

Soil testing status of the farmers in distress prone districts of Vidarbha

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Abstract: The present study entitled soil testing status of the farmers in distress prone districts of Vidarbha was undertaken as Research Review Committee Project for the year 2014-15 in six distressed districts of vidarbha region in Maharashtra State. An exploratory design of social research was used for present study. A sample of 600 farmers was drawn randomly from the six districts and information obtained was considered for tabulation and analysis of data. As regard overall knowledge level of various soil testing practices it was observed that 47.00 per cent of the respondents possessed medium level of knowledge about selected soil testing practices. Majority (85.00%) of the selected respondents have not tested their farm soil till date. Out of the total selected respondents only 10.16 per cent farmers have tested their farm soil and received the soil test report. But it was also noticed that from these 10.16 per cent farmers not a single farmers was observed who had applied the nutrient as per the soil test report to their crop. Remaining 4.84 per cent farmers submitted their farm soil sample to extension functionaries since from last two years but they have not received the soil test report. Non availability of soil testing lab nearby village, lack of technical skill about soil testing technique, no technical guidance from the Government agencies about soil testing (46.33%), non availability of required fertilizer in market, delay in soil test reports (12.96%), soil test report not clear to them and high cost of soil sample testing were the important constraints perceived from the selected farmers. Hence there is wide scope to overcome these adoption gaps in soil sample testing and its recommendations at field level.

Key words: Adoption, Constraints, Knowledge, Soil testing

Introduction

Agriculture is the backbone of Indian economy. Progress of India is very much dependent on the development of agriculture. The increased agricultural production depends upon number of factors of which soil fertility plays an important role. Soil fertility is identified by the nutrient status of the soil. Soil testing has been used by soil scientist as an aid in determining soil fertility level. Yadav *et al.* (2006) stated that soil testing has exposed some information about the accurate amount of nutrients of special kinds of plants and also other information such as acid and saline-alkali soil.

The basic objective of soil testing programme is to give farmers a service leading to better and more economic use of fertilizers and soil management practices for increasing agricultural production. Now a day consumption of fertilizer by farmer is higher than actual requirement. The farmers do not follow the soil testing technique. The present study throws a light on knowledge, adoption and constraints faced by the farmers in adoption of soil test techniques and its recommendations.

Material and methods

The present investigation was carried out during the year 2014-15 in six distressed districts of vidarbha region in Maharashtra State namely Akola, Washim, Buldana, Amravati, Yavatmal and Wardha with the exploratory design of the social research. From each district two Tahsils and from each selected Tahsils five villages were selected randomly for the study. Thus in all 12 Tahsils and 60 villages were selected from six districts of vidarbha region. From each selected village 10 farmers were randomly selected and interviewed with the help of structured

interview schedule. Thus a total 600 farmers comprises the sample for the study.

Results and discussion

Profile of the selected farmers

The data with respect to various characteristics of the respondents have been furnished in Table 1.

Age

It is observed that 40.83 per cent of the respondents belonged to middle age category followed by 33.34 and 25.83 per cent of the respondents who were found in old (above 50 years) and Young (up to 35 years) categories, respectively.

Education

In case of education 32.84 per cent of the farmers were found educated in the range of 8 to 10th standard, followed by nearly one fifth (19.17%) of them were found educated upto primary school, 18.34 per cent found educated upto higher secondary school, 15.17 and 11.18 per cent who have passed middle school and above 12th std. education.

Land holding

It is observed that, 31.84 per cent of the respondents possessing small (1.01 to 2.00 ha) category of land holding, followed by 24.50 per cent of the respondents were possessing semi medium category of land holding, 20.84 per cent possessing medium category of land holding, 16.66 per cent possessing marginal category of land holding and very less *i.e.*, 6.16 per cent holding large category of land holding.

