Research Paper

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Extent of Adoption of Cotton Production Technologies by Farmers in Andhra Pradesh

Agriculture

KEYWORDS :

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ABSTRACT

Ex-post facto research design was followed for carrying out the study in the state of Andhra Pradesh. Sample comprised of 120 farmers selected randomly from four randomly selected mandals of Mahaboobnagar district which was a purposive selection. Majority of the respondents had medium adoption in cotton followed by low and high. Hence, DAATT centre needs to emphasize on low cost technologies like plant protection aspects, maintenance of refugee crops, availability of biological inputs through cooperatives for the community usage.

INTRODUCTION

Research and technology development have been foundation of impressive productivity gains in the agricultural sector. The ability of the sector to conserve natural resources and protect the environment depends, in part, on the technologies used. Two forces guide technological development. The first is "Demand – Pull," where the needs of the farmer create the demand for a technology. The second force is "Supply – Push," where in the impetus for development comes from scientists who find valuable technologies, which are then introduced into farming sector. Both forces produced important and useful technologies, and the government can use both to encourage innovations that foster environmental quality and resources conservation. Policies such as environmental regulation can boost the Demand – Pull forces for environmentally benign technologies. Other government policies can foster Supply – Push forces for the desirable technologies. These polices include funding for research and development, technology transfer activities, and efforts to understand and facilitate technology adoption.

Technological innovation has been a key element in the growth of agriculture throughout the world. But the professionals in agricultural development are gradually realizing that modern agricultural science and technology has a certain bias which causes a different impact on development in different regions and areas. Due to the growth of the population and the low price for agricultural produce, there is an urgent need to develop a holistic/ integrated approach to combat the problems of agricultural production and productivity and find out viable solutions to satisfy the various needs of the people of the developing countries. Transfer of agricultural technology through Research – Extension – Farmers systems contributed tremendously in increasing agricultural production in India and also its transfer mechanism has been very purposeful and result-oriented.

Research focusses on the technical aspects for generating useful technologies, while extension focuses on the acceptance, utilisation and finally adoption of technologies by users.

Agricultural extension involves the whole gamut of complex interaction between farmers, extension workers and researchers in transfer of technology, eventually resulting in enhancing productivity and profitability to the farmers. It is possible to obtain successful results from the research only when it is conducted based on the needs and interests of the targeted people.

MATERIALS & METHODS

Ex-post facto research design was followed for carrying out the study in the state of Andhra Pradesh. Sample comprised of 120 farmers selected randomly from four randomly selected mandals of Mahaboobnagar district which was a purposive selection.

Adoption is the acceptance and practical application of a particular recommended practice. To measure the adoption, recommended practices in cotton crop were selected to prepare the schedule in consultation with Scientists of DAATTC, teaching staff of College of Agriculture, Rajendranagar and officials of State department of agriculture and other staff. The respondents were asked to respond to each sun item of adoption of these practices with respect to their extent of adoption on a five point continuum namely 'full adoption' (5), 'partial adoption' (4), 'less adoption' (3), 'symbolic adoption' (2), 'non adoption' (1) with respective weightages accorded. Full adoption is operationalised as the adoption of stated practice completely and regularly in each season of a year continuously for three year period. Partial adoption is operationalised as the adoption of only a part or whole of recommended practice once in year continuously for three year period. Less adoption was operationalised as the adoption of only a part of recommended practice once in a three years period. Symbolic adoption was operationalised as the practices over which he has taken mental decision but not taken up physical action over them. Non adoption was operationalised as that recommended practices were not all adopted by the farmer.

The maximum and minimum possible scores were 200 and 40 respectively. Whereas the maximum and minimum scores obtained were 160 and 97 respectively. The total score of all respondents was arrived by multiplying the frequency of responses under each of the sub item of practice with corresponding weightage. The mean score of each sub item of practice was arrived from dividing total score with number of respondents and sub items were ranked based on mean scores.

