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A Success Story: Performance of Mid Altitude Variety of Rice (Sr-4) At High Altitude Area of Budgam District: A Benefit of Climate Change

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SUMMARY

Jammu & Kashmir is an Agri-horticulture state where a large population is economically dependent on agriculture and horticulture, directly or indirectly, for livelihood security. Rice production and food security is greatly affected with climate change like high temperature, uncertain rainfall and extreme weather events leading to water stress, reduced yields, increased pests, and soil degradation. Low-lying rice production regions could be the most susceptible to changing environmental conditions, while mid and high-altitude areas in Kashmir valley could see improvements in rice-growing conditions. Future climate change could reduce the suitable low altitude area for rice production by 60%, (Castro-Llanos, 2019). For the dissemination of various technologies KVKs are conducting frontline demonstrations (FLDs) to demonstrate the production potential of newly released varieties on the farmer's fields at different locations in a given farming system. In the similar way KVK Budgam also conducted the FLD Programme on rice (SR-4) at higher altitude areas of Khag block of Budgam Dist. (Hamchipora and Lobrin) during the successive years of 2021-2022, 2022-2023, 2023-24 and 2024-25 for the performance/evaluation of SR-4. During the FLD programme the average seed yield of SR-4 during the four years was 86.48 q/ha in demonstrated fields as compared to average seed yield of 57.38 q/ha from the local check. The average technology gap over the four years was found to be 3.5 q/ha and extension gap 29.10 q/ha. The average technology index was 3.91 per cent. Higher gross returns (Rs 172967.5 ha-1), net returns (Rs 120982.5 ha-1) with a benefit-cost ratio of 2.32 were found in demonstrated fields as compared to 1.2 in case of local check.

INTRODUCTION

Rice (*Oryza sativa*), the staple food of the majority population, is cultivated in diverse agro-ecological conditions from the subtropical area (1000 m amsl) of Jammu, through the temperate valley to cold high-altitude regions (1650-2400 m amsl) of Kashmir (Amjad and sofi, 2018). Shalimar Rice-4 (SR-4) is not specifically adapted to high altitudes but is a high-yielding, early-maturing variety that is highly adaptive to the plains and mid-altitude areas of the Kashmir Valley. It is the superior variety for low-temperature stress during the seedling stage, which is common in Kashmir's temperate climate, leading to its adoption over traditional varieties for its higher yield potential, good grain quality, and resistance to blast disease, which are desirable traits for farmers. Warming temperatures can extend the growing seasons and make previously unsuitable high-altitude regions viable for mid-altitude rice varieties particularly SR-4, a benefit of climate change. Regional and national studies in Asia suggest that rice production will suffer under climate change, researchers also conducted few studies for other parts of the world.

Observations

The study was carried out on farmer's field of block Khag, District Budgam under the supervision of KVK Budgam scientists during the successive years of Kharif seasons of 2021-2022, 2022-2023, 2023-24 and 2024-25. Most of the farmers of Khag belt cultivates the K-39 variety a high-yielding, cold-tolerant indica-type rice variety developed in Kashmir for cultivation in temperate and high-altitude areas. For the dissemination of HYV of paddy (SR-4) the selected farmers of the block Khag, 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 Rice variety "SR-4" was transplanted manually during the first fortnight of June. The number of seedlings/hills used were 5-6 for the cultivation of SR-4. The size of the field under SR-4 cultivation was of variable size. Half dose of nitrogen (40 Kg/ha) along with full Dose of Phosphorus (60 Kg/ha) and Potassium (30 Kg/ha) was applied as basal dose. The remaining quantity of nitrogen in the form of urea was applied in two splits, first split (20 Kg/ha) at tillering stage (18-22 DAT) and second top dose of urea (20 Kg/ha) at panicle initiation stage (35-

40 DAT). The FLD programme was conducted to study the performance of mid altitude variety of rice (SR-4) at high altitude area of Budgam district: a benefit of climate change on the yield, technology gap, extension gap and Technology index (%) The yield data was collected from both the demonstration and farmers practice by random crop cutting method and analysed 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-Farmer's yield.

Technology index (%) = Technology gap/ Potential yield×100.

