Research Article

Indian Journal of Extension Education
Vol. 57, No. 4 (October–December), 2021, (18-22)

ISSN 0537-1996 (Print)
ISSN 2454-552X (Online)

Rapeseed and Pulses Demonstrations as Cultivation Push in District Ferozepur of Punjab

Jagjot Singh Gill

District Extension Scientist, Punjab Agricultural University Farm Advisory Service Centre, Ferozepur, Punjab
E-mail id: jagjotsinghgill@pau.edu

ARTICLE INFO

Keywords: Pulses, Summer moong, Chickpea, Rapeseed, Gobhi sarson, Nutritional security

http://doi.org/10.48165/IJEE.2021.57404

ABSTRACT

Punjab Agricultural University Farm Advisory Service Centre, Ferozepur conducted total 361 demonstrations on PAU improved varieties SML 668 and SML 832 of summer moong, GPF 2 and PBG 5 varieties of gram (chickpea) and GSC 7 variety of gobhi sarson on farmer's fields in district Ferozepur during three consecutive years from *rabi* 2016-17 to *rabi* 2018-19 with aim to get the farmers to grow pulses and rapeseed to secure access of farmer families to an appropriately nutritious diet comprising all essential nutrients and higher net return. Low yield of traditional or local varieties of pulses and rapeseed is a major concern for farmers. To manage the problem of lower yield of pulses and rapeseed demonstration were conducted in different localities of Ferozpur district. PAU recommended varieties of Gobhi sarson, chickpea and summer moong gave 17.5, 19.3 and 17.5 per cent higher grain yield over local check grown by farmers. Chickpea green may earn higher net return of Rs. 304760 which is 83 and 78.7 per cent more than chickpea grain crop and wheat crop. Gobhi sarson with processing may earn net return of Rs. 111205.5 which is 47.6 and 41.7 per cent higher as compared to ghobi sarson without processing and wheat crop. Summer moong given additional net return of Rs. 93208 along with net return from *rabi* season previous crops like potato and gobhi sarson. Rapeseed and pulses gave higher net return than wheat crop along with nutritional security.

INTRODUCTION

Under the advancement of technology agricultural output and productivity has recorded large scale growth in cereal crops in Punjab, especially at the cost of pulses and oilseeds. Better irrigation facilities and assured marketing has led to monoculture of paddy and wheat in Punjab. It has led to adverse effects on agro ecological parameters resulting in depletion of underground water, deterioration of soil health and crop residue burning. Also the relative profitability has started declining and the yield has become stagnated. Cereals have not achieved food security although productivity of cereals has reached its maximum limits. Cereals are available in surplus especially wheat and rice but there is shortage of other food items like pulses, vegetables, oilseeds (Chand and Paul, 2003). Main reasons for slow growth of oilseeds and pulses were the low returns from these crops as compared to paddy and wheat which was due to the reason that these crops were grown on poor and unirrigated lands, low yield, low income level, low level of technology, susceptibility to pests and diseases and lack of assured market. There was urgent need to improve the production of oilseeds and pulses and to bring diversification in agriculture by shifting the area under paddy and wheat to oilseeds and pulses. Assured market, strong price incentive and technology breakthrough was essential for improving production of oilseeds and pulses (Grover and Singh, 2012). The extension services were also needed to promote the production of these crops. Agricultural advisory services are very important to transfer agricultural technology to farmers who are directly engaged in agriculture. Agricultural advisory

Received 09-07-2021; Accepted 20-08-2021

service centers applying scientific research to agricultural practices at farmer's fields through farmer education are doing extension of research from laboratory to the farmer's field. This transfer of technology is being done by organizing farmer awareness camps, by conducting campaigns, lectures, demonstrations and adaptive research trials etc. For this purpose villages are also adopted to create direct link between new research and farmers. In this paper we focus on demonstrations conducted by University Farm Advisory Service Centre, Ferozepur, that aims at transferring specific knowledge to farmers.