Table 1. Distribution of respondents according to their selected characteristics

Sr. No.	Characteristics and levels	Respondents N=600	
		Numbers	Percentage
1	Age:		
i	Young (Up to 35 years)	155	25.83
ii	Middle (36 to 50 years)	245	40.83
iii	Old (Above 50 years)	200	33.34
	Total	600	100.00
2	Education:		
ii	Primary	115	19.17
iii	Middle school	91	15.17
iv	High school	197	32.84
v	Higher secondary school	110	18.34
vi	College	67	11.18
	Total	600	100.00
3	Land holding:		
i	Marginal –Up to 01.00 ha.	100	16.66
ii	Small – 1.01 -02.00 ha.	191	31.84
iii	Semi-medium 2.01 -04.00ha	147	24.50
iv	Medium 4.01-10.00 ha.	125	20.84
v	Large Above 10.00 ha.	37	06.16
	Total	600	100.00
4	Occupation:		
i	Only Agriculture	464	77.33
ii	Agriculture + Labour	81	13.50
iii	Agriculture+ Dairying/ Goatry/ Poultry	12	02.00
iv	Agriculture + Business	17	02.83
v	Agriculture + Service	26	04.34
	Total	600	100.00
5	Farming experience:		
i	Upto 10 years	99	16.50
ii	11 to 20 years	200	33.34
iii	Above 20 years	301	50.16
	Total	600	100.00
6	Annual income:(overall)		
i	Upto ₹ 50,000/-	206	34.33
ii	₹ 50,001 to ₹ 1,00,000/-	163	27.16
iii	₹1,00,001 to ₹ 1,50,000/-	77	12.83
iv	₹1,50,001 to ₹ 2,00,000/-	62	10.34
v	Above ₹ 2,00,000/-	92	15.34
	Total	600	100.00
7	Source of irrigation		
i	No source	278	46.34
ii	River	30	05.00
iii	Well/tube	261	43.50
iv	Canal/Farm pond	21	03.50
v	River+ well	10	0.83
	Total	600	100.00
8	Cropping pattern	Numbers	Percentage
i	Seasonal	258	43.00
ii	Bi seasonal	226	37.67
iii	Annual	95	15.83
iv	Biannual	21	03.50
v	Total	600	100.00
9	Crop rotation		
i	Yes	465	77.50
ii	No	135	22.50
	Total	600	100.00
10	Type of soil		
i.	Very deep	65	21.66

ii.	Deep	28	09.34
iii.	Moderate deep	180	60.00
iv.	Shallow	17	05.66
v.	Very shallow	10	03.34
	Total	600	100.00
11	Soil test		
i	Soil sample not test	510	85.00
ii	Soil test and report received	61	10.16
iii	Soil sample submitted but report not received	29	04.84
	Total	600	100.00
12	Soil test year		
i	2005	2	3.28
ii	2007	1	1.63
iii	2009	2	3.28
iv	2010	3	4.92
v	2011	3	4.92
vi	2012	14	22.95
vii	2013	12	19.68
viii	2014	24	39.34
ix	Soil sample submitted before two years but report not received	29	
	Total	90	
13	Soil test agency		
i	State Dept	19	21.11
ii	KVK	30	33.33
iii	Agrl. Univ	16	17.78
iv	other	25	27.78
	Total	90	100.00
14	Soil test report duration		
i	upto 15 days	13	21.31
ii	16-30 days	27	44.27
iii	Above 30 days	21	34.42
	Total	61	100.00
15	Soil test report received		
i	By hand	21	34.42
ii	By post	40	65.58
	Total	61	100.00
16	Soil test laboratory distance	Numbers	Percentage
i	Upto 20 km	23	37.70
ii	21 to 40 km	31	50.82
iii	above 40 km	07	11.48
	Total	61	100.00

Occupation

Agriculture was the main occupation of 77.33 per cent of the respondents, it was followed by about 13.50 per cent of respondents had agriculture plus labour occupation and very less number of respondents were engaged in agriculture plus service as their occupation (4.34%) and meager per cent respondents had agriculture plus other business (2.83%) and agriculture plus subsidiary occupation (2.00%).

Farming experience

It could be seen from the Table 1 that, half (50.16%) of the farmers having more than 20 years of experience in farming. It was followed by about 33.34 per cent and 16.50 per cent having 11 to 20 years and up to 10 years of experience in cultivation, respectively.

