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Unravelling of Farmers' Existing Crop Nutrient Management Practices

N. Hema Sarat Chandra[1]*, Ch Ramulu[2] and G. Swathi[3]

ABSTRACT

Village adoption is a scientifically proven method for effective extension service to the farmers. The extension interventions in the village can be planned by considering the socio economical and agricultural situations prevailed in the village. An attempt was made to understand the existing crop nutrient management practices of the farmers in Seetharampuram village from Warangal Rural district of Telangana which stand selected by Regional Agricultural Research Station, Warangal (PJTSAU) to impart technical advices to the farmers. A semi structured interview schedule was prepared and soil samples were collected to analyse the existing crop nutrient management practices of the farmers. Soil analysis report from 203 samples were randomly collected by covering whole village fields and found that soils were neutral to strong alkaline in reaction (pH-7.0-9.06), non-saline to saline in nature (EC-0.30-2.95 dS/m), low to medium (0.10-0.74%) organic carbon. Nitrogen was low to medium (88-339 kg/ha) phosphorus and potassium were medium to very high at 37-228 kg/ha and 297-1309 kg/ha respectively. Based on the responses from 60 randomly selected farmers in the village and considering soil analysis data, there was lot of discrepancy observed from recommended practices to the practices of farmers. Though crop yields were on par to the expectations but there was a lot of scope to reduce the chemical fertiliser usage and cost of cultivation. It was estimated that, Rs. 8,61,250/- can be saved to the village on soil nutrient management. Interventions towards sustainable agriculture, enhancing technical knowledge to the farmers and counter to depletion of soil nutrients are manifested as a part of technical empowerment in the adopted village.

Keywords: Baseline survey, Micronutrient status, NPK nutrient status, Organic carbon status, Soil nutrient management practices

INTRODUCTION

Village adoption is the most effective way of showcasing the benefit of improved crop production practices through effective transfer of technology within the stipulated period of adoption (Singh, 2015). It is a development engagement undertaken by an academic / researcher or a development professional who aspires to learn from 'practice' and from the unintended mistakes during the course (Ramesh *et al.*, 2014). In India, several Non-Governmental Organizations, Financial institution along with Krishi Vigyan Kendras and ICAR institutes have reported the positive impact of their respective village adoption approaches (Chandra *et al*., 2017). To increase the efficiency of the transfer of technology from the Regional Agricultural Research Station, Warangal of Professor Jayashankar Telangana State Agricultural University adopted a village Seetharampuram of Damera mandal in Warangal. Baseline survey was conducted in order to know the existing socio economic conditions of the villagers and their crop nutrient management practices. As part of this soil sample survey of the village was conducted to diagnose the existing nutritional composition of the village for farming of various crops. Through this

[1,3]Assistant Professor, Department of Agricultural Extension, Agricultural College, (PJTSAU), Warangal-506006, Telangana
[2]Scientist, Department of Soil Science and Agro-Chemicals, RARS (PJTSAU), Warangal-506006, Telangana
*Corresponding author email id: sarathchandra.neelam@gmail.com

paper an attempt has made to unveil the existing crop nutrition management practices along with their socio economic levels.

METHODOLOGY

This is an exploratory research, simple random sampling was employed to select the respondents to unveil their profile and practices. Seetharampuram village has a population of 820 constituting 203 farm families from which 60 farmers were selected as respondents. Semi structured interview schedule was developed for data collection. The selected village has 570 acres of land under cultivation. 203 farm families were considered for soil survey. Hence, 203 soil samples were collected, processed and analysed to manifest existing soil nutritional and other properties. To estimate availability of Nitrogen, Phosphorous and Potassium in the soil Subbaiah & Asija method, Olsen's method and Neutral normal ammonium acetate method were used respectively. To estimate availability of Organic carbon in soil Walkley and Black

Table 2: Existing level of NPK application in the Seetharampuram village (n=60)

Crop	Existing level of application of NPK (kg/Acre)		
	N	P	K
Cotton	99	41	54
Paddy	65	27	33
Maize	70	31	22
Turmeric	45	43	54

Table 1: Existing average crop nutrient management in kg by the farmers of Seetharampuram village (n=60)

CROP	UREA	DAP	MOP	20-20	Average Yield per acre in quintals
Cotton	173.68	78.95	89.47	26.32	11.38
Paddy	112.50	50.00	54.17	20.83	23.94
Maize	105.56	36.11	36.11	72.22	31.94
Turmeric	42.86	64.29	89.29	64.29	9.50

Table 3: Existing soil nutrient status per hectare of Seethrampuram village (n=203)

Soil fertility level	Distribution of Soil samples			
	Organic carbon (%)	Available N (kg/ha)	Available P_2O_5 (kg/ha)	Available K_2O (kg/ha)
Very high	-	-	150	203
High	9	-	40	-
Medium	52	-	11	-
Medium low	100	6	2	-
Low	32	184	-	-
Very low	10	13	-	-

Table 4: Existing Micro nutrient status in the soil of Seethrampuram village (n=203)

Soil fertility level	Distribution of Soil Samples			
	Available Zn (mg/kg)	Available Cu (mg/kg)	Available Fe (mg/kg)	Available Mn (mg/kg)
Adequate	36	202	7	175
Marginal	163	1	13	26
Low	2	0	45	0
Very low	2	0	138	0

method was used whereas to estimate availability of micro nutrients like Zn, Cu, Mn and Fe Diethylene Triamine Penta Acetic Acid (DTPA) method was used.

