri. Ravi Kashikar, Shri. Madhav Shembhekar, Late Shri. Laxman Aurangabad karably supported by Shri. Makar and Saoji, Late Shri. Vijay Kashikar, Late Shri. Balwant Umalkar.

Shri Ravi Kashikar, the chairman rightly observes and says that “Ankur is not an organization, it is virtually a movement”. Indeed so, the pioneering work initiated and

continued by this vidarbha based company has brought prosperity to millions of farmers in many parts of country. While the founder directors continue to act as guide, the next generation has ably taken over responsibilities at technological, managerial, organizational, and institutional level to manage and control departments like, production, marketing and research. Ankur Seeds Private Limited is poised for continued and accelerated growth and development towards sprouting and germination of seeds of prosperity for millions of farmers in the years to come.

Since Ankur Seed's inception, the focus was on R & D and exercising quality control to create a company that will be recognized by farmers across India for delivering superior hybrid seeds. This dedication has paid rich dividends as we have earned respect and trust of millions of farmers across India and beyond.

Table 1.18: Details of Ankur Seeds Company

Name of the Company	Ankur Seeds Pvt. Ltd.
Establishment Year	1976
E-mail	info@ankurseeds.com
Location of Company	27, New Cotton Market Layout, Nagpur - 440018, Maharashtra.
Phone No.	1800-123-2152
Website	www.ankurseeds.com

(Source: www.ankurseedspvtltd.com)

- **Vision of the company**

➢ We breed for fulfilling all farmers need for seed

- **Mission of the company**

➢ Continue investing in the best and most advanced technologies to keep in pace with the changing needs and demands of the farmers

➢ To create awareness regarding benefits of high yielding hybrids over local varieties

➢ We strive to serve seeds for sustainable, economical and marketable produce and reach new horizons

➢ Our ultimate aim is to satisfy our farmers to maximum and retain trust of farmers

Table 1.19: Different varieties of various crops produced by Ankur Seeds Company

Name of Crops	Name of Varieties
Bajra	HY BAJRA–045, HY BAJRA 2239
Maize	HY MAIZE ARUN, HY MAIZE ADITYA
Paddy	HY PADDY 7042,HY PADDY 7434, HY PADDY 13555, HYBRID PADDY 7576
Pigeon pea (Tur)	TUR PRABHA, TUR CHARU, TUR 1115
Soybean	PRABHAKAR, AGRESAR
Wheat	KEDAR
Cowpea	LOBIA GOMATI, LOBIA KETAKI, LOBIA HARI, LOBIA VU -5
Brinjal	HY BRINJAL ARBH-786, HY BRINJAL KIRTI, HY BRINJAL ARBH 1095

(Source: www.ankurseedspvtltd.com)

Table 1.20: Different varieties of *Bt* cotton crop produced by Ankur Seeds Company

Name of varieties	Characteristics
Ankur-3034-BG II	Soil type : Medium and heavy soil Plant habit : Tall, semi-spreading, indeterminate Ball weight (g) : 5.0-5.5 Staple length (mm) : 29.0-30.0
Ankur-jai-BG II	Soil type : Heavy soil Plant habit : Tall, semi-spreading and more sympodia Ball weight (g) : 5.0-5.5 Staple length (mm) : 29.0-30.0
Ankur- Suwarna BG II	Soil type : Medium soil Plant habit : Tall, Semi-spreading, indeterminate Ball weight (g) : 4.7-5.0 Staple length (mm) : 31.0-35.0
Ankur-3244 BG II	Soil type : Medium and heavy soil Plant habit : Tall, semi-spreading, indeterminate Ball weight (g) : 5.0-6.0 Staple length (mm) : 29.0-30.0
Ankur-3224 BG II	Soil type : Medium and heavy soil Plant habit : Tall, semi-spreading, indeterminate Ball weight (g) : 5-5.5.0 Staple length (mm) : 29.0-30.0

(Source: www.ankurseedspvtltd.com)

1.11Project Title and Objectives of the Study

- **Title of Study**

"Marketing Status and Dealers Outlook for *Bt* Cotton Seed Companies in Banaskantha District"

- **Objective**

1. To study the socio-economic profile of *Bt* cotton growers
2. To analyze the market share of different *Bt* cotton seed companies
3. To study the buying behavior of *Bt* cotton growers
4. To find out major promotional measures followed by *Bt* cotton seed companies
5. To know the dealers outlook about *Bt* cotton seed companies in the study area
6. To study the constraints faced by the *Bt* cotton growers and dealers in the marketing of *Bt* cotton seeds

1.11.1 Practical utility of project

The study is helpful to understand the market prospects of *Bt* cotton seeds by different companies in Banaskantha District. The project is helpful for companies to understand the preference of promotional activities by dealers and *Bt* cotton growers. The study is also helpful to understand the factors affecting the purchasing behaviour of *Bt* cotton growers. In addition, it is beneficial to analyze the improvement in existing strategies dealing with the selling of *Bt* cotton seeds and to explore new ideas to resolve the problems at dealers and farmers level.

II. REVIEW OF LITERATURE

The review of the past studies helps to understand methodology of the research work, types of data required, presentation and interpretation of results. A brief review of studies, which have direct or indirect bearing on the objectives of the present study is presented in this chapter. Commensurate with the objectives of the present study the available literature will refer and briefly will be presented under following heads.

2.1 Socio-economic profile of *Bt* cotton growers

2.2 Market share of different *Bt* cotton seed companies

2.3 Buying behavior of *Bt* cotton growers

2.4 Promotional measures followed by *Bt* cotton seed companies

2.5 Dealers outlook about *Bt* cotton seed companies in the study area

2.6 Constraints faced by the *Bt* cotton growers and dealers in the marketing of *Bt* cotton seeds

2.1 Socio-economic profile of *Bt* cotton growers

Wang *et al.* (2008) reported that the farming of *Bt*-cotton increased the cotton growing area as well as farmer's income. The cotton net margin in one cropping cycle came out to be higher than the combined net margins of wheat and corn, in two cropping cycles. The income from the *Bt* cotton farming played a significant role in the investment on education, leisure and health care.

Morse and Bennett (2008) analyzed livelihood impacts of the adoption of *Bt* cotton in South Africa, most of the 88.00 per cent of respondents reported a higher income from *Bt* compared to non-*Bt* varieties previously grown by them, and this higher income was used primarily for greater education of their children (76.00 %), more investment in growing cotton (46.00 %), repaying debt (28.00 %) and investment in other crops (20.00 %). These benefits of *Bt* adoption appeared widespread regardless of gender or farm size. The impacts of *Bt* cotton on household livelihoods in South Africa, found that the higher income from *Bt* cotton plays a significant role in improving the well-being of the household, the members of which utilize the increased income on children's education, investment in cotton crops, repayment of loans, and improvements in cultivated land.

Manjunath and Kiresur (2011) assessed the performance of *Bt* technology and its impact on farming community in Northern Karnataka. On an average, per farm area under

Bt cotton was 2.21 ha, accounting for 66 per cent of the total landholding. With a yield of 24 q/ha, *Bt* cotton has registered 31 per cent higher yield and 15.10 per cent higher net return over non-*Bt*, the net additional benefit was reported 18429/ha. Seed cost, yield of *Bt* cotton and cost of plant protection have been found to greatly influence the probability of adoption of *Bt* cotton. Non-availability of quality seeds and in required quantity has been identified as the most important factors constraining *Bt* technology adoption.

Dalvi *et al.* (2013) conducted a comparative study between *Bt* and non *Bt* cotton growers in Bharuch district of Gujarat state. Ex-post facto research design and proportionate random sampling technique was used. The study was consisted of 75 *Bt* and 75 non *Bt* cotton growers as respondents. The *Bt* cotton growers, social participation and extension contact were found positively and significantly correlated with knowledge level, where as age, education, occupation, family size, family income and land holding were non-significant In case of non *Bt* cotton growers, land holding and extension contact were founded to be positively and significantly correlated with knowledge level, whereas, age, education, occupation, family size, family income and social participation were non-significant.

Kumar (2015) studied the socio-economic characteristics of the *Bt* cotton cultivators as well as their knowledge about *Bt* cotton. Most of the *Bt* cotton growers were of middle age group, higher secondary educated having small family, members of any organization and three forth of them had medium mass media exposure, extension participation. Majority of the *Bt* cotton grower had farming as main business and landholding above three hectares.

Rajput and Chinchmalatpure (2016) conducted a study in Jalgaon and Dhule district of North Maharashtra, with a random sample of 175 *Bt* cotton growers, to measure the level of knowledge of *Bt* cotton growers and to understand the relationship between selected characteristics of *Bt* cotton growers and their extent of adoption. The results indicated that majority of the respondents had medium (53.7 %) level of adoption towards cultivation practices of *Bt* cotton. The analysis of correlation revealed that variables *viz.*, education, area under *Bt* cotton, annual income, socio-economic status, social participation, scientific orientation, cosmopoliteness, extension contact and knowledge had positive and significant influence on their level of knowledge.

Dave and Mishra (2018) studied demographic profile of farmers in selected districts of Gujarat. Through purposive sampling technique total 320 respondents from 8 districts were selected. Descriptive statistics was used to present the findings. Tabular analysis was

used to meet the objective of the study. The study revealed that majority of farmers held land below one ha and was belonged to the income group below Rs. one lakh.

Satashia and Pundir (2018) studied the performance regarding *Bt* technology and its impact on farming community have been assessed in middle Gujarat based mainly on primary data using tabular analysis. The farmer's perceptions on the impact of *Bt* cotton technology on various dimensions were ascertained and analyzed in terms of "positive", "neutral" and "negative". The impact of *Bt* cotton, as perceived by the farmers, has been in terms of enhanced yield; reduced pest and disease incidence; increased income, employment, education and standard of living; and reduced health risk. To foster adoption, availability of quality and quantity of *Bt* cotton seed to farmers needs greater attention of development agencies, while researchers' attention is called for incorporating resistance/tolerance to *Spodoptera* and pink bollworms. The major production, marketing and economic constraints faced by the *Bt* cotton growers were non-availability of agricultural labor during peak seasons, high incidence of attack from sucking insect-pests and bollworms, fluctuation in the market prices, lack of transportation facilities, high cost of quality *Bt* seeds and high cost of fertilizers and pesticides.

Desai and Shah (2019) studied demographic profile of agriculture input buyers in Banaskantha district of Gujarat. The sample of 20 famers was randomly selected from 5 talukas, resulting in a total 100 farmers. The data for the study was collected by pre-structured questionnaire. Tabular analysis was applied to achieve the objectives of the study. They found that, majority of the respondents had land holding more than 2 ha, an annual income of more than Rs. 3 lakhs, an age of above 25 years and an education up to 12^{th} standard.

Jadav *et al.* (2020) conducted a study to know the knowledge level of *Bt* cotton growers about integrated pest management practices in Rajkot district of Saurashtra region with 150 *Bt* cotton growers. Finally, 52 statements were produced towards *Bt* cotton growers for measuring his knowledge about IPM practices. Majority (66.00 per cent) of *Bt* cotton growers were from medium knowledge followed by high level of knowledge about integrated pest management practices in *Bt* cotton. In case of association between knowledge level of *Bt*. cotton growers and their personal, socio-economic characteristic, out of seven socio-economic characteristics, age was negative and significant associated with the knowledge of *Bt*. cotton growers. While size of land holding was non- significant related with knowledge, remaining all characteristics like, education, annual income, cotton yield index, training received, extension participation and scientific orientation were

positive and significant association with the knowledge of *Bt*. Cotton growers. Therefore, due weight age given to the above positive and significant related characteristic of cotton growers to achieve higher knowledge about IPM practices and better management of pest resulting higher income of cotton growers.

