

The Experience of Bt Cotton Farmers in Tamilnadu

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ABSTRACT: The research article is based on the ethnographic study of Bt cotton farmers in the district of Perambalur, Tamilnadu. The inspiration to study the Bt cotton farmers evolved due to the debates in the Bt technology viz., the suitability of the technology to industrial versus the sustenance farmers, the strategy of the state to promote the technology, the agronomy associated with the cultivation, the assurance of reduced use of pesticide, increased productivity, debates on the cultivation method etc. The concerns of the Bt cotton is researched in this article as well the perspectives of public and private research organisations, governments, ministries, retail dealers of seed, civil society and farmers is evaluated through the field study. The study seeks to establish that stakeholders in the innovation, implementation and promotion of the technology are hierarchically placed and power relations operate among the actors. The field study is an attempt to mitigate the perceptions on the cultivation of Bt cotton and contribute towards a reinvigorated public policy on GM crops in India.

Keywords: Bt cotton, technology, farmers, knowledge, cultivation.

INTRODUCTION

Farming, the life sustaining activity once upon a time in the history of human kind, is gradually promoted to an industrial activity by the use of technology. The developments in technology have helped farmers from hard labour and dreary, but this has shaped the progress of agriculture in its own fashion. The introduction of new technologies in the upliftment of agriculture has witnessed varying experiences for the farmers across India. For example, the Green Revolution (GR) technologies which were considered to be scale neutral have resulted in great economic divide between small and big farmers (Junankar, 1975). The technology could be neutral but its experience has brought in social and economic divide. The technological priorities of the farmers differed due to their capabilities to invest and benefit out of it. The displacement of GR technologies has given space to biotechnology products in the form of GM crops like Bt cotton and so many other GM crops which are ready but yet to be released for the farmers. But there were diverse concerns with GM crops across the spectrum of nations, scientists, think tanks, farmers' group and political parties. Even the Indian agricultural scientist expressed concerns that we have to take a cautious approach since long term studies are not available to understand the benefits of GM crops. (Manish Shukla *et al.*, 2018).

The debates on Bt cotton in India

Bt cotton is the first Genetically Modified (GM) crop in India which was introduced in March 2002. The crop is

claimed to be a success by the government agencies in terms of the increased yield and reduced number of pesticide sprays. The story of Bt cotton is closely watched crop since the GM crop is planted by small farmers which is not the case with Europe. It is also one of the crop very much researched due to different narrative of the stakeholders (Kranthi & Stone 2020). The success story of Bt cotton is not without criticisms and controversies; the following are some of the debates around GM crops and Bt cotton.

(a) Training of farmers to cultivate Bt cotton. The use of Bt cotton requires the farmers to adopt agricultural practices pre-conceived in it. The propagation of this new technology and its use was actively taken up by Krishi Vigyan Kendras and the extension service department of various states in India. It is generally assumed by the extension departments that farmers would not have all the knowledge about a technology and its use has to be effectively communicated to the farmers. Even though there is an active engagement of extension departments in propagating knowledges in new technologies, it is reported by the NSSO that only 40% of the farmers have proper access to formal agencies of knowledge sharing (Vasavi, 2012). The NSSO in its report has not identified the reasons for the inability of the farmers to reach the knowledge propagating agencies like the extension service of the agriculture departments or the KVKs.

The reasons for the inability of farmers to access formal knowledge propagating agencies and the failure of these institutions is a phenomenon very less researched in

India. It is pertinent to understand the issue since the modern technologies are loaded with preconceived cultivation methods in it. The importance of knowledge dissonance is also very important with the new technologies since it is not native to the land nor it is being based on the local agricultural practices. It is argued that GM crops “have been developed essentially for the large land holding, mechanized agriculture of Industrial countries” (Sahai, 2007). So, for a farmer to extract maximum benefit out of a modern technology is to equip himself/herself with the knowledge which are appropriated in the technology.

