

Behaviour of Farmers in Adoption of Recommended Technology of Soybean

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ABSTRACT

The study was conducted in Nagpur district of Maharashtra State. With the help of exploratory research design, data was collected from 150 farmers and analysed with the help of suitable statistical methods. Majority of soybean growers were having partial knowledge and partial adoption of recommended soybean practices. Extent of knowledge, attitude and adoption of recommended practices were found to be medium. In the constraints analysis non availability of labour or cost effective labour, non availability of money at proper time and non availability quality seed were the first three constraints out of fourteen faced by 76.67, 64.67 and 60.00 per cent respondents, respectively.

Key words : *Exploratory research design; Soybean growers; Knowledge; Attitude;*

Pearl of oil called as “soya”. Soybean (*Glycine max* L. merill) became the miracle crop of the 21st century. On the global scale, it tops on the list of oilseed crops. It is introduced as an oilseed crops in India to increase edible oil resources in the country due to its high yield potential. Madhya Pradesh is the first and Maharashtra is second largest soybean producing States in India. Madhya Pradesh produced 70 per cent and Maharashtra produced 18 per cent of countries soybean production. Vidarbha becomes the main region of soybean production in Maharashtra. Cotton was main crop of this region in kharif season but from last five years farmers prefer soybean crop because of less input and high output, requires less agronomical practices as compared to cotton crop.

To improve the agricultural production some form of appropriate technology is necessary. An appropriate technology in this context is defined as the latest scientific technological developments that have been adjusted to suit the local conditions to the highest possible degree. In last decade agriculture research system has generated location specific technology and develops the package of practices of soybean production technology to satisfy the needs of farmers. Yet farmers remain unaware and skeptical to taking full advantage of these

technologies. Technologies are viable only when they are used by farmers.

For increasing adoption and ultimately the production of soybean crop there is need to study the basic perception about the various recommended technologies of soybean crop. Hence, the study was formulated with an objective to study the adoption behaviour of farmers towards the recommended technologies of soybean cultivation and the constraints faced by farmers in adoption of recommended technologies of soybean.

METHODOLOGY

The present study was conducted in ten villages of Nagpur district. Exploratory research design of social research was used for the study. 15 farmers from each village were selected randomly with the help of equal random sampling method and total 150 farmers were selected for the study. Data was collected personally by contacting all the respondents with the help of pre-tested interview schedule. Knowledge, attitude and adoption are the elements of adoption behaviour which were studied as dependant variables. Practice wise knowledge and adoption of recommended technologies were measured with three point continuum i.e. full, partial

and no. Then index developed and extent of knowledge and adoption were measured. Attitude was measured with the help of schedule developed for the study which includes ten statements quantifying with the help of five point continuum and then attitude index was developed. Relational analysis between independent and dependant variables was also computed. In constraint analysis, constraints faced by soybean growers in adoption of recommended technology were recorded. Recorded

constraints were ranked on the basis of frequency and percentage.

RESULTS AND DISCUSSION

Knowledge and adoption of farmers towards recommended practices of soybean: Practice wise knowledge and adoption of respondents about recommended soybean technology have been ascertained and the findings pertaining to these depicted in Table 1.

Table 1. Distribution of the farmers according to their knowledge and adoption of various practices.

S.No.	Recommended soybean practices	Knowledge (N=150)			Adoption (N=150)		
		FK	PK	NK	FA	PA	NA
1	Land preparation	94(62.67)	56(37.33)	00(0.00)	80(53.33)	70(46.66)	00(0.00)
2	Application of Manures	50(33.33)	80(53.33)	20(13.33)	50(33.33)	78(52.00)	22(14.67)
3	Use of Recommended Varieties	86(57.33)	44(29.33)	00(0.00)	95(63.33)	55(36.67)	00(0.00)
4	Seed treatment	38(25.33)	100(66.67)	12(8.00)	40(26.67)	98(65.33)	12(8.00)
5	Use of Biofertilizer	27(18.00)	88(58.67)	35(23.33)	28(18.67)	87(58.00)	35(23.33)
6	Time of sowing	110(73.33)	40(26.67)	00(0.00)	105(70.00)	45(30.00)	00(0.00)
7	Method of sowing and spacing	88(58.67)	60(40.00)	02(1.33)	85(56.67)	65(43.33)	00(0.00)
8	Seed rate	85(56.67)	45(30.00)	20(13.33)	85(56.67)	45(30.00)	20(13.33)
9	Nutrient Management	40(26.67)	86(57.33)	24(16.00)	45(30.00)	85(56.67)	20(13.33)
10	Water management	80(53.33)	70(46.67)	00(0.00)	80(53.33)	70(46.67)	00(0.00)
11	Intercropping system	60(40.00)	90(60.00)	00(0.00)	65(43.33)	85(56.67)	00(0.00)
12	Intercultural operation	72(48.00)	78(52.00)	00(0.00)	75(50.00)	75(50.00)	00(0.00)
13	Use of weedicide	30(20.00)	55(36.67)	65(43.33)	30(20.00)	50(33.33)	70(46.67)
14	Pest and disease management	52(34.67)	75(50.00)	23(15.33)	50(33.33)	70(46.67)	30(20.00)
15	Harvesting	90(60.00)	60(40.00)	00(0.00)	90(60.00)	60(40.00)	00(0.00)

