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## Response of rainfed crops to improved agronomic practices on farmer's field of Chittoor and YSR Kadapa districts, Andhra Pradesh

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**Abstract**

Response of rainfed crops viz., groundnut, red gram and gingelly to improved agronomic practices were tested on farmer fields of Chittoor and YSR Kadapa districts during *kharif* 2014 and *kharif* 2015. Adaption of improved agronomic practices in groundnut such as use of drought tolerant variety Dharani, maintaining optimum plant population by adapting proper seed rate @ 150 kg ha<sup>-1</sup> (30 cm x 10 cm), seed treatment with recommended chemicals, recommended dose of fertilizer *i.e.*, NPK @ 20:40: 50 kg ha<sup>-1</sup> at the time of sowing and top dressing of 500kg gypsum per ha at the time of flowering, application ZnSO<sub>4</sub> @ 25 kg ha<sup>-1</sup> and Borax @ 10 kg ha<sup>-1</sup> at the time of sowing, pre emergence application of herbicide Pendimethalin @ 1 Kg a.i ha<sup>-1</sup> with three rows of border crop of Jowar, In red gram improved wilt tolerant variety TRG-59, Thinning and application of 20-50 N,P kg ha<sup>-1</sup> and suitable and timely plant protection measures. In gingelly improved variety swethatil, thinning and plant protection measures would effectively reduce the technology gap and resulted in enhanced productivity of rainfed crops in both the districts of Andhra Pradesh.

**Keywords:** Groundnut, Redgram, Gingelly, Intercropping system and improved agronomic Vs Farmer packages

**Introduction**

Groundnut (*Arachis hypogaea* L) is a leading oilseed crop in India and important oilseed crop of tropic and sub tropic regions of the world. These are rich source of edible oil (43-55%) and protein (25-28%) also valuable source of vitamins *viz.*, E and K (Kandakoor *et al.* 2014) [7]. The worldwide groundnut is grown in 26.4 million hectares with a total production of 37.1 million metric tonnes and an average productivity of 1.4 metric t ha<sup>-1</sup>. Worldwide groundnut is grown over 100 countries. In India, it is grown on 5.5 million hectares with a production of 9.7 million tonnes and contributing to 55 percent of the total oilseed production in the country and ranks first in the world in total area and second in production. The mean yield of groundnut is about 1784 kg of pods ha<sup>-1</sup> in Tamil Nadu, which is higher than the world average (1336 kg ha<sup>-1</sup>) and it ranks first in India. The crop is mainly grown under three situations, *viz.* *kharif*, *rabi*/summer and residual moisture conditions on riverbeds (Satish Kumar *et al.* 2004) [15]. Although, groundnut is an important oilseed crop in Chittoor, its productivity level is very low (627 kg ha<sup>-1</sup>) and YSR Kadapa is 330 kg ha<sup>-1</sup> during 2011-12 (Plant doctors diary, 2013) [13]. The non-adoption of improved groundnut technologies by small and resource-poor farmers is mainly due to non-availability of quality seeds, high seed cost, poor knowledge and inappropriateness of the technologies to these farmers (Nigam *et al.*, 2004.) [11].

Pulses are the main source of protein, particularly for vegetarians, and occupy a unique position in farming as main, cover, green manure, intercrop and their inclusion in crop rotation keep the soil alive, productive and improve physical properties of the soil by virtue of their biological nitrogen fixation, deep root system and leaf fall. Increasing the cropping intensity may contribute to production and productivity through efficient utilization of available resources. Intercropping is one of the most important technique which, involves growing of crops under different plant geometry. To avoid the risk of sole crop failure, adoption of intercropping is more safe and profitable cropping system for increasing the total production and net profit per unit area. Intercropping offers to farmers an opportunity to utilize diverse resources available at his farm (Ghosh, 2004) [4]. Legumes offer excellent compatible combination for mixing with oilseeds to minimize the competition and to confer a symbiotic association to achieve the prime aim of maximum use of available resources.

The advances in agricultural technology have contributed to increased production and productivity of many crops at research level.

However, it appears from several socio-economic studies that the same has not been reflected in the raises in income levels and improvement in socio-economic status of the farmers in general and marginal farmers in particular (Mann *et al.*, 2001) [10].

Sesame or gingelly (*Sesamum indicum* L.) commonly known as til (Hindi) is an ancient oilseed crop grown in India and perhaps the oldest oilseed crop in the world. It is grown in an area of 7.54 million hectares with a production of 3.34 million tonnes in the world with a productivity of 443 kg ha<sup>-1</sup>. India is the largest producer of sesame in the world. It also ranks first in the world in terms of sesame-growing area (24%) with about 1.8 million hectares with a total production of 0.76 million tonnes and productivity of 422 kg ha<sup>-1</sup> (FAI, 2012) [3]. The major constraints responsible for lower yield are inappropriate production technologies *viz.*, broadcast method of sowing, no use of fertilizers and untimely weed management (Khalque and Begum, 1991) [8].

