Study on Adoption of Organic Farming Practices in Soybean Crop in Guna District of Madhya Pradesh

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ABSTRACT

Soybean is the most important oil seed crop and knows as gold been due to unparalleled productivity among oil seed crops. However, the unproductivity of Soybean in the district is very low. The productivity of Soybean per unit area and time could be increased by adopting feasible scientific and sustainable management practices with a suitable variety. Taking into account the above consideration, training were conducted in a systematic manner to show the worth of a new variety and convincing farmers about potentialities of improved production management practices of Soybean for further adoption. Less productivity of Soybean may be due to lack of knowledge and constraints in the adoption of organic farming practices in soybean crop. Major constraints expressed by the respondent in adoption of organic farming practices of soybean crop were lack of capital, lack of bulk local demand for organic soybean, long process of organic manure preparation, lack of knowledge about bio-pesticides, application time, method and proper dose, lack of published information regarding various practices of organic soybean farming.

Key words: *Soybean; Productivity; Production management; Organic soybean farming;*

Madhya Pradesh is a leading state of India in terms of area and production of oilseeds and recognized as Soya State in the country. It alone contributes about 72 per cent and 65 per cent of the total area and total production of India respectively. It is popular cash crop giving pronounced yield and profit. Due to suitable agro-climatic condition and better price, soybean crop gets prominence in the cropping pattern of the cultivator of Madhya Pradesh. In Madhya Pradesh 5734 thousand hectares area was found under soybean with the total production of 6355 thousand tonnes and average productivity of 1108 Kg. per hectare in the year of 2015. As per APEDA report annually about 6792 t of organic products worth 72 million are exported from India. In Indian agriculture, organic manures have been used since Vedic period. Madhya Pradesh is one of the fore runners in promotion of organic farming. The State Government has adopted a concept called Bio farming through bio-villages for the promotion of organic farming. Bio-farming is implemented in 1565 villages selected from 313 blocks of 48 districts in the state. It is reported that the message of growing crops through organic resources is spreading from village to village through farmers contact programme.

Adoption of organic farming is reported to have a positive correlation with the number of cattle maintained by the farmers, in the state. The large farmers have more cattle and hence more resources for organic manure which facilitates more area under organic farming. Compost or Farm Yard Manure (FYM) is the common source of organic manure used by the farmers, followed by vermicompost and Narayan Devaraj Pandey (NADEP) compost. Farmers are also using bio-gas slurry, green manure and cow horn manure. Poultry manure, neem cake, karanjee cake and bio-fertilizers like rhizobium, azospirillum, phosphate solubilizing bacteria etc, are the other supplements under off-farm organic sources.

METHODOLOGY

Guna district of Madhya Pradesh was selected purposively for the present study. Guna district comprises of 5 blocks namely Guna, Aaron, Bamori, Raghogah and Chachora. Out of which three Guna, Aaron and Raghogah blocks was selected purposively for this study due to awareness and convenience of researcher. 6 villages will be selected through simple random sampling method for beneficiaries and for non-beneficiaries. 10 beneficiaries were selected from each of the village randomly. Similar numbers of non-beneficiaries were also selected randomly. The sample constituted 60 beneficiaries and 60 non-beneficiaries. Thus a total numbers of respondents for present study were 120.

RESULTS AND DISCUSSION

This section is devoted to ascertain the knowledge and adoption of organic farming practices in soybean crop. The adoption process is the mental process through which an individual passes from first knowledge of an innovation to a decision to final adoption. Thus, adoption is a decision to continue full use of an innovation. With a view to find out the extent of adoption of scientific management practices, the beneficiaries and non-beneficiaries were asked to indicate at what extent they adopted scientific management practices.

The data in the Table 1 revealed that majority (60%) had fully adopted deep summer ploughing for in situ conservation, 40 per cent had partial adoption in beneficiary category, considering the same aspect in non-beneficiaries only 5 per cent fully adopted while a large share of 75 per cent did not adopt the practice .considering the aspects of sowing 35 per cent fully adopted use of pest resistant ,early maturing varieties and 35 per cent partially adopted use of pest resistant, early maturing varieties whereas in case of non-beneficiary 60 per cent did not adopt while a mere 10 per cent adopted the practice fully. 45 per cent of beneficiaries adopted the seed treatment fully while only 20 per cent of non-beneficiaries adopted seed treatment fully considering the aspect of use of organic manure and crop residues, 60 percent of beneficiaries applied split dosage of fertilizers and while a mere share of 10 per cent of non-beneficiaries adopted split dosage application fully. 60 per cent of beneficiaries fully adopted the practice of incorporating crop residue in soil and mere 5 per cent of non-beneficiaries fully adopted the practice. The finding is in conformity with the finding as reported by *Sidram (2008), Tarde et al. (2008)*

A large share of beneficiaries (70%) reduced chemical consumption and fully adopted this practice while 15 per cent of non-beneficiaries followed this practice. Considering the aspect of vermicomposting 70 per cent of beneficiaries fully adopted its application while 10 per cent of non-beneficiaries. 80 per cent of non-beneficiaries did not practice vermicomposting preparation. With reference to weed management a major crop share (65%) practiced crop rotation while only 10 per cent of non-beneficiaries fully adopted. Considering pest management aspect 55 per cent of beneficiaries practiced summer ploughing. 60 per cent of beneficiary partially adopted the practice of collection and destruction of eggs, larvae and pupae of crops, pests while 15 per cent of non-beneficiaries partially adopted this practice.

