

Knowledge Difficulty Index and Attitude Level of Farmers about Soil Health Card in Mandya District of Karnataka

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ABSTRACT

The present study was carried out during 2018-19 to analyse the knowledge and attitude level of farmers about Soil Health Card (SHC). Out of 120 soil health card holders 60 farmers were selected from each in Mandya and Maddur taluks of Mandya district. The respondents were randomly selected for the study. Data was collected using a pre-tested interview schedule. A large number of the farmers (49.16%) had medium level of overall knowledge regarding SHC, while 27.50 and 23.33 per cent of the farmers had high and low level of overall knowledge regarding SHC, respectively. It was also found that a majority of farmers (80.00%) were having favourable to more favourable attitude towards SHC. Education, achievement motivation, management orientation, scientific orientation, Cosmopolitaness, mass media exposure, risk orientation, extension agency and extension participation of farmers had significant to highly significant association with their knowledge and attitude towards SHC. Around 70 and 72 per cent of the variation in the knowledge and attitude level of farmers respectively It was explained by all the 14 independent variables selected for the research study. Delay in distribution of soil health cards, fertilizers calculations are not given in SHC, difficulty in following the soil test based results, illiteracy of farmers, lack of awareness regarding method of soil sampling and inadequate follow-up by extension agency were the major problems faced by the farmers.

Keywords: Knowledge difficulty index, Attitude, Farmers, Soil Health Card

INTRODUCTION

The impressive growth of consumption of fertilizers in India in the post-green revolution period meaning increase in food grain production from 74.00 million tonnes in 1966-67 to 277.62 million tonnes during 2017-18.

The rate of growth of food production has shown a declining trend in spite of increase in fertilizers consumption during recent times. This may be due to the adverse effect of imbalanced use of fertilizers on food grain production and productivity.

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In India, the current consumption of NPK ratio is 6.7:2.4:1, which is highly skewed towards nitrogen as against ideal ratio of 4:2:1. India was spent nearly seventy thousand crore rupees on fertilizers subsidy every year. According to an estimate subsidy amount was about Rs.5000 per hectare net cropped area and about Rs.5100 per farmer resulting in excessive use of fertilizers, especially NPK at the cost of micro-nutrients and manures (Anonymous, 2017). Hence, there is a need for balanced use of fertilizers and focus on maintenance of soil quality or soil health.

Plants basically require 17 nutrients for proper growth and development. Nitrogen (N), phosphorus (P) and potassium (K) are essential in large quantities (Primary nutrients). Other nutrients, such as calcium (Ca), magnesium (Mg) and sulphur (S) are required in small quantities (Secondary nutrients). Plant nutrients like zinc (Zn), boron (Bo), manganese (Mn), iron (Fe), copper (Cu), molybdenum (Mo), chlorine (Cl) and nickel (Ni) are required in very small quantities (Micronutrients). Farmers will be able to know how much nutrients are already available in the soil and how much will have to be provided additionally for a particular crop through soil testing.

Soil testing programme started in India in the year 1955-56 with the setting up of 16 Soil Testing Laboratories (STLs) under "Determination of Soil Fertility and Fertilizers Use" programme. The central and state governments took many steps to sustain soil health for maximizing crop production. Soil testing programme was implemented through National Mission for Sustainable Agriculture (NMSA) and Rashtriya Krishi Vikas Yojana (RKVY) (Anonymous, 2012). However, no uniform norms were followed in the country for soil analysis and distribution of such information before the issue of Soil health cards. Further, these initiatives were sporadic and random and therefore did not cover all the farmers within a particular time period. These problems can be tackled by imparting appropriate knowledge on soil health management to the farmers. Keeping

this in view, central government had launched the soil health card (SHC) scheme in February 2015 with an aim to promote soil test based application of fertilisers in respect of all the 14 crore holdings in the country and to implement uniform norms in sampling and testing of soil.

The soil health card scheme brings together the scientific community in the field of agriculture, the information repository of latest tool, techniques and cropping practices, the farmers and the government for the economics upliftment of the people at large. Since, change in knowledge preceded acceptance and application of an innovation, it was therefore, always important to find out the factors responsible for positive or negative disposition associated with farmer toward the soil health card. With this background, there is a need to assess the knowledge and attitude of farmers about soil health card.