Extensive research has been carried out and evolved technologies on different aspects of groundnut cultivation with a location specific approach by the research network of Southern zone for the past three decades. The technologies were tested only in isolation on farmers' holdings and have not been tested with a package mode involving all the technologies to improve the productivity of groundnut crop on farmers' holdings. Thus, a gap is existing in the transfer of technology and to improve the productivity of groundnut in the groundnut growing areas especially under rainfed situations. By conducting the demonstrations on the farmers' holdings it is expected that an opportunity will be provided to the farmers to realize the potential of the research technologies themselves and thus increase the average yields of the crop in the dry lands.

Such a comprehensive technology transfer approach on farmers fields in rainfed crops *viz.*, groundnut, redgram and gingelly as well as profitable intercropping system has been initiated with the following objectives *viz.*, to improve and stabilize the productivity of rainfed crops, groundnut/redgram (7:1) intercropping system and to stabilize economy of rainfed farmers of Chittoor and YSR Kadapa districts.

### Review of literature

Research conducted at Regional Agricultural Research Station, Tirupati revealed that sowing groundnut crop (Spanish bunch) in first fortnight of July at a spacing of 30 cm x 10cm gave significantly highest pod yield of 1646 kg ha<sup>-1</sup>. Application of nitrogen @ 20 kg ha<sup>-1</sup> to rainfed groundnut gave pod yield of 1983 kg ha<sup>-1</sup> as compared to control (No nitrogen) which recorded 1550 kg ha<sup>-1</sup>. Application of gypsum @ 500 kg ha<sup>-1</sup> by placement method to groundnut at flowering during *Kharif* gave highest pod yield of 1884 kg ha<sup>-1</sup> as compared to control treatment (1550 kg ha<sup>-1</sup>).

During *kharif*, among the different groundnut based intercropping systems tried, highest groundnut pod equivalent yield of 2378 kg ha<sup>-1</sup> was recorded when groundnut was intercropped with long duration red gram (LRG-30) in 7:1 ratio as compared to sole crops of groundnut (1474 kg ha<sup>-1</sup>) and red gram (466 kg ha<sup>-1</sup>). (Annual reports of Regional Agricultural Research Station, Tirupati, ANGRAU, Guntur, 1998-2005) [2].

Different agro technologies were standardized through field experiments conducted for three decades at Regional Agricultural Research Station, Tirupati and adjoining research stations on rainfed groundnut. Apart from the development of high yielding and resistant varieties for biotic and abiotic stresses, agro techniques that led to consistent yield

improvement have also been evolved emerged. Maintenance of optimum population (30cm x10cm) has been the prime factor in stabilizing the yields of rainfed groundnut (20-40% increase) and right sowing time commensuration with normal monsoon rain has been the footstep in this direction. Initial vigour is the foundation for high yields under rainfed conditions. To promote, this application of nitrogen @ 20kg ha<sup>-1</sup> led to 20-22% yield increase, gypsum @500 kg ha<sup>-1</sup> enhanced yield by 15-20% and critical micronutrients like zinc, borax by 5-10%. Weed eradication can promote non-competitive utilization of limited resources by the rainfed groundnut crop. Research on weed management recommended pre emergence application of Pendimethalin @2.5 litre ha<sup>-1</sup> followed by post emergence application of Imazethapyr @ 750 ml ha<sup>-1</sup> or Quizalofop – p- Ethyl @ 1000 ml ha<sup>-1</sup> with integration of cultural methods. Further, drought mitigation methods during prolonged dry spells or early cessation of monsoon rains, by spraying urea@2% twice at 10-15days interval positively influenced to an extent of 30-35% yield enhancement.

### Materials and Methods

Different locations (farmers) were selected purely based on their interest before *kharif* starts. Critical inputs such as improved varieties of seed, fertilisers and chemicals were supplied to all farmers after conducting hands on training on production technologies of rainfed crops especially groundnut, redgram, gingelly and intercropping system in rainfed areas. Literature was also supplied in local (Telugu) language. Farmers were guided on various aspects of crop production and timely operations at different phenol phases of rainfed crops. Field days and training programme before harvest was organized at different locations in Chittoor and YSR Kadapa districts. Neighboring farmers also brought to the locations and trained and shown the scientific way of production of different rainfed crops and cropping systems. Knowledge on various rainfed crops was imparted to the farmers. Each demonstration was conducted on an area of 0.20 ha and the same area adjacent to the demonstration plot was kept as farmer's practice. The package of improved production technologies were implemented for achieving potential seed yield. Thinning was done at 14 and 21 days after sowing gingelly and redgram so as to maintain optimum plant population ultimately leads to realize potential yield under improved agronomic management practices.

