Original Research Article

A Study on Farmers' Use Efficiency of Soil Health Card in Rangareddy District of Telangana State, India

Abstract: Soil is natural non- renewable resources on human time scale which is the foundation for sustainable agriculture. In view of this, Global soil partnership was conducted by the United Nations Food and Agriculture Organization at its headquarters in Rome, Italy, from 7 to 9 September 2011. With this, Government of India had launched the Soil Health Card Scheme (SHCs) in 2015. The scheme main objective is to distribute SHCs to each farmer in the country with advanced technologies such as GPS-enabled tablets and mass testing, along with better fertilizer subsidy policies. The research study was conducted during 2019-2020 to analyse farmers' Use efficiency of SHC. Data was collected using a standardised and pre-tested interview schedule. It was revealed that slightly more than the three fifth SHC holders had partially used of overall use efficiency on SHC information (60.83 %), followed by not used (20.00 %) and fully used (19.17 %) of overall use efficiency on SHC information, respectively. All profile characteristics of farmers except mass media exposure had a significant to highly significant association with regard to use efficiency of SHCs. The results also revealed that there is a significant association between attitude and use efficiency (chi-square value 29.66).

Keywords: Soil Health Card, Use efficiency, Association

1. INTRODUCTION

The present work will be a complementary contribution to the comprehensive study of the Farmers' Use Efficiency of Soil Health Card in relation to maintaining healthy soils to ensure food and nutrition security which is required for feeding the growing population of the country and meeting their fast changing needs for biomass (energy), fibre, fodder, and other products can only be ensured. Soil is living medium as it provides nutrition to the plant growth and development. By 2050 world population growth will increase over nine billions which will affect the world food production and ecological services again which will further pressure on soils. Today's world, soils recognition is still seen as a second priority but climate change is the major driver putting the soils in the first priority in global agenda. The conservation and, where possible, enhancement and restoration of world soil resources through sustainable and productive

use should therefore be the ultimate twinned goal of the Global Soil Partnership. However, despite the essential role that soil plays in the life of people, there is increasing degradation of soil resources due to inappropriate practices, burgeoning population pressures and inadequate governance over this essential resource. The green revolution led to a quantum leap in food production and bolstered world food and nutrition security. In order to meet projected demands over the next 40 years, farmers in the developing world must double food production, a challenge made even more daunting by the combined effects of climate change and growing competition for land, water and energy. Healthy soil contains all 17 elements for crop growth and development. If soil lacks one or more elements, it either reduces yield production or degrades quality of crops. "Soil health" is an assessment of ability of a soil to meet the range of ecosystem functions. In simple words, soil health defined as the "fitness of soil for use". Soil health is the integration of three forms such as physical, chemical and biological approaches with their functions; a healthy soil can balance all these three components. Soil health plays an imperative role in improving sustainable farming production and food and nutrition security in coming years. The unbalanced use of fertilizers, the shortage of organic matter and the insufficiency of micronutrients substitution and secondary nutrients leading to decrease in soil fertility in many parts of the country. Soil health assessment at regular intervals and a recommendation to ensure that the farmers follow required nutrients to harness the soil's native nutrients is needed. Healthy soils produce healthy crops that in turn nourish people and healthy ecosystem with healthy planetary process (FAO, 2015). Majority of chilli growers (68.33 %) were having medium level adoption on recommended plant protection measures while, 20.00 per cent and 11.67 per cent of the growers were having a high level adoption and low level adoption, respectively (Rathod, 2009). Majority of the respondents (68.33 %) were having medium level of adoption with regard to recommended coriander production technologies, followed by low level (19.17 %) and high level (12.50 %) of adoption regarding recommended coriander production technology **(**Kumar *et al*. 2014). 47.00 per cent of paddy growers were having a medium level of adoption of improved paddy cultivation practices while, 31.00 per cent and 22.00 per cent were having higher level and lower level of adoption on improved paddy cultivation practices, respectively (Payal, 2014). 45.33 per cent of potato growers were having a medium level of adoption on fertilizers and manure while, 32.00 per cent were having high level adoption on fertilizer and manure. Only 20.00 per cent of Potato grower had low adoption level on fertilizers

and manure and 35.00 per cent of paddy growers had used recommended dose of fertilizers, while potato growers 45.00 per cent had applied not according to recommendation dosage of fertilizers (Peer *et al*. 2014). Slightly more than three fifth (60.83 %) of the soil health card holders were having a medium level of use efficiency on soil health card information, followed by low level (20.83 %) and high level (18.34 %) of use efficiency on soil health card information (Charel, 2016).

