Guj. J. Ext. Edu. Vol. 36 : Issue 1 : December 23 *https://doi.org/10.56572/gjoee.2023.36.1.0013*

IMPACT OF FRONTLINE DEMONSTRATION OF SRI METHOD IN RICE ON PRODUCTIVITY AND PROFITABILITY

L. T. Kapur[1], M. M. Gajjar[2] and R. F. Thakor [3]

1 SMS (Agronomy), Gujarat Vidhyapith, Krishi Vigyan Kendra, Valsad -396 191
2 SMS (Soil science), Gujarat Vidhyapith, Krishi Vigyan Kendra, Valsad -396 191
3 Senior scientist & Head, Gujarat Vidhyapith, Krishi Vigyan Kendra, Valsad -396 191
Email : mitgajjar4772@gmail.com

ABSTRACT

Gujarat Vidyapith, Krishi Vigyan Kendra (KVK)-Valsad conducted an impact study during the year 2020-21 to 2022-23 with the 120 frontline demonstrations (FLDs) on system of rice intensification (SRI) technique in paddy crop on farmer`s field in six villages of Valsad district with improved variety "Sardar" release from Navsari Agricultural University, Gujarat. Result of study showed SRI method of rice cultivation, increased overall, 23.62 percent in mean grain yield as compared to farmer practice, recorded mean of technology gap was 910 kg ha^{-1} whereas extension gap and technology index were observed 780 kg ha^{-1} and 18.2 % respectively. High mean gross return (61,350 Rs.ha^{-1}) and mean net return (27,637 Rs.ha^{-1}) as well as BC ratio (1.82) were found higher under demonstration plots. The results of FLDs revealed that SRI technique is far better than conventional technique of rice cultivation. SRI can be a way to enhance sustain productivity and profitability of rice growers of Valsad district of Gujarat.

Keywords : *SRI, productivity, paddy, tribal*

INTRODUCTION

Rice, the most widely grown and consumed cereal crop, is the lifeline for more than half of the world's population. Total production of rice in India during 2021-22 is 130.29 million tonnes from the 463.79 lakh ha. area with the productivity is 2,809 kg ha^{-1} (Anonymous, 2023). In Gujarat, it occupies 8.18 lakh hectare with production of 18.85 lakh ton and productivity of 2,304 kg ha^{-1}. However, Valsad district produced 1.83 lakh tones rice with the productivity 2,570 kg ha^{-1} from 0.71 lakh hectares area during the year 2021-22 (Anonymous, 2022). The poor productivity of rainfed upland transplanted paddy brings down the total average productivity of the district. Thus, paddy growers of Valsad, looking for alternative methods of production that can significantly increase rice supply without jeopardizing the health and sustainability of ecosystems.

The *system of rice intensification* (SRI), a knowledge-based low-external input technology, developed in the 1980s in Madagascar to benefit farmers with small landholdings, promises higher yields with no deleterious impact on natural resources at affordable costs for poor smallholder farmers.

Keeping in view the above fact, KVK-Valsad set up front line demonstrations (FLDs) on SRI technology of rice cultivation on farmer's field.

OBJECTIVE

To study the impact of frontline demonstrations (FLDs) on system of rice intensification (SRI) technique on productivity and profitability in rice cultivation at farmer's field.

METHODOLOGY

Krishi Vigyan Kendra(KVK)-Valsad were conducted 120 front line demonstrations on system of rice intensification (SRI) technique in paddy crop during the year 2020-21 to 2022-23 in six villages of Valsad district of Gujarat. From the first year, 40 rice farmers from two villages (Twenty from each selected village) for the first year and in subsequent years were selected. Thus, total sample size of the selected demo farmers was confined to 120 during the period of three years. Improved variety of rice "Sardar" was used for both demonstration and farmer practice check plots. Under demonstration, pre-sprouted seeds were sown on raised nursery bed, prepared with a layer of manure, on which spouted seeds were spread and covered with another layer of manure. The bed was then mulched with paddy straw and watered carefully till transplanting. However, in farmers practice, rice seeds was sown on flatbed nursery without pre-sprouting. Farm Yard Manure (FYM) @ 10 t ha^{-1} was applied in a field. Trench was prepared at every 3m distance to facilitate drainage.

In a SRI plot, 12 to 14 days old seedlings were uprooted and placed it in the field without plunging too deep into soil at intersection at 25 cm x 25cm in a square pattern with only one seedling per hill. However, farmers were transplanted 27 to 35 days old seedling at 20 cm x15 cm with 2-3 seedlings per hill. In SRI plots, out of the 100:30:00 kg N:P:K ha^{-1}, 25 percent nitrogen was applied through organic source (FYM). Under farmer's practice only chemical fertilizers were applied. Weeding was carried out at **20** days after transplanting, two inter-culturing with "Paddy hoe" were done before panicle initiation to keep the rice crop weed free. At the stage of physiological maturity to harvest the crop, water was drained out. Plant protection and other cultural practices were carried out in plots as per the scheduled.