Overall extent of adoption of scientific organic soybean cultivationby its beneficiaries and non-beneficiaries: About the overall adoption the beneficiaries and non-beneficiaries were grouped into three categories *viz.*, I) low ii) medium and iii) high. The data in this regard are presented in Table 2.

Table 2. Distribution of beneficiaries and non-beneficiaries according to their overall extent of adoption about scientific management practices

Categories of beneficiaries	Beneficiaries		Non beneficiaries	
	No.	%	No.	%
Low	0	0.00	35	58.34
Medium	19	31.70	20	33.33
High	41	68.30	5	8.33
Total	60	100.00	60	100.00

The data present in Table 2 showed that majority of the beneficiaries' 68.30 per cent found to pertaining high level of extent of adoption regarding various components of scientific management of organic soybean cultivation under ATMA programme followed by medium adoption 31.7 per cent and low adoption 8.33 per cent respectively. The finding is in conformity with the finding as reported by *Latha (2002) Raghuwanshi and Jaiswal (2011), Dangi and Jain (2007).*

Thus, it can be concluded that in study area, most of the beneficiaries found to pertaining high extent of adoption regarding various components of scientific management of organic soybean cultivation under

Table 1. Distribution of beneficiaries and non-beneficiaries according to their extent of adoption of scientific management practices

