Int.J.Curr.Microbiol.App.Sci (2021) *10*(03): 419-426

International Journal of Current Microbiology and Applied Sciences
***ISSN: 2319-7706* Volume 10 Number 03 (2021)**
Journal homepage: http://www.ijcmas.com

Original Research Article https://doi.org/10.20546/ijcmas.2021.1003.056

Socio Economic Factors Affecting the Use of Soil Health Card in Assam Factors Influencing the Soil Health Card Use in Assam

Parthana Gogoi*, U. Barman, R. K. Sharma and Nivedita Deka

Assam Agricultural University, Jorhat-785013, Assam, India

**Corresponding author*

Keywords

Factors, Soil health card, Adoption, Rice, Assam

Article Info

Accepted:
07 February 2021
Available Online:
10 March 2021

A B S T R A C T

With the rising prominence on sustainable agriculture the interest in soil health is reawakening. Poor quality soils are generally vulnerable to weather variations throughout the growing season and which do not support optimum plant growth. Imbalanced and inappropriate use of chemical fertilizer affects soil fertility, crop yield and thus the income of the farmers. Soil testing plays a very vital role in providing unswerving information about the exact amount of fertilizer dose required by diagnosing the physical, chemical and biological properties of the soils. Department of Agriculture & Co-operation under the Ministry of Agriculture and Farmers' Welfare, Government of India initiated Soil Health Card scheme was in February 2015. In Assam 14, 53,358 no of cards were distributed which accounts to 53.82 per cent of the total 27 lakhs farm families. An attempt was made in this paper to analyse factors affecting the use of Soil Health Card and to explore the problems and prospects associated with the use of Soil Health Card. The study was conducted in Nagaon district of Assam with 80 respondents. The primary data were collected by personal interview method during Feb.-March, 2019.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.

Introduction

Soil is the lifeblood for all crops as it provides all the necessary micro nutrient, macro nutrient and water. Soil is considered to be a dynamic resource whose health determines the productivity of the plant. The functional capacity of a soil to sustain the natural productivity, environmental quality, and promotes plant and animal health within the ecosystem is called soil health (Doran and Parkin, 1994). Healthy soil contains all the elements for growth and development of crop or the soil derived of one or more nutrient

either reduce the production or degraded quality of crops. Therefore, proportion and quantity of macro and micro nutrients altogether refer to the soil health (Patel *et al.*, 2017). The success of green revolution in 1965 which introduced high yielding variety seeds and the efficient use of irrigation and fertilizer to increase the productivity of the crop have resulted in making India self-reliant in terms of food grains. The total demand for food grain by 2021-2022 is expected to be 253 million tonnes (Kumar *et al.,* 2009) and 333 million tonnes in 2050 (The Economic Times, 2015). Hence, the production of food grains should be further increased to feed the growing population whose growth rate is much higher that the production of food grains.

Thus, in a developing country like India with a high rate of population growth new improved technology and the efficient and sustainable use of resources like fertilizer should be used to increase the production of food grain. So, the Department of Agriculture & Co-operation under the Ministry of Agriculture and Farmers' Welfare, Government of India introduced a new scheme with an aim of improving the health of the soil 'The Soil Health Card Scheme' (SHC) on 17 February 2015. It scheme was implemented by all the State's Department of Agriculture and Union Territory Governments. The aims of the scheme it to promote soil test based and even-handed use of fertilisers to enable farmers to get hold of higher yields at lower cost. Also the main objective of the scheme was to test the nutrient of the soil and recommend the correct amount of fertilizer required. The Government had allocated an amount of Rs. 568 crore (US$82 million) for the scheme. In 2016 Union budget of India, has been allocated Rs.100 crore to the states for making soil health cards and set up new soil testing labs (Soil Health Card scheme Wikipedia).

In Assam a total of 834,971 Soil Health Cards were distributed in cycle 1, 618,386 in cycle 2 and a total of 14, 53,358 Soil Health Cards were distributed in Assam out of 27 lakh farm families which shows that 53.82 per cent of the farm families have received the Soil Health Card (2018-2019). The figure thus states that 46.18 per cent of the farm families are still not benefited from Soil Health Card. With these Soil Health Cards, the farmers are now aware and have a scope to apply the fertilizer according to the recommended dose. Winter (Sali) rice is the major crop occupying 66.80 Per cent of the net sown area of Assam. However, the farmers of Assam generally use very less amount of fertilizer in Sali rice. Gogoi (2019) in a study on impact of Soil Health Card on farmers income in Nagaon district of Assam reported that with use of Soil Health Cards, the yield advantage of rice cultivation was found to be 16.07 per cent more over rice cultivation without use of soil health card which may be due to the supply of the right amount of fertilizer need for the growth of the crop. However, the extent of adoption of Soil Health Card was found to be less in the entire state due to various underlying reasons. Therefore, the present attempted to identify and analyse the factors for adoption of Soil Health Card and the problems associated with use of Soil Health Cards in Assam.