In view of proven research findings and technologies available on various agronomical aspects of rainfed crops *viz.*, groundnut, redgram, gingelly and groundnut (Dharani) /redgram(TRG-59) (7:1) intercropping system, it is felt appropriately planned a comprehensive multi location, on farm experiments in a project mode to educate the farmers about the benefits of agro techniques for realizing higher productivity of rainfed crops during *kharif* 2014 and *kharif* 2015 in Chittoor and YSR Kadapa districts. The following are the treatments *viz.*,

Groundnut cultivation by farmer method\*

Groundnut cultivation with improved package

Groundnut / Red gram intercropping system (7:1) with improved package

Redgram cultivation with improved package

Gingelly cultivation with improved package

\* Farmer method was defined after collection of data through the project survey before starting of the Experiment presented in tables 1, 2 and 3.

**Table 1:** Difference between improved agronomic package and package followed by farmers in rainfed groundnut.

S. No.	Particulars	Improved agronomic package	Farmer practice(Control)	
			Chittoor	YSR Kadapa
1	Farming situation	Rainfed	Rainfed	Rainfed
2	Variety	Dharani (drought tolerant variety)	Kadiri 6	Kadiri 6
3	Seed treatment	Imidachloprid fby DM 45 fby <i>Trichoderma viride</i>	Seed treatment only with DM 45	Seed treatment only with DM 45
4	Seed rate(kgha <sup>-1</sup> )	150	100	120
5	Herbicide application	Pendimethalin @ 3.3 l ha <sup>-1</sup> as pre emergence spray followed by PoE application of Quizalofop p butyl @ 11 ha <sup>-1</sup> at 21DAS	No herbicide Only hand weeding	No herbicide Only hand weeding
6	Fertilizer application	FYM @ 5 t ha <sup>-1</sup> NPK @ 20: 40: 50 kgha <sup>-1</sup> Gypsum @ 500 kgha <sup>-1</sup> Borax @ 10 kgha <sup>-1</sup> Znso4 @ 25 kgha <sup>-1</sup>	No fertilizer is applied	No fertilizer is applied
7	Micronutrient application	Application ZnSO <sub>4</sub> and FeSO <sub>4</sub> @ 25 kgha <sup>-1</sup> at the time of sowing	Without application of micronutrients	Zn So4 @ 10kgha <sup>-1</sup> applied at the time of sowing
8	Boarder crop	3 rows of jowar is sown around the groundnut crop	No border crops	No border crops

**Table 2:** Difference between improved agronomic package and package followed by farmers in rainfed redgram

S. No.	Particulars	Improved agronomic package	Farmer practice(Control)	
			Chittoor	YSR Kadapa
1	Farming situation	Rainfed	Rainfed	Rainfed
2	Variety	TRG-59(Wilt tolerant)	LRG-41(Wilt susceptible)	LRG-41(Wilt susceptible)
3	Seed treatment	Dithane M 45@3 g kg seed <sup>-1</sup>	Seed treatment only with DM 45	Seed treatment only with DM 45
4	Seed rate(kgha <sup>-1</sup> )	10	15	15
5	Method of sowing	Seed drill	Sowing behind country plough	Sowing with 4 tyned animal drawn seed drill
6	Fertilizer application	FYM @ 5 t ha <sup>-1</sup> NPK @ 20:50 kgha <sup>-1</sup>	No fertilizer is applied	No fertilizer is applied
7	Herbicide application	Pendimethalin @ 3.3 l ha <sup>-1</sup> as preemergence spray	No herbicide only hand weeding	No herbicide only hand weeding
8	Thinning	Thinning should be done at 20DAS	No thinning	No thinning
9	Plant protection	Prophylactic measures as per schedule Neem oil spray followed by thiodicarb@ 1.2 g liter <sup>-1</sup>	No plant protection measures	No plant protection measures

**Table 3:** Difference between improved agronomic package and package followed by farmers in rainfed gingelly

S. No.	Particulars	Improved agronomic package	Farmer practice(Control)	
			Chittoor	YSR Kadapa
1	Farmingsituation	Rainfed	Rainfed	Rainfed
2	Variety	Swethatil	YLM-17	YLM-17
3	Seed treatment	Thiram@3 g kg seed <sup>-1</sup>	Seed treatment with DM 45 only	Seed treatment with DM 45 only.
4	Seed rate(kgha <sup>-1</sup> )	5 -10	8 -12	8-12
5	Method of sowing	Line sowing with drill	Broadcasting	Broadcasting
6	Fertilizer application	FYM @ 5 t ha <sup>-1</sup> NPK @ 40:20: 20 kgha <sup>-1</sup>	FYM @ 3 t ha <sup>-1</sup> No Chemical fertilizer is applied	FYM @ 2 t ha <sup>-1</sup> No chemical fertilizer is applied
7	Herbicide application	Pendimethalin @ 1.5 l/ha as preemergence spray	No herbicide, only hand weeding	No herbicide, only hand weeding
8	Thinning	Thinning should be done at 14 and 21DAS	No thinning	No thinning
9	Plant protection	Prophylactic measures as per schedule Neem oil spray followed by Dimethoate @ 3 ml liter <sup>-1</sup> or kelthane @ 5ml liter <sup>-1</sup>	No plant protection measures	No plant protection measures