An earnest attempt has been made in this study to explore the knowledge and attitude level of farmers towards soil health card. This provides a valuable feedback to the government about the effectiveness of soil health card scheme. The results of the study will help the concerned policy makers, researchers and extension agencies to give thought and redesign the extension efforts.

MATERIALS AND METHODS

The study was conducted in Mandya district of Karnataka state during the year 2018-19. Mandya district was purposively chosen for the study as it is significantly distributed highest number of soil health cards to farmers as compare to other districts of the state. Mandya is located at 12.52°N 76.9°E. It has an average elevation of 678 metres (2,224 ft). As of 2011 India census, Mandya had a population of 131,211. Males constitute 51 per cent of the population and females 49 per cent.

Mandya and Maddur talukas were selected among the seven talukas of the Mandya district, based on the highest number of soil health card distributed. The village-wise information relating to soil health card holders were obtained from Department of

Agriculture and ICAR KVK Mandya. The top six villages having the highest number of soil health card holders in Mandya and Maddur taluks were selected from the district for the purpose of the study. 60 respondents were selected from each taluk. Thus, the total sample constituted to 120 farmers.

The dependent variables for the present investigation were chosen based on the available literature and the objectives of the investigation. The variables chosen for the study along with their empirical measurements are presented here under the following heading,

| Variable | Empirical measurement |
|-----------------------------|---|
| Dependent variable | |
| a) Knowledge b) Attitude | Scale developed by Changa with slight modification (2005) Scale developed by Patel with slight modification (2013) |

Dependent variables

Knowledge and attitude were measured as the dependent variables for the study.

a. Knowledge

Knowledge refers to the actual information possessed by a farmer regarding soil health card and measures the knowledge level of the farmers, knowledge test questions and answers were carefully framed in consultation with

scientists from the disciplines Agricultural Extension and Scientists Teachers of UAS (B). The answers obtained from the farmers for the knowledge test were quantified by giving a score of one and zero for correct and wrong answers respectively. The knowledge index was calculated for each respondent with the help of following formula.

$$\text{Knowledge index (K}_i\text{)} = \frac{X_1 + X_2 + \dots + X_n}{N * n} \times 100$$

Where, K_i = Knowledge index

X₁ + X₂ + + X_n = Total number of correct answers i.e. total score

N = Total number of respondents.

n = Total number of items in the Test

Based on arbitrary scaling technique respondents were grouped into three categories as low, medium and high using

mean(22.36) and half standard deviation(1.46) as measure of check.

| Sl. No | Category | Criteria | Score |
|--------|----------|-----------------------------|-----------------|
| 1 | Low | Less than (mean - 0.5*SD) | Less than 20.90 |
| 2 | Medium | In between (mean ± 0.5* SD) | 20.90 to 23.82 |
| 3 | High | More than (mean + 0.5 *SD) | More than 23.82 |

b. Attitude

Attitude refers to the “degree of positive or negative feelings associated with some psychological object”. In the present study, attitude was conceptualized as positive, neutral or negative feelings of farmers towards soil health card. Scale developed by Patel (2013) was used with slight modification to ascertain

the attitude level of farmers towards soil health card. The scale contained 11 statements each measured on three point continuum namely agree, undecided & disagree. The weightages 2, 1 and 0 for each positive statement and 0, 1 and 2 for each negative statement were assigned. The attitude score of respondents was the sum of his/her scores for all the 11

statements pertaining to the attitude towards soil health card. The maximum score respondent got was 22 and the minimum 0. The respondents were classified as having less

favourable, favourable and more favourable attitude using mean(18.59) and half standard deviation(1.13) as the measures of check.

| Category | Criteria | Score |
|-----------------|-------------------------|-----------------|
| Less favourable | Less than (Mean-0.5 SD) | Less than 17.46 |
| Favourable | Between (mean±0.5 SD) | 17.46 to 19.72 |
| More favourable | More than (Mean+0.5 SD) | More than 19.72 |

Calculation of difficulty index (Pi) : The difficulty index of an item was defined as the proportion of respondents giving correct answer to that particular item. This was Calculated by the formula:

$$P_i = \frac{n_i * 100}{N_i}$$

Where, Pi = Difficulty index in percentage of the item.

ni = number of respondents giving correct answer to item.

