Front Line Demonstrations on Improved Management Practices in Redgram - A Cluster Approach

V. Jyothi[1] and P. Venkata Subbaiah[2]

1. Asstt. Prof. (Agril. Ext.), 2. Asstt. Prof. (Soil Sci.), Agricultural College, Bapatla, AP (ANGRAU, Guntur, AP)

Corresponding author e-mail: jyothyext@gmail.com

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ABSTRACT

In view of the delayed onset of monsoons the redgram variety LRG 52 named Amaravathi having medium duration was introduced in farmers fields during 2016-17 and 2017-18 by way of Front Line Demonstrations in cluster approach. A total of 30 Front Line demonstrations were organized in cluster approach in 30 ha in Krishna district of Andhra Pradesh. Along with the varietal introduction the whole package of improved management practices were demonstrated. The potential yield of the demonstrated variety LRG 52 is 22.50 q/ha. A highest yield of 18.75 q/ha was recorded in the demo fields, while the lowest yield recorded was 17.00 q/ha with an average yield of 17.80 q/ha. The check variety recorded an average yield of 12.50 q/ha. In the demonstration plot the average gross cost recorded was Rs. 27,000/ha, with an average gross return of Rs. 80,100/ha, accounting to the average net return of Rs. 51,450/ha with a benefit cost ratio of 2.79:1. In the check plot average gross cost recorded was Rs. 28,650/ha, with an average gross return of Rs. 56,250/ha, accounting to the average net return of Rs. 27,600/ha with a benefit cost ratio of 1.96:1. The demonstrated improved practices were found to be superior when compared to farmers practice. The farmers expressed positive attitude towards the technology.

Key words: *FLD; Cluster approach; LRG 52; Improved practices;*

Redgram is an important rainfed crop in the state of Andhra Pradesh which is cultivated in about 11 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. For the past 60 years redgram productivity in Andhra Pradesh stagnated around 6 q/ha. The major problem in redgram cultivation being terminal moisture stress. At this juncture Acharya N G Ranga Agricultural University (ANGRAU) developed a redgram variety LRG 52 named Amaravathi having an yield potential of 22.50 q/ha. It reaches maturity in 150 days and is moderately tolerant to helicoverpa, maruca, pod fly, fusarium wilt and sterility mosaic diseases. It is bold seeded and has good dal recovery.

Redgram is a pulse crop with six months duration. It is categorized as long duration crop with existing varieties of 160 to 180 days duration. With the onset of south west monsoons farmers are expected to take up the crop sowings in Andhra Pradesh. But it is observed that in the past few years the monsoons are delayed. Hence it is opportune to plan for a varietal diversification/ replacement with medium duration varieties when compared to the existing long duration varieties. Farmers usually prefer to grow redgram variety LRG 41 in Krishna and Guntur districts of Andhra Pradesh. A high yielding variety LRG 52 named Amaravathi with the whole package of improved practices is demonstrated in farmers fields during 2016-17 and 2017-18 consecutively and its impact was assessed.

METHODOLOGY

The redgram variety LRG 52 was introduced in farmers fields during 2016-17 and 2017-18 by way of Front Line demonstrations in cluster approach. A total of 30 Front Line demonstrations were organized in cluster

approach in 30 ha in Balsupadu and Beemavaram villages in Jaggaiahpet and Vastavai mandals of Krishna district in Andhra Pradesh. Soils are red chalka. The rainfall recorded in the demonstration area during 20016-17 was 520 mm and in 2017-18 was 535 mm. Along with the varietal introduction the whole package of improved management practices were also demonstrated as presented in Table 1. Farmers practices were compared with improved management practices to identify the adoption gaps. The gaps were categorized into three groups as no gap given a score of 1, partial gap given a score of 2 and full gap given a score of 3. Based on the scores obtained by the individuals, considering mean and standard deviation the respondents were categorized as low (Mean – 0.5 SD), medium (Mean $\pm$ 0.5 SD) and high (Mean + 0.5 SD). 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 were calculated as procedure suggested by *Samui et al. (2000)*.

