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Perception and adoption of soil health card (SHCs) recommendations as success story & policy issues by the farmers in Kushinagar district, U.P.

Trilok Nath Rai[1], Kedar Nath Rai[2], Sanjeev Kumar Rai[3], Rajeev Kumar Rai[4], Jyoti Rai[5]
[1] Subject Matter Specialist, Department of Soil Science and Agricultural Chemistry, Krishi Vigyan Kendra (ICAR-CSSRI), Dhikunni, Sandila, Hardoi, Uttar Pradesh, India
[2] Associate Professor and Head, Department of Soil Science & Agricultural Chemistry, Kamla Nehru Institute of Physical and Social Sciences, Sultanpur, Uttar Pradesh, India
[3] Master of Science in the Department of Soil Science & Agricultural Chemistry, Kamla Nehru Institute of Physical and Social Sciences, Sultanpur, Uttar Pradesh, India
[4] Department of Nursing, Institue of Nursing & Paramedical Sciences Sultanpur, Uttar Pradesh, India
[5] Master of Science in Botany, A.P.S., University, Rewa, Madhya Pradesh, India

Abstract
Soil is the basic component of agriculture which contains nutrients and provides to plant for proper growth. The soil quality has deteriorated in recent past due to indiscriminate usage of fertilisers and imbalance use of chemicals. Considering these facts, the Government of India (GOI) has launched a flagship programme aimed at providing information on available nutrient status in the soil for selecting suitable crops. With this backdrop, the present exploration was carried out to evaluate the level of perception and adoption of soil health cards (SHCs) by the farmers in Anantapuram District of Andhra Pradesh during 2019-2020. The primary data for the exploration was collected by survey method adopting personal interview of the selected respondents through well-developed and pre-tested interview schedule with the objective of finding out the perception and adoption level of soil health card based fertilizer application in Kushinagar district of U.P. The research areas were selected randomly and ex post facto design was used. The result showed that, the perceived ability of the farmers on soil health cards was medium (45%) and merely 33 per cent of the farmers are adopting soil health card recommendations in their fields whereas 67 per cent of farmers are not following soil health card recommendations. The study further revealed that, extension agency contact, education, trainings undergone and perception on SHC were found to be the key significant factors influencing the adoption of soil health card results by the farmers. Major Constraints in adopting the SHC recommendations were, difficulty in understanding the information given in the soil health card and calculating fertilizer dose on the basis of nutrient status of soil, unscientific method of collecting soil samples. Regular trainings to the farmers on soil sample collection procedure followed by interpreting recommended dose of fertilizers will create the positive intent among the farmers in adopting the SHC recommendation for sustainable soil health management.

Keywords: Correlation Co-efficient, constraints, factors, soil health cards, suggestions.

Introduction

Healthy soils produce healthy crops that in turn nourish people and animals (FAO, 2015) [5]. Soil health is proposed to focus on the maintenance of four key functions: carbon transformation; nutrient cycles; maintenance of the soil structure; and control of pests and diseases (Kibblewhite *et al.*, 2007) [7]. Naturally, soils contain many nutrients, among these the major elements of prime importance are nitrogen, phosphorus, calcium and potassium. Such nutrients are important for the growth and development of plants (Stevens, 2018) [11]. Plants suffer from nutrient deficiency when soil nutrients are absent or in short supply and stop growing. Then, it is very necessary to apply fertilisers to soils as needed in order to provide the plants grown on it with balanced nutrients. The blanket application of fertilizers without a scientific basis of actual requirements based on soil tests has led to under-use and/or over-use of fertilizers resulting in imbalanced nutrient application. Although the production of food grain increased dramatically during the same time, the increase in the total production of food grain did not keep pace with the drastic increase in the application of fertilisers, resulting in a low and declining efficiency of fertiliser usage (Archana and Balasubramanian, 2019) [1]. Over the years, the indiscriminate use of fertilizers, the less application of organic matter and the non- replacement of reduced micro and secondary nutrients have contributed to soil nutrient deficiencies. The level of awareness and acceptance of soil fertility management strategies among the farming community is relatively limited and the acceptance of soil test-based fertilisers is also significantly affected by various factors (Chowdary *et al.*, 2017) [4]. That's why interpreting soil health management is vital to the sustainability and stability of the climate adaptive farming systems (Xue *et al.*, 2019) [13].

