International Journal of Chemical Studies

P-ISSN: 2349–8528
E-ISSN: 2321–4902
www.chemijournal.com
IJCS 2020; SP-8(4): 445-447

Received: 01-04-2020
Accepted: 04-05-2020

Sunitha NH
Agricultural Extension Education Centre, Huvinahadagali, University of Agricultural Sciences, Raichur, Karnataka, India

Hanumanthppa Shrihari
Agricultural Extension Education Centre, Huvinahadagali, University of Agricultural Sciences, Raichur, Karnataka, India

Manjunatha Bhanuvally
Agricultural Extension Education Centre, Huvinahadagali, University of Agricultural Sciences, Raichur, Karnataka, India

CM Kalibavi
Agricultural Extension Education Centre, Huvinahadagali, University of Agricultural Sciences, Raichur, Karnataka, India

Corresponding Author:
Sunitha NH
Agricultural Extension Education Centre, Huvinahadagali, University of Agricultural Sciences, Raichur, Karnataka, India

Frontline demonstration: An effective tool for increasing productivity of pulses

Sunitha NH, Hanumanthppa Shrihari, Manjunatha Bhanuvally and CM Kalibavi

DOI: https://doi.org/10.22271/chemi.2020.v8.i4h.10236

Abstract
Front line demonstration was conducted on pulse crop (Pigeon pea, Bengalgram, Greengram and cowpea) during Kharif and Rabi seasons of 2017-18 under the jurisdiction of Agriculture Extension centre, Huvinahadagali, Bellari district. The purpose was to know the extent of adoption of improved practices, to find out the yield gap in pulses production technology. Results of the study revealed that the average yield of frontline demonstration on pulse crops that was 11.50, 11.25, 7.40, and 3.50 q/ha in pigeon pea, greengram, bengalgram and cowpea from demonstrated plots, respectively as well as 10.30, 9.70, 6.60 and 3.10 q/ha from control plots respectively. There was a wide yield gap between the potential and demonstration yields in both the pulse crops due to technology and extension gaps. The result reveals the increases yield of demonstrated plots that was 10.43, 13.77, 10.81 & 11.42 percent as compared to existing farming practices for pigeon pea, greengram, bengalgram and cowpea, respectively due to adoption of improved package of practices. The benefit: cost ratio (B:C) observed was 1.55, 1.45, 1.20 & 1.04 pigeon pea, greengram, bengalgram and cowpea respectively in demonstrated plots compared to local check. The use of better input like improved seed, sowing method, balanced use of fertilizers and proper management of insect pest may result in productivity of pulse production.

Keywords: Extension gap, frontline demonstrations, yield, pulses

Introduction
Pulses or grain legumes in general are an indispensable source of supplementary protein to daily vegetarian diets; these are regarded as a poor man's meat. Oilseed and pulses are the integral part of human diet as they are rich sources of proteins and quality nutrition. Pulses provide significant nutritional and health benefits to the human body. Protein-energy malnutrition as well as micronutrient deficiencies can be addressed by increasing the consumption of pulses which are a rich source of proteins, minerals, iron and fibre. Net daily pulses availability for Indians has increased slightly from 32gm per capita in 2000 and 37gm per capita in 2009. In order for India to meet the 40 gm per day per capita requirement of pulses, attention has to be paid to both production and consumption. Thus, a large part of their protein requirement could be met by pulses.

India is the largest producer in the world, with 26 per cent share in the global production by producing 25.23 million tons of pulses from an area of 29.99 million hectares. The average productivity of country is about 841 kg/ha against the average global productivity of 1023 kg/ha (DES, 2018) [2]. The important pulse crops are Chickpea (45.53%), Pigeon pea (17.06%), Urdbean (13.40%) and Mungbean (7.76%). The major pulse producing states are Madhya Pradesh (33%), Maharashtra (13%), Rajasthan (12%), Uttar Pradesh (9%), Karnataka (8%), Andhra Pradesh (5%), Gujrat (4%), Jharkhand (3%), Tamilnadu, (2%), Telangana (2%) and which together for about 91% of the total production (DES, 2018) [2].

Pulses have a wide range of adaptability to latitudes, longitudes and climatic variables. In the production process, pulses improve soil fertility through biological nitrogen fixation, requires less water than cereals, and their rotation with cereals help in controlling diseases and pests. Availability of quality seed of improved varieties and other inputs is one of the major constraints in increasing the production of pulses. Keeping this in view, the present front line demonstrations was conducted on pulses during the year 2017-18 to study the technology gap between the potential yield and demonstrated yield, extension gap between demonstrated yield and yield under existing practice and technology index. The yield data were collected from the demonstrations and control plots (farmers Practice).

The nutritional value of pulses: The nutritional importance of pulses are numerous, they can be a valuable source of energy. The energy content of most pulses has been found to be between 300 and 540 Kcal / 100g (Table 2). Energy is required for all metabolic processes. The energy of Pulses comes from the nutrient supply of protein, fat and carbohydrate.