RESULTS AND DISCUSSION

The responses of randomly selected 60 farmers from the village were analysed. based on the data, crops generally grown in this village were cotton (24.05%), maize (22.78%), turmeric (17.72%), paddy (15.19%), chilli (10.13%) and carrot (7.59%). Banana and water melon were grown to some extent. This village predominantly contained black clay soils (vertisols) and 68.50 per cent of irrigated land. Major (80.00%) source of irrigation was through open wells. Most of the villagers (95.00%) have agriculture as primary source of employment. It could be an opportunity to work with them for their empowerment through agricultural technologies as the young interested farmers with literacy can considerably understand interventions as well as intentions. A serious lacuna observed in this village was insufficient reach of public agricultural extension system. Most of the farmers are (93.33%) frequently seek advice from private input shop-keepers therefore, it could be a serious threat to exploit them with various agrochemicals (may be spurious or non-recommended chemicals) and their recommendations which in turn may threaten the sustainability of arable land. Hence existing practice of fertilizer application of the farmers was identified through survey and represented in Table 1 and the NPK conversion of fertilizers for various crops is represented in Table 2. There was a lot of discrepancy observed with the crop and location specific fertilizer recommendations. Long term and excessive chemical inputs in soil undoubtedly influence the soil microbial communities in terms of their structural and functional diversity as well as the dominant soil species (Prashar and Shah, 2016).

The farmers were almost not accessing the public agricultural extension system and the services of PJTSAU. This might be one of the reasons, for more adoption gap of agricultural technologies like this nutrient management practices. Most of the farmers (81.70%) had no or very little herd size (0 to 1) and this could be the reason for insufficient organic manure. Besides this, none of the farmers were aware of using green manure

Table 5: Discrepancy in use of fertiliser to the recommendation on various crops at Seetharampuram Village

Crop	Existing consumption pattern of NPK (kg) acre			Soil test based recommendation (kg)			Fertilizer saved (kg)			Area (Ac)	Total fertiliser incurred/saved (kg) for total area			Unit cost of nutrients	Total amount incurred/ saved in village
	N	P	K	N	P	K	N	P	K		N	P	K		
Cotton	99	41	54	63	17	17	+36	+24	+37	250	+9000	+6000	+9250	N=13/kg	+6,32,000
Paddy	65	27	33	52	17	17	+13	+10	+16	50	+650	+500	+800	P=55/kg	+51,950
Maize	70	31	22	104	17	14	-34	+14	+8	100	-3400	+1400	+800	K=20/kg	+48,800
Turmeric	45	43	54	90	17	32	-45	+26	+22	100	-4500	+2600	+2200		+1,28,500

Net amount to be saved on nutrient management of the village Seetharampuram = 8,61,250/-

as organic manure. Village soils were neutral to strong alkaline in reaction (pH-7.0-9.06), non saline to saline in nature (Ec-0.30-2.95 dS/m), low to medium (0.10-0.74%) organic carbon. Discrepancy was clearly observed in soil sample analysis, Nitrogen was low to medium (88-339 kg/ha) phosphorus and potassium were medium to very high at 37-228 kg/ha and 297-1309 kg/ha respectively. Per hectare availability of the organic matter and NPK levels is presented in Table 3. It is evident from Table 3 that most of the soil samples were very high at available phosphorous and potassium Due to more phosphorus levels, deficiency of Fe was detected in the soils. Soil samples were tested for Zn, Cu, Fe and Mn and the report witnessed that said micro nutrients were available in the samples 163,1,13 and 26 respectively. They were deficit in 4, 0, 183 and 0 soil samples. The available micro nutrients are presented in the Table 4.

On an average farmers are applying 30 per cent lesser nitrogen than recommended for some crops like maize and turmeric. But the application of phosphorous and potassium were exceeding the recommendation at 30-40 per cent and 10-12 per cent respectively. These observations prove the knowledge gap among the farmers in crop nutrient management. Even though the crop yields are on par to the average yields for the locality, the expenditure on crop nutrient management was on higher side. There is a lot of scope to improve the farmers knowledge on crop nutrient management practices. By manifestation of various extension interventions to improve farmers knowledge it is forecasted that, if farmers follow recommended crop nutrient management practices, rupees 8,61,250 can be saved for the village at fertilizer management.

CONCLUSION

To get consistent yield performance from the crops, farmers were highly depending upon the synthetic fertilizers by applying them at over dosages. By analysing the facts it was revealed that application of the fertilizer at recommended dosages not only reduces the cost of cultivation at farmers end but also supports the soil overall health. Soil analysis data obtained supports the findings of over application of phosphorus, deficiency of Fe occur in the soils. Organic carbon and micronutrient deficit was also found but due to lack of proper knowledge farmers incurring money on fertilizers to get the consistency of yields. Farmers' advisory seeking behaviour was also quite disappointing hence; interventions to enhance technical knowledge to the farmers may be manifested as a part of technical empowerment in the adopted village by Regional Agricultural Research Station, Warangal.

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