2. METHODOLOGY

The agencies that implemented the soil health card were Department of Agriculture, State Agriculture Universities, Krishi Vignan Kendras and International Crops Research Institute for the Semi-Arid Tropics. For effective monitoring of schemes, output and outcome framework was finalized in consultation with National Institute for Transforming India. The scheme is managed by integrated management division in the ministry Agriculture Corporation and farmer's welfare, government of India. Based on objectives of the study, Ex-post-facto-research design is most often used with social and behavioural sciences because it is difficult to assign a respondent dynamic behavioural condition. Thus, Ex-post-facto-research design was used for the study. It was considered appropriate because the event has already happened. It was a systematic empirical study in which the researcher does not have direct control over independent variables because their manifestations have already occurred. The present study was conducted in two blocks namely Shabad and Kothur of Rangareddy district of Telangana State during the year 2019-2020. Rangareddy district was purposively chosen for the study. The rationale applied for selecting the district was large number of soil samples collected (93,912) and farmers covered (1, 67,041) were more compared to other districts in the state. Again from each block top three villages having more soil health card holders of small, medium and large farmers were selected. The village-wise information relating to soil health card holders were obtained from Department of Agriculture, Indian Council of Agricultural Research, Krishi Vignan Kendras, Agricultural extension officers and Agricultural officers. In each of the identified villages 20 farmers were randomly selected for collecting the required data for the research. Thus, 60 respondents were selected from each of the block. Totalling the sample constituted for the study to 120 farmers. The total of 6 villages were selected and top three villages had maximum number of soil health cards had been issued were chosen in each block through simple random sampling 20

respondents per village were selected. One district X two blocks X three villages X 20 farmers. The study aimed to assess the statements about the Use efficiency of soil health card recommendations and to find out the Association between farmers profile characteristics with their use efficiency on soil health card in relation to SHC recommendations. Statistical tools and tests used such as arithmetic mean, Frequency, percentage, standard deviation, rank, chi-square test and Yates' correction for continuity. In the current study, it is an efficiency of using soil health card benefits or features by the holders in terms of applying fertilization practices for farm sustaining and improving soil health status or It is the ratio of the useful soil health practices performed in the farming day by a farmer to the total set of soil health card recommended practices. Use efficiency is efficiency of soil health card holders to use soil health cards benefits or features in terms of the applying in farm for maintaining and improving soil health status. Procedure followed by Charel (2016) with suitable modifications was used for the study. With eleven statements was prepared by using teacher made scale technique with the help of research reviews and consulting experts of soil science, agronomy and extension discipline for deriving meaning of conclusions. The responses of the respondents on each statement was obtained on three point continuum via fully used, partially used and not used with weightage of 3, 2 and 1 scores, respectively. Thus, the possible score for farmers use efficiency of soil health card ranges between minimum of 11 and maximum of 33. The respondents were grouped into three categories on the basis of mean and standard deviation.

3. RESULTS AND DISCUSSIONS

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

Overall Use efficiency of soil health card by farmers

It was clear from the data in Table 1 revealed that slightly more than the three fifth soil health card holders had partially used of overall use efficiency on soil health card information (60.83 %), followed by not used (20.00 %) and fully used (19.17 %) of overall use efficiency on soil health card information, respectively. It might be due to that farmers have understood that using fertilizers efficiently would decrease the cost of cultivation and helps to sustain and

maintain the production and productiveness of their soil. These findings are in line with results of (Rathod, 2009; Ghintala *et al*. 2014; Kumar *et al*. 2014 and Charel, 2016).

Table 1: Overall Use efficiency of soil health card by farmers (n=120)

Sl. No.	Use Efficiency category	Farmers	
		Frequency	Per cent
1.	Not used efficiency of SHC (< 28.51)	24	20.00
2.	Partially used efficiency of SHC (28.51 to 30.73)	73	60.83
3.	Fully used efficiency of SHC (> 30.73)	23	19.17
Total		120	100.00

Mean=29.62; Standard deviation= 2.22

Statement-wise Use efficiency of soil health card by farmers

The results are shown in Table 2. Most of the farmers (99.16 %) were either from partially used efficiency to fully used efficiency with the statement that "Did you incorporate organic matters into the soil as per soil health card recommendations?, "Did you take corrective measures like use of quality water, green manuring, etc. to overcome the problem related to E.C. as recommended in the soil health card?" and "Did you follow the fertilizer combination for your crop as recommended in soil health card. Probable reason might be following the soil health card recommendations.

It was clear from Table 2 that among 11 statements these three statements "Did you apply secondary nutrients into the soil also as per soil health card recommendations, "Did you grow only the recommended crops in the soil health card?" and "Did you use the soil health card to get benefited under govt. schemes. Probable reason might have applying secondary nutrients as per card, growing the recommended crops and using soil health card in getting benefits of programme were either from partially used efficiency to fully used efficiency with 98.33 per cent of farmers.

