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Evaluation of cluster front line demonstration trials on groundnut in Ariyalur district of Tamil Nadu

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Abstract
Front Line demonstrations(FLDs) is a unique approach to provide an direct interface between researcher and farmers as the scientists are directly involved in planning, execution and monitoring of the demonstrations for the technologies developed by them and get direct feedback from the farmers' field about the crops. Thus, FLDs provide an opportunity to researchers and extension personnel for understanding the farmer's resources and requirement to fine tune and/or modify the technologies for easy adaptability at farmers' fields. The cluster frontline demonstrations (CFLDs) on groundnut were conducted by Krishi Vigyan Kendra, Ariyalur during kharif season in village of Kasankottai in T.Palur Block. All 75 demonstrations on groundnut crops were carried out in area of 30 ha by the active participation of farmers with the objective to demonstrate the improved technologies of oil seeds production potential. The improved technologies consisting use of improved variety, seed treatment with *Pseudomonas flurocensence*, mechanized sowing, integrated nutrient, and weed management, pest and disease management. Cluster frontline demonstrations recorded higher yield as compared to farmer's local practice. The improved technology recorded highest yield of 1759 kg/ha in demonstration plot of variety GJG 9 at village Kasankottai at T.palur block of Ariyalur district.

Keywords: Evaluation, cluster front line demonstration trials, groundnut, Ariyalur district, Tamil Nadu

Introduction
Groundnut, the king of oil seeds is one of the important legume crops is cultivated predominantly under rain-fed conditions in the tropical and semiarid tropical countries including India, where it provides a major source of oil, carbohydrates and proteins (Bhauso *et al*., 2014b). The seed is used mainly for edible oil and contains nearly half of the essential vitamins and one-third of the essential minerals. Hence, groundnut played an important role in nutritional security to the resource poor farmers. In addition, the haulms provided excellent fodder for livestock, cake obtained after oil extraction was used in animal feed and overall the crop acted as good source of biological nitrogen fixation (Nautiyal *et al*, 2011) [5].
Groundnut is the sixth most important oilseed crop in the world. It contains 48-50% of oil and 26-28% of protein, and is a rich source of dietary fiber, minerals, and vitamins. Globally, the crop is raised on 26.4 million hectares with a total production of 37.1 million MT. The average productivity is 1400 kg/ha. India shares 22 per cent of the world production (area 4.9 m.ha, production 5.8 m. tonnes). The area under rainfed groundnut in Tamil Nadu is 4.4 lakh hectares with a production of 9.11 lakh tones during *Kharif* 2016-17.
Keeping this in view, frontline demonstrations on groundnut was undertaken to improve the productivity and profitability of groundnut with proven improved production technologies on farmer's fields.

Materials and Methods
To assess the economic feasibility of technology transfer for crop management and better productivity of groundnut, the front line demonstrations were conducted on 75 farmers field of adopted village Kasankottai of Ariyalur district in Central part of Tamil Nadu during *kharif* season of 2016-17 in rainfed condition on medium to heavy soil with medium fertility status under Blackgram – Groundnut cropping system. The average rainfall of this area was 365 mm with 19 rainy days. Each demonstration was conducted on an area of 0.40 ha and the same area adjacent to the demonstration plot was kept as farmer's practices. The package of improved production technologies included high yielding variety GJG 9, fertilizer 25:50:75 kg NPK as

per schedule. Seeds were treated with *Pseudomonas* @ 10g kg^{-1} seed and inoculated with Rhizobium @ 10 g kg^{-1} seed. Seed sowing was done between August to September in every year with a seed rate of 125 kg /ha in line sowing with row to row spacing of 30 cm and 10 cm between plants in the row or broad casting. Optimum plant population was maintained in the demonstrations. Recommended dose of fertilizer was applied through urea, DAP and MOP as basal application. Two hand weeding was done at 25 and 45 DAS for control of weeds. Groundnut rich spraying @ 5kg/ha at peak flowering stage and pod formation stage for bold grains. The crop was harvested during December after the leaves turn yellow and start dropping. In the second plot, locally available mix seed of groundnut treated with Carbendazim 50WP @ 2 g kg^{-1} was sown with basal dose of DAP 50 kg ha^{-1} and maintained as farmers practice.

The data on seed yield, cost of cultivation and gross and net return were collected from technological demonstration plot. In addition to this, data on farmer practices were also collected from the equal area. The benefit cost (B: C) ratio was calculated based on gross return.