Annual income

It is observed that, 34.33 per cent of the respondents were having annual income up to ₹ 50,000/-, it was followed by 27.16 per cent having above ₹ 50,001 to ₹ 1, 00,000/- annual income whereas 15.34 per cent of them have annual income in the range of above ₹ 2,00,000/-. It was followed by 12.83 per cent having annual income in the range of ₹ 1, 00,001 to ₹ 1, 50,000/- and only 10.34 per cent having their annual income in the range of ₹ 1,50,001 to ₹ 2,00,000/-.

Sources of irrigation

Regarding irrigation facilities, it is observed that nearly fifty per cent (46.34%) of the respondents having no source of irrigation, followed by 43.50 per cent respondents have well/tube well as a irrigation source and 5.00 per cent of them used river as a irrigation source. Only 3.50 per cent of them used Canal + farm pond as an irrigation source.

Cropping pattern

In case of cropping pattern it was observed that 43.00 per cent farmers grown seasonal crop in *kharif* season and 37.67 per cent respondents grown crops in *kharif* as well as *rabi* season (Biseasonal). It was followed 15.83 per cent of them have sown annual crop. The meagre per cent of respondents (03.50%) were grown biannual crops.

Crop rotation

It is observed that 77.50 per cent of the respondents were followed crop rotation on their field whereas 22.50 per cent of the respondents were not followed crop rotation on their field.

Type of soil

The data from Table 1 revealed that above fifty per cent (51.66%) selected farmers possessed moderate type of soil, followed by 23.00 per cent farmers have very deep soil type, 12.84 per cent of them possessed deep type of soil whereas 10.16 per cent of them had shallow type of soil and only 2.34 per cent of farmers have very shallow type of soil.

Soil test

The data from Table 1 revealed that majority (85.00%) selected farmers have not done their soil test, followed by 10.16 per cent farmers who have done soil test with report received to them and only 4.84 per cent of them have submitted soil sample for test but report is not received to them since last two years.

Soil test year

It could be seen from the data in Table 1 that, out of 61 (10.16%) farmers who tested their soil 26.66 per cent respondents and 15.55 per cent respondents have tested their soils in the year 2014 and 2012 respectively. It was followed by 13.34 per cent of them in the year 2013 and 3.34 per cent in the year 2010 and 2011 respectively. Equal percentage (2.22%) of them have done soil test in the year 2005 and 2009, respectively whereas very few of them (1.11%) have done soil test in the year 2007.

However nearly one third (32.22%) of them have submitted soil sample before two years but not received report.

Soil test agency

Regarding soil test agency one third (33.33%) of the respondents were used KVK as a agency for their soil test, followed by 27.78 per cent of them was done soil test from other agencies namely RCF, Reliance foundation, Bajaj foundation, Swaminathan foundation and other NGOs. Above one fifth of them (21.11%) used State Department of Agriculture as a agency for their soil test and 17.78 per cent of them were used Agriculture University as soil test agency.

Time taken for soil test report

The data from Table 1 revealed that 44.27 per cent have received soil test report within 16-30 days duration followed by 34.42 per cent farmers received soil test report to them above 30 days and 21.31 per cent of them received soil test report within 15 days.

Soil test report received by hand/post

The data from Table 1 revealed that above one third (65.58%) have received soil test report by post followed by 34.42 per cent farmers received soil test report by hand.

Soil test laboratory distance

The data from Table 1 revealed that above fifty per cent (50.82%) selected farmers have done their soil test at 21 to 40 km soil test laboratory distance, followed by 37.70 per cent farmers who have done soil test upto 20 km laboratory distance from their village and only 11.48 per cent of them have done soil test at above 40 km laboratory distance from their village.

Extent of knowledge of the farmers about soil testing techniques

It is observed from Table 2, that out of fourteen recommended soil test techniques, respondents in study are having high knowledge level about name of organic manures (96.33%), name of nitrogenous fertilisers (89.66%), name of phosphate fertilizers (82.83%) and name of potassium fertilizers (81.50%). The respondents had middle level knowledge about concept of soil test (50.16%), procedure of soil sample collection (42.66%), depth of soil sampling for agronomic crop (40.00%), information attached with soil sample (39.66%), ideal site for soil taking soil sample (39.00%) and appropriate time for soil test (38.33%). However, low level of knowledge was found in case of name of micro nutrient fertilizers (33.16%), name of essential nutrients (31.66%), name of secondary nutrients (30.00%) and depth of soil sampling for fruit crop (29.00%).