(b) Adoption and productivity of Bt cotton. According to the statistics of the government, “Bt cotton area, which was hardly 0.29 lakh ha (0.38 %) out of 76.70 lakh in 2002-03, increased to 119.40 lakh ha out of 128.19 lakh hectares in 2014-15 showing more than 93.14 % adoption within a span of thirteen years” (Ministry of Agriculture & Farmers Welfare, 2017). It signifies that the farmers are more progressive in adopting the modern technologies. The progressive shift of farmers to Bt cotton is argued to be the prospect and success of the technology. The successful adoption of the technology by the farmers have also to be qualified with various influences being promoted through input dealers, companies’ advertisements in media, co-farmers or any other factors which led to the shift of farmer from hybrid cotton to Bt cotton.

The shift of farmers to the new technology has happened due to the enormous trust created in the public that Bt cotton would increase the yield. The government also subscribed to this opinion with the results obtained in the trials during course of its approval of the crop. The decadal experience of Bt cotton according to the “Status Paper on Cotton (2017)” established that Bt technology has increased the yield. But the statistics of the government does not reveal the micro details of the shift of cotton cultivation from rainfed areas to irrigated land or the performance of Bt cotton in different landholdings or the increase in the area of cotton cultivation after the advent of Bt cotton. These details are very much important to assess the success the Bt cotton which could also reveal the dynamics of socio-economic changes that happened among different categories of farmers.

(c) The use of pesticide. The promotion of Bt cotton assured that it would reduce the use of pesticide significantly when compared with hybrid seeds. The advent of Bt cotton reduced the use of pesticide spray to control bollworms but the initial success of Bt cotton in withstanding the attack of bollworms did not last for long which has necessitated farmers to go for more pesticide spray in the recent times. The phase of less number of sprays gradually shifted to more number of sprays as a result of farmers’ least interest in keeping refuge area which is very much necessary for the prolongation of resistance in bollworms. The report “Status Paper on Cotton (2017)” has given a statistics that use of pesticides to control bollworms has decreased but there is an increase in the use of pesticides to control sucking pests (Ministry of Agriculture & Farmers Welfare, 2017). The shift in the pest management system have now forced the farmers to be dependent on the seed companies to offer better technology to withstand the

attack of sucking pest. The knowledge gap of farmers with the technology has resulted in a different pest management system which has made them dependent on market.

(d) The approach of the state and the farmers experience. The Bt cotton crop tested the risk bearing capacities of the small and medium farmers who lacked the support of formal institutions to lend them. The farmers were forced to borrow from the private money lenders which even forced to take their life in the event of crop failure leading to the non-payment of the debt (Gruère *et al.*, 2008). There were numerous incidences of farmers’ suicides reported in the dailies directly linking the suicides and the failure of Bt cotton crop. Even though various studies on farmers’ suicide did not establish the link but studies have established indirect effect of Bt cotton on farmers’ suicide. The distancing of state in promotion of new technologies resulted in huge stress for the farmers even though there were some policy corrections initiated after serious human disasters. The prospects of Bt cotton was promoted to the farmers without institutional support to invest more capital in engaging with the technology. The shift of farmers to modern technologies in the post reform period has promoted farmer more into indebtedness and financial stress. The Government of India report states that “stagnant technology, rising input prices, weakening support systems and declining profitability have all made cultivation a highly risky and un-remunerative enterprise, threatening the livelihoods of farmers, particularly the small and marginal ones. It concluded that agriculture in India is passing through a severe crisis” (Ministry of Finance, 2007).

The experience of Bt cotton cultivation under rainfed condition unlike the irrigated lands in India largely evoked social, agronomic, environmental and political debates on the suitability of GM crops in India. The National Commission on Farmers attributed that farmers’ unrest is more in the rainfed cultivated areas of India. It claimed that “nearly 76% of the farmers committing suicide were dependent on rainfed dryland agriculture” (National Commission on Farmers’, 2004). The dynamics which operates in the rainfed cultivation is thus different from the irrigated land.