METHODOLOGY

Punjab Agricultural University (PAU) Farm Advisory Service Centre (FASC), Ferozepur conducted demonstrations on pulses and rapeseed on farmer's fields in district Ferozepur. In rapeseed, gobhi sarson demonstrations were conducted. Chickpea (Gram) and summer moong demonstrations were conducted in pulses during *rabi* seasons of the years 2016, 2017 and 2018. FASC, Ferozepur conducted 258, 62 and 41 demonstrations of gobhi sarson, chickpea, and summer moong. PAU recommended variety of gobhi sarson under demonstrations was GSC 7 throughout the study period. PAU recommended variety of chickpea under demonstration was GPF 2 during *rabi* 2016-17 and PBG 5 during *rabi* seasons of 2017-18 and 2018-19. Similarly, PAU recommended variety of summer moong under demonstration was SML 668 during *rabi* 2017-18 and SML 832 during *rabi* seasons of 2016-17 and 2018-19. The demonstration plots were evaluated against farmer's locally cultivated varieties with traditional farmers practice as a check. Farmer's local variety means variety purchased from local market from open bags without any assurity of variety and variety name. Improved practices recommended by PAU were strictly followed from sowing to harvesting in demonstration plots. Farmer Training camps were organized in respective villages before conducting the demonstrations to impart technology interventions, selection of sites, selection of farmers, layout of demonstration. Ghobi sarson variety GSC 7 was sown between 20-30th October using 3.8 kg/ha seed in sandy-loam to loamy soil. 225 kg/ha urea and 187.5 kg/ha super-phosphate was applied. Half of the urea and full super-phosphate were applied before sowing and remaining half of the urea was applied with first irrigation 3-4 weeks after sowing. Crops were harvested in last week of March. Chickpea demonstration were sown between 25th October to 10th November using 37.5 kg/ha and 60 kg/ha seed rate for improved varieties GPF2 and PBG5 during the three consecutive years after inoculating the seed with *Mesorhizobium* and *Rhizobacterium* biofertilizers. The soil of demonstration site was sandy loam 32.5 kg/ha urea and 125 kg/ha super-phosphate was applied at sowing. Chickpea were harvested in April. Summer moong varieties SML 668 and SML 832 were sown between 20th March to 10th April using 37.5 kg/ha and 30 kg/ha seed after inoculation with biofertilizer (*Rhizobium* sp LSMR-1 and *Rhizobium* RB-3). The soil was loamy to sandy loam. 27.5 kg/ha urea and 250 kg/ha super-phosphate was applied at sowing. Crops were harvested in June. Plant protection was carried out as per recommendations of PAU. Seed yield data of demonstrations was recorded and statistically analyzed by using CRD design in CPCS1 software. Seed yield data is given in quintals per hectare (q/ha).

RESULTS AND DISCUSSION

Gobhi sarson variety GSC 7 demonstration plots gave significantly higher grain yield as compared to farmer's local practices check plots during the period under study (Table 1). Grain yields of gobhi sarson variety GSC 7 demonstration plots were 5.3, 9.6 and 38.1 per cent higher over local variety with farmer's practices. Similar findings were also reported by Manan and Sharma (2017); Singh et al., (2019d); Singh et al., (2020) and Jha et al., (2021) and observed that adoption of improved variety and recommended cultivation practices is the key to increase crop productivity.

Table 1. Grain yield of demonstrations of various crops at farmer's field

Year	Grain yield (q/ha)		p = 0.05
	Demonstration plot	Farmer's practices	
Gobhi Sarson			
Rabi 2016-17	22.5	21.3	0.8
Rabi 2017-18	20.8	18.8	0.3
Rabi 2018-19	21.8	13.5	0.3
Chickpea			
Rabi 2016-17	17	15	1.1
Rabi 2017-18	11.8	8.5	0.6
Rabi 2018-19	14.8	11.5	1.0
Summer moong			
2016-17	14.0	11.2	2.2
2017-18	15.3	12.8	1.1
2018-19	15.8	13.3	0.4

Chickpea PAU recommended varieties GPF 2 and PBG 5 demonstration produced significantly higher grain yield over farmer's practice with local variety during the period under study. Chickpea variety GPF 2 demonstration recorded 11.8 per cent higher grain yield over local variety during *rabi* 2016-17. Similarly, Chickpea variety PBG 5 yielded 28 and 22.3 per cent higher as compared to farmer's practice with local variety during *rabi* 2017-18 and 2018-19, respectively. This is primarily due to introduction of high yielding disease resistant variety along with improved technology against farmer practices as reported by Roy et al., (2014); Singh et al., (2019); Singh et al., (2019a); Singh et al., (2019c) and Tripathi et al., (2019).

