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Analyzing Farmer's Perception of the Soil Health Card Scheme and Its Role in Reducing Farming Production Costs

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Abstract— *Injudicious and haphazard use of chemical fertiliser in agriculture is a matter of concern in recent times. To avoid the deterioration of soil in the long run and to visualise the importance of balanced nutrients in crop production. The Soil Health Card (SHC) provides soil health data to get appropriate guidance to the farmers for the efficient use of fertiliser to cultivate crops based on soil health analysis. The SHC is a simple document which contains useful data on soil based on chemical analysis of the soil to describe soil health in terms of its nutrient availability and its physical and chemical properties. The soil health card is also made available online for farmers. To understand the feelings of the farmers against this system, there is an urgent need to study the degree of positive or negative disposition associated with farmers towards the usefulness and application of the Soil Health Card. Thus, the present study on farmers' perception regarding the soil health card was undertaken. The study was conducted in three blocks of the Rewari district with 120 Soil health cardholders. The findings revealed that the majority of the farmers had knowledge and understanding about the utility of the soil health card. The findings further reveal that a maximum number of Soil health card holders had a favourable attitude towards the Soil health card, followed by less favourable and most favourable attitudes towards the Soil health card. Among constraints, difficulty in calculating fertiliser dose on the basis of nutrient status of soil was the major constraint faced by the majority of the respondents.*

Keywords— ***Perception. Soil health card, Productivity***

I. INTRODUCTION

India is principally an agricultural country but still Indian farmers continue to be the poorest in the world. India has disparate climatic conditions, diversified soils which are rich in fertility and has immense potential to produce discrete agricultural products and become one among the top leading producer countries in agriculture. Though India has abundant natural resources as raw materials, India lags far behind in ensuring food security for its own citizens. This situation is a combined repercussion of various factors, such as lack in use of advanced scientific methods in agriculture, dearth of modern machinery to the farmers, lack of electricity in villages, lack of consciousness among farming community and lack of proper financial support. Majority of farmers are uneducated and they believed that anything for improving soil fertility must have a direct response and the more they add it, the better things should become. So same notion they followed when it comes to the concept of fertilizer utilization. Indeed, presently farmers are unaware of overuse of fertilizer and they keep on adding fertilizers in a view to get good production, but heating and complexation end up burning the roots.

Soil health is not a new concept. Greek and Roman philosophers were aware of the importance of soil health to agricultural prosperity over 2000 years ago, and reflected this awareness in their treatises on farm management. As the science of agriculture developed, plant nutrients were identified as essential components of soil health, at least with respect to sustaining biological productivity. This resulted in a paradigm of plant nutrition

and soil management that relied heavily on the use of artificial fertilizers and intensive tillage. Increasing concern over agriculture's impact on the environment has created renewed interest in soil health. Efforts to define soil health in the context of multiple soil functions began in 1977, and were followed by more formalized definitions, selection of indicators, and specific strategies to enhance soil health. Soil fertility is largely maintained by the application of compost and manure, but in recent years a decline in soil fertility has been reported.

To overcome declining output resulting from decreasing soil fertility and productivity, farmers need to improve their production techniques. The decision to participate in new agricultural technologies depends on farmer's perception which is a key determinant in influencing adoption. Technology adoption is also influenced by perceived profitability, costs of the technology and clarity at which the new knowledge and information is communicated in a recipient population. Farmers' perceptions regarding compatibility of sustainable practices with their farming systems have emerged as the best predictor of adoption of such practices. Since perception refers to an individual's current appraisal of an object or program, assessing farmers' perceptions is an important means to evaluate their knowledge level on a particular issue. People base their perceptions on past experience and knowledge thus; if a person has limited knowledge and experience about a technology then he cannot accurately perceive it or form an opinion on it. Keeping this in mind the present study entitled "Farmers' perception regarding soil health card" was conducted.

