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Impact of soil health card on fertilizer consumption and yield of paddy in Karaikal district for sustainable agriculture

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Abstract

Soil health plays a vital role to ensure sustainable agricultural production. To protect soil health, the Government of India launched Soil Health Card (SHC) Scheme in 19th February 2015. A sample size of 60 farmers of two groups 30 SHC holders and 30 non-holders were randomly selected for the study. Fertilizer use efficiency was estimated through stochastic frontier analysis for card holders and the results revealed that area and Phosphorus (P) were significant variables at 1 and 5 percent level. For non-holders, human labour and Nitrogen (N) were significant at 1 percent level and machine labour was significant at 5 percent level. Technical efficiency was also estimated and reported as 20.65 percent in case of SHC holders and 48.57 percent for non-holders.

Cost of cultivation worked out for card holding farmer (Rs.27171.66/ac) was found to be lesser than the non-holders (Rs.28902.12/ac). But gross income and net returns for card holders were high when compared to non-holders due to proper utilization of fertilizer and other resources. B: C ratio for card holders was 1.14 and for non-holders was 1.06. The constraints were ranked using Garrett ranking technique and difficulty in calculating appropriate fertilizer dose matching the nutrient status of soil was ranked as first by card holders and non-issuance of SHC was reported by non-card holders.

Keywords: soil health card, stochastic frontier analysis, B: C ratio and Garrett ranking

1. Introduction

Testing of soil was an integral part of fertilizer management policy. It was well known that Indian soils have become deficient not only in major nutrients such as Nitrogen (N), Phosphorous (P) and Potassium (K) but also in secondary as well as micro nutrients. Soil analysis reveals its characters and nutritional deficiencies. Therefore, the Soil Health Card scheme was launched by the Government of India on February 19, 2015 with the aim of promoting nutrient management based on soil analysis to increase the efficiency of nutrient use. Under the scheme, the government plans to issue farmers with a soil cards that will provide recommendations of nutrients and fertilizers required for the individual farms to help farmers to improve productivity through prudent use of inputs. Chowdary and Theoder (2016)^[2] resulted that majority of farmers continuously use higher amounts of fertilizers to increase production without knowing the fertility status of the soils of their fields.

2. Study area and samples

The present study was based on primary data collected through a well-structured, pre-tested interview schedule which was employed for the data collection from Soil Health Card holders and non-holders of Karaikal region. For the study, Totally 60 farmers were selected using the multi stage random technique, in which 30 members were SHC holders and the remaining 30 members were non SHC holder. The data were collected from the selected sample respondents for the period of October, 2018.

3. Methodology

Data processing was carried out to convert raw data obtained from primary data into a suitable form for interpretation.

The tools used for analysis of data are:

- 1) Stochastic frontier analysis
- 2) Paired't' test analysis.
- 3) Garrett ranking technique.

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4. Results and Discussion

4.1 The implementation status of Soil Health Card (SHC)

Table 1: Cycle: I & II (2015-16 to 2018-19)

District	No. of Samples collected	No. of Farmers covered	Sample Test Resulted	SHCs printed and issued
Karaikal	2,551	5,006	2,383	4,784

Table 1, indicates the statistics of SHC in Karaikal district. Nearly 5000 farmers of 28 villages were covered in Soil Health Card scheme in which 2551 samples of soil were collected, 2383 samples were tested and SHC was issued to 4784 farmers in Karaikal district.

4.2 The resource (fertilizer) use efficiency and technical efficiency:

From the table 2, Fertilizer use efficiency was estimated through stochastic frontier analysis for SHC holders, area and Phosphorus (P) were significant at 1 and 5 percent level. The gamma value indicates that there were no inefficiencies

obtained by any external factors or any resources. For non-holders, human labour and Nitrogen (N) were significant at 1 percent level and machine labour was significant at the 5 percent level. The gamma value indicates the inefficiency was 97 percent and highly significant and this was due to some use of resources which were under the control of the farmers in the farms.

Technical efficiency was also estimated about 20.65 percent in SHC holders and 48.57 percent in non-holders. The log likelihood value showed large and significantly different from zero, which indicates the good fit and the correctness of the specific distribution assumption.

Table 2: The resource (fertilizer) use efficiency and technical efficiency

Variables	SHC holders (coefficient)	SHC non-holders (coefficient)
Intercept	4.014*(1.755)	3.649*** (0.986)
Area	0.0995**(0.035)	-0.026*(0.012)
Human labour	0.393(0.202)	0.026**(0.063)
Machine labour	-0.576(0.196)	0.157*(0.076)
Manure	0.104(0.145)	-0.007(0.023)
Nitrogen	0.330(0.198)	0.303**(0.099)
Phosphorous	-0.256*(0.103)	-0.013(0.0577)
Others	0.123(0.144)	0.069(0.039)
Sigma sq	0.016*** (0.004)	0.007*** (0.002)
Gamma	0.00004(0.027)	1.000*** (0.006)
Log likelihood value	19.13	48.57
Mean efficiency	0.9933	0.9404

(Note: ** and * indicate significance at 1% and 5% levels respectively)

(Note: Figures in parenthesis indicate standard errors of the respective coefficients.)