Demonstrations of PAU recommended varieties of summer moong SML 832 and SML 668 recorded significantly higher grain yield than Farmer's practice with local variety. Summer moong SML 668 demonstrations recorded 16.3 per cent higher yield than farmer's practice during 2017-18. Similarly, demonstrations of summer moong variety SML 832 recorded 20 and 15.8 per cent higher grain yield over farmer's practice during 2016-17 and 2018-19, respectively. The observed increase in grain yield of summer moong demonstrations over farmer's practice may be attributed to the use of improved variety, proper seed rate, use of biofertilizers, nutrient management and plant protection. Similarly result has earlier reported on pulse crops by Sandhu and Dhaliwal (2018); Singh et al., (2019b) and Kumar and Boparai (2020).

Average yield of rapeseed and pulses

Demonstrations on PAU recommended varieties of gobhi sarson, chick pea and summer moong recorded significantly higher

grain yield over local varieties grown by farmers (Figure 1). Demonstrations on gobhi sarson, chick pea and summer moong yielded 17.5, 19.3 and 17.5 per cent higher grain yield as compared to farmer's practice. This may be due to higher yield obtained under the recommended practice compared to the farmers practice. The similar results has reported by Shekhawat et al., (2012); Ahmad et al., (2013); Kumbhare et al., (2014) and Nain et al., (2015) and observed that technology adoption is the key to increase crop productivity.

Economics

Area under rapeseed (gobhi sarson), summer moong and gram is very negligible in Ferozepur district. Area of gobhi sarson slightly increased during *rabi* 2018-19 over previous years as shown in Figure 2. However, area under summer moong decreased during the years under study.

Average yield of wheat in Punjab was 50.8 q/ha which was less than average yield of wheat (52.3 q/ha) in Ferozepur district