Ni = Total number of respondents to whom the ith item was administered.

RESULTS AND DISCUSSION

Knowledge level of farmers about Soil Health Card:

Specific knowledge of farmers about soil health card.: It was observed from table 1 that among the 37 knowledge statements, 96.66 per cent of the farmers have knowledge on the statement ‘Which are the major nutrients results of elements of soil are covered in SHC’ and was accorded the first rank. 90.83 per cent of the farmers had knowledge on the statement

‘Which website provides the details about SHC’ and was ranked second. The statement ‘Soil sample has to be collected from’ ranked third by the farmers with 87.50 per cent knowledge. The statements ‘SHC was issued by’ and ‘The acidity and alkalinity of the soil can be known by’ received rank fourth and fifth with 85 per cent and 81.66 per cent knowledge respectively. The reason for the highest knowledge regarding these statements might be the farmers are regular update with newspaper and TV news. It was observed from Table 1 that among the 37 knowledge statements, these five statements have low knowledge on SHC. ‘Only secondary nutrients mentioned in SHC’, ‘In irrigated area soil sample has to be drawn in a grid of’, ‘In rainfed area soil sample has to be drawn in a grid of’, ‘Information must be provided to login to the website on SHC’ and ‘How many parameters of soil were covered in SHC’ with 19.16, 18.33, 15.33, 14.16 and 11.66 per cent respectively. The probable reason was the farmers are not well aware about the features of the soil health card scheme and don’t know much about the secondary and micro nutrients.

Table 1: Knowledge level of farmer beneficiaries about soil health card

| Sl. No | Knowledge items | Knowledge | |
|--------|---|-----------|-----------------------|
| | | Frequency | Difficulty index (Pi) |
| 1 | Ideal time for soil sampling- When there is no standing crop in the field | 76 | 63.33 |
| 2 | Soil sample will drawn by the- staff of state department of agriculture | 55 | 45.83 |
| 3 | Soil sample has to be collected from- Four corners and centre of the field | 105 | 87.50 |
| 4 | In irrigated area, soil samples will be drawn in a | 22 | 18.33 |

| | | | |
|----|---|-----|-------|
| | grid of- 2.5 hectares | | |
| 5 | In rainfed area, soil samples will be drawn in a grid of- 10 hectares | 19 | 15.83 |
| 6 | Soil samples has to be collected from a depth of -15 to 20cm | 95 | 79.16 |
| 7 | The soil sample has to be tested at- Soil testing laboratory of Department of Agriculture/outsourced agency and ICAR institutions including KVKs and SAUs | 87 | 72.50 |
| 8 | SHC scheme was initiated in-2015 | 72 | 60.00 |
| 9 | Soil health card has to be provided for- each of the farmers land holding | 67 | 55.83 |
| 10 | Website that provides details about soil health card is- www.soilhealth.dac.gov.in | 109 | 90.83 |
| 11 | Information required to login soil health card website- name of state | 17 | 14.16 |
| 12 | Soil health card is provided for a cycle of- 3 years | 67 | 55.83 |
| 13 | Parameters of soil covered under SHC- 12 | 14 | 11.66 |
| 14 | The advisory in soil health card contains recommendations on- The dosage of different nutrients needed for the soil | 66 | 55.00 |
| 15 | Major nutrients covered in SHC- Nitrogen, Phosphorous and Potassium | 116 | 96.66 |
| 16 | Only secondary nutrient present in SHC- Sulphar | 23 | 19.16 |
| 17 | Micro nutrients mentioned in SHC- zinc,copper,iron,manganese and boron | 32 | 26.66 |
| 18 | SHC provides information about- pH and EC | 55 | 45.83 |
| 19 | SHC information helps in improving- fertility status and productivity of soil | 84 | 70.00 |
| 20 | From the SHC information, farmers can plan suitable- crop planning and scientific farming | 87 | 72.50 |
| 21 | The acidity and alkalinity of the soil can be known by- Ph | 98 | 81.66 |
| 22 | The pH value for acidic soil ranges between – 4 to 6 | 85 | 70.83 |
| 23 | Organic manure is essential for maintaining- water holding capacity and fertility of soil | 77 | 64.16 |
| 24 | The application of bio fertilizer helps in- Improving the supply of nutrients to plants and promotes root growth and increases the yield | 82 | 68.33 |
| 25 | Lime is used as an amendment for- acidic soil | 90 | 75.00 |
| 26 | Gypsum is used as an amendment for- alkaline soil | 90 | 75.00 |
| 27 | Soil fertility can be maintained by- INM | 92 | 76.66 |
| 28 | Crop yield can be enhanced by- INM | 81 | 67.50 |
| 29 | Application of fertilizers to the field is based on- The recommendation given in soil health card | 56 | 46.66 |
| 30 | SHC scheme is implemented through- Department of agriculture | 36 | 30.00 |
| 31 | Document required for printing SHC in online- sample number | 39 | 32.50 |
| 32 | Under SHC scheme, registration is opened for – entire year | 59 | 49.17 |
| 33 | Waiting period for getting SHC is- 3 months | 40 | 33.33 |
| 34 | SHC is issued by- KVK | 102 | 85.00 |