Materials and Methods: Front line demonstration was conducted on pulse crop (Pigeon pea, Bengalgram, Greengram and cowpea) during Kharif and Rabi season of 2017-18 in selected cluster villages of Bellari district of Huvinahadagali taluka. The total number of 47 pulses growers (10 Pigeon pea, 10 Chickpea, 10 Greengram and 17 cowpea) were selected for successful demonstration during kharif & rabi season 2017-18 in the six blocks of Bellari district viz., Hadagali, Holagundi, Ittagi, Harapanahalli, Kottur and Kudligi which comes under the jurisdiction of Agricultural Extension Education Centre. The total area of 19 ha was covered for the pulse demonstrations. The improved varieties of Pigeon pea, Greengram, Bengalgram and cow pea that was GRG-1881, BGS-9, BGD-103 and IT – 38956-1 respectively, demonstrated with full package of practices viz. proper tillage, proper seed rate and sowing method, balanced dose of fertilizer (18 kg Nitrogen 46 kg P2O5/ha), biofertilizers, Trichoderma and Rhizobium culture & PSB @ 5 gm/kg of seed as seed treatment, proper irrigation, inter cultivation, weed management and improved plant protection measures were applied (Table 1) at the farmers fields. In this demonstration control plot was also kept where farmers practices was carried out. The technology gap, extension gap and technological index (Samui *et al*., 2000) [7] were calculated by using following formula as given below: -
Extension Gap= Demonstration – Farmers yield

Technology gap = Potential yield - Demonstrated yield

$$\text{Technology index} = \frac{\text{Potential yield-Demonstrated yield}}{\text{Potential yield}} \times 100$$

$$\text{Percent increase yield} = \frac{\text{Demonstration yield-farmers yield}}{\text{Farmers yield}} \times 100$$

Result and Discussion

The gap between the existing and recommended technologies of pulse crops in district Bellari was presented in table-1. Full gap was observed in case of use of HYVs, seed rate and seed treatment and partial gap was observed in fertilizer dose, inter cultivation, weed management and protective irrigation, which definitely was the reason of not achieving potential yield. Farmers were not aware about recommended technologies. Farmers in general used local or traditional varieties instead of the recommended high yielding resistant varieties. Unavailability of seed in time and lack of awareness were the main reasons. Farmers applied higher seed rate than the recommended and they were not using seed treatment technique because of lack of knowledge and interest. Burman *et al*. (2010) [1] reported that there is a gap in adoption of technology in major pulse crops both in rain fed and irrigated cropping system. The data given in table-2 revealed that the average yield of frontline demonstration on pulse crops was 11.50, 11.25, 7.40, and 3.50 q/ha in pigeon pea, greengram, bengalgram and cowpea from demonstrated plots, respectively as well as 10.30, 9.70, 6.60 and 3.10 q/ha from control plots respectively during the demonstration period. The crop wise per cent increase in yield recorded was 10.43, 13.77, 10.81 & 11.42 over farmers practice in pigeon pea, greengram, bengalgram and cowpea, respectively. Singh (2002) [8] reported that HYVs with production and protection measures that improve the yield of pulses. The technology gap, the difference between potential yield and yield of demonstration plots was 0.50, 0.75, 17.6 & 6.50 q/ha pigeon pea, greengram, bengalgram and cowpea, respectively during demonstration period. The technology gap observed may be attributed to dissimilarity in the soil fertility status, agricultural practices and local climatic situation (Singh *et al*. 2007) [9]. The highest technology gap 17.6 q/ha was recorded in bengalgram crop. Extensions gap for pulse crops were observe as 1.20, 1.55, 0.80 & 0.40 q/ha for pigeon pea, greengram, bengalgram and cowpea respectively during demonstration period. The technology index shows the feasibility of the evolved technology at the farmers' field. Higher technology index reflected the insufficient extension services for transfer of technology. The lower value of technology index shows the efficacy of good performance of technological interventions.
It is observed from the table the benefit: cost ratio (B:C) was 1.55, 1.45, 1.20 & 1.04 pigeon pea, greengram, bengalgram and cowpea respectively in demonstrated plots. The benefit: cost ratio (IBCR) of 1.30, 1.28, 1.11 & 1.01 pigeon pea, greengram, bengalgram and cowpea, respectively in farmer's fields. Similar findings were also reported in frontline demonstrations on pulse crops by Lathwal (2010) [6] and Dwivedi *et al*., 2014 [3].

Table 1: Difference between technological interventions and farmers practices under frontline demonstrations in pulses.

Sl no.	Particulars	Technological intervention				Existing practices	Gap
		Pigeon pea	Chickpea	Greengram	Cowpea		
1	Variety	GRG-811	BGD-103	BGS-9	IT – 38956-1	Local	Full gap
2	Land preparation	One cultivator ploughing and 3 ploughing	One cultivator ploughing and 2 p ploughing	One cultivator ploughing and 2 p ploughing	One cultivator ploughing and 2 p ploughing	One cultivator ploughing and 2 p ploughing	Nil
3	Seed rate (Kg/ha)	12.5	62.5	12.5	12.5	High seed rate	Full gap
4	Sowing method	Line sowing raised bed 60x15cm (RxP)	30x10cm (RxP)	30x10cm (RxP)	30x10cm (RxP)	Ridge sowing/line sowing/ broadcasting	Full gap
5	Seed treatment	Trichoderma powder and Rhizobium culture @ 5 g/kg seed	Trichoderma powder and Rhizobium culture @ 5 g/kg seed	Trichoderma powder and Rhizobium culture @ 5 g/kg seed	Trichoderma powder and Rhizobium culture @ 5 g/kg seed	No seed treatment	Full gap