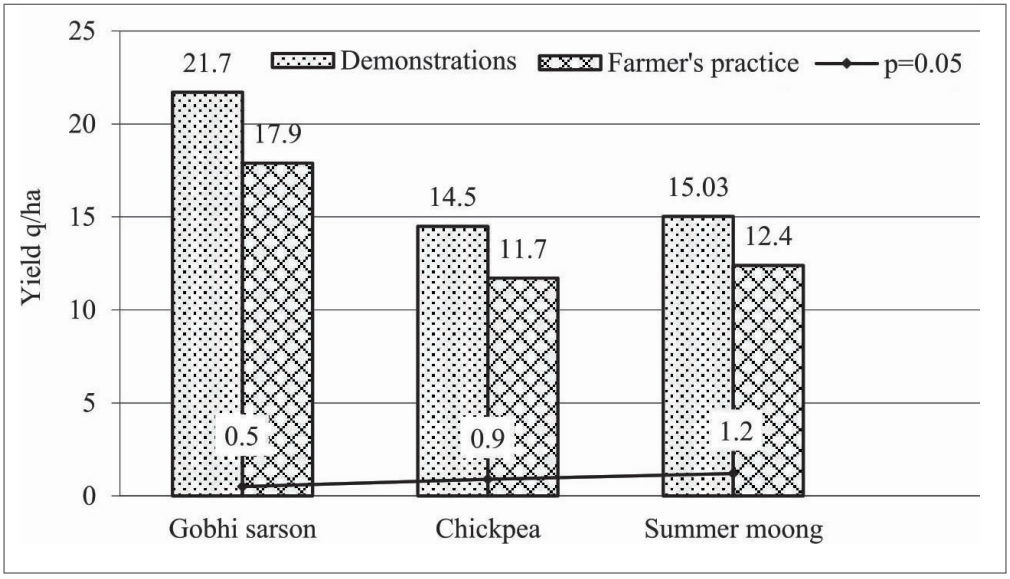

Figure 1. Average yield of demonstrations on rapeseed and pulses

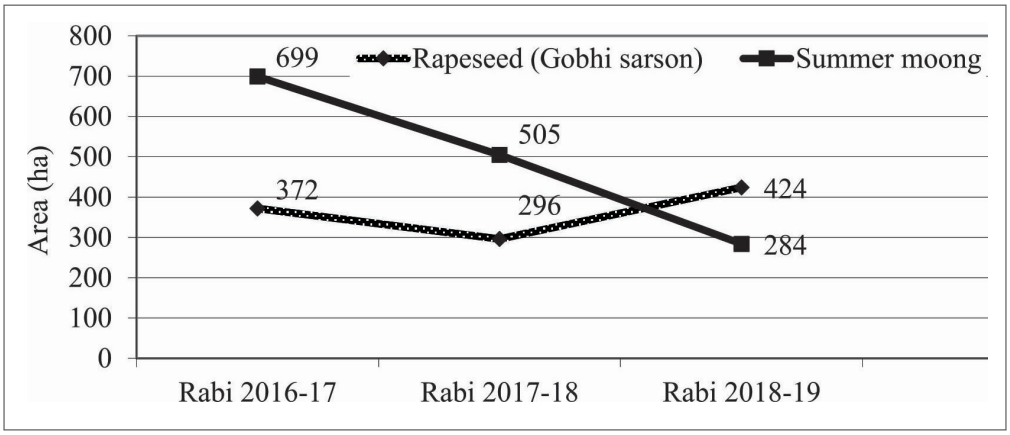

Figure 2. Area (ha) under rapeseed (Gobhi sarson) and summer moong in Ferozepur
*The data regarding gobhi sarson and summer moong in Ferozepur district taken from district headquarter of department of agriculture & farmer welfare, Ferozepur

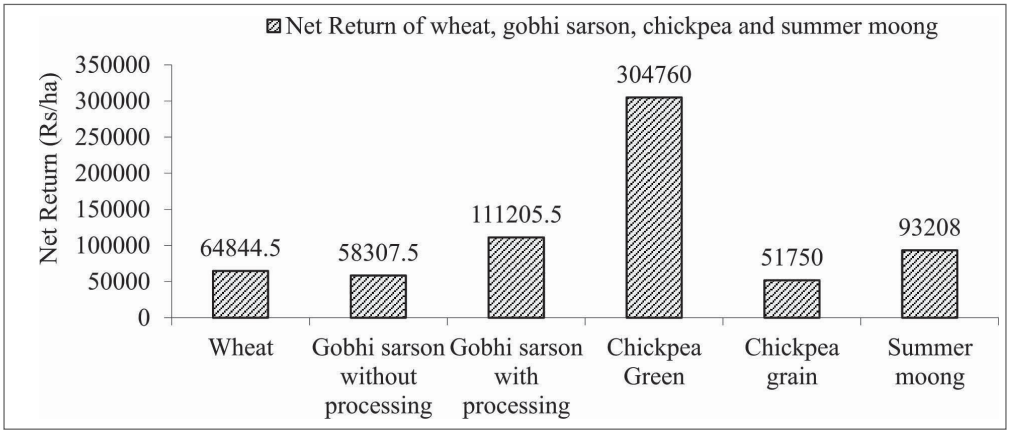

Figure 3. Net return of wheat, gobhi sarson, chickpea and summer moong

Table 2. Economics of various crop

Particulars	Wheat	Summer moong	Gobhi Sarson		Chickpea	
			Without processing	With processing	Mature chickpea seed	Green chickpea (ha) (Pods are not yet dry)
Average grain yield (q/ha)	52.3	15.0	21.7	21.7	14.5	160
Average seed oil cake production (q)			–	14.1		(Green chickpea average yield)
Average oil production (litres)			–	782.6		
Cost of cultivation (Rs/ha)*	31387.5	11417	32832.5	32832.5	15240	15240
Gross return (Rs/ha)**	96232	104625	91140	144038	66990	320000
Net return (Rs/ha)	64844.5	93208	58307.5	111205.5	51750	304760
B:C ratio	2.1	8.2	1.8	3.4	3.4	20.0

