Evaluation of Organic Package on Growth, Yield and Economics in Groundnut

ABSTRACT: To evaluate the organic package on yield and economics of Groundnut, the on-farm testing was conducted by KrishiVigyan Kendra, Kalikiriinfive farmer's fields during two consecutive seasons of 2021 and 2022. Results of two years data revealed that, yield attributes and yields were higher in chemical farming; due to its less cost of cultivation B:C ratio was higher in organic farming. Yield in farmers practice were 1490 and 1782 kg ha^{-1} during 2021 and 2022, respectivelyand in organic farming were 1305 and 1570 kg ha^{-1} during 2021 and 2022, respectively. Net returns were 31763 and 30785 Rs ha^{-1} in organic farming and farmers practice, respectively. B: C ratio of 1.56 and 1.47, were recorded in organic farming and farmers practice, respectively.

Keywords: Economics, Groundnut, Organic farming, Yield

INTRODUCTION:

India occupies a distinct position in annual oilseed crops in diversity (Mandavkar and Talathi, 2013). Groundnut is the major oilseed crops of India which accounts for 25% of total oilseed production in the country. It occupies an area of 5.30 million ha with a production of 5.50 million tonnes and productivity of 1040 kg ha^{-1} (http://www.indiastat.com). In Andhra Pradesh Groundnut productivity was 618 kg ha^{-1}. It was grown in an area of 7.48 lakh ha with 4.62 lakh tonnes production (http://www.indiastat.com). In Chittoordt, Groundnut is one of the major Oilseeds crop. It ranks first in area and production of Oilseeds. In Chittoor district, groundnutwas cultivated in an area of 123268 ha during *Kharif*, 2020-21 and 2124 ha during *Rabi*, 2020-21(O/o JDA, Chittoor). Groundnut is the 13th most important food crop, 4th important source of vegetable oil and 3rd main source of vegetable protein in the world. (Shete*et al*.,2018).Groundnut is cultivated in diverse agro-climatic environments characterized by soils of varying water holding capacity under rainfed as well as irrigated conditions

(Priya*et al*, 2016). In earlier days, farmers use to grow crops naturally without using any chemical inputs. However, now-a-days with increased use of chemical inputs, soil is losing its fertility and productivity. Groundnut, the legume crop requires very less nutrients compared to cereal crops. As the amount of nutrients required by the crop is very less, crop can meet its requirement through organic manures. Due to lack of awareness, farmers are using chemical fertilizers and pesticides indiscriminately in groundnut. Excessive usage of chemical fertilizers results in buildup of nutrients in soil in unavailable form or losses in the atmosphere through evaporation. Indiscriminate use of chemical inputs leads to soil, environmental pollution and also deteriorates soil and human health. So in order to improve soil health and human health and also to reduce pollution, there is need to reduce usage of chemical inputs and increase usage of organic inputs. To shift to organic farming from chemical farming farmers are not ready as they have a fear of reduced yields. In order to overcome this situation, there is need to evaluate the organic package on yield and economics in groundnut.

MATERIALS AND METHODS:

TheOn-Farm testingwas conducted by KrishiVigyan Kendra, Kalikiri during two consecutive seasons of 2021 and 2022 to evaluate the organic package on yield and economics of Groundnut. Groundnut variety Dharaniwas taken as test variety as this variety is best suitable for organic farming compared to other varieties.TCGS 1043, released in 2013 as 'Dharani; drought tolerant (withstands up to 35 days dry spell), water use efficient, tolerant to stem and dry root rots, PBND and PSND with duration of 100-105days; yield of 37-43 q ha^{-1} (*Rabi*); Shelling outturn: 75-77%; Oil content: 49 %; 100-seed weight: 40-43grams; uniform maturity, high SMK%, attractive pods, moderate stature, tolerant to low light condition. Trials were conducted in 2.0 ha area in five farmers' fields during two consecutive seasons of 2021 and 2022 in Guttapalemvillage, Kalikirimandal with organic package and farmers practice. Details of treatments in organic package and farmers'practice were given in Table 1. Soils of the study area are sandy loam in texture with low available nitrogen and phosphorus, high in potassium, deficit in zinc and iron. Sowings were done with seed drill in 5 cm depth with spacing of 30 cm between rows. Fertilizer and pest

management were done as per treatments. One farmer field was split into two plots. In one plot groundnut was supplied with organic inputs and in other plot (farmers practice), crop was grown with chemical inputs. Each treatment was replicated in five farmers' fields during both the seasons. Rainfall data is depicted in Fig 1 and 2. The data recorded on various parameters like no. of pods per plants, 100 dry pod and seed weight, 100 fresh pod and seed weight and Yield were analyzed.The average prices of inputs and outputs commodities prevailed during each year were taken for calculating cost of cultivation, gross returns, net returns and benefit cost ratio.

