



## Research Article

# IMPACT OF FRONT LINE DEMONSTRATION ON PRODUCTIVITY OF GROUNDNUT IN FARMERS FIELDS OF SHIVPURI DISTRICT OF MADHYA PRADESH

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**Abstract:** Fifty Front-Line Demonstrations (FLDs) of groundnut were conducted at farmers' fields in 50 acres to demonstrate production potential and economic benefit of improved technologies consisting suitable variety (GG-20), recommended dose of fertilizer (20:60:25:25 kg NPKS/ha), Zypsum 250kg/ha and Rhizobium (5 g/kg of seed as seed treatment) at Shivpuri district of Madhya Pradesh during *kharif* season from 2013-14 to 2016-17 (4 years). The improved technologies recorded mean yield of 22.15 q/ha, which was 28.03 percent higher than that obtained with farmers practices of 17.30 q/ha. Improved technologies gave higher mean net return of Rs. 60500/ha with a benefit cost ratio of 2.79 as compared to farmers' practices (Rs. 44522, benefit cost ratio of 2.48).

**Keywords:** Groundnut, Front Line Demonstration (FLD), Yield, Net return and BC ratio

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## Introduction

Groundnut (*Arachis hypogaea* L.) is an important oilseed crop and is grown throughout the world. It has gained lot of economic and nutritional importance worldwide. It is an alternative for nuts such as almonds, cashews and pistachio for poor in urban snack. The major production constraints in soils of Shivpuri district are mainly the low organic matter, deficiency of macro and micro nutrients and unavailability of high yielding improved variety. The poor soil fertility also necessitates for the increased rate of nutrients application for better yield. Further, low organic matter, poor nutrient availability and deficiency of micronutrients cause to low yield and poor quality. Use of sulphur and zypsum helps in promoting growth, yield and quality of groundnut. Organic manures are important source of organic carbon, available primary and secondary nutrients and sufficient number of micronutrients [1,2]. Madhya Pradesh is an important state producing groundnut after Gujarat, Rajasthan, Tamil Nadu and Andhra Pradesh. In Madhya Pradesh, normal area under groundnut is 201.6 thousand hectares with a production of 301.6 thousand tones giving productivity of 1497kg/ha. Shivpuri district has highest area (41.7 percent) share in Madhya Pradesh and even highest in productivity [3]. It is grown mainly during *kharif* season and is second measure field crop (70000ha) after soybean. GG-20 variety released from Gujarat state has a desirable combination of early maturity, high yield, high pod growth rate and high oil and protein content.

## Material and Methods

Krishi Vigyan Kendra, Shivpuri conducted front line demonstrations for assessment of production potential and economic benefit of improved technologies consisting of suitable variety (GG 20), recommended dose of Fertilizer (20:60:25:25 kg NPKS/ha), Zypsum 250kg/ha and Rhizobium (5 g/kg of seed as seed treatment) during *kharif* season of four consecutive years from 2013 to 2016 during *kharif* season with total area of 50 acre by involving 5 farmers in 2013 and 2014 each year, 15 farmers in 2015 and 25 farmers in 2016 (0.4 ha for each farmer). Demonstrations were conducted in 2 blocks of Shivpuri district (Pohri and Shivpuri blocks).

All demonstrations were conducted under rainfed situations as the crop is grown during *kharif* season and the soil of demonstration plots ranged from low to medium in nutrient status. Recommended dose of fertilizer NPKS along with variety GG 20 was demonstrated against local variety Desi which is late maturing and not suitable for double cropping system. The yield data was recorded on farmers' field from demonstration and check plots.

