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Demonstrating improved production technologies for enhancing groundnut productivity and economic returns

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Abstract

A Front-Line Demonstration (FLD) on Groundnut VRM 10 was conducted at Arasakulam village of Virudhunagar district to assess the performance and economic benefits of the improved variety and recommended production technologies under farmers' field conditions. The demonstration was conducted with 10 farmers covering a total area of 4.0 ha, with each farmer cultivating 0.4 ha. The performance of the improved practice (IP) was compared with the existing farmers' practice (FP). The improved practice recorded an average yield of 1,004 kg/ha, compared with 815 under farmers' practice, resulting in an average yield advantage of approximately 23.2%. The average increase over farmers' practice (IOFP) was 23.4%. The demonstration generated an average net income of Rs.47,843/ha with a favourable BC ratio of 3.14. Among the participating farmers, the highest IOFP of 30.5% was recorded by Raman, while Malaichami obtained the highest net income of Rs.50,201/ha. The results demonstrated the superior performance and economic viability of Groundnut VRM 10 compared with farmers' practice. The technology has good potential for wider dissemination among groundnut-growing farmers in similar agro-ecological conditions of Virudhunagar district.

Keywords: Front line demonstration, groundnut VRI 10, yield, economics

Introduction

Groundnut is an important oilseed crop, and improving productivity through the adoption of improved varieties and recommended production technologies is essential for enhancing farmers' income. Ayyadurai *et al.* (2021) ^[2] reported that cluster frontline demonstrations involving improved varieties, seed treatment, integrated nutrient management and integrated pest and disease management enhanced groundnut productivity compared with farmers' practices. Similarly, Natarajan *et al.* (2024) ^[5] demonstrated the effectiveness of cluster frontline demonstrations in improving groundnut yield and economic returns under farmers' field conditions in Tamil Nadu.

Materials and methods

The Front-Line Demonstration (FLD) on Groundnut VRI 10 was conducted by the Krishi Vigyan Kendra (KVK),

Aruppukottai, in Arasakulam village of Virudhunagar district, Tamil Nadu under farmers' field conditions. A total of 10 farmers were selected for the demonstration, with each farmer covering 0.4 ha, resulting in a total demonstration area of 4.0 ha. The improved variety VRI 10 was demonstrated along with the recommended production technologies, while the existing farmers' practice was maintained as the comparison treatment. The demonstrations were conducted to assess the performance of VRI 10 in terms of yield, yield advantage, net income, benefit-cost ratio and increase over farmers' practice (IOFP). The required critical inputs and technical guidance were provided to the participating farmers by KVK scientists. Regular field visits were undertaken to monitor crop growth and provide need-based technical advice on crop management. At harvest, data on yield under improved practice (IP) and farmers' practice (FP) were collected from individual farmers. Economic parameters

were calculated based on the prevailing input costs and produce prices. The increase over farmers' practice (IOFP) was calculated using the following formula:

$$\text{IOFP (\%)} = [(\text{Yield under IP} - \text{Yield under FP}) / \text{Yield under FP}] \times 100$$

The net income (Rs/ha) was calculated by subtracting the total cost of cultivation from the gross return. The Benefit:Cost (B:C) ratio was calculated as:

$$\text{B:C ratio} = \text{Gross return} / \text{Cost of cultivation}$$

The data obtained from all ten demonstrations were compiled and the mean values were calculated to compare the performance of the improved practice with farmers' practice. The results were used to assess the productivity and economic benefits of adopting VRI 10 and its recommended production technologies under the agro-climatic conditions of Virudhunagar district.

Results and Discussion

In the present Front-Line Demonstration conducted at Arasakulam, Virudhunagar district, Groundnut VRI 10 under improved practice recorded an average yield of 1,004, compared with 815 under farmers' practice, representing an approximately 23.2% yield advantage. The average increase over farmers' practice was 23.4%, with an average net income of Rs.47,843/ha and a B:C ratio of 3.14.

The present findings are in agreement with Ayyadurai *et al.* (2021) ^[2], who reported improved productivity of groundnut through cluster frontline demonstrations involving improved production technologies. Marlabeedu *et al.* (2022) ^[4] also reported that cluster frontline demonstrations significantly improved the adoption of improved groundnut production technologies and enhanced productivity and economic benefits. Similarly, Arunkumar *et al.* (2023) ^[1] observed higher productivity and profitability of groundnut through cluster frontline demonstrations in Karnataka.