RESULTS AND DISCUSSION:

Yield attributes: On an average no. of pods$plant^{-1}$ in organic farming (23.4 and 25.0 during 2021 and 2022) and farmers practice(24.9 and 26.2 during 2021 and 2022) were 24.2 and 25.6, respectively (Table 2). 100 fresh pod weight in organic farming were 187.6, 187.0 and 187.3 gram during 2021, 2022 and pooled mean; respectively. Whereas, in case of farmers practice 100 fresh pod weight was 188.2, 188.6 and 188.4 gram during 2021, 2022 and pooled mean; respectively. 100 fresh weight of organic farming and chemical farming during 2021 was 73.4 and 76.6 gram; during 2022 was 74.0 and 76.9 gram and pooled mean was 73.7 and 76.8 gram. In organic farming 100 dry pod and seed weight were 92.9 and 37.3 gram during 2021 and 93.1 and 37.5 gram during 2022 and 93.0 and 37.4 gram in pooled mean. Whereas, in farmers practice100 dry pod and seed weight were 104.0 and 44.9 gram during 2021; 103.9 and 44.0 gram during 2022; 104.0 and 44.5 gram in pooled mean.

Since the p-value (=0.0031) is less than 0.01, hence it can be concluded that there is significant difference between two practices with regard to B: C ratio in which improved practice has significantly more B: C ratio (1.56) than that of farmers' practice (1.47).

Yield and Economics:

Results revealed that in farmers practice (1490and 1782kg ha^{-1} during 2021 and 2022, respectively), mean yield was found to be higher than in organic farming (1305 and 1570 kg ha^{-1} during 2021 and 2022, respectively) during both the years as well as in pooled data (Table 3.). Highest yield in farmers practice was due to more number of pods and test weight which were the major yield attributing characters. In farmers practice uptake of nutrients by the crop was more and also faster because of which yield was more due to timely availability of fertilizers. These findings were in agreement with Hanif and Krishnamoorthi (2016).

Based on average prices of inputs and output commodities prevailed during each year of assessment, values of economic indicators like gross cost of cultivation, gross returns, net returns and B:C ratio were calculated and presented in table 3. Even though, gross returns were higher in farmers practice;due to its less cost of cultivation net returns and B:C ratio were substantially higher in organic farming compared to farmers practice. Average gross returns in organic farming and farmers practice were86913 and 94435 Rs ha^{-1}, respectively. Whereas, net returns were31763 and 30785 Rs ha^{-1} in organic farming and farmers practice, respectively. Economic analysis clearly reveals that cultivating groundnut with organic inputs provided higher net returns over farmers practice during both the years. B: C ratio of 1.56 and 1.47, were recorded in organic farming and farmers practice, respectively. Higher net returns and B: C ratio were due to less cost of cultivation in organic farming as pest and disease incidence was very less during the testing period. It has been concluded that there was significant difference in B: C ration in organic farming and farmers practice. These findings were in agreement with Mathukia*et al*, 2015.

CONCLUSION: Based on the result of present investigation, it may be concluded that organic farming is economically feasible if there is less pest and disease incidence.

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Table 1: Details of Treatments

S.No.	Particulars	Organic package	Farmers practice
1	Seed treatment	Rhizobium @ 10 ml/kg seed	Mancozeb @ 2.5 g/kg seed
2	Fertilizer management	FYM @ 4.0 t/acat last ploughing	FYM @ 4.0 t/acat last ploughing
		Soil application of PSB @ 2 kg/ac, Azospirillum @ 2 kg/ac	Basal application of urea @ 75 kg/ac
3	Plant protection	Soil application of Trichoderma @ 2 kg/ac	Soil application of Trichoderma @ 2 kg/ac
		Erection of bird perches	Drenching with carbendazim @ 1.0 g/li of water
		Need based plant protection with neem oil @ 1.0 l/ac/NSKE	
		Pheromone traps @ 8/ac	Spraying of monocrotophos @1.6 ml/lit
		Sticky traps @ 5/ac	
		Bajra 3 rows as border crop	
4	Weed management	Hand weeding/mechanical	Pre-emergence application of Pendimethlin @1.0l/acand hand weeding at 20 DAS

