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Evaluation of front line demonstration of blackgram var. PU-31, Soybean var. DSb-19 and Lentil var. HUL 57 in Bishnupur district, Manipur, India

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Abstract

Front Line Demonstrations (FLD) on Blackgram var. PU-31, Soybean var. DSb-19 and Lentil var. HUL 57 were conducted by the Krishi Vigyan Kendra, Bishnupur district during the year 2017-2018 in the adopted farmer's field in Bishnupur district of Manipur to show the higher production potentiality of the technique using improved variety. In Blackgram technologies gave higher yield of 8.53qt/ha in an average with 32.12% increase in average yield over farmer's local practices. The study also registered improved technology gives higher gross return (Rs. 68240/ha.), net return (Rs. 39540/ha.) with higher benefit cost ratio (2.38:1) as compared to farmer's local practices (1.67:1). In Soybean technologies gave higher yield of 9.14 Qt/ha in an average with 70.99% increase in average yield over farmer's local practices. The study also registered improved technology gives higher gross return (Rs. 59410/ha.), net return (Rs. 28410/ha.) with higher benefit cost ratio (1.92:1) as compared to farmer's local practices. In Lentil, the demonstration packages on high, low and average yield of Lentil were recorded 12.85 Qt/ha., 5.79 Qt/ha., and 12.60 Qt/ha., respectively. It was found higher than yield of local checked (9.86 Qt/ha.). The technology gap in the demonstration yield over potential yield was 2Qt/ha. The highest extension gap of 3Qt/ha was recorded. The technology index was 12 percents. The cultivation of Lentil var. HUL 57 under improved technologies gave higher net return of Rs 72800/ha, as compared to farmers practices Rs. 56880/ha. The benefit cost ratio of Lentil var. HUL 57 under improved technologies was 2.60:1 as compared to 2.58:1 under farmer's practices.

Keywords: Front line demonstration (FLD), productivity, net return, B: C ratio, extension gap, technology gap

Introduction

India being one of the major pulse producing countries in the world contributes about 33 per cent of area and 25 percent of world's pulses production. According to FAOSTAT, 2012, India alone accounts for the 90% global pigeon pea, 65% of chickpea and 37% of lentil production over 93%, 68% and 32% of the global production. Pulse have great significance in the context of Indian agriculture as they are high protein foods (17 to 25%) as compared to others like cereal crop that contributes to 6 to 10% of protein (Veeramani *et al.*, 2017) [42]. It contributes to about 11% of the total proteins intake in India and frequency of consumption is much higher compare to other protein source indicating the importance of pulse in daily food habits (Reddy, 2010) [27]. In the year 2013-2014, India has produce 19.25 million tones of pulse from an area of 25.2 million hectare (Roy *et al.*, 2017) [29], indicating slight incline in pulse productivity but which is far below the global average productivity (840 kg/ha) (Raj *et al.*, 2013) [25]. In the North-eastern parts of India pulses are also grown mainly in the uplands and it had produces 209.3 thousand tonnes of pulses from an area of 252.8 thousand hectare with an average productivity of 828 Kg/ha during the year 2013 – 2014 and still the region is almost 82% deficit in pulse production against its requirements as per ICMR recommendation (Roy *et al.*, 2017) [29]. Despite the significant pulse production during the last decade, the faster growth rate has imposed a bigger challenge for researchers, extension workers and policy makers to fulfill the ever increasing demand of it in India. (Raj *et al.*, 2013) [25].

Black gram is a rich source of food protein containing about 24 per cent protein, which is almost three times that of cereals and other minerals and vitamins (Reddy, 2010, Anonymous, 2017) [27, 3].

Black gram contributes to 10% of the national pulse production. The crop improves the soil fertility by fixing atmospheric nitrogen in the soil. It is reported that, black gram and green gram are reported to meet up to 50 per cent of their requirement from the N_2 fixed by them (Anon, 1972) [2] and black gram produces 22.10 kg of N ha^{-1} which has been estimated to be supplement of 59 thousand tons of urea annually (Senaratne and Ratnasinghe, 1993) [35]. In addition, it is also used as nutritive fodder, especially for milch animals (Sathe, 1996) [34]. In Manipur, Blackgram is major food crops among the pulses (Saikia *et al.*, 2018) [30]. The Blackgram var. PU 31 is a bold seeded Yellow Mosaic Virus (YMV) tolerant blackgram variety with crop duration of 75-85 days depending on the environmental condition.

