Original Research Article

A Study on Farmers' Attitude towards Soil Health Card in Rangareddy District of Telangana State

ABSTRACT

Objectives: The Soil Health Card flagship programme has been implemented to address the national soil issues due to indiscriminate usage of synthetic fertilizers. Thus, it is critical to know farmers' attitude towards Soil Health Card.

Methods: An ex-post-facto-research design was employed in the study. The present study was conducted in Shabad and Kothur blocks of Rangareddy District of Telangana State during the year 2019-2020. Data were collected using standardized, pre-tested interviews and scored, tabulated and statistically analysed.

Findings: Our investigation in Rangareddy District disclosed that the majority of respondents possessed a favourable attitude towards soil health cards and has realized the importance of soil health and soil conservation management practices. The present work serves as a complementary contribution to the comprehensive study of the Farmers' Attitude on Soil Health Card in relation to maintaining healthy soils to ensure the nation's food and nutrition security. It was reported that the more than half of the interviewed farmers (52.50 %) were having more favourable attitude towards Soil Health Card, whereas 30.00 % and 17.50 % of them had favourable attitude and less favourable attitude towards Soil Health Card, respectively. The scale contained 16 statements each measured on a three-point continuum namely less favourable, favourable and more favourable. The possible score for farmers' attitude towards soil health card ranged from the minimum of 16 to the maximum of 48. All the profile characteristics of farmers had significant influences on their attitudes. The results also revealed that there was a significant association between perception and attitude (chi-square value 44.01).

Novelty: Indian Agriculture has been transformed from green revolution to evergreen revolution on a sustainable basis of maintaining healthy soils to enhance the nation's food and nutrition security and citizen life expectancy with the launch of the flagship programme Soil Health Card Scheme. By understanding farmers' attitude towards Soil Health Card and the associated personal profile characteristics, the scheme could be further implemented with installing proper polices in consideration of farmers' need and interest to double their income through distribution of soil health cards, reduced pest and disease incidences and improved soil health management practices.

Keywords: Soil Health, Attitude, Soil Health Card, Profile characteristics, Association

1. INTRODUCTION

The global soil partnership was initiated by the United Nations Food and Agriculture Organization at its headquarters (Rome, Italy) in 2011. In response, the Government of India had launched the flagship Programme of Soil Health Card Scheme to cover the entire country with information communication and soil mapping events, aiming to maintain healthy soils to ensure the food and nutrient security, enhance the life expectancy of people, and maintain agricultural goods export at competitive prices. By 2050 the world population will increase to over nine billions, challenging the world food production and ecological services that rely on healthy soils. In today's world, climate change has been the major driver putting soil as a critical natural resource with the top priority in the global agenda. Farmers' in Karnataka State have been facing declining crop yields and stagnating agricultural production. In May 2009 (International Crops Research Institute for the Semi-Arid Tropics), under the Government of Karnataka, initiated a project termed Bhoochetana (Revival of the Soil). The project started with 200,000 farmers in six districts and reached over 26,000 villages and 4.2 million farmers in the following nine years. With the utilization of science-backed innovations, millions of farmers achieved 20-66 % crop yield increases and obtained a net benefit of US$ 453 million. The State of Karnataka has succeeded in large scale implementation of better soil and farm management to consistently achieve by five per cent annual growth in the agriculture productivity for more than five years. In the targeted regions, Bhoochetana was a mission to elevate crop productivity and double farmers' incomes and improve nutrition and livelihoods. The mission has been successfully scaled up with all the districts in Karnataka and further extended to other states in the country. ICRISAT scientists applied the 'Four Cs Approach' to the project: Consortium, Convergence, Collective action and Capacity building. Other organizations came together to deliver knowledge solutions, technological inputs and a holistic program where multiple government projects could work together to synergize their capacities. Select farmers were trained as 'facilitators' so that they could support other peer farmers. Awareness programs were implemented through field days and training sessions to familiarize farmers with technology, machinery and techniques. Information and communication technologies were used to create and disseminate farming-related information to remote villages.