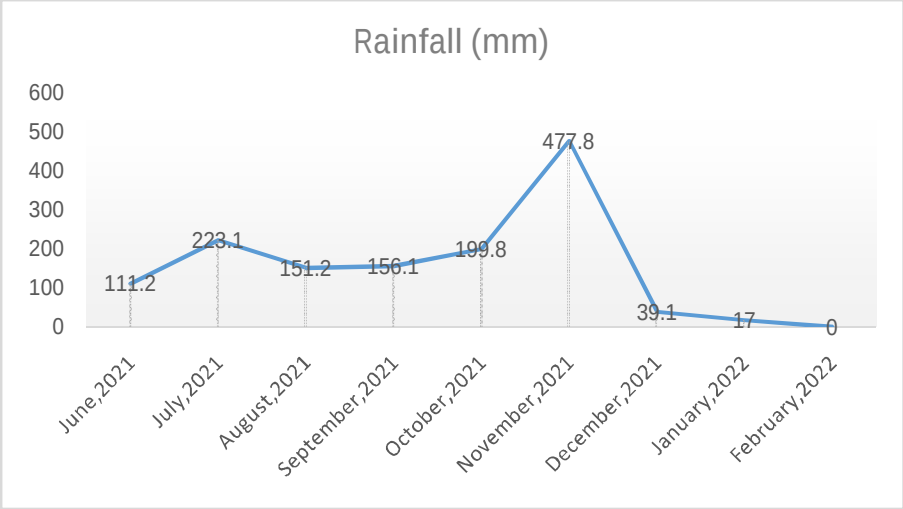

Fig. 1: Rainfall pattern during crop growth period, 2021

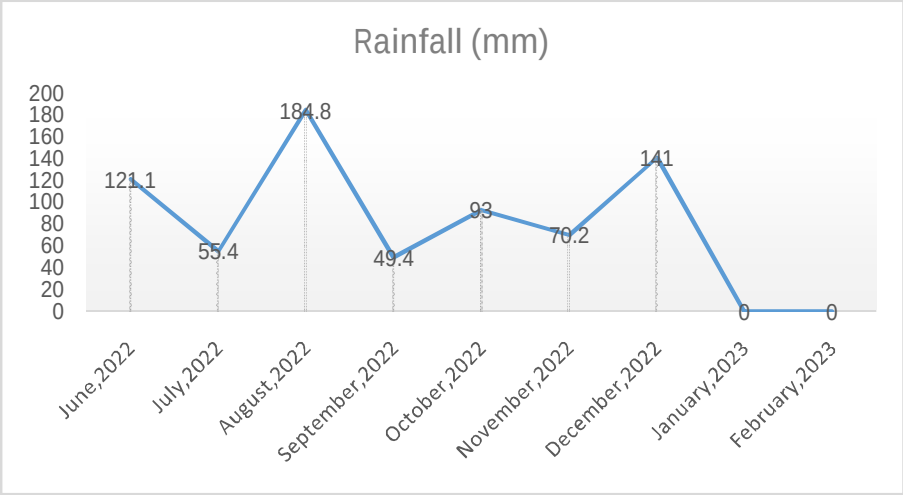

Fig. 2: Rainfall pattern during crop growth period, 2022

Table 2: Yield attributes of groundnut in organic farming and farmers practice

Year	No. of pods per plant		100 fresh pod weight (gram)		100 fresh seed weight (gram)		100 dry pod weight (gram)		100 dry seed weight (gram)	
	Organic farming	Farmers practice	Organic farming	Farmers practice	Organic farming	Farmers practice	Organic farming	Farmers practice	Organic farming	Farmers practice
2021	23.4	24.9	187.6	188.2	73.4	76.6	92.9	104.0	37.3	44.9

2022	25.0	26.2	187.0	188.6	74.0	76.9	93.1	103.9	37.5	44.0
Mean	24.2	25.6	187.3	188.4	73.7	76.8	93.0	104.0	37.4	44.5

Table 3: Yield and economicsof groundnut in organic farming and farmers practice

Year	**Yield (Kg ha^{-1})**		**Cost of cultivation (Rs/ha)**		**Gross returns (Rs/ha)**		**Net returns (Rs/ha)**		**B: C ratio**	
	Organic farming	Farmers practice	Organic farming	Farmers practice	Organic farming	Farmers practice	Organic farming	Farmers practice	Organic farming	Farmers practice
2021	1305	1490	47500	57500	71775	81950	24275	24450	1.50	1.40
2022	1570	1782	62800	69800	102050	106920	39250	37120	1.62	1.54
Mean	1438	1636	55150	63650	86913	94435	31763	30785	1.56	1.47

Groundnut price: Rs.55/kg during 2021 in both practices; Rs.65/kg in organic farming and Rs.60/kg in farmers practice during 2022

Table 4: Summary of t-test in comparing B: C ratio in treatment and farmers practice for two years pooled data

	Organic farming	*Farmers practice*
Mean	1.56	1.47
Variance	0.00968	0.01693
Observations	5	5
Hypothesized Mean Difference	0	
df	4	
t Stat	6.324555	
P(T<=t) one-tail	0.001599	
t Critical one-tail	2.131847	
P(T<=t) two-tail	0.003198	
t Critical two-tail	2.776445	