Medicon Agriculture & Environmental Sciences
Volume 4 Issue 3 March 2023
Research Article

Impact Analysis of Shalimar Sarson - 2 (SS -2) under Cluster Front Line Demonstration Programme in Budgam District, UT Jammu and Kashmir, India

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Received: December 05, 2022; **Published:** March 02, 2023

Abstract

For the dissemination of various technologies KVKs are conducting Cluster frontline demonstrations (CFLDs) to demonstrate the production potential of newly released technologies on the farmer's fields at different locations in a given farming system. In the similar way KVK Budgam also conducted the CFLD Programme on oil seeds in different villages of Budgam Dist. (Haripora Haran, Soibugh, Hajibagh and Warpora) in various clusters during the successive years of 2018-19, 2019-20, 2020-21 and 2021-22 on a silty clay loam soil, high in organic Carbon, medium in available phosphorus, nitrogen and potassium for the performance evaluation of Brown Sarson (*Brassica rapa* L. var. Oleifera). During the CFLD programme the average seed yield of SS-2 during the four years was 12.45q/ha in demonstrated fields as compared to average seed yield of 6.90q/ha from the local check. The average technology gap over the four years was found to be 4.54q/ha and extension gap 5.53q/ha. The average technology index was 26.71 per cent. Higher gross returns (Rs 74745 ha^{-1}), net returns (Rs 52885 ha^{-1}) with a benefit-cost ratio of 3.41were found in demonstrated fields as compared to 2.60 in case of local check. The higher yield is attributed to the introduction of newly released SKUAST K high yielding variety of brown sarson (SS-2).

Keywords: Brown Sarson-2, SS-2, Yield, CFLD, B: C ratio, Technology index

Introduction

Jammu and Kashmir has varied climatic conditions ranging from Sub-tropical to temperate cold desert conditions. In Kashmir valley and high altitude regions of Jammu division brown sarson is the only edible oilseed crop being cultivated during *rabi* season. This is the only crop of the rapeseed-mustard group which fits well in the oilseed – paddy rotation prevailing in the valley of Kashmir and is the dominant *rabi* crop of the Kashmir valley. In Jammu and Kashmir oil seeds are grown on an area of 55 thousand ha with annual production of 370 thousand quintals with productivity of 6.97 q ha^{-1} (Anonymous, 2018). The low productivity is mainly attributed to the fact that the farmers mainly grow the traditional varieties and land races which are not only low yielding but highly susceptible to biotic (weeds, aphid and Jassid infestation of the crop) and abiotic stresses. Among the abiotic stress, climatic factors are responsible for lower productivity of brown sarson as lower temperature restricts the cultivation of high yielding mustard varieties in the temperate valley condition (Sabia et al., 2016).

There are so many appropriate technologies generated at agricultural universities and research stations but the productivity of brown Sarson is still very low due to poor transfer of technologies from the center of its development to the points of its utilization and only a little new knowledge percolates to the farmers' fields, hence a vast gap has been observed between knowledge production & knowledge utilization. To achieve target of additional production of oilseeds, it is necessary to concentrate efforts on scientific cul-

tivation of mustard, the most important oilseed crop of India. The basic objective of CFLDs is to demonstrate improved technology of recently released high yielding bold seeded varieties in conjunction with balanced nutrition, whole package of practices including the timeliness of the farm operations, thinning, weed management, insect pest disease management and other newly developed technologies at farmers field through KVKS. In view of the same and importance of CFLDs, the KVK Budgam of SKUAST-Kashmir, J&K UT conducted demonstrations at farmer's field under unirrigated condition during the *Rabi* seasons of 2018-19, 2019-20, 2020-21 and 2021-22. The main objectives of this study includes, to study the performance of HYV of Brown Sarson (SS-2) over the local check (farmers' field) in terms of yield, extension gap, technology gap, Technology Index, Economics and Benefit ratio etc.

