# STUDY ON TECHNOLOGICAL GAP AND KNOWLEDGE OF THE COTTON GROWERS

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***ABSTRACT***

*As cotton is an important cash crop of India, scientific efforts are being made for transfer of technology to potential users. But there exists a gap between technology generation and its adoption by ultimate users. In order to study extent of knowledge and technological gap in Cotton cultivation, present investigation was undertaken. Four tahsils of Dhule district and four villages from each tahsil were selected purposively on the basis of maximum area under cotton crop. From each village 10 respondents thus 120 respondents were randomly selected. Data were collected and tabulated with personal interview schedule. It was seen that the respondent farmers were having partial knowledge about seed rate and spacing, seed treatment, fertilizer management, protective irrigation, plant protection schedule and harvesting of Cotton while high knowledge of recommended cotton cultivation practices like the selection of proper soil type, preparatory tillage, sowing period, inter-culturing operations, crop rotation, intercropping and post harvest technology, but, the knowledge level of the respondent farmer regarding the use of herbicides was very low. It was found that near about three fourths (70.00 per cent) of the growers belonged to medium category of technological gap. Major technological gap was found in respect of practices like use of herbicides and recommended varieties, protective irrigation, seed treatment, fertilizer management and plant protection measures. High cost of seeds and fertilizers, high labour charges were the important constraints reported by growers and organization of training programs, timely availability of inputs were the major suggestions of respondents. There is a need to develop direct research-extension linkage, conduct need based training programmes to reduce the technological gap in cotton cultivation.*

*Keywords: cotton growers, technological gap, knowledge*

## INTRODUCTION

Cotton is the major cash crop of India grown under diverse agro-climatic conditions and plays a key role in the National economy in terms of both employment generation and foreign exchange earnings. Approximately, 65 per cent of the fibre is used in the textile industry , cotton impacts the lives of an estimated 60 million people in India, including farmers (approximately 5 to 5.5 million) who cultivate the crop and a legion of workers involved in the cotton industry from processing to trading.

Introduction of high yielding varieties and other cultivation technologies for cotton crop is a significant landmark in the history of agriculture department. Various technologies are evolved by scientist including high yielding varieties for increasing yield level and share

profit to cultivators but still due to non adoption of certain recommended technologies by the cultivators its yield level is low. At present, efforts are also being made for quick transfer of scientific information to potential users. But there exists a gap between technology generation and its adoption by ultimate users and this may one of the reasons for low yield in cotton. The extent of yield gap is very high under Indian condition compared to the global productivity. Similar trend was also observed in Dhule district. This may be due to lack of technical know-how and either no or poor adoption of recommended technologies by the growers.

Considering these scientific needs, present study was undertaken with the objectives to study the extent of knowledge of respondents about recommended cotton cultivation practices and to find out the extent of technological

gap between recommended and actually adopted cotton cultivation technologies by the respondents.

**OBJECTIVES**

(a) To know the Overall knowledge of respondent cotton growers

(b) To know the Technological gap in cotton cultivation technology

(c) To know the Practice wise knowledge level of the respondents about cotton cultivation technology

(d) To know the Extent of technological gap with regard to individual practices of cotton production technology

(e) To know the contraints faced and important constraints faced and suggestions made by the respondents

**METHODOLOGY**

Considering the maximum area under cotton cultivation, present study was conducted in Shirpur, Shindkheda, Sakri and Dhule blocks of Dhule district of Maharashtra state. The list of cotton growing villages was obtained from agricultural assistant. From the list, 12 villages having maximum area under cotton cultivation and 10 major cotton growers were selected by proportionate random sampling procedure. Thus, a total of 120 respondents were selected as a sample for the study. Data were collected personally with designed interview schedule. An exploratory research design was used for the present investigation.

**RESULTS AND DISCUSSION**

**Overall knowledge of respondent cotton growers**

The overall knowledge of the respondents in relation to recommended cultivation practices of rainfed cotton technology was assessed. The knowledge score of each respondent farmer was calculated and converted into percentage. The respondent farmers were classified into three categories *viz.,* a) low knowledge level, b) medium knowledge level and c) high knowledge level. The results are presented in Table.1.