The statement "Did you apply micronutrients into the soil as per information given in the soil health card". Probable reason might have applying micronutrients nutrients as per card, obtained an (98.32 %) were either from partially used efficiency to fully used efficiency.

It observed that 96.66 per cent of respondents were either from partially used efficiency to fully used efficiency with the statement that "Did you apply primary nutrients (NPK) into the soil as per soil health card recommendations. Probable reason might be applying primary nutrients nutrients as per card.

The remaining two statements, namely, "Did you apply lime or gypsum into the soil as per recommendation given in soil health card to have optimum pH?" and "Did you grow only the recommended varieties in the soil health card". Probable reason might have growing the recommended varieties as per card, obtained a 95.82 per cent of respondents were either from partially used efficiency to fully used efficiency.

Farmers opined that 94.16 per cent they were either from partially used efficiency to fully used efficiency with the statement that "Did you apply bio fertiliser cultures into the soil as per information given in the soil health card. Probable reason might have applying bio fertiliser cultures as per card.

The statements "Did you incorporate organic matters into the soil as per soil health card recommendations?", "Did you apply secondary nutrients into the soil also as per soil health card recommendations?", "Did you apply micronutrients into the soil as per information given in the soil health card?", "Did you take corrective measures like use of quality water, green manuring, etc to overcome the problem related to E.C. as recommended in the soil health card?", "Did you follow the fertilizer combination for your crop as recommended in soil health card?", "Did you grow only the recommended crops in the soil health card?" and Did you use the soil health card to get benefited under govt. schemes? Obtained an (0.84 %), (1.67 %), (1.68 %) of them were not used soil health card. Probable reason might be due to their unawareness level, primary education and illiterate farmers.

Table 2: Statement-wise use efficiency of soil health card by farmers (n=120)

SI. No.	Statements	Fully used		Partially used		Not used	
		f	%	f	%	f	%
1.	Did you incorporate organic matters into the soil as per SHC recommendations?	89	74.16	30	25.00	01	0.84
2.	Did you apply primary nutrients (NPK)	83	69.16	33	27.50	04	3.34

	into the soil as per SHC recommendations?						
3.	Did you apply secondary nutrients into the soil also as per SHC recommendations?	78	65.00	40	33.33	02	1.67
4.	Did you apply Micronutrients into the soil as per information given in the SHC?	88	73.33	30	24.99	02	1.68
5.	Did you apply bio fertiliser cultures into the soil as per information given in the SHC?	83	69.16	30	25.00	07	5.84
6.	Did you apply lime or gypsum into the soil as per recommendation given in SHC to have optimum pH?	71	59.16	44	36.66	05	4.18
7.	Did you take corrective measures like use of quality water, green manuring, etc to overcome the problem related to E.C. as recommended in the SHC?	90	75.00	29	24.16	01	0.84
8.	Did you follow the fertilizer combination for your crop as recommended in SHC?	89	74.16	30	25.00	01	0.84
9.	Did you grow only the recommended crops in the SHC?	84	70.00	34	28.33	02	1.67
10.	Did you grow only the recommended varieties in the SHC?	86	71.66	29	24.16	05	4.18
11.	Did you use the SHC to get benefited under govt. schemes?	85	70.83	33	27.50	02	1.67

F= Frequency of farmers %=per cent

Association between farmers profile characteristics with their use efficiency of soil health card.

The association between profile characteristics of farmers with their use efficiency of soil health card states in Table 3. This results revealed that variables such as, mass media exposure had a no association with use efficiency on farmers, similarly, age, education, cosmopoliteness, extension contact, extension participation, innovativeness of farmers had being significant association with use efficiency of soil health card at five per cent level. Likewise, land holding, scientific orientation, management orientation, annual income, farming experience, social participation, achievement motivation of farmers had being highly significant association with regard to use efficiency on soil health card at one per cent level. These findings are in line with results of (Ranganatha Babu, 2001; Satasiya, 2008; More *et al*. 2015 and Meenal Dubey, 2018; Sharma *et al.* 2015).