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

Year	*Number of Demos.*	*No. of clusters*	*Location*	*Block*
2021-22	30	1	Hamchipora	Khag
2022-23	40	1	Hamchipora	Khag
2023-24	40	1	Lobrin	Khag
2024-25	50	1	Lobrin	Khag
Average	**40**			

Observations

Yield

The result of 40 demonstrations (average) conducted during the *Kharif* seasons of 2021-22, 2022-23, 2023-24 and 2024-25 at farmers field in different villages of Budgam District are shown in Table 2. Farmers adopted the SKUAST K package of practices and supervised by the scientists of KVK Budgam. The data depicts the remarkable impact of FLD over the farming community. The average seed yield of SR-4 was 86.48 q/ha in demonstrated fields as compared to average seed yield obtained from farmers field (54.96 q/ha). The per cent increase in yield was ranging between 54.38 to 55.99 q/ha. On the basis of four years, demonstration plots resulted in 50.88 % higher seed yield over local check. Though this variety is suitable for mid-altitude areas but because of its ideotype character and climate change it thrives well at higher altitude and tribal areas of Khag block and resulted in higher yield. The average technology gap over the four years was 3.5 q/ha, 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 transplantation appear to be necessary. On an average extension gap of 29.10 q/ha was observed which emphasized the need to aware the farmers about the high yielding varieties, about the latest technologies and climate change through trainings and method demonstrations. On an average technology index of 26.71 percent was observed during the four years of FLD programmes, shows the efficacy of good performance of technical interventions. The lower the value of technology index the more is the feasibility of technology.

Table 2: Yield, technology gap, extension gap and technology index of Paddy (SR-4) in Budgam District.

Year	*Name of crop*	*No. of Demonstration*	*Yield (q/ha)*					
			Demonstration		*Check*			
			Max.	*Min.*	*Av.*	*Max.*	*Min.*	*Av.*
2021-22	SR-4	30	87.00	83.54	85.27	56.7	51.23	58.01
2022-23		40	87.67	84.37	86.02	55.89	52.32	58.99
2023-24		40	88.50	85.23	86.86	57.2	55.33	54.38
2024-25		50	90.00	85.57	87.785	56.76	54.26	58.14
Average		**40**			**86.48**			**57.38**

Year	*% Increase over check*	*Technology gap (q/ ha)*	*Extension gap (q/ha)*	*Technology index (%)*
2021-22	46.99	4.73	27.3	5.26
2022-23	45.82	3.98	27.0	4.42
2023-24	59.73	3.14	32.5	3.49
2024-25	50.99	2.22	29.6	2.47
Average	**50.88**	**3.5**	**29.10**	**3.91**

Economics

An interpretation on economics (Table 3) revealed that SR-4 under FLD programme recorded higher gross returns (Rs **172967.5** ha^{-1}), net returns (Rs **120982.5** ha^{-1}) with a benefit-cost ratio of 2.32 as compared to 1.2 in case of local check. The average sale rate of SR-4 seed was 2000/q. the higher benefit cost ratio in demonstrated plots is due to the 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 FLD programme the high yielding variety of paddy along with improved technologies has remarkable impact on yield and economics of paddy in Budgam District.

Table 3: Gross cost, gross return, net return and B:C ratio of Paddy (SR-4).

Year	*Demonstration Plots*				*Check Plots*			
	Cost of Cultivation (Rs/ha)	*Gross Returns (Rs/ha)*	*Net Returns (Rs/ha)*	*B:C ratio*	*Cost of Cultivation (Rs/ha)*	*Gross Returns (Rs/ha)*	*Net Returns (Rs/ha)*	*B:C ratio*
2021-22	51240	170540	119300	2.33	51240	116020	64780	1.26
2022-23	51700	172040	120340	2.33	51700	117980	66280	1.28
2023-24	52500	173720	121220	2.31	52500	108760	56260	1.07
2024-25	52800	175570	123070	2.33	52800	116280	63480	1.20
Average		**172967.5**	**120982.5**	**2.32**				**1.2**

REFERENCES

Amjad M. Husaini and Sofi NR. 2018. DOI; 10.5772/intechopen. 74591.

Castro-Llanos, F., Hyman, G., Rubiano, J. *et al.* Climate change favours rice production at higher elevations in Colombia. *Mitig Adapt Strateg Glob Change* **24**, 1401–1430 (2019). https://doi.org/10.1007/s11027-019-09852-x

Yadav DB, Kamboj BK and Garg RB. 2004. "Increasing the productivity and profitability of sunflower through front line demonstrations in irrigated agroecosystem of eastern Haryana". *Haryana J. Agron* 20.1 & 2: 33-35.