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Impact of Cotton IPM Demonstration

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ABSTRACT

Cotton (Gossypium sp.), commonly referred to as "white gold" is the major commercial crop grown in India , besides fiber cotton ,seed also plays a vital role in the economics of agro industrial development. Karnataka was one of the important cotton areas in India & covered an area of 6.05 lakh ha in 1998-99. This area in the state decreased over the years. The reasons for decrease in area were due to severe pest problem, price fluctuation and drought. Among these, pest problem made the farmers to spend more on plant protection and also yield level decreased to 201 kg lint/ha in 2005-06 from 244 kg lint/ha in 1998 – 99. Similar decrease in trend was observed in acreage and yield in Belguam district of Karnataka state. The reason for this decrease was severe pest problem, ineffectiveness of chemical insecticides and sole dependence on chemical insecticides.

Though IPM module has been developed long back but the knowledge and adoption rate was low with the cotton farmers of the district. After studying the cotton pest management constraints, large-scale contagious cotton growing tract was selected for the IPM demonstration and implemented in the district. The demonstration was planned and implemented solely to diffuse and influence the practices of IPM technology on yield, cost of plant protection and frequency of pesticides sprays has been developer. The present study in any attempt to investigate the cotton IPM.

METHODOLOGY

IPM technologies were demonstrated in medium staple cotton hybrid fields during kharif season 2005-2006 and 2006-2007 in rainfed farming situations. The large-scale demonstration was carried out in 50 ha of area in each year and totally 214 number of farmers were found as beneficiaries of the demonstration. The selection of the taluks and villages was made purposively, looking at those taluks having large contagious area of cotton, more pest problem and lack of knowledge about IPM technologies. Before conducting demonstration problem and technological gaps in cotton production were identified with due care through use of extension method like survey, group discussion and conducting Gram Sabha. During the conduct of these extension resource inventory appraisals, farmers were facilitated to express the constraints of cotton production. Due care was taken to listen and consider the experiences and gender and also feedback of progressive cotton growers.

The insect pest population level and stage of crop was considered to enforce the IPM components in farmers cotton field and considered it as demonstration field. Traditionally used pest management practices were considered as local check for comparative study. In the present study data on gaps between the potential yield demonstration yield, extension gap, technology index, quantity of insecticides used, and reduction in cost of plant protection were collected from large-scale IPM technology demonstrated plots and local check plots of cotton for analysis and interpretation. The statistical tool to estimate the technology gap, extension gap and the technology index the formulation as mentioned below were used as suggested by Samui et. al.(2000)

Technology gap = Potential yield–demonstrated demonstration yield

Extension gap = Demonstration yield–farmers/ local yield

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Technology index = [(Potential yield–demo yield) / potential yield] x 100

RESULTS AND DISCUSSION

Front line demonstration was conducted during 2005-2006 and 2006-2007 with the intention to demonstrate and develop conviction about the effectiveness of IPM strategies in two villages of Belgaum district covering an area of 50 hectares each year. The data were pooled on different parameters and the results obtained are discussed accordingly.

The data of the yield level of Bt and non–Bt cotton showed non significant increase . The per cent increase in yield levels of IPM demonstrated plots of Bt and non-Bt was 4.89 and 8.96 respectively in Table 1. These results indicated that the IPM technology on yield level might make less impact and IPM technology may not influence much on yield level.

Table 1. Productivity, yield gap and technology index of IPM demonstration conducted during 2005-06 and 2006-07

Type of cotton	Average yield (kg/ha)			Percent increase in yield	Technology gap	Extension gap	Technology index
	Potential	Demon-stration	Local check				
Bt cotton hybrid	40.00	23.17	22.21	4.89	16.81	0.96	42.08
Non Bt cotton hybrid	35.00	21.32	19.54	8.96	13.68	1.78	39.09

Table 2. Economics of IPM demonstration

Type of cotton	Increased yield (Extn. Gap) over local check (qtl/ha)	Average price cotton (Rs/qtl)	Additional income due increased yield (Rs/ha)	Amount saved in plant protection chemical over local check (Rs/ha)	Net income gained (Rs/ha)
Bt cotton hybrid	0.96	2650	2544	1741	4285
Non Bt cotton hybrid	1.78	2450	4717	2150	6867

Table 1. Productivity, yield gap and technology index of IPM demonstration conducted during 2005-06 and 2006-07.