Modalities followed for implementation of soil health card

Telangana State Department of Agriculture was the nodal department for implementation of this scheme. It will provide necessary support to State Level Executive Committee (SLEC) and had the following functions:

a) Prepare annual state level action plan by compiling district-wise action plan and submit to the state level executive committee for approval and there after forward the same to executive committee.

b) Receive funds from Department of Agricultural Corporation for implementing / outsourcing organizations and oversee, monitor & review implementations of the programmes.

c) Organize workshops, seminars and training programmes for all interest groups/associations at state level.

d) Operationalize Information Communication Technology (ICT) enabled management system up to grass-root level.

e) Conduct independent evaluation to assess the performance of the scheme in state.

f) One per cent of total allocation to the state may be earmarked for administrative and other contingent expenses. Expenditure in excess of one per cent limit was met by the state from their own resources.

Four national workshops were organized in which implementing agency representatives and other key stakeholders (agricultural officers at national, state, district, and block levels, technicians in soil test labs, nongovernmental organizations [NGOs], private soil test lab technicians, and progressive farmers) participated. For farmers who followed recommendations on SHC effectively, this scheme proved to be a boon in terms of reduction in fertilizer use and increased net returns (Lal 1993; Wani *et al.* 2016; Wani and Raju 2016).

Soil health has been defined as "the ability of the soil to sustain the productivity, diversity, and environmental services of terrestrial ecosystems" (Intergovernmental Technical Panel on Soils, 2020). Healthy soil contains all 17 elements for crop growth and development. "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 means as the continued capacity of soil to function as a vital living ecosystem that sustains plants, animals, and humans. A healthy soil gives us clean air and water, bountiful crops and productive lands. 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. Healthy soils are the foundation of the food system. Healthy soils produce healthy crops that in turn nourish people and animals. Soils serve as a buffer to protect delicate plant roots from drastic fluctuations in temperature. 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. A number of FAO projects in the area of sustainable land management and soil conservation are currently underway around the world. These include, promoting conservation agriculture in Lesotho, strengthening capacity for sustainable organic farming in Palau and growing poplars for food security in china.

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. Field days exposure visits, farmer field schools, on-farm trials, front line demonstrations, campaigns, training, minikit trials and study tour 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 and agriculture extension officer or extension functionaries of the area need 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 in the country. Timely reminding farmers through online platforms and giving holding hands in the procurement of fertilizers need to be carried out by extension agencies and functionaries to win the confidence of the farmers.

Last but not least, in grid sampling soil mapping should be strengthened as it provides soil data of both farmers who practices chemical and natural farming side by side in farming locations irrespective of soil physical, chemical and biological properties and conditions along with specific site location on grid basis. In some cases soil health card may not be applicable to farmers who practice less application of fertilizers or opt for sustainable agriculture of natural farming. Knowledge management for farmers, policy makers and producers associations. To save healthy soils for sustainable agriculture to “Save and Grow” – farmers need to be facilitated to stop soil degradation and restore degraded soils through targeted soil research and development of robust soil information systems. The government need to promote inclusive policies in its governance with adequate investment for sustainable soil management and provide effective education / extension programmes at various levels.