Extension gap (q/ha) = Demonstrations yield – Yield under existing farmers practice

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

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

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

Economics of the demos and check were recorded. Based on economics additional cost, effective gain, additional returns, incremental B: C ratio were calculated.

Additional cost (Rs.) = Demo.Cost (Rs.) - Farmers' Practice Cost (Rs.)

Additional returns (Rs.)= Demo. returns (Rs.) - Farmers' Practice returns (Rs.)

Effective gain (Rs.) = Additional Returns (Rs.)-Additional cost (Rs.)

Incremental B:C ratio = Additional Returns/ Additional Cost

Paired t test was applied to know if there exists a significant difference in the economics of demo and check. A set of advantages were given and the participating farmers were asked to rank them. Based on the ranks percent position is calculated to arrive at Henry Garret scores as suggested by *Dhanavandan (2016)*.

$$\text{Percent position} = \frac{100\ (Rij - 0.5)}{Nj}$$

Where

Rij = Rank given for the ith variable by jth respondents

Nj = Number of variable ranked by jth respondents

Based on the calculated Garret Total Score the% Garret scores for the perceived scores were calculated and Garret Ranks were assigned.

RESULTS AND DISCUSSION

Adoption gaps: Full gap was identified for varietal stratergy, land preparation, seed treatment, irrigation,

Table 1. Identified adoption gaps in Redgram crop management practices

Item	Improved practice	Farmers practice	Gap
Variety	LRG-52(Medium duration)	LRG 41(Long duration)	Full gap
Land preparation	Deep ploughing with MB plough	Tractor drawn cultivator	Full gap
Seed treatment	Carbendazim 50% WP @ 2.5 g/kg seed, imidacloprid 18.6 SL @ 3.0 ml/kg seed	No seed treatment	Full gap
Sowing time	June-July (kharif)	June-July (kharif)	No gap
Seed rate	5-7.5 kg	5-7.5 kg	No gap
Fertilizer	20-50-00 NPK kg ha^{-1}	18-46-00 kg ha^{-1}	Partial gap
Weed Control	Pre-emergence herbicide Pendimethalin @ 1.0 kg a.i/ha and harrowing at 25-40 DAS	Harrowing at 25-40 DAS	Partial gap
Irrigation	Irrigation at flower bud stage to avoid moisture stress	Not irrigated	Full gap
Plant protection	IPM practices for pod borer management	IPM not practiced	Full gap
Harvesting	Mechanical harvesting	Manual harvesting	Full gap

Table 2. Distribution of respondents based on adoption gaps

Category	No.	%
Low (Mean – 0.5 SD)	6	20.00
Medium (Mean ± 0.5 SD)	6	20.00
High (Mean + 0.5 SD)	24	60.00

Mean = 2.4 SD = 0.8

Table 5. Profit through improved management practices in redgram by paired t test

Item	IP	FP	Diff.	t value
Yield (Kg/ha)	1780	1250	530	3.68*
Total return (Rs./ha.)	80100	56250	23850	2.77*
Profit (Rs./ha.)	51450	27600	23850	2.22*

IP=Improved Practice; FP=Farmers Practice;

Table 3. Yield details of rRedgram crop management practices

Details	No.of Demo.	Area (ha)	Potential yield (q/ha)	Yield (q/ha)				% increase inYield
				Demonstration			Check variety	
				High	Low	Average		
LRG 52/ Rainfed	30	30	22.50	18.75	17.00	17.80	12.50	42.40

Table 4. Economics of redgram crop management practices

Variety details	No.of Demos	Area (ha)	Economics of Demonstration (Rs./ha)				Economics of check (Rs./ha)			
			GC	GR	NR	BCR	GC	GR	NR	BCR
LRG 52	30	30	27000	80100	51450	2.79:1	28650	56250	27600	1.96:1