District	Block	Villages	No. of respondents
Rewari	**Dharuhera**	Bhatsana	**23**
		Khaliawas	**17**
		Khar Khara	**26**
		Khatawali	**21**
		Masani	**33**

II. RESEARCH METHODOLOGY

The present investigation was carried out in Rewari district of Haryana. From Rewari district five blocks of Dharuhera were selected purposively because of having maximum number of soil health card holders. As per the list provided by soil testing laboratory of Department of Farmers Welfare and Agriculture Development. For selection of respondent systematic random sampling method was used. Form each village, every 2nd soil health card holder was selected as respondents. So, in all 120 soil heath card holders were investigated to collect the data. Thus, selected sample was comprised of 120 soil health card holders.

III. RESULTS AND DISCUSSION

3.1 Profile and Socio-Economic Characteristics of the Farmers: -

In this section, results relating to personal profile of the respondent that is age, education, extension contact, landholding, annual income, farm power, crop sequence , nutrient status have been presented in subsequent table. These variables are explained one by one as follows:

Table 1. profile and Socio-economic characteristics of the farmers(n=120)

Sr. No	Independent variable	Category	Frequency	Percentage
1	**Age group**	Young (21-34 yrs.)	40	33.33
		Middle (34-49 yrs.)	50	41.67
		Old (above 50 yrs.)	30	25.00
2	**Education**	Illiterate	25	20.83
		Primary school	32	26.67
		Inter/Diploma	42	35.00
		Graduation and above	21	17.50
3	**Family type**	Joint	90	75.00
		Nuclear	30	25.00
4	**Extension contacts**	Low (21-29)	40	33.33
		Medium (30-38)	50	41.67
		High (39-47)	30	25.00
5	**Occupation**	Agriculture	80	66.67
		Agriculture + service	21	17.5

		Agriculture + Business	19	15.83
6	**Land holding**	Small (up to 1 ha.)	50	41.67
		Medium (1 to 2 ha.)	42	35.00
		Large (above 2 ha.)	28	23.33
7	**Annual income**	Low (up to 1 Lac)	31	25.83
		Medium (1-1.5 Lac)	54	45.00
		High (above 1.5 Lac)	35	29.17
8	**Farm power**	Low (up to 1)	33	27.5
		Medium (2 to 7)	51	42.5
		High (up to 10)	36	30.00
9	**Crop sequence**	Low (9-13)	55	45.83
		Medium (14-17)	33	27.50
		High (18-21)	32	26.67
10	**Nutrient status**	Low (21-27)	41	34.17
		Medium (28- 33)	48	40.00
		High (34-40)	31	25.83
11	**Scientific orientation**	Low (9-19)	55	45.83
		Medium (20-29)	26	21.67
		High (30-39)	39	32.50

The data (Table 1) indicated that majority of the respondents (41.67 percent) from middle age group followed by 33.33percent and 25 percent from young and old age respectively. In case of education majority (35 percent) of respondents was educated up to high secondary group. Only whereas (26.67 percent) upto primary school only. It was indicated in table 1 that 75 percent of the respondents were living in joint family.

The data in table 1 further indicated that nearly (21.7 percent) respondents fall under medium category regarding Extension contact, while 33.33 percent belongs to low category and 25 percent of respondent falls under high category. This might be due to fact that the farmers are not approaching the extension agencies for solving day to day problems of agriculture and also it reflects extension programmes not related to agriculture.

The data in table 1 also shows that almost (66.67 percent) of the respondents have farming as there main occupation. It also indicates that majority (41.67 percent) of the respondents belongs to small land holding i.e. up to 1 ha., 35 percent medium holding and 23.33 percent possessed large land holding.

It was indicated in table 1 that majority (45 percent) of respondents getting 1 to 1.5 Lac income per annum, 25.83 percent respondent gained up to 1lac income and 29.17 percent of respondents gained above 1.5lac income per year. It was indicated that 32.50 percent of respondents had medium level of farm power.

It was indicated from the table 1 that 45.83 percent of respondents belong to low crop sequence whereas 27.50 percent and 26.67 percent of respondents had medium and high crop sequence respectively.

The data in table 1 depicted that majority (45.83 percent) of the respondents had low scientific orientation, 32.50 percent of the respondents had high scientific orientation and 21.67 percent possessed medium scientific orientation.

