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PERFORMANCE OF COTTON (*GOSSYPIUM SPS*) UNDER INTEGRATED CROP MANAGEMENT PRACTICES IN NORTHERN DRY ZONE OF KARNATAKA

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Abstract: With an objective of improving productivity of cotton, Integrated crop management (ICM) demonstrations were conducted in 24 farmers' field in Lingsugur taluka of Raichur district in Karnataka state during *Kharif* season during 2015-16 and 2016-17. The study findings revealed that Integrated Crop Management (ICM) practices recorded a mean yield of 2035 kg/ha which is 8.00 per cent higher than obtained with farmers' practice (1805 kg/ha). The average extension gap, technology gap and technology index were 230 kg/ha, 465 kg/ha and 18.60 per cent, respectively. The improved production technologies gave higher benefit cost ratio (2.48) compared to local check (2.37) being grown by farmers under locality. The productivity of cotton per unit area could be increased by adopting feasible scientific and sustainable management practices with a suitable variety. Considering the above facts, ICM demonstrations were carried out in a systematic and scientific manner on farmer's field to show the worth of an improved practices and convincing farming community about potentialities of improved production management technologies of cotton for further adoption by the farming community.
Keywords: Cotton, ICM, technology, production.

Introduction

Cotton is one of the most important cash, commercial and fiber crop of the country, occupy an area of about 11.872 million hectares with a production of 30.47 m tones and average productivity of 568 kg/ha (Anon., 2016). The productivity of the crop is lowest in Vidarbha as well as in the state of Maharashtra (173 kg lint/ha) as compared to National (299 kg lint/ha) and world (585 kg lint/ha) average. In Karnataka, cotton is grown over an area of 6.63 lakh ha, with a production of 18.02 lakh tones and productivity of 510 kg/ha. Looking into the maximum yields obtained at progressive farmer's fields in Central, North, & South zones, it is possible to double the average yield with the existing cotton technologies. In this direction UAS has introduced the average yield with the existing cotton technologies. In this direction UAS has introduced ICM demonstration. This is the unique programme since the

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scientists are directly involved in conducting demonstrations. This also enables scientists to have first hand information. With a view to communicate cotton production technology widely & for realizing the yields of farmers, around 24 cotton ICM demonstrations of new technologies are laid out directly on farmers field during 2015-16 and 2016-17.

The extent of adoption of improved agricultural technologies is a crucial aspect under innovation diffusion process and the most important for enhancing agricultural production at a faster rate. Large number of technologies evolved in the field of agriculture is not being accepted and adopted to its fullest extent by the farmers. The gap between recommendations made by the scientists and actual use by farmers is frequently encountered. Looking into the situation AEEC, Lingsugur has conducted integrated crop management (ICM) practices through large scale demonstrations.

Materials and Methods

The ICM demonstrations were conducted at AEEC, Lingsugur in Raichur district in Karnataka state in 24 farmer's fields during 2015-16 and 2016-17 with objective to popularize improved technologies for productivity enhancement of cotton through ICM demonstrations. To diffuse cotton productivity enhancement technologies on campus and off campus trainings were conducted. Improved practices like use of improved seed, seed treatment with biofertilisers Azospirillum, PSB and biopesticide (Trichoderma), balanced nutrient application (FYM 10 t/ha, 150 kg N, 75 kg P_2O_5 75 kg K_2O, 25 kg $MgSO_4$) and integrated pest and disease management(Timely spray of pesticides). The crop was harvested at maturity stage. For the study, technology gap, extension gap and technology index were calculated as suggested by Samui *et.al.* (2000).

Technology gap= Potential yield – Demonstration yield

Extension gap = Demonstration yield – Farmers yield

Technology index (%) = (Potential yield – Demonstration yield/Potential yield) * 100

Results and Discussion

The data were subjected to analysis, technology gap, extension gap and technology index were calculated as per the formula and economic analysis was done as per procedure and data were presented in the table 1 and 2.

Yield analysis

The average two years of yield of cotton was 2035 kg per ha as against 1805 in farmers field which is 12.68 per cent higher. The higher yield of cotton in demonstration plot was mainly attributed to the adoption of improved technologies like improved hybrid, seed treatment with

Azospirillum, PSB and Trichoderma, balanced nutrient application including secondary and micronutrients, integrated pest and disease management, proper method of irrigation. Application of bio-inputs enabled to mobalise nutrients from native soil nutrients and Trichoderma helped the crop to resist against diseases. The results confirm the findings in different crops by Keshavareddy *et al.* (2018), Meena *et al.* (2017), Dhruw *et al.* (2012), Girish *et al.* (2011), Dayanand *et al.* (2011) and Lathwal (2010) and Dhaka *et al.* (2010).

Technology gap

The technology gap in the demonstration yield over potential yield was 465 kg per ha. The technological gap may be attributed to the dissimilarity in the soil fertility status and weather conditions (Anuja *et al.,* 2014, Berjesha *et al.,* 2013 and Balai *et al.,* 2012).

Extension gap

The extension gap of 230 kg per ha was noticed. This emphasized the need to educate the farmers through various means for the adoption of improved agricultural technologies to reverse this trend of wide extension gap. More and more use of latest production technologies with high yielding variety will subsequently change this alarming trend of galloping extension gap (Meena and Dudi, 2018, Bhatri *et al.,* 2014 and Meena and Singh, 2013).

Technology index (%)

The new technologies will eventually lead to the farmers to discontinue the old technology and to adopt new technology. The technology index shows the feasibility of the evolved technology at the farmer's fields and lower value of technology index more is the feasibility of the technology. In this demonstration noticed 18.60 per cent technologies index, this indicates proper adoption of improved technologies. Similar results were also recorded by Shalini *et al.* (2016) in tomato, Renbomo Ngullie and Pijush (2016) in chilli.

Economic analysis

The inputs and outputs prices of commodities prevailed during the study demonstrations were taken for calculating gross return, cost of cultivation, net return and benefit cost ratio (Table 2). The cultivation of cotton with improved technologies gave higher net return of Rs 37270/ha as compared to farmer's practices (Rs 34210/ha), which gave additional returns of Rs 3060 /ha. The benefit cost ratio of cotton in ICM was 3.77. This is attributed to higher yields obtained under improved technologies compared to farmers plot as local check.

Conclusion

The study has shown that the ICM demonstration programme was found useful in enhancing the knowledge and adoption level of farmers in various aspects of cotton production

technologies. ICM practices created great awareness and motivated the other farmers to adopt appropriate cotton production technologies. The area of high yielding seedling material of cotton has increased which will spread in the taluk including the adjoining area. The selection of critical input and participatory approach in planning and conducting the demonstration definitely help in the transfer of technology to the farmers.

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Table 1: Cotton yield, technology gap, extension gap and technology index as influenced by ICM practices

Year	Cotton yield (Kg/ha)		% increase in yield in ICM over FP	Technology gap (kg/ha)	Extension gap (kg/ha)	Technology index (%)
	ICM	FP				
2015-16	1540	1370	12.41	960	170	38.40
2016-17	2530	2240	12.95	-30	290	-1.20
Average	2035	1805	12.68	465	230	18.60

Table 2: Economic analysis of cotton demonstration

Sl.No	Net returns (Rs/ha)		Additional returns (Rs /ha)	B:C	
	ICM	FP		ICM	FP
2015-16	27730	22640	5090	1.82	1.70
2016-17	89510	77980	11530	3.13	3.03
Average	58620	50310	8310	2.48	2.37