(Figures in parenthesis indicate percentage)

FK- Full Knowledge, PK- Partial Knowledge, NK- No Knowledge

FA- Full Adoption, PA- Partial Adoption, NA- Non Adoption

A perusal of data in Table 1 shows that remarkably high proportion of the respondents (62.67%) possessed full knowledge about deep ploughing and 37.33 per cent respondents had partial knowledge about land preparation. Whereas, 53.33 per cent respondents have fully adopted the recommended practice of land preparation followed by 46.67 per cent respondents adopted partially.

Knowledge about recommended dose of FYM is partial as expressed by over half of respondents (53.33%). Therefore, majority of respondents (52.00%) were using partial dose of manure in their field. Full knowledge about recommended variety (JS-335) was recorded by 57.33 per cent respondents, but 63.33 per cent respondents were using the soybean variety JS-335. It clearly indicates that the farmers who did not have knowledge of variety were also using on their own only because of other farmers were adopting the variety

JS-335. Seed treatment in soybean was partially known to 66.67 per cent respondents, hence, partially adopted by 65.33 per cent respondents. Similarly, use of biofertilizer was also partially known and adopted by majority of respondents (58.67 and 58.00 per cent, respectively). It is noted from the findings that important and low cost practice like seed treatment and use of biofertilizer in seed treatment was not clearly known to the majority of farmers consequently proper adoption of the practice was not followed by the farmers. About 23.33 per cent respondents were not known and used the biofertilizers.

Regarding time of sowing most of the respondents (73.33%) were having full knowledge of proper sowing time of soybean and about 70.00 per cent respondents were adopting the recommended time of sowing. More than half of total respondents (58.67%) had full knowledge about spacing and method of sowing

followed by 40.00 per cent respondents having partial knowledge. Full adoption was noted by 56.67 per cent respondents followed by 43.33 per cent respondents recorded partial adoption. It means, majority of farmers were sowing the soybean with the help of seed drill on recommended spacing but some of them were not careful about spacing and method of sowing. Nutrient management is an important practice for the healthy growth of crop, but majority of respondents (57.33%) had partial knowledge about the nutrient management. It could be resulted in at random application of fertilizer doses of crop as expressed by 56.67 per cent respondents.

Soybean is a kharif crop hence not required so much irrigation water. But, attention shall be given on protective irrigation when there is long dry spell. Only the management of irrigation in dry spell and drainage of water in continuous rainfall is an important aspect of water management which was fully known and adopted by 53.33 per cent respondents and partially known by 46.67 per cent respondents. Intercropping of tur in soybean with 1:2 proportions is the recommended practice. This was partially known to the 60.00 per cent respondents, similarly partial adoption was recorded by the majority of respondents (56.66%). Intercultural operations in soybean are very important up to 30-40 days after sowing which helps to keep field free from weeds and efficient growth of crop. Importance of weed free farm is very much known by the farmers, but how and when to manage it mechanically was not properly

gained by the 52.00 per cent respondents. With this partial knowledge 50.00 per cent were doing the intercultural operations in soybean. Farmers were now diverting towards the chemical weed control method because of lack of labours or cost effective labours for physical or mechanical weed control. Use of proper herbicides at proper time is proved beneficial, but it was not known by 43.33 per cent respondents and partially known by 36.66 per cent respondents. Depending on the knowledge of use of herbicides, 46.67 per cent respondents had not adopted the chemical weed control and 33.33 per cent respondents have partially adopted the practice. Plant protection from pest and diseases has vital importance in the production of soybean. But, half of the respondents were having partial knowledge of pest and disease management and 34.67 per cent respondents had full knowledge. Regarding adoption of plant protection practices, majority of respondents (46.67%) had partial adoption followed by the respondents (33.33%) of full adoption. Harvesting of soybean at proper time and proper stage was known to majority of respondents (60.00%) and all these respondents had fully adopted the proper time and stage of soybean harvesting.

