

Economics Analysis of Irm and Non Irm Strategies for Sustainable Cotton Production in Khandwa District of Madhya Pradesh

Ashish Bobade, Mukesh Kumar Gupta, Dharmendra Kumar Vani and Omprakash Bharti

K.V.K., B.M. College of Agriculture, R.V.S.K.V.V., Khandwa, (M.P.)

Abstract

This study is based on primary data collected from IRM and Non IRM Cotton growers of district Khandwa. Sampled area was selected for study due to a major IRM and Non IRM Cotton growing area. Total five villages and twenty farmers from each village i.e. 100 farmers were selected randomly as sample size. The study revealed that the adopters of IRM technology could get significantly higher yield as compared to that by non IRM. The IRM farmers harvested higher yields with lesser use of insecticides in all the five targeted IRM villages. The IRM farmers on an average harvested seed cotton yield of 14q/ha as compared to 12.q/ha by non participating farmers during 2013-14. The IRM farmers reduced the number of insecticidal sprays against sucking pests by nearly 30-40 percent with an average of 4-5 sprays as compared to 6-7 sprays by non IRM farmers.

Key words : Cotton, IRM, non IRM, cost analysis and insecticidal spray cost, cost concept and B:C ratio

Introduction

Cotton accounts for 45 per cent of world fiber and supplies 10 per cent of world edible oil. It occupies pride of a place as the prime supplier of raw material (85 per cent) for textile industry. This clearly stresses the need for further efforts to increase productivity of this most important commercial crop of the country. Cotton crop is infested by various sucking pests and cause significant yield losses. About 10 per cent of insecticides on global basis and 45 per cent in India are used for control of insects in cotton crop alone. Application of biotechnology for developing pest resistance in cotton is one among them that appears to hold promise^[2]. Bt cotton was introduced in India to reduce the pesticide consumption^[1]. This study was planned to estimate cost of cultivation per hectare of IRM and Non IRM Cotton incurred by farmers, to compute returns per hectare of IRM and Non IRM Cotton received by farmers and to determine input - output ratio of IRM and Non IRM Cotton production

Materials and Methods

This study was based on primary data collected from IRM and Non IRM Cotton growers of district Khandwa. Sampled area was selected for study due to a major IRM and Non IRM Cotton growing area. Total five villages (Namely- Mathella, Talwadia, Ajanty, Ambapal and Paplia) and twenty farmers from each village i.e. 100 farmers were selected randomly as sample size. Data collected for study pertaining to the period 2013-14. Data collected by interviewing selected farmers by survey method with special designed schedule. Collected data then tabulated according to need and purpose of study. Simple tabular analysis was made. To workout economics of IRM and Non IRM Cotton cultivation, different cost concept such as cost 'A', cost 'B' and cost 'C' were used.

Results and Discussion

Estimation of cost of cultivation of Cotton crop

Cost of cultivation per hectare of IRM and non IRM showed an increasing trend with IRM

and non IRM farmers (Table 1). Among various components of operational costs, manures and fertilizers accounted for 15 percent of total cost followed by expenditure on hired human labour 12 percent, plant protection 12 percent, bullock labour 6

percent, seed 5 percent, irrigation 4 percent and machine labour 3 percent respectively. Total cost of cultivation of IRM and non IRM cotton farmers was estimated to be Rs. 44661/ha and Rs. 45667/ha respectively.

Table-1 Estimation of cost of cultivation of IRM and Non IRM Cotton crop

S. No	Particulars	Cotton (Rs. / ha)		
		IRM	Non IRM	Average
1	Hired Human cost	5680(13)	5432(12)	5556(12)
2	Bullock labour	2487(6)	2597(6)	2542(6)
3	Machine labour	1450(3)	1365(3)	1407(3)
4	Seed	2144(5)	2076(5)	2110(5)
5	Manures and fertilizers	6796(15)	6934(15)	6865(15)
6	Plant protection	4274(10)	6487(14)	5380(12)
7	Irrigation	1686(4)	1875(4)	1780(4)
I	Total operational cost	24517(55)	26766(59)	25641(57)
1	Land revenue and taxes	50(0)	50(0)	50(0)
2	Interest on working capital@10%	2451(5)	2676(6)	2563(6)
3	Rental value of owned land 1/6 th of gross value of produce	10500(24)	9000(20)	9750(13)
4	Depreciation @10%	1041(2)	894(2)	967(2)
5	Interest on fixed capital@10%	1831(4)	1718(4)	1774(4)
6	Imputed value of family labour	4271(10)	4563(10)	4417(10)
II	Total fixed cost	20144(45)	18901(41)	19522(43)
III	Total cost (I+II)	44661(100)	45667(100)	45164(100)

(Figures in brackets shows percentage to the total cost)

Farm Management costs

Analysis of cost of cultivation of IRM and Non IRM Cotton per hectare on the basis of

cost concepts of the selected farmers has been given in table-2.

