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Research Article

Evaluation of front line demonstrations on the yield of drilled rice (*Oryza sativa*)

A.D. RAJ, V. YADAV AND J. H. RATHOD

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SUMMARY : The rice (*Oryza sativa*) covers largest area in total grain production in Narmada district of Gujarat. One of the major constraints of low productivity of rice is lack of technical know how of newly generated technology among farmers. The present study named dissemination of improved production technologies of rice in Narmada district of Gujarat through front line demonstrations (FLD) and its impact assessment. A total of 101 front line demonstrations were conducted during 2008-09 to 2011-12 on area of 35.0 ha with the active participation of farmers with the objective to demonstrate the latest technology of rice production. The percentage increase in the yield over local check was 21.6 with higher gross return of 17212 Rs./ha, net return of 9567 Rs./ha and benefit cost ratio 2.7 as compared to local check (14034 Rs./ha, 7331 Rs./ha and benefit cost ratio 2.5, respectively. By conduction of front line demonstrations on farmer's field there was significant increase in knowledge level of the farmers and majority of farmer's showed high level of satisfaction about demonstrated technologies.

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KEY WORDS :
Rice, Front line demonstrations, Extension gap, Technology gap, Yield

Author for correspondence :

V. YADAV
Krishi Vigyan Kendra, (N.A.U.) DEDIAPADA (GUJARAT) INDIA
Email: vikas.yadav15@yahoo.com

See end of the article for authors' affiliations

BACKGROUND AND OBJECTIVES

Rice continues to hold the key to sustained food security in the country, so even if rice production areas stabilize or register negative growth, future rice production targets must be achieved exclusively through yield improvement. Given many under and unexploited crop production technologies, sustainable productivity can be accomplished. India is still amongst the countries with the lowest rice yields. Seventy per cent of the 414 rice-growing districts report yields lower than the national average. Yield gap analysis further reveals that 30 to 40 per cent of the potential yield is yet to be tapped with available high yielding varieties (HYV) with improved practices. This gap is likely due to use of local varieties, high plant population, endemic pests and diseases, low input use, defective cropping systems, and a low adoption rate by farmers of high yielding technologies. The productivity of rice in Gujarat state is very poor *i.e.*, 1,356 kg/ha as against 1,947 kg/ha average productivity of the nation. The rice area in Gujarat is 7,18300 ha, out of total area. More than 40 per cent rice area is concentrated in rain fed condition with very low productivity (779 kg/ha) (Anonymous, 2008). The Narmada district of this state comes under tribal belt and rain fed condition. All agriculture practices of this area are depending on only monsoon rainfall. The literacy rate of man and women is very poor and unaware new agricultural practices. The food security of this tribal belt is mainly depending upon rice production, however, productivity of rice is low (779 kg/ha). Adoption of local variety, high plant population and no use of plant protection measure are reason of low productivity of rice in this area. Therefore, the present study was carried out by KVK, Dediapada, to provide suitable package of practices of rice and to aware the farmer with improved technology.

Table A: Comparison between demonstration package and existing practices under rice front line demonstrations

Sr. No.	Particulars	Rice	
		Demonstration	Farmers practice
1.	Farming situation	Rainfed	Rainfed
2.	Variety	GR-5	Local (*Dodi lal, Lal kada*)
3.	Time of sowing	15-30 June	1-30 July
4.	Method of sowing	Line sowing (30 cm row to row)	Line sowing (45-60 cm row to row)
5.	Seed treatment	Bavestin 3g/kg seed	Without seed treatment
6.	Fertilizer dose	75:25:00 N:P:K kg/ha	30:00:00 N:P:K kg/ha
7.	Plant protection	Adopted	No adopted
8.	Weed management	Butachlor 1.0 kg a.i./ha + 1 H.W. at 25 DAS	2 H.W. at 25 and 35 DAS

RESOURCES AND METHODS

The study was carried by KVK Dediapada during *Kharif* season for years of 2008, 2009, 2011 and 2012 in the farmer's field of seven adopted villages (Kukarda, Vadivav, Taval, Nanadoramba, Zharnavadi, Khutaamba and Vadi). All 101 front line demonstration in 35.0 ha area in different villages were covered with active participation of farmer. Before conducting FLDs, a list of farmers was prepared from group meeting and specific skill training was imparted to the selected farmers regarding different aspect of cultivation (Venkattakumar *et al*., 2010). The difference between the demonstration package and existing farmers practice are given in Table A.

In general the soil of the study was deep black cotton soil in texture with a pH ranging between 6.5 to 7.5, low in nitrogen, medium in phosphorus and high in available potassium. However, the soils were deficient in zinc and sulpher status. In demonstration plots, use of quality seeds of improved varieties, line sowing and timely weeding, need based pesticide, weedicide as well as balanced fertilization (using micronutrient zinc) were emphasized and comparison has been made with the existing practices (Table A). The necessary steps for selection of site and farmers, lay out of demonstration etc. were followed as suggested by Choudhary (1999). The traditional practices were maintained in case of local checks. The data output were collected from both FLD plots as well as control plots and finally the extension gap, technology gap, technology index along with the benefits cast ratio were work out (Samui *et al*., 2000) as given below:

$$\textbf{Technology gap} = \textbf{Potential yield - Demonstration yield}$$

$$\textbf{Extension gap} = \textbf{Demonstration yield} - \textbf{Farmers yield}$$

$$\textbf{Technology index (\%)} = \frac{\textbf{Technology gap}}{\textbf{Potential yield}}$$