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. Healthy soils produce healthy crops that in turn nourish people and healthy ecosystem with healthy planetary process [1]. Awareness of the Soil Health Card scheme among the farmers was high at 82%, but only 66% were able to understand the recommendations, and only 48% followed the recommended rate of fertilizer application. Literacy rates, irrigated area, contact with extension workers, subsidized micronutrients, and the infrastructure index had a positive influence on use of Soil Health Cards. The farmers benefited through optimal use of fertilizers and reduced cost of production [2]. Research studies reveal that most of the farmers are using continuously larger quantities of chemical fertilizers to increase production without knowing the fertility status of soils of their fields [3]. Majority of farmers (55.83 %) were having more favourable attitude about soil health card, followed by favourable (24.17 %) and less favourable (20.00 %) attitude about soil health card [4]. More than one-third of farmers (45.00 %) were having neutral attitude about soil health card programme, followed by strongly favourable (25.00 %), unfavourable (18.00 %) and strongly unfavourable (12.00 %) attitude towards and rest of them had a favourable attitude about soil health card programme [5]. Majority of farmers are well aware of scheme in the area and also perceive reduced fertilizer consumption in terms of macro nutrients which in turn has decreased their cost of cultivation and clear improvement in micro nutrients application was evident as it was complemented to farmers along with Soil Health Card [6]. An array of soil health management practices have been recommended, including proper land use, crop rotation, cover crops, conservation tillage, soil organic amendment, crop-range-livestock integration, and rotational grazing. Overall, the recommended soil health indicators and assessment methods need further validation and improvement in relevance, scientific validity, practicality, and local adaptation. Continuous research, education, and outreach efforts are warranted to promote localized development, adoption, and implementation of soil health assessment and management [7]. The study concluded that with increase in the level of education, training, high income, increase in awareness level and with more experience in farming the adoption of Soil Health Card scheme increased but the scheme could not bring substantial positive change in the Nagaon district of Assam in the initial years of its distribution because of low rate of adoption of the soil health cards because of the lack of technical advice on method and time of fertilizers application, lack of training, lack of trust in the information given on soil health card, lack of capital to purchase fertilizers and so on. Which demand for mass awareness campaign using the concept of the judicious use of fertilizer as per dose recommended on the Soil Health Card [8]. 80.83 % farmers having positive attitude favourable and 5.00 % most favourable followed by 19.17 % having negative attitude towards SHC [9]. 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 [10]. So, keeping the above in view research was performed to study the Farmers' Attitude on Soil Health Card and to study profile characteristics of the farmers and their association with the Attitude variable in order to maintain healthy

soils to ensure food and nutrient security to enhance life expectancy of people and goods exports at fair price. ds

2. MATERIALS AND METHODS

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 current study was conducted in Rangareddy district of Telangana State during the year 2019-2020. This 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. 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. Thus, 60 respondents were selected from each of the block. Totalling the sample constituted for the study to 120 farmers. One district X two blocks X three villages X 20 farmers. The study aimed to assess the statements about the Attitude on soil health card recommendations and to find out the Association between farmers profile characteristics with their attitude on soil health card in relation to SHC recommendations. In the current study, it was conceptualized as a positive or negative feeling of farmers towards soil health card. Scale developed by (Patel, 2013) was used with suitable modifications to ascertain the attitude level of farmers towards soil health card. The scale contained 16 statements each measured on three point continuum namely less favourable, favourable and more favourable. The attitude score of respondents was the sum of his/her scores for all the statements pertaining to the attitude towards soil health card. Thus the possible score for farmer's attitude towards soil health card ranges between minimum of 16 and maximum of 48. Statistical tools and tests used such as arithmetic mean, Frequency, percentage, standard deviation, rank, chi-square

test and Yates' correction for continuity. Most popular Software like Spps was used to analyse the collected data.

Chart 1 : List of villages and block involved in the study

Name of the Villages	Name of the Block	No. of Farmers
Shabad	Shabad	20
Rudraram	Shabad	20
Hayathabad	Shabad	20
Anthireddyguda	Kothur	20
Chegur	Kothur	20
Thimmapur	Kothur	20
Total sample size		**120**

Status of Rangareddy district

The following table shows the distribution of number of soil samples collected, analysed, number of farmers covered, number of soil health cards printed and number of soil health cards issued to the farmers in district.