Categorization :

The respondents were grouped into following three categories i.e. low, medium and high based on inclusive class interval technique.

Category of adoption	Range
Low	97-118
Medium	118-139
High	139-160

Coefficient of correlation was used to test the relationship between profile characteristics of farmers and their extent of adoption.

RESULTS & DISCUSSION

Extent of adoption of recommended practices in cotton

It could be indicated from the Table.1 that majority (71.67%) of the respondents had medium adoption in cotton followed by low (15.83 %) and high (12.50%).

Table.1 Distribution of respondents based on extent of adoption in cotton
n=120

S. No.	Category	Respondents	
		Frequency	Percentage (%)
1	Low	19	15.83
2	Medium	86	71.67
3	High	15	12.50

The medium extent of adoption of recommended practices was observed because of less opportunity for feedback and consideration of farmers suggestions for refinement of technologies as found from the study.

Table.2 Distribution of respondents based on overall ranking of adoption in cotton
n=120

S No.	Practices	Total score	Mean score	Rank
1	Preparatory cultivation	433.57	3.61	II
2	Seed and Spacing	385.29	3.21	IV
3	Cropping Pattern and crop rotation	386.00	3.22	III
4	Fertilizer Management	377.43	3.15	V
5	Irrigation	326.75	2.72	VIII
6	Weed Management	449.67	3.75	I
7	Plant protection	344.00	2.87	VII
8	Harvest and post harvest operations	361.00	3.01	VI

It can be seen from Table.2 that weed management followed by preparatory cultivation, cropping pattern and crop rotation, seed and spacing, fertilizer management, harvest and post harvesting operations, plant protection and irrigation were ranked in the order of priority.

The weed management was ranked high as seen from the Table.2. The results of Table.3 support the findings of Table.2. Intercultivation with implements was ranked first and this was also due to information coverage by the extension officials and thus the utilisation of this information on mechanization aspects was observed.

Next adopted practice was preparatory cultivation this is due to utilised the information given by DAATTC on mechanization aspects and most of respondents used the implements in land preparation.

The next adopted practice in the order was cropping pattern and crop rotation. This reason can be attributed to their high participation in demonstrations, diagnostic visits and group meetings which motivated the farmers to accept and act upon.

The fourth adopted practice was seeds and sowing. Low cost technologies like seed rate, seed selection were adopted in order as they got convinced of the profitability of these practices in demonstrations, diagnostic visits and group meetings in which their participation was high.

The fifth adopted practice was fertilizer management. In which, time of application right fertilizer, split application and methods were adopted of having realised the importance of these low cost technologies through services rendered. Soil test based fertilizer application and bio fertilizers application were less utilised.

The sixth adopted practice was harvest and post harvest operations, wherein low cost technologies viz., time of picking was adopted which helped in quality maintenance.

The seventh adopted practice was plant protection in which usage of bio pesticides ranked first due to easy availability and trialability of formulation.

Least adopted practice was irrigation as it was rainfed crop. It also found from study that symbolic adoption of micro irrigation methods was high. Though they have taken mental decision on this aspect, they have not adopted it due to non availability of sprinklers and drips to farmers on subsidy from government.

Table.3 Distribution of respondents based on practice wise and sub item wise ranking in adoption
n=120

