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Comparative Economics of IPM and Non-IPM in Cotton Systems

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ABSTRACT

Present study attempted to study the adoption of IPM technology in cotton Rsesults of the study revealed that among the cultural components, all the components were(100 per cent) followed, by IPM farmers. Practices such as deep summer ploughing to control insect pests in cotton cultivation followed by use pest and diseases resistant varieties were found to be followed by 75 per cent IPM farmers only. The practices recommended for IPM in specific are erecting bird perches, use of NSKE, leaves extract Trichogram macards. Collection and destruction of egg masses and larvae, resistant varieties, and trap crops. The technology was environment –friendly as it uses more of eco-friendly inputs and less of chemicals as felt by farmers. The partial budgeting technique revealed that the added costs for IPM were Rs.4070.27/h with no reduced returns while reduced costs were Rs. 4289.43/h and added returns were Rs. 5391.02/h. the net benefit per hectare in IPM farms was Rs. 5610.18/h. The constraints like non-availability of botanicals and bio-pesticides should be addressed on priority basis to make the technology sustainable and more remunerative.

Key words: *IPM and non-IPM farmers, Trichogram macards, Environment –friendly*

INTRODUCTION

In Andhra Pradesh cotton grown in 11.34 lakh hectares with a production of 34.91 lakh bales and productivity of 523 kg/ha (CMIE-2008) which is higher than national average of 467kg/ha. Warangal is one of the leading districts in Andhra Pradesh and stands second in area where cotton is grown in 1.6 lakh hectares and stands third in production with 4.75 lakh bales. (CMIE-2008). The average productivity of cotton in Warangal district is 505 kg/ha and ranked tenth as in Andhra Pradesh. Integrated pest management (IPM) is an important aspect of cotton cultivation. An attempt was made to study the comparative economics of IPM and non-IPM farmers of Warangal district; Cobb Douglas production function was used to find out the elasticity of production. The production function analysis is used to determine efficiency of resource use, which requires the estimation of marginal value products MVP of the resources. The general approach for judging the efficiency of resource use had been the comparison of marginal return with marginal cost.

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In other words, when marginal value products of inputs, considered along with factor acquisition costs, it indicates the efficiency with which resources have been put under use. MVP's for rupee of expenditure incurred on plant material, manures, fertilizers and plant protection chemicals were computed and compared with on opportunity costs since the variables taken in production function were taken in value terms, the acquisition costs of each of them become one rupee. The estimated MVPs of all the inputs were tested using't- test to find out whether MVPs and acquisition costs were significantly different or not. The benefit-cost was worked out to be 1.93 for IPM cotton growers as compared to 1.85 for Non-IPM cotton growers.

Table 1. Costs and Returns

(Rs/ha)

S. No.	Inputs		
		IPM farmers	Non-IPM farmers
I	**Seeds**	3081	2806
II	**Labour**		
1.	Bullock labour	3281	2566
2.	Machine labour	10152	10254
3.	Hired labour	7708	9288
4.	Family labour	7418	5328
III.	**Organic manures and chemical fertilizers**		
5.	Organic manures	8608	8303
6.	Chemical fertilizers	1283	1593
IV	**IPM component**	1769	0
V	**Plant protection chemicals**	1733	3260
VI	**Total Cost of cultivation**	45036	43401
VII	**Yield(quit/ha)**	22.99	22.11
VIII	**Gross returns**	132203	123788
IX	**Net Returns**	87166	80386
X	**BCR**	1.93	1.85

Similar results were reported by Razack[3], wherein the B: C ratio for redgram was higher (1.57) in case of IPM farmers as compared to non-IPM farmers (1.38) Shivaraya[4], studied the production, marketing and processing of red gram in Gulbarga District, where in the IPM and non-IPM farmers, had realized B: C ratio of 1.93 and 1.85, respectively.

The relative less cost of IPM component when compared to the cost of plant protection chemicals use by Non-IPM farmers can be considered as a plus point that shows the viability and profitability of IPM cotton cultivation this clearly indicates that IPM farmers are having good knowledge about the consequences of pesticides. In other words, farmers have realized that with small amount of plant protection chemical application, they can get higher returns than one who uses plant protection chemical frequently. the results are contrary to the findings of Sharma, wherein the rain fed cotton IPM revealed that the

average expenditure on plant protection chemicals was Rs. 1,296/ha in IPM farmers as compared to Rs. 1,890/ha in non-IPM farmers.

The gross returns for the IPM farmers was worked out to be Rs. 132203.4 which was found significantly higher than Non-IPM farmers i.e., Rs.123788.1per hectare. These observations are comparable with the results of Peshin and Kalra[2] studied the adoption of IPM practices in rice crop and their economic impact at farmer's level. The study also revealed that there was appreciable difference with respect to frequency of pesticide sprays between IPM and non-IPM farms. The average yield per unit area in IPM villages was 22.99 q/ha as compared to 22.11 q/ha in the non-IPM villages. The differences in pesticide sprays, expenditure on pesticides and yields were statistically significant. Similar pattern of expenditure was reported by Patil[1] found that in the demonstration on integrated pest management on cotton, the net profit on the IPM plots (Rs. 1,029/acre) was substantially higher as compared to non-IPM plots (Rs. 555/acre) and this was attributed mainly to the higher cost on plant protection chemicals IPM cotton cultivation is more remunerative as compared to Non-IPM cotton cultivation.

RESOURCE USE EFFICIENCY

From the perusal of table 2 it was evident that the resource efficiency is positive and significant for IPM cotton farmers. The ratio of MVP/MOC for the variables seed, bio-pesticide, fertilizer, machine labour, human labour and pesticides was found to be 7.50, 46.01, 1.54, 280.3, 7.34 and 0.93 respectively. On the contrast, the ratio of MVP/MOC was found to be negative for organic manures and bullock with values of -0.96 and -3252 respectively. Thus, it clearly indicated that more income could be realized by the IPM cotton farmers if they use more of the above mentioned variables having positive signs i.e., seed, bio-pesticide, fertilizers, machine labour, human labour and pesticides. Similarly, for the Non-IPM farmers, the value of ratio of MVP/MOC was found to be positive and significant for the variables seed and human labor with the values of 23.07 and 12.72 respectively. The rest of the variables namely organic manures, fertilizers, machine labour, bullock labour and pesticides was found negative with values -0.89, -1.99, -6.64, -30.21 and -8.03 respectively. It clearly indicated that the above mentioned variables were over used and they need to be used in optimum quantity for realization of better income by the Non-IPM farmers. Therefore it can be concluded that the IPM is more profitable than Non IPM cotton cost. Utilization of family labour is done effectively in IPM farms. The chemical pesticide application has been reduced considerably, reducing the environmental pollution. Adoption of IPM technology will be followed if considerable yield increases are recorded even though yield is increased by 0.899Q/ha on an average which was significant farmers expectation would go beyond this. Suitable, demonstrations and convincing the farmers is more important.

Table 2. Marginal value products, opportunity costs and ratios of MVP to opportunity costs cotton IPM farmers & Non-IPM farmers

S. No	Inputs	IPM MVP/OC Ratio	Non-IPM MVP/OC Ratio
1.	Land	16054	-6882.93
2.	Seed	7.5022	23.07851
3.	Organic manure	-0.926	-0.89014
4.	Biopesticides	46.01	-
5	Fertilizers	1.5432	-1.99257
6	Machine labour	280.3	-6.64233
7	Bullock labour	-3252	-30.2134
8	Human labour	7.341	12.72656
9	Pesticides	0.9245	-8.03557

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