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## Assessment of groundnut variety for rainfed tract of southern agro-climatic region in Theni District

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### Abstract

The on-farm trial evaluated different groundnut varieties for pod and haulm yields under rainfed conditions, highlighting their economic viability. TCGS 1694 exhibited superior performance with 61.85% higher pod yield and 48.66% higher total yield compared to local farmer practices (JL 24). Varieties like VRI 10 also showed significant improvements in yield metrics, reflecting their genetic adaptability and disease tolerance, corroborated by previous studies. Moreover, these varieties demonstrated robust haulm yields essential for animal feed, further enhancing their economic appeal with higher gross and net returns. The findings underscored the suitability of these varieties for adoption, driven by market demand for both pods and haulms, making them favorable choices for farmers.

**Keywords:** Assessment, rainfed, yield attributes, groundnut and B:C ratio

### Introduction

Groundnut (*Arachis hypogaea* L.) is also known as peanut and considered the “King of Oilseeds”, is a primary oilseed crop in India and an important oilseed crop found in tropical and subtropical region of the world. Groundnut cultivated in 32.7 m ha area with the production of 53.9 m t in 2021 (ICRISAT, 2023). The leading producer of groundnut in the world are China followed by India. In India groundnut cultivated mainly in kharif season under rainfed condition with minimum quantity of inputs incidence of climatic variance and weed infestation. The major Groundnut growing states are Gujarat, Andhra Pradesh, Tamil Nadu, Karnataka and Rajasthan. Groundnut versatility and adaptability are most important factors making it a reliable crop for farmers across different agro-climatic area. The adaptability enables groundnut to thrive in varying environment condition. About 50% of the world's groundnut crop is used for oil extraction, whereas 35% is used directly for human consumption. The remaining 15% is used for seed and animal feed. Groundnut plays an important role in sustainable agriculture through nitrogen fixation in soils. It improves the soil fertility and making it an ideal rotational crop for enhancing the productivity of subsequent crops. In Tamil Nadu, most of the groundnut was grown under rainfed and irrigated condition in an area of 6.5 lakh ha. In, Theni district most of the area is under the rainfed situation. The ICAR introduce the On Farm Testing for evaluation of location specific technologies to enhance the yield and income of the farmers. The main objective of the trail is newly released varieties, technologies and management practices at farmers field under real farming situation. As farmers were growing different local Groundnut varieties during kharif season registered lower yield and income. Hence the study was planned with the objectives to evaluate improved groundnut with high yield under rainfed condition in kharif season in Theni district through on farm trails and workout the farmers preference based on yield and economics in Theni District.

### Materials and Methods

The field experiment was conducted in the various farmers fields in Theni District, Tamil Nadu during kharif season 2023-2024. The experiment site located at southern agro-climatic region of Tamil Nadu. The average rainfall of the area is 832 mm. the soil type of the trail plot is red sandy loam with low organic carbon (0.19-.039%), available N 248-281 kg/ha, available P 11.2-13.7 kg/ha, available K 157-179 kg/ha.

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The experimental plot was laid out in randomized Block Design and replicated in thrice with following treatments T<sub>1</sub>- VRI 9, T<sub>2</sub>- VRI 10, T<sub>3</sub>- TCGS-1694, T<sub>4</sub>- K1812, T<sub>5</sub>-BSR 2 and T<sub>6</sub>- JL 24 (Farmers practice). There are five improved varieties are used for evaluation of suitable variety along with farmer's practice. The recommended dose of fertilizer and other need-based practices applied as per packages of practices of TNAU (Crop

Production Guide, 2022) <sup>[1]</sup>. Observation on germination percentage, number of pods/plant, pod yield, haulm yield, gross return (Rs/ha), net return (Rs/ha) and BCR were recorded in randomly selected plants. The data on various parameters were subjected to statistical analysis following the method of analysis of variance for the simple randomized block design (Panse and Sukhatme, 1978) <sup>[3]</sup>.