Materials and Methods

The study was carried out on farmer's field of District Budgam under the supervision of KVK Budgam scientists during the successive years of *rabi* seasons of 2018-19, 2019-20, 2020-21 and 2021-22. Most of the farmers of District Budgam sow the brown sarson crop after the harvest of Rice crop. The size of the field was of variable size (Table 1). The texture of the farmer's field was silty clay loam with pH 7.6. The average available Nitrogen, Phosphorus and organic carbon content was 330 kg/ha, 19.1 kg/ha and 0.5 % respectively. The selected farmers of the District Budgam were supplied with the critical inputs like seed and organic fertilizers by the KVK while the other inputs like herbicides, irrigation and agro chemicals were managed by the farmers according to the SKUAST K recommended package of practices. The brown sarson variety "SS-2" was sown manually during the first fortnight of October. A seed rate of 10 Kg/ha was used for the production of the crop. Half dose of nitrogen (44kg/ha) along with full Dose of Phosphorus (55kg/ha) and Potassium (67 k/ha) was applied as basal dose. The remaining quantity of urea was applied in two splits, first split at 1st week of March (44kg/ha) and another split at siliqua formation (44kg/ha). The CFLD was conducted to study the technology gap between the potential yield and demonstrated yield, extension gap between demonstrated yield and yield under existing practices and technology index. The yield data was collected from both the demonstration and farmers practice by random crop cutting method and analyzed by using simple statistical tools. Different parameters as suggested by Yadav et al., (2004) were used for calculating gap analysis, costs and returns. The details of different parameters are as follows:

Technology gap=Potential yield-Demonstration yield.
Extension gap=Demonstration yield-Farmers yield.
Technology index (%) = Technology gap/ Potential yield×100.
Effective gain = Additional return - Additional cost.

Year	*Number of Demos.*	*No. of clusters*	*Location*	*Block*
2018-19	25	1	Khansahib	Khansahb
2019-20	25	1	Hajibagh	Soibugh
2020-21	25	1	N.S Pora	Soibugh
2021-22	25	2	Haripora Haran, Soibugh	Soibugh
Average	25			

Table 1: Details of farmers of Budgam District under FLD Programme.

Cultural operations	*Prevailing Practices*	*SKUAST K recommended package of practices*
Source of Seed	Local seed	MRCFC, Khudwani, SKUAST K
Seed quality	Small and non-graded seed	Bold graded seed
Seed treatment	No seed treatment	Treated with Bavistin 50 WP @ 2g per litre of water for 1 kg of seeds.
Seed rate	30 kg/ha	10 Kg/ha
Sowing time	1st week of November	1st week of October.
Method of sowing	Broadcasting	Line sowing
Fertilizer application	Broadcasting	Band application
Thinning operation	No thinning operation	As and when needed
Weed management	Manual weeding	Manual weeding + chemical Control.
Water management	Totally rainfed	As and when needed
Control measures	No use of pesticides	Use of pesticides according to SKUAST K recommended package of practices

Table 2: Comparison of cultural practices and SKUAST K recommended package of practices.

Results and Discussion

Yield

The result of 25 demonstrations (average) conducted during the *rabi* seasons of 2018-19, 2019-20, 2020-21 and 2021-22 at farmers field in different villages of Budgam District are shown in Table 3. Farmers adopted the SKUAST K package of practices and supervised by the scientists of KVK Budgam. The data depicts the remarkable impact of CFLD over the farming community. The comparison of yield and other parameters between local check and demonstrated variety and practices are shown in Table 3. The average seed yield of SS-2 was 12.45 q/ha in demonstrated fields as compared to average seed yield obtained from farmers field (6.9 q/ha). The increase in per cent of yield was ranging between 76.55 to 82.60q/ha. On the basis of four years, demonstration plots resulted in 80 % per cent higher seed yield over local check. This may be attributed to higher number of primary and secondary branches plant^{-1}, more number of siliqua plant^{-1}, higher number of seeds siliqua^{-1} and 1000 seed weight etc. as compared to check (use of non-descriptive local variety, no use of the balanced dose of fertilizers, untimely sowing and no control measures adopted for pest management). Similar findings were also observed by Rajeev et al. (2020).