Attitude of farmers towards recommended practices of soybean

The data with regard to the attitude of the soybean growers about recommended technology are furnished in Table 2. It is apparent the sizable respondents possessed high degree of positive attitude about the recommended practices except few of them.

Table 2. Attitude of respondents towards the improved technology of soybean cultivation

S.N.	Statement	SA	A	UD	DA	SDA
1	Recommended technology provides possible solutions to present problems of soybean	40(26.67)	50(33.33)	20(13.33)	30(20.00)	10(6.67)
2	Traditional practices of soybean are not helpful to increase the yield	45(30.00)	50(33.33)	10(6.67)	35(23.33)	10(6.67)
3	Only resourceful farmer can get more benefit from new technologies.	30(20.00)	45(30.00)	20(13.33)	35(23.33)	20(13.33)
4	Checking of germination percentage before sowing is very necessary in soybean	40(26.67)	80(53.33)	20(13.33)	5(3.33)	5(3.33)
5	Use of bio-fertilizer in soybean is very important for healthy growth and more yield	35(23.33)	60(40.00)	25(16.67)	20(13.33)	10(6.67)
6	Small and marginal farmers are not able to adopt the improved technologies of soybean	30(20.00)	40(26.67)	10(6.67)	40(26.67)	30(20.00)
7	Use of weedicide is more beneficial than mechanical weeding	45(30.00)	80(53.33)	5(3.33)	10(6.67)	10(6.67)
8	Improved practices of soybean are very expensive	15(10.00)	45(30.00)	20(13.33)	50(33.33)	20(13.33)
9	Labour is not the problem in adoption of improved practices of soybean	30(20.00)	50(33.33)	10(6.67)	50(33.33)	10(6.67)
10	Harvesting of soybean at proper stage is very important	120(80.00)	30(20.00)	00(0.00)	00(0.00)	00(0.00)

(Figures in parenthesis indicate percentage)

(SA-Strongly Agree, A-Agree, UD-Undecided, DA-Disagree, SDA-Strongly Disagree)

Among the 10 statements of the attitude about soybean technology most of the respondents (33.33%) were agreed that recommended technology can provide the possible solution to the present problems followed by strongly agreed farmers (26.66%). About 33.33 per cent and 30.00 per cent respondents were agreed and strongly agreed, respectively towards the traditional practices that give the lower yields to the farmers. Similarly, half of the respondents (30.00%) and (20.00%) were agreed and strongly agreed that only resourceful farmer can get more benefit from the new technology respectively. This contributes to negative statement and for positive statement 23.33 per cent respondents were disagreed and 13.33 per cent strongly disagreed. Favorable attitude was observed in case of germination test of soybean, over half of the respondents (53.33%) were agreed and over one fourth of the respondents (26.67%) were strongly agreed about to test the germination of seed.

In the use of low cost technology most of the farmers (40.00%) were favorable towards use of biofertilizer which was followed by 23.00 per cent were most favorable. About small and marginal farmers similar percentage of the respondents were voted to positive as well as negative attitude about the use of improved technology of the soybean and 6.67 per cent respondents were unable to decided the answer of the statements. In case of soybean, weed is the major problem and labour is the major constraint in control of weed. Hence, most of the farmers i.e. 53.33 per cent and 30.00 per cent were agreed and strongly agreed towards the use of weedicides in soybean respectively. About 30.00 per cent and 10.00 per cent respondents were positively accepted that improved cultivation of soybean was expensive, while 33.33 and 13.33 per cent were disagreed the high expenditure of soybean technology. Over half of the respondents (33.33% and 6.67%) were stated that labours are not the hindrance in adoption of improved soybean cultivation technology. About 80.00 per cent of respondents were strongly agreed about the harvesting of soybean at proper stage.

The distribution of respondents according to their overall level of knowledge about recommended cultivation practices of soybean reveal from Table 3 that majority of the soybean growers (62.67%) were found in medium level of knowledge followed by 20.66 per cent in high knowledge level, whereas 16.67 per cent soybean growers have found in low level of knowledge. Thus, it could be inferred that over half of soybean growers had medium level of knowledge about

improved cultivation practices. These findings were in line with the finding of *Gawande et.al. (2007)* and *Jadhav (2008)*.