In order to achieve this, the application of soil test- based fertilisers as per the recommendations of the 'Soil Health Card' is a significant move by the Government of India towards sustainable agriculture, which was launched in 2015 (Mukati *et al.*, 2018) [10]. The scheme is seen as a holistic measure to achieve sustainable soil health and farm economy with the full use of SHC recommendations, which is a tool to help farmers track and improve soil health and allows farmers to implement soil and crop-specific

fertilisers (Jotin and Anup, 2017) [6]. A SHC is intended to denote soil nutrient status to each farmer and recommend him on the right usage of fertilisers and micronutrients and also on the required soil amendments to be applied in the long term to maintain soil health (Subhash *et al.*, 2019) [12]. Consequently, soil health needs to be assessed under various management schemes in order to recognise and enhance the functioning of soil ecosystems. Precise and comprehensive measurements of soil health will provide the basis for soil health management (Liu *et al.*, 2018) [9].

In view of the increasing importance of soil testing and management of soil health, a study was carried out to examine the perception and adoption of SHC with the following objectives. to study the perception and adoption of soil health cards and deviations in adoption of SHC recommendations, study the factors influencing the adoption behaviour of the farmers with respect to SHC and identify the constraints as perceived by the farmers in adopting SHC recommendations.

Awareness campaign by Dr. Trilok Nath Rai1, Subject Matter Specialist, Department of Soil Science and Agricultural Chemistry, Krishi Vigyan Kendra, on soil health cards at KVK (ICAR-IIVR), Kushinagar, U.P.

Methodology

The present study was carried out in Kushinagar district of U.P. using pre tested and structured interview schedule during 2019-2020. The study aimed to evaluate the statements about the perception and adoption of soil health card recommendations and to find out the influence of personal, socio-economic and psychological attributes of the farmers towards their level of adoption in relation to SHC recommendations. The district was purposively selected, because it is the hub for rainfed agriculture with highest number of rainfed farmers in the state where the sustainable soil health management is crucial for improved soil fertility *vis-à-vis* dryland agriculture. Based on the objectives of the study, ex-post facto design of social research was followed. A comprehensive list of 100 farmer respondents having Soil Health Cards which were obtained from the Krishi Vigyan Kendra, Reddipalli were selected from the five mandalas with ten villages and ten farmers from each village with equal proportions through proportionate random sampling method. All the farmers were individually interviewed using pretested interview schedule to collect the primary data. Statistical techniques like quartile deviation, arithmetic mean, standard deviation, frequencies, percentage and correlation analysis were used. The Garrette's ranking technique was used to identify the constraints in adoption of soil health card recommendations.

Perception in this study was operationally defined as the extent of farmers' knowledge and awareness on the various aspects of SHC like importance of soil testing, interpretation of information from soil health cards and calculating the required dose of fertilizers. A set of 11 statements were developed to measure the perception of SHC and asked each respondent to rate the statements on five point continuum as given in Table 1. Based on the total scores, the respondents were categorised into 3 categories using class intervals, as measure of check. The minimum (11) and maximum (55) possible scores range was considered to derive the class intervals for categorisation.

Adoption in this study was operationally defined as the decision of implementing Soil Health Card results based on knowledge, persuasion of farmers in their farming system. Extent of adoption of SHC recommendations was operationalised as the degree to which the SHC-based recommendations were actually adopted by a respondent. The Extent of Adoption variable was calculated using the Adoption Index followed by Chowdary and Thiodore (2016) [2] which is given as follows:

$$\text{Extent of Adoption} = \frac{\text{Actual}}{\text{Recommended}} \times 100$$

As indicated in the SHC of each farmer respondent, the extent of adoption was worked out for each of the SHC recommendations: (i) Nutrients / Fertilizers-Urea (N), SSP (P) / DAP, MOP (K), Organic manure, and (ii) Problematic soils -Alkali-Gypsum (t / ha), Acidic-CaCo3 (kg / ac). For each respondent, the recommendation-wise adoption values were summarised and then divided by the number of recommendations, and the resulting value was eventually multiplied by 100 to arrive at the extent of adoption score in terms of percentage. The low level of percentage indicated 'less adoption' and the high level of percentage indicated 'higher adoption.' Based on the percentages, the respondents were categorised using the frequency distribution method into low, medium and high categories. The study also explained the influence of respondent's personal, socio-economic and psychological attributes on adoption behaviour of the farmers with respect to SHC by Pearson's coefficient of correlation analysis.

Results and Discussion

The data collected from our sampled respondents tabulated and analysed using suitable statistical tools. The results are explained along with the inferences drawn in relation to the objectives set forth for the study.