**Table 1:** Characteristics of different varieties selected for on farm trail

Variety Name	Characteristics
VRI 9	Duration of 115 days. The average yield of culture is 2500 kg/ha. The oil content of the culture is 47- 90% with seed viability. It has no in-situ germination of matured pods observed before harvest. It has moderate resistance to late leaf spot and rust besides thrips and leaf hopper.
VRI 10	It is a Spanish bunch shorter duration variety with 95 days. The average yield of culture is 2530 kg/ha. The oil content is 48% with seed viability. It has no in-situ germination of matured pods observed before harvest. It has moderate resistance to late leaf spot and rust besides thrips and leaf hopper.
TCGS-1694	Duration: 105-110 days, Pod yield – 2000-2200 kg/ha, oil content 50%, tolerant to rust and tolerant to drought
K1812	Duration- 112 days, yield – 3100 kg/ha, Oil content – 51%, drought tolerant crop.
BSR 2	Duration-105-110 days, Yield -2222 kg/ha, Oil content- 15%, moderately resistant to leaf spot and rust.

## Results and Discussion

The performance of different Groundnut varieties in growth and

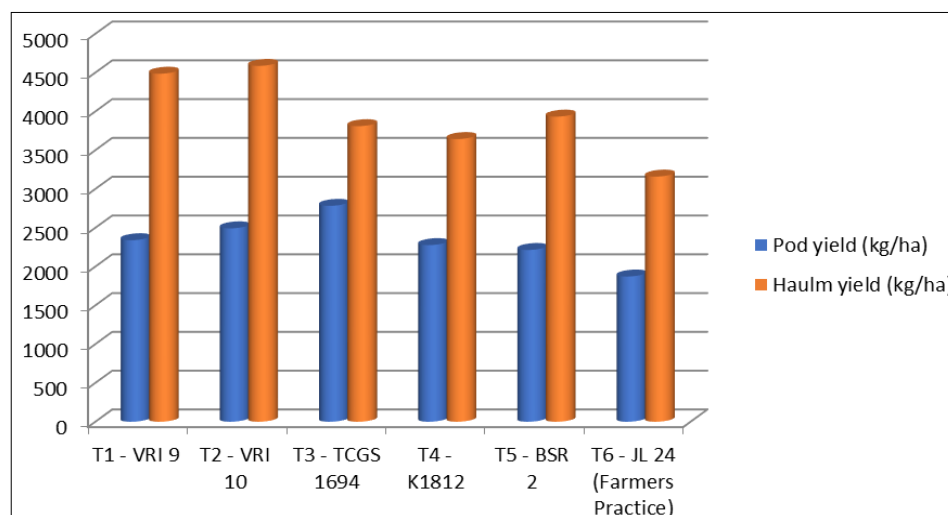
yield attributes under rainfed condition was showed in Table 2.

**Table 2:** Performance of different Groundnut varieties in growth and yield attributes

Variety name	No. of Pods/Plant	No. of filled pods/plant	Root rot incidence (%)	Pod yield (kg/ha)	Haulm yield (kg/ha)
T <sub>1</sub> - VRI 9	35.40	26.66	3.73	2340	4486
T <sub>2</sub> - VRI 10	39.00	28.51	3.16	2493	4587
T <sub>3</sub> - TCGS 1694	43.33	34.20	4.83	2783	3810
T <sub>4</sub> - K1812	44.66	27.00	3.16	2277	3644
T <sub>5</sub> - BSR 2	36.00	26.00	4.06	2214	3933
T <sub>6</sub> - JL 24 (Farmers Practice)	26.66	21.13	7.16	1872	3160
S Ed	1.33	0.90	0.54	57.75	62.24
CD (5%)	2.96	2.02	1.22	128.69	138.69

The on-farm trail revealed that the highest number of filled pods recorded in T<sub>3</sub>- TGCS 1694 (34.20) followed by VRI 10 (28.54). This is 61.85% and 34.92% higher than the farmers practice (T<sub>6</sub>- JL 24). Other Groundnut varieties VRI 9, K1812 and BSR 2 recorded more number of pods per plant 26.17%, 27.78% and 23.04% respectively than the farmer's practices. This was due to the genetic nature, adaptability of this particular location. This result was also agreed with Sahaja deva *et al.* 2023 <sup>[4]</sup> and Ganesan *et al.* 2019 <sup>[2]</sup>. The higher pod yield of 2783 kg/ha recorded in TCGS 1694 followed by VRI 10 (2493 kg/ha) which was 48.66% and 33.17% higher than the farmers practice JL 24

(1872 kg/ha). The other varieties VRI 9 (2340 kg/ha), K 1812 (2277 kg/ha) and BSR 2 (2214 kg/ha) recorded 25.00%, 21.63% and 18.26% higher than farmers practice respectively. The yield of different Groundnut varieties constructed on early growth, low incidence of diseases, adaption in rainfed situation, tolerance to drought and percentage of filled pods. This result was Sahaja deva *et al.* 2023 <sup>[4]</sup> and Ganesan *et al.* 2019 <sup>[2]</sup>. During kharif season incidence of root rot during early stage affects the growth and yield of Groundnut. The TCGS 1694 was shown higher tolerance to root wilt.



