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IMPACT ASSESSMENT OF MEDIUM-EARLY DURATION PADDY VARIETY SHIATS DHAN-1 UNDER IRRIGATED CONDITION IN BHADOHI DISTRICT OF UTTAR PRADESH

Shishir Kumar* and A.A. Broadway

Directorate of Extension, Sam Higginbottom University of Agriculture, Technology & Sciences, Prayagraj (Uttar Pradesh), India.

Abstract

Paddy is the important kharif season food crop of Uttar Pradesh as well as Bhadohi district and improvement in its productivity has play a key role in making the country self-sufficient in food grain. However, its productivity is very low in district Bhadohi as compared to other districts of Uttar Pradesh. The present study was conducted by Directorate of Extension,Sam Higginbottom University of Agriculture, Technology & Sciences, Prayagraj during 2016-17 and 2017-18 in kharif season with 10 FLDs across 5 selected villages of the district. The results of the demonstrations showed that farmers could increase the paddy productivity notably by switching over to improved variety and adoption of improved production technology. From the front line demonstrations, it was observed that the improved paddy variety Shiats Dhan-1 with improved production technologies recorded mean yield of 59.66 q/ha; which was 18.58% higher than that obtained with farmers practice of 50.42q/ha. The average mean of technology gap, extension gap and technology index were recorded 5.33q/ha, 9.24q/ha and 8.20%, respectively. The improved technologies gave higher mean net return of Rs.42862 per hacter with a B:C ratio 1.88 as compared to farmers practice(Rs. 21794/ha. B:C ratio 1.39).

Key words: Paddy, Shiats Dhan-1, FLDs, Extension gap, Technology gap, Technology index, B:C ratio.

Introduction

Paddy (*Oryza sativa* L.) is one of the most predominant food crop of India and second of the world. Among the paddy growing countries, India having the largest area under paddy crop in the world and in case of production it is next to china. India has produces 105.48 million tones of paddy in an area 44.14 mha with an average yield of 2404 kgha^{-1} during 2014-15(Agric Statistics, 2016). Uttar Pradesh has an area of 5.87 mha produces 12.17 million tones with an average yield of 2072 kgha^{-1} of paddy during 2014-15 (Agric Statistics, 2016). Paddy plays a key role in food security; more than 90% of total production in the world is consumed in Asian countries, where it is a staple food for a majority of the population (Mohanty, 2013). The need to produce more rice will increase if it has to meet the growing demand which is likely to be 130 million tonnes of milled rice in 2030. India needs to produce 1.7 million tones of additional rice every year to ensure national food security (Dass and Chandra, 2013). Mostly the farmers of Bhadohi district are grown medium-long duration (135-145 days) paddy varieties in irrigated condition. Narendra-359, Malviya dhan-36, MTU 7029, Arize 6444 etc. are popular paddy varieties mostly grown in the district, but among these Shiats dhan-1 is a newly released high yielding, fine grain quality and mid-early duration (maturity 128-130 days) variety. Farmers in India still producing crops based on the knowledge transmitted to them by their forefathers leading to a grossly unscientific agronomic, nutrient management and pest management practices. As a result of these, they often fail to achieve the desired potential yield of various crops and new varieties. The close discussion with farmers it was found that farmers have keen interest in adopting the improved HYVs but they not use proper agronomical practices due to lack of

***Author for correspondence :** E-mail : shishir.agro@gmail.com

knowledge are also the reasons responsible for limiting the production and productivity of paddy. Keeping this in view the Directorate of Extension, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj conduct FLDs to introduce and popularized of Shiats dhan-1 variety on farmers field. These demonstrations are conducted under the close supervision of scientists of Directorate of Extension. The aim of the demonstration is to convey the technical message to farmers that if they use recommended package and practices the yield of crop and income of the farmers can be easily increased.

