Adoption Behaviour of Paddy Growers about Soil Testing

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ABSTRACT

The present study on adoption behaviour of paddy growers about soil testing in Bhandara District was undertaken in Bhandara district of Vidarbha region of Maharashtra State with sample size of 120 respondents from 12 villages. Data were collected on personal, socio-economic, situational, communicational and psychological profile of farmers towards adoption of soil testing was certain by using exploratory design of social research. Data were collected in face to face situation on a pre-structured interview schedule. It was revealed that, more than half i.e. 56.60 per cent respondents had full knowledge of meaning of depth of sampling and 52.50 per cent respondents had full knowledge of meaning of soil testing. Regarding attitude, majority of respondents found strongly agree with use of soil testing helps to maintain the fertility of soil (52.50%) and soil testing is a simple and easy to adopt technology in paddy(44.16%).The result showed that dependent variable knowledge had medium to low level of knowledge, most of the farmers found to have moderately favorable attitude towards soil testing and a medium to high level of adoption about the soil testing. There is need to organized awareness campaigns and arrange trainings, frontline demonstration, different extension activities to encourage paddy growers and make favorable attitude towards adoption of soil testing.

Key words: *Adoption, knowledge, Attitude, Paddy Growers, Soil Testing*

INTRODUCTION

Agriculture is the backbone of Indian economy. The increased agricultural production depends upon number of factor of which soil fertility play an important role. Soil fertility shows the nutrient status of the soil. Certain nutrients present in the soil are essential for plant growth.

Paddy (*Oryza sativa, L*) is one the important cereal crops of the world, forms the staple food for more than 50 per cent of population and is also known as "king of cereals". The United National General Assembly, in a resolution declared the year of 2004 as the "International Year of Rice" which has tremendous significance to food security it has very eloquently upheld the need of heighten awareness about the role of the rice in alleviation, poverty and malnutrition. Rice provides 21% of global human per capita energy and 15% of per capital protein. Soil Testing is known as a precise management method for determining and assessing soil fertility that enables farmers to assess the impact of management methods and identify what changes are needed each year. Soil fertility plays a key role in increasing crop production in almost all soil of the world. Now in the present situation, there is a gap of 10 million tonnes plant nutrients between removal of crop and replenishment. Srivastava and Pandey (1999) believed that most farmers continuously use a great deal of chemical fertilizers for increasing production without awareness of their farm fertility condition. Soil testing is a general evaluation program of soil fertility that helps farmers to use chemical fertilizers as per requirement. In fact, this method is a mechanism that facilitated economical fertilizer assessment. Until now, the necessary amount of nutrition's per surface for each crop was determined according to fertilizer suggestion which was approximately the same for all areas regardless of different soil and weather conditions. Now a days consumption of fertilizer by the farmers is higher than actually requirement. Farmers do not know the how much use of fertilizer and then increasing cost of input. Farmers blindly use of fertilizer as compare to actually requirement because they do not follow soil testing. So it is need to investigate adoption behaviour of farmers towards soil testing in paddy. In that view the present study, emphasis was given on the measurement of knowledge level, attitude level, adoption level and its relationship with selected personal, socio-economic, situational, communication and psychological characteristics of respondents.

METHODOLOGY

The study was carried out in three tahsils namely Bhandara, Sakoli, and Pauni of Bhandara district of Vidarbha region of Maharashtra State From each selected tahsils, 4 villages were selected purposively having more crop area under paddy cultivation, in all 12 villages selected for study. Thus from these three talukas 12 villages were selected by simple random sampling method and from these villages,120 respondents were selected. An exploratory research design of social research was used. The data were collected with the help of structured schedule consisting the questions on knowledge attitude and adoption of soil testing practices by the paddy growers. The data were collected in face to face situation on a pre-structured interview schedule. The data were then tabulated, analyzed and the results were interpreted.

