Original Research Article

Impact of front line demonstration on Redgram in farmers field through a cluster approach

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Abstract

A total 175 cluster frontline demonstrations (CFLDs) on pigeon pea were conducted by Krishi Vigyan Kendra, Palem, Nagarkurnool during 2019-20 to 2021-22 respectively with Redgram variety PRG-176 in KVK, Palem operational area. The critical inputs were identified in existing production technology through farmers meetings and group discussion. The findings in respect of pigeon pea overall yield trend of demonstrations ranged from 12.50 to 13.00 q/ha and yield increase ranged from 11.11 to 11.84 per cent an over the local practices yield, respectively. The yield levels were considerably lower under local practices because of considerable variation in the extent of adoption of recommended technology depending upon the amount of risk involved in terms of cost, convenience, skill and knowledge about the concerned practice. Average extension gap, technology gap and technology index of pigeon pea was found to be128.3, and 125 per cent and 8.93, per cent, respectively. Average gross returns and net returns of demonstration in pigeon pea crop was 72895 and 47045 per cent higher than the farmers' practices respectively. Average benefit cost ratio was found higher throughout the study in pigeon pea i.e.2.8 respectively. Variations in agro-climatic factors, soil fertility, biotic stressors, socioeconomic position, and management techniques were found to cause variations in the technology gap and index percentage. As a result, it is abundantly obvious from the data that the frontline demonstration programme's employment of better varieties, packaging, and techniques along with scientific intervention has helped to raise the productivity and profitability of pulses in the state of Telangana.

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Key words: CFLD, Redgram, Yield, Farmers and Returns

Introduction

Pulses constitute a very important dietary constituents for human and animal because of their richness with proteins (ranging from 20 to 24 per cent, depending upon the crop species) and essential minerals, vitamins and dietary fibres. The protein content of grain legumes is double that of wheat and three times that of rice. Grain legumes have three times as much protein as rice and twice as much as wheat. As a result, adding pulses to cereals is one of the greatest ways to combat protein-calorie malnutrition. These are a significant source of the 15 necessary minerals that humans need in addition to proteins. Pulses hold a special role in India's nutritional food security for the nation's constantly expanding population as well as the poorer segments of society who cannot afford other sources of protein. India is the largest producer in the world, with 26 per cent stake in the worldwide production by generating 25.23 million tonnes of pulses from an area of 29.99 million hectares. Compared to the global average production of 1023 kg/ha, the average productivity of the country is approximately 841 kg/ha. (DES, 2018).

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Indian farmers have covered 134.02 lakh ha under kharif pulses as on 27th September 2019 as against 136.40 lakh ha last year. Redgram was covered in 45.82 lakh ha as against 45.74 lakh ha last year. In India, major redgram producing states are Maharashtra (12.07 lakh ha), Karnataka (11.93 lakh ha), Madhya Pradesh (5.06 lakh ha), Uttar Pradesh (3.51 lakh ha), Telangana (2.86 lakh ha) and Gujarat (2.15 lakh ha). Redgram is an important rainfed crop in the state of Telangana which is cultivated in about 1.95 lakh ha. It is an integral component of various cropping systems and is grown sole or as an intercrop with groundnut, millets, cotton and other pulses and the major growing districts are Mahbubnagar, Adilabad, Ranga Reddy, Medak, Nalgonda, Warangal and Khammam districts. The average productivity of Redgramin Telangana is 776 kg/ha in 2021-22 (Redgram Outlook, July 2021, Telangana state).

The potential yield of pulse crops is diminishing due to Redgram cultivation using a traditional farming system, non-adoption of recommended production technologies because of ignorance and lack of belief about cutting-edge technologies, and significant abiotic and biotic stressors. Currently, the National Food Security Mission (NFSM) of the Indian government has created Cluster Front Line Demonstrations (CFLDs), which are crucial in the introduction of better pulse varieties and production technologies. Thus, it can be concluded that cluster front-line demonstration is a successful extension intervention to show farmers the possibility for increased production of pulse crops. As a result, it is advised that extension agencies involved in the transfer and application of agricultural technologies on farmer's fields give priority to organising frontline demonstrations on a cluster basis for maximising the productivity potential of pulse crops, minimising the technology gap, accelerating technology adoption, and reducing disease and insect infestation.