| | | | |
|----|--|----|-------|
| 35 | Amount charged by KVK for analysis of soil sample- 150Rs | 50 | 41.66 |
| 36 | The main objective of SHC scheme is- to strengthen functioning of STL’s, to diagnose soil fertility related constraints and promote soil test based nutrient management | 72 | 60.00 |
| 37 | Details present in SHC- dosage of fertilizer application to crops | 93 | 77.50 |

Overall knowledge of farmers about Soil Health Card: A bird eye view of Table 2 reveals that 27.50 per cent of the farmers had high level of overall knowledge regarding SHC, while 49.16 and 23.33 per cent of the farmers had medium and low level of overall knowledge regarding SHC, respectively. The probable reason for the majority of farmers having medium level of knowledge could be due to the fact that lack of awareness about soil health. It was observed from the results of the study that, high is difference in the

knowledge level among farmers regarding SHC, hence the null hypothesis set forth for the study ‘There is no difference in the knowledge level of farmers about the SHC’, is rejected.

Knowledge index of farmers about SHC: The average knowledge index (Ki) of the respondent on SHC was found to be 56.53 per cent. This inferred that more than half of the respondents were Knowledgeable on soil health card and its practical usage.

$$\text{Knowledge index (K}_i) = \frac{X_1 + X_2 + \dots + X_n}{N * n} \times 100$$

$$\text{Knowledge index (K}_i) = \frac{2510}{120 \times 37} \times 100$$

$$= 56.53 \%$$

Table 2: Overall knowledge of farmers about SHC.(n=120)

| Sl. No. | Knowledge category | SHC holders | |
|---------|-------------------------------|-------------|----------|
| | | Number | Per cent |
| 1. | Low(< 20.90 score) | 28 | 23.33 |
| 2. | Medium (20.90 to 23.82 score) | 59 | 49.16 |
| 3. | High (> 23.82 score) | 33 | 27.50 |
| Total | | 120 | 100.00 |

Mean= 22.36; Standard deviation= 2.9

Attitude of farmers about SHC

Statement-wise attitude of farmers about SHC: Table 3 depicts the statement wise attitude of the farmers among the 11 attitude statements, the statement ‘SHC is useful to know the physical properties of soil to ensure soil productivity’ obtained an attitude score of 239 and was accorded the first rank. The statement ‘SHC gives a clear idea of which nutrient the soil is lacking’ received a score of

237 and was ranked second. The statement ‘SHC is useful scheme to understand the fertility status of the soil’ obtained an attitude score of 236 and was ranked third by the farmers. ‘SHC is worthy for balanced use of chemical fertilizers’ was ranked fourth with an attitude score of 232. The statement ‘SHC provides information about deficient nutrients as well as excess nutrients’ received an attitude score of 229 and was ranked fifth.

‘SHC scheme is blessing for the farmers’ obtained an attitude score of 220 and was ranked sixth.

The statement ‘SHC is useful to adopt INM practices in the crops’ obtained an attitude score of 202 and was ranked seventh. The statement ‘Excess cost on fertilizers and nutrients can be reduced by SHC information’ received an attitude score of 185 and was ranked eighth. The statement ‘SHC is useful to save input cost for the farmers’ obtained an attitude score of 174 and was ranked ninth.

