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Evaluation of cluster frontline demonstrations (CFLD) pulses on increasing yield of pigeonpea (*Cajanus cajan* L.) in tribal district of Mandla, Madhya Pradesh

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Abstract
Present investigation was conducted by Krishi Vigyan Kendra Mandla district of Madhya Pradesh to find out the yield gaps among scientific package and practices under cluster front line demonstration (CFLD pulses) and local farmer's practice (FP) of Pigeonpea (*Cicer arietinum* L.) crop variety Rajeshwari under rainfed condition. CFLD on Pigeonpea were performed on farmer's fields during Kharif season of two sequential years i.e. 2018-2019 and 2019-2020 under National Food Security Mission (NFSM), Govt. of India to exhibit the impact of improved agro-techniques on production and economic benefits. CFLD's were conducted in 30 ha and 20 ha area for two years with dynamic participation of 125 farmers and technical staff of Krishi Vigyan Kendra Mandla. According to observed data the highest grain yield was obtained in experimental plots with an average of 13.74 q/ha as compared to local check with an average of 8.15 q/ha. An average mean of extension gap, technology gap and technology index were calculated as 5.60 q/ha, 6.35q/ha, 31.75 percent, respectively. Average higher B:C ratio (3.07) as compared to Farmers Practice (1.93) during the period of study was recorded in adoption of scientific package of practices in Pigeonpea cultivation. Thus, the productivity of Pigeonpea could be increased with the adoption of recommended developed package of practices. The study resulted in satisfying the farmers for maximum productivity and incomes.

Keywords: pigeonpea, front line demonstration, technology gap, practices, yield, agriculture, production

Introduction
Tribal district of Mandla, Madhya Pradesh in India situated at an elevation of 1,768 feet (539 meters) above sea level an upland plateau at a U- shaped bend in the Narmada River where it is joined by the Banjar River. Mandla district has an area of of 8771 km^2. There are 9 blocks, 4 tehsils and 1214 villages in the district. It is very widely used in Indian cuisine and well known by the name Tur dal in hindi. It is rich in protein and supplies a major share of the protein requirement of the vegetarian population of the country and is mainly eaten in the form of split pulse as 'dal'. Seeds are rich in iron and iodine, besides essential amino acids like lycine, tyrocene, cyctine and arginine. The outer covering of its seed together with part of the kernel provides a valuable feed for milch cattle. Pulses are one of the important segments of Indian agriculture. The important pulse crops are Pigeonpea (45.53%), Urdbean (13.40%), Mungbean (7.76%), Lentil (5%) and Field pea (5%). The major pulse producing states are Madhya Pradesh (33%), Maharashtra (13%), Rajasthan (12%), Uttar Pradesh (9%), which together for about 91 per cent of the total production. Among the pulses, Pigeonpea (*Cajanus cajan* L.) is an important pulse-cum-grain legume crop in semi-arid tropical and subtropical areas of the world. It is a second most important grain legume crop next to pigeonpea accounting for about 20 per cent of total pulse production, occupies a prominent place in Indian dry land agriculture by covering an area of around 3.9 m ha with productivity of 729 kg ha-1. India is the world's largest producer and consumer of pulses including pigeon pea. Pigeonpea is an important kharif pulse crop grown in India. Area under pigeonpea in India is about 4.42 million hectare with an annual production of 2.89 million tonnes and productivity of 655 kg/ha In Mandla district, farmers usually cultivate the pigeonpea under rainfed condition during kharif. Farmers realizing the low yield of pigeonpea due to use of traditonal variety, reuse of their own seeds, occurrence of moisture stress, poor management practices especially no use of fertilizers and pesticides for managing pod borer and fusarium wilt disease incidence. Mehra *et al.*, (2018) reported that yield of pigeonpea is limited due to poor spread of improved varieties and production technologies, imbalanced nutrition, abrupt climatic changes and vulnerability to pests and diseases.