## Results and discussion

Results revealed that groundnut with improved package recorded average groundnut pod yield of 2500 kgha<sup>-1</sup> as against FP 1515 kgha<sup>-1</sup> in Chittoor and 2275 kgha<sup>-1</sup> as against 1301 kgha<sup>-1</sup> under FP in YSR Kadapa district during *kharif* 2014. The average increase of groundnut pod yield over

farmer practice was 65% in Chittoor and 75% in YSR Kadapa district. Average net income of ₹55,000 ha<sup>-1</sup> was recorded in groundnut with improved practice compared to farmer practice (₹18663 ha<sup>-1</sup>) in Chittoor while, it was ₹ 46,000ha<sup>-1</sup> in improved practice compared to ₹ 9040 ha<sup>-1</sup> in YSR Kadapa district during *kharif* 2014.(Table 4 and Fig 1).

**Table 4:** Performance of groundnut with improved package vs farmer practice in Chittoor and YSR Kadapa district

District	No. of locations	Season and year	Average Groundnut pod yield (kgha <sup>-1</sup> )		% increase	Net income (₹ha <sup>-1</sup> )	
			IP	FP		IP	FP
Chittoor	04	<i>Kharif</i> ,2014	2500	1515	65	55000	18663
YSR Kadapa	02		2275	1301	75	46000	9040
Chittoor	12	<i>Kharif</i> ,2015	2332	1643	42	48267	23529
YSR Kadapa	08		2473	1732	43	53900	21119

Results revealed that groundnut with improved package recorded average groundnut pod yield of 2332 kg ha<sup>-1</sup> as against 1643 kg ha<sup>-1</sup> in Chittoor and 2473 kg ha<sup>-1</sup> as against 1732 kg ha<sup>-1</sup> in YSR Kadapa district during *kharif* 2015. The average increase of groundnut pod yield over farmer practice was 42% in Chittoor and 43% in YSR Kadapa district. Similarly reported that 60.3% yield gain during 1987-90 summer seasons in 58 on-farm trials conducted in different regions in India (Pawar *et al.*, 1993.)<sup>[12]</sup> (Table 4 and Fig 1.) Average net income of ₹48,267 ha<sup>-1</sup> was recorded in groundnut with improved practice compared to farmer practice (₹23,529 ha<sup>-1</sup>) in Chittoor while, it was ₹ 53, 900 ha<sup>-1</sup>

in improved practice compared to ₹ 21,119 ha<sup>-1</sup> in YSR Kadapa district during *kharif* 2015. This higher income was generated because of higher groundnut yield and better output prices. It was observed that improved practices helped to achieve better pod development and therefore the adopted farmers received a premium price (about 10%) for the bold seed. More than 50% of the adopted farmers reported that the improved management practices facilitate better pod development. (Joshi and Bantilan, 1998.)<sup>[6]</sup> Improved groundnut production practices are compared with traditional methods. Improved sole crop production practices showed significantly greater net returns per hectare than traditional methods as reported by Abalu and Etuk (1986)<sup>[11]</sup>.

**Table 5:** Performance of redgram with improved package vs farmer practice of Chittoor and YSR Kadapa district

District	No. of locations	Season and year	Redgram seed yield (kg ha <sup>-1</sup> )		% increase	Net income (₹ ha <sup>-1</sup> )	
			IP	FP		IP	FP
Chittoor	04	<i>Kharif</i> ,2014	1464	1202	22.0	33550	24735
YSR Kadapa	02		1650	1386	21.7	41000	32177
Chittoor	08	<i>Kharif</i> ,2015	1620	1286	26.0	31691	20006
YSR Kadapa	06		1509	1211	24.6	27815	17391

Results revealed that redgram with improved package recorded average redgram seed yield of 1464 kg ha<sup>-1</sup> as against FP 1212 kg ha<sup>-1</sup> in Chittoor and 1650 kg ha<sup>-1</sup> as against 1386 kg ha<sup>-1</sup> in YSR Kadapa district during *kharif* 2014. The average increase of redgram seed yield over farmer practice was 22% in Chittoor and 21.7% in YSR Kadapa district. Average of different locations net income of ₹ 33,550 ha<sup>-1</sup> was recorded in redgram with improved practice compared to farmer practice (₹24,735 ha<sup>-1</sup>) in Chittoor while, it was ₹41,000 ha<sup>-1</sup> in improved practice in redgram compared to ₹32,177 ha<sup>-1</sup> in YSR Kadapa district during *kharif* 2014. (Table 5 and Fig 2.)

