



Performance of Drought Tolerant Groundnut Variety in Chittoor District of Andhra Pradesh

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ABSTRACT

The western mandals of Chittoor district in Andhra Pradesh are prone to frequent drought marked by deficit and late onset of rainfall and also prolonged dry spells impacting productivity of groundnut (*Arachis hypogaea L.*). To build resilience into the system and to mitigate impact of drought on productivity, 40 demonstrations were conducted using drought tolerant groundnut variety Dharani under National Innovations on Climate Resilient Agriculture (NICRA) by RASS - KVK, Chittoor during 2015-18. The results revealed that about 16 per cent higher pod yield was recorded with Dharani variety (1796 kg/ha) compared to the Kadiri-6 (1551 kg/ha). Dharani recorded higher number of pods per plant (17.5) and uniform maturity of pods than Kadiri-6 (14.8). The average net returns (Rs.34890/-ha) and BC ratio (1.76) were also higher in case of Dharani when compared to Kadiri-6 (Rs.25226/-ha and 1.57). Efforts are on by the KVK to scale out this success story to other blocks of the district with similar climatic vulnerability through participatory seed production by farmers and trying to forge converge with the seed chain of the district.

Key Words: Dharani, Demonstrations, Groundnut, Net Returns, NICRA, Yield.

INTRODUCTION

Groundnut (*Arachis hypogaea L.*) is grown in an area of 4.56mha with an average yield of 1486kg/ha (Anonymous, 2016). Eighty percent of the groundnut area and 84% of the production in India is confined to the states of Gujarat, Andhra Pradesh, Tamil Nadu, Karnataka and Maharashtra. In Andhra Pradesh groundnut is grown in area of 9.31 lakh ha during *Kharif* with a production of 3.91 lakh tonnes and a productivity of 419kg/ha. In Chittoor district it is grown in an area of 1.33 lakh ha with a production of 0.72 lakh tonnes and with an average yield of 540kg/ha (Anonymous, 2017). Climate change and increasing climatic vulnerabilities on agriculture could result in problems with food and nutritional security and may threaten the livelihood activities upon which much of the population depends, especially small and marginal farmers. The impacts

of climate change are global, but countries like India are more vulnerable in view of the high population depending on agriculture. Promoting suitable and appropriate adaptation strategies will enable farmer to cope with climatic risks, efficient use of natural resources to bring sustainable crop production.

Groundnut productivity in India is low due to moisture stress, poor soil fertility, pests and diseases, and cultivation of the crop on marginal and sub marginal lands. Nearly 80% of the groundnut area in India is under rainfed and relies entirely on monsoon rainfall. The rainfall in most of the groundnut-growing regions is low and erratic. There is a high variability in the onset of monsoons, annual rainfall and distribution of rainfall over the growing season. Moreover, such high variability in precipitation is generally associated with a high probability of an early season drought. The western

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Table 1. Yield particulars of Dharani groundnut variety.

Year	Plant Height (cm)		No of pods/plant		Pod Yield (Kg/ha)		Haulm Yield (Kg/ha)	
	K-6	Dharani	K-6	Dharani	K-6	Dharani	K-6	Dharani
2015	44.3	41.2	14.2	15.1	1396	1630	3675	2650
2016	42.8	39.6	15.3	17.4	1665	1850	4382	3007
2017	46.5	42.3	16.1	18.5	1715	1930	4513	3137
2018	47.2	44.3	13.8	19.2	1428	1774	4150	3300
Average	45.2	41.8	14.8	17.5	1551	1796	4180	3024

mandals of Chittoor district in Andhra Pradesh are prone to frequent drought marked by deficit and late onset of rainfall and also prolonged dry spells impacting productivity of groundnut. In addition to above, lack of improved and high yielding varieties in sufficient quantity is the problem faced by the farmers in the district. Farmers generally grow Kadiri-6 variety which is of low yielding and susceptible to drought and bud necrosis. Hence the present study was undertaken to evaluate drought tolerant Dharani groundnut variety in vulnerable cluster villages of Chittoor district, Andhra Pradesh.

MATERIALS AND METHODS

To build resilience into the system and to mitigate impact of drought on productivity, 40 demonstrations were conducted using drought tolerant groundnut variety Dharani by Rashtriya Seva Samithi (RASS) - Krishi Vigyan Kendra (KVK), Chittoor during Kharif 2015-18 in villages, Chittecherla and Deendarlapalli of Chinnagottigallu mandal, Chittoor district, Andhra Pradesh. The farming situation is rainfed, soils are red sandy in texture, neutral in reaction (pH 7.3), Electrical Conductivity (EC) is normal (0.38 milli mhos per cm), low in organic carbon (0.38%) and available nitrogen (160kg per ha), medium in available P₂O₅ (57kg per ha) and low in available Potassium (240 kg per ha). The package of practices *viz.*, seed treatment, nutrient management, weed management, pest and disease management were followed in the demonstration as per ANGRAU recommendations. The data on plant height, number of pods per plant,

pod yield, haulm yield, cost of cultivation, gross returns, net returns and BC ratio were recorded from all the demonstrations at the time of harvest. The variety used in the demonstration was Dharani released in 2013, 100-105 days duration, moderate stature, pod yield is 1600-2600kg/ha in kharif, 100 seed weight is 40.43g, drought tolerant withstands up to 35 days dry spell, uniform maturity, and in the farmers practice it was Kadiri-6 (K-6). It is semi spreading type, 105-110 days duration and yield potential is 2000-2200kg/ha during *kharif*. The results of the study were analyzed statistically using independent t-test and Repeated Measures mixed ANOVA.

