

Factors responsible for adoption of soybean cultivation

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ABSTRACT : The study was conducted in Buldana district of Vidarbha region of Maharashtra State. Findings revealed that the majority of the respondents had a high level of adoption of recommended cultivation practices of soybean. Most of the respondents had completely adopted recommended practices like harrowing, recommended variety, intercultural operations, harvesting stage, sowing time, spacing, ploughing, sowing depth and seed rate. Regarding relational analysis, out of fourteen characteristics studied, eleven variables namely education, land holding, occupation, soil type, annual income, cropping pattern, experience in soybean cultivation, social participation, socio-economic status, extension contact, scientific orientation were positively and significantly correlated with the adoption of soybean growers about soybean cultivation practices. The findings of the regression analysis revealed that all the fourteen independent variables contributed 43.51 influences in adoption of the respondents.

Key Words : Adoption, Soybean, Pulse crop

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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. It is highly nutritious food item, as it contains 20 per cent oil and 40 per cent protein. In addition, it also contains 21 per cent carbohydrates, 11.5 per cent iron, 4 per cent mineral salts like calcium, phosphate and many important vitamins too (Damordjati *et al.*, 1996).

Soybean crop is originated from China. In India it is cultivated in the states of Madhya Pradesh, Maharashtra, Rajasthan, Andhra Pradesh, Karnataka and Chattisgarh. In Maharashtra state, the area under soybean cultivation during 2004-05 was 21,02,200 hectare with total production of 18,92,400 metric tones. Maharashtra is the second largest soybean growing state in the country. In Vidarbha region, the area under soybean cultivation during 2004-05 was 13,27,600 hectares with production of 10,50,100 metric tones. From the statistical information available, it is surprising to note that the area under cotton and other crops is decreasing and the area under soybean is increasing practically every year in Vidarbha region.

In Buldana district the area under soybean crop was 1,23,300 hectares and production was 1,49,800 metric tones with productivity of 1217 kg/ha in the year 2003-04, which increased upto 1,41,200 hectares and production of 1,32,100

metric tones with productivity of 936 kg/ha in year 2004-05. Soybean cultivation has become more prominent in Buldana district, in Buldana, Chikhli and Mehkar Panchayat Samitis in particular from last 14 years as it fetches higher price and less input requirement and therefore, it has replaced the crops like cotton, sorghum, udid, mung etc. to some extent.

The area under soybean crop is increasing gradually year after year. Hence, there is a need to increase the average yield of soybean. The present investigation, therefore, aims to ascertain the factors responsible for adoption of improved cultivation practices of soybean by the farmers.

RESEARCH PROCEDURE

The study was carried out in purposively selected Buldana, Chikhli and Mehkar Panchayat Samitis of Buldana district of Vidarbha region in Maharashtra State, as the area under soybean crop is increasing every year and topping the list of Panchayat Samiti in rank order of first, second and third, respectively. Out of the 13 Panchayat Samitis in Buldana district, Buldana, Chikhli and Mehkar Panchayat Samitis were selected considering the increasing trend of soybean area since last eight years, and ranking first, second and third, respectively in soybean area as compared to other panchayat samitis. From each of the three panchayat samitis thus selected five villages were considered for study. The total sample villages thus

constituted fifteen for the study.

The list of farmers growing soybean crop since last three years, consequently in the selected 15 villages was obtained. The sample of 150 farmers was drawn with the help of disproportionate random sampling method, only from those farmers whose area under soybean crop is increased as compared to last year.

Among the cultivation practices of soybean recommended by Dr. PDKV, Akola, a few technologies were selected by contacting specialists of Oilseed Research Unit, Pulse Research Unit, Agronomy, Pathology and Entomology Department of the University.

RESEARCH ANALYSIS AND REASONING

The results obtained from the present investigation have been discussed in the following sub heads:

Adoption index :

The data in the Table 1 reported that the majority of the respondents (52.67%) adopted recommended cultivation practices at high level, followed by 47.33 per cent of the respondents adopting the practices at medium level. None of them was found in low adoption category.

It was, therefore, concluded that majority of the respondents adopted the recommended cultivation practices of soybean at high level. The present findings were supported by the findings of Shambharkar (1997).

Table 1 : Distribution of the respondents according to their adoption index

Sr. No.	Adoption	Respondent (n=150)	
		Frequency	Percentage
1.	Low	00	00.00
2.	Medium	71	47.33
3.	High	79	52.67
	Total	150	100.00
	X = 69.45	S.D. = 10.36	

Practicewise adoption of recommended soybean cultivation practices :

Adoption shows the degree of actual use of recommended soybean cultivation practices by the respondents. The data with regards to the practicewise adoption of the 17 practices selected for the study have been furnished in Table 2.