Sharma *et al.* (2021) conducted a study with total sample of 120 respondents were selected from Jind district of Haryana state to assess the adoption level, factors affecting adoption level and cropping pattern of growing *Bt* cotton. Most of the respondents were belonging to 35-50 years of age group and were educated up to secondary level. Majority of respondents (71.67 %) were having medium adoption level. The significant association between socio-economic variable like size of land holding, annual income, mass media exposure of the family with adoption level of *Bt* cotton farmers were observed.

Priyadarshini *et al.* (2022) conducted an investigation in the Bhadradri Kothagudem area of Telangana. The study identified the socio economic characteristics of the cotton growers. Most of the growers of cotton (38.33 %) were belonged to the middle age (36 to 58), the increased percentage of these (43.33 per cent) have been trained up to middle level. The increased percentage (62.40 %) had a small landholding size (1 to 2 hectares). The higher percentage of cotton growers (43.33 %) possessed high knowledge of cotton production practices and had a medium level of farming experience (69.16 %). The large number of respondents belongs to joint families (50 %), while 33.33 per cent of growers fall just under the level of low annual earnings (50,001 to 1,00,000/-). It was observed that only 37.50 per cent of cotton growers were solely engaged in agriculture as their primary occupation.

2.2 Market share of different *Bt* cotton seed companies

Datt (2001) studied *Bt* cotton seeds into India in 1996 from Monsanto Enterprise, which owns a 26 per cent share in Mahyco Seeds and also reported the market share of Monsanto was only 20,000 packets of cotton seeds in the year 2002 that delivered great results and dubious players started mushrooming.

Singh and Sidhu (2006) studied the farmers obtained about 34 per cent of the American cotton seed from the authorized seed dealers, about 24 per cent from the village shopkeepers and about 14 per cent from the commission agents. The percentage share of the sources like Punjab Agricultural University, State Department of Agriculture, relatives, friends and private seed companies were 5.08, 2.41, 3.33 and 0.14, per cent respectively. None of the selected farmers used self-retained seed during year 2004-05.

Murugkar *et al.* (2007) examined the structure of India's cotton seed market and factors that underlie the changes. Study found that the private sector has grown rapidly in the last decade. As the proprietary hybrid seed market has grown, more private players have come into the market, eating away at the share of market leaders. With *Bt* cotton, the seed industry encompasses a seed market as well as a technology market. However, the market structure is not frozen because of diffusion from illegal seeds, competition from alternative gene suppliers and changing regulatory practices.

Anonymous (2008) reported Rasi Seeds has released 25 high yielding Bollgard cotton hybrids. It commands a market share of 25 per cent, which is equivalent to 5 million packets out of the total 20 million packets of the seeds produced and distributed in the country. The produce of Rasi Seeds is used by farmers in the cotton growing belts of Maharashtra, Gujarat, Madhya Pradesh, Punjab, Haryana, Rajasthan, Karnataka, Andhra Pradesh and Tamil Nadu covering over 5 million acres.

Pandya and Pandya (2008) studied on the marketing structure in the wake of the development of the cotton seed market and the cotton economy in a selected area of the study. Data was collected from both primary and secondary sources. Total 8 villages from four tehsils were selected based on highest cotton area under cultivation. A total 16 dealers and 8 retailers were selected as sample size from selected study area. Gini co-efficient ratio was found to be 0.62 which implies that there was significant inequality in the marketing of *Bt* cotton seeds in the study area and hence a high level of concentration was present in handling the trade. This exhibits features of imperfect market of monopolistic nature. Lorenz indicates that more than half of the dealer's (53.2 %) account for 27.7 per cent of the total quantity sold, which indicates inequality in distribution.

2.3 Buying behavior of *Bt* cotton growers

Saraf (2013) conducted a study in Sri Ganganagar district to analyze the farmers buying behavior of cotton seeds and to examine the brand loyalty and store loyalty of the farmers. Data was collected from 30 retailers, 10 company's executives and 80 farmers of two tehsils. Data was analyzed by using different statistical tools. Thirty-four companies have 58 cotton brands out of that two were MNCs and remaining were domestic companies. Trade inequality at retailer level was highest for brands of Indian cotton varieties followed by brands of *Bt* cotton and least in brands of American cotton variety. Half of the *Bt* cotton market is dominated by the Shree Ram Bio seeds where as American cotton variety seeds market is in the stage of perfect competition. brands of *Bt* cotton were

more preferred over non *Bt* brands. The major factors influencing brand preference were high yield, peer group influence and disease and pest resistance. The brand loyalty of the farmers was weak because all brands have similar productivity, disease/pest resistance and retailers influence over preference of brands. Most of the farmers are found to be store loyal because of factors like timely availability of desired seeds at the store and long-term relationship with the retailer.

Benakatti *et al.* (2014) conducted a study to know the farmers buying behavior of cotton seeds in Northern Karnataka. A multistage random sampling technique was adopted as appropriate sampling procedure and a total of 270 farmers were selected for the study. The popularity of the *Bt* cotton was found to be popular in Haveri as compared to Dharwad and Gadag district. In the case of non-*Bt* cotton, the purchase behaviour showed the popularity of adoption in Dharwad and Gadag districts as Jayadhar cotton seed occupied the major position (42.20 %) among the other types of non-*Bt* cotton available in the market. Nearly 50 per cent of the farmers opined about their preference to private dealers for their purchases for availability, timely nearness of the stores, quality seed material and the technical advice received from private dealers. The KSDA was popular in Dharwad district due to the better services provided by them. However, the farmers were also approaching crops in Gadag district as the co-operatives are performing well in the district with better services in time supply and adequate quantities. The farmers of Haveri clarified to private dealer due to almost 100 per cent adoption of *Bt* cotton.

Pandey (2016) studied the factors influencing buying behavior of hybrid paddy seed growers. Total 155 farmers were selected from 27 blocks of six sample districts of Bihar state which includes Banka, Bhagalpur, Katihar, Munger, Purnea and Samastipur. Structured interview schedule were used for collection of data. The using frequencies, percentages, garrets ranking and factor analysis, were carried out. The researches revealed that, majority of the farmers were aware of hybrid paddy seeds due to promotion of dealers/retailers.

Ravi *et al.* (2016) conducted the estimation of buying behavior of cotton growers of different size groups for the purchase of cotton seed in middle Gujarat. A multi-stage sampling design was applied for the study and required data were collected from 120 cotton growers (26 marginal, 19 small, 30 medium and 45 large) spread over 12 villages of six talukas, covering three cotton growing districts of the Middle Gujarat during 2011-12. The major methods employed for the analysis were linear multiple regression model and Garrett ranking technique. Brand loyalty among cotton seed growers were influenced by

price of the seed, peer group influence, brand image, advertisement and availability of the seed. The most important constraint viewed by the cotton growers was non-availability of the branded seed demanded in desired quantity followed by non-availability of the branded seed in time.

Sirisha and Babu (2017) studied the buying behavior of farmers and to identify the factors that influence their buying behavior in the area of Guntur district, Andhra Pradesh. Four stage random sampling technique methods was used and analyzed the regression analysis, ANOVA and Post hoc test. It is identified that the factors, Brand image, quality, service, product features influences the buying behavior of farmers, and the factors price, promotional activities, farm size and financial status are least considered by the farmers. ANOVA interprets that there is significant difference between groups and post hoc test interprets that there is significant difference in age groups, education and income.

Sidhu (2017) studied the different seed use practices and farmers buying behaviour in Punjab. The results of the study indicated that the farmers judged the purity and quality of seeds purchased from public seed agencies, research organizations, Government departments, private seed companies, dealers *etc*. by their past experience and reputation of agencies. The results also indicated that among the institutions agencies, Punjab Agricultural University had the highest reputation among the selected farmers in Punjab.

Kulkarni *et al.* (2017) conducted experiment in Nanded district of Maharashtra, which is one of the largest cotton producing state in India. Using a structured questionnaire as instrument of measurement, primary data were collected and analyzed ordinarily through Garrett ranking using the mean score of each variable. It was also observed that timely availability of seed, lack of scientific knowledge, technical guidance about crop production and selection of varieties were the main problems reported by the majority of farmers while purchasing of cotton seed. Mallika and MRC 7351 were most preferred cotton seed brands by farmers as these are pest resistant and high yielding varieties suitable to cultivate in the study area and are recommended by retailers and fellow farmers in the study area.

Nagesh *et al.* (2018) studied impact of training programme on knowledge, perception and attitude of stakeholders towards Bhoochetana programme. The Raichur, Koppal and Bellary districts were purposively selected based on their maximum area under cotton cultivation. The random sampling procedure is being used to identify 180 beneficiaries. The ex-post-facto research design is used for the study. It was observed that 38.89 per cent of beneficiaries belonged to medium adoption category, followed by low

(27.22 %) and high (33.89 %) adoption categories. Majority (83.33 %) of the beneficiaries adopted Mallika followed by Bunny (54.44 %), Vikram (52.78 %) and Dr-Brent (47.27 %). Majority (80.00 %) of the beneficiaries had shown the crop as per the recommended time, while only 20.00 per cent of beneficiaries had delayed the sowing of the crop. Over two fifth (45.56 %) of the beneficiaries partially adopted the recommended management practices for sucking pests like leaf hopper, thrips and mily bugs followed by full (32.33 %) and no adoption (22.22 %). Education, farming experience, land holding, extension contact, risk orientation and management orientation had positive and significant relationship with the adoption of recommended practices in *Bt* cotton crop.

Singh and Singh (2019) conducted a study in Rajkot district. Six talukas and 42 villages were selected purposively from Rajkot district. Both, primary and secondary data were used. The primary data were collected on structured schedules through personal interview method. Tabular analysis Exploratory Factor analysis and Garrett's Ranking Technique were used to analyze the data. The study revealed that 66 per cent of the total variance in the data set was explained by five factor solution. These factors were production, promotion, retailer's suggestion, quality, and price. The demonstration was found as the best promotional tool followed by after sales service, farmer's meeting, campaigning, retailer's suggestion, leaflets, videos, posters, exhibition, and wall painting.

Ramaswarny and Chandrashekaran (2019) examined factors influencing cotton seed buying behavior of farmers in Kamraj district of Tamil Nadu, India. Sixty cotton growers were selected from four villages. Factors influencing farmer's purchase of cotton seeds were source of purchase, varietal preference, seed quality, source of information about the supply of cotton by different agencies and brand preference. Dealers with credit facility, availability of seeds at lower prices and premises located close to the farmers locality attracted.

2.4 Promotional measures followed by *Bt* cotton seed companies

Bhattacharya and Paliwal (2014) conducted a study on promotional measures adopted for bio-fertilizer marketing. They stressed the need for availability of credit to farmers, technical knowledge to farmers, and availability of bio-fertilizers at district and taluka levels and also to make the people aware of importance of bio-fertilizer for soil and crop growth. The promotional measures such as radio, T.V., press advertisement, wall paints, road side boards, cinema sliders, film show, street drama etc were suggested.

