



Appraisal of Soil Health Card Scheme on Change in Cultivation Practices of Sali Rice in Darrang District, Assam

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Authors' contributions

This work was carried out in collaboration between both authors. Author LR conducted the study and written the manuscript. Author UB have provided guidance in conducting the study and finalizing the manuscript for submission. Both authors read and approved the final manuscript.

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ABSTRACT

The study was conducted during 2017-18 to examine the changes observed in cultivation practices of Sali rice after receiving Soil Health Card (SHC) and for identifying the problems faced by respondents in utilising the SHC recommendations in Darrang district, Assam. A sample of 150 respondents was selected randomly by proportional allocation to size. The result showed that 74.66 per cent of the respondent did not apply the fertilizers as per SHC recommendation. For examining average change in terms of fertilizer application pattern, area and productivity of Sali rice intended for before and after getting SHC, no significant changes have been observed using student's *t*-test at 5% level of significance. Increased in area under Sali rice was not significantly higher than before SHC was distributed. The distribution of SHC didn't bring any changes in cultivation practices of sali rice during 2017-18 at Darrang district. Thus; the study has suggested providing extension support to farmers. Credit linkage through Kisan Credit Card will be helpful in increasing the production of rice and then market linkage may be established. For getting the better result it is necessary to link all the schemes with each other instead of implementing each scheme independently.

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1. INTRODUCTION

Soil is one of the important elements required for farming. Soil health plays a vital role in ensuring sustainable production with optimizing the utilisation of fertilizer. Healthy soil is rich in essential element that helps in proper crop growth and the soil deprived of one or more nutrient lowers the crop yield [1]. So the entire essential element should be made available at required stage. Plants can obtain the essential nutrient from chemical fertilizers as it act as an important source of nutrients [2]. Judicious application of fertilizer is necessary for increasing the foodgrain production. The reason for low crop yield in India is due to repeated cultivation in the same land year after year without providing essential nutrient to soil [3]. Moreover population are increasing day by day and growth rate is more than the foodgrain production so to meet the consumption needs of population it is necessary to increase the rate of foodgrain production from the area already in cultivation. Fertilizer is one of the important components for crop production providing nourishment to the soil as well as crop thereby increasing the production on sustainable basis [4]. During 1991-92, average consumption of fertilizer in India was 69.84 kg/ha which during 2014-15 increased to 128.08 kg/ha [5]. Due to increase in consumption of fertilizer, global shortages of fertilizers occurred as a result of which prices of fertilisers increased in global markets and it led to imbalanced application of different types of chemical fertilizers in India. Imbalanced application of chemical fertilizers in India affects soil fertility, crop productivity and ultimately farmers' net profit [6]. So it is necessary to use judicious amount of chemical fertilizers for achieving maximum production along with maximum profit [7]. Soil testing is one of the important tools as it provides information regarding actual requirement of fertilizer doses thereby helping the farmer in proper use of nutrient. So, government of India has launched Soil Health Card Scheme for promoting soil test based and balanced use of fertilizers. Under the SHC scheme, India has collected 2,53,49,486 number of SHC and after testing 2,49,92,167 samples, India has distributed 10,43,70,551 no. of cards to the farmers till 13th February 2018 (Department of Agriculture, Cooperation and Farmers Welfare) [11]. But the performance of the scheme is not as per targeted. Similarly in case of Assam the productivity potential of soil is

limited leading to low agricultural productivity. So, for increasing production and productivity in the state it is necessary to use judicious amount of fertilizer for proper crop nutrient management and the soil needs to be replenished periodically. Rice plays a major role in the development of the Assam's economy as climatic condition of the state is suitable for rice cultivation. The use of commercial fertilizer in Assam was started during the green revolution and from that period fertilizer like N, P, K was used but the amount use is not same over the years. To improve agricultural productivity of the state about 1.39 lakh cards have been distributed to the farmers till 14th March, 2017 (Press Information Bureau, Government of India, and Ministry Agriculture) [12]. In view of the above, the present study has been designed to find out the changes observed in cultivation practices of Sali rice after receiving SHC and for identifying the problems faced by respondents in utilising the SHC recommendation. The study is based on extent of adoption of Soil Health Card by farmers. However the researcher did not studied the rate of adoption over time period and impact on farmers as even after the two years of distribution of Soil Health Card the extent of adoption was negligible.