The data on yield of crop, cost of cultivation and monetary returns were collected during the year 2020-21 to 2022-23 from FLD plots and farmer practice plot to work out the productivity and profitability of rice cultivation. The technology gaps, extension gaps and technology index were calculated using formula given by Samui *et al.* (2000) as:

$$\textbf{Increase in yield (\%)} = \frac{\text{Demonstration yield- Farmer yield}}{\text{Farmer yield}} \times 100$$

Technology gap = Potential yield- Demonstration yield

Extension gap = Demonstration yield- Farmer yield

$$\textbf{Technology index} = \frac{\text{Potential yield- Demonstration yield}}{\text{Potential yield}} \times 100$$

Table 1: Difference between technology intervention and farmers practice

Sr. No.	Particulars	Farmers practice	SRI technology interventions
1	**Seed rate (kg ha^{-1})**	30 kg ha^{-1}	5 kg ha^{-1}
2	**Nursery method**	Flat bed	Raised bed
3	**Nursery Area**	10 Guntha for 1 ha. Transplanting	1.0 Guntha for 1 ha. Transplanting
4	**Transplanting days**	27-35 DAS	12-14 DAS
5	**Transplanting spacing**	20 cm x15 cm	25 x 25 cm
6	**No. of seedling/ hill**	2-3	1
7	**Nutrient Management**	100:30:00 kg N:P:K ha^{-1}, out of which 25 % N and 100 % P_2O_5 is applied as basal, while remaining N is applied in two to three equal splits.	100:30:00 kg N:P:K ha^{-1}, out of which 25 % N and 100 % P_2O_5 is applied as basal, while remaining N is applied in two to three equal splits. 25 % N from organic source.

RESULTS AND DISCUSSION

Impact FLDs on productivity

As per the data depicted in Table 2 shows that the productivity of rice crop recorded between 3,925 to 4,205 kg ha^{-1} with an average 4,090 kg ha^{-1}against the average yield 3,310 kg ha^{-1} of farmer practice. Data of the study further shows that SRI method of rice cultivation, increased 24.60, 25.08 and 21.18 percent in yield over the farmer practice in the year 2020-21, 2021-22 and 2022-23 respectively. Overall, 23.62 percent increase was observed for mean grain yield under demonstration of SRI method as compared to farmers practice. This was might be due to transplanting of young seedlings in SRI method also improved rice growth, tillering pattern, vegetative and reproductive period of crop (Vinaya et al., 2013, Ahmad *et al.,* 2021 and Mevada *et al.,* 2016).

Table 2: Impact on productivity, increase in yield, technology gap, extension gap and technology index (n=120)

Year	Productivity (kg ha^{-1})			Increase in yield (%)	Techno-logy gap (kg ha^{-1})	Extension gap (kg ha^{-1})	Techno-logy index (%)
	Potential yield (kg ha^{-1})	Grain yield (kg ha^{-1})	Grain yield (kg ha^{-1})				
		Demo plot	Farmer plot				
2020-21	5,000	3,925	3,150	24.60	1,075	775	21.5
2021-22	5,000	4,140	3,310	25.08	860	830	17.2
2022-23	5,000	4,205	3,470	21.18	795	735	15.9
Mean	**5,000**	**4,090**	**3,310**	**23.62**	**910**	**780**	**18.2**

Data (Table 2) regarding mean of technology gap (910 kg ha^{-1}) indicated that farmer`s cooperation in application of SRI method at their fields with an encouraging result. The extension gap ranged between 830-735 kg ha^{-1}, which indicated that there is a need to create awareness among the farmers through various extension activities like Method demo, Training, Kisan gosthi etc. on SRI method of rice cultivation to reverse the trend of wide extension gap. Feasibility of the technology at the farmer's field can be measured with technology index value, lower the value, more is the feasibility of technology. Mean 18.2 % technology index was recorded during the study which indicated the more feasibility of the SRI technology in the Valsad district (Bordoloi *et al.,* 2022).

Impact FLDs on profitability

The data show in Table-3 clearly indicated that gross and net return, cost of cultivation as well as benefit cost ratio were observed higher in the FLD plots. Mean gross return of 61,350 Rs.ha^{-1} recorded from FLD plots as compare to farmer practice was 49,650 Rs.ha^{-1}. Mean net return of` 27,637 Rs.ha^{-1} from the FLD plots were obtained as compared to the net return of 13,740 Rs.ha^{-1} from farmer's field. Similarly, the highest B.C ratio was recorded in the demonstrated technology (1.82) followed by Farmer's practice (1.38). The gross and net return as well as BC ratio were found higher under demonstration plots might be due to increase in the yield under the demonstration plots (Mevada *et al.,* 2016).

Table 3: Impact on profitability of rice cultivation

Year	Gross return (₹ ha^{-1})		Cost of cultivation (₹ ha^{-1})		Net return (₹ ha^{-1})		BCR	
	Demo plot	Farmer plot	Demo plot	Farmer plot	Demo plot	Farmer plot	Demo plot	Farmer plot
2020-21	58,875	47,250	33,010	35,580	25,865	11,670	1.78	1.33
2021-22	62,100	49,650	33,880	35,900	28,220	13,750	1.83	1.38
2022-23	63,075	52,050	34,250	36,250	28,825	15,800	1.84	1.44
Mean	**61,350**	**49,650**	**33,713**	**359,10**	**27,637**	**13,740**	**1.82**	**1.38**

CONCLUSION

Frontline demonstration on SRI method of cultivation of rice, improved productivity and profitability of crop than the farmer`s practice. Results of study created greater awareness and motivated the other farmers to adopt SRI technique in these villages of Valsad district. SRI technique is proved far better than conventional technique of rice cultivation. Increase in yield and incurred maximum income against the farmers' practices thus leads to productivity and profitability of farmers in the Valsad district.

IMPLICATION

This study on SRI method ensures farmers' sovereignty by low quantum of water usage, decreased in cost of production and low seed requirement, which could serve as a guide for planners and extension agencies. The findings proved effectiveness of SRI, thereby contributing to more production. Ultimately, this could result in better outcomes for farmers and other stakeholders in the agricultural value chain.

CONFLICT OF INTEREST

This is to declare that there is "No conflict of interest" among researcher.

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Received : September 2023 : Accepted : November 2023