*Original Research Article*

# A STUDY ON FARMERS' PERCEPTION ON SOIL HEALTH CARD IN RANGAREDDY DISTRICT OF TELANGANA STATE

**Abstract:** Agriculture is the backbone of Indian economy and primary source of income of larger part of Indian population. In view of this, Government of India had launched the Soil Health Card Scheme in 2015. The scheme main objective is to distribute soil health cards (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 soil samples were tested in laboratories across the India. Government conducted soil testing and issued soil health cards that carry crop specific recommendations of fertilizers required to enable more judicious use of fertilizers to improve productivity and decline cost of cultivation. The research study was conducted during 2019-2020 to analyse farmers' perception on soil health card. Data was collected using a standardised and pre-tested interview schedule. It was observed that majority of the SHC holders were having moderate perception (71.66 %), followed by good (15.00 %) and poor perception (13.33 %). All profile characteristics of farmers except mass media exposure and innovativeness had significant to highly significant association with regard to perception. The results also revealed that there is a significant association between perception and attitude (chi-square value 44.01) and between attitude and use efficiency (chi-square value 29.66).

**Keywords:** Soil Health Card, perception



## 1. INTRODUCTION

Soil is living medium as it provides nutrition to the plant growth and development. 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). Rathor (2018) observed that majority of farmers (83.00 %) were having favourable perception about soil health card, while 11.00 and 6.00 per cent of the farmers were with less favourable perception and most favourable perception on soil health card, respectively. Charel (2016) concluded that a good majority of soil health card holders (70.83 %) were having medium level of perception on soil health card, followed by high level (15.00 %) and low level (14.17 %) of perception on soil health card. Chauhan (2015) indicated that a good majority of farmers (71.00 %) were having moderate level of perception on low-cost greenhouse technology, while 18.00 and 11.00 per cent of them had poor level and good level of perception on low-cost greenhouse technology, respectively. Mukati (2016) stated that great majority of the soil health card holders (83.76 %) were having a favourable perception towards soil health card, followed by less favourable (11.97 %) and most favourable (4.27 %) of perception on soil health card.

## 2. METHODOLOGY

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 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. The present study was conducted in 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. 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. Two blocks namely Shabad and Kothur were selected on the same criteria. Again from each block top three villages having more soil health card holders of small, medium and large farmers were selected. 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 perception on soil health card recommendations and to find out the Association between farmers profile characteristics with their perception 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. Perception is defined as the process of understanding sensation or become aware by the farmers on soil health card. Procedure followed by Charel (2016) with suitable modifications was used for present study with 21 statements administered on the sample farmers and asked to express their reaction of each item on three-point continuum as given Table 2. Thus, the possible score for farmer's perception on soil health card ranges between minimum of 21 and maximum of 63. The respondents were classified into three categories on the basis of mean and standard deviation as a measure of check.

## 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 perception of farmers about soil health card

15.00 per cent of the farmers were having good perception regarding soil health card, while 71.66 and 13.34 per cent of them had moderate and poor level of perception regarding soil health card, respectively. The probable reason for majority of farmers were having moderate

perception might be due to lack of awareness of soil health card scheme and limited understanding about soils health. Further the respondents mostly had education at secondary level, medium level of mass media exposure and scientific orientation. Therefore, the perception of soil health card holders was too good with 86.66 per cent of farmers. These results shown in Table 1. These findings are in line with results of Kadam *et al.* (2012), Chauhan (2015), Sonawane *et al.* (2015) and Charel (2016).

**Table 1: Overall perception of farmers about soil health card (n=120)**

| Sl. No. | Perception category | SHC holders | |
|---|---|---|---|
| | | Frequency | Per cent |
| 1. | Poor perception (< 51.68) | 16 | 13.34 |
| 2. | Moderate perception (51.68 to 53.89) | 86 | 71.66 |
| 3. | Good perception (> 53.89) | 18 | 15.00 |
| Total | | 120 | 100.00 |

Mean= 52.79; Standard Deviation= 2.21

**Statement-wise perception of farmers about soil health card**

These results are shown in Table 2. Most of the farmers (98.33 %) were either from agree to undecided with the statement that "We can know the acidity or alkaline levels of soil by referring the pH value with the normal range given in soil health card". Probable reason might be to know the saline and alkaline soils which are unsuitable for crop cultivation thereby can be corrected by amendments like gypsum.

The remaining three statements, namely, "Soil health card intends to provide the information of primary and secondary nutrients, "Soil health card suggests suitable reclamation measure to correct problem soils" and "Adoption of recommended varieties and level of nutrients will ensure in getting the reference yield of the area", were either from agree to undecided (98.32 %). Probable reason might be farmers understood correcting the problematic soils to ensure good crop yield

97.50 per cent of farmers were either from agree to undecided with the statement that "Soil health card helps in arriving commonality among the farmers, extension workers and experts in levels of nutrients application for the soil". Probable reason might be organising the awareness programmes on healthy soils by extension agencies tie up all in arriving commonality among the farmers, change agents and experts.

