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Research Article

IMPACT OF FRONT LINE DEMONSTRATION ON PRODUCTIVITY OF GROUNDNUT IN FARMERS FIELDSOF COASTAL KARNATAKA UDUPI DISTRICT

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Abstract- The Front-Line Demonstration (FLD) of groundnut were conducted in paddy fallows during *rabi* season at 40 farmers' fields in 40 acres to demonstrate production potential and conomic benefit of improved technologies consisting suitable variety (GPBD-4), Recommended dose of Fertilizer (25:50:25 kg NPK/ha), Rhizobium (4 g/kg of seed as seed treatment), Zinc (10 kg/ha) and Boron (4.5 kg/ha) at Udupi district of coastal Karnataka during *rabi* season from 2010 to 2013 (4 years). The improved technologies recorded mean yield of 25.80 q/ha, which was 8.76 per cent higher than that obtained with farmers practices of 23.72 q/ha. Improved technologies gave higher mean net return of Rs. 70,839/ha with a benefit cost ratio of 4.03 as compared to farmers' practices (Rs. 49,822, benefit cost ratio of 3.40).
Keywords- Front Line Demonstration, Groundnut, Yield, Net return and BC ratio.

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Introduction

Groundnut (*Arachis hypogaea*) is a major oilseed crop and is grown throughout the world. It has gained lot of economic and nutritional importance worldwide. It has now been regarded as poor man's cashew and has become a replacement for expensive nuts such as almonds, cashews and pistachio in urban snack.

The major production constraints in coastal sandy soils are mainly the low organic matter, deficiency of macro and micro nutrients and poor nutrient retention property of soil. The poor retention and leaching of nutrients also necessitates for the increased rate of nutrients application in such soil as compared to normal soils. Further, Low organic matter, poor nutrient retention and deficiency of micronutrients are common feature of coastal sandy soil. Zn and B are recognized as key elements in promoting growth, yield and quality of groundnut. These adsorbed ions are released slowly for the benefit of crop during entire growth period. Organic manures improve the organic carbon status, available primary and secondary nutrients and also supply sufficient number of micronutrients in available forms [1,2].

Gujarat is the leading producer contributing 29.63 percent of total production followed by Tamil Nadu (20.78%) Andra Pradesh (15.23%), Rajasthan (8.23%), Maharashtra (8.23%) and Karnataka (7.82%). In Karnataka, normal area under groundnut is 0.86 million hectares with a production of 0.6m tones. About 70 percent of the crop is grown in black soil and the remaining in red soils. Udupi is one of the districts where groundnut is being grown in *rabi* season after the harvest of paddy in *kharif*. As the district area falls under Coastal Zone with assured residual moisture during the cropping season of Groundnut, normal area under groundnut is 1990 hectares with a production of 4012 tones and productivity 2100 kg/ha. About 90 percent of the crop is grown in coastal sandy soil and the remaining in alluvial soil.

GPBD- 4 is an improved Spanish bunch groundnut variety developed at University of Agricultural Sciences, Dharwad, it is popular in Karnataka and Southern states of India [3]. It has a desirable combination of early maturity, high yield, high pod growth rate, desirable pod and kernel features, high oil and protein content, optimum oleic/linoleic acid (O/L) ratio and resistant to late leaf spot and rust.

Material and Methods

Krishi Vigyan Kendra, Brahmavar conducted front line demonstration on production potential and economic benefit of improved technologies consisting suitable variety (GPBD-4), Recommended dose of Fertilizer (25:50:25 kg NPK/ha), Rhizobium (4 g/kg of seed as seed treatment), Zinc (10 kg/ha) and Boron (4.5 kg/ha) during *Rabi* season of four consecutive years from2010-11 to 2013-14 during *rabi* season with total area of 10 ac by involving 10 farmers in each year (0.4 ha for each farmer). 40 demonstrations on groundnut crop in an area of 16 hectares by involving 40 farmers in all the four years of demonstrations were conducted in 2 taluk of Udupi district (Kundapura and Udupi Taluks). Demonstrations were conducted under residual moisture and the soil of demonstration plots ranged from low to medium in nutrient Status. Recommended dose of fertilizer NPK alone with varietyGPBD-4 as a standard check. The yield data was recorded from demonstration and check.