Farmers' perception on soil health cards (SHC)

The set of statements on perception towards SHC was administered to the farmers from the selected locations and the farmers' perception towards SHC revealed that majority of the respondents had medium level of perception on SHC (45%) followed by high level of perception (35%) and low level of perception (20%) respectively towards SHC Table 1. Hence, majority of the farmers have shown medium to high level of perception on SHC recommendations. The reason that could be attributed for this kind of results might be that most of the farmers were much aware of about soil health cards scheme, location of soil testing laboratories and information available from soil health card report. Hence, the farmers have shown medium to high level of perception on SHC recommendations. The finding are in accordance with the findings of Archana and Balasubramanian (2019) [1] who conducted the study on awareness, knowledge and attitude of farmers towards soil health card scheme in Tamil Nadu.

Table 1: Distribution of farmers based on the farmers' level of perception on soil health cards

Perception	Farmers (n=60)	
	No.	%
Less perceived (<20)	20	20
Moderately perceived (20-27)	45	45
Highly perceived (>27)	35	35

Extent of Adoption

The results of the analysis of extent of SHC recommendations adoption are presented in Table 2. From the glance of Table 3 it was observed that, majority of the farmers (40%) were applying/using Nitrogen as per the SHC recommendations followed by Potash as per the SHC recommendations (39%), Phosphorus as per the SHC recommendations (36%), Gypsum/lime as per the SHC recommendations (31%) respectively with a very less proportion of farmers applying organic manures as per the SHC recommendations (25%) followed by applying micro-nutrients as per the SHC recommen- dations (19%). This might be because, majority of the farmers had a firm belief that, adopting SHC recommendations cannot increase the level of production and also high cost for micro nutrients testing. Hence, the extent of adoption of various fertilizers as per SHC was low as and when compares to the number of soil samples tested during that particular period.

Table 2: Adoption of Soil Health Cards (SHC) by the farmer

Adoption	(N=100)	%
Recommended organic manures as per SHC results	25	25
Recommended Nitrogen as per SHC results	40	40
Recommended Phosphorous as per SHC results	36	36
Recommended Potash as per SHC results	39	39
Recommended Micro nutrients as per SHC results	19	19
Recommended Gypsum/Lime as per SHC results	31	31

Deviations in adoption of SHC recommendations

The results pertaining to the deviations in adoption of SHC recommendations was depicted in Table 4. A glance of Table 3 revealed that, among the total sampled respondents, only 33 per cent of the farmers are adopting soil health card results in their own situation whereas 67 per cent of farmers are not following soil health card recommendations. Whereas among the 67 per cent of farmer non-adopters, 88 per cent of the farmers are using more than the recommended dose of fertilizers with 12 per cent of the farmers are using less than the recommended dose of fertilizers.

The reason that could be attributed for this kind of results might be that, although farmers had high level of perception on SHC recommendations, the impeding constraints like lack of knowledge on soil sampling procedure, lack of comprehending ability of SHC reports, difficulty in calculating required dosage of fertilizers in proportion to the available nutrient status in their soils and other socio-economic factors forced the farming community to go for imbalanced usage of fertilizers rather than adopting soil health card recommendations. The finding are in agreement with the results of Chowdary *et al.* (2018) who conducted the study on awareness, knowledge and attitude of the farmers towards soil health card scheme in Tamilnadu.

Table 3: Deviations in adoption of SHC recommendations

Extent of Adoption Categories	Adopters of SHC Recommendations (33) (33%)		Non-Adopters of SHC recommendations (67) (67%)	
	No.	%	No.	%
Less adoption (-)	-	-	12	12
Recommended level of adoption	33	33	-	-
Excess adoption (+)	-	-	88	88

Distribution of respondents based on their personal, socio-economic and psychological attributes of the farmers under the study

Distribution of respondents based on their personal, socio-economic and psychological attributes of the farmers in relation to adoption of SHC was given in the Table 4. A detailed and careful perusal of Table 4 further revealed that majority of the respondents belonged to the 'middle and young aged' categories with (40% and 36% respectively) followed by 'old aged' category (24%). Out of 100 respondents, majority of the respondents had high school education (34%) followed by higher secondary education (20%), college and above education (18%), primary education (18%) and illiterates (10%) respectively.

It was perceived that nearly half of the respondents (55%) were moderately experienced followed by highly experienced (25%) and less experienced (20%) respectively. Observing the respondents distribution with respect to scientific orientation, more than half of the respondents had medium level of scientific orientation (54%) followed by

high level of scientific orientation (26%) and low level of scientific orientation (20%) respectively.