The remaining two statements, namely, ‘SHC scheme is not useful for illiterate farmers’ and ‘Soil degradation can be reduced from soil test results’ were ranked tenth and eleventh with attitude scores of 166 and 111, respectively.

Large majority of farmers opined that soil health card was useful to understand the physical properties, fertility status of the soil and gives clear idea of which nutrient the soil is lacking. It provides detailed information regarding the status of nutrients in the soil that help farmers in deciding the quantity of nutrients to be applied.

Majority of farmers expressed that SHC is worthy for balanced use of chemical fertilizers. It certainly reduces the burden on the farmers by reducing the input cost.

Farmers opined that information provided in soil health card are appropriate and reliable in reducing excess cost on fertilizers. This depicts the trust that farmers have on soil health card and its recommendations which were based on research.

Table 3: Statement-wise attitude of farmers about SHC (n=120)

| Sl. No. | Attitude statements | Farmers | |
|---------|---|----------------|------|
| | | Attitude score | Rank |
| 1 | I believe that soil health card scheme is blessing for the farmers. | 220 | VI |
| 2 | I realize that SHC is useful to know the physical properties of the soil to ensure soil productivity. | 239 | I |
| 3 | I trust that soil health card is useful to save input cost for the farmers. | 174 | IX |
| 4 | I feel that SHC scheme is not useful for illiterate farmers. | 166 | X |
| 5 | I feel that SHC is useful scheme to understand fertility status of the soil. | 236 | III |
| 6 | I recognized that SHC is worthy for balanced use of chemical fertilizers. | 232 | IV |
| 7 | I recognized that SHC is useful to adopt integrate nutrient management practices in the crops. | 202 | VII |
| 8 | I believe that SHC provides information about deficient nutrients as well as excess nutrients. | 229 | V |
| 9 | I believe that SHC gives a clear idea of which nutrients the soil is lacking. | 237 | II |
| 10 | I believe that Soil degradation can be reduced from soil test results. | 111 | XI |
| 11 | I believe that excess cost on fertilizers and nutrients can be reduced by following SHC information | 185 | VIII |

Overall attitude of farmers about SHC

The data in table 4 shows that more number of farmers (55.83%) had more favourable attitude towards SHC, followed by 24.16 per cent of the farmers were having favourable attitude towards SHC and the remaining 20.00 per cent of the farmers were having less favourable

attitude towards SHC. It could be concluded that a majority of farmers (80.00%) were having favourable to more favourable attitude towards SHC. It may be due to farmers know the importance of soil health card and its impact on production.

Table 4: Overall attitude of farmers about SHC**(n=120)**

| Sl. No. | Attitude category | Farmers | |
|---------|-----------------------------------|---------|----------|
| | | Number | Per cent |
| 1. | Less favourable (< 17.45 score) | 24 | 20.00 |
| 2. | Favourable (17.45 to 19.72 score) | 29 | 24.16 |
| 3. | More favourable (> 19.72 score) | 67 | 55.83 |
| Total | | 120 | 100.00 |

Mean= 18.59; Standard deviation= 2.26

CONCLUSION

Nearly half of the respondents were having medium level of overall knowledge regarding SHC while 27.50 and 23.33 per cent of the respondents had high and low level of overall knowledge regarding SHC, respectively. The Knowledge index (Ki) of the respondents on soil health card indicates that respondents were knowledgeable on soil health card. The study reveals that majority of the SHC beneficiaries were had more favourable attitude towards SHC and have realised the importance of soil health and its management. The above result shows effective implementation of SHC scheme by the development departments mainly Karnataka State Department of Agriculture (KSDA) and promotion by other stakeholders. Participation in extension activities, extent of extension contact, mass media exposure, scientific orientation, management orientation, risk orientation and achievement motivation factors were might influenced to gain more knowledge and attain favourable attitude towards SHC. Hence, the implementation and promotion of SHC scheme need to be continued and strengthened further. It can therefore be said that there is a need to impart the quality practical training for improving their skill and knowledge on soil health management aspects. Extension personnel can be an ideal bridge between development department and SHC beneficiaries for catalytic effect. Through

organisation of awareness programme, scientific attitude can be inculcated among the SHC beneficiaries on soil management aspects. However, easy accessibility of extension personnel (Agricultural Officer) at village level can check the role of quacks and indigenous technical knowledge in treating soil related complex problems.

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