

## RESEARCH PAPER IN BOTANY

## Abstract:

Present paper deals with the survey of cotton growers from Parbhani district of Maharashtra, India. For this survey 133 farmers were randomly selected from nine Tehsils (Talukas) of Parbhani district. The questionnaire of 20 questions was prepared to collect the information. Most of the farmers were rain fed cultivators and few were using different irrigation practices. All the farmers were gone for Bt cotton cultivation. Near about 75% of the farmers were observed practice of weeding for 3 times throughout the duration of crop. The 25% of the farmers were found for weeding 4 times in a season. *Alternanthera sessilis* was noted to be the most common weed. Farmers surveyed stated that 60% of cotton flowers develops into bolls or fruits and their average yield recorded was about 2.9 Quintal/acre. Though this district has an agricultural university, hardly 15.5% of farmers were found in contact with university for getting knowledge of cotton cultivation. To enhance yield and economy of the cotton growers more efforts are needed to make farmers aware about new techniques of cultivation, various field practices and government schemes.

**Keyword:** Cotton growers, Survey, Parbhani, Cultivation practices.

## Introduction:

Parbhani is one of the districts in Maharashtra located in Marathwada region. This district has nine tehsils: Sonpeth, Manwath, Pathri, Gangakhed, Parbhani, Selu, Jintur, Purna and Palam. In Parbhani, area under cultivation of cotton (*Gossypium* spp. Family, Malvaceae) is about 2736 ha, production is 2121 tones and the productivity are 127.0 kg/ha (Dendage et al., 2018). In India, Marathwada, Vidarbha and Khandesh regions mostly gives high production of cotton as compared to other parts of Maharashtra (Fand et al., 2019; Kelkar et al., 2020). Parbhani district is one of the major cotton cultivators and producers in Marathwada region of Maharashtra. Most of the land in Parbhani district is black cotton soil which is suitable for cotton cultivation. Previous study shows that only few farmers cultivate the cotton using drip irrigation method. Mandlik (2018) reported that farmers using drip irrigation method could get 1.75 times more yield than non-irrigated cotton fields. Comparison of organic and inorganic cotton production showed that, organic production of cotton is beneficial than inorganic cotton production (Satpute et. al., 2009). The comparative study of Bt and non-Bt cotton from Parbhani and Nanded district was done by

Changule et al. (2010). Regarding knowledge and adaptation of drip irrigation system and its management practices by Bt cotton growers in Parbhani district was earlier studied (Ambhure and Syed, 2022), however, the consolidated survey of all nine talukas was not tried so far. Due to loss in the cotton crop many farmers use to go under depression and commit suicide. In view of this there is need of implementation of proper methods of cultivation and its knowledge. In order to explore the research gaps and to find out lacunae in the cultivation practices the proper survey is necessary. Therefore, this paper deals with study of cotton growers in Parbhani district to design the strategies for effective cultivation practices among cotton growers and to put certain suggestions to improve yield and profit of the cotton growers in this region.

## Material and Methods:

## Study area:

Parbhani is one of district in the Maharashtra state which is situated in the Godavari drainage basin in the central part of India. In the Maharashtra this district lies in the central part of Marathwada region and its geographical location lies between 18.45 and 20.10° North Latitudes and 76.13 and 77.39° East Longitude (Figure 1).