Incidences of pod borer causes damage upto 30-40 per cent pods (Rahman, 1990). Pigeonpea is an key kharif pulses crop of Mandla district of Madhya Pradesh. The productivity of pulses in the district is as low as 760 kg/ha compared to productivity of National average and it is mostly due to poor crop management practices ultimately and insufficient accessibility of quality seed of improved variety of Pigeonpea and other inputs. KVK's are grass root level organizations meant for spreading of technology through assessment, refinement and demonstration of verified production technologies under different micro-farming situations (Das, 2010). The main focus of Krishi Vigyan Kendra is to decrease the time lag amongst generations of technology at the research and its transmission to the farmer community for enhancing productivity and income and socio economic status. The chief objective of CFLD under National Food Security Mission was to reveal improved crop production technologies of pulses on the farmers field and to promote the newly reported better varieties for varietal diversification and well-organized management of resources, the present study was undertaken to evaluate the effect of cluster frontline demonstration on increasing yield of Pigeonpea (*Cajanus cajan* L.) in tribal district of Mandla, Madhya Pradesh with the objective of increasing productivity and to tapered down the time lag and insured prompt adoption of technologies in district.

Materials and methods

Cluster Frontline Demonstrations (CFLDs) on improved farm technology (Table 1) were conducted by Krishi Vigyan Kendra Mandla of JNKVV Jabalpur in Pigeonpea (JG14) during Kharif 2018-2019 and *Kharif* 2019-2020 under rainfed conditions on 22 ha area of Mandla district covering 55 farmers. The scientific technology such as improved varieties seed (Rajeshwari) method of line sowing with Nari plough and seed drill, seed treatment with thirum and biocontrol agents weed management and integrated insect pest and integrated disease management practices was maintained during period of investigation seed treatment was done with thirum 2.5 gm/kg seed Rhizobium, trichoderma and PSB @ 5 gm/kg of seed before sowing to protect the crop against fungal diseases up to 20-25 days after sowing the seed rate of Pigeonpea was kept 20 kg/ha in demonstrations plot the sowing of Pigeonpea was done during 20th june to 30th june during the study period the spacing between row to row and plant to plant was kept 75x15 for the Cluster Frontline Demonstrations. The fertilizers were also given in the ratio of 20:40:20:10 kg/ha as basal dose spraying of chloropyriphos+ cypermethrin for controlling of insect and pests like gram pod borer @1250 gm/ha. The data were collected from beneficiary farmers through personal interviews and after that data was tabulated and analysed to find out the findings and conclusions. The yield increase in demonstrations over farmers practice was calculated by using following formula.

$$\text{\% Yield increase over farmer's} = \frac{\text{Demonstration average plot yield} - \text{Famer's average plot yield}}{\text{Farmer's average plot yield}}$$

Estimation of technology gap, extension gap and technology index

Extension gap means adoption of improved transfer technology in demonstrations practices resulted in higher grain yield than traditional farming practices. The related observations were also find out in black gram crop by Mahalingam *et al.*, (2018) Bairwa *et al.*, (2013) [2], Hiremath and Nagarju (2010) [5] and also Jamwal Anamika *et al.* (2020). The estimation of technology gap, extension gap and the technology index were worked out by using following formula (Kadian *et al.*, (1997) [6] Samui *et al.*, 2000)

- Technology yield gap = Potential yield – Demonstration plot average yield
- Extension yield gap = Demonstration plot average yield-Farmer's plot average yield
- $$\text{Technology index} = \frac{\text{Technology yield gap}}{\text{Potential Yield}} \times 100$$