Extent of overall knowledge level

Data regarding overall knowledge level of the respondents about recommended soil testing techniques in Table 3 revealed that, nearly two third (62.84%) of the respondents were mediocre in respect of their overall knowledge, it was followed by 25.00 per cent in high knowledge category and only 12.16 per cent per cent of the respondents were observed in low category of

Table 2. Distribution of respondents according to their extent of knowledge about recommended soil testing techniques

Sr. No.	Techniques of soil testing	Mean knowledge index	Knowledge level
1	Name of organic manures	96.33	High
2	Name of nitrogenous fertilisers	89.66	High
3	Name of phosphate fertilizers	82.83	High
4	Name of potassium fertilizers	81.05	High
5	Concept of soil test	50.16	Medium
6	Procedure of soil sample collection	42.66	Medium
7	Depth of soil sampling for agronomic crop	40.00	Medium
8	Information attached with soil sample	39.66	Medium
9	Ideal site for soil taking sample	39.00	Medium
10	Appropriate time for soil test	38.33	Medium
11	Name of micro nutrient fertilizers	33.16	Low
12	Name of essential nutrients	31.66	Low
13	Name of secondary nutrients	30.00	Low
14	Depth of soil sampling for fruit crop	29.00	Low

Table 3. Distribution of respondents according to extent of overall knowledge index level

Sr. No.	Knowledge index level	Knowledge index range	Respondents(N=600) Numbers	Percentage
i	Low	Upto 33.33	73	12.16
ii	Medium	33.34 to 66.66	377	62.84
iii	High	Above 66.66	150	25.00
	Total		600	100.00

knowledge level. Therefore, it can be inferred that majority of the farmers had medium level of awareness knowledge about various soil testing techniques. Similar findings were reported by Patil, *et.al.* (2016a) and Patil, *et.al.* (2016b).

Extent of adoption of soil test recommendation report by the farmers

The data in Table 4 shows that, all selected respondents have partially adopted all soil test recommendation as per the soil test report such as Organic manures, green manures and vermi compost used as per the soil test report (100.00%), Potash fertilisers used as per the soil test report (96.72%), phosphate fertilisers used as per the soil test report (95.08%), nitrogenous fertilisers used as per the soil test report (93.44%) and any other nutrients used as per the soil test report (88.52%). Similar findings were reported by Dohare (2014) who found that majority (69.00%) of the respondents partially adopt the application of nitrogen fertilizer as per the soil test recommendation. Whereas 73.00 per cent respondents partially adopt application of phosphorus fertilizer and 63.00 per cent of

the respondents partially adopt recommended application of potash fertilizer, as per soil test report. Only 05.00 per cent of the respondents partially adopt application Zinc (zn) as per soil test report.

Department of Extension Education, College of Agriculture, VNMKV, Parbhani have conducted research project entitled Knowledge and Adoption of Soil Testing Recommendations by the Farmers in Distress Prone Districts of Marathwada as a AGRESO 2014-15 Project. The results of this project revealed that more than half (51.25%) of the respondents have adopted soil testing recommendations at medium level, that means they have not adopted soil testing recommendations as per the report of soil test. Delay in soil test reports, non availability of required fertilizers in market, non availability of soil testing lab nearby village and soil test report not clear to them were the important constraints experience by the farmers (Anon., 2015).

Extent of overall adoption level

It could be seen from Table 5 that, among the all selected farmers only 61(10.16%) farmers have done the soil testing of their farm soil and received the soil test report. Out of them majority (85.25%) of the respondents have used/applied nutrients at medium level, followed by 14.75 per cent respondents were observed in low adoption category and none of the respondents were observed in high category of adoption. Therefore, it can be inferred that not a single farmers was observed who had applied the nutrient as per the soil test report to their crop. Similar findings were reported by Dohare (2014) who found that most of the respondents (73.00 %) had medium level of adoption of soil test recommendations.