Table 1
Distribution of the respondents according to their knowledge of soil sampling, soil testing and its recommendations

Sr. No	Particular	Knowledge			Adoption		
		FK	FA	PA	NA	PK	NK
A)	**Soil sampling**						
1	Depth of soil sample (15-20 cm)	68 (56.60)	26 (21.66)	73 (60.83)	21 (17.50)	41 (34.16)	11 (9.24)
2	Selection of sites (select 5-10 sites)	17 (14.16)	33 (27.50	13 (10.87)	70 (58.33)	53 (44.18)	50 (41.66)
3	Procedure of taking soil sample (taking V-Notch)	09 (7.50)	13 (10.83)	24 (20.00)	83 (69.17)	41 (34.17)	70 (58.33)
4	Preparation of soil sampling (taking half kg soil sample)	19 (15.83)	78 (65.00)	33 (27.50)	09 (07.50)	40 (33.33)	61 (50.84)
5	Information to be attached (Name, Address, Survey No.)	13 (10.84)	91 (75.84)	21 (17.50)	08 (06.66)	63 (52.50)	44 (36.66)
B)	**Soil testing**						
1	Meaning of soil testing	63 (52.50	34 (28.34)	79 (65.83)	07 (05.83)	37 (30.83)	20 (16.67)
2	Objective of soil testing	07 (05.83)	43 (35.83)	63 (52.50)	14 (11.67)	83 (69.17)	30 (25.00)
3	Benefits of soil testing	13 (10.84)	18 (15.00)	87 (72.50)	15 (12.50)	58 (48.33)	49 (40.83)
C)	**Soil testing recommendations**						
1.	Recommendation as per crop (100:50:50 kg NPK per ha)	23 (19.17)	29 (24.17)	73 (60.83)	18 (15.00)	60 (50.00)	37 (30.83)
2	Repeated soil testing (Once in a three year)	17 (14.17)	08 (6.67)	43 (35.83)	69 (57.50)	54 (45.00)	49 (40.83)
3	Desirable P^H of soil (5.5-7.0)	43 (35.83)	27 (22.50)	88 (73.33)	05 (04.16)	37 (30.84)	40 (33.33)
4	Recommendation to correct N_2 content in soil 1. <140kg - add 50% more N_2 2. 141-280kg - add 25% more N_2 3. 281-420kg- No change	27 (22.50)	07 (05.83)	45 (37.50)	65 (54.17)	70 (58.33)	23 (19.17)
5	Recommendation to correct P_2O_5 content in soil 1. <15kg - add 50% more P_2O_5 2. 16-30kg -add 25% more P_2O_5	13 (10.84)	09 (07.50)	33 (27.50)	78 (65.00)	10 (08.33)	97 (80.83)
6	Recommendation to correct K_2O content in soil 1. <120kg - add 50% more K_2O 2. 121-180kg –add 25% more K_2O 3. 181-240kg – No change	09 (07.50)	09 (07.50)	28 (23.33)	83 (69.17)	08 (06.67)	103 (85.83)

FK- Full knowledge **PK-** Partial knowledge **NK-** No knowledge
FA- Full adoption **PA-** Partial adoption **NA-** No adoption

RESUTS AND DISCUSSION

The findings of the study have been presented under following heads.

Knowledge and adoption of paddy growers about of soil testing

The distribution of the respondents according to their knowledge under the heads of soil sampling, soil testing and soil testing recommendations have been presented in Table 1.

It was observed from Table 1 that under soil sampling more than half i.e 56.60 per cent respondents had full knowledge of depth of sample i.e. to be taken up to 15-20 cm. followed by 34.16 per cent respondents having partial knowledge of it. Information like name of farmer, his address and survey number etc. required to attach with the soil sample drawn, but it was partially known to 52.50 per cent respondents followed by 36.66 per cent who had no knowledge of it. Majority of respondents (58.33%) found to have no knowledge of procedure of taking soil sample by preparing 'V'-notch, while one third of respondents (34.17%) had its partial knowledge. Similarly, half of the respondents (50.84%) had no knowledge of preparation of soil sample by taking half kg soil sample, while one third of respondents (33.33%) had partial knowledge. While taking sample, selection of sites is an important criterion where 5 to 10 sites need to select for good sample, however it was observed that 44.18 per cent respondents had partial knowledge, followed by 41.66 per cent respondents had no knowledge of selection of sites.