Results and Discussion

Grain Yield

The finding in the study revealed that transmission of developed technology under CFLD in Pigeonpea resulted in higher grain yield as compared to farmer's practice which is depicted in Table 2. The more yield in demonstration plot was might be due to inclusion of enriched variety of seed, seed treatment and integrated pest management practices. The average grain yield of demonstration plots and farmers plot were 9.89 q/ha and 6.75 q/ha respectively. The increased yield percentage in demonstrated plot over control was 45.30% higher than in local check. However the seed yield of 9.89 q/ha in Cluster Demonstrations was low as compared to potential yield 20 q/ha of Pigeonpea variety Rajeshwari due to attack of Pigeonpea pod borer, spotted pod borer and pod fly. Similar to present findings, the yield improvement through adoption of developed technology has also been reported in earlier studies of FLD's (Kothyari *et al.* 2018 and Kumar *et al.* 2019 and Jamwal Anamika *et al.* 2020) [7]. Yield of the Frontline Demonstration trials and potential yield of the crop was compared to estimate the yield gaps which were further classified into technology and extension gaps (Hiremath & Nagarju; 2009 and Jamwal Anamika *et al.* 2020) [5].

Extension Yield gap

An average extension gap between farmers practices and demonstrated practices was observed 3.09 q/ha (Table2). According to higher extension gap in current study there is a need to encourage and aware the farmers for acceptance of developed technologies in Pigeonpea over existing local farm practices. The similar results were also reported by Bairwa *et al.* 2013 [2] Gangadevi *et al.* 2018 Jamwal Anamika *et al.* 2020.

Technology Yield gap and Technology Index

CFLD's were conducted under the strict direction of farm scientists on the farmers field though technological gaps generally appear which can be observed in table 2 which showed that the value of technological gap was higher 6.03 to till per hectare during the year 2019-20 while during 2018-19 the technological gap was 6.11 per ha the technology gap witnessed may be ascribed to the decimal variation in soil status, lack of irrigation facilities, disease, non-congenial weather conditions and pest attacks and change in the position of demonstrations plots every year. Technology index specified the feasibility of the generated Technology at the farmer's fields under existing agro climatic conditions (Vedna *et al.* 2007) [11]. The results of table 2 revealed that value of technology index was 38.19% and 37.69% during 2018-2019 and 2019-20 respectively. Whereas the average value of technology index was recorded 37.94%. Lower the value of the technology index more is the feasibility and applicability of the tested technology. This showed that a gap existed among technology involved and technology adopted at farmer's field. The similar results were also reported by Gangadevi *et al.* 2018, Chaudhary *et al.* 2019 and Jamwal Anamika *et al.* 2020.

Table 1: Technology demonstrated in CFLD's and Farmer's practices

S/No.	Intervention	Demonstration Intervention	Farmers Intervention
1	Field preparation	2 ploughings	Single plough
2	Method of sowing	Line sowing by seed drill & Nari	Broad casting
3	Seed Variety	Rajeshwari	Local
4	Seed treatment	Thirum @ 2.5 gm/kg of seed, Rhizobium, PSB & Trichoderma @ 5gm/kg of seed	Not treated
5	Seed rate	20kg/ha	35-40 kg/ha
6	Manures and fertilizers	PSB 500ml, Rhizobium 500gm with 100kg vermicompost and sulphor 20:40:20:10	Nil
7	Weed management	Pendimethaline @ 2,5lit/ha	No pre emergence used
8	IPM measures	IPM practices like spray of Neem oil and pheromone traps, yellow sticky traps	Imbalance use of pesticides
9	Technical guidance	Time to time	Nil

Table 2: Year wise productivity, extension gap, technology gap and technology index of Pigeonpea under CFLD's and farmer's practices.

Year	Yield q/ha		Increase yield (%) over Control	Extension gap (q/ha)	Technology gap (q/ha)	Technology Index (%)
	Demo	Farmer's Practice				
2018-19	9.89	6.75	46.52%	3.14	6.11	38.19
2019-20	9.97	6.92	44.08%	3.05	6.03	37.69
Mean	9.93	6.84	45.30%	3.09	6.07	37.94

Table 3: Cost of cultivation, Gross return and B:C ratio of Pigeonpea under Demonstration and farmer's practices.

