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Performance Assessment of Submergence tolerance Rice variety in Flood prone areas of Dibrugarh, Assam, India

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ABSTRACT

A three years field demonstration was conducted under Krishi Vigyan Kendra, Dibrugarh during 2020, 2021 and 2022 in flood prone situation to increase the present low yield of traditional rice variety through adoption of submergence tolerant high yielding rice variety with improved package of practices. The results revealed that rice var. Ranjit Sub 1 yielded maximum average 50.24 qt ha^{-1} after submergence period of 7 days followed by Jalashree (38.50 qt ha^{-1}), Jalkuwari (38.70 qt ha^{-1}) where as 29.62 qt ha^{-1} received from traditional rice variety after same submergence period. The variation was also obtained in net income received from Ranjit sub -1 Rs. 21,398/- ha^{-1} was more as compared to Jalkuwari (Rs.11,060/- ha^{-1}), Jalashree (Rs. 10,850/- ha^{-1})and traditional rice variety that provides Rs.1,620 ha^{-1} only. Rice variety Ranjit Sub -1 showed 5.46 qt ha^{-1}, 20.92 qt ha^{-1} and 9.76% Technology gap, Extension gap and Technology index respectively where as rice variety Jalashree and Jalkuwari showed 6.50 qt ha^{-1} and 6.30 qt ha^{-1} and 8.88 qt ha^{-1} and 9.08qtha^{-1} and 14.44 % and 14.00% Technology gap, Extension gap and Technology index respectively. From the experiment all the submergence tolerant high yielding rice variety performed better as compared to traditional rice variety and can be the alternative for the rice growers in flood prone areas of the district to decrease their production loss due to flood situation.

***Key words**: Rice cultivation, Yield, Submergence tolerant, Variety and Return*

Introduction

Rice is the major cereal crop cultivated in Assam covering an area of 50 lakh ha with production of 52.04 MT (Goswami *et al*. 2020) in the district Dibrugarh, Rice and Tea are the main dominant agricultural crop practiced by the Farmers and rice occupying an area of 6.72 thousand ha with production of 37.16 thousand tones (Anonymous, 2021). Most of the upland areas are covered by Tea plantation so only low land areas are under rice cultivation in the district. Every year or alternate year Dibrugarh district receives heavy rainfall due to which few pockets in the district Dibrugarh are chronically affected by flood every year even 2-3 times in a single rice cultivation season. Flood occurs due to black flow of water from three rivers namely mighty river Brahmaputra and its tributaries Burhidihing and Sessa. The local rice varieties cultivated by farmers could not resist long flood situation and after 5-6 days it finally dies leading to heavy yield loss. For both the reasons rice growers suffer lot a for obtaining a good yield. With the objective to minimize the farmers production losses due to flood, submergence tolerant rice varities like Ranjit Sub-1, Jalashree and Jalkuwari were intro-

duced in the flood prone areas to address the problem.

Materials and Method

The experiment was conducted at Farmers field under Krishi Vigyan Kendra (KVK) Dibrugarh, Assam during 2020, 2021 2022. The soil of the experimental area was Alluvial & Sandy loam soil and medium high. Three submergence tolerant Paddy varieties Ranjit Sub -1, Jalashree, Jalkuwari keeping local traditional rice variety as check. The present field demonstrations were conducted in a Randomized Block Design (RBD) with 5 replications covering a net area of 2000 sqm. The net area was subdivided into small individual plots maintaining a size of 10m X 10m each and 25 days old rice seedlings were transplanted at a spacing of 25 cm X 25 cm (P-P X R-R) in each plot of each variety replicating for 5 times with a view to identify the potentiality and feasibility in the flood prone areas during sali season of 2020 , 2021 and 2022 respectively. Critical Inputs and all good agricultural practices were followed during the entire season.

Observations on production data of four varieties including local one were recorded separately from each experimental plot consecutively for three years. The collected data were then analysed statistically for comparison among the varieties. The other parameters like Technology gap, Extension gap and Technology index were worked out by using methods of Samui *et al*., (2000) as mentioned below.

Technology gap=Potential yield-Demonstration yield

Extension gap= Demonstration yield-farmer's practice yield

Technology index (%) = ((Potential yield-demo yield)/Potential yield) X 100

To determine the gross cost, net income and benefit: cost ratio were estimated for the various treatments as outlined by Olukosi and Erhabor (2005). The obtained data were statistically analyzed in SPSS computer based software.

Results and Discussion

The present results indicated that under submergence condition Ranjit Sub -1 performes better as compared to Jalashree, Jalkuwari and local traditional rice variety (Table 1). Rice variety Ranjit sub-1 yielded average 50.54 q tha^{-1} where as 38.50 $qtha^{-1}$, 38.70 qt ha^{-1} and 29.62 q tha^{-1} was achieved from Jalashree, Jalkuwari and local traditional rice variety respectively. The present findings are in accordance with the findings of Goswami, *et al.* (2020) for increase of yield in Ranjit sub -1 and confirms the present result.

