



Frontline demonstration results in Raebareli district of Uttar Pradesh, India, for long duration paddy variety Swarna sub-1

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ABSTRACT

Paddy is a predominant kharif crop of Uttar Pradesh as well as the country and it plays major role in enhancing the income of small and marginal farmers of Raebareli district of Uttar Pradesh. One of the major constraints of traditional paddy cultivation is low productivity due to non-adoption of recommended package of practices and improved varieties. To overcome this phenomenon Krishi Vigyan Kendra, Raebareli conducted frontline demonstrations in farmers' fields at different locations in the district with high yielding variety Swarna sub-1 in the year 2020 and 2021. Improved scientific practices were adopted in cultivating crop that includes transplanting of paddy seedling in line. The paddy crop productivity and its economics under improved cultivation practices were calculated and compared with the prevailing farmers' practice. Results revealed that Swarna sub-1 variety under improved practices recorded higher yield of 12.44% and 17.29% during 2020 and 2021 and the recommended practice gave higher net returns of Rs 57640 and 64340 per ha and B:C ratio of 3.20:1 and 3.34:1 respectively as compared to farmers practice.

Keywords: Paddy, Swarna sub-1, Front line demonstration, Line Transplanting, Net returns

INTRODUCTION

India is the second largest producer of rice in the world (135.7 million tonnes), lagging behind only China (208.49 Million tonnes) according to the 2022 annual report by United States Department of Agriculture. This signifies the contribution of rice in meeting food requirements of the hungry mouth of country. In India, rice is grown in almost half the states, with West Bengal leading the way in terms of production with 15.88 million tonnes, followed by Uttar Pradesh (12.22 million tonnes) and Andhra Pradesh (15.51 million tonnes) as per the Agricultural Statistics 2019-20, Ministry of Agriculture & Farmers Welfare of the government of India. But now day crop yield stagnation as well as no further increment in crop yield is emerging challenge for researchers (Regar and Singh, 2014). The demand of cereals to meet the food necessity is rising of increasing population, while on the other hand most important inputs (water, labour) of agriculture are

decreasing in the area.

Paddy crop holds the key for food security of Uttar Pradesh as well as the country. In Uttar Pradesh presently the crop is grown in 5.96 million hectare areas with a production of 15.96 million tons (Directorate of Economics & Statistics, Govt. of India 2022). Mostly the farmers of this region are going for cultivation of medium-long duration (140-150 days) rice varieties as irrigated and rainfed crop. Swarna Sub-1, BPT-5204, Mashuri etc are the popular rice varieties mostly grown in the low land area of the district; but among these Swarna Sub-1 is the predominant variety rice growing low land area. Swarna Sub-1 has high production potential and also resistant to water logged condition. Apart from the improved agronomic practice unawareness of the farmers about the improved high yielding varieties and adoption of proper package of practices are also the reasons responsible for limiting the production and productivity of paddy. Keeping this

in view Krishi Vigyan Kendra, Raebareli (UP) had taken up demonstrations to introduce and popularize sowing of Swarna Sub-1 variety of paddy in the real farm situation.

MATERIALS AND METHODS

Frontline demonstrations (FLDs) in Paddy were conducted during *Kharif* 2020 and 2021 by Krishi Vigyan Kendra, Raebareli at the farmers' fields in different locations of the district. A total of 60 demonstrations in 24 ha area were conducted in the selected villages. The improved variety Swarna Sub-1 was procured from N. D. University of Agriculture and Technology, Kumarganj Faizabad for demonstration purpose. In case of local check plots, existing practice of transplanting was followed by the farmers. The whole package approach demonstrated to farmers through FLD trials included components such as improved variety, line transplanting, recommended seed rate, seed treatment, weed and water management, fertilizers and plant protection measures (Table 1). In the demonstration plots critical inputs in the form of improved seed of Swarna Sub-1 variety and balanced fertilizers were provided to the farmers. Traditional practices were maintained in case of local checks. The farmers involved in demonstrations were

facilitated by KVK scientists in performing proper field operations like timely sowing of nursery, transplanting, spraying of herbicide, insecticide and harvesting. During this period extension activities like field days, farmers' trainings, diagnostic visits, etc. were undertaken which benefitted the farmers. Data on crop yield were recorded by per square meter observation method randomly from 3 to 4 places from an FLD plot. The yield data were collected from both the demonstrations and farmers' fields and analyzed using simple statistical tools. The technology gap, extension gap and technology index (Samui *et al.*, 2000) were calculated using the following equation:

Technological gap: Potential yield – demonstration yield

Extension gap: Demonstration yield – yield under farmer practice

Technology index (%): (Potential yield - demonstration yield/potential yield) × 100

RESULTS AND DISCUSSION

The yield of paddy recorded under demonstration was 52.40 and 55.60 qha⁻¹ during *kharif* 2020 and 2021 respectively (Table 2). The yield enhancement due to the improved practices

