Performance of Groundnut Varieties in Kallakurichi district Through Farmer Participatory Mode

Abstract

Field demonstrations were conducted in farmers field of Kallakurichi district during rabi 2020-21 to assess the growth, yield performance and economics of new groundnut varieties under irrigated condition. Three improved groundnut varieties *viz.* TMV14, Dharani (TCGS-1043) and CO 7, and check variety TMV 7 was taken for study. Critical inputs such as Groundnut seed (40 kg farmer^{-1}), seed treatment chemicals, groundnut rich @ 5 kg ha^{-1} and bio inputs were distributed to identified farmers (50 nos) by Krishi Vigyan Kendra, Kallakurichi through ICAR Cluster Front line Demonstration (CFLD) programme. The study revealed that Dharani variety recorded higher number of pods (36/plant), pod yield (2530 kg/ ha), Haulm yield (3890 kg/ ha), higher gross returns of Rs 139150 ha^{-1} and net return of Rs 84900 ha^{-1} with higher benefit ratio of 3.0 followed by CO7 variety with pod yield of 2380 kg/ ha and B:C ratio of 2.84 when compared to TMV 7 and local check. The impact of FLD was also analyzed which showed that there was significant improvement in adoption of new variety, improved technologies, knowledge level and satisfaction on the part of farmers. It concluded that, groundnut varieties Dharani and CO 7 are suitable for cultivation in *rabi/summer* (January-April) season of Kallakurichi district.

Ke y words

Groundnut varieties, Cluster Front line Demonstration (CFLD), Pod yield and Economics

Introduction

Groundnut is the important leguminous cum oilseed crop that is widely cultivated in tropics and sub tropics region of the world. It contains 48-51% of oil and 26-28% of protein, and is a rich source of dietary fiber, minerals and vitamins. Hence, groundnut played an important role in nutritional security to the resource poor farmers. In addition, the haulms provided excellent fodder for livestock, cake obtained after oil extraction was used in animal

feed and overall the crop acted as good source of biological nitrogen fixation (Nautiyal *et al,* 2011). Globally, the crop is raised in 29.5 million hectares with a total production of 48.7 million MT. The average productivity is 1647 kg/ha (FAOSTAT,2019)

Globally, India ranks first in Groundnut acreage and is the second largest producer in the world with 101 lakh tonnes with a productivity of 1816 kg/ha in 2020-21 (agricoop.nic.in). Gujarat, Rajasthan, Tamil Nadu and Andhra Pradesh are the leading producers in the country and accounts for nearly 75% of the total output. Tamil Nadu is one of the leading groundnut producing state with an area, production and yield of 3.35 lakh hectares, 9.11 lakh tons and 2718 kg/hectare, respectively. Groundnut crop is cultivated in all season, but nearly 80 percent acreage and production comes from *kharif* season (June-October).

Groundnut acreage in the country is fluctuating over the years and from the last two decades the area had declined from 83 lakh ha to 47 lakh ha as farmers are shifting from Groundnut to other remunerative crops. Though the groundnut productivity of the state is still the highest among the different groundnut growing states in the country, the groundnut yield realized over the years showed fluctuations because of frequent changes in the rainfall pattern and also owing to long spell of drought experienced during the crop growth period. Low and unstable yields of most oilseed crops, and uncertainty in returns to investment, which result from the continuing cultivation of oilseeds in rainfed, high risk production environments, are the factors leading to this situation of wide demand-supply gap in India.

In Kallakurichi district, Groundnut is grown in 12700 ha with a total production of only 19304 tonnes, and a very poor yield of 1520 kg/ha. The main reasons of such a very poor yield per ha in Kallakurichi district is due to cultivation of low yielding varieties, poor and marginal land, non-adoption of improved farming techniques, and an overall lack of awareness among farmers about improved packages of practices. To overcome the above said problems Krishi Vigyan Kendra, Kallakirichi (Villupuram –II) has laid out cluster front line demonstration (CFLD) programme in farmers field of Kallakirichi district to assess the yield performance of improved Groundnut varieties **t**hrough farmer participatory mode.

Materials and methods

Field demonstrations cum trails were conducted in farmers field during *rabi* 2020-21, to assess the yield performance and economics of new groundnut varieties under irrigated condition with integrated crop management practices. The trial plot size was 0.2 ha area with plant spacing of 30x10 cm followed. Three improved groundnut varieties such as TMV14, Dharani (TCGS-1043), CO 7 and check variety TMV 7 was taken for study (Table 1). The soil was sandy clay loam in texture with pH 7.2. The fertility status of the soil was low, medium and medium in the available N, P_2O_5, and K_2O, the values is 210, 13 and 140 kg ha^{-1} respectively. Critical inputs such as Groundnut seed (40 kg $farmer^{-1}$), seed treatment chemicals (Trichoderma viride), TNAU groundnut rich @ 5 kg ha^{-1} and bio inputs were distributed to identified farmers (50 nos) by Krishi Vigyan Kendra, Kallakurichi through ICAR Cluster Front line Demonstration (CFLD) programme. Demonstration was laid out in farmers field of Nainarpalayam and Kalasamuthiram cluster villages through farmer participatory mode. Training and method demonstration were carried out in farmers field for enriching Groundnut production technologies and effective implementation of demonstrations.

