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Farmers' Knowledge of Soil Health Card and Constraints in its Use

Sarvjeet Kaur[1]*, Prabhjot Kaur[2] and Pankaj Kumar[3]

ABSTRACT

Soil health and fertility is the representative for sustained high crop productivity and profitability of the farmers. Although soil testing is a regular feature of the Department of Agriculture Cooperation and Farmer's Welfare but after the launch of Soil Health Card Scheme, soil testing is taken up on a mission mode. The study was undertaken to study the knowledge of farmers regarding the application of Soil Health Card issued under Soil Health Card Scheme and constraints faced by them in its use. Findings of the study revealed that majority of the beneficiaries had knowledge regarding ideal time for the collection of soil sample and collection of soil sample from the place where a heap of FYM is not placed. About 73 per cent of the beneficiaries were having knowledge regarding different macro nutrients displayed on SHC and majority of the respondents had knowledge regarding judicious use of fertilizers and various soil testing laboratories available for soil testing. Majority of the beneficiaries had medium level of overall knowledge regarding the application of SHC. Difficulty in operating internet to access soil health card portal, delay in receiving SHC and lack of mobile soil testing vans were major constraints faced by the farmers in the application of SHC.

Keywords: Constraints, Knowledge, Soil Health Card, Scheme

INTRODUCTION

India ranks second in agricultural output and among top five positions for about 80 per cent of the products produced from farms. Agriculture contributes 70-80 per cent to country's GDP (Anonymous, 2019). India's cropping intensity is highest in the world and has achieved grain self-sufficiency but the production has gradually turned resource intensive, cereal centric and regionally biased. The resource intensive ways of Indian agriculture has raised serious sustainability issues. Application of fertilizers being one of the factors led to tremendous increase in the level of fertilizer consumption and today, India is one of the largest producer and consumer of fertilizers in the world. No doubt the use of chemical fertilizers has transformed a food deficit country into a food surplus one leading to agricultural renaissance. But this can be hazardous in long run deteriorating the soil health and polluting the environment and natural resources of soil and water. After pioneering green revolution, Punjab is currently facing the problem of sluggish agricultural yield. The practice of mono-cropping (wheat rice regime) and burning wheat and rice straw in the fields has augmented a gradual decline in soil fertility. Deterioration of the macronutrients such as nitrogen, phosphorus and potash as well as micronutrients such as zinc, iron and manganese are the result of unsustainable agricultural practices. The consumption of fertilizer per hectare is 223.46 kg as compared to 90 kg at national level (Anonymous, 2016). Over during the past 100 years, intensive farming has tripled the level of phosphorus and doubled the level of nitrogen in the environment compared to natural level. As a result of excessive chemical fertilizer use the health of soil and water is jeopardized. Soil health and fertility is the representative for sustained high crop productivity and profitability of the farmers.

[1]Senior Research Fellow, Dairy Extension Division, NDRI, Karnal-132001, Haryana
[2]Professor, [3]Assistant Extension Specialist, Department of Extension Education, PAU, Ludhiana-141004, Punjab
*Corresponding author email id: sarvjeet-ee@pau.edu

According to 'Degraded and Waste Lands of India' report by the Indian Council of Agricultural Research (ICAR) and the National Academy for Agricultural Sciences, of the 328.7 million hectares of total geographic area about 141.4 million hectares are under cultivation (Maji *et al.,* 2010) of which, about 100 million hectares is heading down a path where it will be incapable of supporting agriculture. Using optimal doses of fertilizers and cropping pattern is the first step towards sustainable farming. Only after 2014-15, soil management gained attention as a more forward approach although soil testing service begun in India in 1955-56 with the setting up of 16 soil testing laboratories under the Indo-US Operational Agreement for "Determination of Soil Fertility and Fertilizer Use". The Soil Health Card Scheme (SHCS) was launched in Suratgarh town of Sri Ganganagar district of Rajasthan on 19 February, 2015 to address the problems of degrading soil health. Under this scheme Soil Health Cards (SHCs) are issued to farmer. SHC is a printed report prepared in 14 local languages that a farmer is handed over for each of his holdings. The card contains an advisory based on the soil nutrient status of a farmer's holding. It contains the status of soil with respect to 12 parameters, namely N, P, K (Macro-nutrients); S (Secondary-nutrient); Zn, Fe, Cu, Mn, Bo (Micro - nutrients); and pH, EC, OC (Physical parameters). Based on this, the SHC also indicates fertilizer recommendations and soil amendments required for the farm. The scheme offers GPS enabled soil sampling at a grid of 2.5 ha in irrigated area and 10 ha in rain-fed areas. A Soil Health Card (SHC) is issued to all the farmers in a period of two years and these cards need to be renewed after every three years (Anonymous, 2017). SHC provides a qualitative assessment of soil health and thus helps the farmer to monitor and improve the soil health based on their field experiences. Punjab has a total of 56 static soil testing laboratories and 15 mobile soil testing laboratories (Reddy, 2017). The present scheme is undoubtedly a great initiative that may go a long way to promote soil health. However, success of this programme will largely depend upon knowledge of farmers to use SHC.