6	Fertilizer dose (Kg/ha)	18 N and 46 P_2O^5	18 N and 46 P_2O^5	18 N and 46 P_2O^5	18 N and 46 P_2O^5	Use imbalance fertilizers	Partial gap
7	Weed management	Pendimethalin 30% EC @ 3.3 lit/ha + one hand weeding at 45-60 days after sowing	Pendimethalin 30% EC @ 3.3 lit/ha + one hand weeding at 45-60 days after sowing	Pendimethalin 30% EC @ 3.3 lit/ha + one hand weeding at 45-60 days after sowing	Pendimethalin 30% EC @ 3.3 lit/ha + one hand weeding at 45-60 days after sowing	Improper chemical weed management	Partial gap
8	Irrigation	In absence of rain, at flowering/ pod development stage	One at pre flowering and one at pod development stage	One at pre flowering and one at pod development stage	One at pre flowering and one at pod development stage	Untimely irrigation	Partial gap
9	Plant protection	Need based plant protection measure Indoxacarb (15.8% E.C) @ 500ml/ha	Need based plant protection measure Indoxacarb (15.8% E.C) @ 500ml/ha	Need based plant protection measure Indoxacarb (15.8% E.C) @ 500ml/ha	Need based plant protection measure Indoxacarb (15.8% E.C) @ 500ml/ha	Improper management.	Partial gap

Table 2: Performance of frontline demonstrations on pulses in the year 2017-18

Name of the crop	Variety	Area (ha)	No of demos	Yield (q/ha)		% increase in yield over local check	TG	EG	TI	B:C ratio	
				Demo	Check					Demo	Local check
Redgram	GRG-811	4.00	10	11.50	10.30	10.43	0.50	1.20	4.16	1.55	1.30
Greengram	BGS-9	4.00	10	11.25	9.70	13.77	0.75	1.55	6.25	1.45	1.28
Bengalgram	BGD-103	4.00	10	7.40	6.60	10.81	17.6	0.80	70.40	1.20	1.11
Cowpea	IT – 38956-1	7.00	17	3.50	3.10	11.42	6.50	0.40	65.00	1.04	1.01

N=19 TG=Technology gap, EG=Extension Gap, TI=Technology Index

Conclusion

There was a technological gap between technological intervention and existing practices in pulse production technology due to lack of knowledge and conviction of improved technologies. Technology and extension gap showed that the farmers were not aware about improved package and practices of pulse production technologies; therefore it is recommended that the farmers should be aware for adoption of improved technologies through various extension aids (training, demonstration etc). The technology index shows the feasibility of the technology demonstrated at farmer's field. The lower technology index showed that the good performance of technological intervention. So, it is concluded that introduction of improved technologies can fulfil the technological and extension gap and extension agencies can also play a significant role to transfer of improved technologies among communities for better production. Thus, it can be said, that the adoption of improved package of practices of pulse production technology may result in higher productivity per unit area.

References

1. Burman, Roy R, Singh SK, Singh AK. Gap in adoption of improved pulse production technologies in Uttar Prasesh. Indian Res. J Ext. Edu. 2010; 10(1):99-104.
2. DES. Directorate of Economics and Statistics, Department of Agriculture Cooperation and Welfare, Ministry of Agriculture, Government of India, New Delhi, 2018, 3.
3. Dwivedi AP, Mishra, Anupam Singh SK, Singh SRK, Singh Mamta. Yield gap analysis of chickpea through front line demonstration in different agro-climatic zones of M. P. and Chhatisgarh. Journal of food legumes. 2014; 27(1):50-63.
4. Joshi NS, Bariya MK, Kunjadia BB. Yield gap analysis through front line demonstration in wheat crop. Int. J Sci. Res. Pub. 2014; 4(9):1-3.
5. Kumar J, Singh YP, Rana DK. Yield and gap analysis of wheat (Triticum aestivum) productivity in NCR Delhi. Indian J Ext. Edu. 2014; 50(1, 2):56-58. 6.
6. Lathwal OP. Evaluation of frontline demonstrations on black gram in irrigated agro ecosystem. Annals of Agricultural Research. 2010; 31:24-27.
7. Samui SK, Maitra S, Roy DK, Mandal AK, Saha D. Evaluation on front line demonstration on groundnut. Journal of the Indian Society Coastal Agricultural Research. 2000; 18(2):180-183.
8. Singh PK. Impact of participation in Planning on adoption of new technology through FLD. Manage Extension Research Review, 2002, 45-48.
9. Singh SN, Singh VK, Singh RK, Singh Rakesh K. Evaluation of on farm front line demonstrations on the yield of mustard in central plains zone of Uttar Pradesh. Indian Res. J Ext. Edu. 2007; 7(2, 3):70-81.