Velavan *et al.* (2015) conducted a study in Tamsi and Jainath mandals of Adilabad district in Andhra Pradesh. The results of the study indicated that dealers were the major source of information for farmers to purchase various *Bt* cotton seed brands. Brahmma and Mallika were the most popular brands among the farmers in the study area. Majority of the farmers purchased *Bt* cotton seeds from the district private dealers by paying in cash. The sample farmers ranked high-yielding character of brands as a major influencing factor for the purchase of *Bt* cotton seeds and majority of the sample farmers were highly satisfied with fiber quality and were highly dissatisfied with the germination of *Bt* cotton seeds. Majority of the farmers were not ready for brand switchover, and the irrigated farmers were more loyal to their brands than the rain fed farmers. Variables such as yield performance, resistance to pest and disease, seed germination, new varieties, and new technology were found to be an important reason for brand switching.

Rana *et al.* (2019) studied the farmer's perspective of *Bt* cotton growers. The results revealed that the main factors considered for brand loyalty were quality, yield and past experience and factor considers for brand preference towards *Bt* cotton seeds were yield, price and product availability. Farmers meeting by company, field demonstration, and exhibition were respectively found most influence promotional activities on farmers for brand preference and loyalty.

Jayasree *et al*. (2020) evaluated the perception of dealers towards the market mix elements comprising product, price, promotion and place of the products and services of competing brands. The study is conducted in southern part of Telangana State constituting Jogulamba Gadwal, Mahabubnagar and Rangareddy districts. The data is collected through random sampling method covering dealers and number of farmers. Statistical tests like ANOVA and tools like multi dimensional scale were used in this study. The study revealed that most of the dealers are well educated, middle aged people with age group ranging between 30-40 years with the income of more than seven lakh per annum. The dealers data after the application of statistical tools revealed that strategies applied by Kaveri, Rasi and Nuziveedu are similar whereas the strategies applied by Tata Rallis and other brands like Ajith, Nidhi seeds are different from one another when the product, price, promotion and place elements are considered.

Sharma and Jhamb (2021) studied the impact of promotional activities and campaigns on consumers buying decision. The promotional activities such as one to one farmers contact, group meetings, brand and promotion through posters, banners and various engagement campaigns conducted by seed companies have been considered. The

study also covered the impact of live demonstrations, user farmer testimonials and brand ambassadors and the influence of various farmer fairs and government agricultural extension activities. For the study from cotton and rice crop growing in three districts and six villages of Punjab were selected. These farmer groups were diverse in age ranging from 22 years to 50 years and some of them having exposure of social media as they use smart phones. The outcome of study showed that own experience of farmer testing seeds in his own farm has major impact on buying decision, advice from fellow farmers, friend or relative stands second in terms of influencing buying decision of seeds. Majority of activities where notions are very strong for acquisition of new customer like field demonstrations are not very well accepted by farmers unless done in their own village.

Bains and Dewani (2021) studied the challenges being faced by super seed, a hybrid seed manufacturer, in order to increase their market share. Super seed industry successes so far have been due to high product quality or features, channel strategies, and the use of mass media for promotional activities. While super seed has best seller brands, which also faced supply shortages in the last season, its relationships with the channel are not as robust as desired. However, to their strength they launched the Kisaan Vikaas Project in 2011, which focuses on face-to-face interaction with farmers and equips them with information and crop management practices.

Geeta (2022) conducted a study is about the farmers awareness about cotton seed. The place for the study is Sabarkantha, in Gujarat district. The reason to select the particular location is, Sabarkantha is a major cotton producing area in Gujarat. The data is collected through questionnaire developed by the researcher to know the awareness and the other factors which determine in purchasing the seeds for cotton cultivation. Descriptive statistical methods are used for analysis. The study is concluded that the farmers totally depend on the distributors for purchasing the cotton seed. Some of them even never know that which organization has produced the cotton seed.

2.5 Dealers outlook about *Bt* cotton seed companies in the study area

Mane and Hiremath (1995) studied the economic performance of seed marketing of groundnut varieties grown in Parbhani district in Maharashtra. The sample comprised of 28 per cent of dealers from Hingoli and Parbhani talukas was selected for the study. There were set marketing costs at various levels of hybrids seeds. The dealer's net margin was found to be higher for advance purchases and their marketing margin constituted about 6 per cent of consumers' price.

Beakatti (2007) conducted a study on market strategy analysis of cotton seeds in Dharwada district of Karnataka. The results indicated that the dealer's retail price was found to be Rs. 750 for 450 gm of Bt cotton. There was no much variation in the prices of all the brands found in the district on the study. The dealer's price varied from Rs. 718 in chamundi brand and Mayhco to Rs. 723 in the case of Rasi brand of cotton seeds. It was found that there is not much procurement price of the dealer. The margin obtained by dealers varied from Rs. 27 in the case of Rasi brand to Rs. 32 in the case of chamundi and Mahyco brands of cotton seeds. The percentage of margin obtained by the dealers varied from 4.46 in Mahyco and about 3.72 per cent in the case of Rasi seeds. However, the brands namely Mahyco BG-2, chamundi, JK Durga realized about 4 per cent margin.

Sodhi (2011) studied dealers margin in relation to the GCH-7 and reported different companies involved in the marketing of castor seed like GSSCL, GUJCOMASOL, Avni, Nandi, DSP, Mahyco, Bhooma and Navbharat. The researchers estimated that the purchase price of the dealers ranged from Rs. 270 (Avni) to Rs. 400 (Bhooma). The discount on per 2 kg bag ranged from Rs. 15 (Gurabini and GUJCOMASOL) to Rs. 40 (Mahyco). The retail price for the consumers' *i.e.* farmers ranged from Rs. 290 to Rs. 435 per two Kg bag. In respect of the dealers' margin, it was as low as 4.55 per cent for Gurabini (Gujarat RajyaBeej Nigam), a popular brand of GSSCL and GUJCOMASOL brand and up to 11. 76 per cent in respect of Mahyco brand.

Ghaghod (2014) studied dealers marketing strategy for groundnut seeds in Banaskantha district of Gujarat. The results indicated that the dealer's percentage of gross margin was found to be Rs. 100 and Rs. 50 for 20 kg of different brands of groundnut seeds. The dealer purchase price for 20 kg bag varied from Rs. 1400 to Rs. 1600. It was found that dealer's retail price for Super Sweta and Veer was Rs. 1500 and the percentage of gross margin was Rs. 100. While G G 20 and Sweta retail price was Rs. 1600 and the gross margin was Rs. 100 for 20 kg. It was observed from the data that Super Sweta and Veer were very famous among the dealers because it gives highest per cent of gross margin i.e 7.14 per cent.

Nidhanam (2019) conducted a study on dealer's margin for groundnut seeds in Sabarkantha district. There was no much variation in the profit margin of the different brands found in the study area. The dealers purchase price for 20 kg bag varies from Rs.1800 to Rs.1950. It was found that the purchase price of G-20 was Rs.1800 and for the same gross margin was Rs.150. While in case of G-24 purchase price was Rs. 1900 and for the same gross margin was Rs. 150 for 20 kg.

Rutsaert *et al.* (2021) examined marketing environment for maize seed in Kenya. The results revealed that some growers opted to sell their seed at a similar price as their international competitors, others maintained the price below the 2.50 $/kg threshold. The difference in sales price did not result in large margin differences for the agro-dealers. The average margin per kg was 0.17 USD (or 7.5% of sales price), being slightly lower for the parastatal varieties because of lower unit margin per kg for high-volume packages of 10 kg and 25 kg.

2.6 Constraints faced by the *Bt* cotton growers and dealers in the marketing of *Bt* cotton seeds

Beakatti (2007) studied the marketing of cotton seeds in Dharwad district of Karnataka. The marketing problems of cotton seeds in Karnataka state indicated that Government interference was quite high (67.00 %) followed by risk in investment in the business. Mostly the procurement problems were of medium nature as opined by majority of the dealers. Timely supply and inadequate storage facility were found to be major problems. The supply of adulterated seeds and high transportation were reported as low intensive problem by dealers. The sales problems were found to be acute particularly competition among dealers (87.00%) followed by high investment in the sales of the cotton seeds. The problems such as lack of awareness of use of particular seeds by farmers and inventory management were of medium range. The other problems like high taxes and management of advertisement were found to be lower magnitude among the problems enlisted.

Kumar *et al.* (2017) conducted a study in Guntur district of Andhra Pradesh. Results revealed that majority of the famers were belonged to above the age of 50 and were found illiterate with 46.00 per cent. Moreover, a majority of the dealers are above the age of 50.00 with 40.00 per cent followed by the major portion of the surveyed respondents were graduates with 45.00 per cent, the majority of growers has the farming experience of more than 15 years. The major factors influencing the preference of brands by dealers are farmers preference followed by quality of the seed, brand image, high profit margin. The top three market share of the *Bt* cotton brands in the Guntur district were reported Rasi, Kaveri and Nuziveedu. It could be observed that the poor quality of seeds, lack of awareness about the different brands of *Bt* cotton were the major constraints faced by the farmers in the procurement of *Bt* cotton.

Kulkarni *et al.* (2018) conducted a study in Nanded district of Maharashtra. Using a structured questionnaire as an instrument of measurement, primary data were collected and analyzed ordinarily through Garret ranking using the mean score of each variable. It was observed that timely availability of seed, lack of scientific knowledge, technical guidance about crop production and selection of varieties were the main problems reported by the majority of farmers while purchasing of cotton seed. Mallika and MRC 7351 were most preferred cotton seed brands by farmers as these are pest resistant and high yielding varieties suitable to cultivate in the study area and are recommended by retailers and fellow farmers in the study area.

Joshi (2019) studied the constraints faced by the dealers and reported that 80.00 per cent dealers faced constraint in low price of products followed by 70.00 per cent dealers faced constraint in low quality product and lack of finance. While 60.00 per cent dealers faced constraints in lack of storage, 40.00 per cent dealers faced constraints in lack of extension service and 20.00 per cent in lack of packaging materials, respectively.

Patel (2019) studied the constraints faced by the dealers in selling of castor seeds. 86.67 per cent dealers faced problem of competition among dealers followed by 73.33 per cent dealers faced problem of credit sales and 63.33 per cent faced problem regarding demand and supply gap. The data further revealed that 43.33 per cent dealers faced problem of lack of awareness about quality seed among farmers. Remaining 13.33 per cent dealers faced problem of high advertisement cost. It can be thus concluded that competition among dealers and credit sales were the major constraints faced by the dealers while selling castor seeds.

Kumar *et al.* (2019) studied the problems faced by dealers in marketing of *Bt* cotton seeds. Results revealed that competition among dealers and lower credit facility were occupied first and second place with a mean score of 77.20 and 76.60, respectively, followed by field staff provided by company with a mean score of 60.70, provision of promotional scheme by the company with a mean score of 55.70. Advertisements, lack of storage facility, high transportation cost, non- availability of seeds, poor quality of *Bt* cotton seeds and higher price of *Bt* cotton seeds were the minor problems in their order.

III. METHODOLOGY

In the process of achieving the objectives of the study, it is essential to follow a systematic and scientific approach in selecting the study area, sampling techniques, sources of data, and analytical techniques employed, as well as other information to support the research study. This chapter on methodology is discussed under the following headings:

3.1 Description of the study area

3.2 Nature and source of data

3.3 Sampling techniques

3.4 Research design

3.5 Analytical techniques

3.1 Description of the Study Area

The Banaskantha district of Gujarat state is presumably named after the West Banas River and shares its border with the neighboring state of Rajasthan. It is the third largest district in the state. Geographically, the district shares its borders with Rajasthan state in the North, Sabarkantha district in the East, Kutch district in the West and Patan and Mehsana districts in the South.