Most of the farmers (97.49 %) were either from agree to undecided with the statement that "Soil health card suggests suitable corrective measures to deficient soils in order to increase the soil health status for better yield". Probable reason might be farmers understood to correct deficient soils to improve soil status and good crop yield

The four statements, namely, " Indication of soil nutrients availability in soil health card helps to decide the quantity of organic and inorganic nutrients required for the crop, "Soil health card recommendations help to remove unnecessary expenditure on fertilizers, "Soil health card helps to know recommended crops varieties and their reference yields for the land under consideration" and "Farmers can access their soil health card information 24X7 through online soil health card portal were either from agree to undecided of (96.66 %). Probable reason might be farmers understood the importance of soils, input cost savings and online platform of various services.

The statement "The validity of soil health card is lifelong and no further soil health card needs to be obtained", were either from agree to undecided with 95.82 per cent of farmers. Probable reason might be farmers practising traditional practices.

95.00 per cent of farmers were either from agree to undecided with the statement "Soil health card helps to check the excessive application of fertilizers". Probable reason might be farmers understood that fertilizers application should be reduced to save input cost and improve better crop yields.

94.99 per cent of farmers were either from agree to undecided with two statements namely "Scientific crop planning can be done by referring the soil health range parameters mentioned in the soil health card" and "The results of soil health card is an authenticated one, as it indicates date of soil sampling, geo positioning system coordinates and testing laboratory in

which it was analysed". Probable reason might be farmers understood the scientific methods of farming to improve healthy soils.

Most of the farmers (94.16 %) were either from agree to undecided with the statement that "Having the soil health card is a must for getting benefits under government schemes". Probable reason might be farmers will know the recommended inputs for their cost of cultivation practices.

The statement "On the basis of EC value given in soil health card, we can know the salinity level in the soil and take necessary action for improvement, "Soil health card indicates available organic matter in the soil which could serve as a basis for working out required quantity of organic matter application in the soil" and "Soil health card suggests us multiple combinations of NPK fertilizers to choose the fertilizers available in the market to meet the recommended fertiliser ratio", obtained an (93.33 %) were either from agree to undecided. Probable reason might be farmers knowing the right quantity of fertilizer application either organic or inorganic

Most of the farmers (93.00 %) were either from agree to undecided with the statement that "Proper utilization of soil health card information will leads to economic benefits". Probable reason might be farmers understood that healthy soils lead to better yield cum income.

It revealed that 92.50 per cent of respondents were either from agree to undecided with the statement that "Famers can know the quantity of plant nutrient elements available in the soil through soil health card". Probable reason might be farmers understood that elements available in soil.

**Table 2: Statement-wise perception of farmers about soil health card (n=120)**

| SI. No. | Statements | A | | UD | | DA | |
|---|---|---|---|---|---|---|---|
| | | f | % | f | % | f | % |
| 1 | SHC intends to provide the information of primary and secondary nutrients. | 80 | 66.66 | 38 | 31.66 | 02 | 1.68 |
| 2 | SHCs recommend the levels of micro nutrients for soil application. | 61 | 50.83 | 49 | 40.83 | 10 | 8.34 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 3 | Proper utilization of SHC information will leads to economic benefits. | 65 | 54.00 | 46 | 39.00 | 09 | 7.00 |
| 4 | Soil Health Card helps in arriving commonality among farmers, extension workers and experts in levels of nutrients application for the soil. | 66 | 55.00 | 51 | 42.50 | 03 | 2.50 |
| 5 | Soil Health Card helps to check the excessive application of fertilizers | 73 | 60.83 | 41 | 34.17 | 06 | 5.00 |
| 6 | Famers can know the quantity of plant nutrient elements available in the soil through SHC. | 66 | 55.00 | 45 | 37.50 | 09 | 7.50 |
| 7 | Soil Health card suggests suitable corrective measures to deficient soils to improve soil health status for better yield. | 67 | 55.83 | 50 | 41.66 | 03 | 2.51 |
| 8 | The indication of soil nutrients availability in SHC helps to decide the quantity of organic and inorganic nutrients required for the crop. | 69 | 57.50 | 47 | 39.16 | 04 | 3.34 |
| 9 | Scientific Crop planning can be done by referring the soil health range parameters mentioned in the SHC. | 73 | 60.83 | 41 | 34.16 | 06 | 5.01 |
| 10 | SHC recommendations help to remove unnecessary expenditure on fertilizers. | 69 | 57.50 | 47 | 39.16 | 04 | 3.34 |
| 11 | We can know the acidity or alkaline levels of soil by referring the pH value with the normal range given in SHC. | 61 | 50.83 | 57 | 47.50 | 02 | 1.67 |
| 12 | SHC suggests suitable reclamation measure to correct problem soils. | 71 | 59.16 | 47 | 39.16 | 02 | 1.67 |
| 13 | On the basis of EC value given in SHC, we can know the salinity level in the soil and take necessary action for improvement. | 66 | 55.00 | 46 | 38.33 | 08 | 6.67 |
| 14 | SHC indicates available organic matter in the soil which could serve as a basis for working out required quantity of organic matter application in the soil. | 64 | 53.33 | 48 | 40.00 | 08 | 6.67 |
| 15 | Having the SHC is a must for getting benefits under government schemes. | 64 | 53.33 | 49 | 40.83 | 07 | 5.84 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 16 | Adoption of recommended varieties and level of nutrients will ensure in getting the reference yield of the area. | 68 | 56.66 | 50 | 41.66 | 02 | 1.68 |
| 17 | The validity of SHC is lifelong and no further SHC needs to be obtained. | 65 | 54.16 | 50 | 41.66 | 05 | 4.18 |
| 18 | The results of SHC is an authenticated one, as it indicates date of soil sampling, GPS coordinates and Testing Laboratory in which it was analysed. | 67 | 55.83 | 47 | 39.16 | 06 | 5.01 |
| 19 | SHC helps to know recommended crops, varieties and their reference yields for the land under consideration. | 63 | 52.50 | 53 | 44.16 | 04 | 3.34 |
| 20 | Farmers can access their SHC information 24X7 through online SHC portal. | 70 | 58.33 | 46 | 38.33 | 04 | 3.34 |
| 21 | SHC suggests us multiple combinations of NPK fertilizers to choose the fertilizers available in the market to meet the recommended fertiliser ratio. | 60 | 50.00 | 52 | 43.33 | 08 | 6.67 |