Table 3: Association between profile characteristics of farmers with their use efficiency of soil health card by the farmers (n=120)

Sl. No.	Characteristics	$\chi 2$	C-value
1.	Age	08.94 *	0.35
2.	Education	06.38 *	0.30
3.	Annual income	37.17 **	0.48
4.	Land holding	29.60 **	0.33
5.	Farming experience	23.00 **	0.40
6.	Cosmopoliteness	08.12 *	0.25
7.	Mass media exposure	0.33 NS	0.05
8.	Extension contact	06.51 *	0.16
9.	Extension participation	09.31 *	0.26
10.	Social Participation	10.24 **	0.19
11.	Management orientation	09.69 *	0.27
12.	Scientific orientation	11.77 **	0.19
13.	Achievement motivation	13.75 **	0.24
14.	Innovativeness	07.03 *	0.23

NS=Non-significant, *=Significant at 5% level, **=Significant at 1% level

4. CONCLUSION

The farmers need to register at the web portal *www.soilhealth.dac.gov.in* along with the characteristics of collected soil samples and reports from soil test laboratory. Once registered, the farmer can track test results through soil testing labs, fertilizer and nutrient recommendations and soil health card generation. The majority of respondents possessed partially used efficiency on soil health card information. Extension personnel involved in conducting capacity building programmes need to be evolving an exercise that makes the farmers to comprehend soil health card values and right way of making inferences for cropping decisions. Field days need to be arranged at appropriate crop growth stage for farmers of the same and nearby villages. Subject

matter specialists should explain the advantages of soil test based fertilization and need based use of soil amendments like for acidic soils (pH below normal) and alkaline or saline soils (pH above normal), Gypsum or liming materials are to be used. Also the Agriculture Officer of the area needs to be contacted for reclamation of soil. Intensive use and need of Information and Communication Technologies for database management for faster delivery of soil health cards in Public Private Panchayat Raj Partnership mode and popularizing soil test based Integrated Nutrient Management through field demonstrations or field days.

Soil and Water Conservation through Land Shaping Techniques in Coastal Regions should be strengthened for sustainable and conservative agriculture. The Panchayat Raj Institutes (PRIs) need to be involved in publicizing the demonstrations and training of farmers and in ensuring participation of farmers from nearby areas for widespread dissemination of technology. The follow-up activities by extension agency to make the best use on soil health card recommendations are inadequate was another constraint. Undertaking appropriate follow-up activities is a must for the success of any program or project. Timely reminding farmers through online platforms and giving holding hands in the procurement of fertilizers need to be carried out by extension agencies to win the confidence of the farmers.

5. REFERENCES

Charel J. M. 2016. Perception and use efficiency of soil health card by the farmers of Navsari District. *M.Sc. (Agri.), Thesis (Unpub.),* Navsari Agricultural University, Gujarat.

FAO,(2015). Healthy soils are the Basis for Healthy

Ghintala, A. and Singh, K. 2013. Knowledge and Adoption of Sprinkler irrigation system by the farmers of Banaskantha District of North Gujarat. *Indian Journal of Extension Education, and R.D.* 21 **(1)**: 26-29.

Kumar, S., Hanuman, L. and Hanuman, S. B. 2014. Extent of Adoption of recommended coriander production technology by the farmers, *Indian Journal of Extension Education and Rural Development,* 22(**1**): 177-179.

Meenal Dubey. 2018. Impact assessment of soil health card scheme on income and nutrient management practices in major crops among the farmers of Raisen District in Madhya Pradesh, *M.Sc. (Agri.), Thesis (Unpub.),* Department of Agricultural Extension, I.G.K.V., Raipur, Chhattisgarh.

More, G. B. Mokhale, S. U. and Chikhale, J. 2015. Knowledge and Adoption of production technology by ajwain growers, *Agril, Update* **10**(1): 6-11.

Payal, S. D. 2014. Adoption level of paddy growers and its relationship with their selected socio personal characteristics in Navsari district of Gujarat State. *Indian Journal in Management and Social Science,* 12 (**2**): 31-34.

Peer, Q.J.A., Kher, S. K., Nafees, A., Manhas, J.S. and Kaur, J. 2014. Adoption dynamics of fertilizers and manure in potato crop. *Indian Res. J. Extension Education,* 14 (**1**): 115-117.

Rathod, J.J. 2009. A Study on Adoption of recommended plant protection measures by chilli growers in Anand district of Gujarat State. *M.Sc. (Agri.), Thesis (Unpub.),* A.A.U., Anand.

Ranganatha, Babu. D. 2001. A study on Knowledge and Adoption of bio fertilizers by the farmers of Cauvery command area, *M.Sc. (Agri.), Thesis (Unpub.),* Department of Agricultural Extension, U.A.S. Bangalore.

Satasiya, S. D. 2008. Impact of Front line demonstrations (FLDs) of castor production technology on the knowledge and adoption level of castor growers in Junagadh District of Gujarat State, *M.Sc. (Agri.), Thesis (Unpub.),* A.A.U., Anand.

Sharma, A., Singh, M., Sharma, S. N. and Tamble, S. B. 2015. Adoption of chilli production technology among chilli growers in Sehore District of Madhya Pradesh, *Indian Journal of Extension Education*, 51(**1&2**): 95-98.