**Table.1: Distribution of the respondents according to their level of overall knowledge          n=120**

| Sr. No. | Overall knowledge level | No. of respondents | Percentage |
|---------|------------------------|--------------------|-----------|
| 1 | Low (Scores upto 35) | 09 | 7.50 |
| 2 | Medium (Scores 36 to 43) | 99 | 82.50 |
| 3 | High (Scores 44 and above) | 12 | 10.00 |

Mean = 39.2                                    SD = 8.1525

It was observed from Table1 that the highest percentage (82.50 per cent) of the respondent cotton growers were having medium level knowledge followed by 7.50 per cent and 10.00 per cent of them had low and high knowledge level respectively. Same findings were reported by Chavan (2005), Mane (2005) and Patil (2007).

Thus, it can be inferred that the knowledge level regarding cotton technology by the majority of the respondent cotton growers was satisfactory. The medium knowledge level of majority of the respondent cotton growers might be due to the fact that the farmers might have exposed to the different communication channels of information sources.

**Practice wise knowledge level of the respondents about cotton cultivation technology**

From Table 2 it was observed that 68.33 per cent of the cotton growers had complete knowledge about medium to black cotton soils with good drainage for cotton crop followed by 23.34 per cent had partial knowledge and very negligible percentage (i.e. 8.33 per cent) cotton growers had no knowledge about selection of proper soil type.

It was observed that 57.50 per cent of the cotton growers had complete knowledge regarding preparatory tillage, while 42.50 per cent had partial knowledge about it. However, 64.16 per cent of them had complete knowledge regarding application of FYM i.e. 10 to 12 cartloads per hectare before last harrowing followed by 35.84 per cent of them had partial knowledge.

**Table.2: Practice wise knowledge of the respondent cotton growers**          **n=120**

| Sr. No. | Recommended Practice | Complete | Partial | No |
|---|---|---|---|---|
| 1 | Selection of proper soil type (medium to black cotton soils with good drainage) | 82 (68.33) | 28 (23.34) | 10 (8.33) |
| 2 | Preparatory tillage | | | |
| a | One deep ploughing, 2 to 3 harrowing clod crushing | 69 (57.50) | 51 (42.50) | -- |
| b | 10 to 12 cart loads FYM/ha before harrowing | 77 (64.16) | 43 (35.84) | -- |
| 3 | Use of recommended varieties | 47 (39.16) | -- | 73 (60.84) |
| a | Deshi-Y-1, JLA-794 | 32 (26.66) | -- | 88 (73.34) |
| b | American - LRA -5166, JLH-168 | 44 (36.66) | -- | 76 (63.34) |
| c | Hybrid - H-6, NHH-44, Phule-492, Phule-388 | 63 (52.50) | -- | 57 (47.50) |
| 4 | Sowing period | | | |
| a | After first shower of monsoon or before second week of July | 99 (82.50) | 21 (17.50) | -- |
| b | Dry sowing before onset of monsoon | 89 (74.16) | 31 (25.84) | -- |
| 5 | Seed rate and spacing | | | |
| a | Seed rate per hectare | 35 (29.17) | 85 (70.83) | -- |
| b | Spacing D 90 X 60 cm, H 90 X90 cm | 48 (40.00) | **72** (60.00) | -- |
| 6 | Seed treatment | | | |
| a | For certified seed, no need of seed treatment | 76 (63.34) | 44 (36.66) | -- |
| b | Own cotton seed, treatment of 75 D Thirum 3 g + 1 g Carbendazium | 43 (35.84) | 62 (51.66) | 15 (12.50) |
| c | Rubbing the seed with cow dung paste | 82 (68.34) | 26 (21.66) | 12 (10.00) |
| d | Seed treatment with 250 gm *Azotobacter* per 10 kg | 41 (34.16) | 47 (39.16) | 32 (26.68) |
| 7 | Inter-culturing operations | 91 (75.80) | 29 (24.20) | -- |
| 8 | Fertilizer management | | | |
| | Hybrid: 100:50:50 kg NPK/ha | 33 (27.50) | 74 (61.67) | 13 (10.83) |
| | Deshi : 80:40:40 kg NPK/ha | 37 (30.83) | 69 (57.50) | 14 (11.67) |
| 9 | Protective irrigation | | | |
| a. | 1 to 2 irrigation from initial stage of boll formation upto complete boll formation | 23 (19.16) | 78 (65.00) | 19 (15.84) |
| b. | 1 to 2 irrigation if necessary when there is dry spell of 15 to 20 days | 45 (37.50) | 71 (59.16) | 4 (3.34) |
| 10 | Use of herbicides | 8 (6.66) | 10 (8.33) | 102 (85.01) |