A-Agree, UD- Undecided, DA- Disagree

f=frequency of Farmers, %=Per cent

The statement “Soil health cards recommend the levels of micro nutrients for soil application”, were either from agree to undecided categories by 91.66 per cent of farmers. Probable reason might be farmers understood that application of micro nutrients also plays a vital role in plant anatomical system.

The statements “Soil health card intends to provide the information of primary and secondary nutrients”, “we can know the acidity or alkaline levels of soil by referring the pH value with the normal range given in soil health card”, “soil health card suggests suitable reclamation measure to correct problem soils” and “adoption of recommended varieties and level of nutrients will ensure in getting the reference yield of the area” were disagree category by (1.67 %) and (1.68 %) of farmers. Probable reason might be due to their primary education level or illiterate.

**Association between farmers profile characteristics with their perception on soil health card.**

Chi square test was being employed to know association between profile characteristics of farmers with perception, attitude and use efficiency of soil health card.

These results of analysis of association between farmer's profiles characteristics with regard to perception on soil health card are presented in Table 3. The variables mass media exposure and innovativeness had no association with perception level of farmers, whereas variables such as education, land holding, management orientation of farmers had significant association with perception on soil health card at five per cent level. Variables such as, age, scientific orientation, annual income, farming experience, cosmopoliteness, extension contact, extension participation, social participation, achievement motivation of farmers were highly significant association with farmers perception on soil health card at one per cent level. These findings are in line with results of Chand (2012), Shiroya (2014), Hingonekar (2011), Badhe (2012), Chauhan (2015), Kadam *et al.* (2012), Patidar and Patidar (2015), Kesha Ram *et al.* (2015) and Badhe (2012).

**Table 3: Association between farmers profile characteristics and their perception about soil health card**

**(n=120)**

| Sl. No. | Characteristics | $\chi 2$ | C-value |
|---|---|---|---|
| 1. | Age | 17.36 ** | 0.28 |
| 2. | Education | 6.59 * | 0.16 |
| 3. | Annual income | 56.49 ** | 0.43 |
| 4. | Land holding | 8.72 * | 0.18 |
| 5. | Farming experience | 41.76 ** | 0.38 |
| 6. | Cosmopoliteness | 20.97 ** | 0.28 |
| 7. | Mass media exposure | 5.55 NS | 0.15 |
| 8. | Extension contact | 10.47 ** | 0.20 |
| 9. | Extension participation | 21.47 ** | 0.28 |
| 10. | Social Participation | 13.75 ** | 0.23 |
| 11. | Management orientation | 9.71 * | 0.19 |

| | | | |
|---|---|---|---|
| 12. | Scientific orientation | 15.25 ** | 0.24 |
| 13. | Achievement motivation | 16.69 ** | 0.34 |
| 14. | Innovativeness | 1.75 NS | 0.08 |

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

## 4. CONCLUSION

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 Partnership mode and popularizing soil test based Integrated Nutrient Management through field demonstrations or field days.

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.

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