



Impact of Integrated Pest Management Practices On Soybean

Gudadhe N.M.¹, S. P. Salame², P. K. Wakle³, P. P. Chavan⁴ & S.P.Nandapure⁵

Directorate of Extension Education

Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola (MS) 444104

Correspondence author mail : pkwakle@gmail.com

ABSTRACT

The present study was conducted with a view to study the impact of integrated pest management practices on soybean grower towards change in production, productivity and annual income in the Akola district of Maharashtra state under NRTT project. An exploratory design of social research was used for the present study. It is observed that majority of the respondents (62.00%) were observed in medium level of adoption of Integrated Pest Management practices, followed by 31.00 per cent of the respondents were observed in high level of adoption category. It further showed the change in average production, productivity and annual income in positive direction.

Key Words : *Integrated pest management, production and productivity*

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INTRODUCTION

Oilseed crops occupy prominent place in agricultural economy of the India. In the country's economy their share is up to 4 per cent of the gross domestic product (Nasurudeen and Subramaniam, 1995). Soybean in Indian agriculture as a pulse and oil seed crop has attained importance due to its nutritional and industrial value. It occupies an important place as it gets more foreign exchange from the export of soya powder due to its greater demand in the international market.

In India 120.32 lakh hectare of land was under soybean cultivation during 2014 with an average yield of 10.79 quintal per hectare. In Maharashtra, total 38.704 lakh hectare of land under soybean cultivation during 2014 with an average yield of 12.55 quintal per hectare (Anonymous 2013). One of the most important reasons for low level of yield is the incidence of pests and diseases. With a view to keep infestation of pest and disease within normal limit, Integrated Pest Management Practices in soybean are recommended for adoption by the farmers.

Navajbai Ratan Tata Trust, Mumbai was started in the year 2010-2011 the first component of the programme encompasses: (1) Sustainable agriculture development (SAD) (2) In situ soil and water conservation (SWC): and (3) Live stock and dairy development 20,000 farmers have been covered so far under SAD, where intervention include promoting the adoption of low external input for sustainable agriculture development practices, crop diversification developing tree based farming system, integrated pest management (IPM) and implementing scientific package of practices for various agricultural package of practices for various agricultural crop and ensuring technical support from specialist appointed by the trust and agriculture universities. A project focusing on dissemination of IPM has been initiated with eight partner organization in vidarbha. Four training session IPM for cotton, soybean, Red gram (kharif crops) and wheat and green gram (Rabi crops) were conducted by Dr. Panjabrao Deshmukh Krishi Vidyapeeth (PKKV); Akola in which around 180 krishi Doots (village level worker) and 10 field officers from partner-organizations participated. Under the project number of demonstrations were conducted on farmers field on soybean IPM practices. So the present investigation was conducted with following objective.

To study the impact of integrated pest management practices on soybean grower towards change in production, productivity and annual income.

METHODOLOGY

The present study was conducted in six panchayat samiti of Akola district in vidarbha region of Maharashtra state. An exploratory design of social research was used for the present study aims at assessing the impact of Integrated Pest Management practices on soybean under NRTT project. 10 respondents were selected from each village who adopt NRTT project before 3 years. Thus, 100 respondents were selected for the present study for making the sample size of 100 in total. The data was collected with the help of interview schedule. The collected data was analyzed with help of various statistical tools.

Results and Discussion

It could be noted from Table 1 that, among cultural practices over one third of the soybean growers (80.00%) had complete adoption of summer ploughing for killing of hibernating insects in pupal and larval stage and followed by (85.00%) adoption about uses of healthy and improved seed, (95.00%) adoption about use of resistant variety while 85.00 per cent respondent do not rotate crop with ground nut and avoid monocropping.

Table 1 Distribution of the farmer according to adoption of recommended IPM practices of soybean under NRTT project.

