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Research Paper

Role of front line demonstrations on the performance of drilled rice (*Oryza sativa* L.)

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SUMMARY : The rice 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 knowhow 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 34 front line demonstrations were conducted during 2012 to 2013 on area of 7.8 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 20.5 with higher gross return of 15528 Rs./ha, net return of 5652 Rs./ha and benefit cost ratio 1.6 as compared to local check (12882 Rs./ha, 3851 Rs./ha and benefit cost ratio 1.4, respectively). By conduction of frontline 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, FLD,
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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 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 FLD

Sr. No.	Particulars	Rice	
		Demonstration	Farmers practice
1.	Farming situation	Rainfed	Rainfed
2.	Variety	IR-28	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	Not 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 2012 and 2013 in the farmers field of seven adopted villages (Kukarda, Vadivav, Taval, Nanadoramba, Zharnavadi, Khutaamba and Vadi). All 34 front line demonstration in 7.8 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 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 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 and technology index along with the benefits cast ratio were work out (Samui *et al*., 2000) as given below:

Technology gap = Potential yield – Demonstration yield

Extension gap = Demonstration yield – Farmers yield

$$\text{Technology index (\%)} = \frac{\text{Technology gap}}{\text{Potential yield}} \times 100$$

OBSERVATIONS AND ANALYSIS

The experimental findings obtained from the present study have been discussed in following 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 (1505 kg/ha) during 2013 and minimum yield was recorded in year of 2012 (1450 kg/ha). The average yield of two years was recorded 1478 kg/ha over local check (1227 kg/ha). The increase in per cent of yield was raging from 18.2 to 22.7 during the study. The results are in conformity with the finding of Raj *et al.* (2013). The results

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

Years	Area (ha)	No. of farmers	Yield (kg/ha)			% increase over control	Technology gap (kg/ha)	Extension gap (kg/ha)	Technology Index (%)
			Potential	Demonstration	Control				
2012	2.8	14	4000	1450	1226	18.2	2550	224	63.8
2013	5.0	20	4000	1505	1227	22.7	2495	278	62.4
Mean	–	–	4000	1478	1227	20.5	2523	251	63.1

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

Years	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
2012	14498	12264	9853	9013	4645	3251	1.5	1.4
2013	16558	13500	9900	9050	6658	4450	1.7	1.5
Mean	15528	12882	9877	9032	5652	3851	1.6	1.4

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, was ranging between 2495 to 2550 kg/ha. The present trends reflect the farmer co-operation 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 224 - 278 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 showed 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 62.4 to 63.8 per cent during period of study (Table 1). These finding corroborates with the finding of Mokidue *et al*. (2011).

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 returns (15528 Rs./ha), net returns (5652 Rs./ha) and B: C ratio (1.6) 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 increased up to 22.7 per cent. Technological and extension gap extended which can be bridged 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 fifty six thousand rupees.

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