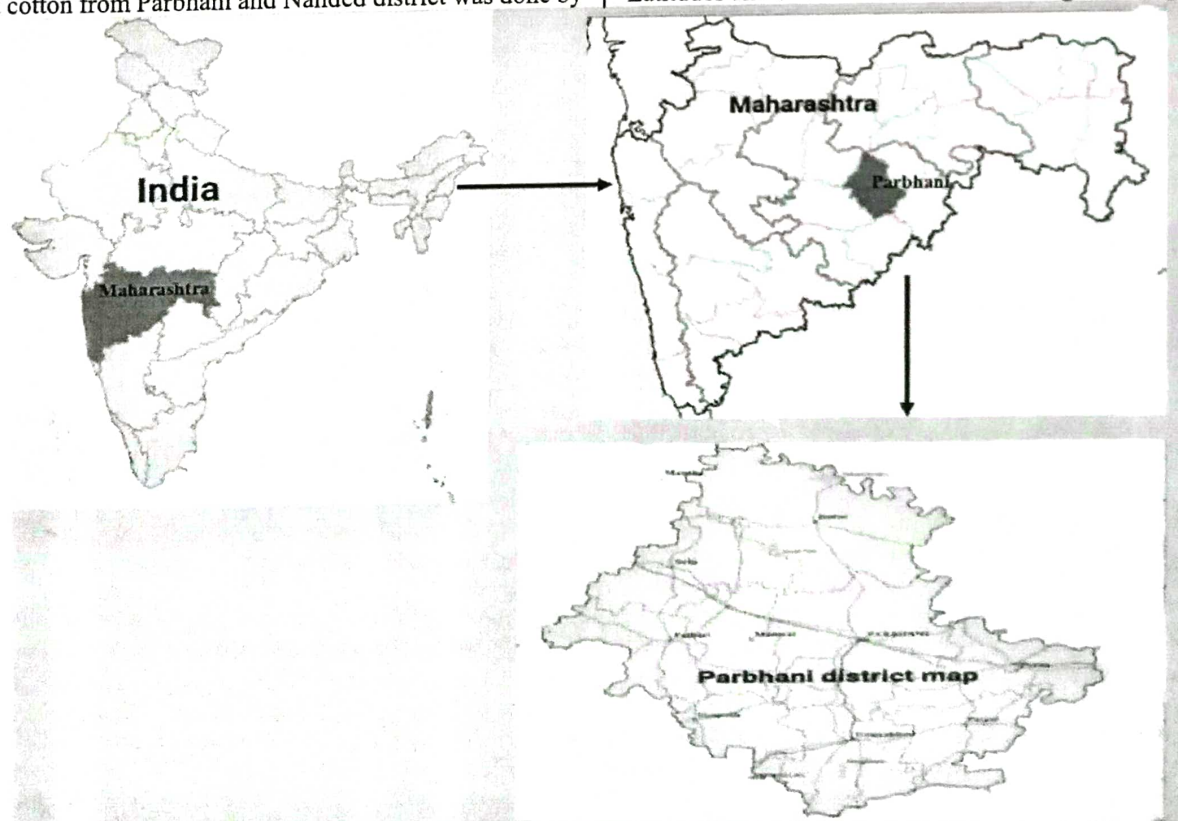


Figure 1. Map showing Parbhani district in the Maharashtra state, India.



**Survey method:**

For collecting information from cotton growers, random survey was carried during April-May, 2021. For conducting this survey, a questionnaire based on cotton cultivation was prepared containing 20 different questions as mentioned in Figure 2. The 135 farmers from

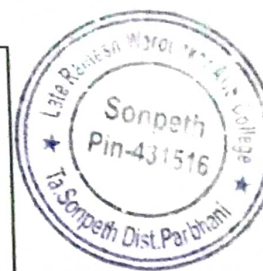
nine tehsils of Parbhani district were surveyed for the answers of the questions (Table 1). The information collected was further analyzed. Total 135 farmers belonging to 9 Tehsils (15 farmers from each Tehsil) of Parbhani district were selected randomly, for the survey.

**Questionnaire**

Name of the Farmer: ..... Village: .....

Tehsil: ..... Mobile number.....