Materials and Methods

Cluster front line demonstrations (CFLDs) are among the most effective extension strategies because, in general, farmers are motivated by the idea that "Seeing is believing." Cluster frontline demos' major goal is to display recently released crop production and protection technology, as well as their management techniques, in a farmer's field in a microfarming environment. Under centrally sponsored scheme on pulses production and protection technology under National Food Security Mission scheme, the KVK, Palem had conducted the cluster front line demonstrations on pulse crops during kharif and rabi season 2019-20 to 2021-22. Krishi Vigyan Kendra, Palem, Nagarkurnool organised 150 CFLDs with 150 acres on pigeon pea in KVK,Palemoperational area and adopted villages viz Khnapaur, Gorita, Ippalapally, Manthati and Nallavelly of Thimmajipet, Binepallyand Ngarakuronnlmandals of Nagarkurnool district in Red chalka soils and rainfall recorded in the demonstration area during 2019-20 to 2021-22 was 650 mm. The total area of 60 ha was covered for the pigeon pea demonstrations, respectively (Vijaya Lakshmi,*et al.*, 2017). A list of farmers was prepared from group meeting and specific skill training was imparted to the selected farmers regarding different aspects of recommended production and protection technologies. The technological interventions on pulse crop were comprised of suitable improved and short duration variety of pigeon pea that was PRG-176 and demonstrated with full package of practices like,deep summer ploughings, optimum seed rate, time of sowing and sowing method, balanced dose of fertilizer (18 kg Nitrogen 46 kg P2O5/ha), Trichoderma and Rhizobium culture @ 5 gm/kg of seed as seed treatment, timely irrigation, weed management and improved plant protection measure were applied (Table 1) at farmers' fields. In this demonstration control plot was also kept where farmers practices were carried

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out (use of non-descriptive varieties, regular farm practices viz. broadcasting sowing method, no use of fertilizer, one hand weeding and indiscriminate use of plant protection measures). The demonstrations on farmers' fields were monitored by scientists of KVK, Palem right from sowing to harvesting and made to guide them. These visits were also used to gather feedback data for future research and extension programme improvements. Through demonstrations, the extension scientists in this cluster identify any gaps in the farmers' growing techniques. They also determine the adoption rate depending on the farmers' adoptability.

The gaps were categorized into three groups and given scores like full adoption (No Gap)-1, partial adoption (partial gap) -2 and no adoption (Full gap)-3 scores respectively. The yield data were collected from both the demonstration and farmers practice by random crop cutting method and analyzed by using simple statistical tools (Rajashekar, *et al.* 2018). Adoption gap index was calculated using the formula given by Dubey *et al.*, (1981). Adoption gap index is the per cent deviation in farmers practices as compared to the improved practices.

$$\text{Adoption gap index} = \frac{(R - A)}{R} \times 100$$

Where R = Total no. of improved practices

A = No. of improved practices actually adopted by the farmer

Yield parameters of both demonstrations and check involving farmers practices were recorded. Using the yield parameters extension gap, technology gap, yield gap, technology index was calculated as procedure suggested by Samui *et al.* (2000) & (Rajashekar *et al*, 2022).

Extension gap (q/ha) = Demonstrations yield – Yield under existing farmer's practice

Technology gap (q/ha)= Potential Yield – Demo. Yield

Additional return = Demonstration return – farmer's practice return

$$\text{Yield Gap (\%)} = \frac{\text{Extension gap}}{\text{Yield under farmers practice}} \times 100$$

$$\text{Technology Index (\%)} = \frac{\text{Technology gap}}{\text{Potential yield}} \times 100$$

Results and Discussion

With technology involvement, the better package and methods are more crucial for the production and profitability of pulses. Detailed materials and procedures with technology assistance for advised practises (Table 1). Additionally, it was noted that farmers largely avoided using fungicides and used insecticides injudiciously and against recommendations. Similar observations were reported by Singh *et al.*, (2011).

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Grain yield and gap analysis of red gram

The grain yield and gap analysis of Redgram in demonstrated field's and farmer's practice is presented in Table 2. Data revealed that average grain yield of demonstrated field's was higher from farmer's practice in all the years. The results revealed that average grain yield of Redgram under cluster frontline demonstrations were 1275 Kg ha-1 as compare to 1147Kg ha-1 recorded in farmer's practice and average yield increased i.e 11.20 per cent, respectively. The above finding was in accordance with Singh *et al*., (2018). The extension gap 128 Kg ha-1 technology gap 125 Kg ha-1 and technology index 8.93 was recorded (Table 2). This Extension gap should be assigned to adoption of improved dissemination process in recommended practices which outcome in higher grain yield than the farmer's practice.