The GM crops are unlike the green revolution technologies which were promoted by the state with subsidies and infrastructure for its success is not the case in the biotechnology revolution. The state has introduced GM crops with less support but promised that this could liberate agriculture with lot of economic and environmental benefits. The imagination of the state and raises questions about its total reliance on the new scientific possibilities relegating the local knowledge to its shelves. The local practices of farming and the report of International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD, 2008) argues that the importance of imbibing local knowledges in the developmental plans of the state.

Ethnographic study of Bt cotton

The introduction of Bt cotton and its experience in India has revealed socio, economic, scientific, environmental and political dynamics operating in the technology. The study is conducted in Veppanthattai block, Perambalur

district of Tamilnadu to unravel the debates in Bt cotton. The total area of cotton cultivation in Perambalur district is 20371 hectares; it occupies the largest area of cotton cultivation in the state followed by the districts of Tiruchirappalli, Virudhunagar and Salem (Government of Tamilnadu, 2015). Even though it occupies the largest area under cultivation, the total production of cotton is far less in comparison to other districts. The average total production of cotton of the district is estimated to be 25,875 (in bales of 170 kg. lint each) for the period of 2007-08 to 2015-16 (Government of Tamilnadu, 2017). The production of cotton in Perambalur district is low in comparison to total area of cotton cultivation. The districts of Salem, Dharmapuri and Virudhunagar cultivate lesser area than Perambalur district but their total production is much more than the district. The lesser yields in comparison to other districts is attributed to the cultivation of cotton under rainfed conditions (Perambalur.nic.in, 2017). The Perambalur district of Tamilnadu predominantly cultivates cotton under rainfed condition and also occupies largest area of cotton cultivation in the state which is very less researched to study the experience of Bt cotton with the focus on the power relations mediating the technology.

Details of the study area

In Perambalur district there are four revenue blocks viz. Alathur, Perambalur, Veppanthattai and Veppur. The Veppanthattai block was randomly selected through lottery method. The total acreage of cotton cultivation in the block is little lower than the Veppur and Alathur block (Table 1). The Veppanthattai block is gifted with Cotton Research Institute which is run by the Tamilnadu

Agriculture University, Coimbatore. The Veppanthattai block enlarged the scope of the study to assess the contribution of the research institute in cotton cultivation in the nearby villages. The Veppanthattai block has a total of 36 villages and out of which 4 villages are in the vicinity to the Cotton Research Centre. The villages list in Table 2 was identified for the field work with the help of the agriculture department, Perambalur. The cotton farmers of these villages were chosen by simple random sampling method with the farmers household details provided by the agriculture department, Perambalur.

41 farmers in Veppanthattai revenue block, Perambalur district, Tamilnadu were interviewed for this study from 13th October to 14th November, 2022 based on a questionnaire to evaluate their experience in cotton cultivation. The farmers belonged to the following villages of Veppanthattai revenue block; Udumbiyam, Thondamandurai, Venganur and Venbavoore. These villages are in the vicinity of Cotton Research Centre, Veppanthattai and which cultivate predominantly Bt cotton and maize as rainfed crop. The district is majorly dependent on rainfall and does not have the facility of canal irrigation. The tubewell irrigation is fast developing in the area which caters to the irrigation needs of cotton when the rainfall is substantially low. The farmers keep shifting between cotton, maize and onion crops based on the rainfall pattern expected in the season. The choice of cultivating cotton or maize or onion depends on the manpower available at home to make the process of cultivation smooth which also reduces the dependency of labourers from the market.

Table 1: Total area of Cotton Cultivation (Perambalur District).