Table 3.1: Profile of Banaskantha District

Geographical Location	Longitude: 71.03°to 73.02°East
	Latitude: 23.33° to 24.25° North
Temperature	45° Centigrade (Maximum)
	5° Centigrade (Minimum)
Average Rainfall	685 mm
Rivers	Banas
Area	10,400.16 Sq. Km
District Headquarters	Palanpur
Taluka	14
Population	3.20 Million (As per Census 2011)
Population Density	290 Persons per sq. km
Sex Ratio	938 Females per 1000 Males
Languages	Gujarati, Hindi and English
Literacy Rate	80.83%

(Source: www.gujaratindia.com)

Table 3.2: Geographical features of Banaskantha District

Sr. No.	Particular	Total area ('000 ha)
1	Geographical area	1044.42
2	Cultivable area	744.00
3	Forest area	110.66
4	Land under non- agricultural use	52.93
5	Cultivable waste land	17.51
6	Net sown area	744.00
7	Gross cropped area	1033.41
8	Gross irrigated area	472.15

(Source: Comprehensive Agriculture Contingency Plan Banaskantha, Ministry of Agriculture and Farmer Welfare, New Delhi)

3.1.1 Rainfall

The annual rainfall of the district is 578.8 mm and is mostly received during the southwest monsoon season from June to September.

3.1.2 Soil

In general, the soils of Banaskantha district are sandy to sandy loam in texture, having very low organic matter with poor moisture retention capacity.

Table 3.3: Various soils of Banaskantha District

Major Soils	Area ('000 ha)	Percent (%) of total
Medium black soil	22.74	03.02
Loamy Sand to Sandy loamy soils	325.76	43.73
Sandy soil	395.63	53.12

(Source: Comprehensive Agriculture Contingency Plan Banaskantha, Ministry of Agriculture and Farmer Welfare, New Delhi)

3.1.3Irrigation

Table 3.4: Irrigation sources of Banaskantha District

Sources of Irrigation	Number	Area	Percentage of total
Canals length	218 Km	8.63	1.87
Tanks	34	0.20	0.04
Open wells	50796	107.59	22.73
Bore wells	14591	355.81	75.36
Lift irrigation schemes	-	-	-
Micro-irrigation	15254	28.85	6.15
Total Irrigated Area	-	472.16	-

(Source: Comprehensive Agriculture Contingency Plan Banaskantha, Ministry of Agriculture and Farmer Welfare, New Delhi)

3.1.4 Major crops growing in Banaskantha

Banaskantha is primarily an agricultural district with Bajra and Potato as the predominant crops. The other major crops cultivated are Groundnut, Cotton, Mustard, Castor, Cumin, Fennel *etc*.

3.2Nature and Source of Data

3.2.1 Primary data

The primary data were collected through well-structured interview schedules. The schedule was designed with the close-ended questions, which was used to collect data from the sample respondents in the study area.

3.2.2 Secondary data

The secondary data were collected from the company's brochures, pamphlets, website of company, department of agriculture and co-operation, district statistical office, university Library and other related departments.

3.3 Sampling techniques

In order to proceed with the investigation as per the objectives stated, it was necessary to adopt an appropriate sampling design so as to focus on the importance of the objectives. A multi-stage random sampling method was adopted as the appropriate sampling procedure for the study.

3.4 Research design

This chapter on methodology consists of selection of district, talukas, village *Bt* cotton seed growers and dealers.

Table 3.5: Selection of Taluka, Growers and Dealers from Banaskantha District

Sr. No.	Taluka	Number of Growers	Number of Dealers
1.	Deodar	30	5
2.	Kankrej	30	5
3.	Bhabhar	30	5
4.	Deesa	30	5
	Total:	**120**	**20**

3.4.1 Selection of Districts

In the first stage, Banaskantha district was purposively selected for the study. The reason for choosing Banaskantha district is that Utsav Seed Company (which was selected for the industrial attachment) is situated in Banaskantha District. As well as, the cultivated area of *Bt* cotton was the fourth highest in this district after Ahmadabad, Sabarkantha and Patan districts of North Gujarat.

3.4.2 Selection of Taluka

In the second stage, four taluka were selected purposively in Banaskantha district on the basis of the highest area under *Bt* cotton. Deesa, Bhabhar, Kankrej and Deodar taluka have been identified to carry out this study. Kankrej, Bhabhar, Deodar and Deesa taluka primarily have higher *Bt* cotton areas (Table 3.6). Hence, these four talukas were selected purposively for the study.

Table 3.6: Taluka wise area under *Bt* cotton crop in Banaskantha District (2021-22)

Sr. No.	Taluka	Area (Ha)
1	Deesa	2292
2	Vav	235
3	Tharad	52
4	Dhanera	90
5	Bhabhar	7110
6	Palanpur	185
7	Dantiwada	00
8	Amirgadh	98
9	Kankrej	16861
10	Lakhni	434
11	Deodar	4888
12	Suigam	264
13	Vadgam	00
14	Daanta	367
Total		**32876**

(Source: District Panchayat Office, Palanpur, Agriculture Department, Banaskantha District, Palanpur-385001)

3.4.3 Selection of Village

In third stage, from each Taluka five villages were selected on the basis of pilot survey. Therefore, total 20 villages were selected.

3.4.4 Selection of *Bt* cotton growers

From each village six *Bt* cotton growers were selected randomly.

3.4.5 Selection of dealers

This study was also designed to survey the important components in the seed industry *i.e.*, dealers, which act as nodal agencies for agricultural input marketing. Hence, five dealers were selected from each selected taluka of Banaskantha district. Therefore, a total of 20 dealers were selected to get the information required for the study.

3.4.6 Sample size

The final samples that were 120 *Bt* cotton growers and 20 dealers were selected for the research study.

3.5 Analytical techniques

3.5.1 Preparation of interview schedule

A well-structured interview schedule was prepared in light of the objectives of the study. It was used as a tool for data collection and was prepared with the help of teaching staff of the Department of College of Agribusiness Management of the Chimanbhai Patel College of Agriculture, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar, as well as guidance provided by major advisor. Questions and statements on each and every aspect of the problem were framed in order to study with possible accuracy, clarity and objectivity.

3.5.2 Method of data collection

An interview schedule was used as a tool for collection of data. The data was collected through personal contact by the researcher using the final interview. The responses were recorded in the interview schedule as verbal responses given by the farmers.

3.5.3 Statistical methods

The data were collected through interview schedule. The following statistical methods were used for analysis and interpretation of the data.

3.5.3.1 Frequency and percent

Simple interpretation was made on the basis of frequency and per cent analysis.

3.5.4 Socio-economic profile of *Bt* cotton growers

- **Tabular Method**

To study the socio-economic profile of *Bt* cotton growers in Banaskantha. Simple tabular method was used for research. The parameters included for the study of socio-economic profile of the sample growers are given below.

- Age (Year)
- Education level (Year)
- Size of family (No.)
- Size of land holding (Ha.)
- Source of irrigation (Openwell-1/Borewell-2/Canal-3/Others-4)
- Farming experience (Year)
- Annual income (Rs.)
- Total area under *Bt* cotton cultivation (Ha.)

Age, education and source of irrigation variables were measured with the help of procedure followed by Pandya and Pandya (2008).

3.5.5 Market share of the different *Bt* cotton seed companies

Market share was measured in terms of major companies preferred by farmers for purchase of *Bt* cotton seeds. Market share is defined as its sales measured as a percentage of the industry's total sales, for a particular fiscal period.

3.5.6 Buying behaviour of *Bt* cotton seed growers

Buying behaviour of the *Bt* cotton growers were identified by using percentage method. By certain Percentage method we mean parts per hundred. There are 99 points which divided in to the 1 to 100 equal parts.

$$\text{Percentage} = \frac{X}{Y} \times 100$$

Where,

X=No. of respondent (Frequency)

Y= Total number of respondents

- The following parameters which were consider to find out the buying behaviour of *Bt* cotton growers are as below:

- Mode of payment
- Source of *Bt* cotton seed purchased by *Bt* cotton growers

- Time of purchase of *Bt* cotton seeds
- Satisfaction with the quality of previously used *Bt* cotton seeds

3.5.7 Major promotional measures followed by *Bt* cotton seed companies

In order to analyze the preference type of promotional activities for the *Bt* cotton seed of different companies, personal interview method was employed with the help of structured schedule (Patterson, 2006). The schedule was containing statements under following heads *viz*.

- Farmer meeting
- Radio & Television
- Field demonstration
- Fair and exhibition
- Wall painting, Poster, Banner
- Social media
- Advertisement/News Paper

3.5.8 Dealers outlook about *Bt* cotton seed companies in study area

To study the dealers outlook about *Bt* cotton seed companies in study area by using following parameters:

- Business experience of *Bt* cotton dealers
- Dealer association with various *Bt* cotton seed companies over the year
- Different brand wise dealer's margin in *Bt* cotton seeds marketing
- Rating the *Bt* cotton seeds
- Expectations of dealers from company

3.5.9 Constraints faced by *Bt* cotton growers and dealers in marketing of *Bt* cotton seeds

- **Garrett's ranking technique**

The Garrett's ranking technique was used to analyse the constraint faced by *Bt* cotton growers and dealers by using below formula;

$$\textbf{Percent Position} = \frac{100\ (R_{ij} - \ 0.5)}{N_j}$$

Where,

$\mathbf{R_{ij}}$ = Rank given for i^{th} factor by the j^{th} individual

$\mathbf{N_j}$ = Number of factors ranked by the j^{th} individual

In the Garrett's table, the per cent positions were converted into scores. Thus, for each factor, the scores of the various respondents were added and then mean values were estimated. The attributes with the highest value were considered as the most important ones and the others follow in order.

Various constraints faced by *Bt* cotton seed growers while purchasing of *Bt* cotton seed from company are as given below:

- Scarcity of particular company seed
- High price of seeds
- Timely non availability of seed
- Spurious seed
- Low yield of seed
- Seed is not available in nearby area

Various constraints faced by dealers while selling the *Bt* cotton seed are as given below:

- Lack of awareness of use of seed by farmer
- Credit sales
- Competition among dealer
- Lack of field staff
- Management of advertisement

IV. RESULTS AND DISCUSSION

This chapter is conceptualized to present results obtained after a systematic analysis and interpretation of the data and information collected. The results of the study are presented and discussed under the following headings:

4.1 Socio-economic profile of *Bt* cotton growers

4.2 Market share of different *Bt* cotton seed companies

4.3 Buying behavior of *Bt* cotton growers

4.4 Promotional measures followed by *Bt* cotton seed companies

4.5 Dealers outlook about *Bt* cotton seed companies in the study area

4.6 Constraints faced by the *Bt* cotton growers and dealers in the marketing of *Bt* cotton seeds

4.1 Socio-economic characteristics of *Bt* cotton growers

In the present study, the socio-economic profile of the *Bt* cotton seed growers was determined by including various indicators, namely age, size of family, education, farming experience, annual income, size of land holding, source of irrigation, *etc*. The result of each characteristic is depicted in subsequent tables.