| 11 | Plant protection measures | | | |
|---|---|---|---|---|
| a. | At the time of sowing application of 10 % phorate granules @ 10 kg per ha | 28 (23.33) | 73 (60.83) | 19 (15.84) |
| b. | 1) Spraying - sucking pest, spraying of Dimethoate 30 % 400 ml in 500 lit. of water/ha | 45 (37.50) | 60 (50.00) | 15 (12.50) |
| | 2) Bollworms - spraying of Endosulfan 35 E.C. 1000 ml /ha | 34 (28.33) | 86 (71.66) | -- |
| c | For areal disease control. Two spraying of copper oxychloride (0.25 %), streptocycline (100 ppm) at interval of 10 to 15 days | 21 (17.50) | 86 (71.66) | 13 (10.84) |
| d. | Biological control | 18 (15.00) | 34 (28.34) | 68 (56.66) |
| 12 | Harvesting of cotton | 41 (34.16) | 79 (65.84) | -- |
| a. | Harvesting should be completed in 3 to 4 pickings | 67 (55.84) | 53 (44.16) | -- |
| b | Picking should be done in the morning | 91 (75.84) | 29 (24.16) | -- |
| 13 | Crop rotation | 102 (85.00) | -- | 18 (15.00) |
| 14 | Intercropping | 72 (60.00) | 48 (40.00) | -- |
| 15 | Post harvest technology | | | |
| a | Storage | 120 (100.00) | -- | -- |
| b | Marketing | 120 (100.00) | -- | -- |

Note : Figures in parentheses indicates parentages

It was observed that most of the respondents did not know recommended varieties.viz. Y-l, JLA-794, LRA-5166, JLH-168, H-6, NHH-44, Phule-492, Phule-388 which are recommended for Dhule district. It was observed that 82.50 per cent and 74.16 per cent had complete knowledge about complete knowledge about sowing period and dry sowing before onset of monsoon, respectively. However 17.50 per cent had partial knowledge about sowing after first shower of monsoon.

Only 29.17 per cent and 40.00 per cent of the respondents had complete knowledge about recommended seed rate and spacing, respectively. However,70.83 per cent and 60.00 per cent had partial knowledge about it. Similar findings were observed by Khandekar (1996).

About recommended seed treatment of thirum and carbondazium 35.84 per cent and 68.34 per cent of the respondents had complete knowledge about use of cow dung paste while, 51.66 per cent of them had partial knowledge and 12.50 per cent had no knowledge.

It was observed that 64.16 per cent had complete knowledge about application of manures and fertilisers while 35.84 per cent had partial knowledge. Nearly three fourths (75.84 per cent) and 24.20 per cent had complete and partial knowledge regarding inter-culturing practices, respectively.

Only 19.16 per cent of the respondents had complete knowledge about protective irrigation at the time of initial stage of boll formation upto final stage. On the contrary, 65.00 per cent and 15.84 per cent of them had partial and no knowledge, respectively.

Regarding application of herbicides, a very less i.e. only 6.66 per cent of the respondent cotton growers had complete knowledge followed by partial knowledge (8.33 per cent).

Regarding plant protection measures equal respondents (71.66 per cent) had partial knowledge about spraying of endosulfan 35 E.C. and copper oxychloride (.25 %) for control of bollworms and aerial disease respectively whereas only 15.00 per cent of the respondent cotton had complete knowledge regarding use of biological control. Same results were reported by Andheri *et.al* (2007),Chapke (2000), Katole and *et al*.(1998).

Regarding crop rotation and intercropping a large majority (85.00 and 60.00 per cent respective) of the

cotton growers had complete knowledge. However all the respondents were completely awared about the method of storage and marketing of cotton.

$$T.G. = \frac{[\text{Recommended cultivation practice} - \text{Actual adopted practice by the respondents}]}{\text{Recommended cultivation practice}} \times 100$$

The distribution of the respondent cotton growers by their overall technology gap is given in Table 3.