Sr. No.	Recommended cultivation of IPM practices of soybean crop	Respondents (n=100)		
		Completely	Partially	No
		Freq.	Freq.	Freq.
A	Cultural practices			
1	Summer ploughing to destroy resting pest stage of pest of soybean exposing stage to hot sunlight and predating bird.	80.00 (80.00%)	20.00 (20.00%)	0.00 (0.00%)
2	Complete sowing operation before second week of July.	30.00 (30.00%)	70.00 (70.00%)	0.00 (0.00%)
3	Use of healthy improved seed.	85.00 (85.00%)	10.00 (10.00%)	5.00 (5.00%)
4	Use of resistance variety Js 335 ,Js-93-05, Tams-98-21 etc.	95.00 (95.00%)	5 (5.00%)	0.00 (0.00%)
5	Do not rotate soybean crop with groundnut and avoid mono cropping.	85.00 (85.00%)	10.00 (10.00%)	5.00 (5.00%)
6	Follow proper crop rotation.	70 (70.00%)	25 (25.00%)	5.00 (5.00%)
B	Mechanical practices			
1	Keep soybean field free from weed which may act as collateral host of certain pest.	60.00 (60.00%)	20.00 (20.00%)	20.00 (20.00%)
2	Uprooting and burning of unhealthy and diseased plants.	50.00 (50.00%)	30.00 (30.00%)	20.00 (20.00%)
3	Destruction of infested plant along with larval stage of girdle beetle and stem fly.	5.00 (5.00%)	30.00 (30.00%)	65.00 (65.00%)
4	As the larval stage of <i>Hairy caterpillar</i> and <i>Spodoptera litura</i> feeds gregariously their larva should be destroy early by plucking infested leaves and destroy the egg masses of <i>Hairy caterpillar</i> and <i>Spodoptera litura</i> .	7.00 (7.00%)	20.00 (20.00%)	73.00 (73.00%)
C	Chemical practices			
1	Seed treatment for healthy and proper growth of crop. Eg Trichoderma, thrum as fungal antagonist.	80.00 (80.00%)	20.00 (20.00%)	0.00 (0.00%)
2	Keep close watch on crop regular survey of soybean crop. If pest level is above etl use suitable insecticides with recommend dose /ha.	10.00 (10.00%)	20.00 (20.00%)	70.00 (70.00%)
3	Use Dichlorvos 76 EC 5ml/10 lit water.	70.00 (70.00%)	26.00 (26.00%)	4.00 (4.00%)
4	Use Triazophos 40 EC & 20EC 12.5 ml/10 lit water.	70.00 (70.00%)	25.00 (25.00%)	5.00 (5.00%)
D	Biological practices			
1	Use of 5% NSE for management of pest.	70.00 (70.00%)	25.00 (25.00%)	5.00 (5.00%)
2	Favorable eco system for development of entomopathogenic fungi to control lepidopterous pest.	3.00 (3.00%)	17.00 (17.00%)	80.00 (80.00%)
3	Setting of light trap.	50.00 (50.00%)	30.00 (30.00%)	20.00 (20.00%)
4	Conservation of biological control agents such as spider, lizard, prayingmantid, tachnid fly, dragon fly, chrysoperla and grass hopper.	2.00 (2.00%)	13.00 (13.00%)	85.00 (85.00%)
5	Use of biopesticides (<i>Nomouraea rileyi</i> & <i>Beauveria bassiana</i>).	60.00 (60.00%)	20.00 (20.00%)	20.00 (20.00%)
6	Install of sex pheromene trap for early montoring of <i>Spodoptera litura</i> @10 trap/ha.	2.00 (2.00%)	8.00 (8.00%)	90.00 (90.00%)
7	Erect bird perches @4-5/ha depend on pest population.	2.00 (2.00%)	8.00 (8.00%)	90.00 (90.00%)

Regarding Mechanical practices about IPM practices of soybean, (60.00%) respondent kept soybean field free from weed followed by (50.00%) adoption about uprooting and burning of unhealthy and diseased plants from the field.

In the case of chemical practices (80.00%) of the soybean growers had complete adoption about seed treatment of soybean with trichoderma and its recommended quantity (3 g/kg seed) for seed treatment. About insect pest control, 10.00 per cent of the soybean growers know the pest level is above etl use suitable insecticides with recommend dose /ha while application of chemical pesticides for control of sucking pests (70.00%) farmers adoption about the use dichlorvos 76 EC 5ml/10 lit water and (70.00%) adoption about the use triazophos 40 EC & 20EC 12.5 ml/10 lit water.

However, in case of biological practices (70.00%) of the farmer had complete adoption about use of 5% NSKE followed by (60.00%) adoption about Use of biopesticides (*Nomouraia rileyi* & *Beauveria bassiana*) and (50.00%) adoption about Setting of light trap.

Table 2 Distribution of soybean growers according to their level of adoption about integrated pest management practices of soybean

Sr. No.	Adoption levels	Respondents (n=100)	
		Frequency	Percentage
1	Low	7	7.00
2	Medium	62	62.00
3	High	31	31.00
	Total	100	100.00

It can be observed from Table 2 that majority of the respondents (62.00%) were observed in medium level of adoption of Integrated Pest Management practices, followed by 31.00 per cent of the respondents were observed in high level of adoption category and remaining 7.00 per cent of the respondents were found to have low adoption of integrated pest management practices of soybean. In brief, the soybean growers were found to be moderate in adoption of integrated pest management practices of soybean

Table 3 Distribution of production of soybean is study according to the production before and after adoption of NRTT project

Sr.No.	Crop	Respondents (n=100)		
		Before adoption of NRTT project	After adoption of NRTT project	Percentage change
		kg/ha	kg/ha	Percent
1.	Soybean	8529	10549	23.69

It is revealed from Table 3 that, soybean crops showed change in average production in positive direction i.e. increase in production of soybean crops showed increase in average production. In soybean crops there were increase in average production (23.69%) after implementation of NRTT project.