Materials and Methods

The present study was carried out by the Directorate of Extension, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj during kharif season of 2016-17 and 2017-18 (Two consecutive years) at the farmers field of five adopted villages (Kurmaicha, Sujatpur, Paraupur, Jakhawn and Vedpur) in Bhadohi district of Uttar Pradesh. During this two year of study an area of 4.0 ha was covered with plot size 0.4 ha under FLDs with active participation of 10 farmers. Before conducting FLDs, a list of farmers was prepared from group meeting and specific skill training was given to the selected farmers regarding package of practices of paddy crop were followed as suggested by Choudhary, 1999 and Venkattakumar *et al*., 2010. Material for the present study with respect to demonstrations and existing farmers practices are given in table 1. In case of local check plots, existing farmer's practices being used by farmers were followed. The soils under study area were sandy loam, medium in fertility status and medium organic carbon content (0.42-0.56%) with a pH range in between 7.2 to 7.8. The available nitrogen, phosphorous and potash varied between 230-250, 36-40 and 260-280 $kgha^{-1}$, respectively. However, the soils were deficient in micro nutrients particularly zinc and ferrous.

In demonstration plots, use of newly released improved paddy variety, line transplanting, balanced fertilization, timely irrigation and plant protection measures were demonstrated on the farmer's field through FLD. The crops of were transplanted during first fortnight of July and harvested in first fortnight of November. Observations on different growth stages and yield parameters were taken and economical analysis was done by calculating cost of cultivation, gross return, net return and B:C ratio. The gross return cost of cultivation and net return were calculated by using prevailing prices of inputs and out puts. For the introduction of technology, different extension approaches through regular field visit and interpersonal communication were made by the scientists of Directorate of Extension, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj. Farmers Trainings were conducted for the awareness among the farmers and organized field days at demonstration plots to disseminate the message at large scale. Pamphlet and leaflets of improved production technologies of paddy crop were prepared and distributed among the farmers during training programme. The data were collected from FLDs plots as well as control plots (Farmers practices) and finely the extension gap, technology gap and technology index were calculated by the formula as suggested by *Samui et al*., 2000, as given below:

Technology Gap (q/ha) = Potential yield – Demonstration yield

Extension gap (q/ha) = Demonstration yield – Farmers yield

Technology index (%) =

$$\frac{Potential\ yield - Demonstration\ yield}{Potential\ Yield} \times 100$$

Tabular analysis involving simple statistical tools like mean was done by standard formula to analyze the data and draw conclusions and implications.

Table 1: Comparison between Adoption of Demonstrations Package & Farmers Practices under Paddy FLD_s.

S.No.	Particular	Demonstration Package	Farmers Practice
1.	Farming Situation	Irrigated	Irrigated
2.	Improved Variety	Shiats Dhan-1	Local Popular Varieties
3.	Optimum seed rate	30kg/ha	40kg/ha
4.	Sowing Method	Line Transplanting (20cm.x10cm.)	Random Transplanting
5.	Seed Treatment	Carboxin 37.5% + Thiram 37.5@ 2.5gm/ Kg seed	Not used
6.	Time of Sowing	1st Fortnight of July	2nd Fortnight of July
7.	Application of Fertilizers	N:P:K @ 120:60:40 Kg/ha.	Imbalanced use of fertilizer
8.	Weed Management	Pretilachlor 50 EC @ 1.60 lit./ha as pre-emergence weedicide	Not used
9.	Plant Protection	Plant Protection Measures with Technical Guidance	Plant ProtectionMeasures withoutTechnical Guidance

Details of Technology:

The paddy variety Shiats dhan-1 (AAIR-2) IC No. 594941 was developed from Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj and notified by Ministry of Agriculture and Farmers Welfare (Dept. of Agri. & Co-operation), Govt. of India vide gazette no. GOI/MAGHA 5, 1935 in the year 2014. Shiats dhan-1 variety is suitable to rice-wheat cropping system in irrigated condition. It is a mid-early duration, fine grain quality, medium slender grain, moderate gel consistency and alkali spread value. Its protein content is 9.6% (standard value 7.1% USDA nutrient database), iron content 2.0 mg/100 gm (standard value 0.8 mg USDA nutrient database), zinc content is 1.5 mg/100gm (standard value 1.09 mg USDA nutrient database) and variety having yield potential 66 qha^{-1}. The variety is also resistant to neck blast, moderately resistant to bacterial leaf blight, brown spot and sheath blight. Keeping all these characters in view the variety 'Shiats Dhan-1' has recommended for cultivation in Uttar Pradesh.