Chart 2 : distribution of number of soil samples collected, analysed,

Sl. No.	Soil samples for 2015-16 & 2016-17 (cycle I)	Soil samples		No. of Farmers covered	No. of Soil health cards printed	No. of soil health card issued
		Collected	Tested			
1.		93,912	2,691	1,66,861	6,440	3,42,671

Source: Soilhealth.dac.gov.in

Chart 3 : Distribution of soils in Rangareddy district

SI. No.	Soil types	Area in Hectares	Locations
1.	Red sandy loams (Red chalka)	125000	Medchal, Shameerpet, Hayathnagar, Saroornagar, Rajendranagar etc.
2.	Red loamy sands (Dubba soil)		Ibrahimpatnam, Yacharam, Maheshwaram, Kandukur, etc.
3.	Black cotton soils	98000	Chevella, Shabad, Kothur, Vikarabad, Tandoor etc.

Source: Rangareddy.telangana.gov.in

Chart 4 : Distribution of soil testing laboratories (STL) in Rangareddy district

SI.	Particulars	No. s	Location

No.			
1.	Agriculture Market Committee (STLs)	4	Ibrahimpatnam, Medchal, Parigi and Vikarabad
2.	Main Lab and (Mobile soil testing lab at ARI)	1	Rajendranagar
3.	Total	5	

Source: Rangareddy.telangana.gov.in

3. RESULTS AND DISCUSSION

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 attitude of farmers towards soil health card

It is observed the results in (Figure 1) that the more than half of the farmers (52.50 %) were having more favourable attitude with regard to soil health card, whereas 30.00 and 17.50 per cent of them had favourable attitude and less favourable attitude towards soil health card, respectively. It might be that farmers knowing importance of soil health card and its impact on production and income. These findings are in line results (Madhu H.R, *et al*, 2019).

Item-wise attitude of farmers towards soil heath card

These results are shown in Table 1. Most of the farmers (91.66 %) were feeling either from favourable to more favourable with the Item that “I realize that soil health card has essential indicators to understand the chemical properties of the soil”. Probable reason might be famers realized that importance of soil chemical properties with soil health card. It is observed from Table 1 that among 16 Items these two Items 86.66 per cent of the farmers were feeling either from favourable to more favourable categories “I believe that soil health card is blessing for the farmers to have idea about soil health” and “I feel that soil health card will not useful to illiterate farmers”. Probable reason might be that farmers believed in healthy soils to maintain but at the same time soil health card may not useful to illiterate’s farmers. The statement with half of farmers said “I believe that excessive crop nutrition cost can be reduced to a greater extent by following soil health card information” and “I believe that soil health card is useful for checking deficient nutrients, excess nutrients as well as unavailable forms nutrients present in the soil”, obtained an (79.99 %) were either from favourable to more favourable. Probable reason might be farmers believed that excessive crop nutrition cost can be reduced to a greater extent and useful for checking

deficient nutrients, excess nutrients as well as unavailable forms nutrients present in the soil by using soil health card. The Item “I feel that the grid sampling method and generation of soil health card based on that is an irrelevant method”, obtained an (77.49 %) of them were either from favourable to more favourable. Probable reason might be farmers feel that practicing too much fertilization by one farmer may not be applicable for other farmers as they practiced the organic farming or not used much fertilization application in their fields.

Half of the farmers opined that (79.16 %) were either from favourable to more favourable with the Item that “Following soil health card recommendations will certainly lead to improving soil health”. Probable reason might be farmers followed the soil health card recommendations which lead to improving healthy soils and better crop yield with less pest incidence due to Integrated Farming System practices. Three fourth of the farmers stated that (76.66 %) were either from favourable to more favourable with the Item that “I feel that soil health card is the best measure to know the soil fertility status of the soil”. Probable reason might be farmers believed that soil health card will helps in knowing the soil fertility status of the soil so that they can decide which crop can be taken up with minimum cost of cultivation and maximizes the marketing of their produces. Three fourth of the farmers opined that (75.83 %) were either favourable to more favourable with the statement that “I recognize that soil health card is prerequisite for preparing balanced crop nutrition plan”. Probable reason might be farmers recognized that soil health card helps in preparing balanced crop nutrition plan for scientific cultivation of crops with nutrients application.