Table 4 Distribution of soybean crops is study according to the productivity before and after adoption of NRTT project

Sr.No.	Crop	Respondents (n=100)		
		Before adoption of NRTT project	After adoption of NRTT project	Percentage change
		Quintals/ha	Quintals/ha	Percent
1.	Soybean	9.01	11.87	31.75

Table 5 Distribution of respondents according to their annual income.

Sr. No	Annual Income (Rs.)	Respondents (n = 100)			
		Before adoption of NRTT project		After adoption of NRTT project	
		Frequency	Percent	Frequency	Percent
1	Up to Rs. 50,000	37	37.00	14	14.00
2	Rs.50,001 to Rs. 1,00,000	32	32.00	30	30.00
3	Rs.1,00,001 to Rs.1,50,000	15	15.00	29	29.00
4	Rs.1,50,001 to Rs.2,00,000	15	15.00	16	16.00
5	Above Rs. 2,00,000	1	1.00	11	11.00
	Total	100	100.00	100	100.00
	Mean	88643		113735	28.30

Distribution of the soybean farmers according to their annual income in both the categories i.e. before and after adoption of NRTT project presented in Table 5, it was found that relatively higher proportion (37.00 %) of the soybean farmers, in before category were having their annual income Rs. Up to 50,000, followed by, 32.00 per cent of the respondents were having their annual income in the ranging of up to Rs. 50,001 to Rs 1,00,000, whereas 15.00 per cent were having annual income ranging were having to category RS 1,00,001 to Rs 1,50,000 whereas 15.00 per cent were having annual income ranging were having to category RS 1,50,001 to Rs 2,00,000 and remaining 1.00 per cent of the farmers having their annual income ranging from Above Rs 2,00,000/-.

After the adoption of the NRTT project by the farmers majority of farmers (14.00%) were having their annual income in range of Rs. Up to Rs 50,000, followed by 30.00 per cent were having their annual income in range of Rs. 50,001 to Rs.1,00,000/- whereas 29.00 per cent were found in the category of above Rs. 1,00,001 to Rs.1,50,000/- whereas, 16.00 per cent were having annual income ranging from RS.1,50,001 to Rs.2,00,000/- and 11.00 per cent of the farmers having their annual income ranging from Above Rs. 2,00,000/- . The per cent change in annual income after adoption of IPM practices on soybean under NRTT project was 28.30 per cent.

A cursory look at Table 6 revealed that mean of production of soybean (8529 kg/ha) productivity of soybean (9.01 qt/ha) annual income (Rs 88,643) before adoption of NRTT project were higher than the mean of production of soybean (10549 kg/ha) productivity of soybean (11.87 qt/ha) annual income (Rs 1,13,735) after adoption of NRTT project.

Table 6. Overall impact of IPM practices on soybean under NRTT project on farmers.

Sr. No.	Impact indicators	Respondents (n=100)		
		Before (mean)	After (mean)	Change
1.	Production of soybean	8529	10549	23.69
2.	Productivity of soybean	9.01	11.87	31.75
3.	Annual income	88643	113735	28.30
Overall impact		27.91%		

It was also found that there was a change in production of soybean, productivity of soybean, change in annual income to the tune of 23.69, 31.75, 28.30 per cent respectively after adoption of NRTT project .

CONCLUSION

It could be concluded that Soybean crop showed change in average production and productivity in positive direction i.e. increase in production and productivity of soybean crop showed increase in average production and productivity. In soybean crop there were increase in average production (23.69%) after adoption of NRTT project and increase in average productivity (31.75%), after adoption of NRTT project. As regards annual income, after the adoption of the NRTT project 30.00 per cent of the farmers were having their annual income in range of Rs. 50,001 to Rs 1,00,000, followed by (29.00%) were having their annual income in range of Rs. 1,00,001 to Rs 1,50,000, whereas (16.00%) were found in the range of Rs 1,50,001 to Rs 2,00,000/- .whereas, (14.00%) were having annual income ranging from Up to Rs 50,000 and (11.00%) of the farmers having their annual income ranging category above Rs 2,00,000/-.

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