Block	(Area in Hectares)			
	2010-11	2011-12	2012-13	2013-14
Perambalur	NA	1862.57	1325.48	1505.865
Veppanthattai	NA	7485.31	7165.03	7344.73
Alathur	7217.925	7190.97	7360.52	8712.11
Veppur	8667.4	9612.7	8428.745	10002.81

Source: Department of Agriculture, Perambalur District, Tamilnadu.

Table 2: Villages selected for the field study.

Village Name	Cultivators	Male	Female
Udumbiyum	115	29	86
Thondamandurai (West)	4	1	3
Thondamandurai (East)	22	11	11
Venganur	182	77	105
Venbavoore	7	4	3
Total	330	122	208

Source: Department of Agriculture, Perambalur District, Tamilnadu

RESEARCH METHODOLOGY

A detailed questionnaire was developed to map the social profile of the farmer, the change in agricultural practices due to adoption of Bt cotton, the factors which influence farmers to shift to Bt cotton, the agronomy of Bt cotton and the overall experience of farmers in cotton cultivation. The response to the questions was measured by the use of Likert scale. The data collected through questionnaire was codified and quantified by the SPSS software. The researcher apart from the data collection through questionnaire also conducted focussed group

discussions. The group was of minimum four farmers with one farmer randomly selected from the list of participants in training programme of Bt cotton conducted by the local Kirshi Vighyan Kendra, Hans Roever Krishi Vighyan Kendra(KVK), Valikandapuram, Perambalur. The researcher also held unstructured interviews with the family members of the farmers and the labourers if any present in the farm to understand their perception on cultivation of Bt cotton. The supporting staff and the officers of Cotton Research Centre, Veppanthattai and KVK Valikandapuram, Perambalur.

Farmers' Profile

The data on the farmers' profile consists of the age, family members, family members engaged in agriculture and the education level. The age profile of the farmers starts from the range of 25 years and had upper age limit upto the age of 75 years. The researcher could witness even farmers aged above 75 are engaged in cotton cultivation and also assisting the young generation in supervision role and sharing knowledge about their farming experience. The aged farmers said that they continue to engage in agricultural activities and do not retire until their body stops supporting them. The age group of the farmers was divided into four categories and the largest among the categories in terms of size was the age group of 45 – 55 (15) (36.6%) followed by 35 – 45 (10) (24.4%); 55 and above 10(24.4%) and 25 – 35 (6) (14.6%).

The total family members in a farmers' family were ranged in three categories. The category 1 – 4 family members was the largest with 27(65.9%), 4 – 8 is 12(29.3%) and the third category 8 and above family members was 2(4.8%).

The family members engaged in agriculture were ranged into five categories. The category of 2 family members engaged in agriculture is the largest with 24(58.6%), 4 is 8(19.5%), 1 is 4(9.8%), 3 is 3(7.3%) and 5 is 2(4.8%). It is observed in the samples that the joint family engagement in agriculture is very negligible. The frequency of 2 members engaging in agriculture is the largest group among the family members engaged in agriculture. It is inferred that the 2 members engaging in agriculture is a nuclear family where they have one or two kids who are encouraged to study in schools and college or encouraged to do any work in the urban place near to the village or in the far off cities.

The farmers with primary education were the largest with 10(24.4%), Secondary level is 9(22%), Middle level is 8(19.5%), Uneducated is 8 (19.5%), Senior Secondary level is 5(12.2%) and Graduate is 1(2.4%).

Farmers' Landholding

The category of small farmers (2.5 to 5 acres) is dominant in the samples collected in the field work. They were 20(48.8%) typically representing the overall landholding pattern of the block. The next large number of respondents was in small medium (5-12.5acres) farmers of 11(26.9%). It was followed by the marginal farmers (below 2.5 acres) 4(9.7%), medium farmers (12.5 to 25 acres) 3 (7.3%) and the landless 3(7.3%).