GC=Gross cost; GR=Gross returns; NR=Net returns BCR=Benefit Cost Ratio;

Table 6. Perception of the respondents on the improved redgram variety LRG 52

Item	Garret Total Score	% Garret score	Garret Rank
Crop duration reduced by three weeks	1843	12.44	I
More branching with good number of filled pods	1762	11.90	II
Escapes terminal moisture stress	1700	11.48	III
High yielding	1677	11.32	IV
Less flower drop	1620	10.94	V
Suitable for mechanical harvesting	1617	10.92	VI
More fruit setting	1615	10.90	VII
No pod fly incidence	1490	10.06	VIII
Less height so easy to move in fields and take up sprays	1487	10.04	IX

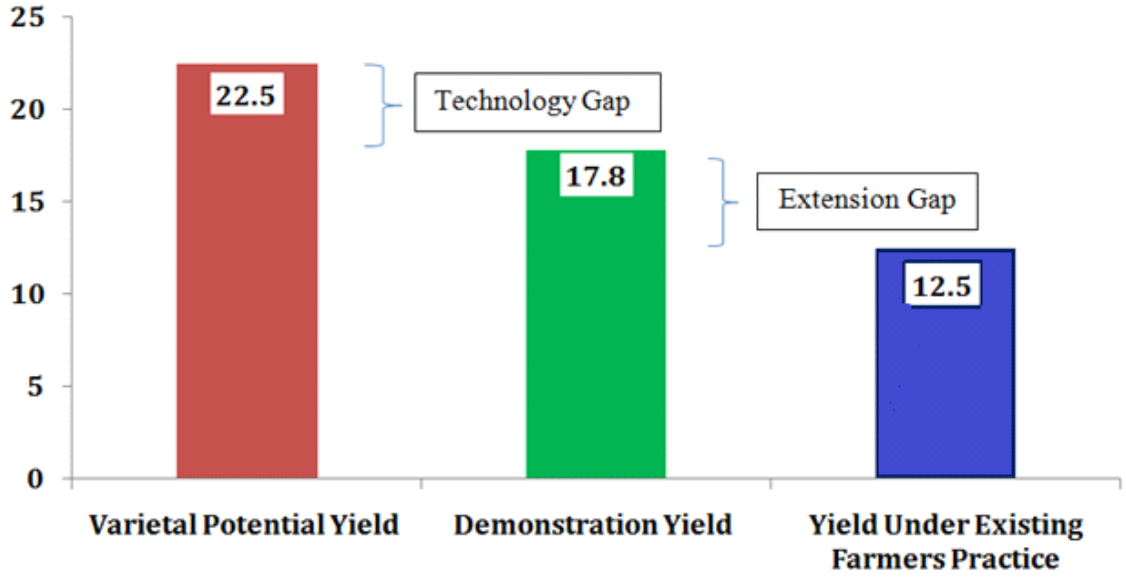

Fig 1. Graphical representation of technology gap and extension gap

plant protection, harvesting. Fertilizer management and weed control showed partial adoption gaps. Sowing time and seed rate showed no adoption gap as presented in Table 1. The distribution of the respondents based on adoption gaps revealed that 60.00 per cent of them were observed with high adoption gap, while equal proportion of 20.00 per cent each were observed in medium and low adoption gaps as presented in Table 2. There is every need to educate the farmers on improved practices of crop management.

Adoption gap index: The Adoption gap index was calculated and found to be 80.00 per cent which indicates that there is urgent need for technological interventions by the scientists. Hence it was planned to take up the Front Line demonstrations in farmers fields following cluster approach.

Yield details: The potential yield of the demonstrated variety LRG 52 is 22.50 q/ha. A highest yield of 18.75 q/ha was recorded in the demo fields, while the lowest yield recorded was 17.00 q/ha with an average yield of 17.80 q/ha. The check variety recorded an average yield of 12.50 q/ha as presented in Table 3. This indicates that the demo performed superior than check. Based on the yield details extension gap, technology gap, yield gap, technology index were calculated and also represented in Fig 1.