**Fig 1:** Performance of different Groundnut varieties in growth and yield attributes

The haulm yield was also important under rainfed situation. the animal feed majorly meets out by farmers from crop source only. The highest haulm yield of 4587 kg/ha was recorded in

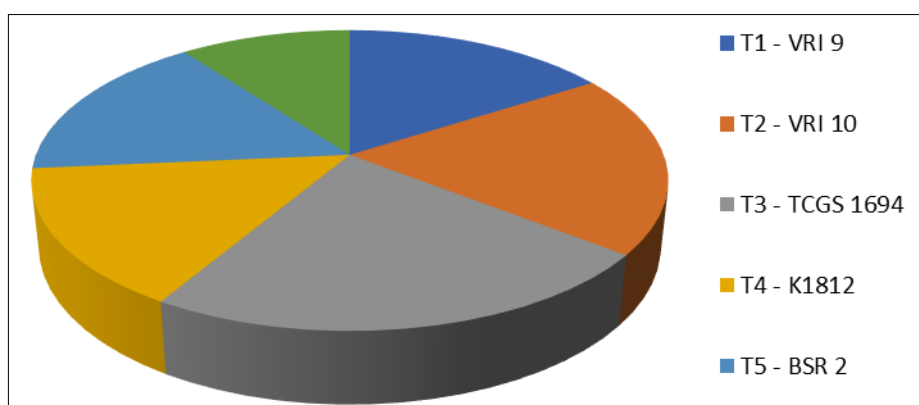
VRI 10 followed by VRI 9 (4486 kg/ha). The other groundnut varieties of TCGS 1694, K 1812 and BSR 2 recorded haulm yield of 3810 kg/ha, 3644kg/ha and 3933 kg/ha respectively.

**Table 3:** Economics of different Groundnut varieties under rainfed condition

Variety name	Cost of Cultivation (Rs. /ha)	Gross income (Rs. /ha)	Net income (Rs. /ha)	BCR	Market preference (pods)
T <sub>1</sub> - VRI 9	41686	102986	61310	2.48	Moderate
T <sub>2</sub> - VRI 10	39283	114523	75294	2.86	High
T <sub>3</sub> - TCGS 1694	39583	128080	88479	3.24	High
T <sub>4</sub> - K1812	38816	96621	57523	2.42	Moderate
T <sub>5</sub> - BSR 2	39523	101666	62231	2.56	High
T <sub>6</sub> - JL 24 (Farmers Practice)	39141	78547	39354	2.04	Moderate

Economics of raising a particular crop or technology plays a vital role in making recommendation for adoption of the

farmers. The data pertaining to gross return, net return and BCR presented in Table 3.



**Fig 2:** Net income (Rs. /ha)

The result revealed that higher Gross return (Rs.128080/ha) and Net return (Rs.88479/ha) recorded in TCGS 1694 followed by VRI 10 (Rs.114523 and Rs.75294). The lowest net income of Rs.39354 was recorded in farmer practice (JL 24). This was due to higher market preference of Groundnut pods in market and haulms preferred by milch animals. The pods of TCGS 1694 and VRI 10 highly preferred by consumers as compared to other varieties. The haulm of VRI 10, VRI 9 and TCGS 1694 highly preferred by the fodder traders as well as milch animal growers. The highest BCR of 3.24 was recorded in TCGS 1694 followed by VRI 10.

## Conclusion

Overall, from the research trail, TCGS 1694 recorded higher more number of filled pods/plant, low incidence of root wilt and higher yield and economics compared to VRI 9, VRI 10, K 1812 and BSR 2 varieties. It Also have higher ability to withstand in rainfed condition. So, it could be considered as a better option for achieving higher productivity and profitability under the rainfed condition of Southern tract of Theni district.

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