The operational land holding is highest in the category of 2.5 to 5 acres with 24(58.6%). It is gathered from the survey that many small farmers either lease their land to others or have migrated from their village to urban areas due to the meagre profit they earn from their small size of the land. The small farmers are able to cultivate only once in the year with lot of dependency on the rainfall. The medium and the large farmers are able to cultivate twice in a year due to the bore-well facility which can irrigate their land when the rainfall fails or very meagre in a particular year. The category of 5 – 12.5 acres was 10 (24.4%); below 2.5 acres were 6 (14.9%) and 12.5 acres and above was 1(2.4%).

Farmers' experience and training in cotton and Bt cotton cultivation

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Most of the farmers in the Veppanthattai block have rich experience in cotton cultivation. The category of 10-20 years experience in cotton cultivation was 24(58.5%) and the category of 20-30 years experience was 7(17%) and farmers having experience of more than 30 years was 2(5%). The dominant presence of black soil in the region has contributed to the rich experience of farmers in cotton cultivation. The other most important reason for the dominant cotton cultivation in the district is due to the low rainfall it receives in a monsoon year. The best choice for a farmer in the black soil is cotton and also it becomes the best major cash crop for him/her.

The farmers experience in Bt cotton cultivation is very rich due to the swift pattern of adopting to the new technology. The category of 4-8 years experience in Bt cotton cultivation was 14(34.1%), 8-12 years was 13(31.7%) and more than 12 years was 11(26.9%). Among the samples there were three farmers who had less than four years of experience. The samples reveal that there was a gradual shift of farmers from the hybrid cotton to Bt cotton.

Some who adopted at the early stage of Bt cotton release in 2002 are having lengthy experience in Bt cotton cultivation, farmers who developed faith by learning from other farmers on Bt cotton productivity have less experience in Bt cotton cultivation since it took some years for them to adopt. The farmers expressed that Bt cotton showed good results of controlling bollworm and decrease in the number of pesticide spraying which induced farmers to adopt Bt cotton seed in large levels. The farmers also expressed that the seed market were flooded with Bt varieties of seed and there was less option for farmers to grow hybrid or desi seeds.

The farmers expressed good experience and knowledge in growing Bt cotton which they learnt from co-farmers and through their own experience. Since the district is known for cotton cultivation it is perhaps most of the farmers have good experience in Bt cotton cultivation. Out of the 41 farmers interviewed only 8 farmers have attended some training programmes offered by any institutes in Tamilnadu or elsewhere in the country. The remaining 33 farmers have never attended any training programme offered by any formal institute. The most important factor inferred from the farmers was that the economically well off farmers have good contact with the officers in these institutes and the officers operate through the contacts of these farmers. The farmers conveyed that officers did neither reached to individual farmer nor able to give proper advertisements regarding the training programmes. The farmers who are in regular touch with the institute know about the programmes and invite their friends to the training schedule. Even among those farmers who attended training expressed that they did not take the training programmes very seriously. The farmers said that they used to visit the centre and collect their TA and DA; attend some sessions and leave the institute. This is the scenario even though the block is gifted with the Research Station on Cotton, set up by the Tamilnadu Agriculture University, Coimbatore. It is also learned that the Research Station responded satisfactorily to individual farmers if they go with problems in growing the crop.

Cultivation of Bt cotton and farmers satisfaction

Bt cotton is considered to be the wonder technologies of the biotechnology which was propagated to mitigate the hard labour of the farmers and bring prosperity in their life. When the farmers were questioned about the better income/monetary management brought in by Bt cotton cultivation 53.7% of the farmers were not able to make an opinion whether they agree or disagree on the proposition. The same was also seen on the better control over farm management (63.4%) and on self-satisfaction with the cultivation of Bt cotton (56.1%). The lack of opinion formation on the cultivation of Bt cotton by the farmers signified that there could be other factors like the market, monsoon etc might be influencing the overall impacts on the occupation and life of farmers.