RESULTS AND DISCUSSION

The results (Table 1) revealed that the average plant height was found to be 41.8cm in Dharani and it was 45.2cm in the case of Kadiri-6. The average number pods per plant were more with 'Dharani' (17.5) when compared to Kadiri-6 (14.8). It might be due to better translocation of photosynthates from source to sink which resulted in more number of pods. Similar results reported by Umadevi *et al* (2018) and Bhagavata Priya (2014). The average yield of Dharani variety (1796kg/ha) was more when compared to Kadiri-6 variety (1551kg/ha). About 15.8% increase in yield was observed in Dharani variety when compared to Kadiri-6 variety. This might be due to more number of pods due to better translocation of photosynthates from source to sink. Bhagavatha Priya *et al* (2016) also reported that highest pod yield was recorded by Dharani variety followed by TAG-24, Kadiri-6 and

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Table 2. Economics of Dharani groundnut variety.

Year	Cost of Cultivation (Rs/ha)		Gross Returns (Rs/ha)		Net Returns (Rs/ha)		BC Ratio	
	K-6	Dharani	K-6	Dharani	K-6	Dharani	K-6	Dharani
2015	38225	39947	56367	65828	18142	25881	1.47	1.65
2016	43020	44370	86580	96200	43560	51830	2.01	2.17
2017	48135	49575	73745	82990	25610	33415	1.53	1.67
2018	50668	51395	64260	79830	13592	28435	1.27	1.55
Average	45012	46322	70238	81212	25226	34890	1.57	1.76

Table 3. Comparison between the varieties during each year (Independent t-test).

Particulars	Year	Treatments	Mean	SD	t-value	p-value
No of pods/plant	2015	K-6	14.22	0.44	5.467**	0.000
		Dharani	15.11	0.25		
	2016	K-6	15.26	0.42	10.380**	0.000
		Dharani	17.35	0.47		
	2017	K-6	16.14	0.37	12.438**	0.000
		Dharani	18.49	0.46		
	2018	K-6	13.77	0.44	28.719**	0.000
		Dharani	19.24	0.40		
Pod Yield (kg/ha)	2015	K-6	1396	26.95	9.797**	0.000
		Dharani	1630	70.55		
	2016	K-6	1665	35.39	10.535**	0.000
		Dharani	1850	42.75		
	2017	K-6	1715	28.48	9.072**	0.000
		Dharani	1930	69.32		
	2018	K-6	1428	43.98	19.722**	0.000
		Dharani	1774	33.81		

** Significant 1% level

Greeshma during early kharif season in Sothern agro climatic zone of Andhra Pradesh.

The average haulm yield was more in Kadiri-6 when compared to Dharani variety. It might be due to increase in plant height results in more vegetative growth. This finding was in agreement with that of Bhutadiya *et al* (2019).

The average cost of cultivation of Dharani variety was higher than Kadiri-6 by Rs.1310/- ha but, Dharani variety recorded higher average gross returns (Rs.81212/-ha) and net returns (Rs.34890/-

ha). The average B.C Ratio of Dharani (1.76) was more than the Kadiri-6 (1.57). Bhagavatha Priya *et al* (2016) also reported that highest net returns was recorded by Dharani variety followed by TAG-24, Kadiri-6 and Greeshma during early kharif season in Southern agro climatic zone of Andhra Pradesh.

Independent ‘t’ test was used to compare number of pods per plant and pod yield between Dharani and K-6 varieties in each year. From the data (Table 3), it can be understood that there was a significant difference between Dharani and K-6 varieties with regard to number of pods/plant and pod yield. No

Table 4. Pooled analysis for the variables using Repeated Measures (RM) mixed ANOVA

Variables	Pods per plant		Pod Yield (Kg/ha)	
	F-value	p-value	F-value	p-value
Source				
Years	135.94	0.000	183.14	0.000
Years*treatments	105.01	0.000	11.26	0.000
Treatments	970.38	0.000	556.50	0.000

of pods and pod yield of Dharani was significantly higher than Kadiri-6 during every year.

Mixed ANOVA is carried out for pooled analysis of four years data due to repeated measures. The data (Table 4) identified a significant difference between the varieties during all the years with respect to number of pods per plant and pod yield in both Kadiri-6 and Dharani varieties. Further, treatments differed significantly in all the years in which Dharani performed well with respect to number of pods and pod yield than farmers practice, Kadiri-6. Hence it can be concluded that no of pods and pod yield of Dharani variety is significantly higher than Kadiri -6 during all the years.

CONCLUSION

It can be concluded from the study that the yield, gross returns, net returns and BC Ratio were more with 'Dharani' groundnut variety than Kadiri-6 in vulnerable village clusters of Chittoor district, Andhra Pradesh.

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