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Research Article

Evaluation of front line demonstrations on the yield of transplanted rice

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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 newly generated technology among farmers. A total of 54 front line demonstrations were conducted during 2012 to 2013 on area of 9.0 ha with the active participation of farmers with the objective to demonstrate the latest variety technology of rice production. The percentage increase in the yield over local check was 20.4 with higher gross return of 41805 Rs./ha, net return of 29359 Rs./ha and benefit cost ratio 3.4 as compared to local check (34752 Rs./ha, 22755 Rs./ha and benefit cost ratio 2.9, respectively).

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KEY WORDS :
Rice, FLD, Extension gap, Technology gap, Yield

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BACKGROUND AND OBJECTIVES

In India, rice is the most important and extensively grown food crop for more than two third of the Indian population. During the period 1950-51 to 2001-02, the area has increased by one and half times (31.0 million hectare to 44.6 million hectares), productivity by three times (668 kg/ha to 2086 kg/ ha) and production by four and half times (20.58 million tons to 90 million ton) (Mishra, 2005).

India is still amongst the countries with the lowest rice yields, Seventy per cent of the all 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. More than 60 per cent rice area is concentrated in irrigated condition with low productivity (2361 kg/ha) (Anonymous, 2011). The area, production and productivity of transplanted rice in Narmada district are 0.008 mha, 0.018 million tones and 2377 kg/ha, respectively (Anonymous, 2011) in Gujarat. The Narmada district 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 low and unaware new agricultural practices. The food security of this tribal belt is mainly depending upon rice production. Adoption of local variety, high plant population and no use of plant protection measure are main reasons of low productivity of rice in this area. Therefore, the present study was carried out Krishi Vigyan Kendra, Dediapada, to provide suitable package of practices of transplanted rice and to aware the farmer with improved technology.

RESOURCES AND METHODS

The study was carried by KVK Dediapada during *Kharif* season for years of 2012 and 2013 in the farmer's field of fifteen adopted villages

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	GNR-2	Local
3.	Time of sowing	15-30 June	25-30 June
4.	Method of sowing	Transplanted (20 x 15cm)	Without line
5.	Seed treatment	Bavestin 3g/kg seed	Without seed treatment
6.	Fertilizer dose	100:50:00 N:P:K kg/ha	50:00:00 N:P:K kg/ha
7.	Plant protection	Adopted	Not adopted
8.	Weed management	Butachlor 1.0 kg a.i./ha + 1 hand weeding at 25 DAT	2 H.W. at 20 and 40 DAT

(Almavadi, Kukarda, Vadivav, Nanadoramba, Navagam, Rakhaskundi, Sorapada, Soliya, Nivalda, Kakarpada, Panchpipli, Motodevrupen, Motasukaamba, Besna and Samarpada) of Narmada district. All 54 front line demonstration in 9.0 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.

The soil of the demonstrations field were 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 sulphur status. In demonstration plots, use of quality seeds of improved varieties, line transplanting 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 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:

Technologygap Z Potential yield J Demonstration yield

Extension gap Z Demonstration yield J Farmers yield

$$\textbf{Technology index (\%)} = \frac{\textbf{Technology gap}}{\textbf{Potential yield}} \textbf{x100}$$

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 maximum average of both years yield was recorded (3484 kg/ha) and minimum yield was recorded in control plot (2896 kg/ha). The increase in per cent of yield was raging from 19 to 21.7 during

Table 1 : Productivity, technology gap, extension gap and technology index of transplanted 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	4.0	24	5500	3453	2903	19.0	2047	550	37.2
2013	5.0	30	5500	3515	2889	21.7	1985	626	36.1
Mean	9.0	54	5500	3484	2896	20.4	2016	588	36.7

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

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	41430	34835	11893	12493	29537	22342	3.5	2.8
2013	42180	34668	13000	11500	29180	23168	3.2	3.0
Mean	41805	34752	12447	11997	29359	22755	3.4	2.9

the study. The results are in conformity with the finding of Raj *et al.* (2013). 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, was ranging between 1985 to 2047 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 *et al.*,2010 and Sharma and Sharma, 2004).

The extension gap showed an irregular trend (Table 1). This extension gap ranged between 550-626 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 36.1 to 37.2 per cent during period of study (Table 2). These findings corroborate 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 (41805 Rs./ha), net returns (29359 Rs./ha) and B: C ratio (3.4) 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 planting time is not followed due to delay in land preparation in monsoon season and non availability of quality seed. Lack of popularization of rice planter for planting 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 20.4 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 be increase in the production and net income by more than twenty five thousand rupees. Similar work related to the topic was also done by Anonymous (2011); Suryawanshi and Prakash (1993); Santhi *et al.* (1998); Sivakumar *et al.* (2005) and Shekar and Singh (1991).

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