3.2 Perception of farmers regarding soil health cards

It was observed (Table 2) that 43.33 percent of respondents had medium level of perception followed by low level of perception(32.50 percent) and high level of perception observed is 24.17 percent. Thus, it could be concluded that majority of the beneficiaries were found to have moderate level of perception regarding various components of Soil health card. These results are in accordance with the findings of **kumari (2016), Bandyopadhyay (2018) and Charle (2018).**

Table 2. Perception level of farmers(n=120)

S. No.	Perception on soil health Card	Frequency	Percentage
1.	**Low (16-20)**	39	32.50
2.	**Medium (21-24)**	52	43.33
3.	**High (25-28)**	29	24.17
Total		**120**	**100.00**

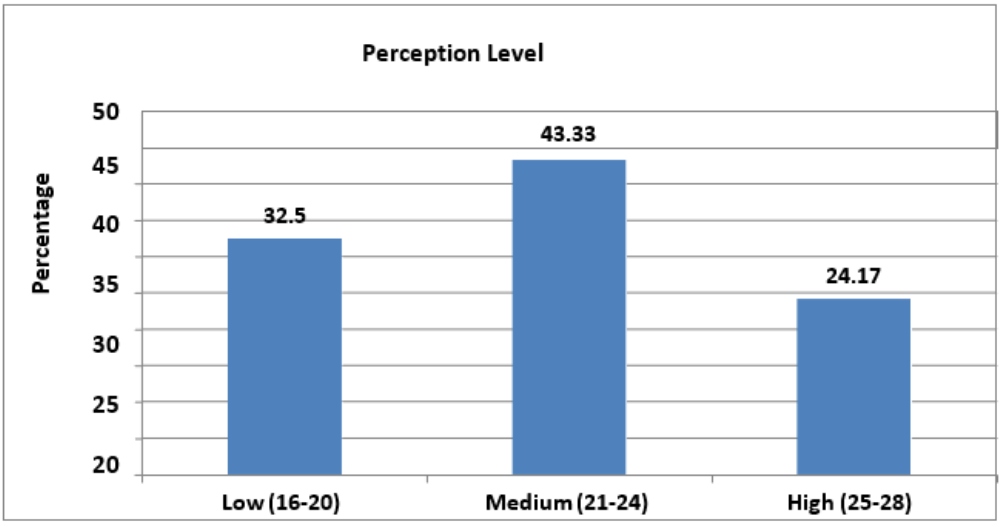

Table 3. Statement analysis of Perception of respondents regarding Soil Health Card (n=120)

S. No.	STATEMENTS	A (3)		UD (2)		DA (1)	
		f	%	f	%	F	%
1	Soil health card can be obtained after the soil testing	112	**93.33**	8	**6.67**	0	**0**
2	Soil health can be maintained by fulfilling the nutrient deficiency in soil as given in soil health card	90	**75**	28	**23.33**	2	**1.67**
3	Soil fertility and productivity can be maintained with the help of soil health card	87	**72.5**	27	**22.5**	6	**5**
4	Systematic crop planning can be done by using soil health card information	72	**60**	38	**31.67**	10	**8.33**
5	Farming can be done in scientific way by using soil health card information	85	**70.83**	32	**26.67**	3	**2.5**
6	Soil health card may help to establish coordination among farmers, extension workers and experts	65	**54.17**	48	**40**	7	**5.83**
7	The quantity of available nutrients in soil can be known with help soil health card	68	**56.67**	50	**41.67**	2	**1.67**
8	Soil health card gives information about number of fertilizers to be applied	88	**73.33**	27	**22.5**	5	**4.17**
9	Unnecessary expenditure can be reduced by using information given in soil health card	85	**70.83**	31	**25.83**	4	**3.33**
10	Acidity, alkalinity of the soils can be known with help of soil health card information	75	**62.5**	43	**35.83**	2	**1.67**
11	We can know the quantity of available organic elements in the soil by information given in soil health card.	62	**51.67**	55	**45.83**	3	**2.5**
12	We can apply the necessary quantity of organic matter in the soil with the help of information given in soil health card	89	**74.17**	27	**22.5**	4	**3.33**
13	Bio fertilizers can be applied with the help of soil health card information	87	**72.5**	21	**17.5**	12	**10**