The economic advantage observed in the present study is also supported by Mamatha *et al.* (2024) ^[3], who reported the economic importance of frontline demonstrations in improving groundnut production technology and farm returns. Natarajan *et al.* (2024) ^[5] further reported that cluster frontline demonstrations contributed to improved yield and economic sustainability of groundnut production in

Cuddalore district of Tamil Nadu.

Major Findings

- Groundnut VRM 10 performed better than farmers' practice under the agro-climatic conditions of Arasakulam.
- The improved practice recorded an average yield of 1,004, compared with 815 under farmers' practice.
- The improved practice provided an average yield advantage of approximately 23.2% over farmers' practice based on the supplied average yields.
- The recorded average IOFP was 23.4%, indicating a considerable productivity improvement.
- The average net income was Rs.47,843/ha, demonstrating good economic returns.
- The average B:C ratio of 3.14 indicates that adoption of the improved technology was economically beneficial.
- All 10 participating farmers obtained higher yield under the improved practice compared with their respective farmers' practice.
- Raman recorded the highest IOFP of 30.5%, demonstrating the maximum yield advantage.
- Malaichami recorded the highest net income of Rs.50,201/ha and an IP yield of 1,025.

The results indicate good potential for horizontal dissemination of VRM 10 and its recommended production technology among groundnut farmers in similar agro-ecological situations.

Impact of the Demonstration

The demonstration provided farmers with an opportunity to observe the performance of the improved groundnut variety under actual field conditions. The higher yield and favourable economic returns generated confidence among farmers regarding the adoption of improved varieties and recommended production practices. The results also demonstrate that technology-based interventions can improve productivity without requiring farmers to depend solely on their traditional practices. The 23.4% average IOFP and 3.14 B:C ratio provide strong evidence of the potential economic benefit of the demonstrated technology. The successful performance of VRM 10 can therefore be used as a basis for farmer-to-farmer dissemination, field days, method demonstrations and extension programmes in groundnut-growing areas of Virudhunagar district.

Table 1: FLD farmer's details and economic analysis of Groundnut (2024-25)

S No.	Name of Farmer	Village	Dist.	Variety	Crop	Area (ha)	IP Yield (q/ha)	FP Yield (q/ha)	Net Income (Rs/ha)	B:C Ratio	IOFP* (%)
1	Ayyappan	Arasakulam	Virudhunagar	VRM 10	Groundnut	0.4	1010	812	48160	3.14	24.4
2	Malaichami	Arasakulam	Virudhunagar	VRM 10	Groundnut	0.4	1025	825	50201	3.33	24.2
3	Marimuthu	Arasakulam	Virudhunagar	VRM 10	Groundnut	0.4	990	840	46385	3.02	17.9
4	Mani	Arasakulam	Virudhunagar	VRM 10	Groundnut	0.4	995	792	46996	3.07	25.6
5	Vasumathi	Arasakulam	Virudhunagar	VRM 10	Groundnut	0.4	980	785	46650	3.13	24.8
6	Raman	Arasakulam	Virudhunagar	VRM 10	Groundnut	0.4	1026	786	49166	3.17	30.5
7	Pandiarajan	Arasakulam	Virudhunagar	VRM 10	Groundnut	0.4	998	815	47965	3.19	22.5
8	Manikandan	Arasakulam	Virudhunagar	VRM 10	Groundnut	0.4	985	865	46494	3.07	13.9
9	Muthu	Arasakulam	Virudhunagar	VRM 10	Groundnut	0.4	1023	840	48605	3.11	21.8
10	Kalai	Arasakulam	Virudhunagar	VRM 10	Groundnut	0.4	1005	785	47803	3.12	28.0
Total Average							1004	815	47843	3.14	23.4

* Increased Over Farmers Practice

Conclusion

The present FLD demonstrated that the adoption of Groundnut VRI 10 with recommended production technologies resulted in higher productivity and better economic returns than farmers' practice. The findings are consistent with the observations of Ayyadurai *et al.* (2021)^[2], Marlabeedu *et al.* (2022)^[4], Arunkumar *et al.* (2023)^[1], Mamatha *et al.* (2024)^[3], and Natarajan *et al.* (2024)^[5], who established the effectiveness of frontline demonstrations in enhancing groundnut productivity and profitability.

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