Results and Discussion

Yield Attributing Parameters:

The yield attributing parameters like number of effective tillers/hill, number of spikelets /panicle and number of filled grains/panicles of paddy crop obtained over the years under recommended as well as farmers practices are presented in table 4. The number of effective tillers/hill of Shiats dhan-1 variety ranged from 16-22 under recommended practices on farmer's field as against a ranged from 22-16 recorded under farmers practices. Similarly, higher number of spikelets/panicle (210-230) and number of filled grains/panicle (185-215) as compared to farmers practice ranged between 165-185 and 160-170, respectively. The higher values of number of tillers/ plant, number of spikelets/panicle and number of filled grains/panicle following recommended practices as well as farmers practice was due to the use of improved high yielding Shiats dhan-1 variety, seed treatment, timely transplanting, use of recommended dose of fertilizers and timely use of plant protection measures on paddy crop during both the years of demonstration. The differential response of tillering in the genotype could be attributed to its genetic potentiality. These results are in agreement with Tripathi *et al.*, (2013).

Grain Yield (qha^{-1}):

The yield of paddy crop obtained over the years under recommended practice as well as farmers practices are presented in table 2. The yield of Shiats dhan-1 ranged between 58.80qha^{-1} to 63.53qha^{-1} with mean yield of 59.66qha^{-1} under recommended practice on farmers field as against a yield ranged from 52.37qha^{-1} to 48.47qha^{-1} with a mean of 50.42qha^{-1} recorded under farmers practice. In comparison to farmers practices there was an increase of 12.28% and 24.88% higher grain yield of shiats dhan-1 variety, respectively during 2016-17 and 2017-18. These results clearly indicated higher average grain yield in demonstration plots compared to local check over the years due to knowledge and adoption of full package of practices. The average yield of paddy increased 18.58%. The higher grain yield of paddy crop under recommended practice was due to the use of improved high yielding Shiats dhan-1 variety with use of recommended practice. Similar results have been reported earlier by Tripathi *et al.*, (2013).

Test Weight (gm.):

The improved high yielding paddy variety Shiats dhan-1 recorded the higher test weight of grains ranged

Table 2: Grain Yield and Gap Analysis of Front Line Demonstrations on Paddy Crop.

Year	Area (ha)	No. of farmers	Yield q/ha			% increase over farmers practice	Technology Gap (q/ha)	Extension Gap (q/ha)	Technology Index (%)
			Potential	Recommended Practices	Farmer's practice				
2016-17	1.6	04	65	58.80	52.37	12.28	6.20	6.43	9.53
2017-18	2.4	06	65	60.53	48.47	24.88	4.47	12.06	6.87
Total/Mean	4.0	10	65	59.66	50.42	18.58	5.33	9.24	8.20

Table 3: Economic Analysis of Demonstrated Plots and Farmers Practices.

Year	Average cost of cultivation (Rs/ha)		Average Gross Return (Rs./ha)		Average Net Return (Rs./ha)		B : C Ratio	
	Demonstrated Plots	Farmers Practice	Demonstrated Plots	Demonstrated practice	Demonstrated Plots	Farmers practice	Demonstrated Plots	Farmers practice
2016-17	46500	53500	85260	75936	38760	22436	1.83	1.42
2017-18	49955	56400	96848	77552	46893	21152	1.94	1.37
Mean	48227.50	54950.00	91054.00	76744.00	42862.00	21794.00	1.88	1.39

between 22 to 23 gm with a mean of 22.5 gm under recommended practice as compared to farmers practice in local check. Profuse root growth and tillering increases assimilates synthesis and divert to support greater grain filling leading to higher test weight. Shukla *et. al,* 2014. Simiar results were also reported by Akram *et al.,* (2007) and Samant T.K. (2015).