Constraints and suggestions in adoption of soil testing techniques and its recommendations expressed by the farmers

The data in Table 6 shows that non availability of soil testing lab nearby village (87.50%), lack of technical skill about soil testing technique e.g. soil sample collection, sample preparation (48.33%), no technical guidance from the Govt agency about soil testing (46.33%), non availability of required fertilizer in market (43.00%), delay in soil test reports (12.96%), Soil test report not clear to them (9.66%), high cost of soil testing (7.00%) were the constraints perceived by the respondents for non adoption soil test techniques and its recommendations at their field level. Similar findings were reported by Patil *et al.* (2016a).

It could be seen from Table 7 that, soil test report should be made available in time i.e. within 15 days (87.50%), availability of soil test lab nearby village/taluka level (87.50%), provide technical guidance from the Govt agency about soil testing

Table 4. Distribution of respondents according to their extent of adoption of recommendations as per the soil test report

Recommendations of soil test report	Respondents (n=61)			Overall Mean Adoption Index
	Full	Partial	Non adoption	
Nitrogenous fertilisers used as per the soil test report	00 (00.00)	57 (93.44)	4 (6.55)	48.03
Phosphate fertilisers used as per the soil test report	00 (00.00)	58 (95.08)	3 (4.91)	
Potash fertilisers used as per the soil test report	00 (00.00)	59 (96.72)	2 (3.27)	
Any other nutrients used as per the soil test report	00 (00.00)	54 (88.52)	7 (11.47)	
Organic manures, green manures and vermi compost used as per the soil test report	00 (00.00)	61 (100.00)	00 (00.00)	

Table 5. Distribution of respondents according to overall adoption index level

Sr. No.	Adoption index level	Adoption index range	Frequency (n=61)	Per cent
ii	Low	Upto 33.33	09	14.75
iii	Medium	33.34 to 66.66	52	85.25
iv	High	Above 66.66	00	00.00
	Total		61	100.00

Table 6. Constraints in adoption of soil test techniques and its recommendations by the farmers

Sr. No.	Constraints	frequency	%
A	Technical constraints		
1	Lack of technical skill about soil testing technique e.g. soil sample collection, sample preparation	290	48.33
2	No technical guidance from the Govt agency about soil testing	278	46.33
B	Situational constraints		
1	Delay in soil test reports	77	12.96
2	Non availability of required fertilizer in market	258	43.00
3	Non availability of soil testing lab near by village/taluka level	525	87.50
C	Other constraints		
1	Soil test report not clear to them	58	9.66
2	High cost of soil testing	42	7.00

(46.33%), provide technical skill about soil testing technique e.g. soil sample collection, sample preparation (48.33%) and availability of mobile soil test van in the village (42.50%) were the major suggestions expressed by the farmers for increasing the adoption of soil test techniques and its recommendations at field level.

Conclusion

The findings of the present study concludes that although majority of the farmers possessed medium level of knowledge

Table 7. Suggestions given by farmers to overcome the constraint experienced by them in adoption of soil testing technique and its recommendations at field level

Sr. No.	Suggestions	Frequency	%
1	Soil test report should be made available in time i.e. within 15 days or before sowing season	525	87.50
2	Availability of soil test lab nearby village/taluka level	525	87.50
3	Provide technical guidance from the Govt agency about soil testing	340	46.33
4	Availability of mobile soil test van in the village	255	42.50
5	Provide technical skill about soil testing technique e.g. soil sample collection and sample preparation	358	48.33

about recommended techniques of soil test, however, there exists high level of adoption gap in respect of soil sample testing by the farmers. It could, therefore be, concluded that, there is wide scope to overcome these adoption gap in soil sample testing and its recommendations at field level.

The research study on soil testing status of the farmers in distress prone districts of Vidarbha indicated that nearly two third (62.84%) of the respondents possessed medium level of knowledge about the various soil testing techniques, However, it was observed that majority (85.00%) of the respondents did not test their farm soil till date. Non availability of soil testing lab nearby village/taluka level is the major constraint perceived by 87.50 per cent of the respondents for non adoption of soil testing techniques. Hence, it is recommended, that soil sample testing facility should be made available at block level and mobile soil sample testing van alongwith technical staff should be made available at village level by the State Department of Agriculture to the farmers, to increase the adoption level of soil sample testing technique and its recommendations at field level.

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