## Results and Discussion

The data of front-line demonstration presented in [Table-1] showed that application of recommended dose of fertilizer (20:60:25:25 kg NPKS/ha), Zypsum 250kg/ha and Rhizobium (5 g/kg of seed as seed treatment) along with improved variety GG 20 at Shivpuri district positively influenced the pod yield (kg/ha) ranging from 19.01 to 25.50 q/ha. The average yield of groundnut pods was found to be 22.15 q/ha whereas in farmers practice plot it was found to be 17.30 q/ha. There was 28.03 percent average increase in pod yield was attained in demonstration plot over farmers practice plot. The increase in pod yield due to the beneficial influence of macro and micro nutrients provided through zinc sulphate and zypsum which lead to activation of various enzymes and basic metabolic rates in plants. It 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]. Zinc application enhances the plant growth enhancement through auxin and better dry matter production by better nodulation and N fixation. The secondary nutrients calcium and sulfur also play an important role in enhancing production and productivity of groundnut. Sulfur is very crucial for the formation of sulfur containing amino acids and oil synthesis and it also improves both yield and quality of crops [6]. Wiatrak *et al.* [7] indicated that gypsum application may help to increase peanut yields in years with high potential yield by increasing Ca availability in the fruiting zone. They reported that groundnut yields were higher with gypsum application compared to the treatment without gypsum application.

Table-1 Pooled data on Yield performance of Improved variety and RDF application in groundnut demonstration under FLD programme in Shivpuri District of Madhya Pradesh

Year	Technology demonstrated	Name of Block/Village	No. of Demonstrations	Area (ha)	Pod Yield (q/ha)			% increase in yield
					Demo (Max.)	Average	Check ave.	
2013-14	Variety GG-20	Ratore, Piparsama, Karmajkala	05	2.0	30.0	25.5	20.0	27.5
2014-15	RDF:20:60:25:25 kg	Karmajkala, Sirsod, Raja kiMuderi	05	2.0	26.5	23.58	16.98	38.06
2015-16	NPKS/ha, Zypsum 250kg/ha	Sirsod, Ratore, Gopalpur	15	6.0	23.6	19.01	15.4	23.44
2016-17	& Rhizobium (5 g/kg of seed)	Dhauriya	25	10.0	24.0	20.5	16.8	22.02
Total/ Average			50	20	26.03	22.15	17.30	28.03

Table-2 Pooled data on Cost economics of Improved variety and RDF application in groundnut demonstration under FLD programme in Shivpuri District of Madhya Pradesh

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
2013-14	30000	102000	72000	28000	80000	52000	3.40	2.85
2014-15	39618	99036	59418	32430	71316	38886	2.49	2.19
2015-16	41200	97780	56580	35480	80480	45000	2.36	2.26
2016-17	28000	82000	54000	25000	67200	42200	2.90	2.60
Average	34705	95204	60500	30228	74749	44522	2.79	2.48

The economics of groundnut crop under front line demonstration have been presented in [Table-2]. It revealed that in demo plots, average gross expenditure Rs. 34705/- per ha was higher than the farmer's practices Rs. 30228/- per ha by about 14.81 % but, front line demonstrations recorded higher average gross returns (Rs. 95204/- per ha) and average net return (Rs. 60500/- per ha). This is in accordance with Naveen *et al* (2017) [8]. The average benefit cost ratio of demonstration plot (2.79) was also more than the farmer's practices (2.48). This technology spread to more than 30 villages over an area of 300 ha by the end of 2016-17 in the district.

### Conclusion

Application of recommended dose of fertilizer (20:60:25:25 kg NPKS/ha), Zypsum 250kg/ha and Rhizobium (5 g/kg of seed as seed treatment) would be helpful in increasing the productivity of groundnut crop in Shivpuri district of Madhya Pradesh.

**Application of research:** Study of increasing the productivity of groundnut crop in Shivpuri district of Madhya Pradesh.

**Research Category:** Technology extension

**Abbreviations:** FLD: Front Line Demonstrations, BC Ratio: Benefit /Cost Ratio

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**Conflict of Interest:** None declared

**Sample Collection:** Shivpuri district of Madhya Pradesh

**Cultivar/ Variety name:** GG-20- *Arachis hypogaea* L

**Ethical approval:** This article does not contain any studies with human participants or animals performed by any of the authors.

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