It is evident from Table 2 that majority of the respondents had completely adopted various recommended cultivation practices of soybean namely harrowing (100.00%), recommended variety (100.00%), interculture operations (100%), harvesting stage (100.00%), sowing time (98.00%), spacing (96.67%), ploughing (92.67%), sowing depth (92.00%) and seed rate (84.67%). It was further observed that more than one third of the respondents had complete adoption regarding seed treatment (45.33%). However, very few respondents adopted the practices, such as intercrop (31.33%), biofertilizer use (30.67%), recommended dose of fertilizer (29.33%), FYM application (25.33%), plant protection measures (22.67%),

Table 2 : Distribution of the respondents according to their adoption of recommended soybean cultivation practices

Sr. No.	Recommended soybean cultivation practices	Adoption					
		Complete		Partial		Non-adoption	
		F	%	F	%	F	%
1.	Ploughing	139	92.67	04	02.67	07	04.66
2.	Harrowing	150	100.00	00	0.00	00	00.00
3.	Recommended variety	150	100.00	00	0.00	00	00.00
4.	FYM application	38	25.33	85	56.67	27	18.00
5.	Biofertilizer used (<i>Rhizobium japonicum</i> and PSB 250 g/10 leg seed)	46	30.67	15	10.00	89	59.33
6.	Seed treatment	68	45.33	03	02.00	79	52.67
7.	Sowing time	147	98.00	03	02.00	00	00.00
8.	Sowing depth	138	92.00	12	08.00	00	00.00
9.	Seed rate	127	84.67	23	15.33	00	00.00
10.	Spacing	145	96.67	05	03.33	00	00.00
11.	Intercrop	47	31.33	13	08.66	90	60.0
12.	Interculture operation	150	100.00	00	00.00	00	00.00
13.	Protective irrigations at flowering and grain filling stage	32	21.33	05	03.33	113	75.33
14.	Micronutrient used	19	12.67	03	02.00	128	85.33
15.	Application of urea 35 kg and SSP 235 kg per ha	44	29.33	104	69.33	02	01.33
16.	Plant protection measures for control of pest and diseases	34	22.67	111	74.00	05	03.33
17.	Harvesting of crop at the stage of drying of leaves and yellowing of pods	150	100.00	00	00.00	00	00.00

protective irrigations (21.33%) and micronutrient used (12.67%) completely.

In case of plant protection, 74.00 per cent of the respondents adopted plant protection measures partially, followed by dose of fertilizer (69.33%) and FYM application (56.67%). However, very few respondents adopted seed rate (15.33%), biofertilizer was used by (10.00%) intercrop followed by (8.66%), sowing depth was kept (8.00%), spacing followed by (3.33%), protective irrigations adopted by (3.35%), ploughing done by (2.67%), seed treatment was given by (2.00%), sowing time was followed by (2.00%) and micronutrient was used by (2.00%).

It was also observed that majority of the respondents had not adopted the recommend cultivation practices like micronutrient use (85.33%), protective irrigations (75.33%), intercrop (60.00%), biofertilizer use (59.33%), followed by seed treatment (52.67%). Very few respondents had not adopted the practices of FYM application (18.00%), ploughing (4.66%), plant protection measures (3.33%) and dose of fertilizer (1.33%).

It could therefore be concluded that majority of the respondents had completely adopted the recommended practices like harrowing, recommended variety, interculture operations, harvesting stage, sowing time, spacing, ploughing, sowing depth and seed rate. Majority of the respondents had not adopted recommended practices like use of micronutrients, protective irrigations, intercrop, biofertilizer use and seed treatment.

Relational analysis:

In order to find out the relationship of the selected characteristics of the respondents with adoption of recommended soybean cultivation practices, correlation coefficients were worked out. The results obtained from the relational analysis have been presented in the Table 3.

Table 3 shows that only age had showed negative and significant relationship with adoption of cultivation practices recommended for soybean. Whereas, variables like education, land holding, occupation, soil type, annual income, cropping pattern, socio-economic status, extension contact, scientific orientation and knowledge showed positive and highly significant relationship with adoption. The, variables like experience in soybean cultivation, social participation, market orientation and risk preference showed positive and significant relationship with adoption.