Table-2 Farm Management costs (Rs./ha)

Costs	Cotton (Rs./ha)		
	IRM	Non IRM	Average
Cost A1	24517(54)	26766(58)	25641(56)
Cost A2	24517(54)	26766(58)	25641(56)
Cost B1	26348(58)	28484(62)	27416(60)
Cost B2	36848(81)	37484(81)	37166(81)
Cost C1	30619(68)	33047(71)	31833(70)
Cost C2	41119(91)	42047(92)	41583(91)
Cost C3	45230(100)	46251(100)	45741(100)

Figures in brackets shows percentage to Cost C3

Table 2, shows that, on an average, the cost of cultivation per hectare of IRM and non IRM over cost A1, A2, cost B1, cost B2, cost C1, cost C2 and cost C3 were worked to Rs. 25641, Rs. 25641, Rs. 27416, Rs. 37166, Rs. 31833, Rs. 41583 and Rs. 45741 respectively.

Economics of Production of Cotton crop IRM & Non IRM:-

An examination of profitability of IRM and Non IRM Cotton crop per hectare has been given in Table 3, clearly shows that the cultivation of IRM was highly profitable over Non IRM Cotton. Even though the cost of cultivation of IRM was lower than that of Non IRM cotton, its gross returns as well as net

returns were also correspondingly higher than Non IRM cotton. All the cost i.e. - Cost A, Cost B and Cost C were lower in case of IRM as compared to Non IRM cotton. Similarly, net returns per hectare were significantly higher over Cost A, B and C, in case of IRM as compared to Non IRM cotton. The net return was higher in case of IRM (Rs.17769) as compared to Non IRM cotton (Rs.7748) and benefit cost ratio was higher in case of IRM (1.39) than that Non IRM Cotton (1.17). The study indicated that there have been incentives for farmers to grow IRM cotton in kharif instead of its Non IRM Cotton.

Table 3 Economics of Production of Cotton crop IRM & Non IRM

S. No	Particulars	Cotton (Rs./ha)	
		IRM	Non IRM
1	Production per ha(ctl)	14.00	12.00
2	Gross return	63000	54000
3	Cost		
a	CostA	24517	26766
b	Cost B	36848	37484
c	Cost C	45230	46251
4	Net return at		
a	Cost A	38483	27234
b	Cost B	26152	16516
c	Cost C	17769	7748
5	Cost of production	3190	3805
6	Net return per quintal	1269	645
7	Input-Output at		
a	Cost A	2.57	2.02
b	Cost B	1.71	1.44
c	Cost C	1.39	1.17

Average No. of sprays in IRM and Non IRM 2013-14

By implementation of IRM strategies farmers have realized higher seed cotton yield with a low investment on insecticides by reduced number of insecticidal sprays. Monetary benefit of Rs. 2213/ha was achieved by farmers in IRM fields by saving in plant protection cost and increased seed cotton yield

as compared to non IRM fields. The IRM strategies let the farmers reduce the number of insecticidal sprays on cotton and consequently reduce plant protection cost, preventing development of resistance to insecticides and environmental risk and finally achieve sustainable cotton ecosystem in addition to higher net returns from cotton cultivation^[3].

Table-4 Average No. of sprays in IRM and Non IRM

No. of Chemical pesticide sprays		Quantity of chemical pesticide applied(Rs./ha)	
IRM	Non IRM	IRM	Non IRM
4.6	6.4	4274	6487

Averages of 4.6 rounds of insecticidal spraying were imposed in IRM fields compared to 6.4 rounds of insecticidal spraying in non IRM fields (Table 4). This has been also reported by Sharma *et.al.* (2008),

Conclusions

Insects/ pests pose serious problems from sowing to harvesting stages in the cultivation of cotton crop. For sustainable production of cotton and judicious use of pesticides, new cotton pest management technologies, namely IPM and IRM have been developed. The study has revealed that the adoption of these technologies have increased the cotton productivity. These technologies are cost-effective (decrease production cost) and more remunerative (increase the net income of the farmer). Both the technologies are environment-friendly as pesticides consumption could be reduced to less than half of that is used in non IRM farms. All the parameters used for the evaluation have conferred that these technologies are economically viable at the farmer’s field. The study has suggested that the state, researchers and extension workers should launch a mass campaign to educate the farmers about these technologies. It would improve the economic condition of cotton-growers and check the

environmental deterioration due to excessive use of insecticides. Above all, it would sustain and enhance the productivity of cotton growing areas of Madhya Pradesh on a long-term basis.

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