1. Which method is used for cultivation (Traditional/ Modern)?
2. Which irrigation method do you prefer?
3. Which method do you prefer (mixed/single crop method) for cotton cultivation?
4. Do you cultivate another crop after cotton cultivation in a year?
5. Which type of seed (Bt/Non-Bt) is used for cotton cultivation?
6. Number of weeding Undertaken during a season?
7. How many times in a year do you apply fertilizers?
8. Whether soil testing is done before cultivation?
9. Which are the common weeds found in cotton fields?
10. Which are the common diseases on cotton?
11. Do you use chemical pesticides for cultivation?
12. If yes, then how many times pesticides applied?
13. What kind of methods were used for management of plant remnant?
14. What is the percentage of fruit settings?
15. Where do you sell your cotton (government agencies/ private agencies)?
16. What is the yield of cotton per acre?
17. Do you get any government benefits?
18. Which is the source of knowledge regarding cultivation and field practices?
19. Which kinds of tools are used for cultivation?
20. What kind of methods were used against bollworm infection (chemical spray or any other)?



**Figure 2. Format of questionnaire**

**Collection and identification of field samples:**

Beside the survey of cotton growers, some of the cotton fields were also visited to collect the weeds growing in the cotton field. Diseased parts of cotton plants were also collected such as leaf, cotton bolls, etc. Based on the occurred symptoms on plant parts diseases were identified (Agrios, 2005). The weeds species were identified using Flora of Marathwada Vol. I (Naik, 1998), Flora of Maharashtra State Monocotyledones (Sharma et al., 1996) and Flora of Maharashtra State Dicotyledones Vol. I (Singh et al., 2001). The information collected from the cotton growers was analyzed as well as the weeds collected from the cotton fields were identified.

**Results and Discussion: -**

After analyzing responses of farmers, it was found that only few farmers (about 1.5%) of Parbhani district were aware of testing soil health before cultivation of the cotton in their field which is a very low percentage (Table 1). Out of them very few farmers were sending soil samples for testing, but they couldn't receive reports on time.

Most of the farmers were found for using modern methods to cultivate cotton while some farmers were using traditional method of cultivation. The 22.66% farmers told that they were using amalgamation of both modern and traditional methods of cultivation (Table 1). As the agricultural university located at the district place, farmers were asked whether they get any guidance regarding cotton cultivation practices from university. In response, it was found that only 15.5% of farmers were contacting the agricultural university and getting cotton cultivation related information (Table 1).

It was also found that 17.7% farmers used to cultivate cotton on irrigated land while other were cultivating based on rainfed conditions (Table 1). Most of the farmers were found using their traditional wooden agricultural appliances operated by animals like ox. Only 25.95% farmers were found to use machineries (tractors) to perform various agricultural activities (Table 1). All the farmers were growing Bt cotton only. Most of the farmers told that generally they applied chemical fertilizers for better growth of cotton and its application was done thrice in a season. The weeding was carried out 3-4 times in a season depending on the requirement. The common weeds found in cotton field were *Alternanthera sessilis* (L.) R.Br. ex DC, *Parthenium hysterophorus* L., *Cynodon dactylon* (L.) Pers, *Argemone mexicana* L., and *Achyranthes aspera* L. (Figure. 2). The occurrence of *Alternanthera sessilis* was found to be more as compare to others.

During life span of the cotton, number of insects and pests attacks were narrated by the famers, the pests were causing great loss of the yield and reduction in fruit setting (flower to fruit). It was found that percentage of fruit setting was only 60% (Figure 3). Bollworm was the major insect pest of the cotton (Figure 4). Most of the farmer used different chemical insecticides to control Bollworm. The 24.45% farmers were found to be using different ways of disease management like light traps, pheromone trap, spraying neem extract in addition to the chemical spray (Table 1).

Average yield of cotton was found to be 2.9 quintal/acre (Table 1). The 67.8% farmers were growing only cotton as single crop in a year (Table 1), while others were found to grow different seasonal crops like soybean, Jawar and wheat. The 60.74% farmers were found



to be selling their cotton fibres to government agencies while 40% farmers were selling to the private buyers (Table 1).

After harvesting cotton, the remnants were burned by the farmers leading to production of carbon monoxide and carbon dioxide. Therefore, there is need of the effective waste management practices for the usage of the post-harvest remnants of the crop. Generation of bioethanol from the cotton wastes was suggested (Moorthy et al., 2016) in this regard which can be considered.

