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Research Article

YIELD GAP ANALYSIS OF GROUNDNUT IN TAMIL NADU

T. Alagumani*, M. Chinnadurai and K. Chandran

Centre for Agricultural and Rural Development Studies Tamilnadu Agricultural University,

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ABSTRACT

Groundnut crop was largely grown under rain-fed condition and are more prone to biotic and a-biotic stresses. TMV 7 was grown by majority of the sample farmers. The average yield of groundnut was 1486, and 685 Kg/ha during kharif 2015 and 2016, respectively. The yield gap –I was -386 kg/ha and 415 kg/ha during kharif 2015 and 2016, respectively. In terms of ratio it was -0.35 and 0.38 respectively during the same period. The yield gap-II was 1108 kg/ha and 1168 kg/ha in Kharif 2015 and 2016, respectively. Attainable yield gap was 0.43 and 0.63 in Kharif 2015 and 2016, respectively which indicates that yield of groundnut can be increased by 43 to 63 percent. Low and erratic rainfall, labor shortage and high cost of seeds coupled with non-availability of quality seeds of varieties and hybrids were the major constraints faced by groundnut farmers in Tamilnadu.

INTRODUCTION

Edible oils play a major role in day to day consumption. The edible oil consumption has increased from 14.06 million tonnes in 2008-09 to 23.55 million tonnes in 2016-17.The production of oilseeds in India was 25.30 million tonnes in 2015-16. Over years the oilseeds production in India is not sufficient to meet the growing demand for consumption and hence India is importing edible oils every year.

In India, groundnut is the major oil seed crop with a share of 50 per cent of the oilseed crop area and 45 per cent of edible oil production. India's productivity of groundnut was 10.4q/ha in 2016-17 kharif which found to be lower than the world average of 16.6 quintals/ha. It reveals that in India the yield of groundnut can be increased thereby the production can be increased. Groundnut production is concentrated in five states viz. Gujarat (26.34 per cent), Andhra Pradesh, Tamil Nadu, Karnataka and Maharashtra. These five states accounted for about 86 per cent of the total area under groundnut. Nearly 75 per cent of the groundnut is being cultivated in a low to moderate rainfall zone. Nearly three fourth of the groundnut production is from Kharif season (rainfed crop). In Tamilnadu, area and production of groundnut was 3.46 lakh hectares and 8.92 lakh tonnes, respectively during 2015-16.

The problem relating to agriculture in India is twofold. On one hand, the land and water resources available for cultivation are shrinking and on the other the demand for agricultural commodities are increasing.

Corresponding author:* **Alagumani T
Centre for Agricultural and Rural Development Studies
Tamilnadu Agricultural University,

It is more applicable to oilseeds. In this context, one of the options to meet growing demand is to increase production through increasing productivity.

REVIEW OF PAST STUDIES

Bhatia *et.al.*(2006), estimated yield gaps in India and reported that the total yield gap for the production zones ranged from 850 to 1320 kg per ha for soybean, 1180 to 2010 kg /ha, for groundnut, 550 to 770 kg/ ha for pigeon pea and 610 to 1150 kg/ ha for chickpea. YG II formed a significant part of the total yield gap of the four legumes, indicating the need to scale-up the improved crop production technologies from on-farm demonstration sites to farmers in the production zones. Singh *et al.* (2007) studied yield gap in mustard in U.P.and described two types of yield gap in terms of technological and extension yield gaps using frontline demonstrations data (FLD) on mustard. They reported that there was positive impact of FLD over existing practices for farming community of Lucknow district as they were motivated by the new agricultural technologies applied in the FLD plots. Farm level yield of mustard has increased on an average by 45.97 per cent as compared to local check (12.4q/ ha). Dhandhalya and Shiyani (2009) found that the average total yield gap in groundnut ranged from 75 per cent in spreading varieties to 119 per cent in case of bunch cultivars with the overall average of 85 per cent.