METHODOLOGY

The study was conducted in Jalandhar and Sangrur districts of Punjab. *Krishi Vigyan Kendra* (KVK) Noormahal, (Jalandhar) and *Krishi Vigyan Kendra*, Kheri (Sangrur) were purposively selected for the purpose. A list of farmers who have got SHC under SHCS from KVK, Noormahal (Jalandhar) and KVK, Kheri (Sangrur) was prepared. From this list, 40 farmers benefited from each KVK were chosen randomly, thus making a total of 80 farmers. An Interview schedule was prepared for the collection of data from the beneficiaries of SHCS. A knowledge test was prepared to study the knowledge level of the farmers regarding SHC. The knowledge test contained items in the form of multiple choice questions, true/false, fill in the blanks etc. covering all the aspects of application of SHC. Constraints were measured through structured questions regarding the application of SHC. Statements were made regarding different aspects of SHC. Responses were recorded in the form of Yes/No. Data were analyzed using appropriate statistical tools.

RESULTS AND DISCUSSION

Knowledge of farmers regarding soil sampling procedure

Data in the Table 1 indicate that majority (95%) of the beneficiaries were having knowledge regarding the ideal time for the collection of soil sample. As high as 90 per cent of the beneficiaries had knowledge regarding the collection of soil sample from the spot where a heap of FYM is placed. About 86 per cent of the farmers were having knowledge regarding type of the cut given in the soil to take soil sample, technique of making soil sample representative and implement to be used to draw soil sample. More than 60 per cent beneficiary farmers were having knowledge regarding the approximate weight of the soil sample to be collected and 63.75 per cent had knowledge about the area of the field to be avoided while taking sample. Only 30 per cent of the beneficiaries had knowledge regarding the handling of soil sample before sending it to soil testing laboratory. The findings were in line with the findings of Patel *et al.* (2017).

Knowledge of farmers regarding contents of Soil Health Card

Data given in Table 2 show that about three-fourth of the beneficiaries had knowledge regarding different

Table 1: Distribution of respondents on the basis of knowledge regarding soil sampling procedure (n=80)

S.No.	Items	f (%)
1.	Type of cut given in the soil to take soil sample	69 (86.25)
2.	Technique of making soil sample representative	69 (86.25)
3.	The approximate weight of the soil sample collected	52 (65.00)
4.	The ideal time for the collection of soil samples	76 (95.00)
5.	The depth to take soil sample	59 (73.75)
6.	Correct method of soil sampling.	64 (80.00)
7.	The grid method of taking soil sample	23 (28.75)
8.	The area of the field to be avoided while taking soil sample	51 (63.75)
9.	Cleaning the spot before taking soil sample	68 (85.00)
10.	Taking soil sample from problematic soil in the field along with normal soil	65 (81.25)
11.	Collection of a soil sample from the spot where a heap of FYM was placed	72 (90.00)
12.	Proper way of handling the soil sample before sending it to soil testing laboratory	24 (30.00)
13.	Implement to be used to draw soil sample	69 (86.25)

Table 2: Distribution of respondents on the basis of knowledge regarding contents of SHC (n=80)

S.No.	Items	f (%)
1.	Status of organic carbon given in SHC	35 43.75)
2.	Different macronutrients status displayed on SHC	59 (73.75)
3.	Different micronutrients status displayed on SHC	27 (33.75)
4.	Organic manure recommended in SHC	47 (58.75)
5.	The chemical properties of soil mentioned in SHC	53 (66.25)
6.	The physical properties of the soil mentioned in SHC	27 (33.75)
7.	Red color used in SHC to indicate result regarding nutrient status in the soil	17 (21.25)
8.	Green color used in SHC to indicate result regarding nutrient status in the soil	24 (30.00)

macro nutrients displayed on SHC and only 33 per cent of beneficiaries had knowledge regarding different micro nutrients displayed on SHC. About 58 per cent of the beneficiaries had knowledge regarding organic manure recommendation and 43 per cent of the beneficiaries had knowledge regarding the status of organic carbon given in SHC. About 66 per cent of the beneficiaries were having knowledge regarding the chemical properties of soil mentioned in SHC whereas only 21.25 and 30.00 per cent of the beneficiaries had knowledge regarding different colors; red and green respectively, used to indicate results regarding nutrient status in the soil.

Knowledge of farmers regarding general aspects of Soil Health Card

Data in Table 3 indicate that as high as 91 per cent of the beneficiaries had knowledge regarding judicious use of fertilizers under SHCS followed by 85 per cent of the beneficiaries who had knowledge regarding soil testing laboratories available for soil testing. About 83 per cent of the beneficiaries had knowledge regarding application of macro and micro nutrients based on soil testing. Half of the respondents were having knowledge regarding corrective measures suggested by the experts along with soil test results and the department responsible for implementing SHCS at state level. About nine per cent of them had knowledge regarding the SHCS website and the provision available to print the SHC.