Results and Discussion

The data of front line demonstration presented in [Table-1] showed that application of Zinc (10 kg/ha) and Boron (4.5 kg/ha) along with the recommended dose of Fertilizer (25:50:25 kg NPK/ha) and Rhizobium 4 g/kg (as per Package of Practice recommended by Govt. of Karnataka State) as seed treatment is positively influenced the pod yield (kg/ha) from 24.0 to 27.1 q/ha. The average

yield of groundnut pods was found to be 23.72 q/ha whereas in farmers practice plot it was found to be 20.27 q/ha. There was 17 percent average increase pod yield was attained in demonstration plot pod yield Zinc (10 kg/ha) and Boron (4.5 kg/ha) along with the recommended dose of Fertilizer (25:50:25 kg NPK/ha) and Rhizobium 4 g/kg of seed as seed treatment over farmers practice plot. The increase in pod yield due to the beneficial influence of micronutrients *viz.,* Zn and B through activation of various enzymes and basic metabolic rate in plants, facilitated the synthesis of nucleic acids and hormones, which in turn enhanced the pod yield due to greater availability of nutrients and photosynthates. These results are in agreement with the findings of Helpyati A.S. (2001) and Sumangala B.J.(2003) [4,5]. Application of zinc enhances the plant growth enhancement through auxin and better dry matter production. Zinc improved dry matter production through the nodulation and N fixation by enhanced root growth and by activation of several enzyme systems and auxins. Whereas, boron influenced the nitrogen and carbohydrate metabolism of plants which might have contributed for the better plant growth [6].

Economics of frontline demonstration: The economics of groundnut crop under front line demonstration have been presented in [Table-2]. In demo plot revealed that the average gross expenditure Rs. 22,596 per ha was higher than the farmer's practices Rs. 20,336 per ha by about 11.11 % but, front line demonstrations recorded higher average gross returns (Rs. 93,799/ha) and average net return (Rs. 70,840/ha). The average benefit cost ratio of demonstration plot (4.03) was also more than the farmer's practices (3.40).

By the end of 2013-14 it is fascinating to note that this technology has spread to more than 20 villages extending over an area of 500 acres in the district.

Table-1 *Pooled data on Yield performance of Micronutrient application in groundnut demonstration under FLD programme in Udupi District of Coastal Karnataka*

Year	Name of Black/Village	Technology demonstrated	No. of Demonstration	Area (ha)	Pod Yield (q/ha)			% increase in yield
					Demo (Max)	Average	Check Avg	
2010-11	Saligrama, Udupi Taluk	Variety GPBD-4 RDF:25:50:25 kg NPK/ha, Rhizobium (4 g/kg of seed), Zinc (10 kg/ha) and Boron (4.5 kg/ha)	10	4.0	26.5	23.1	19.5	18.46
2011-12	Kota, Udupi Taluk		10	4.0	27.1	24.5	20.5	19.51
2012-13	Mannuru, Udupi Taluk		10	4.0	24.0	22.5	20.1	11.94
2013-14	Kambadkone, KundapuraTaluk		10	4.0	25.6	24.8	21.0	18.09

Table-2 *Pooled data on Cost economics of Micronutrient Management in groundnut demonstrated under FLD programme in Udupi district*

Year	Demonstration			Control / Check			B:C ratio	
	Cost of cultivation (Rs./ha)	Gross Return (Rs./ha)	Net Return (Rs./ha)	Cost of cultivation (Rs./ha)	Gross Return (Rs./ha)	Net Return (Rs./ha)	Demonstration	Check
2010-11	20,549	62,945	42,395	16,987	47,725	30,011	3.06	2.81
2011-12	23,697	1,04,125	80,428	20,859	78,623	57,766	4.39	3.76
2012-13	23,590	1,03,125	79,535	21,859	75,621	53,746	4.37	3.45
2013-14	24,000	1,05,000	81,000	21,640	79,625	57,766	4.30	3.60

Conclusion

Application of Zinc (10 kg/ha) and Boron (4.5 kg/ha) along with the recommended dose of Fertilizer (25:50:25 kg NPK/ha) and Rhizobium 4 g/kg of seed as seed treatment would be helpful in increase in the productivity of groundnut crop in Costal Karnataka.

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Abbreviations: FLD: Front Line Demonstration.

Conflict of Interest: None declared

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