Table 1. Characteristics of varieties selected for demonstration

Name of the variety	**Source**	**Duration (Days)**	**Special features**
TMV14	TNAU, 2018	95 -100	Erect and bunchy plant, 70% shelling, 48 % oil content
Dharani (TCGS-1043)	ANGARU,2013	100-110	Suitable for all season, drought tolerant**,** shelling outturn 75%, oil content 50%
CO 7	TNAU, 2013	100-105	Tolerant to drought, Moderately resistant to rust and late leaf spot, shelling outturn 71%, oil content 51%

The recommended package of practices for groundnut cultivation followed as per TNAU,CPG, 2020. Major weeds found in demonstration fields were *Chloris barbata, Cyperus rotundus* and *Amaranthus viridis* and weed managed by hand weeding at 20 and 45 DAS. Check basin method of irrigation followed in all farmers field. An average of 32 man days was engaged per house hold as employment (Table 2).

Table.2.Agronomic practices and employment generation realised in demonstration

Major weeds found in demo field	Method of weed management	Method & No.of irrigation	Major insect and disease observed	Method of harvesting	Employment generation (man days/house hold)
Chloris barbata,	Hand weeding @ 20 & 45	Check basin	Jassids and stem rot	Manual	32 nos

Cyperus rotundus Amaranthus viridis	DAS	method & 7 nos			

The data on germination per cent, Plant height at harvesting stage, No. of pods/ plant, pod yield, haulm yield and economics of all the varieties were recorded. Farmers feedback also collected to know the field and market performance of new Groundnut varieties.

Results and Discussion

The results of the study revealed that, Dharani (TCGS-1043) variety recorded more germination percent and plant height of 37.5 cm at harvesting stage when compared to other varieties. Higher plant height may be attributed to the variety which tends to germinate and establish early compared to farmer practice varieties with medium and small seeds. Similar increase in plant height with large seeds was also observed by Singh *et al.,* (1998) and Nandania *et al.,* (1992).

Among the three varieties evaluated for their performance under demonstration Dharani registered the highest mean pod number of 36 and dry pod yield of 2530 kg/ha followed by CO7 with pod number of 32 and dry pod yield of 2380 kg/ha. The improved variety Dharani produced 13 and 24 per cent higher yield when compared to TMV 14 and farmers practice variety, respectively (Table 3). Groundnut varieties, CO 7 and TMV 14 recorded 17 and 10 per cent higher pod yield than check variety (TMV 7), respectively. With regard to haulm yield, dharani variety recorded highest haulm yield of 3890 kg/ha as compared to other varieties. The probable reason for higher yield due to genotype character and lesser incidence of pest and disease coupled with higher number of pods/plant resulting higher pod and haulm yield these results were in agreement with the findings of Vindhiyavarman *et al.,* (2010) and Saravanan et al,2018.

Table 3.Yield and economics of Groundnut varieties during rabi 2020-21 under demonstration

Varieties	**TMV 14**	**Dharani**	**CO 7**	**Farmers practice (TMV 7)**
Germination %	84	91	87	78
Plant height at harvesting stage (cm)	31.6	37.5	36	34
No.of pods/plant	28	36	32	25

Pod yield (kg/ha)	2240	2530	2380	2035
Haulm yield (kg/ha)	3360	3890	3570	3060
Gross return (Rs/ha)	123200	139150	130900	111925
Net return (Rs/ha)	78200	93150	84900	66950
B: C ratio	2.67	3.0	2.84	2.48

Economic analysis of the yield performance revealed that improved Dharani variety recorded higher gross returns of Rs 139150 ha^{-1} and net return of Rs 93150 ha^{-1} with higher benefit ratio of 3.0 as compared to other varieties and local checks. Groundnut variety CO7 observed net return of Rs 84900 ha^{-1} with benefit ratio of 2.84. Farmers perception and feedback about the variety was higher yield, attractive pods, higher market price, suitability to existing farming situation, more affordability and farmers are satisfied about this variety (Table 4).

Table 4.Farmer's Perception Parameters of Groundnut varieties

Farmer's Perception Parameters (scientists observation)						
Variety	**Suitability to the existing farming system (Y/N)**	**Likings (Varietal ranking)**	**Affordability (%)**	**Any Negative Effect (Y/N)**	**Level of Technology Acceptance (%)**	**Suggestions, for Change/Improvement, If any**
TMV 14	Yes	III Rank	72	No	76	Small size pod and kernal
Dharani	Yes	I Rank	80	No	85	Nil
CO 7	Yes	II Rank	75	No	80	Nil

Conclusion

It concluded that, groundnut varieties Dharani and CO 7 are suitable for cultivation in *rabi/summer* (January-April) season of Kallakurichi district. The impact of FLD was also analyzed which showed that there was significant improvement in adoption of new varieties, improved technologies, knowledge level and satisfaction on the part of farmers. Hence, this new varieties Dharani and CO 7 are recommended for large scale cultivation in Kallakurichi district..

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