Regarding soil testing, 52.50 per cent respondents had full knowledge of meaning of soil testing, followed by 30.83 per cent respondents had its partial knowledge. Majority of respondents (69.17%) had partial knowledge of objectives of soil testing whereas nearly half of the respondents (48.33%) were partially aware about the benefit of soil testing.

Under the head of soil testing recommendations, half and more respondents had partial knowledge of recommendation to correct N_2 content in soil (58.33%) and recommendation as per crop (50%). Further, vast majority of respondents i.e. 85.83 per cent and 80.83 per cent never know the recommendations to correct K_2O and P_2O_5, respectively.

Adoption of soil sampling and testing

The data presented in Table 1 further revealed that majority of respondents were fully adopted soil sampling procedures i.e. information to be attached to the collected soil samples like name, address, survey no. etc. It was followed by the practice of preparation of half kg soil sample which was fully adopted by 65 per cent respondents. During collection of soil sample, depth of soil sample should be 15-20 cm, but majority of respondents (60.83%) not carefully followed it, hence partially adopted. It was also observed that majority of respondents never use to take sample from properly prepared 'V' notch dug (69.17%) and never follow the proper selection of sites for collection of soil sample (58.33%).Previously in the knowledge table it was observed thatmajority of respondents had no knowledge or partial knowledge of information to be tagged to the collected soil sample and weight of soil sample to be collected, but here in adoption majority of respondents found to be using it. The contradictory situation of adoption without knowledge was mostly due to the campaign of soil testing and distribution of soil health card to the farmers by Government of Maharashtra. Under this campaign, extension workers on their own collecting sample from farmers field labeled it and send it to the soil testing labs. They could not focus to provide knowledge to the farmers.

Items under soil testing not directly justify the adoption of soil testing, but it explain whether farmers could really follow the meaning and objectives of soil testing and could they get benefit of it. In this regard majority of respondents partially achieve the benefits of soil testing (72.50%), partially followed the meaning (65.83%) and objectives (52.50%) of soil testing.

In case of soil testing recommendations,

majority of respondents (60.83%) partially used to maintain recommended dose of paddy crop i.e. 100:50:50. Around one fourth of respondents (24.17%) had fully adopt the recommended dose of paddy. Similarly, 73.33 per cent respondents partially maintain the desirable p^H of soil i.e. 5.5 to 7. Further, soil testing recommendations could not adopted by majority of respondent like recommendation to correct K_2O content in soil (69.17%), recommendation to correct P_2O_5 content in soil (54.17%) and recommendation to correct N_2 in soil (54.17%) while the recommendation to repeat soil testing once in three years was also not adopted by 57.50 per cent, respectively.

Table 2
Distribution of the respondents according to their level of knowledge of soil testing technology

Sr. No.	Level	Knowledge (n=120)		Adoption (n=120)	
		Number	Percentage	Number	Percentage
1	Low	46	38.33	9	7.50
2	Medium	69	57.50	84	70.00
3	High	05	04.17	27	22.50
	Total	**120**	**100.00**		**100.00**
		Mean=39.46		**Mean=53.98**	

Table 3
Distribution of the respondents according to their attitude towards the soil testing

Sr. No	Statements	SA	A	UD	DA	SD
1	Use of soil testing helps in increase the rice yield	31 (25.83)	22 (18.33)	40 (33.33)	17 (14.18)	10 (08.33)
2	The soil test is good but very difficult to adopt	21 (17.50)	32 (26.67)	28 (23.33)	39 (32.50)	00 (--)
3	Use of soil testing is more profitable in relation to cost involved	13 (10.83)	43 (35.83)	23 (19.17)	28 (23.33)	13 (10.33)
4	The use of soil testing helps to maintain the fertility of soil	63 (52.50)	35 (29.17)	18 (15.00)	03 (02.50)	01 (0.83)
5	Chemical fertilizer suggested based on soil testing is not useful	19 (15.84)	27 (22.50)	07 (05.83)	06 (05.00)	61 (50.83)
6	If I treat and manage my soil based on soil testing, I may not see an increase crop production but longevity of production will be better	09 (07.50)	53 (44.17)	33 (27.50)	19 (15.83)	06 (05.00)
7	After use of soil testing, if increase is not seen in rice production, it will be discontinued	03 (02.50)	15 (12.50)	41 (34.18)	38 (31.66)	23 (19.16)
8	Soil testing is a simple and easy to adopt	53 (44.16)	41 (34.18)	16 (13.33)	10 (8.33)	00 (--)
9	It is not possible to conduct soil testing repeatedly	13 (10.83)	31 (25.83)	38 (31.68)	29 (24.16)	09 (07.50)
10	Soil testing and further recommendations helps to grow plant healthier	36 (30.00)	53 (44.16)	23 (19.18)	08 (6.66)	00 (--)
11	I cannot use soil testing because of high cost and time consuming process	09 (07.50)	13 (10.83)	29 (24.17)	39 (32.50)	30 (25.00)
12	Soil testing reports are not received on time from the lab, hence not useful	57 (47.50)	41 (34.17)	13 (10.83)	09 (07.50)	00 (--)