Soybean is an important oilseed and cash crop, which has a vital role in Indian agriculture, industry and export trade. Soybean possesses a very high nutritional value along with high yield potential. It contains about 40% high quality protein and 20% oil (Verma *et al.*, 2013, Singh, 2018) [43, 38]. The planted area under soybean in India is above 6.50 million ha, which produces above 7.00 million tonnes of soybean with an average productivity 1,070 kg. ha^{-1} (Patil *et al.*, 2010) [20]. Soybean ranked first in the world in oil production (57%) (Raj *et al.*, 2014) [26] and in the international trade markets (Meena *et al.*, 2012). Soybean is the also major oilseed crop of Manipur that boosted the economy of the state (Raj *et al.*, 2014) [26]. Traditionally, it is consumed as fermented alkaline food "*Hawaijar".* Small-seeded local variety soybean grown in the hilly terraces of Manipur is used to prepare *hawaijar* (Tamang, 2015) [41].

Lentil (*Lens culinaris*), a pulse crop is one of the oldest pulse crops in India and nutritionally it tops among the other Rabi pulses. Although India ranks first in the world in respect of production as well as acreage, the average productivity is significantly poor (714kg/ha) far below the world average productivity 1008 kg/ha (Afzal Ahmad *et al.* 2012) [1]. Lentil being the most actively traded pulse crop, it have also been proven to be invaluable in crop rotation, controlling of weeds, diseases and insects, as well improving soil texture and fertility.

It is the need of the hour for wider adoption of low-cost technology among all pulse crops in order to meet the increasing demand both domestically as well as globally. The study was conducted with the aim to promote and extend improved technologies using improved seed varieties, micro-nutrients, soil amendments, integrated pest management techniques, farm machinery and implements, irrigation devices along with capacity building of farmers. This project was implemented by Krishi Vigyan Kendra, Bishnupur district with main objective to boost the production and productivity of lentils through FLDs with latest and improved technologies besides the speed spread of new technology of lentil in Bishnupur district of Manipur.

Materials and Methods

The present study was carried out Front Line Demonstrations (FLD) on Blackgram var. PU-31, Soybean var. DSb-19 and Lentil var. HUL 57 were conducted by the Krishi Vigyan Kendra, Bishnupur district during the year 2017-2018 in the adopted farmer's field in Bishnupur district of Manipur to show the higher production potentiality of the technique using improved variety. The study was carried out to demonstrate the production and economic benefit of adopting improved technologies through line transplanting in each of the 20 (Twenty) adopted farmer's field covering an area of 10 ha. The improved technology included modern varieties, seed treatment and maintenance of optimum plant population etc. The fertilizers were given as per improved practices as basal dose. Pest and diseases management were done routinely. The crops were harvested at perfect maturity stage with suitable method. In demonstration plots, critical inputs in the form of quality seed and treatment, farm manure, balanced fertilizers and agro-chemicals were provided by KVK, Bishnupur. For the study, technology gap, extension gap and technology index were calculated as suggested by Samui *et al* (2000) [31].

Technology gap = Potential yield- Demonstration yield

Extension gap = Demonstration yield-Farmers yield

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

Results and Discussion

Yield

The demonstration packages on high, low and average yield of Blackgram var. PU-31 were recorded 11.80 Qt/ha., 6.90 Qt/ha., and 8.53 Qt/ha., respectively. It was found higher than yield of local checked (5.79 Qt/ha.). The results indicated that the front line demonstrations have given a good impact over the farming community of *Kumbi*, Bishnupur district as they were motivated by the new agricultural technologies applied in the FLD plots. The demonstration packages on high, low and average yield of Soybean var. DSb-19 were recorded 11.50Qt/ha., 7.20 Qt/ha., and 9.14 Qt/ha., respectively. It was found higher than yield of local checked (5.42 Qt/ha.). The results indicated that the front line demonstrations have given a good impact over the farming community of Bishnupur district as they were motivated by the new agricultural technologies applied in the FLD plots. Average soybean yield under front line demonstrations was observed higher (70.99%) over the prevailing farmers practice. The demonstration packages on high, low and average yield of Lentil were recorded 12.85 Qt/ha., 5.79 Qt/ha., and 12.60 Qt/ha., respectively. It was found higher than yield of local checked (9.86 Qt/ha.). The results indicated that the front line demonstrations have given a good impact over the farming community of Bishnupur district as they were motivated by the new agricultural technologies applied in the FLD plots. This finding is in agreement with the findings of Kumar and Yadav (2007), Poonia and Pithia (2010) [12].