The remaining four Items, namely, “Simply issuing of soil health cards without interpretation of results & recommendations is of no use for farmers, “I recognized that soil health card has appropriate recommendations for adopting integrated nutrient management practices, “I trust that soil health card essential to get government benefits only and not significant benefits for other farmers” and “Referring organic matter content in the soil health card is the right way to decide the quantity of organic amendments for soil application”, three fourth of them were either from favourable to more favourable of (75.00 %). Probable reason might be farmers believed that adopting integrated nutrient management practices is the right way to decide the quantity of organic amendments like gypsum for soil application has significant benefits for improving their crop yields cum income. 72.50 per cent of the farmers reported that they were either from favourable to more favourable with the Item that “I feel that there is no need of soil health card as farmers themselves are practicing balanced nutrition through other methods”. Probable reason might be farmers practising the traditional way of farming instead of modern way of farming practices. The Item “I feel that soil health card can be effective only if the recommendations are followed on regular basis”, obtained a 71.66 per cent of them were either from favourable to more favourable. Probable reason might be farmers practiced the fertilizers recommendation to some extent. The statements “I believe that soil health card is blessing for the farmers

to have an idea about soil health", I realize that soil health card has essential indicators to understand the chemical properties of the soil" and I feel that soil health card is not useful for illiterate farmers", obtained an (8.34 %) and (13.34 %) of them were less favourable. Probable reason might be due to their primary education or illiterate farmers (Patel, 2013).

Association between farmers profile characteristics with their attitude towards soil health card.

These results reported that variables such as, age in this regard findings are in line with Probable reason might be fact that old aged farmers had a traditional way of thinking while, on other hand young age farmers were more enthusiastic and dynamic which leads to develop positivism with regard to soil health card. Thus age played an important role in shaping attitude with regard to farmers towards soil health card and developed favourable attitude (Charan ES *et al*., 2019). Extension participation farmers had being significant association with farmers' attitude with regard to soil health card at five per cent level could be due to the farmers frequent and active participation in extension activities organized about soil health card may act as strong motivational factor for possessing favourable attitude towards soil health card (Madhu, H.R, *et al.* 2019). Variables like education, land holding, mass media exposure, management orientation, innovativeness, scientific orientation, annual income, farming experience, cosmopoliteness, extension contact, social participation, achievement motivation of farmers had being highly significant association with attitude with regard to soil health card at one per cent level, in this regard literate farmers might have contacted agricultural extension workers to obtain the information on soil health card (importance and benefits to farmers) and have developed favourable attitude towards soil health card; farmers were having more land holding therefore, had a great positivism with regard to soil health card; The mass media exposure such as radio, television, newspaper, magazines *etc*. has been helped the farmers in knowing the various benefits under soil health card. The farmer feels that the soil health card enables them to increase their attitude towards crop planning and was an effective means to increase agricultural production; offers a chance for good management of resources in having a highly significant association exist between management orientation of farmers and had positive with their attitude on soil health card at one per cent level could be due to greater efforts toward excellence farming. Soil health card provide information on balanced use of fertilizers by the farmers with favourable attitude by increasing their income and helping the farmers in managing their farm enterprise. The urge to perform better than others will act as an instrument to acquire and adopt managerial components related to agriculture; innovativeness offers the impetus for working for an excellence could enable the individual excellence in field activities results in developing positivism attitude; developing trustworthiness by scientific methods of agricultural technology by ultimately build up the confidence which act as a catalyst in the rational thinking that lead to its significant influence in developing favourable attitude towards soil health card; developing trustworthiness by scientific methods of agricultural technology by ultimately build up the confidence which act as a catalyst in the rational

