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Original Research Article

Impact Analysis of Front Line Demonstration of Rice in Eastern Uttar Pradesh

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Rice, High yielding variety extension gap, Technology gap, Technology index

A B S T R A C T

Technological and extension gap of yield and profitability can be bridges by adopting package of practices with emphasis of improved variety, use of proper seed rate, balance nutrient application and proper use of plant protection measures. The study was carried out through front line demonstrations during Kharif season of 2017 and 2018 in three adopted district and sixteen village of Ayodhya, Gonda and Azamgarh on farmers field with the active participation of farmers with an objective to evaluate the performances of improved technology of high yielding rice variety Sambha Mahsuri-Sub 1 and compared to the local check (Sambha Mahsuri). The Sambha Mahsuri-Sub 1 recorded grain yield 50.20 q/ha which was 20.92 per cent higher yield than local check (Sambha Mahsuri 41.53 q/ha.) In spite of increase in yield of improved technology the technological gap, extension gap and technology index existed which was 4.80 q/ha, 8.67 q/ha and 8.73 per cent, respectively. The improved technology of HYV Sambha Mahsuri-Sub 1 gave higher gross return of Rs. 79818/hawith a benefit cost ratio of1.69 and additional net return of Rs.13780/ha as compared to local check variety. Hence, the existing high yielding rice variety Sambha Mahsuri can be replaced by HYV Sambha Mahsuri-Sub 1.

Introduction

Rice is the staple food crop of India and occupies highest area among all the crops grown in the country (Shobha Rani *et al*., 2010). Currently India produces rice that is sufficient not only to meet the domestic demands, but also was the largest exporter during 2012 (Mahender Kumar *et al*., 2013), imparted to the selected farmers regarding different aspect of cultivation (Venkattakumar *et al*., 2010). Rice is the only crop grown in the wet season from lowland ecosystem. Poor sunshine, inclement weather, disease pest incidence and the associated adversities affect crop growth. The scenario needs cutting edge technologies for increasing rice production in India. Although productivity of rice has increased from 2372 kg per hectare in 2011-2012 to 2390 kg/ha in 2016-2017, due to development of high yielding varieties with site specific

technology, but huge technological and extension gaps are constantly. Front Line Demonstration has been used as an useful extension tool to demonstrate High Yielding Variety (HYV) along with production, protection and management practices in the farmer's field under different agro-climatic regions and farming situations. The improved cultivation practices followed in the national demonstrations have already shown high yield potentials (Anonymous, 2012). The Eastern region is located between23°501 N to 28°251 N and 81°10i E to 840401 E area of 85,804 Sq.Kms. The rainfall more than 80 percent of the precipitation is concentrated during the period June to September. Fertilizer ratio of Eastern region are higher than the state's average and in respect of phosphorous similar to the consumption of nitrogen the average consumption of phosphorous to higher in Eastern region. Rice is the seed of the grass species Oryza sativa (Asian rice). As a cereal grain, it is the most widely consumed staple food for a large part of the world's human population, especially in Asia. Rice (Oryza sativa L.) is one of the most important cultivated plants of tropics and subtropics. Next to wheat and maize, it occupies third place in global cereals production and is the most important staple food crop with more than half of the world's population relying on rice as the major daily source of calories and protein (Tiwari *et al*., 2014). India needs to produce 120 million tons by 2030 to feed its one and a half billion plus population (Anonymous, 2013). Change in climate conditions and the frequency of natural disasters in recent times has made it imperative to find lasting adaptation solutions for the agriculture sector. Given that almost 60 % of the country's population relies on this sector for its livelihood and that it contributes approximately 15.7% of India's GDP, an analysis of changes which could impact crop yields and subsequently lead to an instable food security scenario is necessary. Achieving self-sufficiency in rice production and maintaining price stability are important political objectives in low-income countries because of the importance of this crop in providing national food security and generating employment and income for low-income people (Ghosh *et al*., 2009) But knowledge behaviour of general farmers towards these practices is not known and hardly any systematic research has done to explore these areas. Therefore, it is very essential to conduct investigation on Front Line Demonstrations on rice to assess their effectiveness and efficacy towards enhancement in yield and knowledge.

Materials and Methods

The study was carried out Crop Research Station, Masodha Ayodhya during WS for years on 2017 and 2018 in the farmer's field of Ayodhya, Gonda and Azamgarh district of sixteen adopted villages. 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. The crops were transplanted during 3rd week of July and harvested during 1st week of November the traditional practices were maintained in case of local check variety. 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) [9] as given below:

Technology gap = Potential yield - Demonstration yield

Extension gap = Demonstration yield- Farmers yield

Technology Index= Technology gap /potential yield*100

% increase over farmers practices = Improved practices – Farmers practices / farmers practices x 100

Observations on different growth and yield parameters weretaken and economic analysis was done by calculating cost of cultivation, gross return, net return and B: C ratio. Final crop yield (grain and straw) were recorded and the gross return were calculated on the basis of prevailing market price of the produce. The variety Sambha Mahsuri-Sub 1 could successfully out yield all other local and old varieties and recorded eye catching higher yield in lowland. The major differences were observed between demonstration package and farmer's practices are regarding recommended varieties, seed treatment, method of sowing, fertilizer dose, Method of fertilizer application, weed management and plant protection measures.