Difference of cultivating Bt cotton over non Bt cotton crop

The sowing of Bt cotton and non Bt cotton seed marked one of the main difference in cultivating these crops. The farmers expressed that gap between Bt cotton seeds has to be more when compared to the non Bt cotton seeds. Most of the farmers have opted to keep more spaces between Bt cotton seeds, which a small farmer when interviewed said that he accepted the process very hesitantly since it decreases the number of plants. The farmers think that planting more seeds would result in more yields per acre and less number of seeds would decrease the yield. The private companies were very successful in campaigning the farmers to adopt more spaces between seeds and assured that the yields won't be reduced by planting less seeds. Majority of the farmers (40.8%) agree that sowing of Bt cotton seed is different from the non Bt cotton seed. The farmers didn't find greater difference between Bt cotton and non Bt cotton in the preparation of the field. The farmers (46.3%) were following most of the established procedures which they used to follow for non Bt seed.

The farmers (61%) were thoroughly satisfied with the germination of the Bt seed. The farmers were conscious of the illegal Bt seeds available in the market and to identify the good seeds in the market they totally depend on the local seed agents. The instruments to identify illegal Bt cotton was developed by Central Institute of Cotton Research, Nagpur did not reach these farmers.

The farmers were not able to strongly give an opinion on the requirement of water in cultivating cotton crop. Around 65.9% of the farmers did not have an opinion on the requirement of water since the agro-ecological conditions of the district favors the cultivation of cotton without much dependence on irrigation. The main season of cultivation in the block as well in most parts of Tamilnadu starts with October and by January the total process ends. The season brings frequent rainfall which is sufficient for the cotton crop. The black soil is an additional advantage which supports water retention and reduces the frequent water supply to the crops. The farmers felt that at the end of the season if there might be possibility of watering the crop it would result in increased yield of cotton. The farmers are not so much disturbed about the water necessity but are worried about the unpredictable rainfall in the season which damages the crop.

The farmers were of the strong opinion (53.7%) that the Bt seed required less number of sprays and very effective in containing the bollworm pests. Most of the farmers expressed happiness about the technology which has reduced their spraying more than 10 times. They felt this has not only reduced the physical labour but also the undesired stress on the body due to pesticide spraying. The farmers also showed apprehension that the bollworm pest is undergoing fast resistance to Bt and this is shown in the increasing number of sprays year after year.

The farmers were not able to make an opinion on the fertility of the soil which is used for Bt cotton cultivation and the level of fertility maintained in the soil during the cultivation of hybrid cotton. It signified that they did not feel the soil is infertile or gradually losing fertility with the cultivation of Bt cotton. The farmers did not find the plucking of cotton lint from the plant is much different from the non Bt.

Farmer's selection of Bt cotton seed and other aspects of cultivation

The farmers were questioned to understand how different varieties of cotton seed bring about changes on the aspects of cultivation. The farmers uniformly agreed that the variety of cotton seed is very important on the output of the crop. They also expressed that in order to bring good yield they are ready to spend more on the good seed available in the market. It is a fact that Indian farmers have spent equally like an American farmer in buying a good variety of cotton seed when the Bt cotton seed was sold on exorbitant rates during initial years of its release. They felt that only when good seed is planted the whole exercise of various efforts to increase the yield will be successful. The farmers are aware of the multiplicity of companies in the production of Bt cotton seeds and they choose the seed which has given good performance in the previous season.

56.1% of farmers agreed that the fertilizer consumption of different varieties of cotton does not vary significantly. The farmers expressed that the use of fertilizer did not substantially change after the adoption of Bt seeds. The farmers also said that they have continued to use more or less the same amount of fertilizers for so many years. For every acre of cotton cultivation the farmers themselves have fixed their ratio of fertilizers and they use it according to the need of the soil. They are very sure about what they are applying in the fields even without any soil testing based on the performance in the previous season.