Results and Discusson

The major differences were observed between demonstration package and farmer's practices are regarding recommended varieties, seed treatment, time of sowing, fertilizer dose, method of fertilizer application and plant protection measures. Table 1 shows that under the demonstrated plot only recommended varieties and bio-agents were given to farmer by the KVK and all the other package and practices were timely performed by the farmer itself under the supervision of KVK scientist. Under farmers' practice, they generally sow seed of groundnut varieties VRI 2 & local at higher seed rate without treatment. Both these varieties grow by farmers found susceptible to root rot and tikka leaf spot disease. As a result, the farmers selected under FLD programme on groundnut were provided with the seed of groundnut variety GJG 9. It is also observed that under farmer situation, normally sowing of groundnut is earlier to escape from water shortage for irrigation, thus leading to reduction in yield. Regarding the method of fertilization, under demonstration, all fertilizers were drilled at the time of sowing, whereas, under farmers' practice, broadcast method of fertilization was adopted. Similar findings have also been observed by Chandra (2010) [1] and Raj *et al*. (2013) [3]. Results concluded that average higher yield 1516 kg/ha were found in demonstration plot of variety GJG 9 followed by 1190 kg/ha in control plot (Table 2) of the same village.

The Gross returns and Net returns of demonstration plot was Rs. 93,912/- and Rs. 56,403/- per ha and for control Rs. 62,586/- and Rs. 24,244/- per ha, respectively. B: C ratio for demonstration and control was 2.51and 1.63 respectively (Table 2). This improvement in yield might be due to the application of seed treatment, use of bio fertilizers, timely sowing, application of recommended dose of fertilizers, proper and timely weed management and integrated pest management practices. The results indicated that the frontline demonstrations gave good impact over the farming community of Ariyalur district as they were motivated by the new agricultural technologies applied in the FLD plots (Table 1). This finding is in corroboration with the findings of Poonia and Pithia (2011) [2].

Reasons for low yield of black gram at farmers' fields: Optimum sowing time 1 was not followed due to non availability of quality seed. More than 90 per cent of the farmers had been sowing seed as broadcast method due to which the plant population was sometimes more 2-3 times more than the recommended one. Lack of popularization of seed cum fertilizer drill for sowing and use of inadequate and imbalance doses of fertilizers especially the nitrogenous and phosphatic fertilizers by farmers could not result into potential yield. Chemical control was also quite uncommon in this region grain yield over the local check.

Table 1: Details of need based input material given on CFLDs of Groundnut

Crop	Variety	Cluster village	Demo. Area (ha)	No. Of Demo.	Technology demonstrated	Need based inputs
Groundnut	GJG 9	Kasankottai	30	75	Seed and soil application of *Trichoderma viridi* @2.5 kg/ha STL based fertilizer application Application of TNAU Mn mixture @12.5 kg/ha. Application of post emergence herbicide pursuit 875 ml/ha. Spraying of groundnut rich @10kg/ha Spraying of NPV virus @1lit/ha Setting of pheromone trap @12 Nos./ha Foliar spraying of carbendazim + Mancozeb @ 250g + 1 kg/ha.	Seed VBN 6, *Pseudomonas* Yellow sticky Trap Pheromone trap (Spoda lure) Groundnut rich

Table 2: Details of yield and economics of cluster frontline demonstration on Groundnut

Yield obtained (q/ha)						Yield increase (%)	Expenditure and returns (Rs./ha)								Net returns increase (%)
Check			Demo				Check				Demo				
Max	Min	Av.	Max.	Min	Av.		Gross Cost (Rs/ ha)	Gross return (Rs/ ha)	Net Return (Rs/ha)	B:C ratio	Gross Cost (Rs/ ha)	Gross return (Rs/ ha)	Net Return (Rs/ha)	B:C ratio	
13.5	9.7	11.9	17.5	12.0	15.6	31	38,342	62,586	24,244	1.63	37,508	93,912	56,403	2.51	132.6

Conclusion

In the frontline demonstrations there was an increase of 31 per cent in grain yield over the local check. Such increase was recorded with net returns increase was 132 per cent. As found in the results the BCR (2.51) was sufficiently high to motivate the farmers for adoption of the technologies. These demonstration trails also enhance the relationship and confidence between farmers and KVK scientists. The

recipient farmers of FLDs also play an important role as source of information and quality seeds for wider dissemination of the improved varieties of groundnut for other nearby farmers. It is concluded that the FLD programme is a successful tool in enhancing the production and productivity of groundnut crop through changing the knowledge, attitude and skill of farmers.

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