The variation was also obtained in net income received from Ranjit sub -1 (Rs. 21,398/- ha^{-1}) was more as compared to Jalkuwari (Rs.11,060/- ha^{-1}), Jalashree (Rs. 10,850/- ha^{-1}) and traditional rice variety that provides Rs.1,620 ha^{-1} only having benefit cost ratio 1.55, 1.34, 1.35 and 1.06 in Ranjit Sub -1 Jalashree, Jalkuwari and traditional rice variety respectively (Table 1). The higher additional returns from the submergence tolerant rice varieties could be due to improved technology, timely operations of crop cultivation and scientific monitoring and are in conformity with the findings of Yadav *et al*. (2004) and Goswami *et al*. (2020) insunflower and green gram cultivation and Ranjit sub-1 respectively. The present results are also in conformity with the findings of Singh *et al.* (2018) and Girish *et al.,* (2020) in rice.

Rice variety Ranjit Sub-1 showed 5.46 qt ha^{-1}, 20.92 qt ha^{-1} and 9.76 % Technology gap, Extension gap and Technology index respectively where as rice variety Jalashree and Jalkuwari showed 6.50 qt ha^{-1} and 6.30 q tha^{-1} and 8.88 qt ha^{-1} and 9.08q tha^{-1} and 14.44 % and 14.00% Technology gap, Extension

Table 1. Average yield and Economic benefits of Rice varieties

Variety	Avg. Yield (q tha^{-1})	Gross cost ($Rs.ha^{-1}$)	Gross return ($Rs.ha^{-1}$)	Net Return ($Rs.ha^{-1}$)	B : C Ratio
Ranjit Sub 1	50.54	39,250	60,648	21398	1.55
Jalashee	38.50	31,500	42,350	10850	1.34
Jalkunwari	38.70	31,510	42,570	11060	1.35
Local Variety	29.62	28,000	29,620	1620	1.06
CD (5%)	3.12		4.22	4.55	

Considering sale price: Rs. 11/- per kg

Table 2. Different Gap analysis among the paddy varieties

Variety	Avg. Yield (qtha^{-1})	Technology gap (qt ha^{-1})	Extension Gap (qt ha^{-1})	Technology Index (%)
Ranjit Sub 1	50.54	5.46	20.92	9.75
Jalashee	38.50	6.5	8.88	14.44
Jalkunwari	38.70	6.3	9.08	14.00
Traditional Rice variety	29.62			

Data are mean of three years

gap and Technology index respectively (Table 2). Technology gap might be due to the soil fertility status, agricultural practices, local climatic situation and overcome by adopting efficient management practices. This extension gap necessitates the need to bring awareness among the farmers for adoption of improved submergence tolerant rice varieties. These findings are in similarity with Goswami *et al*. (2020) and Singh *et al.* (2018). The lower value of technology index in Ranjit Sub-1 shows the efficacy of good performance of technological interventions as compare to Jalkuwari and Jalashree. Similar findings were reported by Girish *et al*. (2020) in rice. Technology index can be reduced with proper adoption of demonstrated technological interventions to increase the yield potential of rice crop. It shows the effectiveness and good performance of technological interventions.

Conclusion

The objective of the present experiment was to provide an alternative way to farmers cultivating rice under low land situation where they have to face a large production loss due to the flood prone situation in few pockets in the District. All three submergence tolerant high yielding rice variety performed better as compared to traditional rice variety and can be the alternative for the rice growers in flood prone areas of the district to decrease their production loss due to flood situation, mor preferably Ranjit Sub-1 rice variety.

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References

Anonymous, 2021. Statistical Hand Book of Assam,. Directorate of Economics and Statistics, Govt. of Assam, PP 85.

Goswami, R., Dutta, M., Deka, B. C. and Nath, L.K. 2020. Yield Performance and Popularization of Stress Tolerant Rice Variety (Ranjit Sub-1) In Lakhimpur District of Assam. *International Journal of Current Micro. Biology & Applied Science*. 9(5): 1421-1427.

Girish, R., Bharath Kumar, T.P., Shruthi, H.R., Shivakumar, L. and Praveen, K.M. 2020. Frontline demonstration on paddy variety KPR 1 by KVK in Chikkamagaluru district of Karnataka, India: An impact study. *Journal of Pharmacognosy and Phytochemistry*. 9(2): 303-305.

Samui, S.K. Maitra, S. Roy, D.K. Mondal, A.K. and Saha, D. 2000. Evaluation on front line demonstration on groundnut (*Arachis hypogaea* L). *Journal of Indian Society of Coastal Agricultural Research.* 18: 180–3.

Singh, P.K. and Varshney, J.G. 2010. Adoption level and constraints in coriander production technology. *Indian Research Journal of Extension Education.* 10: 91-94.

Singh, R. Dogra, A. Sarkar, A. Saxena, A. and Singh, B. 2018. Technology gap, constraint analysis and improved production technologies for yield enhancement of barely (*Hordeum vulgare*) and chickpea (*Cicer arietimum*) under arid conditions of Rajasthan. *International Journal of Agricultural Sciences.* 88(2): 93-100.

Yadav, D.B. Kamboj, B.K. Garg and R.B.. 2004. Increasing the productivity and profitability of sunflower through front line demonstrations in irrigated agro ecosystem of eastern Haryana. *Hariy Journal of Agronony.* 20: 33-35.