2. MATERIALS AND METHODS

The study was conducted in Darrang district of Assam during the period 2017-18. In Darrang district Soil Health Card was distributed during December, 2015 so farmer got the scope to utilise the SHC in Sali paddy for one crop season from June to November as the study was carried out in the second year i.e. 2017-18. Initially 1000 numbers of Soil Health Card's were distributed to 40 villages of the district. So a total of 10 numbers of villages were randomly selected among the 40 villages. The respondents were selected through proportional allocation to size from the 1000 numbers of card holders. Thus, 150 numbers of respondents were selected among the farmer's receiving Soil Health Card to know the changes occurred in cultivation practices of Sali rice by the beneficiaries after receiving SHC and the problems faced by respondents in using Soil Health Cards recommendation. The data were collected through personal interview method with the help of structured schedule and analyzed with the help of appropriate statistical tool like frequency,

percentage, mean, standard deviation, paired “t” test.

3. RESULTS AND DISCUSSION

3.1 Socio-Economic Characteristics of Respondents

Table1 shows that average age of the respondents under study was 44 years. The respondents were belonged to marginal category farm size with average landholding of 0.96 ha. Similarly in case of Darrang the average land holding is 0.95 ha. Most of the respondent was under below poverty line with average annual income of Rs. 54433 and majority of the respondents (65.33%) had gross annual income of Rs. 20000 to Rs.52857. In contrast Patel *et al.*[1] in their study observed that nearly 70 percent of soil test farmers earn between Rs. 50001 to Rs.100000. Average 1.31 number of family member’s were involved in sali rice cultivation and 96.00 per cent of the respondents had 1-3 family members involved in sali rice cultivation. The result was almost similar to Grover *et al.* [8] where they found that in a family two of its members were engaged in agriculture. The respondents had average 30.40 years of experience in sali rice cultivation. Bordoloi and Das [9] in their study at Assam identified that

each respondent had 28.40 years of experience in farming. Regarding awareness about SHC programme 74.67 per cent of the respondent were unaware about the SHC programme before receiving SHC. The reason was due to lack of proper training, publicity, campaign etc regarding the SHC programme by the implementing agency.

3.2 Pattern of Fertilizer Application as per SHC’s Recommendation in Sali Rice

From Table 2, it was observed that 74.66 per cent of the respondents were not applied the fertilizer’s as per SHC recommendation as because most of the respondents were waited for experts for guidance about the pattern of use of SHC recommendation. However experts did not came and due to lack of idea they could not applied the fertilizers as per SHC recommendation. Moreover lack of finance, rainfed condition and flood were other problems due to which respondents couldn’t apply SHC recommendation. The result was similar to the findings of Ramappa *et al.* [2] where they reported that among the soil test farmer 23.00 per cent paddy growers and 11.00 per cent of maize growers adopted the recommended doses of fertilizers.

Table 1. Socioeconomic characteristics of respondents n=150

Character	Percentage	Mean	S.D.
I. Age (Years)		44	8.64
II. Farm size (ha)		0.96	0.54
III. Avg. annual income (Rs.)			
20000-52857	65.33		
52858-85715	21.34		
85716-118572	3.33		
118573-151430	3.33	54433	
151431-184288	2.67		
184289-217146	2.00		
217147-250004	2.00		
IV. Family labours (No.)			
1-3	96.00	1.31	
3-5	2.00		
5-7	2.00		
V. Experience in Sali rice cultivation (years)		30.40	10.49
VI. Awareness about SHC programme			
Aware	25.33		
Not aware	74.67		

Table 2. Distribution of respondents according to pattern of fertilizer application as per SHC's recommendation in sali rice n=150

Particulars	Percentage
Not applied	74.66
Partially applied	18.67
Fully applied	6.67
Total	100

3.3 Changes in Cultivation Practices of Sali Rice after Receiving SHC by the Respondents

Table 3 depicts that in case of changes observed in fertilizer application pattern by respondents after receiving SHC, the difference in application of urea before and after receiving SHC was 0.28 with "t" value 0.95 which was found to be non significant. But in case of SSP there was no difference in fertilizer application pattern as shown by mean value. For DAP the mean difference was found to be 0.23 with "t" value 1.43. From the table it was clear that the changes in application of DAP was not significant even after getting SHC. Similarly in case of MOP also the change in application of MOP in Sali rice was not significant with "t" value 2.48. The reason behind the result was that the farmers of the investigated area did not found the SHC's recommendations reliable and had a perception of knowing about the actual requirement of fertilizer for their paddy land. So it is necessary to take intervention to convince the farmers about SHC based fertilizer recommendation. The result was similar with the study of Fishman *et al.* [10] as they reported that distribution of SHC did not affect the fertilizer application pattern of farmers in the treatment sample. This indicates that farmers do not have confidence in the information contained in SHC.