Results and Discussion

Yield data (Table 1) clearly indicate that the improved practice of HYV Sambha Mahsuri-Sub 1 recorded grain yield 50.20 q/ha which was 20.92 per cent higher yield than local check 41.53q/ha. (Sambha Mahsuri).This might be due to the production of higher number of effective tillers/plant and panicle length. Thus, the FLD might have a positive impact on farming community in the district over local check. Similar results were also reported by (Mondal *et al*. 2005) in rice crops. 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 4.80 q/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 *et al*., 2010 and Sharma and Sharma, 2004). 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 8.73 Per cent during period of study. 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 in presented in (Table 3). The adoption of improved technology under FLDs recorded higher average gross returns (Rs. 79818 /ha), net returns (Rs. 13780 /ha) and B: C ratio (1.69)compared to farmers practice.

Table.1 Yield and gap analysis of FLD on Rice Average WS 2017 & 2018 at farmers field

District	No. of demonstrations	Area (ha)	Potential Yield	demonstrations Grain Yield q/ha		Yield Increase (%)	Extension gap (q/ha)	Technology gap (q/ha)	Technology index
				Sambha Mahsuri-Sub 1	Sambha Mahsuri				
Ayodhya	25	15	55.00	49.90	40.10	24.43	9.80	5.10	9.27
Gonda	11	9	55.00	53.10	44.60	19.05	8.50	1.90	3.45
Azamgarh	8	3	55.00	47.60	39.90	19.29	7.70	7.40	13.45
Total/Mean	**44**	**27**	**55.00**	**50.20**	**41.53**	**20.92**	**8.67**	**4.80**	**8.73**

Table.2 Analysis of no. of panicle/sqm, panicle length and plant height on Rice Average WS 2017 & 2018 at farmers field

District	Demonstrations Panicle/sqm		Increase (%)	Panicle length (cm)		Increase (%)	Plant height (cm)		Increase (%)
			Sambha Mahsuri-Sub 1	Sambha Mahsuri		Sambha Mahsuri-Sub 1	Sambha Mahsuri		Sambha Mahsuri-Sub 1
Ayodhya	315	278	13.30	28.8	25.5	12.91	89	73	21.91
Gonda	339	296	14.52	27.9	26.1	6.89	95	80	18.75
Azamgarh	297	251	18.32	27.3	25.9	5.40	82	70	17.14
Total/mean	**317**	**275**	**15.38**	**28.0**	**25.8**	**8.40**	**88.67**	**74.33**	**19.27**

Table.3 Economic analysis of front line demonstrations on rice WS 2017 & 2018 at farmers field

District	Cost of cash input		Additional cost in demonstrations (Rs./ha)	Sale price of grain (MSP) (Rs./qt)	Total returns (ha)		Extra returns	Incremental Benefit : Cost ratio
	Sambha Mahsuri-Sub 1	Sambha Mahsuri			Sambha Mahsuri-Sub 1	Sambha Mahsuri		
Ayodhya	49200	45700	3500	1590	79341	63759	15582	1.61
Gonda	46900	44889	2011	1590	84429	70914	13515	1.80
Azamgarh	45310	43290	2020	1590	75684	63441	12243	1.67
Total/mean	47137	44626	2510	1590	79818	66038	13780	1.69

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). Higher technology index reflected the insufficient extension services for transfer of technology. The results are in conformance with (Girish *et al*., 2011).

Small and marginal farmers are resource poor having less risk bearing ability and do not dare to invest in the costly input which is a obstacle in adoption of proven technology. Traditional implements and tools of poor working efficiency are still in practice due to small holding. The lack of modern implements and tools for small holding also a hindrance to the adoption of improved technology. The HYV Sambha Mahsuri-Sub 1 produced higher yield with more panicle no. capacity and resistance to submergence disease and insect pest incidence.

Thus, the cultivation of rice with improved technologies has been found more productive and grain yield might be increased up to 22.8 per cent. Technology and extension gap extended which can be bridges by popularity package of practices with emphasis of improved variety. Replacement of old variety with newly released variety of rice will increase the

production and net income. The existing HYV of rice Sambha Mahsuri can be replaced with HYV Sambha Mahsuri-Sub 1 because of higher productivity and income. HYV Sambha Mahsuri-Sub 1 was found to be suitable since it fits well to the existing farming situation and also it had been appreciated by the farmers.

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