#### Conclusion:

Parbhani district has black cotton soil which is very suitable for cotton growth but the net income obtained from cotton growing by farmers was very low. The majority of the farmers were using fertilizers without testing the soil during the cultivation. The field waste management was found poor. There is need of the proper guidance and counselling of farmers by the agriculture university in order to improve the crop yield. By increasing sustainable cultivation of cotton crop the money generation would be appropriate which can reduce the problems among cotton growers.

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Table 1 Analysis of data collected from questionnaire from the farmers in Parbhani district (in Percentage)

Sr. No.	Name of Tehsil (Taluka)	SN	MN	GK	PB	PT	SL	JN	PL	PN	
1	Farmers undergone for soil testing	0	7	0	6.66	0	0	0	0	0	
2	Farmers following different methods of cultivation	Traditional	33.33	26.66	20	20	26.66	20	20	33.33	27
		Modern	46.66	53.33	53.33	60	46.66	53.33	53.33	46.66	53.33
		Both	20	20	26.66	20	26.66	26.66	27	20	20
3	Farmers getting guidance for cultivation Practices	Self-Experience	80	87	73.33	80	86.66	93	93	87	80
		From Agriculture Department	20	13.33	26.66	20	13.33	7	6.66	13	20.00
4	Irrigated	20	20	13.3	20	26.67	13.34	13.34	20	13.34	



	Farmers following irrigated/ non-irrigated filed	Non- Irrigated	80	80	86.66	80	73.33	86.66	86.66	80	86.66
5	Farmers using ox/ tractors	Ox	80	80	73.33	80	66.66	73.33	73.33	66.66	73.33
		Tractors	20	20	26.66	20	33.33	26.66	26.66	33.33	26.66
6	Methods used to control Bollworm infection	Synthetic pesticides	73.33	80	66.66	86.66	80	73.33	80	73.33	66.66
		Natural methods for control	26.66	20	33.33	13.33	20	26.66	20	26.66	33.33
7	Yield (Quintals/Acre)		3	3.5	3	3	3	2.5	2.5	3	2.5
8	Farmers selling cotton to Government Agencies		53.33	73.33	66.66	66.66	60	53.33	53.33	53.33	66.66
9	Farmers cultivating only cotton		67	80	70	66.66	53.33	66.66	70	70	66.66
10	Percentage of farmers getting Government support		60	53.33	53.33	66.66	60	53.33	66.66	60	53.33

SN=Sompeth, MN=Manwath, GK= Gangakhed, PB=Parbhani, PT=Pathri, SL=Selu, JN= Jintur, PL=Palam, PN=Purna