Redgram with improved package recorded average groundnut pod yield of 1620 kg ha<sup>-1</sup> as against 1286 kg ha<sup>-1</sup> in Chittoor

and 1509 kg ha<sup>-1</sup> as against 1211 kg ha<sup>-1</sup> in YSR Kadapa district during *kharif* 2015. The average increase of redgram seed yield over farmer practice was 26% in Chittoor and 24.6% in YSR Kadapa district. This might be due to pulse crops with their characteristic promotion of free living microorganisms (*Rhizobium* spp.) release N in soil. Release of N helps in narrowing down of C: N ratio and thus, increased mineralization resulted in rapid conversion of organically bound N to inorganic forms (Kumar *et al.*, 2010)<sup>[9]</sup>. Average net income of ₹31,691 ha<sup>-1</sup> was recorded in redgram with improved practice compared to farmer practice (₹ 20,006 ha<sup>-1</sup>) in Chittoor while, it was ₹ 27,815 ha<sup>-1</sup> in improved practice compared to ₹ 17, 391 ha<sup>-1</sup> in FP of YSR Kadapa district during *kharif* 2015.

**Table 6:** Performance of gingelly with improved package vs farmer practice of Chittoor and YSR District

District	No. of locations	Season and year	Gingelly seed yield (kg ha <sup>-1</sup> )		% increase over FP	Net income(₹ ha <sup>-1</sup> )	
			IP	FP		IP	FP
Chittoor	08	<i>Kharif</i> ,2014	882	680	31.00	25704	11181
YSR Kadapa	02		866	718	21.60	22345	13150
Chittoor	14	<i>Kharif</i> ,2015	994	799	24.40	27700	17968
YSR Kadapa	09		1011	868	16.50	28550	21417

Results revealed that gingelly with improved package recorded average seed yield of 882 kg ha<sup>-1</sup> as against 680 kg ha<sup>-1</sup> in Chittoor and 866 kg ha<sup>-1</sup> as against 718 kg ha<sup>-1</sup> in YSR Kadapa district during *kharif* 2014. The average increase of seed yield over farmer practice was 31% in Chittoor and 21.6% in YSR Kadapa district. (Table 6 and Fig 3.) Imoloame *et al.* (2007)<sup>[5]</sup> reported the superiority of row planting of gingelly over broadcasting to control weed and that this factor resulted in considerable yield increase and also grain yield significantly.

Results revealed that gingelly with improved package recorded average gingelly seed yield of 994 kg ha<sup>-1</sup> as against

799 kg ha<sup>-1</sup> in Chittoor and 1011 kg ha<sup>-1</sup> as against 868 kg ha<sup>-1</sup> in YSR Kadapa district during *kharif* 2015. The average increase of gingelly seed yield over farmer practice was 24.4% in Chittoor and 16.5% in YSR Kadapa district. Rudrasensingh *et al.* (2014)<sup>[14]</sup> reported that maximum average net returns (₹.12914 ha<sup>-1</sup>) as well as benefit cost ratio (2.49) were recorded under improved technologies of gingelly as compared to farmer's practice (₹.7740 ha<sup>-1</sup> and 2.20) in Chhatarpur district in Bundelkhand region of Madhya Pradesh during *kharif* seasons of 2008 to 2012 in rainfed condition on light to medium soils.

**Table 7:** Performance of groundnut/redgram (7:1) inter cropping system vs farmer practice of Chittoor and YSR Kadapa district.

District	No. of locations	Season and year	GN PEY (kg ha <sup>-1</sup> )		% increase over FP	Net income(₹ ha <sup>-1</sup> )	
			IP	FP		IP	FP
Chittoor	04	<i>Kharif</i> ,2014	2418	2210	9.4	57694	50175
YSR Kadapa	02		2331	2181	6.9	54161	48988
Chittoor	13	<i>Kharif</i> ,2015	2423	2207	9.8	57919	50075
YSR Kadapa	07		2504	2271	10.3	61146	52696

Results revealed that groundnut/redgram (7:1) intercropping system with improved agronomic management recorded average groundnut pod equivalent yield of 2418 kg ha<sup>-1</sup> as against 2210 kg ha<sup>-1</sup> in Chittoor and 2331 kg ha<sup>-1</sup> as against FP recorded 2181 kg ha<sup>-1</sup> in YSR Kadapa district during *kharif* 2014. The average increase of groundnut pod equivalent yield over farmer practice was 9.4 % in Chittoor and 6.9% in YSR Kadapa district. Average of different locations, net income of ₹ 57,694 ha<sup>-1</sup> was recorded with improved practice in groundnut/redgram (7:1) intercropping system compared to farmer practice (₹50,175ha<sup>-1</sup>) in Chittoor while, it was ₹54,161 ha<sup>-1</sup> in improved practice compared to ₹ 48,988 ha<sup>-1</sup> in YSR Kadapa district during *kharif* 2014 (Table 7 and Fig 4.). Results revealed that groundnut/redgram