Overall knowledge level was calculated by using the knowledge test constructed for this purpose. Scores obtained for different items on the knowledge test were summed up. The obtained scores were then classified in

Table 3: Distribution of respondents on the basis of knowledge regarding general aspects of SHC (n=80)

S.No.	Items	f (%)
1.	Government by which SHCS was launched	24 (30.00)
2.	Department responsible for implementing SHCS at state level	40 (50.00)
3.	Judicious use of fertilizers under SHCS	73 (91.25)
4.	Application of macro and micro nutrients based recommendation given in SHC	67 (83.75)
5.	Soil testing laboratories available for soil testing	68 (85.00)
6.	The time taken for soil analysis after the receipt of soil sample at soil testing laboratory.	13 (16.25)
7.	SHCS website and the provision available to print the SHC	7 (8.75)
8.	Soil Health Card portal and SHC mobile app.	12 (15.00)
9.	Corrective measure suggested by the experts along with soil test results.	53.75)

Table 4: Distribution of beneficiaries on the basis of overall knowledge regarding the application of SHC

Knowledge level	Percentage
Low	7.50
Medium	72.50
High	20.00

to three categories of low, medium and high using range method. Data in Table 4 reveal that as high as 72 per cent of the beneficiaries had medium level of overall knowledge regarding the application of SHC followed by 20 per cent of the beneficiaries who had high level of knowledge. Only seven per cent of the beneficiary farmers had low level of knowledge. Similar results were reported by Patel (2013), Rajesh (2011) and Singh *et al.* (2019).

Constraints faced by the beneficiaries in the use of Soil Health Card

Constraints referred to the hindrances faced by the beneficiaries of SHCS in the use of SHC. Constraints were measured through structured questions and response was recorded in the form of Yes/No. From data available in Table 5, it is clear that 93 per cent of the beneficiaries faced difficulty in operating internet to access SHC portal. It might be because no demonstration camps were organized for making the users familiar with the interface of Soil Health Card Portal and it was fewer

Table 5: Distribution of beneficiaries according to the constraints faced in the use of SHC

S.No.	Constraints	Percentage
1.	Illiteracy among the farmers to use soil health card	18.75
2.	Non-availability of micronutrient status on the card	58.75
3.	Difficulty in operating internet to access SHC portal	93.75
4.	Time gap between soil sampling and issuing soil health card is too long	91.25
5.	Lack of demonstration and training to use soil health card	53.75
6.	Lack of follow up by the extension agency	78.75
7.	Difficulty in following test based fertilizer recommendation	75.00
8.	Corrective measures for problem soils not discussed by the experts	40.00
9.	Non availability of recommendation regarding integrated nutrient management and organic fertilizer on SHC.	61.25
10.	Cost of soil testing is high.	27.50
11.	Soil testing is a complex procedure.	25.00
12.	No soil testing lab available in nearby area.	3.75
13.	Lack of mobile soil testing vans.	91.25

farmers friendly. About 90 per cent of the beneficiaries reported delay in receiving SHC, lack of mobile soil testing vans and lack of demonstration and training to use SHC as major constraints. Lack of follow up by the extension agency and non-availability of internet cafe in the area were some other constraints reported by about three-fourth of the beneficiaries. Moreover, farmers were asked to collect sample from their fields for soil testing after giving them soil sampling training. The reason might be the non-availability of sufficient staff required for soil sampling and soil testing under SHCS, Department of Agriculture Cooperation and Farmers Welfare, Punjab. Difficulty in using soil test based fertilizer recommendations paved a hindrance in use of SHC for 75 per cent of the respondents. Farmers did internalize recommendation and the information on SHC also altered their preferred fertilizer mix, but other factors such as cost, liquidity or timely availability of fertilizers prevented them from acting on these preferences by shifting their actual application. The findings of the study support the study of Bunkar (2018); Mukati (2016); Patel (2013); Patel *et al.* (2017) and Patel *et al*, (2019).

CONCLUSION

Soil Health Card Scheme has completed two cycles (2015-17 and 2017-19) and launch of new design of SHC (24 Feb, 2018) shall solve the problems that farmers faced in understanding the contents of SHC. The use of fertilizers has reduced in several crops and also total cost of cultivation, which is appreciable. Given short duration of the scheme, awareness level among farmers is good. Study revealed that the norms prescribed in SHCS are not followed due to various reasons. Soil testing infrastructure and human resource is grossly inadequate which is hindering the progress of the scheme. Building adequate and permanent staff at soil testing laboratories interested in soil testing shall improve the pace of development. There is a need to strengthen SHC related extension services to provide better advisories. For effective penetration of the benefits of SHCS, awareness campaigns need to be organized on content of SHC, use of recommended practices, reduction in fertilizer use and costs and increase in profitability.

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