Materials and Methods

A multi stage random sampling design was used for selection of respondents for the present study. Nagaon district was purposively selected at the first stage, as the district is agriculturally developed one. In the second stage, four blocks were randomly selected from the district. In the third stage five villages were randomly selected from these four blocks. In the final stage, 40 farmers using Soil Health Card and 40 farmers not using Soil Health Card were

selected from these selected villages resulting in 80 sample respondents. The rice crop considered in the study was winter rice mostly covered by *Ranjit* variety developed at Assam Agricultural University. The selected farmers were categorized into three size groups on the basis of operational holding under cultivation *viz.*, marginal (less than 1 ha), small (1.01-2.00 ha) and medium (2.01- 10.00 ha). No large farmers were found in the selected sample. The distribution and number of selected farmers from different categories according to Soil Health Card user and Soil Health Card non-user are presented in Table 1 For the purpose of collection of primary data and other relevant information, a pre-tested schedule was specially designed.

Factors affecting use of Soil Health Cards

To quantify the relative influence of various factors in the decision of the respondents to use the Soil Health Card, a logistic regression model was used. This study was assumed that the probability of a farmer adopting soil health card (*Yi*) depends on the attributes like age, literacy level of farmers, farm size, occupation, family size, training received, income, rice area, experience in farming and number of extension agent contacts. The index variable Zi (Zi is a dichotomous variable) indicating whether a farmer is using Soil Health Card or not has been expressed as a linear function of the independent variables. The probability of adoption, P, for a given set of values of variables is given by the logit model

$$\ln\left(\frac{P}{1-P}\right) = \beta_{\circ} + \sum_{i=1}^{n} \beta i Xi + u$$

Where, βi's are logit coefficients for the n variables Xi's, and u is the error term.

$$Yi = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10}$$

Where,

Yi= Farmer's adoption to Soil Health Card adoption (1 for adoption and 0 for non adoption); and

X1= Age of the respondents (years)

X2= Literacy level of farmers; 1 if graduate; 0 if otherwise X3= Occupation; 1 if agriculture; 0 if non agriculture

X4= Family size in number X5= Farm size in ha

X6= Rice area in ha

X7 = Training received; 1 if training received; 0 if otherwise

X8 = Income of the farmer; 1 if income greater than 60000; 0 if otherwise (per year) X9= Awareness of the farmer about Soil Health Card; 1 if aware; 0 if otherwise X10= Experience of the farmer; 1 if experience more than 20 years; 0 if otherwise

Further to analyse the problems associated with the use of Soil Health Cards in the study area. Garrett's ranking technique was used. Garrett ranking is applied to rank a set of items or factors as perceived by the sample respondents based on their priority. Garrett and Woodworth (1977) formula was used to convert the order of merit assigned by the respondents into scores.

$$\text{Per cent position} = \frac{100\,(Rij}{Nj}$$

Where, Rij = the rank of the ith item by jth individual and Nj = the number of items ranked by the jth individual.

By referring the Garrett's table, per cent position estimated was converted into score. The mean score was calculated by adding the scores of various respondents given for each factor and then dividing by number of items. The factor with the highest mean score was considered to be the most important constraint. Thus, mean score for each constraint was ranked by arranging them in the descending order.

Results and Discussion

Estimation of the factors influencing adoption of Soil Health Card

Table 2 represents the maximum likelihood estimate of the coefficients of the logit model for the respondents. The logit framework revealed that the probability of a respondent to adopt Soil Health Card was found to be affected by socio-economic characteristics such as age of respondents, literacy level, occupation, farm size, family size, rice area, training, income, awareness and experience of the farmer. The results revealed that education (1.03*), training (4.03***), income (3.56**), awareness (5.34***) and experience (2.77*) in farming were positive and significant indicating that rate of adoption of Soil Health Card was supposed to be higher with increase with the level of education, more numbers of training, higher the income, increase in awareness level and with more experience in farming. Which could be because of the higher education, more number of trainings and awareness about the scheme the farmers are more aware of its benefits of maintain the soil health and increase the productivity of the crop. Occupation and rice area were found to affect the rate of adoption positively, though not significantly. The family size was found to affect the rate of adoption negatively and also significant which revealed that as the size of the family increase the rate of adoption of Soil Health Card decreases, which could be due to higher family expenditure, the capital constrain farmers cannot effort to buy the inputs for the production. The size of holding was found to affect the rate of adoption negatively and also not significantly which revealed that farmers with larger size holding will not adopt the Soil Health Card. Ntshangase (2018) from his study found that the age, education, training, were positive and significant and farm size was found to be negative and significant similar to the present study. Mahendrasinh (2016) in a study conducted that majority of Soil Health Card holders (65.83 per cent) were of middle aged, and most of the farmers were well educated. Majority of the Soil Health Card beneficiary farmers owned medium size land holding (46.67 per cent) and half of the Soil Health Card holders (50 per cent) belonged to high annual income group. Majority of the farmers (70.83 per cent) possessed medium level farming experience (10 to 31 years) and nearly 65 per cent of the farmers were practicing a mixed farming style integrating crops and livestock.