The technology gap in Bt and non–Bt was 16.81 q/ha and 13.68 q/ha. The reason for this large gap may be due to cultivation of cotton in medium red and sandy soils and Bt cotton yields better in medium to deep black soils. The technology gap was also more in Bt hybrids, which might be due to cultivation of Bt hybrids in rainfed situation. Hence, the result indicated that cotton needs deep black soils and Bt cotton must be cultivated in assured irrigation situation.

The extension gap was 0.96 q/ha and 1.79 q/ha in Bt and non-Bt hybrids, respectively. The data showed that there was not much extension gap in yield but more efforts are needed to convince the effectiveness of IPM technologies .The knowledge up gradation on technology, time of use of IPM inputs and ease in impact availability might definitely create positive impact on yield and cotton pest reduction. The technologies would eventually lead the farmers for discontinuance of old practice with new technology.

The technology index showed the feasibility of the evolved technology at the farmer field. The lower the value of technology index more is the feasibility of technology. The technology index of Bt and non-Bt hybrids were 42.08 per cent and 39.09 per cent, respectively. It showed that the technology is feasible. But considering the ecological safety and net economic benefit,

the technology is much more feasible as IPM technology includes ecologically safer pest management practices.

The additional income due to increased yield saving on plant protection chemical in Bt cotton was rupees 2,544/- and 1,741/- per hectare respectively, where as in non Bt hybrids it was rupees 4,717/- and 2,152/- per hectare from additional income due to increased yield and saving on plant protection chemicals, respectively, Table 2. These data showed that both in Bt (Rs 4,285/- per ha) and non-Bt (Rs 6,867/- per ha) hybrid IPM technology found to increase the income of cotton farmers.

The data (Table 3 &5) on insecticide consumption and number of sprays in Bt and non-Bt hybrids showed that reduction in quantity of number of insecticides sprays per hectare and hence the results enabled to conclude that the IPM technology reduced chemical load on soil considerably and was found as eco–friendly technology for cotton farmers.

Table 3. Cost of plant protection in cotton

Type of cotton	Cost of plant protection (Rs/ha)		Per cent reduction in Cost of plant protection	Extension gap
	Demonstration	Local check		
Bt cotton hybrid	2575/-	4316/-	40.61	- 1741/-*
Non Bt cotton hybrid	4104/-	6254/-	34.37	- 2150/-*

***Note:** Negative digits of extension gap can be read as it is saving on plant protection chemical.

Table 4. Quantity of pesticides used in cotton

Type of cotton	Quantity of Pesticide		Percent reduction quantity in pesticides used	Extension gap
	Demonstration	Local check		
cotton hybrid	4.87	7.16	31.98	- 2.29*
Non Bt cotton hybrid	6.48	9.16	29.26	- 2.68*

***Note:** Negative digits of extension gap can be read as reduction in quantity of plant protection chemicals used per hectare area.

Table 5. Number of insecticidal sprays in cotton

Parameters	Number of sprays		Per cent reduction in sprays	Extension gap
	Demonstration	Local check		
Bt cotton hybrid	4.08	6.02	31.85	- 1.93*
Non Bt cotton hybrid	5.90	7.78	24.29	- 1.89*

*Note: Negative digits of extension gap can be read as it lead to reduction in number of plant protection chemicals sprayed in perhectare area .

CONCLUSION

In cotton production system, IPM technology was found as imperative for cotton pest problems. The adoption of IPM technology helped to increase the net income and the technology was found much safer for labors and environment. The use of the IPM technology in cotton ecosystem substantially increased the income as well as the livelihood of the farmers.There is need to adopt multipronged strategy for popularization and adoption of IPM technology in cotton at a wider scale.

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