S. No.	Practices	FA		PA		LA		SA		NA		Total score	Mean score	Rank
		F	%	F	%	F	%	F	%	F	%			
I.	Preparatory cultivation													
1	Type of soils in which cultivation done	56	46.67	15	12.50	20	16.67	17	14.17	12	10.00	446	3.72	IV
2	Deep summer ploughing	53	44.17	32	26.67	16	13.33	19	15.83	0	0.00	479	3.99	III
3	Implements used in land preparation	34	28.33	59	49.17	27	22.50	0	0.00	0	0.00	487	4.06	I
4	Usage of pre-emergence herbicides	20	16.67	27	22.50	23	19.17	31	25.83	19	15.83	358	2.98	VII
5	Maintenance of soil moisture at sowing	89	74.17	0	0.00	0	0.00	6	5.00	25	20.83	482	4.02	II
6	Basal application of organic manures in soil	35	29.17	41	34.17	20	16.67	5	4.17	19	15.83	428	3.57	VI
7	Basal application of fertilizers in soil	31	25.83	21	17.50	10	8.33	28	23.33	30	25.00	355	2.96	VIII
			37.86		23.21		13.81		12.62		12.50		3.61	
II.	Seed and Spacing													
1	Seed selection	49	40.83	22	18.33	18	15.00	31	25.83	0	0.00	449	3.74	II
2	Pre-sowing seed treatment	19	15.83	11	9.17	7	5.83	38	31.67	45	37.50	281	2.34	VI
3	Chemical seed treatment	45	37.50	21	17.50	18	15.00	29	24.17	7	5.83	428	3.57	IV
4	Sowing time followed	34	28.33	29	24.17	21	17.50	16	13.33	20	16.67	401	3.34	V
5	Seed rate	63	52.50	19	15.83	21	17.50	17	14.17	0	0.00	488	4.07	I
6	Maintenance of refugee crop	5	4.17	15	12.50	8	6.67	20	16.67	72	60.00	221	1.84	VII
7	Spacing followed	46	38.33	23	19.17	19	15.83	18	15.00	14	11.67	429	3.58	III
			31.07		16.67		13.33		20.12		18.81		3.21	

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III.	Cropping pattern and crop rotation													
1	A) Type of cropping pattern	31	25.83	8	6.67	49	40.83	18	15.00	14	11.67	384	3.20	II
2	B) Crop rotation followed	32	26.67	25	34.17	21	17.50	23	19.17	19	2.50	388	3.23	I
			26.25		20.42		29.17		17.09		7.09		3.22	
IV.	Fertilizer Management													
1	Soil test based fertilizer application	18	15.00	45	37.50	27	22.50	9	7.50	21	17.50	390	3.25	V
2	Time of fertilizer application	31	25.83	53	44.17	21	17.50	2	1.67	13	10.83	447	3.73	I
3	Number of fertilizer applied in splits	43	35.83	23	19.17	19	15.83	24	20.00	11	9.17	423	3.53	II
4	Method of application	23	19.17	37	30.83	28	23.33	12	10.00	20	16.67	391	3.26	IV
5	Micronutrient application	38	31.67	19	15.83	17	14.17	24	20.00	22	18.33	387	3.23	VI
6	Biofertilizer application	0	0.00	10	8.33	14	11.67	18	15.00	78	65.00	196	1.63	VII
7	Fertilizer application during drought condition i.e. 2% urea	36	30.00	26	21.67	18	15.00	30	25.00	10	8.33	408	3.40	III
			22.50		25.36		17.14		14.17		20.83		3.15	
V.	Irrigation													
1	Scheduling of irrigations at critical stages	39	32.50	21	17.50	24	20.00	7	5.83	29	24.17	394	3.28	II
2	Irrigation interval	38	31.67	25	20.83	27	22.50	13	10.83	17	14.17	414	3.45	I
3	Number of irrigations	31	25.83	19	15.83	8	6.67	20	16.67	42	35.00	337	2.81	III
4	Micro- irrigation methods	0	0.00	0	0.00	0	0.00	42	35.00	78	65.00	162	1.35	IV
			22.50		13.54		12.29		17.08		34.58		2.72	