(7:1) intercropping system with improved agronomic management recorded average groundnut pod equivalent yield of 2423 kg ha<sup>-1</sup> as against FP (2207 kg ha<sup>-1</sup>) in Chittoor and 2504 kg ha<sup>-1</sup> as against 2271 kg ha<sup>-1</sup> in YSR Kadapa district during *kharif* 2015. The average increase of groundnut pod equivalent yield over farmer practice was 9.8 % and 10.3% in Chittoor and YSR Kadapa district respectively. Average of different locations, net income of ₹ 57,919 ha<sup>-1</sup> was recorded with improved practice in groundnut/redgram (7:1) intercropping system compared to farmer practice (₹ 50,075 ha<sup>-1</sup>) in Chittoor while, it was ₹ 61,146 ha<sup>-1</sup> in improved practice compared to ₹ 52,696 ha<sup>-1</sup> in FP of YSR Kadapa district during *kharif* 2015.

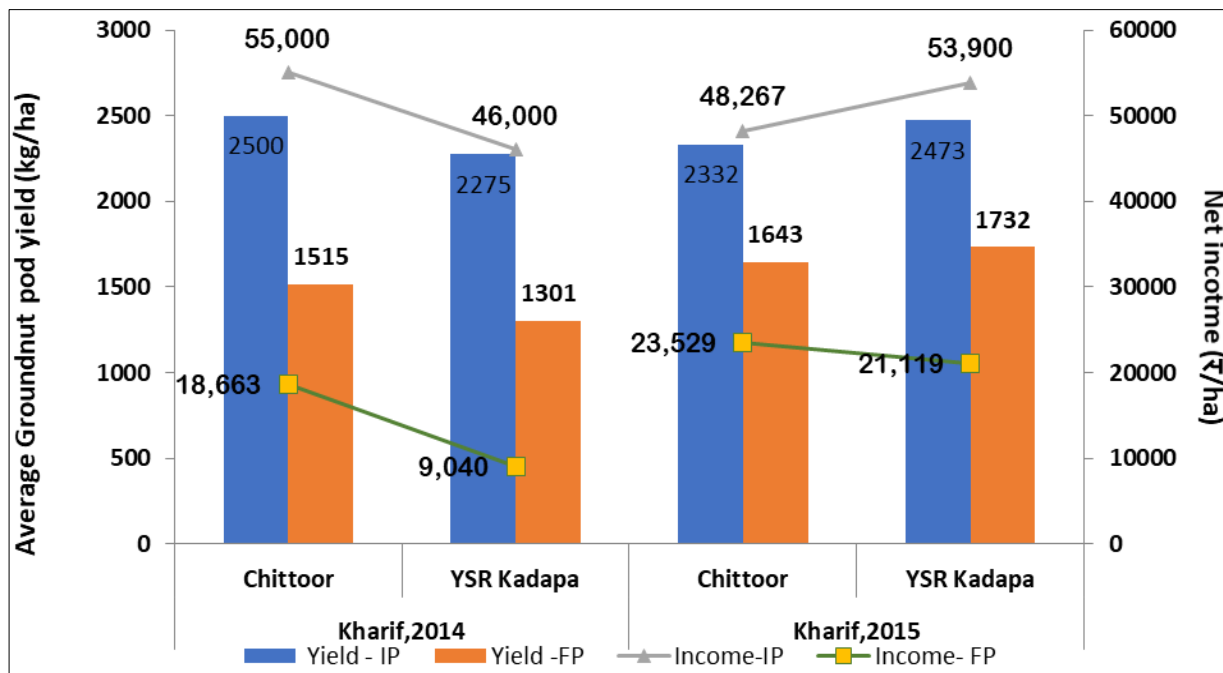


Fig 1: Performance of Groundnut with improved package vs farmer practice of Chittoor and YSR Kadapa district