14	We can apply the necessary quantity of nitrogen into the soil with the help of information given in soil health card	48	**40**	52	**43.33**	20	**16.67**
15	We can apply the necessary quantity of phosphorus into the soil with the help of information given in soil health card.	61	**50.83**	49	**40.83**	10	**8.33**
16	We can apply the necessary quantity of potassium into the soil with the help of information given in soil health card.	80	**66.67**	32	**26.67**	8	**6.67**
17	We can apply the necessary quantity of sulphur into the soil with the help of information given in soil health card.	60	**50**	48	**40**	12	**10**
18	We can apply the necessary quantity of zinc into the soil with the help of information given in soil health card.	61	**50.83**	50	**41.67**	9	**7.5**
19	We can apply the necessary quantity of iron into the soil with the help of information given in soil health card.	69	**57.5**	40	**33.33**	11	**9.17**
20	We can apply the necessary quantity of magnesium in the soil with the help of information given in soil health card.	64	**53.33**	39	**32.5**	17	**14.17**

(A= Agree, UD= Undecided, DA= Disagree)

It is evident in Table 3 that, majority (93.33%) of farmers perceived "agree" towards the statement "Soil health card can be obtained after the soil testing". Among undecided category of perception statement, we can know the quantity of available organic elements in the soil by information given in soil health card was perceived undecided by 45.83 per cent of farmers. Among disagree category of perception statement "We can apply the necessary quantity of nitrogen into the soil with the help of information given in soil health card" was perceived disagree by 16.67 per cent of farmers.

The possible reasons for the above trend of perception may be generally soil health cards can be issued only after testing the soil samples and farmers are well perceived about brief information of soil health cards. Acidity and alkalinity which are the cause for problematic soils require reclamation measures which show the result in long run only without any immediate effect. This long run action of the reclamation measures which is invisible in short run made farmers to disagree with the statement regarding alkalinity and salinity. Though Soil health card helps to increase soil fertility and take corrective measures against problematic soils the result is invisible in short run. Hence, the measures which require long run for visibility are perceived as disagree by the farmers.

Association between selected independent variables with perception level of respondents towards Soil Health Card depicted below:

S. No.	Characteristics	Correlation coefficients ('r' values)
1	Age	**0.997***
2	Education	**0.928***
3	Family Type	**0.255****
4	Extension contacts	**0.991***
5	Occupation	**0.913***
6	Land holding	**0.568****
7	Annual income	**0.818***
8	Farm power	**0.0809NS**
9	Nutrient status	**-0.036**
10	Crop sequence	**0.984***
11	**Scientific orientation**	**-0.513**

***Correlation is significant at the 0.01 level of probability.**

****= Correlation is significant at the 0.05 level of probability NS= non-significant.**

It was observed from the Table 4 that age, education, occupation extension contact, annual income, crop sequence was positively and significantly correlated at 0.01 level of probability and land holding, family type was positively and significantly correlated at 0.05 level of probability with the perception level of farmers towards soil health card scheme. Whereas, farm power is non-significantly correlated with the perception level of farmers towards soil health card scheme.

The variables such as nutrient status, scientific orientation was negatively correlated with the perception level of the farmers towards soil health card scheme.

IV. CONCLUSION

It is concluded that the majority of the respondents using the Soil Health Card Scheme were from the middle age group, had educated up to the middle level of education, had a small category of land holding, had a medium income group, had medium extension contacts, had a medium level of farm power, had a low crop sequence, had a medium

nutrient status, and had a medium scientific orientation. Most of the respondents belonged to joint families and perceived agriculture as their main occupation. Meanwhile, most of them had a medium level of perception regarding soil health. The respondents faced several problems regarding the use of the soil health card. The difficulty in calculating fertilizer dose on the basis of the nutrient status of the soil, followed by the time gap between soil samples taken and issuing SHC, is too high for successive crops.

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