*Cost involved in wheat cultivation-seed and seed treatment cost, fertilizers cost, plant protection cost, irrigation cost, human labour hours cost, harvesting cost, tractor hours cost, interest on variable costs and marketing charges were not included. **Gross return not included returns of by product (Minimum Support Price of wheat was Rs. 1840 per quintal during 2018-19).

*Cost involved in gobhi sarson cultivation-cost of seed, fertilizers cost, plant protection cost, irrigation cost, human labour hours cost, tractor hours cost. Interest on variable costs and marketing charges were not included. **Gross return included returns of by product oil (Rs. 130 per litre as per market rate) and seed oil cake (Rs. 3000 per quintal as per market rate). Minimum Support Price of sarson was Rs. 4200 per quintal during 2018-19.

*Cost involved in chickpea cultivation-cost of seed and seed treatment, fertilizers cost, plant protection cost, irrigation cost, human labour hours cost, tractor hours cost. Interest on variable costs and marketing charges were not included. **Gross return included returns of green chickpea (local name "Chholiya") (Rs. 20 per kg as per market rate). Minimum Support Price of mature chickpea was Rs. 4620 per quintal during 2018-19.

*Cost involved in summer moong cultivation-cost of seed and seed treatment, fertilizers cost, plant protection cost, irrigation cost, human labour hours cost, tractor hours cost. Interest on variable costs and marketing charges were not included. Minimum Support Price of summer moong was Rs. 6975 per quintal during 2018-19.

during the year of 2017-18 (Statistical Abstract, 2018). Study of economics of wheat crop, gobhi sarson, chickpea and summer moong showed that net return (Rs/ha) of rapeseed and pulses were comparable with net return (Rs/ha) of wheat crop i.e. Rs. 64844.5. Gobhi sarson gave net return of Rs. 58307.5 without processing and Rs. 111205.5 with processing. Net return from matured chickpea grain crop was Rs. 51750. Green chickpea (green chickpea plant bearing green pods also called Chholiya sale in market) gave net return Rs. 304760. Net return of Rs. 93208 was obtained from summer moong (Table 2). Summer moong given additional net return of Rs. 93208 along with net return from *rabi* season previous crops like potato and gobhi sarson. Green chickpea gave higher net return Rs. 304760 followed by net returns of Rs. 111205.5 and Rs. 93208 from gobhi sarson and summer moong (Figure 3). Even with the higher net returns from rapeseed and pulses, farmers are hesitating from increase in area under these crops due to involvement of labour, less mechanization, cumbersome processing and poor market linkages (Singh and Bansal, 2020).

CONCLUSION

Cultivation practices considered under demonstrations of PAU recommended varieties of rapeseed and pulses as a technology including improved cultivation practices viz., proper seed rate, seed inoculation by biofertilizers, balance application of fertilizer, plant protection as recommended by PAU out yielded farmer's practice with local varieties. Rapeseed and pulses besides securing nutritional value of food could be a way for earning superb economic return. But, week marketing linkages, hesitation to post harvest processing, involvement of labour which is unavailable at peak of season and less mechanization as compared to established rice-wheat cropping system farmers are disinclined to increase area under rapeseed and pulses.

REFERENCES

Ahmad, A., Guru, P., & Kumar, R. (2013). Impact of front line demonstrations on Indian mustard through improved technologies. *Indian Research Journal of Extension Education*, *13*(1), 117-119.

Chand, R., & Pal, S. (2003). Policy and technological options to deal with India's food surpluses and shortages. *Current Science*, *84*, 388-398.