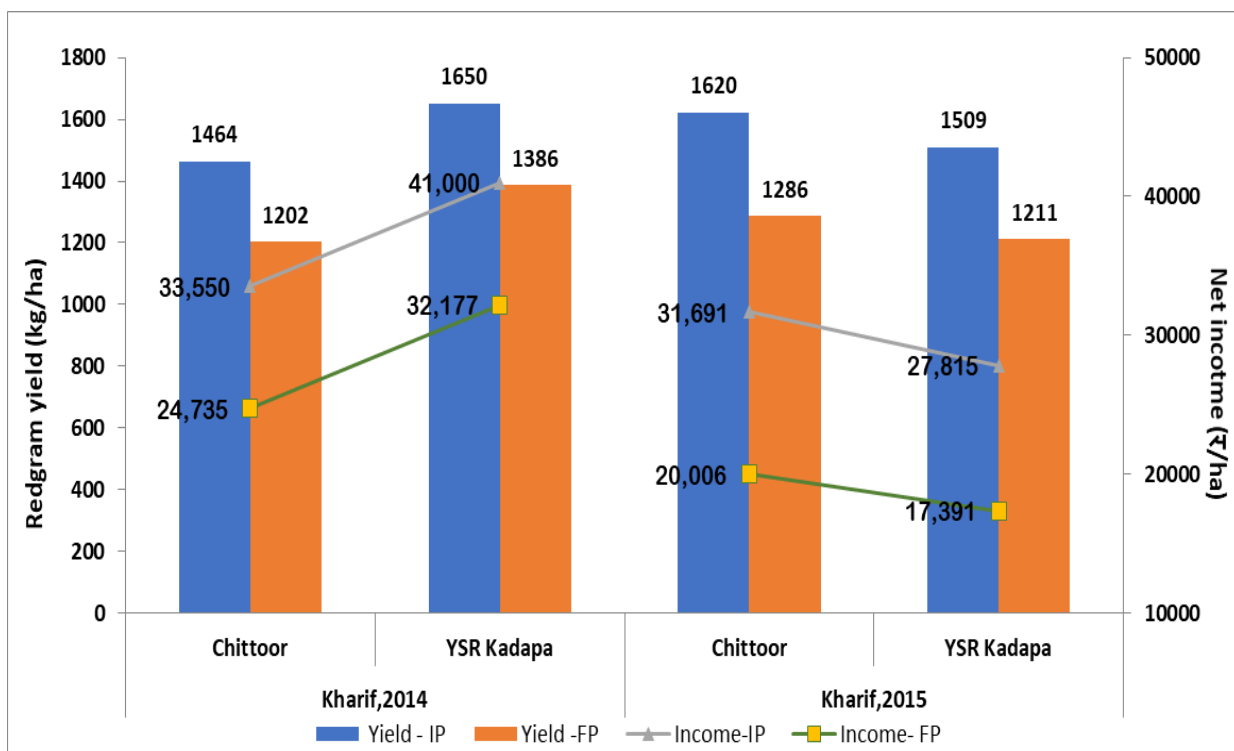


Fig 2: Performance of redgram with improved package vs farmer practice of Chittoor and YSR district

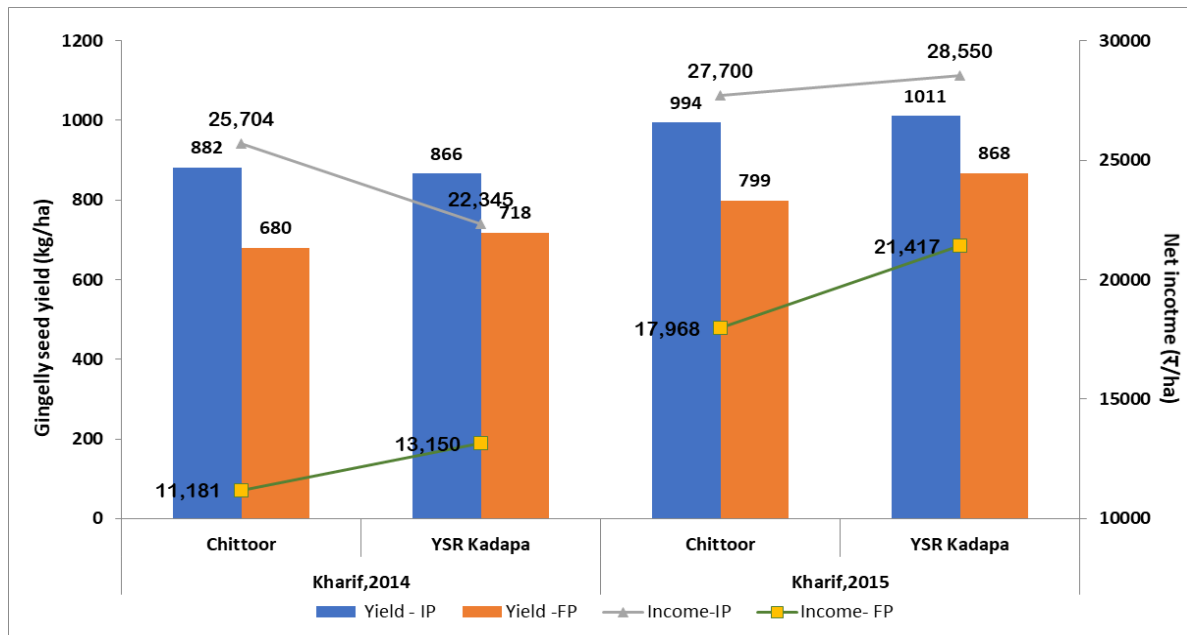


Fig 3: Performance of gingelly with improved package vs farmer practice of Chittoor and YSR Kadapa district