The farmers (56.1%) felt that there is a great difference in the use of pesticide on the variety of seed used in the fields. The experience of farmers with Bt seed made them to realize that use of pesticide is very less compared to the hybrids available earlier than 2002.

The farmers (82.9%) were not able to make an opinion on the assured need of irrigation for the cotton crop. They felt if irrigation facilities are available it is an added security to cultivate cotton crop. The need of assured irrigation in the block was not a serious aspect among the farmers in the cultivation of cotton crop.

The farmers (43.9%) agreed that a good favourable weather condition is essential for the cultivation of cotton crop. The farmers were of the opinion that

weather condition is most important at the time of germination of seed and plucking of cotton lint.

The farmers (87.8%) strongly agreed that the best performing Bt cotton seed is so important to fetch a good market price for the produce. The majority of the farmers in India have shifted to growing American long staple cotton from the short staple cotton in the 1970s shows that the importance of the variety produced in the field is important to acquire high market value.

The influence of various entities over farmers in adopting Bt cotton over non Bt cotton seeds

The decision of farmer to imbibe a new technology is due to a range of factors which influences him/her. The private moneylenders play an important role in the rural areas to meet the financial needs of the farmers. It is inferred from the survey that moneylenders are not playing a major role in influencing the farmers to shift towards Bt cotton over non Bt cotton. The Banks and other Financial Institutions are also not able play an influencing role with farmers. The Local Panchayat Leader is also a least influencing factor for the farmer in shifting towards Bt cotton. In the group of other least influencing factors are Rural Agricultural Officer, Local Politician/Leader and the District administration. The state apparatus and network of the state to influence the farmer is also the least influential in shifting farmers' opinion towards Bt.

The Seed Companies and the Local Dealers of the Bt seeds played a decisive role in influencing the farmers in adopting Bt cotton over non Bt cotton seeds. The seed companies have promoted their products in TV advertisements, local posters, loud speaker campaign, street plays, sponsoring cultural and sports programmes in the villages. The competition of various seed companies to sell their products witnessed flow of information to villages and farmers regarding the prospects of Bt seed. The local seed dealers have furthered the process of advertising the prospects of Bt which made farmers to go for it. The intimate relationship of dealers with the farmers strengthened the prospects assured by Bt seed companies. This has become a major influence factors for the farmers to adopt Bt cotton over non Bt. The farmers showed choice in companies which produced Bt seed but they did not reject Bt over hybrids.

Relatives/Co-Farmers/Learned person in family also formed to play a major influence in shifting the farmers towards the adoption of Bt cotton seeds. The farmer who witness his co-farmers' good results of Bt cotton play a peer effect on him/her to adopt Bt seeds. The farmers expressed that the Bt cotton results were so impressive that the farmer did not have any option to reject or go for other hybrids. The learned person in the farmers' family also played a very influential role in making an opinion on the choice of Bt and not Bt.

CONCLUSION

The cultivation of Bt cotton in Veppanthattai block, Perambalur district of Tamilnadu are mainly rainfed. The

productivity and the overall success of Bt cotton depends on the vagaries of the monsoon. The social profile of the farmers reveal that nuclear families are more dominant in the cultivation of Bt cotton. The small farmer (2-5acres) is the largest landholding pattern of the area which is also the case with the general trend of landholding pattern in India. The farmers are proactive in adopting new technologies in cultivation. They relied more on the seed dealer or the local salesperson in selecting their Bt cotton seed. The farmers did not find any major difference in the cultivation of Bt cotton in comparison to hybrid cotton. The farmers experienced less use of pesticide and more productivity in Bt cotton.

FUTURE SCOPE

The field study of farmers in Perambalur district, Tamilnadu cannot be generalized across India where different geographic conditions decide the cultivation of Bt cotton. The Krihi Vigyan Kendras across the length and breadth of the nation should be involved in preparing a report on the cultivation of Bt cotton. The reports would help the Government of India to devise new strategies at the scientific, market and cultivation practices of the farmers.

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