Technology gap

The technology gap in the demonstration yield of Blackgram var. PU-31 over potential yield (10Qt/ha.) was 1.47Qt/ha. The technology gap in the demonstration yield of Soybean var. DSb-19 over potential yield was 10Qt/ha. The technology gap in the demonstration yield of Lentil over potential yield was 2Qt/ha. The technological gap may be attributed to the dissimilarity in the soil fertility status and weather conditions (Mukharjee, 2003). Hence, variety wise location specific recommendation appears to be necessary to minimize the technology gap for yield level in different situations (Rachhoya *et al.*, 2018) [24].

Extension gap

The extension gap of 2.74Qt/ha was recorded in Blackgram var. PU-31. The extension gap of 3.72Qt/ha was recorded in Soybean var. DSb-19 and the extension gap of 3Qt/ha was recorded in Lentil. This emphasized the need to educate the farmers through various means for the adoption of improved agricultural production technologies to reverse this trend of wide extension gap. More and more use of latest production technologies with high yielding variety will subsequently change this alarming trend of galloping extension gap. The new technologies will eventually lead to the farmers to discontinue the old technology and to adopt new technology. This finding is in corroboration with the findings of Hiremath and Nagaraju (2010) [6].

Technology Index

The technology index were 14.7 percent, 45.45 percents and 12 percents; found in Blackgram, Soybean and Lentil respectively. The technology index shows the feasibility of the evolved technology at the farmer's fields and the lower the value of technology index more is the feasibility of the technology (Jeengar, *et al*., 2006) [9].

Economic return

The cultivation of Blackgram var. PU-31 under improved technologies gave higher net return of Rs. 39540/ha, as compared to farmers practices Rs. 18571/ha. The benefit cost ratio of Blackgram var. PU-31 under improved technologies was 2.38:1 as compared to 1.67:1 under farmer's practices. The cultivation of Soybean var. DSb-19 under improved technologies gave higher net return of Rs. 28410 /ha, as compared to farmers practices Rs. 7230/ha. The benefit cost ratio of Soybean var. DSb-19 under improved technologies was 1.92:1 as compared to 1.23:1 under farmer's practices. The cultivation of Lentil var. HUL 57 under improved technologies gave higher net return of Rs 72800/ha, as compared to farmers practices Rs. 56880/ha. The benefit cost ratio of Lentil var. HUL 57 under improved technologies was 2.60:1 as compared to 2.58:1 under farmer's practices. This may be due to higher yields obtained under improved technologies compared to local check (farmers practice). This finding is in corroboration with the findings of Mokidue *et al* (2011) [16].

Conclusion

It can be concluded that frontline demonstration exercised under the close supervision of extension workers and scientists is one of the important tool for agricultural extension for rural communities to demonstrate newly released crop production and protection technologies and its management practices in the farmer's field under different agro-climatic regions and farming situations**.** Hence, from the study that there exists a wide gap between the potential and demonstration yields in Blackgram, Soybean and Lentil mainly due to technology and extension gaps and also due to the lack of awareness about new technology in Bishnupur district of Manipur. The higher average yield was recorded in demonstration plots over the years compared to local check due to increased knowledge and adoption of full package of practices. Hence, it is concluded that the FLDs programme is a successful tool in improving the production and productivity of blackgram, Soybean and Lentil crops through FLDs with latest and specific technologies.