VI.	Weed Management													
1	Weedicide application	34	28.33	20	16.67	24	20.00	10	8.33	32	26.67	374	3.12	III
2	Intercultivation with implements	72	60.00	9	7.50	26	21.67	2	1.67	11	9.17	489	4.08	I
3	Stages of weed control	69	57.50	12	10.00	25	20.83	4	3.33	10	8.33	486	4.05	II
			48.61		11.39		20.83		4.44		14.72		3.75	
VII	Plant protection													
1	Cultural control methods	31	25.83	19	15.83	23	19.17	17	14.17	30	25.00	364	3.03	IV
2	Physical control methods	33	27.50	21	17.50	18	15.00	14	11.67	34	28.33	365	3.04	III
3	Mechanical control measures	5	4.17	13	10.83	16	13.33	8	6.67	78	65.00	219	1.83	VI
4	Usage of bio pesticides	73	60.83	13	10.83	12	10.00	2	1.67	20	16.67	477	3.98	I
5	Chemical control measures	46	38.33	21	17.50	16	13.33	10	8.33	27	22.50	409	3.41	II
6	Biological control measures	5	4.17	14	11.67	21	17.50	6	5.00	74	61.67	230	1.92	V
			26.81		14.03		14.72		7.92		36.53		2.87	
VIII.	Harvest and post harvest operations													
1	Implement usage	0	0.00	8	6.67	12	10.00	52	43.33	48	40.00	220	1.83	IV
2	Time of picking	42	35.00	24	20.00	21	17.50	5	4.17	28	23.33	407	3.39	I
3	Harvesting parameters like staple length and kapas length	40	33.33	19	15.83	17	14.17	14	11.67	30	25.00	385	3.21	III
4	Storage facilities	39	32.50	43	35.83	8	6.67	11	9.17	19	15.83	432	3.60	II
			25.21		19.58		12.08		17.08		26.04		3.01	

Table.4 Correlation coefficient values between selected profile characteristics of farmers with extent of adoption of the practices in cotton

S. No.	Variables	Extent of Adoption in cotton
1	Age	0.17144^{NS}
2	Education	0.15833^{NS}
3	Farm size	0.21587*
4	Farming experience	0.2549**
5	Annual income	0.13671^{NS}
6	Occupation	0.1299^{NS}
7	Innovativeness	0.17087^{NS}
8	Economic orientation	0.12925^{NS}
9	Market Orientation	0.05226^{NS}
10	Change proneness	0.15942^{NS}
11	Achievement motivation	0.188267*
12	Information seeking behaviour	0.18613*
13	Social participation	0.1557^{NS}
14	Participation in DAATTC activities	0.13677^{NS}

* Significant at 5 per cent level of probability,
** Significant at 1 per cent level of probability
NS - Non significant

Relationship of profile characteristics of famers with extent of adoption in cotton

From the Table.4 it is understood that the calculated 'r' values of farm size, achievement motivation and information seeking behaviour were greater than tabled 'r' value at 5 per cent level of probability, whereas it was greater at 1 per cent level of probability in case of farming experience. Hence, null hypothesis was rejected and empirical hypothesis was accepted. Therefore, it can be concluded that there was positive and significant relationship between above profile characteristics and adoption level in cotton and more so, in case of farming experience.

On the other hand the calculated 'r' of age, education, annual income, occupation, innovativeness, market orientation, economic orientation, change proneness, social participation and participation in DAATTC activities were less than tabled 'r' value. Hence, null hypothesis was accepted and empirical hypothesis was rejected. Therefore, it can be concluded that there was no significant relationship between above characteristics and adoption in cotton.

CONCLUSION

As majority of respondents had small farm size with medium income with labour and agriculture as main and subsidiary source of income, DAATTC scientists need to focus on promotion of farming system approach for betterment of their livelihood. Majority of respondents were not members in any organization so extension agencies should encourage the farmers social participation by strengthening community organization programmes to form youth clubs, welfare associations, farmers discussion groups etc. so that they will get more exposure and empowered and effectively utilise the services. Majority of respondents had medium adoption of Bt cotton technologies were less adopted. Hence, DAATT centre needs to emphasize on low cost technologies like plant protection aspects, maintenance of refugee crops, availability of biological inputs through cooperatives for the community usage. The government should sensitize the farmers to involve formally in various rural organizations like panchayat, youth clubs, water users associations, community libraries and market committee etc. to improve their level of confidence and risk receptivity which enhance their adoption towards technologies.

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