Jha *et.al* (2011) estimated yield gap for Rapeseed-mustard using front line demonstration data and found that the yield gap II ranged from 4.68 per cent (Madhya Pradesh) to 17.71 per cent (Uttar Pradesh) among major oilseeds growing states, All India level Groundnut yield gap I was found to be 33.21 and gap II was 19.74 per cent in 2007-08 and 2009. Globally

yield gap studies are being conducted by FAO (2015) in different countries in the context of addressing food security. It was reported that yield attained was 70-80 per cent of the potential and they are discussing on ways to reach the full potential of yield. In India, average of five years data showed yield gap of 48 per cent during kharif season and 27.44 per cent during rabi season (National Mission on oilseeds (2017). This indicated the potential to increase yield of groundnut.

Review of past studies indicated that assessment of yield and extent of yield gap in different locations and states would enable to devise suitable strategies to increase productivity and thereby production of groundnut. Hence the present study is taken up with the overall objective of assessing yield, yield gap in groundnut and to identify the constraints faced by the farmers in cultivation of groundnut in Tamil Nadu.

METHODOLOGY

Sampling*:* The sample size for kharif 2015 groundnut survey was 405. Sample farmers were drawn from 7 major districts. And for kharif 2016 survey sample size was 260 and the sample farmers were drawn from 8 districts. For rabi 2015-16 the sample size was 196 and they were drawn from five major districts.

Period of data collection: Primary data were collected from sample farmers for kharif 2015 during October 2015, for rabi season during May to July 2016 and for kharif 2016 in October 2016 by personal interview method using pre tested interview schedule.

Tools of Analysis: Percentage, average and ratio analysis were used to analyse data. Yield gap I and yield gap II were estimated for all three seasons. Yield gaps were worked out both in terms of quantity and ratio.

Yield Gap-I: Yield gap –I is the difference between potential yield and average actual yield.

Yield Gap-II: Yield gap-II is the difference between the best farmers' yield and average actual yield.

RESULTS AND DISCUSSION

General characteristics of sample farmers

Nearly 89 per cent of sample farmers were marginal and small farmers. Area under groundnut was less than one ha in 79.62 per cent of the farms. All the sample farmers raised groundnut under rainfed condition during kharif 2016.

The sources of seed to the sample farmers was analysed and it was found that nearly 77 percent of the sample farmers used their own seeds and 19.23 per cent purchased seeds from private company and 3.85 purchased seeds from Govt. department. Since the cost of seed was high farmers preferred to use their own seeds. Regarding fertilizer application it was found about 85 per cent of the farmers applied farmyard manure (FYM). DAP and Gypsum was applied by only 47.31 percent, 30.38 percent of sample farmers, respectively.

Variety: Groundnut Varieties grown by the sample farmers are given in Table1.

It could be seen from the table that 41.54 per cent of the farmers raised TMV-7 variety followed by local variety (30.38 per cent). Pollachi red, Co-2, VRI -2 and K-6 were cultivated in 7.31, 6.92, 5.77 and 5.38 per cent, respectively. The results revealed that 57 per cent of the sample farmers used groundnut varieties released by TNAU and the remaining farmers used other varieties.

Table 1 Groundnut Varieties grown during Kharif 2016

Sl.no	Varieties	Number of farmers	Percentage
1.	TMV -2	3	1.15
2.	TMV -7	108	41.54
3.	TMV-10	2	0.77
4.	VRI -1	2	0.77
5.	VRI -2	15	5.77
6.	Pollachi red	19	7.31
7.	K -6	14	5.38
8.	CO -2	18	6.92
9.	Local	79	30.38
	Total	260	100.00

Yield of Groundnut in the Sample farms of Tamilnadu

The estimated yield of groundnut in Tamilnadu state during kharif 2015, rabi 2015-16 and kharif 2016 are presented in Table 2 and 3 along with yield gaps.

Table 2 Yield Gap-I of Groundnut Variety (TMV 7) in Tamil Nadu (Kg/ha)

Sl.No.	Particulars	Kharif 2015	Rabi 2015-16	Kharif 2016
1.	Potential yield (Yp)	1100	1900	1100
2.	Mean Actual yield (Ya)	1486	739	685
3.	Yield gap (Quantity) $Y_g = Yp - Ya$	-386	1161	415
4.	Yield gap ratio $\left(\frac{Yg}{Yp}\right)$	-0.35	0.61	0.38

The average yield of groundnut during Kharif 2015was 1485.92 Kg / ha. While the average yield in Rabi 2015-16 was 739 Kg / ha. The average yield of groundnut during Kharif 2016 was only 684.54 Kg / ha. Compared to 2015, yield was found to be low in2016 due to low and erratic rainfall and no rainfall during peg formation and harvesting seasons. The farmers expressed that they could not harvest the crop due to long dry spell and no moisture in the field.