4.1.1 Age of the *Bt* cotton growers

Age is an important socio-economic indicator. Age of the sample respondents of *Bt* cotton growers year wise are presented in the Table 4.1 and Fig. 4.1.

Table 4.1: Distribution of the *Bt* cotton growers according to their age

(n=120)

Sr. No.	Age	Frequency	Percentage
2.	Young (18 to 35 Year)	68	56.67
3.	Middle (36 to 50 Year)	36	30.00
4.	Old (Above 51 Year)	16	13.33
	Total:	**120**	**100.00**

The *Bt* cotton growers are categorized into four groups based on their age. Highest per cent (56.67 %) of *Bt* cotton growers were belong to 18 to 35 year category followed by 36 to 50 year category (30.00 %), only few of them belonged to above 51 year category (13.33 %). This pattern of ages showed that majority of *Bt* cotton growers belonged to 18 to 35 year age category.

4.1.2 Types of family of *Bt* cotton growers

Member of family with its type is a key factor which impact on economic condition and social life of any type of family. Types of family of *Bt* cotton growers are presented in the Table 4.2 and Fig. 4.2.

Table 4.2: Distribution of *Bt* cotton growers according to their types of family

(n=120)

Sr. No.	Types of family	Frequency	Percentage
1.	Joint family	70	58.33
2.	Nuclear family	50	41.67
	Total:	**120**	**100.00**

The *Bt* Cotton growers are categorized into two groups based on their types of family. Highest percentage (58.33 %) of *Bt* cotton growers were belonged to joint family and near about 41.67 per cent were belonged to nuclear family. This pattern of type of family showed that majority of *Bt* cotton growers belonged to the joint family category.

4.1.3 Education status of *Bt* cotton growers

Educational level of farmers helps in adoption of technology at farm level. Improved seed is also one of the important technology which determines the *Bt* cotton production. Education of the sample *Bt* cotton growers are categorized into six groups *i.e.* illiterate, primary, secondary, higher secondary and graduation and post graduation level. The results are presented in the Table 4.3 and Fig. 4.3.

Table 4.3: Distribution of *Bt* cotton growers according to their education level

(n=120)

Sr. No.	Educational status	Frequency	Percentage
1.	Illiterate	20	16.67
2.	Primary level (1 to 8)	42	35.00
3.	Secondary level (9 to 10)	26	21.67
4.	Higher secondary (11 to 12)	22	18.33
5.	Graduation and Post graduation	10	08.33
	Total:	**120**	**100.00**

The *Bt* cotton growers are categorized into six groups based on their education. Highest percentage (35.00 %) of *Bt* cotton growers were belonged to primary level education followed by senior secondary level education (21.67 %), higher secondary (18.33 %), and illiterate (16.67 %). Only few of them belonged to graduation and post graduation level (08.33 %). This pattern of education level showed that majority of *Bt* cotton growers belonged to the primary level educational status.

4.1.4 Farming experience of *Bt* cotton growers

More experience in farming of *Bt* cotton crop leads growers to carried out their farming with better interest of benefits so it is an important socio-economic indicator for the study. Farming experience of the sample respondents of *Bt* cotton growers year wise are given in the Table 4.4 and Fig. 4.4.

Table 4.4: Distribution of *Bt* cotton growers according to their farming experience

(n=120)

Sr. No.	Farming Experience	Frequency	Percentage
1.	Below 5 years	05	04.17
2.	5 to 10 years	17	14.17
3.	10 to 15 years	40	33.33
4.	Above 15 years	58	48.33
	Total:	**120**	**100.00**

The *Bt* cotton growers are categorized into four groups based on their farming experience. Highest per cent (48.33 %) of *Bt* cotton growers were belonged to above 15 years category followed by 10 to 15 years (33.33 %), 5 to 10 years (14.17 %) farming experience, and only few of them belonged to below 5 years (04.17 %) farming experience. This pattern of farming experience showed that majority of *Bt* cotton growers have above 15 years farming experience in growing *Bt* cotton.

4.1.5 Annual income of the *Bt* cotton growers

More benefits in terms of yearly income received have positive impact on the standard of living of any crop growers. Sample *Bt* cotton grower's annual income category wise are presented in the Table 4.5 and Fig. 4.5.

Table 4.5: Distribution of *Bt* cotton growers according to their annual income

(n=120)

Sr. No.	Annual income (₹)	Frequency	Percentage
1.	Less than ₹ 1,00,000	37	30.8
2.	₹ 1,00,001 to ₹ 2,50,000	61	50.84
3.	₹ 2,50,001 to ₹ 5,00,000	15	12.50
4.	More than ₹ 5,00,000	07	05.83
	Total:	**120**	**100.00**

The *Bt* cotton growers are categorized into four groups based on their annual income. Highest percentage (50.84 %) of *Bt* cotton growers from 1.00 to 2.50 lakh category followed by less than 1.00 lakh (30.83 %), 2.50 to 5.00 lakh (12.50 %) and only few of them belonged above 5.00 lakh (05.83 %) annual income category. This pattern of annual income showed that majority of *Bt* cotton growers were belonged from 1.00 to 2.50 lakh annual income category.

4.1.6 Size of land holding possessed by the *Bt* cotton growers

Land holding capacity possessed by the farmer is a significant socio-economic marker. The land possessed by the sample *Bt* cotton growers are presented in the Table 4.6 and Fig. 4.6.

Table 4.6: Land holding pattern of the *Bt* cotton growers

(n=120)

Sr. No.	Land holding size	Frequency	Percentage
1.	Marginal (up to 1.0 ha)	34	28.33
2.	Small (1.01 to 2.0 ha)	38	31.67
3.	Semi medium (2.01 to 4.0 ha)	28	23.33
4.	Medium (4.01 to 10.0 ha)	15	12.50
5.	Large (more than 10 ha)	02	01.67
	Total:	**120**	**100.00**

The *Bt* cotton growers were categorized into five groups based on their land holding. Highest percentage of *Bt* cotton growers were belonged to small land holding category 31.67 per cent followed by marginal land holding category (28.33 %), semi medium land holding category (23.33 %), medium land holding category (12.50 %) and only few of them belonged to large land holding category (1.67 %). This pattern of land holding distribution showed that majority of *Bt* cotton growers were belonged to the small and marginal land holding categories.

4.1.7 Source of irrigation facilities available with *Bt* cotton growers

Cotton is *kharif* season crop and it is generally required assured irrigation facility. Therefore, for cotton crop irrigation facility is a pre-requisite. The results displayed in Table 4.7 and Fig. 4.7 showed that bore well (69.17 %) is the main source of irrigation water for the *Bt* cotton growers. Whereas another important irrigation source available with *Bt* cotton growers was reported canal irrigation (20.83 %). Only few of them used open well (05.83 %) as a source of irrigation. Farm ponds (04.17 %) are another source of irrigation used by farmers. Bore well irrigation source is mainly prominent in Deesa and Bhabhar taluka because not continue source water meet throughout the year and might be suffer crop at required water at pick stage of crop. Canal source of irrigation mostly available in Deodar and Kankrej taluka. Mainly growers were used farm pond water and it is prominent in Kankrej and Deesa taluka because of low rainfall in these arid region farmers have become aware to conserve rain water.

Table 4.7: Source of irrigation facilities available with *Bt* cotton growers

(n=120)

Sr. No.	Sources of irrigation	Frequency	Percentage
1.	Open well	07	5.83
2.	Bore well	83	69.17
3.	Canal	25	20.83
4.	Others (farm pond)	05	04.17
	Total:	**120**	**100.00**

4.2 Market share of different *Bt* cotton seed companies

4.2.1 Classification of major crops seed is availability in dealers shop

So many crops like pulses, oilseeds, vegetables are cultivated in this region and all season. The details of various crops seed available in dealers shop are given in Table 4.8 and Fig. 4.8.

Table 4.8: Classification of major crops seed available in dealers shop

(n=20)

Sr. No.	Crop seed	Frequency	Percentage
1.	Cotton	20	100.00
2.	Cumin	16	80.00
3.	Castor	14	70.00
4.	Mustard	13	65.00
5.	Bajra	17	85.00
6.	Jowar	15	75.00
7.	Groundnut	14	70.00

Cotton seed has the highest availability (100.00 %) in dealers' shops, followed by bajra seed availability (85.00 %), cumin seed (80.00 %), jowar seed (75.00 %), castor and groundnut for crop seeds 70.00 per cent, respectively. The lowest availability of seed crops was founded for mustard seed (65.00 %).

4.2.2 Different companies *Bt* cotton seed available in dealers shop

Dealers are keeping various companies *Bt* cotton seed on their shops because of various reasons like farmers demand of particular brand of seed, price of seed and marketing margin associate with seed *etc.* Therefore, it is important to know that which companies seed dealers are keeping at their shop. The results related to availability of various companies *Bt* cotton seed are presented in Table 4.9 and Fig. 4.9.

Table 4.9: Distribution of dealer according to different companies *Bt* cotton seeds available in shop

(n=20)

Sr. No.	Name of Company	Frequency	Percentage
1.	Utsav Seeds Pvt. Ltd.	10	50.00
2.	Rasi Seeds Pvt. Ltd.	14	70.00
3.	Akshay Seed Tech Company	13	65.00
4.	Western Agri Seeds Ltd.	16	80.00
5.	Ankur Seeds Pvt. Ltd.	18	90.00
6.	Others	14	70.00

The result revealed that the maximum dealers have Ankur Seeds Pvt. Ltd. company seed followed by Western Agri Seeds Ltd., Rasi Seeds Pvt. Ltd., Akshay Seed Tech Company, Utsav Seeds Pvt. Ltd. and also other Ajit Seeds Pvt. Ltd., Avani Seeds Pvt. Ltd., Buyer, Sagarlaxmi, Mahyco, Dantiwada Seeds Pvt. Ltd. *etc.*, *Bt* cotton seed companies. Moreover these result showed that Ankur Seeds Pvt. Ltd. and Western Agri Seeds Ltd. companies have accounted major share in *Bt* cotton seed market.

4.2.3 Sales of different companies *Bt* cotton seeds by dealers

The previous section of this study displayed the information regarding the various companies *Bt* cotton seed available with dealers. The companies *Bt* cotton seed sold by the dealers in the Table 4.10. The findings of study inferred that Rasi Seeds Pvt. Ltd. was ranked first in *Bt* cotton seed sold by the dealers followed by Ankur Seeds Pvt. Ltd., and Western Seeds Ltd., Akshay Seed Tech Company and Utsav Seeds Pvt. Ltd. companies *Bt* cotton seed in the study area.

Table 4.10: Ranking of different companies based on highest *Bt* cotton seeds sold in selected markets

(n=20)

Sr. No.	Name of Company	Rank
1.	Rasi Seeds Pvt. Ltd.	1st
2.	Ankur Seeds Pvt. Ltd.	2nd
3.	Western Agri Seeds Ltd.	3th
4.	Akshay Seed Tech Company	4th
5.	Utsav Seeds Pvt. Ltd.	5th

4.2.4 Market share of *Bt* cotton seeds companies in selected markets

Market share is the per cent of total sales in market generated by a particular company. Market share of particular company determine its reputation and dominance in the market. Hence, this study targeted to examine the *Bt* cotton seeds market share of different companies in the selected market and results are presented in the Table 4.11 and Fig. 4.10.