References

1. Afzal Ahmad, Ramesh Kumar, Guru Prem. Impact of frontline demonstration on lentil in Ambala district of Haryana. Agriculture Update. 2012; 7(1 & 2):96-98.
2. Anon. The International Rice Research Institute Annual Report, 1972, 41.
3. Anon. Indian Food Nutrition Chart for grains, fruits and vegetable, 2017. Fitjog.com.
4. FAO. Report of the international rice commission-twenty-first session Rome: Food and Agriculture Organization, 2006.
5. FAO STAT. FAOSTAT - Statistical Database, 2012.
6. Hiremath SM, Nagaraju MV. Evaluation of on-farm front line demonstrations on the yield of chilli. Karnataka Journal of Agricultural Sciences. 2010; 23(2):341-342.
7. Hossain M. Sustaining food security in Asia economic, social and political aspects. In Dowling NG; SM Greenfield and KS Fischer (eds), sustainability of rice in the global food system. Manila (Philippines): International Rice Research Institute, 1998, 19-43.
8. Hrish Kumar Rachhoya, Mukesh Sharma, Saini VK. Impact of Cluster Front Line Demonstrations on Productivity and Profitability of Chickpea in Desert of Rajasthan. International Journal of Currurent Microbiology and Applied Science. 2018; 7(06):1860-1864.
9. Jeengar KL, Panwar P, Pareek OP. Front line demonstration on maize in Bhilwara District of Rajasthan. Current Agriculture. 2006; 30(1/2):115-116
10. Kiresur VR, Ramanna Rao SV, Hedge DM. Improved technologies in oilseeds production: An assessment of their economic potentials in India. Agricultural Economic Research Review. 2011; 14(2):95-108.
11. Kumar Arvind. Status and future thrust areas of rape seed mustard research in India. Indian Journal of Agricultural Sciences. 2015; 75(10):621-635.
12. Kumar H, Yadav DS. Effect of phosphorus and sulphur levels on growth, yield and quality of Indian mustard (*Brassica juncea*) cultivars. Indian Journal of Agronomy. 2007; 52(2):154-157
13. Meena DS, Ali M, Ram Baldev, Tetarwal JP. Impact of improved technology on Soybean productivity in South Eastern Rajasthan. Soybean Research. 2012; 10:99-103.
14. Meena K, Anuradha Ranjan Kumari, Sharma RP, Srivastava R. Study on production potential of rice through front line demonstration in Deoria district of Uttar Pradesh, India. International Journal of Current Microbiology and Applied Science. 2018; 7(01):328-331.
15. Mishra B. More crop per drop. The Hindu, Survey of Indian Agriculture, 2005, 41
16. Mokidue I, Mohanty AK, Sanjay K. Correlating growth, yield and adoption of Urdbean technologies. Indian Journal of Extension Education. 2011; 11(2):20-24.
17. Mukherjee N. Participatory, and action. Concept, Publishing Company, New Delhi, 2013, 63-65.
18. Nag N, Srivastava JP, Bibhu Santosh Behera. Impact of participatory seed production programme on knowledge level of Paddy seed producers under Rastriya Krishi Vikas Yojona on Junagarh block of Kalahandi district, Odisha. Indian Journal of Agricultural Science & Research. 2015; 6:239-246
19. Nagy K, Sharma RN, Nandah C, Kanwer SS. Genetic variability and association studies among yield attributes in pigeonpea [*Cajanus cajan* (L.) Millsp.] accessions of Bastar. Proceedings of International Conference on harmony with nature in context of eco technological intervention and climate change. National Environmentalists Association, India, 2013.

