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Utilization of soil health card recommendations in organic manures and soil amendments application

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Abstract
The research study was conducted in Mylavaram and Ibrahimpatnam mandals of Krishna district of Andhra Pradesh to assess the utilization of soil health card recommendations by farmers in soil amendments and organic manures application in paddy, sugarcane, cotton, maize and black gram crops with the sample size of 150 soil health card holders. In organic manure application number of farmers following recommendations increased from first year to second year in all crops. Paired 't' test showed a significant difference in organic fertilizers application at one per cent level of significance in paddy and five per cent level of significance in sugarcane. Majority of farmers applied recommended dosages of soil amendments in paddy, sugarcane and cotton crops. Number of farmers following soil amendment recommendations increased from first year to second year in all crops where there is deficiency. Paired 't' test revealed no significant difference in utilization of soil amendments between first and second year after the distribution of soil health card in all crops.

Keywords: utilization, soil health card, organic manures, soil amendments

Introduction
Soil health and fertility is the basis for sustainable profitability of the farmers. Using optimal doses of fertilizers and cropping pattern as per the scientific recommendation is the first step towards sustainable farming. Soil testing is a science based and time-tested tool for assessment of soil fertility status and for nutrient amendment recommendations. Soil testing, as a tool for judicious fertilizer use, works on the principle of profitability, meaning if all other factors of production are at optimum and none of them limiting, there is all probability to obtain more profitable response to applied nutrients based on soil testing than those applied on adhoc basis. In the view, central government had launched the soil health card 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. Soil health card is a field-specific detailed report of soil fertility status and it contains information on 12 parameters like PH, EC, organic carbon, primary nutrients like N,P,K; secondary nutrients like S; micro nutrients like Zn, B, Fe, Cu & B (Anonymous, 2012) [1]. With this background, there is a need to assess the utilization of soil health card recommendations in organic manure and soil amendments application.

Materials and Methods
The study was an *Ex-post facto* research carried out in Krishna district of Andhra Pradesh. Krishna district consists of 50 mandals and among them, Mylavaram and Ibrahimpatnam mandals were purposively selected and from each mandal five villages were selected based on the criteria of maximum number of soil health cards distributed to the farmers under soil health card scheme. From each village 15 farmers were selected by using simple random sampling to form a sample of 150.
Utilization of Soil health card by farmers was studied taking into consideration quantity of application of organic manures and amendments over successive two years in comparison with recommendations as per soil health card for different crops. The primary data about application of plant nutrients by soil health card holders for 2016 and 2017 was collected by using the schedule developed for the study. Paired't' test for two sample means was used to compare the utilization of soil health card recommendations by farmers in organic fertilizer and soil amendment application.

$$t = \frac{\overline{|d|}}{s/\sqrt{n}}$$

Where, $|\bar{d}|$ = Mean difference, s = Sample variance, n = Sample size

Results and Discussion

Utilization of organic manures by farmers

The data in Table 1 depicted the utilization of organic manures by farmers in kharif paddy, sugarcane, cotton and maize crops in successive two years. Regarding organic manures, 73.33 per cent farmers in first year and 76.00 per cent in second year in case of paddy, 68.57 per cent in first year and 74.29 per cent in second year in sugarcane, 78.94 per cent in first year and 84.21 per cent in second year in cotton, 60.00 per cent in first year and 63.33 per cent in second year in maize applied recommended organic manures. In organic manures application number of farmers following recommendations increased from first year to second year in all crops. Paired't' test (Table 2) showed a significant difference in organic manures application at one per cent level in paddy and five per cent level of significance in sugarcane. Farm yard manure (FYM) being in use traditionally from time immemorial and stands tall as all the farmers know about it. Farmers with good farm resource base have livestock possession. These factors have contributed towards following recommended dose of organic manures.

Table 1: Utilization of organic manures by farmers

Sl. No.	Crops	Extent of utilization	1st year		2nd year	
			f	%	f	%
1.	Paddy (n=150)	Under	31	20.66	28	18.67
		Recommended	110	73.33	114	76.00
		Over	9	6.00	8	5.33
2.	Sugarcane (n=35)	Under	10	28.57	8	22.86
		Recommended	24	68.57	26	74.29
		Over	1	2.86	1	2.86
3.	Cotton (n=38)	Under	8	21.05	6	15.79
		Recommended	30	78.94	32	84.21
		Over	0	0.00	0	0.00
4.	Maize (n=30)	Under	12	40.00	11	36.68
		Recommended	18	60.00	19	63.33
		Over	0	0.00	0	0.00