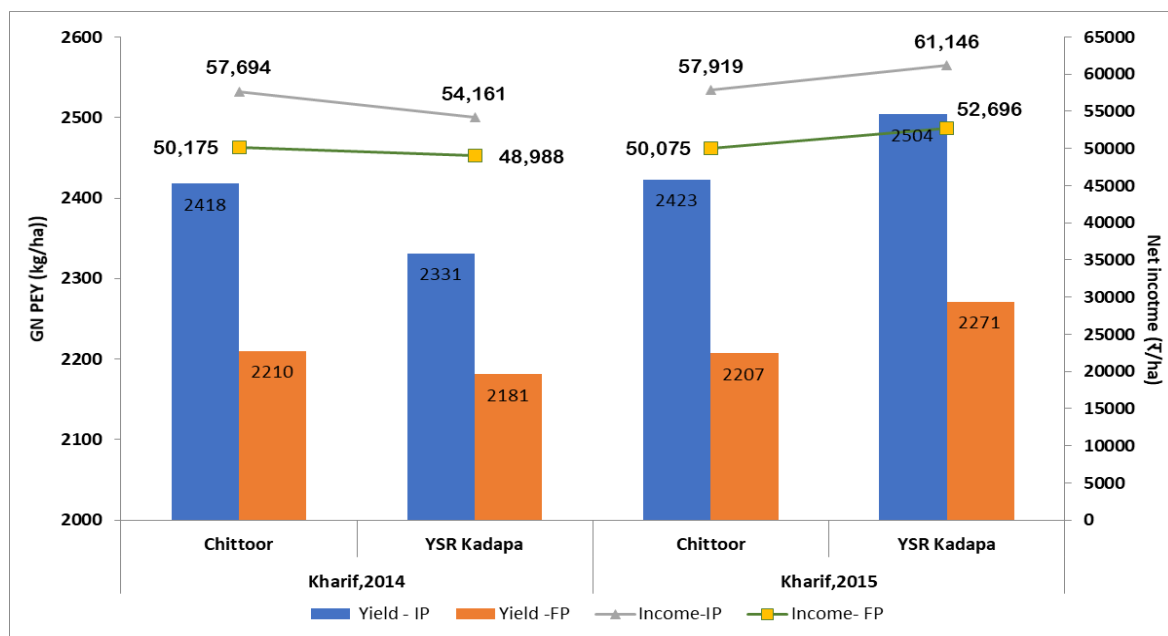


Fig 4: Performance of groundnut/redgram (7:1) inter cropping system in Chittoor and YSR Kadapa districts

## Conclusions

Study revealed that improvement in average productivity of rainfed crops was recorded in both the districts. Farmers were trained in the scientific production of rainfed crops viz., groundnut, redgram and gingelly. Stability in production and economy of rainfed crops were recorded in different locations of Chittoor and YSR Kadapa districts. During *kharif*, 2014, the average increase of groundnut pod yield over farmer practice was 65% in Chittoor and 75% in YSR Kadapa district, while it was 42% in Chittoor and 43% in YSR Kadapa district. Average net income of sole groundnut ₹ 55,000ha<sup>-1</sup> was recorded with improved practice compared to farmer practice (₹18663 ha<sup>-1</sup>). During *kharif*, 2015 average net income of ₹48,267ha<sup>-1</sup> was recorded with improved practice in groundnut compared to farmer practice (₹23,529 ha<sup>-1</sup>) in Chittoor while, it was ₹53,900 ha<sup>-1</sup> in improved practice compared to ₹ 21, 119 ha<sup>-1</sup> in YSR Kadapa district during *kharif*2015. Gingelly with improved package recorded 31% more seed yield in Chittoor, while it was 21.6%

increased seed yield was recorded in YSR Kadapa district during *kharif* 2014. Similar trend was recorded in *kharif* 2015 also. Groundnut intercropping with redgram 7:1 ratio increased the yield from unit area by efficient utilization of ground and atmospheric resources. Besides yield increase, the system provided stability of production, returns and won the confidence of dryland farmer. It was concluded that intercropping of groundnut with redgram in 7:1 row ratio is a biologically and economically sustainable intercropping system for rainfed conditions of Chittoor and YSR Kadapa districts. Moreover, improved seed which was produced is well utilized by the neighboring farmers for enhanced productivity in the ensuing seasons at village level.

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