Economics:

The inputs and outputs prices of commodities prevailed during both the year of demonstrations were taken for calculating cost of cultivation, net returns and benefit cost ratio table 3. The investment on production by adopting recommended practices ranged from Rs. 46500 and 49955 ha^{-1} with a mean value of Rs. 48227.50 against farmer's practices where the variation in cost of production was Rs. 53500 and 56400 with a mean value of Rs. 54950 ha^{-1}. Cultivation of Shiats dhan-1 paddy variety under recommended practices gave higher net return of Rs. 38760 and 46893 ha^{-1} compared to Rs. 22436 and 21152 ha^{-1} under farmers practice during 2016-17 and 2017-18, respectively. The higher average benefit cost ratio 1.88 recorded in improved technology of shiats dhan-1 variety varying from 1.83 and 1.94 and that of farmers practice was 1.39 varying from 1.42 and 1.37. This may be due to higher yield obtained under recommended practices compared to farmers practice. Similar results have been reported earlier on paddy crop by Kumar *et al.,* (2009).

Extension and Technology Gap:

The extension gap showed an increasing trend. The extension gap ranging between 6.43 to 12.06 qha^{-1} during the period of study emphasizes the need to educate the farmers through various means for adoption of improved agricultural production technologies to reverse the trend. The average extension gap was observed 9.24qha^{-1}. The technology gap is the difference between the demonstration yield and potential yield. The technology gap ranged between 6.20qha^{-1} and 4.47qha^{-1} during 2016-17 and 2017-18, respectively. This gap exists due to variation in the soil fertility and climatic conditions. The average technology gap was observed 5.33qha^{-1}. These findings are similar to the findings of *Sharma et al.,* (2011) and Mandavkar *et al.,* (2012). Technology index showed the feasibility of evolved technology at the farmer's field. The lower is the value of technology index; the more is the feasibility of technology demonstrated. The wider in technology index ranging between 9.53% and 6.87% with a mean value of 8.20% during 2016-17 and 2017-18 (Table 2), which shows the higher feasibility of the demonstrated technology of Shiats dhan-1 paddy variety. The results of the present study are in recurrence with the findings of Samant T.K. (2014).

Table 4: Yield Parameters under Demonstration Package and Existing Farmers Practices.

Yield Parameters	Demonstration Package	Existing Farmers Practice
No. of Effective Tillers/Hill	16-22	12-16
No. of Spliklets/Panicle	210-230	165-185
No. of Filled Grains/Panicle	185-215	160-170
Test weight (gm.)	22-23	18-22
Grain Yield (q/ha^{-1})	58-62	48-54
Straw Yield (q/ha^{-1})	60-62	65-70

Conclusion

The productivity enhancement under frontline demonstration over traditional method of paddy cultivation created greater awareness and motivation the other farmers to adopt appropriate production technology of paddy in district Bhadohi. The cultivation of paddy with recommended improved technologies has been found more productive and grain yield might be increased up to 18.58 %. Technology and extension gap extended which can be bridges by popularity package of practices with emphasis of improved variety. Replacement of local popular varieties with newly released improved variety will increase the production and net income. The existing local popular varieties of paddy can be replaced with newly released high yielding Shiats dhan-1 variety. The paddy variety Shiats Dhan-1 was found to be suitable since it fits well to the existing forming situation and also it had been appreciated by the farmers.

References

Agricultural Statistics at a Glance (2016). Ministry of Agriculture & Farmers Welfare Department of Agriculture, Cooperation & Farmers Welfare Directorate of Economics and Statistics. Government of India. *www.agricoop.nic.in & http://eands.dacnet.nic.in.*

Akram, M., A. Rehman, A. Ahman and A. Cheema (2007). Evaluation of rice hybrids for yield and yield components in three different environments. *J. Anim. Plant Sci.,* **17(3-4):** 70-75. *ISSN* 2071-7024.

Anonymous (2014). Statistical Diary, Economics & Statistical Division, State Planning Institute, Uttar Pradesh.