4.3 Cost and returns

From the table 3, total cost was estimated for both SHC holders and non-holders where SHC holders cost (Rs.17272.68/ac) were less than SHC non-holders cost (Rs.17710.32/ac). From the table 3, finally concluded that the cost of cultivation for SHC Holders (Rs.27171.66/ac) were less when compare to SHC non-holders (Rs.28902.12/ac).

Gross Income (Rs.31132/ac) and Net Income (Rs.3960.343/ac) was high when compared to SHC non-holders Gross Income (Rs. 30720.67/ac) and net income (Rs.1818.543/ac). For B: C ratio card holders were 1.14 and non-holders were 1.06 (Table 4). Choudan *et al*, (2017) revealed that that soil health card scheme was found highly beneficial to the farmers in term of increasing their income.

Table 3: Cost of cultivation

Particulars	Holders	Non-Holders
Variable cost		
Seed	1098.065	1069.33
Human labour	5111.935	5070
Manure	1325.806	1160
Nitrogen	533.871	618.33
Phosphorus	748.6452	1063.33
Potash	357.1613	358.93
Plant protection chemicals	395.3226	437.67
Irrigation	150	120
Interest on working capital (8%)	777.6645	791.8072
Total variable cost	10498.47	10689.4
Rental value	5067.097	5346
Depreciation	286.96	300.64
Interest on fixed capital (12%)	642.4868	677.5968
Fixed cost	5996.544	6324.237
Total cost	17272.68	17710.32

Table 4: Cost and returns

Cost and Returns		
Particulars	Holders	Non-Holders
Cost of cultivation	27171.66	28902.12
Gross income	31132	30720.67
Net income	3960.343	1818.543
B:C ratio	1.145753	1.065221

4.4 Impact of yield

Table 5: paired “t- test” impact of yield

Parameter	With SHC	Without SHC	T-Test	Probability
Mean	1666	1788	1.692981*	0.050588
Standard Deviation	108169.7	44788.97		
No. Of Observation	30	30		

The yield of paddy was analyzed by paired t-test from which we concluded that there was positive yield difference. The SHC holders were less in yield (1666 kg/ac) when compare to SHC Non-Holders (1788 kg/ac) but significant at 5 percent level (Table 5). The paired ‘t’ test reflected positive and significant effect of Soil Health Card on sugarcane and kharif paddy yield in South Gujarat region (Makadia, *et al.*, 2017) [3].

4.5 Constraints

‘Know about SHC but not issued by government’ was the first and important constraint ranked by SHC non-holders. The following other constraints were No subsidy on inputs required by the government for improving the soil quality, Recommendation was not relevant, not interested to adopt the soil health card and High price of fertilizers were ranked II, III, IV and V respectively by SHC non- hold farmers. (Table 6)

From the table 7, ‘Difficulty in calculating fertilizer dose on the basis of nutrient status of soil’ was the important constraint and ranked first by SHC holders followed by Inability to understand all the information given in the card, Time gap between soil samples taken and issuing cards was too high, Received soil health cards after crop harvest and Not interested to follow the soil health card were II, III, IV and V ranks respectively by SHC hold farmers.

Table 6: Constraints for SHC non-holders

factors	Constraints	Rank
F1	Know about SHC but not issued by government	1
F2	No subsidy on inputs required by the government for improving the soil quality	2
F3	Recommendation was not relevant	3
F4	Not interested to adopt the soil health card	4
F5	High price of fertilizers	5

Table 7: Constraints for SHC holders

Factors	Constraints	Rank
F1	Difficulty in calculating fertilizer dose on the basis of nutrient status of soil.	1
F2	Inability to understand all the information given in the card	2
F3	Time gap between soil samples taken and issuing cards was too high	3
F4	Received soil health cards after crop harvest	4
F5	Not interested to follow the soil health card	5

5. Conclusion

Soil Health Card scheme was useful to farmers because it reduce the cost, over usage of fertilizer and provide a way for sustainable agriculture. Due to few constraints, the farmers were not adopting the scheme, and the major one was difficulty in calculating the fertilizer dosage value and it was due to lack of awareness. It is suggested to periodically update the SHC issued so that the farmers will be aware about of the change in fertility status of their land. It is also necessary to raise awareness among farmers about the spraying, fertigation and drilling method of fertilizer application. The advantages of adoption of soil test recommendations can be disseminated to farmers along with strengthening the provision of extension service delivery in the Union Territory of Puducherry. It is also recommended that the coverage of SHC beneficiaries may be increased every year for the overall development of the farming community and to ensure sustainable food production by promoting eco-friendly practices.

6. Reference

1. Chouhan RS, Sharma D, Rathi HO, Nirajan HK. Impact of Soil Health Card Scheme on Farmers’ Income –A Case Study of Kharif Crops in Madhya Pradesh. *Agricultural Economics Research Review*. 2017;30:139-141.
2. Chowdary K, Theodore RK. Soil Health Card Adoption Behaviour among Beneficiaries of Bhoochetana Project in Andhra Pradesh. *Journal of Extension Education*. 2016;28:1.
3. Makadia JJ, Mistry HH, Kuthe SB. Impact of Soil Health Card on Fertilizer Consumption and Yield of Sugarcane and Kharif Paddy in Gujarat State. *Economic Affairs*. 2017;62(1):61-66.