Practices	Beneficiaries			Non beneficiaries		
	FA	PA	NA	FA	PA	NA
Land preparation and bio mass development						
Deep summer ploughing for moisture conservation & pest control	58(96.67)	02(03.33)	00(00.00)	49(81.67)	11(18.33)	00(00.00)
FYM @ 15t/ha must be added before preparatory tillage	59(98.33)	1(1.67)	0(0.00)	51(85.00)	9(15.00)	0(0.00)
Neem Cake or castor cake to be added at the time of ploughing	30(50.00)	20(33.33)	10(16.67)	9(15.00)	29(48.33)	22(36.67)
Sowing						
Select Pest resistant, early maturity varieties	18(30.00)	22(36.67)	20(33.33)	8(13.34)	26(43.33)	26(43.33)
Vermicompost should be added supplementing FYM	51(85.00)	9(15.00)	0(0.00)	28(46.67)	28(46.67)	4(6.66)
Seed treatment must be done with biological sources	32(53.34)	20(33.33)	8(13.33)	23(38.34)	20(33.33)	17(28.33)
Seed inoculation of *Azatobactor* or *Azospirillum*	30(50.00)	16(26.67)	14(23.33)	16(26.67)	29(48.33)	15(25.00)
Chemical treated seed cannot be used for sowing	24(40.00)	21(35.00)	15(25.00)	11(18.33)	15(25.00)	34(56.67)
Use of organic manures and crop residues						
Application of FYM or compost in any crop	59(98.33)	1(1.67)	0(0.00)	59(98.33)	1(1.67)	0(0.00)
Application time and method of FYM/ compost use	57(95.00)	3(5.00)	0(0.00)	44(73.33)	16(26.67)	0(0.00)
Method of FYM preparation	37(61.67)	18(30.00)	5(8.33)	18(30.00)	31(51.67)	11(18.33)
Crop residue incorporation in the soil	20(33.33)	28(46.67)	12(20.00)	7(11.67)	32(53.33)	21(35.00)
Organic/ solid waste management	15(25.00)	29(48.33)	16(26.67)	3(5.00)	37(61.67)	20(33.33)
Adoption of green manure crop selected and sowing time	25(46.67)	23(38.33)	9(15.00)	13(21.67)	24(40.00)	23(38.33)
Stage of incorporating green manure crop in your field	29(48.34)	23(38.33)	8(13.33)	8(13.34)	26(43.33)	26(43.33)
Use of bio fertilizers						
Bio fertilizers applied in soybean main crop	59(98.33)	1(1.67)	0(0.00)	57(95.00)	3(5.00)	0(0.00)
Chemical fertilizers not used/ reduced consumption	38(63.33)	18(30.00)	4(6.67)	10(16.67)	33(55.00)	17(28.33)
Seed treated with bio fertilizer for vigour growth/ disease control	24(40.00)	20(33.33)	16(26.67)	13(21.67)	20(33.33)	27(45.00)
Dose of bio fertilizer used	54(90.00)	4(6.67)	2(3.33)	51(85.00)	8(13.33)	1(1.67)
Bio fertilizes purchased from authorised source	13(21.67)	30(50.00)	17(28.33)	8(13.33)	33(55.00)	19(31.67)
Vermicompost						
Vermicompost application	48(80.00)	12(20.00)	0(0.00)	31(51.67)	25(41.67)	4(6.66)
Vermicompost preparation	36(60.00)	22(36.67)	2(3.33)	23(5.00)	24(40.00)	13(21.67)
Application of Vermiwash	18(30.00)	22(36.67)	20(33.33)	5(8.33)	15(25.00)	40(66.67)
Weed management						
Practiced crop rotation and shallow ploughing for weed control	41(68.34)	11(18.33)	8(13.33)	25(41.67)	25(41.67)	10(16.66)
Growing a fodder crop cowpea between 2 rows of soybean	13(21.67)	20(33.33)	27(45.00)	7(11.66)	19(31.67)	34(56.67)
One or two hand weeding for weed control	31(51.67)	23(38.33)	6(10.00)	26(43.33)	25(41.67)	9(15.00)
Employed labour for manual weeding	24(40.00)	27(45.00)	9(15.00)	24(40.00)	25(41.67)	11(18.33)
Pest management						
Practiced summer ploughing	56(93.33)	3(5.00)	1(1.67)	57(95.00)	2(3.33)	1(1.67)
Clean seed bed /bunds from crop debris and stubble incorporated	32(53.33)	19(31.67)	9(15.00)	8(13.34)	26(43.33)	26(43.33)
Maintained proper spacing to check pest/ disease population	34(56.67)	23(38.33)	3(5.00)	21(35.00)	32(53.33)	7(11.67)
Crop residue managed properly to check major pest and diseases	31(51.67)	25(41.67)	4(6.66)	7(11.67)	18(30.00)	35(58.33)
Ploughed field after harvest	49(81.67)	10(16.67)	1(1.67)	38(63.33)	21(35.00)	1(1.67)
Sown resistant varieties for pest/disease control	24(40.00)	19(31.67)	17(28.33)	15(25.00)	19(31.67)	26(43.33)
Installed light traps/ pheromone traps to kill adult pests	29(48.33)	29(48.33)	2(3.34)	10(16.66)	19(31.67)	31(51.67)
Bio agents/ predators adopted for pest control	3(5.00)	23(38.33)	34(56.67)	0(0.00)	5(8.33)	55(91.67)
Bio pesticides like BT and plant extracts used	21(35.00)	25(41.67)	14(23.33)	8(13.33)	15(25.00)	37(61.67)
Follow crop rotation for pest control	40(66.67)	19(31.67)	1(1.66)	28(46.67)	24(40.00)	8(13.33)
Weed removed to control pest/ diseases	31(51.67)	22(36.67)	7(11.66)	19(31.67)	29(48.33)	12(20.00)
Installing fishtail palm / wild saccharum for predatory birds	3(5.00)	23(38.33)	34(56.67)	0(0.00)	9(15.00)	51(85.00)
Adopted indigenous / traditional methods for proper storage	30(50.00)	20(33.33)	10(16.67)	28(46.67)	25(41.67)	7(11.67)
Collection and destroyed eggs larvae and pupae of crop pests	33(55.00)	19(31.67)	8(13.33)	9(15.00)	24(40.00)	27(45.00)

Chilli or garlic extract or others for pest / disease control	44(73.33)	15(25.00)	1(1.67)	9(15.00)	12(20.00)	39(65.00)
Biological control of diseases						
Seed soaking in mixture of Cow urine	33(55.00)	24(40.00)	3(5.00)	25(41.67)	28(46.67)	7(11.66)
Three spray of raw neem oil and DAS for the management of rust	40(66.67)	19(31.66)	1(1.67)	36(60.00)	19(31.67)	5(8.33)
Seed soaking in mixture of Cow urine (1:10) + asafoetida (0.01%) or in cow urine alone for 1 minute for the managements of bacterial pustule	29(48.33)	21(35.00)	10(16.67)	17(28.33)	23(38.34)	20(33.33)
Harvesting and post-Harvest management						
Timely harvesting should be done	52(86.67)	7(11.66)	1(1.67)	48(80.00)	11(18.33)	1(1.67)
Harvesting should be done by hand, which is typically done by breaking the stalks on the ground with a sickle	46(76.67)	13(21.66)	1(1.67)	38(63.34)	20(33.33)	2(3.33)
Threshing can be done either with a mechanical soybean thresher or some other conventional method	44(73.34)	14(23.33)	2(3.33)	39(65.00)	20(33.33)	1(1.67)
Harvested soybean have moisture content	42(70.00)	17(28.33)	1(1.67)	29(48.33)	29(48.33)	2(3.34)
Harvest soybean should be fill with gunny bags only (do not use fertilizer bags, moisture bags)	40(66.67)	16(26.67)	4(6.66)	17(28.33)	17(28.33)	26(43.34)
Marketing						
Marketing news much useful to farmers	37(61.67)	14(23.33)	9(15.00)	29(48.33)	25(41.67)	6(10.00)
A farmer can get better price of organic soybean	4(6.66)	16(26.67)	40(66.67)	6(10.00)	10(16.67)	44(73.33)
One should sell his organic soybean to organic awareness	1(1.67)	25(41.66)	34(56.67)	7(11.66)	16(26.67)	37(61.67)
Purchase of organic inputs only as guided by the shopkeeper	34(56.67)	19(31.67)	7(11.66)	25(41.67)	21(35.00)	14(23.33)
One should grow those organic crops which has a demand	4(6.66)	19(31.67)	37(61.67)	6(10.00)	15(25.00)	39(65.00)