OBSERVATIONS AND ANALYSIS

The results of the present study as well as relevant discussions have been presented under following sub heads:

Yield :

The data of Table 1 clearly indicate that the yield of rice fluctuated successively over the years in demonstration plot. The maximum yield was recorded (2182 kg/ha) during 2008 and minimum yield was recorded in year of 2012(1244 kg/ha). The yield in year 2012 was very low due to huge attack of bacterial leaf blight and blast diseases and very low and erratic rainfall. The average yield of four years was recorded 1782 kg/ha over local check (1466 kg/ha). The increase in per cent of yield was raging from 20 to 23.1 during the study. The results are in conformity with the finding of Tomer *et al.* (2003) and Tiwari and Saxena (2001). The results clearly indicate the positive effects of FLDs over the existing practices toward enhancing the yield of rice.

The technology gap, which is the difference between potential yield and demonstration yield, ranged between 318 to 1256 kg/ha. The present trends reflect the farmer cooperation in carrying out such demonstration with encouraging result in subsequent years. The technology gap increased may be attributing to the dissimilarity soil fertility status and weather conditions (Mitra and Samajdar, 2010).

The extension gap showed an irregular trend (Table 1). This gap ranged between 214-420 kg/ha during period of study emphasizes the need to educate the farmer through various means for adoption of improved agriculture production to reverse the trend of wide extension gap.

The technology index shows the feasibility of the evolved technology at the farmer's fields. The lower the value of technology index more is the feasibility of the technology. As such, fluctuation in technology index was from 5.6 to 50.2 per cent during period of study (Table 1). These findings corroborate with the finding of Mokidue *et al*. (2011) and Tomar (2010).

The comparative profitability of rice cultivation with adoption of improved technology and farmers practices has been presented in Table 2. The adoption of improved technology under FLDs recorded higher average gross

Table 1 : Productivity, technology gap, extension gap and technology index of rice under FLDs

Year	Area (ha)	No. of farmers	Yield (kg/ha)			% increase over control	Technology gap (kg/ha)	Extension gap (kg/ha)	Technology index (%)
			Potential	Demonstration	Control				
2008	10.0	30	2500	2182	1772	23.1	318	410	12.7
2009	10.0	30	2500	2360	1940	21.6	140	420	5.6
2011	10.0	25	2500	1341	1127	21.6	1159	214	46.4
2012	5.0	16	2500	1244	1026	20.0	1256	218	50.2
Mean	35.0	101	2500	1782	1466	21.6	718	316	28.7

Table 2 : Gross realization (Rs./ha), cost of cultivation (Rs./ha), net return (Rs./ha) and B: C ratio as affected by improved and local practices

Year	Gross realization Rs./ha		Cost of cultivation Rs./ha		Net return Rs./ha		B: C ratio	
	Improved technologies	Local check	Improved technologies	Local check	Improved technologies	Local check	Improved technologies	Local check
2008	18156	14176	5000	4300	13156	9876	3.49	3.30
2009	23600	19400	5200	4500	18400	14900	4.54	4.31
2011	13408	11270	9853	9000	3555	2270	1.36	1.25
2012	13683	11289	10527	9013	3156	2276	1.30	1.25
Mean	17212	14034	7645	6703	9567	7331	2.7	2.5

returns (17212 Rs/ha), net returns (9567 Rs/ha) and B: C ratio (2.7) compared to farmers practice. This fluctuating income trend was obtained due to variable price of rice and improper marketing system. These results are in conformity with the findings of Katare *et al*. (2011).

Reason of low yield of rice at farmer's field :

Optimum sowing time is not followed due to delay in land preparation and non availability of quality seed. Lack of popularization of seed cum fertilizer drill for sowing and use of inadequate and imbalance dose of fertilizers especially the nitrogenous and phosphatic fertilizers by farmers does not make possible to fetch potential yield. Mechanical weed control is costly and chemical control is quit uncommon in this region.

Specific constraints with marginal /sub marginal farmers:

Small holding :

The adoption of well proven technology is constrained due to small size of holding and poor farm resources. Small and marginal farmers have less capability to take risk and do not dare to invest in the costly input due to high risk and the poor purchase capacity of small farmer.

Farm implements and tools :

Traditional implements and tools are still in practice due to small holding which have poor working efficiency. The lack of simple modern tools for small holding also hinders the adoption of improved technology.

Thus, the cultivation of rice with improved technologies has been found more productive and grain yield might be increase up to 21.6 per cent. Technological and extension gap extended which can be bridges by popularity package of practices with emphasis of improved variety, use of proper seed rate, balance nutrient application and proper use of plant protection measures. Replacement of local variety with the released variety of rice would increase in the production and net income by more than seventeen thousand rupees.

Authors' affiliations :

A.D. RAJ AND J.H. RATHOD, Krishi Vigyan Kendra, (N.A.U.) DEDIAPADA (GUJARAT) INDIA, Email: ajitdraj73@rediffmail.com and kvk_narmada@yahoo.com

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