In case of annual Income of the respondents, half of the respondents' annual income was medium (50%) followed by high (29%) and low (21%) respectively. It is also evident from the Table 5 that majority of the respondents have undergone moderate number of trainings (57%) followed by more number of trainings (29%) and less number of trainings (14%) respectively. With respect to innovation proneness nearly half of the respondents had medium level of innovation proneness (48%) followed by low level of innovation proneness (32%) and high level of innovation proneness (20%) respectively.

In case of extension agency contact, more than half of the respondents (55%) had medium level of extension agency contact followed by high level of extension contact (30%) and low level of extension contact (15%) respectively. With respect to economic motivation, majority of the respondents had moderate level of economic motivation (42%) followed by low level of economic motivation (32%) and high level of economic motivation (26%) respectively.

In case of achievement motivation, majority of the respondents had medium (43%) and high (37%) levels of achievement motivation followed by low level of achievement motivation (20%) respectively.

Table 4: Distribution of respondents based on their personal, socio-economic and psychological attributes of the farmers under the study

Personal, socio-economic and psychological attributes of rainfed farmers	Category	Respondents	
		Frequency	Percentage
Age	Young	36	36
	Middle	40	40
	Old	24	24
Education	Illiterate	10	10
	Primary	18	18
	High school	34	34
	Higher Secondary	20	20
	College and above	18	18
Farming experience	Less experienced	20	20
	Moderately experienced	55	55
	Highly experienced	25	25
Scientific orientation	Low	20	20
	Medium	54	54
	High	26	26
Annual Income	Low	21	21
	Medium	50	50
	High	29	29
Number of Trainings undergone	Low	14	14
	Medium	57	57
	High	29	29
Innovation proneness	Low	32	32
	Medium	48	48
	High	20	20
Extension agency contact	Low	15	15
	Medium	55	55
	High	30	30
Economic motivation	Low	32	32
	Medium	42	42
	High	26	26
Achievement motivation	Low	20	20
	Medium	43	43
	High	37	37

Relationship between personal, socio-economic, psychological attributes and the adoption of SHC recommendations by the farmers under study

The results of Pearson's coefficient of correlation analysis were taken into consideration for analysing the influence of respondent's personal, socio-economic and psychological attributes on adoption of SHC recommendations by the farmers (Table 5). The results of correlation analysis revealed that out of eleven personal, socio-economic, psychological factors studied, four factors namely, extension agency contact, education, trainings undergone, perception on SHC were found to be the chief contributory factors which were positively and significantly correlated with adoption of SHC recommendations. Whereas on the other hand seven factors namely, age, farming experience, annual income, innovation proneness, economic motivation, scientific orientation and achievement motivation were not correlated with extent of attitude towards agri-entrepreneurship (Table 5).

From the glance of Table 5 further revealed that extension agency contact of the farmers was found to have positive and significant relationship with the adoption of SHC recommendations. The reason for this might be that the famers who had regular contact with extension agencies might have aware about the advantages of soil test based fertilizer recommendation. Hence, the farmers who had more extension agency contact proportionately had more favourable attitude towards agri-entre- preneurship. Education level of the farmers was found to have positive and significant relationship with the adoption of SHC

recommendations. The reason for this might be that the level of education might have brought more knowledge and positive intent towards soil health management.

The number of trainings undergone by the farmers was found to have positive and significant relationship with the adoption of SHC recommendations. This might be because the training enlightens the knowledge, skill and attitude in a desirable way hence those who undergone more number of trainings on soil health management might have gained the knowledge on soil sample collection procedure and interpretation of soil health card results.

Perception on SHC is one of the factor positively and significantly influencing the adoption of SHC recommendations. Farmers who had regular and frequent interaction with various extension agencies like Krishi Vigyan Kendra's, District Agricultural Advisory and Transfer of Technology Centres and Agricultural offices might have convinced about the importance of soil test based fertilizer application. Hence, the farmers who had higher level of perception in turn showed higher rate of adoption.

Factors	Correlation co-efficient 'r' value
	Total = 100
Age	- 0.118
Farming experience	- 0.126
Extension agency contact	0.135*
Education	0.210*
Annual Income	0.162
Trainings undergone	0.353**
Innovation proneness	0.163
Economic motivation	0.263
Scientific Orientation	0.187
Achievement motivation	0.156
Perception on Soil Health cards	0.281*

Constraints as perceived by the farmers in adopting SHC recommendations

A constraint is anything that prevents or limits an individual or a group to utilize any resources or information or restrains them from tapping the intended effect of the information (Kumar *et al*., 2017) [8]. Constraints can be of any type like personal or external in a social system. In this study the limiting factors faced by farmers while utilizing the Soil Health Card and its information were analysed and the results depicted in the Table 6. From the glance of Table 6. it was observed that difficulty in calculating fertilizer dose on the basis of nutrient status of soil was the first ranked constraint with the mean score 87 per cent followed by difficulty in understanding all the information given in the soil health cards (83%), unscientific method of collecting ideal soil sample (77%), delay in issuing Soil health cards (75%), soil testing laboratories are located far away (53%), lack of guidance (40%) and farmers feel that fertilizer dose is not sufficient if applied as per SHC result (38%) as last ranked constraint. The study shows a resemblance with Mukati *et al*., (2018) [10] who found that majority of soil tested farmers were found to be difficulty in calculating the required quantity of fertilizers as per SHC.