Yield Gap Analysis of Groundnut

The yield gap analysis was done in order to assess the extent of yield that can be attained with the existing technology. It assumes importance in the context of fixed land and increasing demand for land for various purposes and conversion of agricultural land to non agricultural purposes.

Yield Gap-I: Groundnut is a rainfed crop. In the sample farms, it was raised under both irrigated and rainfed condition.TMV-7 is the major groundnut variety grown in the sample farms. Yield gap 1 worked out both in terms of quantity and ratio are presented in Table 2.

It is evident from the table that under rainfed the potential yield was 1100kg /ha while the average yield was 1486 and 685 kg/ha during kharif 2015 and 2016, respectively. The gap was -386 kg/ha and 415 kg/ha during 2015 and 2016 respectively. In terms of ratio it was -0.35 and 0.38 respectively during the same period. During kharif 2015 yield was higher than the potential yield. Similar findings are reported by National Mission on Oilseeds (2017) for Tamilnadu state.

Rabi season is the irrigated crop. The potential yield is 1900 for TMV 7. Average actual yield of sample farmers was only

739kg/ha. The yield gap- I was 1161 kg/ha. In terms of ratio it was 0.61. This indicates the scope for increasing the yield.

Yield gap I was found to be high in 2016 and the main reason attributed by farmers was low rainfall.

Yield Gap-II: Yield gap II was worked out both in terms of quantity and ratio and the results are presented in Table 3.

Table 3 Yield gap-II of Groundnut Variety (TMV-7) in Tamil Nadu

Sl.No.	Particulars	Kharif 2015	Rabi 2015-16	Kharif 2016
1.	Progressive Farmers' Yield	2594	1976	1853
2.	Average actual yield	1486	739	685
3.	Yield gap (1-2)	1108	1237	1168
4.	Yield gap Ratio (3/1)	0.43	0.63	0.63

The best farmers' yield was 2594 kg/ha in Kharif 2015 and 1853 kg/ha in Kharif 2016.The gap between best farmers' yield and average actual yield was 1108 kg/ha and 1168 kg/ha in Kharif 2015 and 2016, respectively. The average yield and yield gap varied much between two years. In terms of ratio it was high in Kharif 2016 and rabi crop with 0.63 as compared to 0.43 in Kharif 2015. The results clearly indicate that there exists potential to increase farm level yield of groundnut in all the seasons. Attainable yield gap ranged from 0.43 to 0.63 which indicates that yield can be increased by 43 to 63 percent.

Constraints in groundnut production

The constraints faced by the sample farmers in groundnut production during kharif season are given in Table 4.

Table 4 Groundnut production constraints of the sample farmers

S.No	Particulars	Percentage of sample farmers
1.	Low and erratic rainfall	90.77
2.	High cost of seeds	30.45
3.	Labour shortage	15.38
4.	Pest and disease	3.08
5.	Low profit	5.00
6.	Damage by birds and animals	1.92

It is evident from the table that 90.77 per cent of the sample farmers reported that low and erratic rainfall was the major constraint in groundnut cultivation followed by high cost of seeds. Labor shortage and pest and disease were reported by 15.38 and 3.08 per cent of the farmers, respectively. Low profit and damage by birds and animals were reported by 5 and 1.92 per cent of the farmers, respectively.

CONCLUSIONS AND POLICY IMPLICATIONS

Groundnut crop was largely grown under rain-fed condition and are more prone to biotic and a-biotic stresses. The average yield of groundnut was 1486, 739 and 685 Kg/ha during kharif 2015, rabi 2015-16 and kharif 2016, respectively. The yield was lower due to erratic rainfall and limited adoption of improved varieties and technologies. This led to yield gap. Yield gap II is the attainable gap and it was found to be higher which indicates the scope for increasing the yield of groundnut at farm level. Necessary focused efforts may be taken to reduce the yield gap in groundnut there by increasing the yield. The new varieties released have to be popularized and quality seeds at subsidized rate may be distributed to the farmers through the state agricultural extension system.

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