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RESEARCH PAPER

Study on impact of soil health card based fertilizers recommendation on crop productivity and farmer's income - A case study in Saharsa district of Bihar

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Abstract : Soil is the basic component of agriculture which contains nutrients and provides to plant for proper growth. Due to indiscriminate use of fertilizer the soil health has degraded in recent past. Considering these facts Government of India has launched soil health card scheme on 19th February 2015. Since inception of soil health card scheme in order to increase agricultural production and sustain soil health, a large number of soil heath cards have been distributed to the farmers of Saharsa district of Bihar. In order to assess the impact of soil health card, on production, productivity of maize crop and farmer's income by studying the economics of cultivation of maize crop, the present study was carried out in Sahara district of Bihar. The present work has been comprise of 140 soil tested farmers before and after the application of recommended doses of fertilizer as per soil health card. An interview schedule was prepared for the collection of data from the beneficiaries of soil health card. Data were analyzed using appropriate statistical tools. The data indicated that yield of maize crop increased by 4.12 per cent, after adopting recommendation of soil health card. The net income per acre increased from Rs. 3566 to Rs. 8558 (58.33%) after adoption of recommended doses of fertilizer. The B:C ratio increased by 23.11 per cent after adoption of soil health card. Thus, issue of soil health card to the farmers which carry crop wise recommendation of nutrients and fertilizer required for the individual farm to help farmers to improve productivity and net income. However, there is an urgent need to aware farmers about the importance of soil health card with the help of information technology as well as strengthening of present infrastructure of soil testing laboratories to increase quantity and quality of soil sample testing.

Key Words : Soil health card, Productivity, Income, Sustainability

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INTRODUCTION

Soil is the key to ecosystem function, which support the production of food, forestry products and human health Lal (2009). Healthy soil produce healthy crops that in turns nourish people and animal. In soil properties, soil health plays an important role in agricultural productivity, food quality, environmental resilience and ecosystem sustainability Stevens (2018). Soil health and

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fertility are the basis for sustainable profitability of the farmers all over the world. Further, utilizing optimum doses of fertilizer according to scientific recommendation is the initial step towards sustainable farming. Healthy soil containing all the elements for growth and development of crop and on the other hand soil deprived of one or more elements either reduces production or degrades quality of crops Verma *et al.* (2021). That's why understanding soil health conditions essential to the sustainability and stability of the entire ecosystem and farm land Kumar *et al.* (2019). Non-judicious use of fertilizers, low addition of organic matter and non-replacement of depleted micro and secondary nutrients over the years have resulted in nutrient deficiencies in soil. Knowledge level and adoption of soil fertility management practices are relatively less Chowdary *et al.* (2017). Therefore, in order to grasp and improve soil ecosystem function, soil health under different management system need to be evaluated. Therefore, Government of India started a new scheme of providing soil health card to farmers on 19th February, 2015. The scheme aims at promoting soil test based and balanced use of fertilizers to enable farmers to realise higher level at low cost and also to make them aware about the appropriate amount of nutrients for the concerned crop depending on the quality of soil Veeraiah *et al.* (2019). Soil health card is basically printed report that a farmers is given for all his land holding, which contains the status of soil considering 12 parameters *viz*., organic carbon, electrical conductivity, pH, N, P, K, S, Z, Cu, Mn, Fe and B. the soil card system brings together the scientific community in the field of agriculture, the information repository of latest tools, techniques and cropping practices, the farmers and the government for the economic upliftment of the people at large Patel (2013). So considering all these facts an attempt has made to analyse the impact of soil health card on maize productivity and net income of the farmers of Saharsa district in Bihar.

MATERIAL AND METHODS

Selection of the block:

The study was conducted in Sattar Kataiya block of Saharsa district purposively because this block has the sizable area of maize cultivation and large number of farmers were issued soil health card.

Selection of the village:

Out of 38 village of Sattar Kataiya block, ten village namely; Bara, Barahser, Bela, Gandaul, Makuna, Padampur, Purikh, Rakeapatti, Tuniahi and Sisai were selected on the basis of higher issue of soil health card under maize growers with the help of line department.

Selection of respondent:

Farmers from these village were selected through proportionate random sampling method to make a sample of 140 maize growers. Finally the sample consisted of 140 respondent.

Maize crop was taken to study the impact of soil health card on farmers' income.

Dependable variables:

Impact of soil health card on maize production.

RESULTS AND DISCUSSION

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads :

Yield of maize crop :

A remarkable change in yield of maize crop was registered before and after issue of soil health card in the area under study. On application of recommended dose of fertilizers as per soil health card the yield of maize increased by 4.13 per cent from 8.37 q / acre to 12.5 q / acre (Table 1). This may be due to integrated nutrient management through conjunctive use of both inorganic and organic sources of plant nutrients depicted in soil health card Niranjan *et al.* (2018). The study was supported by Kumar *et al.* (2019) and Bhayal *et al.* (2019).

Table 1: Impact of soil health card based fertilizers recommendation on yield of maize crop

Crop	Average yield (quintal / acre)		% change
	Before issue soil health card	After issue soil health card	
Maize	8.37	12.50	4.13

Variable changes :

The most important changes observed after the application of recommended dose of fertilizer as per soil health card were (i) expenditure of crop production decreases (69.36%) (ii) improvement in soil fertility (62.52%) and (iii) increase in production (57.43%) in

Table 2 : Changes occurred after application of recommended dose of fertilizer as per soil health card (% of farmers)

Change	Most important	Important	Least important	Total
Increase in production	57.43	8.49	34.08	100
Improvement in soil fertility	62.52	10.12	27.36	100
Enhancementof yield attributing character	13.79	68.13	18.08	100
Improvement in grain filling	10.82	59.56	29.62	100
Lower incidence of pest and diseases	10.22	20.22	69.56	100
Expenditure of crop production decreases	69.36	11.12	19.52	100

Table 3 : Impact of soil health card on economics of cultivation of maize crop (Rs. / acre)

Variable	Before getting SHC	After getting SHC	Differences
Total cost	8707	9927	1220 (12.28)
Gross income	12434	18501	6067 (32.79)
Net income	3566	8558	4992 (58.33)
B:C ratio	1.43	1.86	0.43 (23.11)

Figures in the parenthesis show percentage difference

Table 2. The important changes observed were enhancement of yield attributing characters (68.13%) and improvement in grain filling (59.56%) after the adoption of recommendation made in soil health card. Lower incidence of pest and diseases (69.56%) was observed among the least important changes. Similar finding was also reported by Chouhan *et al.* (2017).

Economics of cultivation of maize crop :

The impact of soil health card on the economics of cultivation of maize crop is presented in Table 3. The total cost of cultivation increased by 12.28 per cent from Rs. 8707 to Rs. 9927 per acre. The return per rupees investment also increased from 1.43 to 1.86 after the farmers got their soil health card recommendations. Sharma *et al.* (2015) and Chouhan *et al.* (2017) also confirms the finding of present investigation. Singh (2017) in his study on chickpea farmers in Bemetara and Mungeli district of Chhattisgarh reported an improvement in gross income, average cost of cultivation and benefit cost ratio after the adoption of the recommendations contained in soil health card.

Conclusion :

In the present study it was found that soil health card provides information on nutrient status of soil and provide a recommendation dose of fertilizers according to the need of crop and soil. Soil health card provide corrective measures for improving soil health and for getting better yield of maize crop by reducing extra expenditure which leads to increase in farmer's income.

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