FA = Fully adopted; PA = Partially adopted; NA = Not adopted

ATMA programme followed by medium and low adoption respectively. On the other hand, data showed that majority of the non-beneficiaries 58.34 per cent found to pertaining low adoption regarding various components of scientific management of organic soybean cultivation under ATMA programme followed by medium knowledge 33.33 per cent and high knowledge 8.67 per cent respectively. The finding is in conformity with the finding as reported by *Thalor (2004)*. Thus, it can be concluded that in study area, most of the non-beneficiaries found to pertaining low adoption regarding various components of scientific management of organic soybean cultivation under ATMA programme followed by medium and high knowledge respectively.

The distribution of respondents according to their overall level of extent of adoption about scientific management of organic soybean cultivation reveal from Table that majority of the soybean growers (68.3%) were found in high extent of adoption followed by 31.7 per cent in medium level extent of adoption whereas meager percentage of soybean growers (0.00%) were found in low level of extent of adoption. Thus, it could be inferred that over half of soybean growers had high level of knowledge about organic farming practices in soybean crop. These findings in line with the finding of *Vyas (2007).*

Table 3. Correlation between independent variables with extent of adoption of beneficiaries and non-beneficiaries about scientific management

Independent variables	Coefficient of correlation (*r*)	
	Beneficiaries	Non beneficiaries
Age	0.0852^{NS}	0.2759*
Education	0.3337**	0.4899**
Family size	0.0718^{NS}	0.0856^{NS}
Land holding	0.3747**	0.1492^{NS}
Annual income	-0.0793^{NS}	0.1650^{NS}
Organic inputs utilization pattern	0.3009*	0.0853^{NS}
Innovativeness	0.2813*	0.4777**
Extension contact	0.2838*	0.0892^{NS}
Social participation	0.2605*	0.0177^{NS}
Mass Media exposure	0.2668*	0.2636*
Economic motivation	0.3305**	0.3624**
Risk preference	0.1699^{NS}	0.0892^{NS}

Significance Levels 0.01 (1 %)**
Significance Levels 0.05 (5 %)*
NS – Non Significant

Correlation between personal profiles with extent of adoption of organic soybean cultivation : The data indicated in Table 3 revealed that the education, land holding of beneficiaries showed positive and significant relationship at 0.01 level of probability,

whereas annual income, extension contact, social participation, mass media exposure and showed positive and significant relationship at 0.05 level of probability with their adoption about of scientific management, The remaining three variables namely age, family size and risk preference did not establish any significant relationship with their adoption of scientific management. The finding is in conformity with the finding as reported by *Saxena and Singh (2000).*

However, Education of non-beneficiaries showed positive and significant relationship at 0.01 level of probability, whereas age and mass media exposure showed positive and significant at 0.05 level of probability with their adoption of scientific management. The remaining six variables namely family size, land holding, annual income, extension contact, social participation, risk preference did not establish any significant relationship with their adoption of scientific management. The finding is in conformity with the finding as reported by *Thalor (2004), Singh and Yadav (1977)*

CONCLUSION

Based on the major findings it is concluded that majority of the beneficiaries were in middle and old age groups, above secondary level of education, majority of beneficiaries had active social participation, small family size and higher level of mass media categories medium to higher level of risk orientation and innovativeness. Majority of beneficiaries had high level of adoption about organic farming practices on soybean crop.

Majority of the non-beneficiaries were in meddle to old age groups, secondary to illiterate level of education, belong to low to medium level of extension contact, low active social participation, low and medium level of mass media categories, majority of the non-beneficiaries had low level of adoption about organic farming practices on soybean crop.

Out of various constraints were lack of knowledge about bio pesticide, application time, methods and proper dose and the suggestion were to farmers group must be promoted for economy of scale.

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