The problems faced by adopters and non adopters

The adopter farmers opined that they received higher yield of rice by use of Soil Health cards and that resulted in higher income. Soil health was supposed to be improved due to balanced use of fertilizer. Yet, they found some problems in proper utilization of Soil Health cards. The results of analysis of problems faced by both Soil Health card users and non-users are presented in Table 3 and Table 4. The problems stated by the farmers during personal interview were ranked by using the Garrett ranking technique, and ranks were given against each problem. Table 3 revealed that among the Soil Health Card user the major problem observed was the difficulty to calculate the required quantity of fertilizers

as per the card ranked I with score 68.10 which may be due to the poor literacy level of the respondents. The second problem observed was no follow up trainings and advice (55.13), lack of capital to purchase fertilizer was also a major problem identified with mean score 52.63.Lack of government subsidy was considered as another problem and ranked IV with 51.38 mean score. Soil Health Card not available in time was a problem faced by farmers (40.85) and ranked V. Recommendation for other crops was also considered as another problem and ranked as VI with mean score (31.92). As the recommendation was only given for rice but the respondents grow many crops and the recommendation was not given for other crops which was also a problem identified. Mukati (2016), Patel *et al.*, (2017) and Dubey (2018) also found similar problem associated with the use of Soil Health Card.

Table.1 Distribution of sample farms according to Soil Health Card user and Soil Health Card non-user

Size Class	No. of Farmers	% to total nos. of farmers	SHC Users	% of SHC User to total	SHC Non User	% of SHC non-User to total
Marginal	29	36.25	14	17.5	15	**18.75**
Small	28	35.00	14	17.5	14	**17.5**
Medium	23	28.75	12	15	11	**13.75**
Total	**80**	**100**	**40**	**50**	**40**	**50**

Table.2 Parameter estimates for logit model

Variables	Coefficients	Standard Error
Constant	−6.77	**3.99**
Age	0.02	**0.06**
Education	1.03*	**0.59**
Occupation	0.13	**1.46**
Family size	−0.89**	**0.40**
Size of holding Ha	−1.30	**1.32**
Rice area	1.51	**1.83**
Training	4.03***	**1.29**
Income	3.56**	**1.69**
Awareness	5.34***	**1.76**
Experience	**2.77***	**1.59**

*Significant at 10 per cent probability level
** Significant at 5 per cent probability level
*** Significant at 1 per cent probability level

Table.3 Problems faced by Soil Health Card user in the study area

Problems	Mean Score	Rank
Difficult to calculate the required quantity of fertilizers as per Soil Health Card	68.1	I
Follow up training and advices	55.13	II
Lack of capital to purchase fertilizers	52.63	III
Lack of government subsidy	51.38	IV
Soil Health Card not available in time	40.85	V
Recommendation for other crops	31.92	VI

Table.4 Problems faced by soil health card non-user in the study area

Problems	Mean Score	Rank
Lack of technical advice on method and time of fertilizers application	63.03	I
Lack of knowledge about Soil Health Card	62.08	II
Lack of training	54.25	III
Lack of trust in the information given on soil health card as collection are not done in the presence of the farmers	46.95	IV
Lack of capital to purchase fertilizers	39.23	V
Soil Health Card are issued in English which makes it difficult to understand	34.48	VI

From the Table 4, it was observed that in case of Soil Health Card non-user, lack of technical advice on method and time of fertilizers application was the major problem identified with mean score 63.03. After the distribution no advices were given and hence the respondents were unaware of the benefits and the proper use of the card. Lack of knowledge about the soil health card was also among one of the major problem ranked as II with mean score 62.08. The respondents were still unaware of the soil health card scheme

and thought that the card will get them some other benefits. Lack of training about the use of the card was ranked III with a mean score 54.25. Because of no training about the use of the card the respondent farmers are unable to understand the doses in the card and use them. Lack of trust in the information given on soil health card as collection are not done in the presence of the farmers was also one of the major problem ranked VI with mean score 46.95. The respondent farmers were unaware of the grid system of sample collection thus when the health card are distributed they don't trust the card as the sample was not collected from their field. Lack of capital to purchase fertilizers was also a major problem identified and ranked V with mean score 39.23. Soil Health Card are issued in English which makes it difficult to understand and read the contents in the card which may be due to the poor literacy rate of the farmer and was ranked as VI with mean score 34.48. Similar problem was also reported by Patel (2013), Grover *et al.,* (2014) who reported that the most important constraint in applying recommended doses of fertilizers as revealed by 69.01 per cent soil test farmers were in 'difficult to understand and follow the recommended doses'.