Table 1. Improved practices and Farmers practices of Paddy under FLDs

Sl. No.	Technology	Improved practices	Farmers practice	GAP (%)
1	Variety	Swarna Sub -1	BPT-5204, SHUATS 1 etc.	100
2	Land preparation	Ploughing, Harrowing and puddling	Ploughing, Harrowing and puddling	50
3	Seed rate	25-30 kg (ha)	30-40 Kg (Ha)	High seed rate
4	Seed treatment	Carbendazim 50WP@ 2g/kg of seed	No application	100
5	Sowing method	Line transplanting	Random transplanting	100
6	Herbicide application	Bispyribac-sodium 10 SC@ 250-300 ml/ha	Pretilachlor 50% EC @ 1.25-1.5 lit./ ha	100
7	Fertilizer dose	120-60-60 (N-P-K) and ZnSO ₄ @ 25 kg ha	Imbalanced/Indiscriminate application	50
8	Plant protection	IPM	Indiscriminate use of plant protection chemicals	50

Table 2. Grain yield performances of Swarna sub-1 paddy variety under FLDs

Year	No. of demonstrations	Area (ha)	Demo yield (q ha ⁻¹)	Farmers' practice (control)(q ha ⁻¹)	Yield increment (%)
2020	30	12	52.40	46.60	12.44
2021	30	12	55.60	47.40	17.29
Mean	30	12	54.00	47.00	14.86

was to the tune of 12.41 and 17.29 per cent over farmers' practice. Yield enhancement in rice and other crops under frontline demonstration has amply been documented by Haque (2000) and Tiwari (2001). Extension gap of 5.8 and 8.2 qha⁻¹ was observed during *kharif* 2020 and 2021. Extension gap emphasized the need to bring awareness among the farmers for adoption of improved varieties and production technologies and to revert the trend of wide extension gap. Results also indicated technological gap between the improved technology and farmers' practice in tune of 7.6 and 4.4 qha⁻¹ during *kharif* 2020 and 2021 respectively. The technology gap observed may be attributed to difference in soil fertility status and agricultural practices and may be overcome by adopting efficient management practices. The technology index indicates the feasibility of the evolved technology at the farmers' fields. Lower the values of technology index more is the feasibility of the technology demonstrated (Chauhan, 2011).

The data on yield attributes of improved technology indicate that the no of matured panicles (m²) and No of filled grains panicles⁻¹ were 272-288 and 176-182 recorded as compared to 212-220 and

140-148 under farmers practice. Moreover, the test weight (g) was 24.6-25.8 as compared to 21.2-22.6 under farmer practice (Table 3).

The data on economics of the improved technology indicate that the cost of production in FLD was higher than that of the local practice (Table 4). The input and output prices of the commodities prevailing during the study were taken into account for calculating the net returns and B:C ratio. A higher net return of Rs 57640 and 64340 ha⁻¹ was recorded during both the years as compared to Rs 51160 and 53790 achieved as net returns in the farmers' practice. The benefit-cost ratio of paddy cultivation under improved cultivation practices was 3.20 and 3.34 during both the years as compared to 2.45 and 3.20 under farmers' practice. This may be due to higher yield obtained under improved technologies as compared to farmer's practice. The technology index in the present study was 14.50 and 7.33 per cent showing the efficacy of good performance of technical interventions. The reduction in the technology index from 14.50 per cent in the first year to 7.33 per cent in the second year exhibited the feasibility of the technology demonstrated (Table 5).

Table 3. Performances of yield attributes of paddy between FLD and farmers' practice

Yield attributes	Demonstration	Farmers' practice
No. of matured panicles m ²	272-288	212-220
No. of filled grains panicle ⁻¹	176-182	140-148
Test weight (g)	24.6-25.8	21.2-22.6

Table 4. Economical comparison of paddy cultivation between FLD and farmers' practice

Year	Demonstration				Farmers' practice (control)			
	Cost of cultivation (Rs.ha ⁻¹)	Gross return (Rs.ha ⁻¹)	Net return (Rs.ha ⁻¹)	B:C	Cost of cultivation (Rs.ha ⁻¹)	Gross return (Rs.ha ⁻¹)	Net return (Rs.ha ⁻¹)	B:C
2020	26200	83840	57640	3.20:1	23400	74560	51160	2.45:1
2021	27400	91740	64340	3.34:1	24420	78210	53790	3.20:1

Table 5. Impact of paddy var. Swarna sub-1 on technology gap, extension gap and technological index under FLDs

Year	Technology gap (q ha ⁻¹)	Extension gap (q ha ⁻¹)	Technology index (%)
2015	7.6	5.8	14.50
2016	4.4	8.2	7.33
Mean	10.0	7.0	10.91

Conclusion

The yield potential of paddy cultivation increased to a great extent by conducting frontline demonstrations of the proven technology. This substantially increased the income as well as the livelihood of the farming community of the Raebareli district of Uttar Pradesh. Some of the factors constraining the full adoption of swarna sub-1 paddy variety. Thus variety of paddy (Swarna sub - 1) gained a momentum in up scaling the paddy productivity which created a positive impact on farming community.

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