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Effect of improved management practices on economics in Groundnut (*Arachis hypogaea* L.) cultivation

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Abstract
An experiment was carried out during kharif season of 2016 at Hiregundgal District: Tumkur (Karnataka) at five location under the project of Bhoo Samruddhi collaboration between KSDA (Karnataka State Department of Agriculture) and ICRISAT (International Crop Research Institute for Semi-Arid Tropics Agriculture). To study the "Effect of improved management practices on factor of productivity on Groundnut (Arachis hypogaea L.) cultivation" Economic viability of groundnut proved superior in recommended dose of fertilizer (25:50:25 NPK+ Gypsum @ 500 kg ha^{-1}) along with micro nutrient (ZnSO4@ 25 kg ha^{-1}& Borax @ 10 kg ha^{-1}) than recommended dose of fertilizer. Broad bed and furrow was superior over flat bed. Cultivated variety ICGV 91114 superior to cultivated variety K 6. Farmer's practice registered the lowest value for economics compared to all treatments.

Keywords: Recommended dose of fertilizer, Micro nutrients, Broad bed and furrow, Flat bed, ICGV 91114, K 6

Introduction
Groundnut (*Arachis hypogaea* L.) is an annual legume native to South America. It is one of the principal oilseed crop of tropical and sub-tropical regions of the world belongs to the family Leguminoceae. It is commonly called as poor man's almond, wonder nut and is also called as king of oilseeds. It is the world's fourth most important source of edible oil and third most important source of vegetable protein.

Groundnut seed contain about 50% edible oil. The remaining 50% of the seed has high quality protein (21.4 to 36.4%), carbohydrates (6.0 to 24.9%), minerals and vitamins. This contains 20%, saturated and 80% unsaturated fatty acids. Poly saturated fatty acids has 2 types *i.e.* oleic (40-50%) and linoleic (24-35%). It is also fairly rich in calcium, iron and vitamin B complex like thiamine, riboflavin, niacin and vitamin A.

In broad bed and furrow the furrows should lead to a main drain at the end of the field. The advantages of this system is crop in raised bed showed excellent root growth and nodulation, vigorous plant growth and greener foliage than the flat bed.

India's resounding success from its past green revolution has been followed by stagnating or declining agricultural productivity, even with increased total fertilizer use in the country over the years. This declining factor productivity is largely due to imbalanced fertilizer use. Fertilizers application is highly skewed in favour of N, with relatively small use of K and P application, and rare use of secondary and micronutrients. Current generalized fertilizer recommendations are also sub-optimal and need upward refinement. So this concept of soil test based balanced nutrient application helps in getting good crop yields.

Improved new varieties having advantage over traditional varieties. Replacement of traditional variety with improved cultivar is very important in respect to pod yield, haulm yield and oil yield in groundnut crop. Therefore, evaluations of improved varieties with other management practices are crucial for farmer's point of view.

Material method
A field experiment (in farmer's field) at five location represented in Table no. 1. It was laid out in factorial randomized block design (FRBD) with control in five replications comprising eight treatment combination. Treatment combination consisting of three factor at two levels *viz.*, recommended dose of fertilizer (25:50:25 NPK+ Gypsum @ 500 kg ha^{-1}) and recommended

dose of fertilizer (25:50:25 NPK+ Gypsum @ 500 kg ha^{-1}) + Micro nutrient (ZnSO4@ 25 kg ha^{-1}& Borax @ 10 kg ha^{-1}) s in first factor, broad bed & furrow and flat bed in second factor and third factor consisting of variety ICGV 91114 and K 6. Farmer's practice as control treatment. Groundnut variety ICGV 91114 and K 6 were used as test crops. To study the "Effect of improved management practices on factor of productivity on Groundnut (*Arachis hypogaea* L.) cultivation." during *kharif* 2016 at Hiregundgal District: Tumkur (Karnataka)at five location under the project of Bhoo Samruddhi collaboration between KSDA (Karnataka State Department of Agriculture) and ICRISAT (International Crop Research Institute for Semi-Arid Tropics Agriculture).

Results and discussion

Cost of cultivation (₹ ha^{-1})

Cost of cultivation of five different locations according to actual cost was calculated. For the calculation actual cost of cultivation of different inputs like field preparation, sowing, seed cost and other cost considered. Treatment cost of cultivation calculated according to treatment variation. Cost of cultivation of (25:50:25 NPK+ Gypsum @ 500 kg ha^{-1}) dose of fertilizer along with or without micro nutrient (ZnSO4@ 25 kg ha^{-1}& Borax @ 10 kg ha^{-1}) was ₹ 34343 and ₹ 32463 respectively. Cost of cultivation for broad bed and furrow treatment was ₹ 34903 and for flatbed treatment ₹ 31903.For cultivated variety ICGV 91114 was ₹ 33529.00 and K 6 was ₹ 33279.00 respectively. Cost of cultivation according to farmer's practice was calculated according to practices adopted by the groundnut farmers and it was ₹ 29880.00 on basis of five locations mean.