Table 3. Distribution of respondent according to their overall level of knowledge about recommended cultivation practices of soybean

S. N.	Behaviour category	Score range	Respondents (N=150)	
			No.	%
<i>Knowledge</i>				
1	Low	Up to 52	25	16.67
2	Medium	53-76	94	62.67
3	High	Above 76	31	20.67
<i>Attitude</i>				
1	Low favorable	Up to 63	31	20.67
2	Medium favorable	64-85	87	58.00
3	Highly favorable	Above 85	32	21.33
<i>Adoption</i>				
1	Low	Up to 51	26	17.33
2	Medium	52-73	94	62.67
3	High	Above 73	30	20.00

The distribution and analysis of respondents according to their attitude towards the improved cultivation practices of soybean revealed that majority of the soybean growers (58.00%) were having medium favourable attitude followed by 21.33 per cent in highly favourable and latter 20.67 per cent respondents were having low favourable attitude. Thus, it could be inferred that majority of soybean growers possessed the medium to high favourable attitude towards the improved technology of soybean cultivation. These findings are supported by the finding of *Todasam (2009)* and *Venkatta Kumar Padmaiah (2010)*.

Adoption shows the status of actual use of recommended technology by the soybean growers. The distribution of the respondents according to their levels of adoption is presented in Table 3 clearly reveals that majority of farmers (62.67%) were included under medium category of adoption of recommended technologies followed by the farmers (20.00%) belonging to high category of adoption, whereas only 17.33 per cent of the farmers had low level of adoption of recommended technology of soybean. These finding are in the same line with the finding of *Raghuwansi and Jaiswal (2011)*.

Constraints in adoption of recommended practices of soybean: Several constraints under different sub heads as reported by the soybean growers in adoption behaviour of recommended technologies are presented in Table 4.

Table 4. Distribution of farmers according to constraints faced by them in use of recommended technology

S. No.	Constraints	Respondent (N=150)		Rank
		No.	%	
<i>A Economical</i>				
1	Non availability of money at proper time	97	64.67	II
2	Higher cost of fertilizer	61	40.66	XI
3	Higher rent of threshing machine	12	8.00	XIV
4	Higher cost of seed	54	36.00	XII
5	Higher cost of insecticide	63	42.00	X
<i>B Technical</i>				
1	Lack of information about seed treatment timely	78	52.00	VIII
2	Lack of information about fertilizer management	75	50.00	IX
3	Lack of information about the plant protection	80	53.33	VI
4	Lack of information about bio fertilizers and their use	79	52.66	VII
5	Lack of information about use of weedicide	85	56.66	V
<i>C Situational</i>				
1	Non availability and cost effective of labour at proper time	115	76.67	I
2	Non availability of protective irrigation facilities	87	58.00	IV
3	Non availability of quality seed	90	60.00	III

It inferred Table 4 that situational constraints i.e. non availability and cost effective labour at proper time was expressed by the majority of farmers (76.66%) and this problem is emerged at Ist rank. Second ranked problem was economic i.e. non availability of money at proper time (64.67%), then IIIrd was non availability of quality seed expressed by 60.00 per cent farmers because from last two years seed purchased from the market was not germinated properly.

Lack of protective irrigation was assumed as a constraint at Ist or IInd rank, but 58.00 per cent farmers

reported that non availability of protective irrigation at 4th rank is the important problem because from last 2 years continuous rainfall was received due to which water longing was observed in the field. Due to the more rainfall weed was not controlled by the mechanical methods. Farmers were tried to use the weedicides for control of weed in soybean. But, due to the lack of knowledge about weedicides and its proper use 56.66 per cent farmer were unable to adopt the weedicide. Next constraint was the lack of information about plant protection this was reported by 53.33 per cent framers, because spodoptera is the major pest of the soybean which seriously affects the crop if not control. Use of bio fertilizer is the simple technology which helps to increase the yield of soybean, but due to the lack of its knowledge, 52.66 per cent farmers were unable to use it. Similarly, 52.00 per cent respondents reported the lack of information about seed treatment. Followed to this lack of information about fertilizer management was reported by 50.00 per cent respondents. It clearly indicates that beside the situational and economical problem technical constraints were the most important hurdle in adoption of recommended technology. Some of the farmers i.e. 42.00, 40.66, 36.00 and 08.00 per cent were expressed their displeasure due to the higher cost of insecticide, fertilizer, seed and rent of threshing machine, respectively. On the parallel line *Shinde (2003)*, found the similar technical constraints in adoption of improved technology.

CONCLUSION

It was observed that some of the important practices of soybean cultivation were partially adopted by considerable group of farmers. Partial adoption could not give the relative advantage as expected, which can be demoralizing the farmer for adoption of technology. Hence, it is necessary to organize skill oriented trainings’ which can impart in depth technical knowledge to the farmers by developing self confidence about the technology.

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