Grover, D., & Singh, J. M. (2012). Possibilities and constraints for increasing the production of pulses in Punjab and impact of national food security mission on pulses. AERC Study # 26, Agro-Economic Research Centre, Department of Economics and Sociology, Punjab Agricultural University, Ludhiana, Punjab, India, 145p.

Jha, A. K., Mehta, B. K., Kumari, M., & Chatterjee, K. (2021). Impact of frontline demonstrations on mustard in Sahibganj district of Jharkhand. *Indian Journal of Extension Education*, *57*(3), 28-31.

Kumar, P., & Boparai, A. K. (2020). Impact of summer moong through improved technology in Jalandhar district of Punjab, India. *International Journal of Current Microbiology and Applied Sciences*, *9*(5), 3495-3501.

Kumbhare, N. V., Dubey S. K., Nain, M. S., & Bahal Ram (2014). Micro analysis of yield gap and profitability in pulses and cereals. *Legume Research- An International Journal*, *37*(5), 532-536.

Manan, J., & Sharma, M. (2017). Yield realization of different Brassica cultivars under Central Plain Zone of Punjab. *Journal Krishi Vigyan*, *6*(1), 221-223.

Nain, M. S., Ram Bahal, Dubey, S. K., & Kumbhare, N. V. (2015). Adoption gap as the determinant of instability in Indian legume production: Perspective and implications. *Journal of Food Legumes*, *27*(2), 146-150.

Roy, R., Singh, A., & Kang, J. S. (2014). Yield and quality of chickpea (*Cicer aerietinum*) varieties as influenced by different planting techniques. *Legume Research*, *37*(3), 294-299.

Sandhu, B. S., & Dhaliwal, N. S. (2018). Grain yield and economics of mungbean (*Vigna radiate* L.) as influenced by different varieties and previous crop. *Food Legumes*, *31*(1), 49-52.

Shekhawat, K., Rathore, S. S., Premi, O. P., Kandpal, B. K., & Chauhan, J. S. (2012). Advances Agronomic Management of Indian Mustard (*Brassica juncea* (L.) Czernj. Cosson) : An Overview. *International Journal of Agronomy*, pp 1-14. https://doi.org/10.1155/2012/408284

Singh, A. K., Chauhan, R., Rikhari, Y. C., & Kumar, P. (2020). Evaluation of front line demonstration on mustard crop in Bundelkhand Zone. *Indian Journal of Extension Education*, *56*(1), 18-22.

Singh, B. P., Kumar S., & Verma A. (2019). Causes of technological gap in green gram cultivation in District Ramabai Nagar U.P. *Indian Journal of Extension Education*, *55*(2), 53-56.

Singh, K. K., Singh R. P. N., & Mishra, D. (2019d). Evaluation of front line demonstration of oilseeds in Raebareli district. *Indian Journal of Extension Education*, *55*(3), 49-52.

Singh, K. K., Singh R. P. N., Mishra, D., & Chauhan, D. (2019a). Evaluation of front line demonstration of pulses in Raebareli. *Indian Journal of Extension Education*, *55*(4), 77-80.

Singh, L., & Bansal, S. (2020). Pulses in Punjab: growth rate and decomposition analysis. *International Journal of Farm Science*, *10*(2), 81-85.

Singh, R. K., Singh, D., & Singh, R. (2019c). Accelerating the chickpea productivity through suitable technological interventions in Vindhyan Plateau Zone of Madhya Pradesh. *Indian Journal of Extension Education*, *55*(1), 92-98.

Singh, R. P., Dhillon, B. S., & Sidhu, A. S. (2019b). Productivity of summer moong (*Vigna radiate* L.) as influenced by different sowing dates and varieties. *Journal of Pharmacognosy and Phytochemistry*, *8*(3), 781-784.

Statistical Abstract. (2018) Statistical Abstract of Punjab.

Tripathi, U. K., Singh, R. K., & Srivastav, V. (2019). Performance of blackgram and their improved variety in Chhatarpur districts under Bundelkhand region of Madhya Pradesh. *Indian Journal of Extension Education*, *55*(4), 71-76.