Chaudhary, B.N. (1999). Krishi Vigyan Kendra- A guide for KVK managers. Publication, Division of Agricultural Extension, ICAR, pp. 73-78.

Chauhan, N.M. (2011). Samir Kumar Pandey, Dheeraj Kumar Tiwari, Sunil Singh and Prapti Singh (2018). Promotion of long duration rice variety Swarna sub-1 through frontline demonstration in Chandauli district of Uttar Pradesh. *Int.*

J. Curr. Microbiol. App. Sci., **7(05):** 2870-2874.

Dass, A. and S. Chandra (2013). Irrigation, spacing and cultivar effects on net photosynthetic rate, dry matter partitioning and productivity of rice under system of rice intensification in Mollisol of northern India. *Experimental Agriculture,* **49(4):** 504–23.

Haque, M.S. (2000). Impact of compact block demonstration on increase in productivity of rice. *Maharashtra Journal of Extension Education,* **19(1):** 22-27.

Khanda, C.M., B.K. Mandal and L.M. Garnayak (2005). Effect of nutrient management on nutrient uptake and yield of component crops in rice bassed cropping system. *Indian J. Agron.,* **50:** 1-5.

Kumar, R.M., K. Surekha, C. Padmavathi, L.V. Subbarao, P.C. Latha, M.S. Prasad, V. Ravindrababu, A.S. Ramprasad, O.P. Rupela, V. Goud, P. Muthuraman, N. Somashekhar, S.M. Ravichandran, S.P. Singh and B.C. Viraktamath (2009). Research experiences on system of rice intensification and future directions. *Journal of Rice Research,* **2(2):** 61-71.

Mandavkar, P.M., P.A. Sawant and Mahadik (2012). Evaluation of Front line demonstration trial on rice in Raigad district of Maharastra. *Rajstan Journal of Extension Education,* **20:** 4-6.

Mohanty, S. (2013). Trends in global rice consumptions. *Rice Today*, **12(1):** 44-45.

Rahul Yadav and Thomas Abraham (2017). Agronomic performance of rice (*Oryza sativa* L.) As Affected by planting system, date of transplanting, source and dose of nitrogen. *Int. J. Curr. Microbiol. App. Sci.,* **6(8):** 387-394.

Samant T.K. (2015). Impact of front line demonstration on yield and economics of hybrid rice (Rajalaxmi). *Indian J. Agric. Res.,* **49(1):** 88-91.

Samui, S.K., S. Mitra, D.K. Roy, A.K. Mandal and D. Saha (2000). Evaluation of frontline demonstration on groundnut. *Journal of the Indian Society of Coastal Agricultural Research,* **18(2):** 180-183.

Sharma, P., S. Khar, S. Kumar, A. Ishar, S. Prakash, V. Mahajan and S. Jamwal (2011). Economic impact of front line demonstrations on cereals in Poonch district of Jammu and Kashmir. *Journal of Progressive Agriculture,* **2:** 21-25.

Shukla, U.N., V.K. Srivastava, S. Singh, A. Sen and Kumar (2014). Growth, yield and economic potential of rice (*Oryza sativa*) as influenced by different age of seedlings, cultivars and weed management under system of rice intensification. *Indian Journal of Agricultural Sciences,* **84(5):** 628–36.

Singh, D., A.K. Singh, A. Singh, A.K. Patel and M.S. Baghel (2015). Impact assessment of short duration paddy variety Birsa Vikas Dhan-109 in Sidhi district of Madhya Pradesh. *Journal of Agri. Search,* **2(1):** 53-56.

Tripathi, K., J. Pandey and A. Saxsena (2013). Performance of local, improved and hybrid rice varieties in district Rewa, (M.P), India. *International Journal of Pharmacy & life Science,* **4(12):** 3205-3208.

Venkattakumar, R., S.V. Ramanna Rao, M. Padmaiah and P. Madhuri (2010). Production constraints and information needs of growers in Andhra Pradesh. *Agric. Extn. Review* (April-June): 21-24.