Table 2: Comparison of organic manures utilization between two successive years

Sl. No.	Crop	Average quantity in tonnes		Paired t - value
		1st year	2nd year	
1.	Paddy (n=150)	1.98	2.65	3.28**
2.	Sugarcane (n=35)	0.53	0.76	1.36*
3.	Cotton (n=33)	0.25	0.30	0.62
4.	Maize (n=30)	0.30	0.35	0.49

** - Significant at 1 per cent
* - Significant at 5 per cent

Utilization of soil amendments by farmers

Utilization of soil amendments by the farmers in paddy, sugarcane, cotton and maize crops in successive two years is presented in Table 3. Gypsum deficiency was noticed in paddy, cotton and sugarcane growing farms of 34.00 per cent, 39.39 per cent and 25.71 per cent farmers respectively. The recommended dosage of gypsum was applied by 64.70 per cent farmers in first year and 70.59 per cent in second year in paddy, 53.84 per cent in first year and 84.61 per cent in second year in cotton, 55.55 per cent in first year and 77.78 per cent in second year in sugarcane. Lime deficiency was found in cotton, paddy and sugarcane fields of 21.21 per cent, 10.67 per cent and 8.57 per cent farmers respectively. The recommended dosage of lime was applied by 57.14 per cent farmers in first year and 85.71 per cent in second year in cotton, 68.75 per cent in first year and 75.00 per cent in second year in paddy and 66.67 per cent in first year and 100.00 per cent in second year in sugarcane. Number of farmers following soil amendment recommendations increased from first year to second year in all crops where there is deficiency. Acidity and alkalinity of the soil makes the micro nutrients like zinc, aluminium, manganese and iron either toxic or deficient which shows direct effect on yield. Liming and gypsum application was essential for the obtaining high yields. The push given by extension agency in the form of subsidized supply of gypsum and lime also contributed towards recommended utilisation. Paired ' t ' test (Table 4) revealed no significant difference in utilization of soil amendments between first and second year after the distribution of soil health card in all crops.

Table 3: Utilization of soil amendments by farmers

Sl. No.	Crop	Soil amendments	Year	Extent of Utilization					
				Under		Recommended		Over	
				f	%	f	%	f	%
1.	K-Paddy (n=150)	Gypsum (n=51)	I	18	35.29	33	64.70	0	0.00
			II	15	29.41	36	70.59	0	0.00
		Lime (n=16)	I	5	31.25	11	68.75	0	0.00
			II	4	25.00	12	75.00	0	0.00

2.	Sugarcane (n=35)	Gypsum (n=9)	I	4	44.44	5	55.55	0	0.00
			II	2	22.22	7	77.78	0	0.00
		Lime (n=3)	I	1	33.33	2	66.67	0	0.00
			II	0	0.00	3	100.00	0	0.00
3.	Cotton (n=33)	Gypsum (n=13)	I	6	46.15	7	53.84	0	0.00
			II	2	15.38	11	84.61	0	0.00
		Lime (n=7)	I	3	42.86	4	57.14	0	0.00
			II	1	14.29	6	85.71	0	0.00
4.	Maize (n=30)	Gypsum (n=1)	I	1	100.00	0	0.00	0	0.00
			II	0	0.00	1	100.00	0	0.00
		Lime (n=0)	I	0	0.00	0	0.00	0	0.00
			II	0	0.00	0	0.00	0	0.00

Table 4: Comparison of soil amendments utilization between two successive years

Sl. No.	Crop	Soil amendments	Average quantity in kilograms		Paired t - value
			1st year	2nd year	
1.	Paddy (n=150)	Gypsum (n=51)	64.00	70.00	2.01
		Lime (n=16)	647.05	667.05	2.12
2.	Sugarcane (n=35)	Gypsum (n=9)	88.88	100	2.31
		Lime (n=3)	666.67	1000	1.42
3.	Cotton (n=33)	Gypsum (n=13)	53.85	84.62	2.18
		Lime (n=7)	428.57	571.43	2.44
4.	Maize (n=30)	Gypsum (n=1)	0.00	0.67	-
		Lime (n=0)	0.00	0.00	-

Summary and Conclusion

It can be concluded that number of farmers applied the organic manures as per recommendation was increased from first year to second year in all crops. Paired‘t’ test showed a significant difference in organic manures application at one per cent level of significance in paddy and five per cent level of significance in sugarcane. Majority of farmers applied recommended dosages of soil amendments in paddy, sugarcane and cotton crops. Number of farmers following soil amendment recommendations increased from first year to second year in all crops where there is deficiency. Paired‘t’ test revealed no significant difference in utilization of soil amendments between first and second year after the distribution of soil health card in all crops. The government have to keep sustained efforts in creating awareness to the farmers about the importance of soil amendments in soil health and yield.

References

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2. www.soilhealth.dac.gov.in