After receiving the SHC average area under sali rice has increased to 0.92 ha from 0.74 ha and the mean difference in average area before and after receiving SHC was 0.17 with "t" value 2.95. But the changes occurred in the area of sali rice was not significant. It indicated that only distributing SHC had no influence in increased in area of sali rice.

Average change in yield of sali rice is one of the most important factor to analyze the effectiveness of utilisation of SHC recommendation by farmers in sali rice. Table 3 shows that the average yield of sali rice before and after receiving SHC was 33.17 q/ha and 37.68 q/ha respectively with mean difference of 4.51. The changes observed was non significant with "t" value of 11.59. So there was no effect of SHC in the yield of sali rice.

3.4 Problems Associated with Utilisation of Soil Health Card's Recommendation in Sali Rice

Table 4 indicates that 100 per cent of the respondents had perceived the problem of occurrence of regular flood. The half of the investigated area was near Brahmaputra river and in case of other half region most of the areas were under lowland condition due to which the regions had faced regular flood which hinder them from using fertilizer according to the SHC recommendation.

Table 3. Distribution of respondents according to changes in cultivation practices of Sali rice after receiving SHC n=150

Particulars	Before receivig SHC	After receiving SHC	Mean difference	SD	't' value	Probability
Average quantity of fertilizer applied (kg/bigha)						
Urea	10.34	10.62	0.28	3.60	0.95	0.34
SSP	4.26	4.26	0	0		
DAP	5.57	5.81	0.23	1.63	1.43	0.15
MOP	5.94	6.34	0.40	1.92	2.48	0.01
Average area under sali rice (ha)	0.74	0.92	0.17	0.74	2.95	0.004
Avg. yield (q/ha)	33.17	37.68	4.51	4.76	11.59	0.00

Table 4. Distribution of respondents according to problems associated with application of Soil Health Card's recommendation in sali rice

Sl. No.	Problems	Percentage	Rank
1.	Occurrence of regular flood	100	I
2.	Inadequate follow-up by extension agent	96.66	II
3.	Fertilizer as per SHC recommendation was not affordable	86.66	III
4.	Difficult to understand and follow the recommendation	82.00	IV
5.	Lack of government subsidy	80.00	V
6.	Lack of irrigation system	79.33	VI
7.	Soil analysis and fertilizer recommendations was not reliable or compelling	76.66	VII

96.66 per cent of the respondents mentioned that inadequate follow up by extension agent after distribution of SHC was the reason for not using fertilizer according to recommendation as they needed guidance for using soil health card. Chowdary and Theodore [7] in their study identified that inadequate follow-up by extension agency was the foremost constraint expressed by majority of the respondents.

Cost of fertilizer was another problem faced by 86.66 per cent of the respondents as because most of the respondents had poor economic status which hinders them from using fertilizers as per recommendation.

82.00 per cent of the respondent cited the problem as difficult in understanding the content and follow the recommendation as 56.66 per cent of the respondent was unable to read the content of SHC due to the reason that SHC was in English language and also the pattern of recommendation of fertilizers was not understandable to them. The problem found was similar to the findings of Grover *et al.* [8] where they reported that 69.01 percent of the soil test farmers found difficulty in understanding the SHC recommendation.

Lack of government subsidy was one of the major problem perceived by 80 percent respondent because government had distributed SHC without any provision of distributing free fertilizer. Due to poor economic status, respondents wanted free fertilizers so that they can maintain the soil health by using fertilizers as per recommendation.

Another problem faced by 79.33 per cent of the respondent was lack of irrigation system in the investigated area which is one of the essential components for proper utilisation of fertilizer.

76.66 per cent of the respondents did not found the soil analysis and fertilizer recommendations to be reliable or compelling. Fishman *et al.* [10]

also reported that one of the reason for ignorance of SHC by farmer was that they did not found the soil analysis and fertilizer recommendations to be reliable or compelling.

4. CONCLUSION

The distribution of SHC did not bring any changes in the cultivation practices of sali rice in the initial year in Darrang district of Assam. There were no significant changes observed in the pattern of application of fertilizer, area expansion and production. Moreover it was observed that the respondents faced various problems in application of SHC recommendation. Thus, it is necessary to provide extension support to farmers so that they can use fertilizer in judicious amount to enhance the crop productivity. Extension agents should also be trained on SHC recommendation so that they can explain the points in an influencing manner. As the most of the respondents were from the poor economic background, credit linkage through Kisan Credit Card will be helpful in increasing the production of paddy and then market linkage may be established. Instead of implementing all the scheme independently, it is better to link with each other to get a better result.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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