..... *et al.* (1992), Dupare (1995), Shambharkar (1997), Zade (1998), Wane (2000), Jaiswal (2001), Mahajan (2002) and Asane (2003) had reported in accordance with the findings of the present study.

Multiple regression analysis :

As one of the objectives and in order to find out the relative contribution of independent variables to the variation in dependent variable *i.e.* adoption, the multiple regression

Table 3 : Coefficient of correlation of independent variables with their adoption

Sr. No.	Variables	'r' value
1.	Age	-0.1895*
2.	Education	0.3390**
3.	Land holding	0.2305**
4.	Occupation	0.3709**
5.	Soil type	0.2365**
6.	Annual income	0.3035**
7.	Cropping pattern	0.2309**
8.	Experience in soybean cultivation	0.1914*
9.	Social participation	0.1907*
10.	Socio-economic status	0.2112**
11.	Extension contact	0.3746**
12.	Market orientation	0.1936*
13.	Risk preference	0.1735*
14.	Scientific orientation	0.2305**
15.	Knowledge	0.5242**

* and ** indicate significance of values at P=0.05 and 0.01, respectively

analysis was employed.

Multiple regression analysis of independent variables with adoption of cultivation practices recommended for soybean was carried out and presented in Table 4.

The data presented in Table 4 indicate that coefficient of determination (R^2) of the independent variable was 0.4351 which

Table 4 : Multiple linear regression coefficient of adoption

Sr. No.	Variables	'r' value		
		Reg. coefficient	SE(b)	't' value
1.	Age	-0.0543	0.0836	0.6495 ^{NS}
2.	Education	-0.2198	0.3512	0.6260 ^{NS}
3.	Land holding	-0.0826	0.4722	0.1751 ^{NS}
4.	Occupation	2.2395	1.0240	2.1870*
5.	Soil type	3.1988	1.6624	1.9241 ^{NS}
6.	Annual income	0.000036	0.000021	1.6876 ^{NS}
7.	Cropping pattern	0.7162	0.6889	1.0396 ^{NS}
8.	Experience in soybean cultivation	0.0129	0.5871	0.0175 ^{NS}
9.	Social participation	0.2883	0.4836	0.5961 ^{NS}
10.	Socio-economic status	-1.8213	0.6979	2.6095**
11.	Extension contact	0.8637	0.3557	2.4276*
12.	Market orientation	1.9618	0.7464	2.6283**
13.	Risk preference	-0.0543	0.4772	0.1138 ^{NS}
14.	Scientific orientation	0.0103	0.6139	0.0168 ^{NS}
15.	Knowledge	0.3106	0.0759	4.0925**

$R^2 = 0.4351$ 'F' value = 6.8822

* and ** indicate significance of values at P=0.05 and 0.01, respectively

means that 43.51 per cent of total variation in the adoption level was explained by the selected 15 independent variables.

From the data presented in Table 4, it is observed that occupation and extension contact had positive significant influence upon the adoption of cultivation practices at 0.05 level of probability, respectively. Whereas socio-economic status, market orientation and knowledge had positively significant influence upon the adoption of cultivation practices at 0.01 level of probability, respectively. This indicates that with every one unit increase in the value of occupation, the value of adoption index has increased by 2.239 units when all other variables kept constant at their geometric mean level, whereas, with the every one unit increase in the value of knowledge, the value of adoption index increased by 0.310 units. The coefficient of the remaining variables namely age, education, land holding, soil type, annual income, cropping pattern, experience in soybean cultivation, social participation, risk preference and market orientation had no influence on the adoption of cultivation practices recommended for soybean.

Conclusion :

From the findings it can be concluded that the majority of the respondents had a high level of adoption of recommended cultivation practices of soybean. Most of the respondents had completely adopted recommended practices like harrowing, recommended variety, intercultural operations, harvesting stage, sowing time, spacing, ploughing, sowing depth and seed rate. Regarding relational analysis, out of fourteen characteristics studied, eleven variables namely education, land holding, occupation, soil type, annual income, cropping pattern, experience in soybean cultivation, social participation, socio-economic status, extension contact, scientific orientation were positively and significantly correlated with the adoption of soybean growers about soybean cultivation practices. The findings of the regression analysis revealed that all the fourteen independent variables contributed 43.51 influences in adoption of the respondents. It is also revealed that characteristics like occupation, socio-economic status, extension contact, market

orientation and knowledge were consistent in exerting the influence over adoption level of cultivation practices of the adopters.

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