Year	Cost of Cultivation (Rs/ha)		Gross Return (Rs/ha)		Net Return (Rs/ha)		B:C Ratio	
	Demo	Farmer's Practice	Demo	Farmer's Practice	Demo	Farmer's Practice	Demo	Farmer's Practice
2018-19	21500	18200	55384	37800	33884	19600	2.58	2.08
2019-20	21700	18350	55832	38752	34132	20402	2.57	2.11
Mean	21600	18275	55608	38276	34008	20001	2.58	2.09

Economic study of Cluster Front Line Demonstrations

In the present study average cost of cultivation of Farmer's practice (Rs 18375/ha) was lesser as compare to demonstration plot (Rs 21600/ha) and the finding shown in table 3 which clarified the implication of Cluster Frontline Demonstration at Farmer's field during the period of investigation in which higher average net return rupees 34008 were found under Demonstration plots as compared to farmer's practice (Rs 20001/ha). The Benefit cost ratio was also higher in demonstration plots (2.58) as compared to farmer's practice (2.09). Increased monetary returns as well as Benefit cost (B:C) ratio through upgraded farm technology have also been reported by various scientists (Vedna *et al.* 2007, Bairwa *et al.* 2013 and Jamwal Anamika *et al.* 2020) [11, 2].

Conclusion

It can be concluded that the integration of scientific farm knowledge and practices along with active contribution of farmer's of the area has encouraging effect on growing the yield and economic return of Pigeonpea in Mandla district. The economic sustainability of appropriate technology for growing the productivity of Pigeonpea encouraged the farmers towards acceptance of technologies demonstrated at farmer's field.

Reference

1. Anonymous. Agricultural statistics at a glance. DAC Government of India. 2016, 118.
2. Bairwa RK, Verma SR, Chayal K, Meena NL. Popularization of Improved Blackgram production through Front line demonstration in humid southern plain of Rajasthan, Indian Journal of Extension Education and R.D. 2013;21:98-101.
3. Chauhan RS, Singh SRK, Mishra YD, Singh P, Bhargava MK, Singh HP. Impact analysis of Front Line Demonstrations (FLDs) on pigeonpea in Shivpuri district of Madhya Pradesh. Journal of Community Mobilization and Sustainable Development. 2013;8(2):205-208.
4. Devi Ganga M, Kumar CH, Anil, Kumar Yugandhar M. Performance Evaluation of Cluster Front Line Demonstration in Blackgram. India Int. J Curr. Microbial App. Sci. 2018;7(8):4349-4354.
5. Hiremath SM. Evaluation of front line demonstration trials on onion in Haveri District of Karnataka, Karnataka J Agric Sci. 2009;22(5):1092-1093.
6. Kadian KS, Sharma R, Sharma AK. Evaluation of frontline demonstration on oilseeds in Kangra valley of Himachal Pradesh, Annals of Agric. Res. 1997;18(1):40-43.
7. Kothyari Singh, Hukam, Meena KC, Meena BL, Aseray Ram, Evaluation of Cluster Front Line Demonstration on Black gram in Sawai Madhopur District of Rajasthan, India. Int. J Curr. Microbial App. Sci. 2018;7(1):1569-1573.
8. Kumar Sanjeev, Khar Sanjay, Sharma Magdeshwar, Singh Praveen. Stability analysis for seed yield attributing traits in pigeonpea (*Cicer arietinum* L.) under Mid Hills of J & K. Leg. Res. 2014;37(5):552-555.
9. Tomar RKS, Sharma P, Yadav LN. Comparison of yield and economics of irrigated pigeonpea under improved and local management practices. Int. Pigeonpea

Pigeonpea News Lett. 1999;6:22-23.
10. Tomar RKS. Maximization of productivity for pigeonpea (*Cicer arietinum* L.) through improved technologies in farmer's field. Indian Journal of Natural Products and Resources. 2010;1(4):515-517.
11. Vedna Kumari, Kumar A, Bhateria S. Demonstration an effective tool for increasing productivity of repeseed-Pigeonpea in Kangra district of Himachal Pradesh. J Oilseeds Res. 2007;33(2):257-261.