SA-Strongly agree **A-** Agree **UD-**Undecided **D-**Disagree **SD-**Stronglydisagree

Extent of knowledge

Table 2 shows that, majority of respondents (57.50%) belonged to medium level of knowledge followed by 38.33% per cent who have occupied in the low level of knowledge about soil testing. Only 4.17 per cent respondents found in the category of high level of knowledge of soil testing parctices. The average knowledge of respondents was 39.46 per cent. These findings are similar with Ingle (2011) and Patilet al. (2016).

Extent of adoption

Data presented in Table 2 shows that majority of respondents (70.00%) belonged to medium level of adoption followed by 22.50% per cent respondents who were found in high level of adoption about soil testing. There was 7.50 per cent respondents found in low level of adoption. The average adoption of soil testing by the respondents was 53.98 per cent. These findings are in line with the findings of Patil (2013) and Dohtare (2014).

Attitude of paddy growers towards soil testing

The distribution of the respondents according to their attitude has been presented in Table 3.

It is observed from Table 3 that one third of respondents (33.33%) unable to decide whether soil testing helps to increase the rice yield, however one fourth of respondents (25.83%) and nearly one fifth of respondents (18.33%) were strongly agree and agree that soil testing helps to increase the rice yield, respectively. Further, it was observed that nearly one third of respondents (32.50%) disagreed that soil testing is good but difficult to adopt, while 26.67 and 17.50 per cent respondents were agreed and strongly agreed to this statement, respondents. Regarding profitability of soil testing in relation to cost involved, 35.83 per cent respondents noted their agreement to this while 23.33 per cent respondents found to be disagreed.

Majority of respondents (52.50% and 29.17%) found strongly agree and agree to state that use of soil testing helps to maintain the fertility of soil, respectively. Half of respondents (50.83%) strongly disagree about the chemical fertilizer suggested based on soil testing is not useful while nearly one fourth of respondents (22.50%) found agree to that. Further, it was seen that 44.17 per cent respondents state to agree that if they treat and manage their soil based on soil testing they may not see an increase in crop production, but longevity of production would be better. Nearly one third of respondents (31.66%) found disagreed, that if rice production will not increase after use of soil testing, it will be discontinued, while 34.18 per cent of respondents found undecided about that.

Vast majority of respondents were found strongly agree (44.16%) and agree (34.18%) that soil testing is a simple and easy to adopt technology in paddy. One fourth of the respondents (25.83%) thought that it is not possible to conduct soil testing repeatedly, while similar proportion of respondents (24.16%) disagree on it. Three fourth of respondents together seen agree (44.16%) and strongly agree (30%) that soil testing and further recommendations helps to grow plant healthier. Towards the negative statement, 25 per cent that respondents cannot use soil testing because of high cost and time consuming process but 32.50 per cent respondents disagree followed by strongly disagreed on it. However, great majority of respondents were strongly agree (47.50%) and agree (34.17%) that soil testing reports are not received on time from lab hence not useful for getting expected benefits.