Table 4.11: Distribution of *Bt* cotton growers according to various *Bt* cotton seed companies based on purchase

(n=120)

Sr. No.	Name of Company	Frequency	Market Share (%)
1.	Utsav Seeds Pvt. Ltd.	18.00	15.00
2.	Rasi Seeds Pvt. Ltd.	27.00	22.50
3.	Akshay Seed Tech Company	19.00	15.83
4.	Western Agri Seeds Ltd.	20.00	16.67
5.	Ankur Seeds Pvt. Ltd.	24.00	20.00
6.	Others	12.00	10.00
	Total:-	**120.00**	**100.00**

Bt cotton growers purchased different companies seeds. Number of sample of farmers purchased brand of seeds gives their particular company's current year market share. From the results of study it can be interpreted that 22.50 per cent *Bt* cotton growers grow Rasi Seeds Pvt. Ltd. company followed by Ankur Seeds Pvt. Ltd. (20.00 %), Western Agri Seeds Ltd. (16.67 %), Akshay Seed Tech Company (15.83 %), Utsav Seeds Pvt. Ltd. (15.00 %) and others (10 %) companies *Bt* cotton seed. The study revealed that *Bt* cotton growers mostly grown Rasi Seeds Pvt. Ltd. Company *Bt* cotton seed, may be because of ease in availability of seed and higher production.

4.2.5 Preference of another *Bt* cotton seed companies by farmer

Distribution of *Bt* cotton seed companies according to farmer preference are showed in the Table 4.12 and Fig. 4.11.

Table 4.12: Distribution of *Bt* cotton seed companies according to farmer preference

(n=120)

Sr. No.	Name of Company	Frequency	Percentage
1.	Utsav Seeds Pvt. Ltd.	45.00	37.50
2.	Rasi Seeds Pvt. Ltd.	65.00	54.17
3.	Akshay Seed Tech Company	42.00	35.00
4.	Western Agri Seeds Ltd.	54.00	45.00
5.	Ankur Seeds Pvt. Ltd.	59.00	49.17
6.	Others	27.00	22.50

From the results of study it can be interpreted that 54.17 per cent farmer preferred the *Bt* cotton seed of Rasi seeds Pvt. Ltd. followed by Ankur seeds Pvt. Ltd.(49.17 %), Western Agri seeds Ltd. (45.00 %), Utsav seeds Pvt. Ltd. (37.50 %), Akshay seed Tech Company (35.00 %) and 22.50 per cent other companies like Avani seeds, Dantiwada, Mahyco, Buyer, Sagarlaxmi *etc.*

4.2.6 Source of *Bt* cotton seed purchased by *Bt* cotton growers

The purchase decision of farmers to purchase the seed is depending on the number of factor like proximity, quality, price, brand preference and discount given by the seller. *Bt* cotton growers' decision to purchase the improved seed is presented in Table 4.13 and Fig.4.12. The result of study interpreted that 75.83 per cent farmers purchased *Bt* cotton seed from Retailer shop followed by 15.83 per cent co-operative society source, 7.50 per cent from other sources like relatives *etc*. and very less 0.83 per cent growers purchased from whole seller source. The highest proportion of *Bt* cotton seed were purchased from Retailer shop may be because of easy of availability of *Bt* cotton seed in the proximity and may be credit given by retailers.

Table 4.13: Distribution of *Bt* cotton growers according to source from *Bt* cotton seeds purchased

(n=120)

Sr. No.	Source	Frequency	Percentage
1.	Wholesaler shop	01	0.83
2.	Retailer shop	91	75.83
3.	Co-operative society	06	15.83
4.	Others-(farmers and relatives)	22	07.50
	Total :	**120**	**100.00**

4.3 Buying behavior of *Bt* cotton growers

4.3.1 Time of purchase of *Bt* cotton seeds

Time of purchase of *Bt* cotton seeds to *Bt* cotton growers is important to know buying behavior. Time of purchase of *Bt* cotton seeds of the sample *Bt* cotton growers presented in the Table 4.14 and Figure 4.13.

Table 4.14: Time based behavior of growers for purchase of *Bt* cotton seed

(n=120)

Sr. No.	Purchasing time	Frequency	Percentage
1.	At the time of sowing	76	63.33
2.	Before the time of sowing	44	36.67
	Total:	**120**	**100.00**

Among 120 sample of the *Bt* cotton growers, (63.33 %) of *Bt* cotton growers were purchased seeds at the time of sowing whereas 36.67 per cent of *Bt* cotton were purchased seeds before the time of the sowing. This pattern of time of purchase of *Bt* cotton seeds showed that majority of *Bt* cotton growers buy seeds at the time of sowing.

4.3.2 Mode of payment of *Bt* cotton seeds

Mode of payment of *Bt* cotton seeds to *Bt* cotton growers is important to know buying behavior. In this survey, two mode of payment is considered: cash and credit, *Bt*

cotton seeds of the sample *Bt* cotton are presented in the Table 4.15 and Figure 4.14.

Table 4.15: Mode of payment to purchase *Bt* cotton seeds

(n=120)

Sr. No.	Mode of purchase	Frequency	Percentage
1.	Cash	85	70.83
2.	Credit	35	29.17
	Total:	**120**	**100.00**

Among 120 sample of the *Bt* cotton growers, 70.83 per cent of *Bt* cotton growers were purchased *Bt* cotton seeds by cash whereas 29.17 per cent of *Bt* cotton growers were purchased by credit. This pattern of mode of purchase of *Bt* cotton seeds showed that majority of *Bt* cotton growers purchased seeds by cash.

4.3.3 Satisfaction level with the previously used *Bt* cotton variety

Farmer's perception and satisfaction regarding particular seed variety critical role in future purchase of particular seed. Hence in this study response of *Bt* cotton growers were accessed regarding the satisfaction realized from previously used company's *Bt* cotton seed and results are presented in Table 4.16 and Fig. 4.15. It is observed from the results that 85.00 per cent *Bt* cotton growers were satisfied about the previous year seeds, 15.00 per cent *Bt* cotton growers were unsatisfied with respect to the *Bt* cotton seeds.

Table 4.16: Satisfaction of farmers regarding *Bt* cotton variety grown in previous season

(n=120)

Sr. No.	Satisfaction level	Frequency	Percentage
1.	Satisfied	102	85.00
2.	Unsatisfied	18	15.00
	Total:	**120**	**100.00**

4.4 Major promotional measures followed by *Bt* cotton companies

4.4.1 Major factors considered by the *Bt* cotton growers in purchasing *Bt* cotton seeds

Farmers generally considering numerous factors while purchasing the seed. To account the factors *Bt* cotton growers undertaken to purchase the *Bt* cotton seeds various responses collected from them and results are presented in Table 4.17 and Fig. 4.16. The results showed that 70.83 per cent *Bt* cotton growers were purchased *Bt* cotton seeds as per dealer's suggestion followed by 52.50 per cent farmers purchased *Bt* cotton seeds according to advice of fellow farmer. Similarly, 45.00 per cent growers consulted progressive farmer followed by 30.83 per cent growers consulted marketing officer and 26.67 per cent growers were purchased *Bt* cotton growers were purchased the *Bt* cotton seeds on their own experience. Only 20.00 per cent *Bt* cotton growers were purchased *Bt* cotton seeds based

on media like television and radio *etc*. and 12.50 per cent followed other people who were working in agricultural branch or seed company of their relatives.

Table 4.17: Factors considered by *Bt* cotton growers in purchasing *Bt* cotton seeds

(n = 120)

Sr. No.	Particulars	Frequency	Percentage
1.	Dealers	85.00	70.83
2.	Marketing officer	37.00	30.83
3.	Fellow other farmer	63.00	52.50
4.	Progressive farmer	54.00	45.00
5.	Media	24.00	20.00
6.	Own experience	32.00	26.67
7.	Others	15.00	12.50

4.4.2 Promotional activities carried out by the companies

The result of study showed that 75.00 per cent of *Bt* cotton growers were responded that company organized field demonstration and 43.33 per cent company's adopted radio and television for promotional purpose followed by 34.17 per cent utilized farmer meeting platform, 31.67 per cent responded that Advertisement/News paper. Whereas, *Bt* cotton growers were highlighted that only 23.33 per cent companies were utilized the fair and exhibition for promotional activities, whereas and 19.17 per cent responded social media. Also *Bt* cotton grower responded Companies in very few proportion (18.33 %) were organized activities like Wall painting, Poster and Banner.

Table 4.18: Promotional activities carried out by the companies as per *Bt* cotton growers

(n=120)

Sr. No.	Particulars	Frequency	Percentage
1	Farmer meeting	41	34.17
2	Radio & Television	52	43.33
3	Field demonstration	90	75.00
4	Fair and exhibition	28	23.33
5	Wall painting, Poster, Banner	22	18.33
6	Social media	23	19.17
7	Advertisement/News paper	38	31.67

4.5 Dealers outlook about *Bt* cotton seed companies in study area

4.5.1 Business experience of *Bt* cotton dealers

Business experience is an important socio-economic indicator. Business experience of the sample respondents of *Bt* cotton dealers year wise are presented in the Table 4.19 and Fig. 4.18.

Table 4.19: Distribution of *Bt* cotton dealers according to their business experience

(n=20)

Sr. No.	Business experience	Frequency	Percentage
1.	0 to 5 year	02	10.00
2.	5 to10 year	04	20.00
3.	10 to 15 year	07	35.00
4.	15 to 20 year	04	20.00
5.	Above 20 year	03	15.00
	Total:	**20**	**100.00**

The *Bt* cotton dealers were categorized into five groups based on their business experience. Highest per cent (35.00 %) of *Bt* cotton dealers were belong to 10 to 15 year category followed by 5 to 10 year and 15 to 20 year category (20.00 %), above 20 year category (15.00 %), only few of them belonged to below 5 year category (10.00 %). This pattern of business experience showed that majority of *Bt* cotton dealers belonged to the 10 to 15 year business experience category.

4.5.2 Dealer association with various *Bt* cotton seed companies over the year

Dealer association with seed companies is also affect while, purchasing of seed material by the farmer. That means more supply by particular seed that time more benefit obtain to dealer and number of year spending also affect for achieving any business. Now a day more demand of seed that time more dealer enter for creating business as dealer for supplying *Bt* cotton seed. Dealer association with various *Bt* cotton seed companies over the year are presented in Table 4.20 and Fig 4.19.

Table 4.20: Dealer association with various *Bt* cotton seed companies over the year

(n=20)

Sr. No.	Dealer association	Frequency	Percentage
1.	<2 year	01	05.00
2.	2 to 5 year	05	25.00
3.	5 to 10 year	08	40.00
4.	10 to 15 year	04	20.00
5.	>15 year	02	10.00
	Total:	**20**	**100.00**

The result were showed that 40.00 per cent *Bt* cotton dealer associated from 5 to 10 year that followed with 25.00 per cent *Bt* cotton dealer associated from 2 to 5 year, 20.00 per cent *Bt* cotton dealer associated from 10 to 15 year, 5.00 per cent *Bt* cotton dealer associated than less two year and only 10.00 per cent *Bt* cotton dealer associated with more than 15 year *Bt* cotton dealer associated. This result showed that the emerging day to day new dealership with new seed companies.