**Table 3: Distribution of the cotton growers by their overall technological gap** n=120

| Sr. No. | Technological gap | No. | Percent |
|---|---|---|---|
| 1 | Low (up to 42 scores) | 30 | 25.00 |
| 2 | Medium (43 to 58 scores) | 84 | 70.00 |
| 3 | High (59 and above scores) | 06 | 05.00 |

Mean = 49.7 SD = 8.1525

Data from Table 3 state that majority (70.00 per cent) of the respondent fell in medium followed by 05.00 per cent of the respondent cotton growers in high technological

**Technological gap in cotton cultivation technology**

Technological gap (T.G.) was calculated by using following formula

gap and 25.00 per cent of the respondent cotton growers in low technological gap category. Similar results were reported by Ahire and e*t.al*(2002) and Howal(2008)

The average technological gap of the respondent cotton growers was 49.70 per cent in the sampled areas.

**Extent of technological gap with regard to individual practices of cotton production technology**

It was felt that extent of technological gap among respondent cotton growers may not be uniform in all practices of cotton growers. Hence, technological gap for each practice was worked out which is presented in Table 4.

**Table 4 : Extent of technological gap in individual practices of cotton production technology** n=120

| Sr. No. | Practice | Standard score | Extent of adoption (percent) | T.G. (Percent) | Rank |
|---|---|---|---|---|---|
| 1 | Selection of proper soil type | 2 | 89.00 | 11.00 | XIII |
| 2 | Preparatory tillage | 3 | 82.33 | 17.67 | XII |
| 3 | Use of recommended varieties | 4 | 5.00 | 95.00 | III |
| 4 | Sowing period | 3 | 93.59 | 6.41 | XV |
| 5 | Seed rate and spacing | 5 | 44.00 | 56.00 | VIII |
| 6 | Seed treatment | 3 | 11.67 | 88.33 | IV |
| 7 | Fertilizer management | 6 | 18.59 | 81.41 | V |
| 8 | Inter-culturing operations | 4 | 57.62 | 42.38 | VIII |
| 9 | Protective irrigation | 3 | 5.00 | 95.00 | II |
| 10 | Use of herbicides | 2 | 3.00 | 97.00 | I |
| 11 | Plant protection measures | 6 | 18.83 | 81.17 | VI |
| 12 | Harvesting of cotton | 3 | 78.75 | 21.25 | X |
| 13 | Crop rotation | 2 | 81.75 | 18.25 | XI |
| 14 | Intercropping | 2 | 75.75 | 24.25 | IX |
| 15 | Post harvest technology | 2 | 89.60 | 10.40 | XIV |
| Average T.G. | | | | 49.70 | |

It was found that near about three fourth (70.00 per cent) of the growers belonged to medium category of technological gap. It was observed that major technological gap was found in respect of practices like use of herbicides and

recommended varieties, protective irrigation, seed treatment, fertilizer management and plant protection measures. Similar findings were recorded by Vijaykumar (2007) and Maghade (2008).

**Table 5 : Important constraints faced and suggestions made by the respondents                n=120**

| Sr. No. | Constraints | Frequency | Percent |
|---|---|---|---|
| 1 | Non availability and high cost of seeds | 77 | 64.16 |
| 2 | Lack of knowledge about ' recommended seed treatment method | 78 | 65.00 |
| 3 | High cost of chemical fertilizers | 87 | 72.50 |
| 4 | High labour charges and Shortage of labour | 58 | 48.33 |
| 5 | Inadequate storage and transportation facilities, lack of knowledge about proper grading | 102 | 85.00 |
| **Suggestions** | | | |
| 1 | Supply of inorganic fertilizers at subsidized rates by Govt. | 91 | 75.83 |
| 2 | Timely supply of seeds, fertilizers and pesticides | 63 | 52.50 |
| 3 | Trainings should be organized on plant protection, INM, grading, packaging by Agril. department etc. | 68 | 56.66 |

The major constraints faced by the respondents were inadequate storage and transportation facilities (85.00 per cent), high cost of chemical fertilizers 72.50 per cent) and unavailability of seeds in time (64.16 per cent). Also important suggestion made by majority of the respondents were supply of inorganic fertilizers at subsidized rates (75.83 per cent), trainings in respect of plant protection, INM, grading, packaging etc. should be organized. Similar suggestions were reported by Patil (2007), Parikh *et al.,* (2015) and Shinde (1997).

Further the study can be concluded that there is a need to develop direct research-extension linkage to make co ordinated efforts by SAUs, agril. departments, research institutes, NGOs for providing technical guidance, so as to reduce the technological gap, conduct intensive trainings on IPM ,INM ,irrigation management etc. Further cotton growers should be promoted for establishing co-operative processing units.

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