Table 4
Distribution of the respondents according to their level of attitude

Sr. No.	Attitude Index	Respondents (n=120)	
		Number	Percentage
1	Less favourable	19	15.83
2	Moderately favourable	101	84.17
3	Highly Favourable	0	00
	Total	**120**	**100.00**
Mean=42.69			

Table. 5
Correlation coefficients of selected characteristics of the respondents with their knowledge, attitude and adoption of soil testing

Sr. No.	Independent Variables	Knowledge	Attitude	Adoption
1	Age	-0.7866**	-0.8111**	-0.8029**
2	Education	0.9487**	0.9680**	0.9618**
3	Land holding	-0.0313	-0.0770	-0.0735
4	Area under paddy crop	-0.0736	-0.1079	-0.1082
5	Annual income	-0.0276	-0.0665	-0.0615
6	Experience of farming	-0.7647**	-0.7890**	-0.7837**
7	Cropping intensity	0.0360	0.0895	0.0527
8	Extension contact	0.9047**	0.9229**	0.9270**
9	Extension participation	0.8105**	0.8201**	0.8239**
10	Use of information sources	0.9202**	0.9414**	0.9489**
11	Scientific orientation	0.9208**	0.9529**	0.9432**
12	Economic motivation	0.8981**	0.9083**	0.8985**

***- Significant at 0.01 level of probability*

Table 4 shows that, great majority of respondents (84.17%) belonged to moderately favourable attitude, followed by 15.83% per cent respondents were found to have less favourable attitude towards soil testing. None respondents found in highly favourable attitude towards soil testing. The average attitude of respondents was 42.69 per cent favourable towards soil testing. These findings corroborate with the findings of Thakare (2000) andPatel *et al.* (2002).

Relational analysis

In order to find out the relationship between selected personal, socio-economic, situational, communication and psychological characteristics of respondents with adoption behaviour of paddy growers towards soil testing was worked out. The results obtained from relational analysis of knowledge, attitude and adoption has been presented in Table 5.

It is observed from the Table no. 5 that respondents' age and education were found to be highly significant with knowledge, attitude and adoption of soil testing practices, but age was negatively correlated. Here hypothesis set for those variables is proved. It was indicated that age and education were an important personal characteristics of farmer played vital role in adoption behaviour of farmers towards soil testing. However, old age farmers unable to understand the technology of soil testing hence their attitude became unfavourable resulted in non-adoption or low adoption of technology. Education helped them to understand the technology; their attitude became favourable and tried to adopt the soil testing in paddy. These findings were supported by Jadhav*et al.* (2010) and Konde*et al.* (2017).

Experienced farmers in paddy cultivation found dispirited to gain the knowledge and adopt soil testing in their paddy fields as shown in Table 24 where negative but significant correlation of experience in farming with knowledge, attitude and adoption was seen at 0.01 level of probability. Apathy of farmers toward soil testing may be because of their age factor and low level of education from their side and lack of knowledge, delay in report and that report could not be understandable to the farmers were the major constraints from institutional side expressed by the respondents. These finding were supported by Borkar (2000) and Konde *et al.* (2017).

Further, communication and psychological variable viz. extension contact, extension participation, use of information sources, scientific orientation and economic motivation were significantly correlated with knowledge, attitude and adoption of soil testing practices at 0.01 level of

probability. It means null hypothesis for communication and psychological variable was proved. It clearly indicated that communication and psychological variables help farmers to improve their behaviour towards soil testing. In the study area educated farmers could try to gain knowledge of soil testing through different sources which help them to understand the technology and make them psychologically strong that may resulted in favourable attitude and leads to adopt soil testing or at least some of its components, because very low proportion of full adoption was seen in the study area. The findings are in line with the findings of Meshram (2010) and Konde*et al*. (2017).

Land holding, area under paddy crop, annual income and cropping intensity were the situational and economic variables found to have non significant relationship with knowledge, attitude and adoption of soil testing. It means that these variables could not influence the adoption behaviour of farmers. Here, null hypothesis is accepted for non significant characteristic for farmers. The findings found to be supported by the findings of Patil (2008) and Han Hong Yun *et al.* (2011).

CONCLUSION

Majority of farmers had medium level of adoption of soil testing. To increase the adoption of soil testing, it is necessary to provide informal education to the farmers through different extension agencies, provide popular literature in the form of leaflets, pamphlets, folders, booklets and posters etc. has to be published by the extension agency in simple and understandable language for use to the farmers at village level which help to increase the adoption of soil testing.

Received *: July 30, 2018*
Accepted *: August 14, 2018*

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