Technology gap (q/ha)

The technology gap is the gap between potential yield and yield of demonstration plots and were 5.06, 4.51, 4.4 and 4.2 q/ha during 2018-19, 2019-20, 2020-21 and 2021-22 respectively, on an average technology gap under four year CFLD programme was 4.54 q/ha. The technology gap observed may be attributed to dissimilarity in the soil fertility status, agricultural practices and local climatic situation. This indicates the gap between technology evolved and technology adoption at farmer's field and also reflects the farmer's cooperation in carrying out such demonstrations with encouraging results in subsequent years. In order to reduce this gap, location specific recommendations for varieties and timely sowing appear to be necessary. Similar findings were observed by Girish et al. (2020).

Extension gap

Extension gap is the difference between demonstration yield and Farmers yield and Ranging between 5.33-5.65 q/ha. On an average extension gap of 5.53q/ha was observed which emphasized the need to aware the farmers about the high yielding varieties and about the latest technologies through trainings and method demonstrations. These findings are in accordance with Sharma et al. (2011).

Technology Index

The technology index shows the feasibility of the demonstrated technology at the farmer's field. The technology index varied from 24.70 to 29.76 percent (Table 3). On an average technology index was observed 26.71 percent during the four years of CFLD programmes, shows the efficacy of good performance of technical interventions. The lower the value of technology index the more is the feasibility of technology. As such fluctuation in technology index during the four years of study period in certain regions may be attributed to the dissimilarity in soil fertility status, weather condition, non-availability of irrigation water and insect-pests attack. This finding is in accordance with the findings of Singh (2015).

Economics

An analysis on economics (Table 4) revealed that Brown Sarson under CFLD programme recorded higher gross returns (Rs 74745 ha^{-1}), net returns (Rs 52885 ha^{-1}) with a benefit-cost ratio of 3.41 as compared to 2.61 in case of local check. The average sale rate of Brown Sarson seed was 6000/q. the higher benefit cost ratio in demonstrated plots is due to of higher yield obtained under improved technologies as compared to farmers practice during the demonstration years. Similar results were obtained by Mitra et al., 2014 and It is concluded from the study that under CFLD programme the high yielding variety of Brown Sarson along with improved technologies has remarkable impact on yield and economics of Brown Sarson in Budgam District.

Year	Name of variety	No. of Demonstration	Yield (q/ha)						% Increase over check	Technology gap (q/ha)	Extension gap (q/ha)	Technology index (%)
			Demonstration		Check							
			Max.	Min.	Av.	Max.	Min.	Av.				
2018-19	SS-2	25	13.0	10.9	11.95	7.60	5.63	6.62	80.63	5.06	5.33	29.76
2019-20		25	13.5	11.5	12.50	7.80	5.89	6.85	82.00	4.51	5.65	26.52
2020-21		25	13.6	11.6	12.60	7.99	6.00	7.00	80.25	4.40	5.61	25.88
2021-22		25	13.7	11.9	12.80	8.00	6.50	7.25	76.55	4.20	5.55	24.70
Average					12.46			6.93		4.54	5.53	26.71

Table 3: Yield, technology gap, extension gap and technology index of Brown sarson (SS-2) in Budgam District.

Year	Demonstration Plots				Check Plots			
	Cost of Cultivation(Rs/ha)	Gross Return (Rs/ha)	Net Return (Rs/ha)	B:C ratio	Cost of Cultivation(Rs/ha)	Gross Returns (Rs/ha)	Net Returns (Rs/ha)	B:C ratio
2018-19	21240	71640	50400	3.37	15275	39690	24415	2.60
2019-20	21700	74940	53240	3.45	15500	41070	25570	2.65
2020-21	22000	75600	53600	3.44	16000	41970	25970	2.62
2021-22	22500	76800	54300	3.41	16500	43500	27000	2.64
Average		74745	52885	3.41		41557	25739	2.60

Table 4: Gross cost, gross return, net return and B:C ratio of Brown Sarson variety SS-2.

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