Frontline demonstration: An effective tool for increasing productivity of pulses

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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 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%), Gujarat (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 the actual 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

Technology index = Potential yield-Demonstrated yield

Percent increase yield = Demonstration yield-farmers yield x 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.

<table>
<thead>
<tr>
<th>SI no.</th>
<th>Particulars</th>
<th>Technological intervention</th>
<th>Existing practices</th>
<th>Gap</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pigeon pea</td>
<td>Chickpea</td>
<td>Greengram</td>
</tr>
<tr>
<td>1</td>
<td>Variety</td>
<td>GRG-811</td>
<td>BGD-103</td>
<td>BGS-9</td>
</tr>
<tr>
<td>2</td>
<td>Land</td>
<td>One cultivator ploughing and 3 ploughing</td>
<td>One cultivator ploughing and 2 p ploughing</td>
<td>One cultivator ploughing and 2 p ploughing</td>
</tr>
<tr>
<td>3</td>
<td>preparation</td>
<td>Seed rate (Kg/ha)</td>
<td>12.5</td>
<td>62.5</td>
</tr>
<tr>
<td>4</td>
<td>Sowing</td>
<td>Line sowing raised bed 60x15 cm (RxP)</td>
<td>30x10cm (RxP)</td>
<td>30x10cm (RxP)</td>
</tr>
<tr>
<td>5</td>
<td>treatment</td>
<td>Trichoderma powder and Rhizobium culture @ 5 g/kg seed</td>
<td>Trichoderma powder and Rhizobium culture @ 5 g/kg seed</td>
<td>Trichoderma powder and Rhizobium culture @ 5 g/kg seed</td>
</tr>
</tbody>
</table>
Fertilizer dose (Kg/ha) | 18 N and 46 P₂O₅ | 18 N and 46 P₂O₅ | 18 N and 46 P₂O₅ | 18 N and 46 P₂O₅ | Use imbalance fertilizers | Partial gap
--- | --- | --- | --- | --- | --- | ---
7. Weed management | Pendimethalin | Pendimethalin | Pendimethalin | Pendimethalin | Improper chemical weed management | Partial gap
| 30% EC @ 3.3 lit/ha + one hand weeding at 45-60 days after sowing | 30% EC @ 3.3 lit/ha + one hand weeding at 45-60 days after sowing | 30% EC @ 3.3 lit/ha + one hand weeding at 45-60 days after sowing | 30% EC @ 3.3 lit/ha + one hand weeding at 45-60 days after sowing | |
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

<table>
<thead>
<tr>
<th>Name of the crop</th>
<th>Variety</th>
<th>Area (ha)</th>
<th>No of demos</th>
<th>Yield (q/ha)</th>
<th>% increase in yield over local check</th>
<th>B:C ratio</th>
</tr>
</thead>
</table>
| Redgram | GRG-811 | 4.00 | 10 | 11.50 | 10.30 | Demo Check | 10.43 | 0.50 | 1.20 | 4.16 | 1.55 | 1.30
| Greengram | BGS-9 | 4.00 | 10 | 11.25 | 9.70 | Demo Check | 13.77 | 0.75 | 1.55 | 6.25 | 1.45 | 1.28
| Bengalgram | BGD-103 | 4.00 | 10 | 7.40 | 6.60 | Demo Check | 10.81 | 1.76 | 0.80 | 70.40 | 1.20 | 1.11
| Cowpea | IT – 38956-1 | 7.00 | 17 | 3.50 | 3.10 | Demo Check | 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