4.5.3: Different brand wise dealer's margin in *Bt* cotton seeds marketing

The dealer's margin is an important factor that determines the dealer's preference of selling the seed of particular company. This study targeted to study the dealer's margin over the different brand of *Bt* cotton seed and results are presented in Table 4.21 and Figure 4.20. The results revealed that dealers were getting 15.94 per cent margin on Utsav Seeds Pvt. Ltd., 15.71 per cent on Rasi Seeds Pvt. Ltd., 14.08 per cent on Western Agri Seeds Ltd., 13.89 per cent on Akshay Seed Tech Company and 12.50 per cent on Ankur Seeds Pvt. Ltd. Company's *Bt* cotton seed marketing.

Table 4.21: Dealer's margin across the different brands of *Bt* cotton seeds

(n=20)

Sr. No.	Companies name	Margin (%)
1.	Utsav Seeds Pvt. Ltd.	15.94
2.	Rasi Seeds Pvt. Ltd.	15.71
3.	Akshay Seed Tech Company	13.89
4.	Western Agri Seeds Ltd.	14.08
5.	Ankur Seeds Pvt. Ltd.	12.50

4.5.3 Dealer's rating for *Bt* cotton seeds on various parameters

Table 4.22: Dealer's rating for *Bt* cotton seeds on various parameters

(n=20)

Rating parameter	Always (5)	Mostly (4)	Often (3)	Rarely (2)	Never (1)	Cumulative Score	Rank
Quality	5(25)	8(32)	4(12)	1(02)	0(0)	71	1
Brand image	4(20)	8(32)	3(09)	1(02)	0(0)	63	2
Demand	3(15)	8(32)	4(12)	0(0)	0(0)	59	3
Price	2(10)	8(32)	4(12)	0(0)	0(0)	54	4
Time availability	4(20)	4(16)	2(06)	0(0)	0(0)	42	5
Promotional scheme	2(10)	2(08)	3(09)	5(10)	0(0)	37	6
Credit policy	4(20)	2(08)	2(06)	0(0)	0(0)	34	7

(Note: Always-5, Mostly-4, Otten-3, Rarely-2, Never-1)

The above table indicates that Quality(1^{st}) was first most important factor while farmer purchasing *Bt* Cotton, Brand image (2^{nd}), Demand (3^{rd}), Price (4^{th}), Promotional scheme(5^{th}), Time availability (6^{th}), Credit policy (7^{th}) and others were given different rating for *Bt* cotton seeds. The results show that quality like fiber fineness, fiber strength *etc*. Gives more return at the time of marketing of economic product, Brand Image also role for believeness regarding supplying trusted was *Bt* cotton. More demand and lowest priced *Bt* cotton seeds also give more margin to dealer.

4.5.4 Expectations of dealers from company

The expectation of *Bt* cotton growers from company was presented in below Table 4.23. Increasing margin ranked first which show that the dealers also expect more margin from company and more profit in business and high yield variety ranked second which shows that the dealers also expect new hybrid highest production varieties from seed company to increase yield and also increase farmers output followed by farmer satisfaction ranked third which shows *Bt* cotton growers satisfied with product, Fourth ranked was easily and timely availability of *Bt* cotton seed because at the time of cultivation season the *Bt* cotton seed was available within this time period and last fifth ranked was bonus like tour and gifts from company.

Table 4.23: Expectations of dealers from seed companies

(n=20)

Sr. No.	Expectations	Garrett's Score	Rank
1.	Increasing margin	54.80	I
2.	High yield variety	54.60	II
3.	Farmer satisfaction	49.05	III
4.	Easily and timely availability of seed	46.75	IV
5.	Bonus	45.60	V

4.6 Constraints faced by farmers and dealers

4.6.1 Constraints faced by farmers during purchasing *Bt* cotton seeds

Constraints analysis is important to overcome it, therefore this study point out the majorconstraints faced by farmers and dealers and results are presented in Table 4.24. The results of study showed that *Bt* cotton growers faced the major constraints as high price of *Bt* cotton seeds of companies followed by low yield and scarcity of particular brand of *Bt* cotton seed. Other constraints faced by the *Bt* cotton growers were timely non availability, spurious seed and seed is not available in nearby area.

Table 4.24: Constraints faced by *Bt* cotton growers during purchasing of *Bt* cotton seeds

(n=120)

Sr. No.	Constraints	Garrett's Score	Rank
1.	High price of seeds	55.53	I
2.	Low yield of seeds	51.98	II
3.	Scarcity of particular company seeds	50.64	III
4.	Timely non availability of seeds	49.88	IV
5.	Spurious seeds	47.95	V
6.	Seed is not available in nearby area	44.10	VI

4.6.2 Constraints faced by dealer during selling *Bt* cotton seeds

The data regarding constraints faced by the dealers in selling of *Bt* cotton seeds are presented in Table 4.25. The result of study revealed that dealers faced constraints of lake of awareness of use of seed by farmer followed by competition among dealers, credit sales, and management of advertisement and lack of field staff.

Table 4.25: Constraints faced by dealers during selling of *Bt* cotton seeds

(n=20)

Sr. No.	Constraints	Garrett's Score	Rank
1	Lack of awareness of use of seed by farmer	57.60	I
2	Competition among dealers	53.75	II
3	Credit sales	48.70	III
4	Management of advertisement	47.80	IV
5	Lack of field staff	41.15	V

V. SUMMARY AND CONCLUSIONS

Seed is the most important input component for productive agriculture. In the significant advances that India has made in agriculture in the last four decades, the role of the seed sector has been substantial. The expansion of the seed industry has occurred in parallel with growth in agricultural productivity. India is one of the few countries where the seed sector is already reasonably advanced. The private seed industry is no longer confined to just production and marketing of seed. It has well acquired technological strength to cater to the varietal needs of tomorrow.

Bt cotton is a genetically modified cotton crop that expresses an insecticidal protein whose gene has been derived from a soil bacterium called Bacillus thuringiensis, commonly referred to as *Bt*. Many subspecies of *Bacillus thuringiensis* are found in soil and are in general known to be toxic to various genera of insects but safe to other living organisms. *Bt* was first discovered by a Japanese scientist, Ishiwata, in the year 1901. *Bt* has been used as an insecticide for control of stored grain pests since 1938 in France and from 1961 as a registered pesticide in the USA and later in many other countries, including India, as sprays in cotton IPM programs to control insects. *Bt* toxins thus have several decades of proven selective toxicity to insect pests and with an established safety record for non-target animals. Currently there are 67 recognized subspecies of *Bacillus thuringiensis*, most of which produce spores and insecticidal proteins.

In India, during 2020-21 production of cotton was 371.00 lakh bales cultivated under an area of 129.57 lakh hectares with a productivity of 487 kg per hectare (Cotton Corporation of India). According to 3rd advance estimate 2020-21, cotton cultivation in Gujarat was 22.51 lakh hectares cultivated under area with a productivity of 671.95 kg per hectare. In India, there are nine major cotton growing states, which fall under three zones *viz.* the North Zone (Punjab, Haryana and Rajasthan), the Central Zone (Maharashtra, Madhya Pradesh and Gujarat), and the Southern Zone (Andhra Pradesh, Karnataka and Tamil Nadu). Nearly 65 per cent of the cotton crop is cultivated under rain fed conditions in the country. Nearly 2/3rd of the cotton production in India comes from the states of Maharashtra, Gujarat, Andhra Pradesh, and Telangana, collectively known as cotton basket of India.

Gujarat is India's largest cotton producer, accounting for about 28 per cent of its total lint output. Within Gujarat, more than 70 per cent of production comes from the Saurashtra region. In North Gujarat, major cotton producing districts are Banaskantha, Patan, Mehsana, Sabarkantha, Gandhinagar, Aravali and Ahmadabad. Banaskantha district was selected purposively for conducting the study, as Banaskantha district ranks 2nd in yield and production of cotton in north Gujarat. As well, Banaskantha district holds 4th position for the area in North Gujarat. Moreover, the research intern is located from the same district, and the same will be convenient for data collection.

The present study entitled **"Marketing Status and Dealers Outlook for *Bt* cotton Seed Companies in Banaskantha District"** encompasses various aspects like socio-economic characteristics of *Bt* cotton growers, market share of various *Bt* cotton seed companies, growers seed buying behavior, major promotional activities followed by *Bt* cotton seed companies, dealer outlook about *Bt* cotton seed companies and constraints faced by *Bt* cotton growers and dealers in the study area.

The specific objective of the study was:

1. To study the socio-economic profile of *Bt* cotton growers
2. To analyze the market share of different *Bt* cotton seed companies
3. To study the buying behavior of *Bt* cotton growers
4. To find out major promotional measures followed by *Bt* cotton seed companies
5. To know the dealers outlook about *Bt* cotton seed companies in the study area
6. To study the constraints faced by the *Bt* cotton growers and dealers in the marketing of *Bt* cotton seeds

As per the objective of the study, a purposive and multistage random sampling technique was adopted. At the first stage, four talukas, Deodar, Kankrej, Bhabhar and Deesa from the Banaskantha District were selected on the basis of the highest area under *Bt* cotton cultivation. Hence, these four talukas were selected purposively for the study. Then five villages were selected from each selected taluka and six *Bt* cotton growers were selected from each selected village.

The primary data were collected through personal interviews with *Bt* cotton growers by using a well-structured schedule. Secondary data were collected from published materials and websites. Tabular and percentage analysis and Garrett's ranking technique were used for data analysis purposes.

The results of study revealed that highest 56.67 per cent *Bt* cotton growers were belonged to 21 to 40 years age group followed by 41 to 60 age group (30.00 %), above 60 years age group (12.50 %). It was observed that majority of *Bt* cotton growers belonged to joint family (58.33 %). Majority of *Bt* cotton growers *i.e.,* 35.00 per cent have studied up to primary level. The highest percentage (48.33 %) *Bt* cotton seed growers have more than 15 years farming experience. The annual income of 50.84 per cent *Bt* cotton growers were found in between Rs. 1,00,001 to Rs. 2,50,000. The pattern of land holding distribution showed that majority of *Bt* cotton growers belonged to the marginal and small land holding categories. The bore well was the main source of irrigation water for the *Bt* cotton growers *i.e.,* 69.17 per cent. Whereas another important irrigation source available with *Bt* cotton seed grower was canal (20.83 %).

The results of study interpreted that 54.17 per cent *Bt* cotton growers preferred Rasi Seeds Pvt. Ltd. company's *Bt* cotton seed followed by Ankur Seeds Pvt. Ltd. company (49.17 %),Western Agri Seeds Ltd. (45.00%), Utsav Seeds Pvt. Ltd. (37.50 %), Akshay Seed Tech Company (35.00 %) and 22.50 percent other companies like Avani seeds, Dantiwada, Sagarlaxmi *etc.* The findings of study inferred that Rasi Seeds Pvt. Ltd. was ranked first in *Bt* cotton seed sold by the dealers followed by Ankur Seeds Pvt. Ltd., Western Agri Seeds Ltd., Akshay Seed Tech Company and Utsav Seeds Pvt. Ltd.

The study also revealed that more than 85.00 per cent *Bt* cotton growers were satisfied from the quality of previous year purchased seeds. The result of the study showed that 75.83 per cent *Bt* cotton growers purchased *Bt* cotton seed from Retailer's shop. Majority of *Bt* cotton growers purchased seeds at the time of sowing (63.33 %). The highest 70.83 per cent *Bt* cotton growers purchased *Bt* cotton seed by cash.