Economics analysis of red gram

Economic performance of red gram under cluster frontline demonstration was depicted in table 3. The economic analysis results revealed that the redgram recorded higher total return from recommended practice (CFLD's) were 69375.00 Rs.ha-1 in 2019-20 and 73450. 00 Rsha-1 in 2020-21 and 75862 Rs.ha-1 in 2021-22 as compared to 62437, 66387 and 67830.00Rsha-1 farmer's. practice respectively. The net returns were 43125, 48150 and 49862 in recommended practice in comparison to 26187, 30887 and 32830 Rs. ha-1 and Rs. ha-1 respectively in farmer's practice. It was economically observed that average additional returns were 17077.00 Rs. ha-1 in recommended practice in both the years. The benefit cost ratio also recorded higher in recommended practice with 2.8 as compared to 1.8 in farmer's practice in both the years. The higher net returns and B: C ratio in red gram demonstration might be due to the higher grain yield and better pricing of the produce in the market.

Table1: Differences between technological intervention and farmers practices under FLD on Red gram

Particulars	Technological intervention in FLD	Farmers practices	Gap
Variety	PRG-176	Local/own seed	Full gap
Seed rate	7.5 kg/ha	10 kg/ha	High seed rate
Sowing method /Spacing	150 X 20 cm, sowing with seed cum fertilizer drill	Line sowing, un even plant population	Partial gap
Time of Sowing	June 15th to 31st July	June 15th to 15th July	Partial gap
Seed treatment	Seed treatment was done with *Trichoderma* and *Rhiozibium*	Seed treatment was not by done	Full gap
Fertilizer Dose	Balanced fertilization as per soil test values 44 kg of urea in split doses and 312.5 kg of SSP as basal dose.	Imbalance use of fertilizer 20 Kg urea as basal and 50 Kg DAP as top dressing.	Full gap
Weed management	Pre emergence herbicides Pendimethalin 1 lit per acre and post emergence herbicide Imazethapyr 250 ml acre at15-20 DAS.	Manual weeding / weeding with bullocks	Full gap

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Plant Protection	Neem oil @ 5ml/lit and Chlorophyriphos @2.5 ml/lit for control of sucking pest. Emmamectine benzoate 100 grams per acre Chlorontrinilprole80 ml per acre	Injudicious use of and insecticides and fungicides.	Full gap

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Table 2: Grain yield and gap analysis of cluster frontline demonstrations on Redgram

Year	No. of Demonstrations	Average yield Kg ha-1		% Increase in Recommended Practice (RP)	Extension gap (Kg ha-1)	Technology gap (Kg ha-1)	Technology Index
		Demonstration	Farmers				
2019-20	50	1250	1125	11.11	125	150	10.71
2020-21	50	1300	1175	10.64	125	100	7.14
2021-22	50	1275	1140	11.84	135	125	8.93
Average	**50**	**1275**	**1147**	**11.20**	**128**	**125**	**8.93**

Table 3: Economic analysis of the cluster frontline demonstrations on Redgram

s. no		Total returns (Rs.ha-1)		Input cost (Rs.ha-1)		Net return (Rs.ha-1)		Additional return (Rs.ha-1) FLD's	B:C ratio	
1	Year	**Recommended Practice (RP)**	**Farmer's Practice (FP)**	**Recommended Practice (RP)**	**Farmer's Practice (FP)**	**Recommended Practice (RP)**	**Farmer's Practice (FP)**		**Recommended Practice (RP)**	**Farmer's Practice (FP)**
2	2019-20	69375	62437	26250	36250	43125	26187	16937	2.64	1.72
3	2020-21	73450	66387	25300	35500	48150	30887	17262	2.90	1.87
4	2021-22	75862	67830	26000	35000	49862	32830	17032	2.92	1.94
	Average	72895	65551	25850	35583	47045	29968	17077	2.8	1.8

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Conclusion

The CFLD programme is a useful tool for boosting pulse production and productivity as well as altering farmers' knowledge, attitudes, and abilities. The per cent increment in yield of pulses to the extent of 11.11 to 11.84 in Redgram and CFLDs over the farmers practise created greater awareness and motivated the other farmers to adopt the improved package of practises of pulses. These demonstrations also built the relationship and confidence between farmers and scientists. The FLD recipients also play a significant role as a source of knowledge and high-quality seeds for the widespread distribution of high-yielding pulse varieties to other nearby farmers.

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