Gross returns (₹ ha^{-1})

For the calculation of gross return market rate of groundnut pod was considered ₹ 38 kg^{-1} according to local market of the location. The gross return was maximum in the case of recommended dose of fertilizer (25:50:25 NPK+ Gypsum @ 500 kg ha^{-1}) treatment along with micro nutrient (ZnSO4@ 25 kg ha^{-1}& Borax @ 10 kg ha^{-1}) ₹ 67662 and minimum in the case of recommended dose of fertilizer (25:50:25 NPK+ Gypsum @ 500 kg ha^{-1}) treatment ₹ 57110. The gross returns was maximum in the case of broad bed and furrow treatment ₹ 70243 than flat bed treatment ₹ 54529. Dhadage *et al.* (2008) [4] found same results in broad bed and furrow treatment. The gross returns were ₹ 60961.A lowest gross return was observed in the case of farmer's practice compared to all other treatments about ₹ 44041.

Table 1: Name of farmers and GPS location of experimental plots.

Sl. No.	Farmer's name	GPS location of the fields
1	Veerabhadrayya	13 ^{0} 43' 51" N, 77 ^{0} 13' 21'' E
2	Laxmipathy	13 ^{0} 43' 59" N, 77 ^{0} 13' 22'' E
3	Gurumoorthy	13 ^{0} 43' 34" N, 77 ^{0} 13' 19'' E
4	Bhimanna	13 ^{0} 43' 48" N, 77 ^{0} 13' 17'' E
5	Narasimraju	13 ^{0} 43' 38" N, 77 ^{0} 13' 38'' E

Table 2: Cost of cultivation, net gross returns (₹ ha^{-1}) and B:C ratio influenced by nutrients, land configuration and varieties

Treatment			Cost of Cultivation (₹ ha^{-1})	Gross returns (₹ ha^{-1})	Net returns (₹ ha^{-1})	B:C Ratio
Nutrient	N_1	RDF	32464	57111	24647	1.77
	N_2	RDF+MN	34344	67662	33318	1.97
Land	L_1	BBF	34904	70243	35339	2.02
configuration	L_2	FB	31904	54529	22626	1.72
Variety	V_1	ICGV 91114	33529	63811	30283	1.91
	V_2	K 6	33279	60961	27682	1.83
General mean			33404	62386	28982	1.87
Farmer's practice			29880	44042	13789	1.45

RDF=Recommended Dose of Fertilizer (25:50:25 NPK+ Gypsum @ 500 kg ha^{-1})
MN=Micronutrients ($ZnSO_4$@ 25 kg ha^{-1} & Borax @ 10 kg ha^{-1}) BBF=Broad Bed &Furrow,
FB=Flat Bed, Farmer's practice =NPK (18:46:30) fertilizer+ Flat bed+ K 6

Net returns (₹ ha^{-1})

The net returns was maximum in the case of recommended dose of fertilizer (25:50:25 NPK+ Gypsum @ 500 kg ha^{-1}) treatment along with micro nutrient (ZnSO4@ 25 kg ha^{-1}& Borax @ 10 kg ha^{-1}) ₹ 33318 and minimum in the case of (25:50:25 NPK+ Gypsum @ 500 kg ha^{-1}) dose of fertilizer treatment ₹ 24646. Broad bed and furrow system gives ₹ 12714 advantage over flat bed in respect to monitory gross return. Vekariya *et al*. (2015) reported the same result in groundnut crop broad bed (90 cm width) and furrow (45 cm) with 3 with highest net returns of ₹ 23,662 ha^{-1}.The net return was higher in the case of cultivated variety ICGV 91114 ₹ 30283 than cultivated variety K 6 ₹ 27682. Lowest net returns was observed in the case of farmer's practice compared to all other treatments about ₹ 13788 only which is very less monitory return in groundnut crop.

B:C ratio

The B:C ratio was maximum in the case of recommended dose of fertilizer(25:50:25 NPK+ Gypsum @ 500 kg ha^{-1}) treatment along with micro nutrient (ZnSO4@ 25 kg ha^{-1}& Borax @ 10 kg ha^{-1}) (1.97) and minimum in the case of recommended dose of fertilizer (25:50:25 NPK+ Gypsum @ 500 kg ha^{-1}) treatment (1.77). Wani *et al*. (2015) found same results in case of balanced fertilization. The B: C ratio was maximum in the case of broad bed and furrow treatment (2.02) than flat bed treatment (1.72). Difference between both the land configurations was very vast in respect to benefit cost ratio so by modifying the land preparation in case of groundnut farmer can take advantage over existing system of land preparation. Baskaran *et al*. (2003) [3] and Dhadage *et al*. (2008) [4] reported same results with broad bed and furrow treatment. The B: C ratio was higher in the case of cultivated variety ICGV 91114 (1.91) than cultivated variety K 6 (1.83).

Lowest B:C ratio was observed in the case of farmer's practice compared to all other treatments about 1.45 which is very less in respect to groundnut cultivation.

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