20. Patil YG, Mahajan SJ, Patil CH, Deshetti AS, Sarode PN. Front line demonstration – An effective tool for increasing the productivity of Groundnut and Soybean in Jalgaon district of Maharashtra. International Journal of Agricultural Sciences. 2010; 6(1):88-90.
21. Poonia TC, Pithia MS. Impact of front line demonstrations of Chickpea in Gujarat. Legume Research. 2011; 34(4):304-307.
22. Prasad Y, Kumar K, Mishra SB. Studies on genetic parameters and inter-relationships among yield and yield contributing traits in Pigeonpea [*Cajanus cajan* (L.) Millsp.]. The Bio Scan. 2013; 8(1):207-211.
23. Pulses Production in India: Present Status, Bottleneck and Way Forward. Journal of Agricultural Search. 2(2):75-83.
24. Rachhoya Hrish Kumar, Mukesh Sharma, Saini V Kumar. Impact of Cluster Front Line Demonstrations on Productivity and Profitability of Chickpea in Desert of Rajasthan. International Journal of Current Microbiology and Applied Sciences. 2018; 7(06):1860-1864.
25. Raj AD, Yadav V, Rathod JH. Impact of front line demonstrations (FLD) on the yield of pulses. International Journal of Scientific & Research Publication. 2013; 3(9):1-4.
26. Raj AD, Yadav V, Jadav HR, Rathod JH. Impact of front line demonstrations on Soybean in tribal belt of Gujarat. Agriculture Update. 2014; 9(4):587-589.
27. Reddy AA. Regional Disparities in Food Habits and Nutritional intake in Andhra Pradesh, India, Regional and Sectoral Economic Studies, 2010, 10-2.
28. Reddy Amarender A. Pulses Production Technology: Status and Way Forward, Review of agriculture, Economic & Political Weekly. 2009; 44(52):73.
29. Roy A, Singh NU, Tripathi AK, Yumnam A, Sinha PK, Kumar B *et al*. Dynamics of Pulse Production in North-East Region of India- A State-wise Analysis. Economic Affairs. 2017; 62(4):655-662.
30. Saikia Nabadeep, Kapil Deb Nath, Pulakabha Chowdhury. Impact of cluster frontline demonstrations on popularization of black gram *var.* PU 31 in Cachar district of Barak Valley region of Assam. Journal of Pharmacognosy and Phyto chemistry. 2018; 7(4):940-942
31. Samui SK, Maitra S, Roy DK, Mandal AK, Saha D. Evaluation on front line demonstration on Groundnut (*Arachis hypogea* L.). Journal of Indian Society and Coastal Agriculture Research. 2000; 18(2):180-183.
32. Samui SK, Maitra S, Roy DK, Mandal AK, Saha D. Evaluation on front line demonstration on Groundnut (*Arachis hypogea* L.). Journal of the Indian Society of Coastal Agricultural Research. 2000; 18(2):180-183.
33. Saroj SK, Singh MN, Ravindra Kumar, Tejveer Singh, Singh MK. Genetic variability, correlation and path analysis for yield attributes in pigeonpea. The Bio Scan. 2013; 8(3):941-944.
34. Sathe SK. The nutritional value of selected Asiatic pulses: chickpea, black gram, mung bean and pigeon pea. Legumes and Oilseeds in nutrition, 1993, 12-13.
35. Senaratne R, Ratnasinghe DS. Ontogenic variation in nitrogen fixation and accumulation of nitrogen in mungbean, blackgram, cowpea, and groundnut. Biology and Fertility of Soils. 1993; 16(2):125-130
36. Sharma V, Kumar V, Sharma SC, Singh S. Productivity enhancement and popularization of improved production technologies in Wheat through frontline demonstrations. Journal of Applied and Natural Science. 2016; 8(1):423-428
37. Singh D, Patel AK, Baghel SK, Singh MS, Singh A, Singh AK. Impact of Front Line Demonstration on the Yield and Economics of Chickpea (*Cicer arietinum* L.) in Sidhi District of Madhya Pradesh. Journal of Agricultural Research. 2014; 1(1):22-5.
38. Singh SB. Impact of Frontline Demonstrations on Yield of Soybean (*Glycine max* L. Merril) under Rainfed Conditions in Uttarakhand, India. International Journal of Current Microbiology and Applied Science. 2018; 7(05):986-992.
39. Singha K. Growth of paddy production in India’s North Eastern Region: a case of Assam. Anvesak. 2013; 42:193-206.
40. Singha K, Mishra S. Sustainability of Rice Cultivation: A Study of Manipur. Journal of Rice Research. 2015; 4:159.
41. Tamang Jyoti Prakash. Naturally fermented ethnic soybean foods of India. Journal of Ethnic Foods. 2015; 2:8e17.
42. Veeramani P, Davidson S Joshua, Anand G, Pandiyan M. Cluster front line demonstration in blackgram variety Vbn 6 at Vellore district of Tamil Nadu. Agricultural Update. 2017; 12:475-478.
43. Verma Arjun Kumar, Ram Raj Meena, Bhim Singh. Soybean front line demonstrations in Jhalawar district of Rajasthan for minimizing the yield gap. Plant Archives. 2013; 13(2):715-718.
44. Wang HL, Fang SF. History of Chinese Fermented Foods. In Hesseltine CW, Wang HL (Eds) Indigeneous Fermented Food of Non-Western Origin 23-35. Cramer, Berlin, 1986.