thinking that lead to its significant influence in developing favourable attitude towards soil health card; majority of farmers had a favourable attitude as it is easy to follow the information given in the soil health cards and had high farming experience; The probable reason might have interacted with the agricultural extension personnel regarding the procedure of getting benefits under scheme by frequent visit and developed favourable attitude; frequent contacts with agricultural extension functionaries have been helped farmers in knowing the soil health card benefits available to farmers. Therefore, farmers believe that soil health card would help in enhancing crop productivity and income with favourable attitude; most of farmers had a membership in the cooperative society, therefore, naturally it gives opportunities to members to interact in organization to find out ways on use of soil health card, which reflected into existence of favourable attitude relationship, might have possible explanation of this results; To achieve favourable distinction, farmers would have availed benefits of soil health card in the form of reducing input cost by balanced use of chemical fertilizers. The probable reason might be achievement value associated with an individual who drives farmers to excel in farming and therefore, attaining sense of personal accomplishment (Madhu, H.R, *et al*. 2019; Patel, 2005). The association between farmers profile characteristics with their attitude towards soil health card shown in (Table 2 and Figure 2).

4. CONCLUSION

The majority of respondents possessed a favourable attitude about soil health cards and have realized the prominence of soil health and management. Farmers of these blocks need to be studied for the economic benefits of soil health cards and documenting successful case studies. Less than one-third of farmers had a farming experience of 30.00 % and 58.33 % of the respondents belonging to low annual income group. The majority of the farmers (52.50 %) were in more favourable attitude concerning soil health cards. Majority of the farmers (91.66 %) were feeling either from favourable to more favourable with the statement that “I realize that soil health card has essential indicators to understand the chemical properties of the soil”, with their attitude. Variables age and extension participation had a significant association with farmers attitude about soil health card at five per cent level, whereas education, landholding, mass media exposure, management orientation, innovativeness, scientific orientation, annual income, farming experience, cosmopoliteness, extension contact, social participation and achievement motivation of the farmers had a highly significant association with an attitude about soil health card at one per cent level. The chi-square coefficient values of 44.01 between perception and attitude and 29.66 between attitude and use efficiency shown that there exits a significant association between them. Important suggestions offered by the farmers for the effective usage of soil health cards are: Government could organize awareness training programs to farmers about soil health cards (Rank I), to increase the credibility of the soil health card, soil sampling should be done in presence of farmers. (Rank II), the

interpretation of the results on soil health cards need to be made simpler with visual charts (Rank III) and making the availability of recommended inputs in market (Rank IV).

Extension participation and extension contact showed a significant association with the perception, attitude, and use efficiency of farmers. Hence, extension personnel's should plan organising capacity building along with demonstrations on soil samples sampling to utilization of soil health card recommendations by the farmers. Unavailability of bio-fertilizers to adopt recommended combinations and delay in the distribution of soil health cards were expressed as a major constraint. This need to be viewed seriously by making the availability of bio-fertilizers as per recommended combinations by the agricultural department and appropriate actions to be taken for timely distributing of cards and appropriate time to win the confidence of the farmers. These things need to be viewed seriously by making the availability of bio-fertilizers as per recommended combinations by the agricultural department and appropriate actions to be taken for timely distributing of cards and appropriate time to win the confidence of the farmers. 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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Fig. 1: Overall attitude of famers towards Soil Heath Card

Table 1: Item-wise attitude of farmers towards soil health card (n=120)