The results showed that 70.83 per cent *Bt* cotton growers were purchased *Bt* cotton seeds as per dealer's suggestion and 52.50 per cent *Bt* cotton seed growers purchased *Bt* cotton seeds as per the fellow farmer suggestions. The result of study showed that 75.00 per cent of *Bt* cotton growers had responded that companies organized field demonstrations and 43.33 per cent companies adopted radio and television for promotional purposes.

The results revealed that dealers were getting 15.94 per cent market margin on Utsav Seeds Pvt. Ltd., 15.71 per cent on Rasi Seeds Pvt. Ltd., 14.08 per cent on Western Agri Seeds Ltd., 13.89 per cent on Akshay Seed Tech Company and 12.50 per cent on Ankur Seeds Pvt. Ltd. The quality was first most important factor while farmer purchasing *Bt* cotton seeds followed by brand image. The result showed that quality like fiber fineness, fiber strength *etc*. gives more return at the time of marketing of economic product, brand image also play an important role for increasing the trust of *Bt* cotton growers.

The results of the study also revealed that *Bt* cotton growers faced major constraints i.e. high price and followed by low yield and scarcity of particular brand of *Bt* cotton seed. Other constraints faced by the *Bt* cotton growers were timely non availability, spurious seed.

The dealers faced major constraints of lake of awareness of use of seed by farmer followed by competition among dealers, credit sales, and management of advertisement and lack of field staff. The result of study inferred that dealer's major expectations from the seed company were increasing margin and high yield variety followed by farmer satisfaction, easy and timely availability of seed and bonus.

- **Conclusions**

- Majority of (56.67 %) growers belonged to 21 to 40 years age group followed by 41 to 60 years aged growers (30.00 %) and more than 50 per cent (58.33 %) *Bt* cotton growers belonged to joint family
- Around 35.00 per cent of *Bt* cotton growers have primary education and 21.67 per cent have reported secondary education and majority of (48.33 %) *Bt* cotton growers have more than 15-years farming experience
- It was observed that 50.84 per cent of *Bt* cotton growers have annual income ranges from Rs. 1,00,001 to Rs. 2,50,000
- Majority of (31.667%) the *Bt* cotton growers have small land holding followed by marginal land holding (28.33 %)
- Bore well (69.17 %), was the main source of irrigation, whereas canal (20.83 %) was another important source of irrigation available with *Bt* cotton seed growers
- The results revealed that followings companies seeds are most available at dealer's shop: Ankur seeds company (90.00 %), Western Agri seeds company (80.00 %), Rasi seeds company (70.00 %).

- The study inferred that Rasi Seeds Company was ranked first followed by Ankur Seeds Company in sales volumes
- The study revealed that *Bt* cotton growers mostly used Rasi Seeds Pvt. Ltd., may be because of ease in availability of seed and higher production
- Most of (54.17 %) *Bt* cotton growers have preferred Rasi seeds company's *Bt* cotton seed followed by Ankur seeds company (49.17 %) and Western Agri seeds company (45.00 %)
- The majority (75.83 %) *Bt* cotton growers purchased *Bt* cotton seeds from Retailer's shop and liked to purchase at the time of sowing with cash payment
- It is observed from the results that 85.00 per cent *Bt* cotton growers were satisfied from previous year seeds
- More than 70.00 per cent *Bt* cotton growers preferred to purchase *Bt* cotton seeds as per dealer's suggestion and near about 75.00 per cent growers responded that field demonstrations activity was used for promotional purposes
- Majority of (35.00 %) *Bt* cotton dealers have 10 to 15 years of business experience and around (40.00 %) *Bt* cotton dealers associated with company from 5 to 10 years
- It was observed that across the different *Bt* cotton seeds company's dealer's margin varied from 12 to 16 per cent and majority of the dealers rating *Bt* cotton seeds on quality (1st) for selling *Bt* cotton seeds, followed by brand image, demand and prices.
- *Bt* cotton dealer's main expectations from the seed companies were increasing margin, high yielding varieties and farmer satisfaction
- Majority of grower have faced major constraint of high price of seeds followed by low yield while dealers faced major constraint of lack of awareness of use of seed by farmer followed by competition among the dealers

- **Suggestions**

Based on the finding of the present study, following suggestions are drawn

- Companies should provide quality seed materials on time and in sufficient quantity at reasonable price
- Companies should invest more in research and development activities to develop new high yielding varieties

- Government institutes, agriculture universities, and seed companies should provides better knowledge and awareness to the farmers about the use of seeds and improved farming techniques

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ANNEXURE - A

SCHEDULE FOR FARMER

---

1. **Name of farmer : _____**
2. **Village : _____ Taluka : _____**
3. **Age : _____**
4. **Phone no. : _____**
5. **Size of family**

   Joint ☐ Nuclear ☐

6. **How many hectares of land you have?**

   Area under *Bt* cotton cultivation _____

7. **Educational Status**

Sr. No.	Education level	Remark
1	Illiterate	
2	Primary level (1 to 8 Standard)	
3	Secondary level (9 to 10 Standard)	
4	Higher secondary (11to 12 Standard)	
5	Graduation	
6	Post-Graduation	

8. **Farming Experience**

Sr. No.	Parameter	Remark
1	Below 5 Years	
2	5 – 10 years	
3	10 – 15 Years	
4	Above 15 years	

9. **Average annual income from various sources**

Sr. No.	Annual income	Income(Rs/-)	Remark
1	Less than ₹ 1,00,000		
2	₹ 1,00,001 to ₹ 2,50,000		
3	₹ 2,50,001 to ₹ 5,00,000		
4	More than ₹ 5,00,000		

10. Size of land holding (hectares)

Sr. No.	Land holding	Area (Ha.)	Remark
1	Marginal (up to 1.0 hectare)		
2	Small (1.01 to 2.0 hectares)		
3	Semi medium (2.01 to 4.0 hectares)		
4	Medium (4.01 to 10.0 hectares)		
5	Large (more than 10 hectares)		

11. Which irrigation source you are using?

Sr. No.	Irrigation source	Remark
1	Open well	
2	Bore well	
3	Canal	
4	River	
5	Others	

12. When you purchase *Bt* cotton seeds from particular place?

Sr. No.	Time of purchase	Remark
1	At the time of sowing	
2	Before the time of sowing	

13. How much purchasing price of *Bt* cotton seeds?

_____

_____

14. From where do you purchase *Bt* cotton seeds?

Sr. No.	Source	Remark
1	Wholesaler shop	
2	Retailer shop	
3	Co-operative society	
4	University	
5	Others	

15. Are you satisfied with the quality of *Bt* cotton seeds variety?

Satisfied ☐ Unsatisfied ☐

16. Through which mode do you purchase *Bt* cotton seeds?

Sr. No.	Particular	Remark
1	By Cash	
2	By Credit	

17. Which companies *Bt* cotton seeds do you grow?

Sr. No.	Name of Hybrid castor seeds companies	Remark
1	Utsav Seeds Pvt. Ltd.	
2	Rasi Seeds Pvt. Ltd.	
3	Akshay Seed Tech Company	
4	Western Agri Seeds Ltd.	
5	Ankur Seeds Pvt. Ltd.	
6	Other	

18. Preference of another *Bt* cotton seeds companies

Sr. No.	Name of Hybrid castor seeds companies	Remark
1	Utsav Seeds Pvt. Ltd.	
2	Rasi Seeds Pvt. Ltd.	
3	Akshay Seed Tech Company	
4	Western Agri Seeds Ltd.	
5	Ankur Seeds Pvt. Ltd.	
6	Other	

19. According to whose suggestion do you purchase *Bt* cotton seed?

Sr. No.	Person	Remark
1	Dealers	
2	Marketing officer	
3	Fellow other farmer	
4	Progressive Farmer	
5	Media	
6	Own experience	
7	Others	

20. Which type of promotional activity did the companies in village?

Sr. No.	Name of media	Remark
1	Farmer meeting	
2	Radio & Television	
3	Field demonstration	
4	Fair and exhibition	
5	Wall painting, Poster, Banner	
6	Social media	
8	Advertisement/News Paper	

21. Major constraints faced by you while purchasing the *Bt* cotton seeds?

Sr. No.	Constraints	Rank
1	Scarcity of Particular company seed	
2	Low yield of seed	
3	High price of seeds	
4	Spurious seed	
5	Timely non availability of seed	
6	Seed is not available in nearby area	

22. Do you have any suggestion?

_____

_____

ANNEXURE - B

SCHEDULE FOR DEALER

---

1. **Name of dealer : _____**
2. **Name of shop : _____**
3. **Village : _____**
4. **Contact No. : _____**
5. **Taluka : _____**

6. **Experience in Business**

Sr. No.	Year	Remark
1	0-5 year	
2	5-10 year	
3	10-15 year	
4	15-20 year	
5	Above 20 years	

7. **Which major crops seed are available in your shop?**

Sr. No.	Name of crop
1	
2	
3	
4	
5	

8. **Which companies *Bt* cotton seed are available in your shop?**

Sr. No.	Name of company	Remark
1	Utsav Seeds Pvt. Ltd.	
2	Rasi Seeds Pvt. Ltd.	
3	Akshay Seed Tech Company	
4	Western Agri Seeds Ltd.	
5	Ankur Seeds Pvt. Ltd.	
6	Others	

9. Which companies *Bt* cotton seeds having more demand/higher sale in your shop?

Sr. No.	Name of the company	Rank
1	Utsav Seeds Pvt. Ltd.	
2	Rasi Seeds Pvt. Ltd.	
3	Akshay Seed Tech Company	
4	Western Agri Seeds Ltd.	
5	Ankur Seeds Pvt. Ltd.	

10. Dealer association with various *Bt* cotton Seed companies over the year

Sr. No.	Year	Utsav	Rasi	Akshay	Western	Ankur
1	<2 year					
2	2-5 year					
3	5-10 year					
4	10-15 year					
5	>15 year					
6	Others					

11. Dealer's margin in selling *Bt* cotton seeds of different companies

Sr. No.	Company	Purchase price(Rs/kg)	Selling price(Rs/kg)
1	Utsav Seeds Pvt. Ltd.		
2	Rasi Seeds Pvt. Ltd.		
3	Akshay Seed Tech Company		
4	Western Agri Seeds Ltd.		
5	Ankur Seeds Pvt. Ltd.		
6	Others		

12. Rating the *Bt* cotton Seeds on following parameter

Sr. No.	Rating/ parameter	Always (5)	Mostly (4)	Often (3)	Rarely (2)	Never (1)
1	Quality					
2	Price					
3	Demand by farmer					
4	Credit policy					
5	Company relationship					
6	Promotional scheme					
7	Time availability					
8	Customer satisfaction					
9	Brand image					

13. What are the expectations from the companies?

Sr. No.	Particular	Rank
1	Increasing margin	
2	High yield variety	
3	Farmer satisfaction	
4	Easily and timely availability of seed	
5	Bonus	

14. What are major constraints do you faced in sales of the *Bt* cotton seeds?

Sr. No.	Constraints	Rank
1	Credit sales	
2	Lack of field staff	
3	Management of advertisement	
4	Lack of awareness of use of seed by farmer	
5	Competition among dealer	

15. Your suggestion?

_____

_____

CERTIFICATE

This is to certify that, I have no objection for supplying to any scientist only one copy or any part of this thesis at a time through reprographic process, if necessary for rendering reference service in a library or documentation centre.

Place : SARDARKRUSHINAGAR

Date : FEBRUARY, 2023 [SUNDESHA UTTAM KUMAR C.]