Extension gap: The difference between demonstrated yield and yield under existing farmers practice is extension gap. It is recorded as 5.30 q/ha in this study and it should be filled by various extension methods. Information on improved practices need to be disseminated through training programmes, awareness programmes, communication through print & electronic media, etc. extension personnel intervention to reduce this gap is required. The increased awareness created by the extension functionaries would motivate the farmers to adopt improved practices and there by reduce the extension gap. The findings are in line with that reported by *Kulkarni et al. (2018)*

Technology gap: The difference between the potential yield of the variety and demonstration yield is technology gap. It is recorded as 4.70 q/ha in this study. It indicates that still there is gap in technology demonstration as a result of which the potential yield of the improved practices could not be reaped by the participating farmers. It may be due to changing climatic and soil conditions also which cannot be avoided. The findings are in line with that reported by *Vijaya Lakshmi et al. (2017)*

Yield gap : The ratio between extension gap and farmers yield expressed in percentage is yield gap. It is recorded as 42.40% in this study. This has arises as a result of extension gap. With extension intervention for increased awareness of the improved practices the yield gap can be reduced.

Technology index: The ratio between technology gap and potential yield expressed as percentage is technology index. It is 20.80 per cent in this study. This has arises as a result of technology gap. With adoption of improved practices the technology gap can be reduced as a result technology index will be reduced. The findings are in line with that reported by *Balai et al. (2013), Raj et al. (2013)*

Economics: The economics of the demonstrations as presented in Table 4 indicated that in the demonstration plot the average gross cost recorded was Rs. 27,000/ha, with an average gross return of Rs. 80,100/ha, accounting to the average net return of Rs. 51,450/ha with a benefit cost ratio of 2.79:1. In the check plot average gross cost recorded was Rs. 28,650/ha, with an average gross return of Rs. 56,250/ha, accounting to the average net return of Rs. 27,600/ha with a benefit cost ratio of 1.96:1 as presented in Table 4.

The profits obtained through improved management practices were shown using paired t test as shown in Table 5. The demo was found to be superior in performance in terms of yield, total returns and profits over the check. A yield difference of 5.3 q/ha was observed between demo and check. The difference in total return observed was Rs. 23,850/ha and the profit recorded was Rs. 23,850/ha over check. The calculated t values showed significant positive difference between improved practice and farmers practice. Improved practice was found to be superior to farmers practice.

Additional cost, effective gain, additional returns, incremental B: C ratio were calculated and found that farmers practice incurred an additional cost of Rs.1650/ ha compared to demonstration. As a result of the demonstrations an additional returns of Rs.23850/ha was recorded in demo plot. The effective gain noticed in demo was Rs.25500/ha with an incremental B:C ratio of 14.45.

Farmers feedback: Further the feedback on the

perception of the respondents on the improved redgram variety LRG 52 is presented in Table 6. The results revealed that the farmers perceived the advantages of LRG52 as crop duration reduced by three weeks (Rank I), more branching with good number of filled pods (Rank II), escapes terminal moisture stress (Rank III), high yielding (Rank IV), less flower drop (Rank V), suitable for mechanical harvesting (Rank VI), more fruit setting (Rank VII), no pod fly incidence (Rank VIII), less height so easy to move in fields and take up plant protection sprays (Rank IX).

CONCLUSION

Organization of Front Line Demonstrations in cluster approach is good practice to influence not only the participating farmers but also the neighbouring farmers. As the demonstrations are conducted under the supervision of the scientist in farmers fields they are more authentic and results could to generalized to that vicinity. The demonstrated improved practices are superior when compared to farmers practice. The farmers expressed positive attitude towards the demonstrations through their perception on the technology. However the technology need to be popularized to decrease the extension gaps, technology gap, technology index, adoptions gaps and there by yield gap so as to increase the income of farmers. The economic details of the demonstrations give us a green signal to further popularize them among the farming community for large scale adoption.

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