SI. No.	Items	More favourable		Favourable		Less favourable	
		f	%	f	%	f	%
1	I believe that soil health card is blessing for the farmers to have an idea about soil health.	74	61.66	30	25.00	16	13.34
2	I realize that SHC has essential indicators to understand the chemical properties of the soil.	73	60.83	37	30.83	10	8.34
3	I feel that SHC is not useful for illiterate farmers.	74	61.66	30	25.00	16	13.34
4	I feel that SHC is the best measure to know the soil fertility status of the soil.	77	64.16	15	12.50	28	23.34
5	I recognize that SHC is prerequisite for preparing balanced crop nutrition plan.	73	60.83	18	15.00	29	24.17
6	I recognized that SHC has appropriate recommendations for adopting Integrated Nutrient Management practices.	75	62.50	15	12.50	30	25.00
7	I believe that SHC is useful for checking deficient nutrients, excess nutrients as well as unavailable forms nutrients present in the soil.	76	63.33	20	16.66	24	20.01
8	Following SHC recommendations is an effective preventive measure for managing soil degradation.	69	57.50	22	18.33	29	24.17
9	I believe that excessive crop nutrition cost can be reduced to a greater extent by following SHC information.	79	65.83	17	14.16	24	20.01
10	I trust that SHC essential to get government benefits only and not significant benefits for other farmers.	72	60.00	18	15.00	30	25.00
11	Following SHC recommendations will certainly lead to improving soil health.	77	64.16	18	15.00	25	20.84
12	I feel that there is no need of SHC as farmers themselves are practicing balanced nutrition through other methods.	72	60.00	15	12.50	33	27.50
13	Referring organic matter content in the SHC is the right way to decide the quantity of organic amendments for soil application.	69	57.50	21	17.50	30	25.00
14	Simply issuing of SHCs without interpretation of results & recommendations is of no use for farmers.	78	65.00	12	10.00	30	25.00
15	I feel that the grid sampling method and generation of SHC based on that is an irrelevant method.	74	61.66	19	15.83	27	22.51
16	I feel that SHC can be effective only if the recommendations are followed on regular basis.	63	52.50	23	19.16	34	28.34

f=frequency of Farmers, %=Per cent

Table 2: Association between farmers profile characteristics with their attitude towards soil health card. (n=120)

Sl. No.	Characteristics	$\chi 2$	C-value
1.	Age	06.23 *	0.34
2.	Education	32.38 **	0.61

3.	Annual income	49.35 **	0.53
4.	Land holding	33.81 **	0.35
5.	Farming experience	17.24 **	0.35
6.	Mass media exposure	23.82 **	0.40
7.	Extension contact	17.77 **	0.26
8.	Extension participation	07.18 *	0.23
9.	Social Participation	32.07 **	0.45
10.	Achievement motivation	27.21 **	0.31

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

Figure 2: Association between farmers profile characteristics with their attitude towards soil health card.

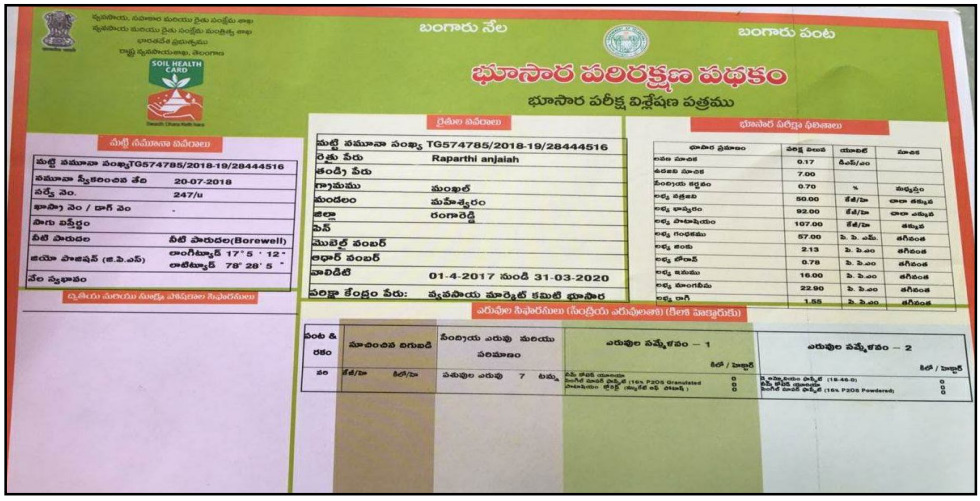

Image 1 Soil Health Card

Image 2 : Interacted with AO and AEO Glimpse of Data Collection using standardized interview schedule