The present study revealed that with more educated farmer, more training, more awareness, and more experience in farming the adoption of Soil Health Card was found to increase. Difficult to calculate the required quantity of fertilizers as per the card, lack of capital to purchase fertilizer, lack of government subsidy, non-availability of Soil Health Card in time, no recommendation for other crops were some of the problems hampering the Soil Health Card adoption, therefore Government's subsidy on fertilizer should be given and the Soil Health Card should be made available well ahead of time of growing of the crop. Soil Health Card should be given in regional and vernacular language so that the farmers will understand the fertilizer doses properly. Some farmers were not properly aware about the new technology for which awareness and training should be given to the farmers, more extension workers should be appointed for direct contact with the farmers. To meet the increasing demand of ever increasing population it is necessary that farmers go for some innovative alternative which give more profit from the same piece of land. Hence the health of the soil is very important for the better productivity of the crop thus ensuring food security. Thus at this point the soil health card scheme seems very fruitful for maintenance of soil health. The study recommended that both the government and private agencies should work in tandem for capacity building and empowering the farmers for adopting this new technology for increasing production and maintain the soil health. A regular monitoring of the soil health has to be done both by the farmers and the card issuing authority.

References

Doran, J. W. and Parkin, T. B. 1994. Defining and assessing soil quality. *Defining soil quality for a sustainable environment*, (definingsoilqua), pp. 1-21.

Dubey, M. 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. A doctoral dissertation submitted to Indira Gandhi Krishi Vishwavidyalaya, Raipur.

Economic times. 2015 retrieved from, https://economictimes.indiatimes.com/news/economy/agriculture/india-needs-333-mt-grain-production-to-meet-demand-by-2050/articleshow/50033751.cms.

Gogoi, P. 2019. Impact of Soil Health Card on farmers' income in Nagaon district

of Assam. An unpublished M.Sc.(Ag) thesis submitted to Assam Agricultural University, Assam.

Grover, D., Singh, J., Singh, J. and Kumar, S. 2014. Adoption of recommended doses of fertilizers on soil test basis by farmers for Wheat and Rice in Punjab, AERC study no.34. Agro-economic research centre department of economics and sociology, Punjab Agricultural University Ludhiana.

Kumar, P., Joshi, P. K. and Birthal, P. S. 2009. Demand projections for foodgrains in India. *Agricultural Economics Research Review*, 22(347-2016-16842): 237-244.

Mahendrasinh, C. J. 2016. Perception and efficiency of soil health card by the farmers of Navsari district. An unpublished M.Sc. (Ag.) Thesis submitted to Navsari Agricultural University, Gujarat.

Mukati, A. 2016. Farmers' perception regarding soil health card- a study in Tikamgarh district of Madhya Pradesh. An unpublished M.Sc.(Ag) thesis submitted to Jawaharlal Nehru Krishi Vishwavidyalaya, Madhya Pradesh.

Ntshangase, N., Muroyiwa, B. and Sibanda, M. 2018. Farmers' perceptions and factors influencing the adoption of no-till conservation agriculture by small-scale farmers in Zashuke, KwaZulu-Natal Province. *Sustainability*, 10(2): 555.

Patel, G.G., Lakum, Y.C., Mishra, A and Bhatt, J.H. 2017.Awareness and knowledge regarding soil testing and utility perception of Soil Health Card. *Int. J. Curr. Microbiol. App. Sci*. 6(10): 329-334.

Patel, N.G. 2013. Attitude of the farmers towards soil health card programme. An unpublished M.Sc.(Ag) thesis submitted to Anand Agricultural University, Gujarat

Soil Health Card Scheme. 2018, retrieved from, https://en.wikipedia.org/wiki/Soil_Health_Card_Scheme

How to cite this article:

Parthana Gogoi, U. Barman, R. K. Sharma and Nivedita Deka. 2021. Socio Economic Factors Affecting the Use of Soil Health Card in Assam Factors Influencing the Soil Health Card Use in Assam. *Int.J.Curr.Microbiol.App.Sci.* 10(03): 419-426.
doi: https://doi.org/10.20546/ijcmas.2021.1003.056