Table 6: Constraints / Reasons for non-adoption of SHC recommendations

Constraints	Garette score	Rank
Difficulty in calculating fertilizer dose on the basis of nutrient status of soil	87	1
Difficulty in understanding all the information given in the soil health cards	83	2
Unscientific method of collecting ideal soil sample	77	3
Delay in issuing Soil health cards	75	4
Soil testing laboratories are located far away	53	5
Lack of guidance	40	6
Farmers feel that fertilizer dose is not sufficient if applied as per SHC result	38	7

Conclusion

The study revealed that majority of farmers perception on SHC was medium (45%) and merely 33 per cent of the farmers are adopting soil health card recommendations in their fields whereas 67 per cent of farmers are not following soil health card recommendations. The study further revealed that, extension agency contact, education, trainings undergone and perception on SHC were found to be the key significant factors influencing the adoption of soil health card results by the farmers. The major impeding factor in adopting the SHC recommendations were, difficulty in understanding the information given in the soil health card and calculating fertilizer dose on the basis of nutrient status of soil, unscientific method of collecting soil samples. To overcome these constraints regular farmers training on soil sample collection procedure followed by use of Soil Health Card by calculating recommended dose of fertilizers and understating the use of good fertilisers should be recommended. Extension personnel and agriculture departments can take their lead in this to overcome the barriers in adoption of the SHC recommendations.

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References

1. Archana SS, Balasubramanian R. Awareness, Knowledge and Attitude of Farmers towards Soil Health Card Scheme in Tamil Nadu. International Journal of Agriculture Sciences,2019:11(9):8405-8407.
2. Chowdary RK, Theodore RK. Soil Health Card Adoption Behaviour among Beneficiaries of Bhoochetana Project in Andhra Pradesh. Journal of Extension Education,2016:28(1):5588-5597.
3. Chowdary RK, Prasad GB, Theodore RK. Soil Health Card Adoption Behaviour of Farmers in Andhra Pradesh State of India. International Journal of Current Microbiology and Applied Sciences,2018:7:4028-4035.
4. Chowdary RK, Theodore RK, Anandarja N, Santhi R. Factors Determining the Use of Soil Health Card (SHC) Recommendations in Kurnool District of Andhra Pradesh. International Journal of Pure & Applied Bioscience,2017:5(6):1689-1694.
5. FAO. Healthy Soils Are the Basis for Healthy, 2015.
6. Jotin Bordoloi, Anup K. Das. Impact of Soil Health Card Scheme on Production, Productivity and Soil Health in Assam, 2017.

7. Kibblewhite MG, Ritz K, Swift MJ. Soil health in agricultural systems. Philosophical Transactions of the Royal Society B: Biological Sciences,2007:363(1492):685-701.
8. Kumar S, Sangeetha V, Singh P, Burman RR, Bhowmik A, Kumar SA. Constraints Faced by Farmers in Utilizing Rice Related Information through Rice Knowledge Management Portal (RKMP). Indian Journal of Extension Education,2017:53(1):84-89.
9. Liu J, Wu L, Chen D, Yu Z, Wei C. Development of a soil quality index for Camellia oleifera forestland yield under three different parent materials in Southern China. Soil Tillage Research,2018:176:45-50.
10. Mukati A, Bisht K, Singh SP, Raghuwanshi S. Farmer's perception regarding soil health card. International Journal of Chemical Studies,2018:6(6):307-310.
11. Stevens AW. Food Policy, 2018. https://doi.org/10.1016/j.foodpol.2018.08.005.
12. Subhash R, Monika J, Himanshu T, Vani DK, Gupta MK. Study on knowledge and adoption of soil health card based fertilizer application in Khandwa district (M.P.). International Journal of Chemical Studies,2019:7(3):3152-3155.
13. Xue R, Wang C, Liu M, Zhang D, Li K, Li N. A new method for soil health assessment based on Analytic Hierarchy Process and meta-analysis. Science of the Total Environment,2019:650:2771-2777.