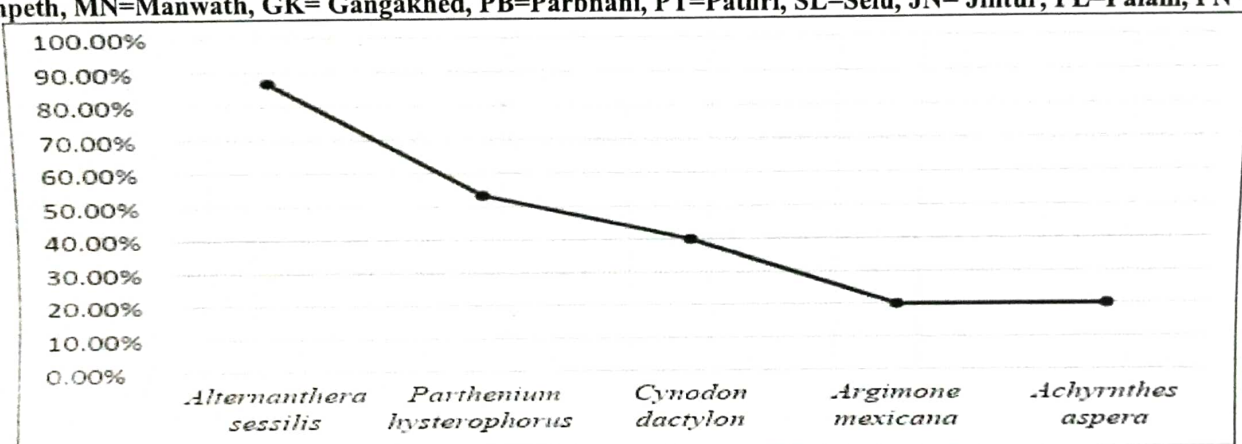


Figure-2. Weeds found in cotton field

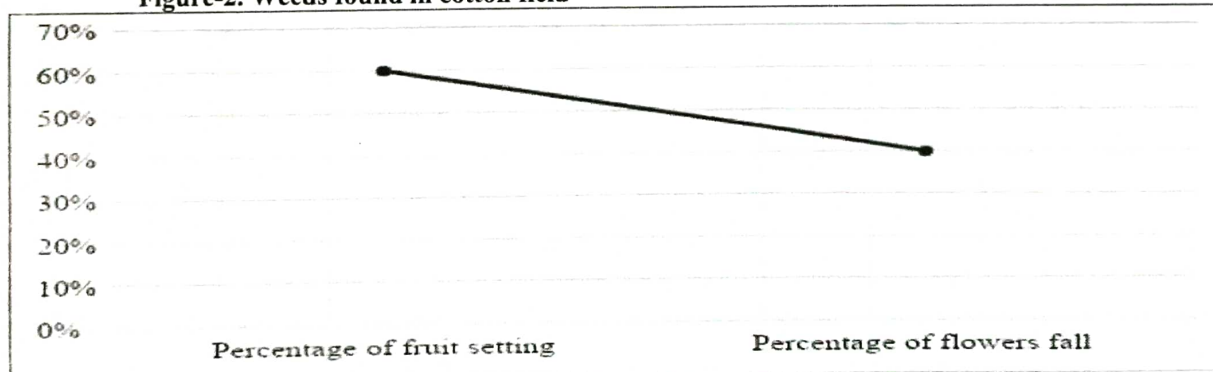


Figure-3. Percentage of fruit setting and flower fall

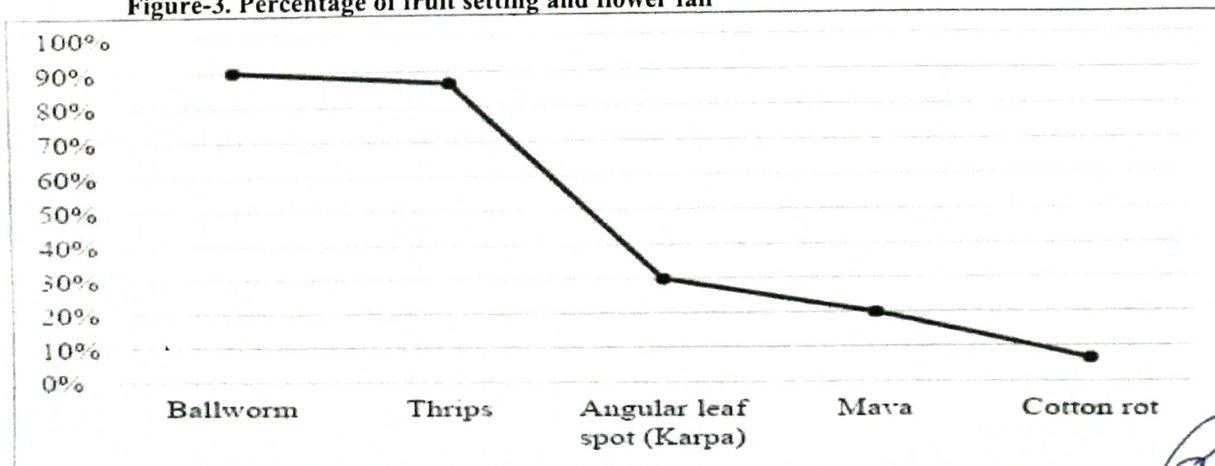


Figure-4 Common threats found on cotton



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