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Research Article

Performance of frontline demonstration on kharif rice (*Oryza sativa* L) in Garo Hills, Meghalaya

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ABSTRACT

Rice is the major crop and stable food as well as the livelihood security for small and marginal farmers' and farming community in Garo Hills of Meghalaya. One of the major constraints in traditional local rice farming in Garo Hills district of Meghalaya is lower productivity. To replace the local tall long duration traditional cultivars, ICAR-Krishi Vigyan Kendra, West Garo Hills was conducted frontline demonstrations in five different blocks viz., Rongram, Selsella, Betasing, Dalu, Gambegre and Zikzak in West and South West Garo Hills district of Meghalaya during 2010 to 2013 in kharif season. The high yielding varieties of rice was performed extremely well when compared with local check variety Champali. The percentage increase in yield was 68.89, 73.64 and 77.00 in Ranjit, Swarna Mahsuri and Gomati, respectively with average increase of 73.18 in yield of four HYVs. The technology gap which corroborates to the gap in demonstration yield over potential yield of 71 kg/ha for Ranjit to 544 kg/ha for Gomati. The highest extension gap was found in the variety Gomati followed by Swarna Mahsuri and Ranjit which emphasized the need to educate the farmers through various means of adoption of improved high yielding varieties and improved agro-technologies to reverse the trend of wide extension gap. The lowest technology index of 1.48 for the variety Ranjit and highest technology index of 9.89 with Gomati was recorded. But the range of technology index showed that the gap of new technologies evolved at research stations and farmers' field was 1.48 to 9.89 percents. The higher net return and benefit cost ratio was fetched by the Gomati variety closely at par with variety Ranjit.

Key words: Extension gap, Frontline demonstration, Rice yield, Technology gap, Technology index

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INTRODUCTION

The livelihood security of farmers' and farming community in Garo Hills of Meghalaya mainly depends on rice. The productivity of sali rice in Garo Hills district of Meghalaya is lower than the national average. It is attributed to use of tall, long duration traditional varieties, improper method of sowing and transplanting, inappropriate management practices, rainfall condition, climatic aberrations, insect pest, diseases and less use of other resources in rice cultivation. Even under favourable conditions, the productivity of rice in this part of the country is nearly stagnating and the farmers in North- East India in general and Meghalaya in particular are losing interest in rice cultivation as its profitability is declining with the rise in input costs. The productivity of sali rice could be improved by using high yielding varieties following improved management of soil, water, weeds, organic nutrients and other resources. Thus, there is a need to adopt new technologies including high yielding varieties for higher productivity and income to reduce the wider gaps. So, the present study was undertaken to study the production potential of newly developed high yielding varieties in Garo Hills through front line demonstrations(FLDs).

MATERIALS AND METHODS

The present investigation was carried out three years from 2010 to 2013 during kharif season in 22 different villages in six different blocks viz., Rongram, Selsella, Betasing, Dalu, Gambegre and Zikzak in West and South West Garo Hills district of Meghalaya. Materials for the present study comprised of four HYV varieties of Sali rice viz., Ranjit, Swarna Mahsuri, Swarna Sub-1 and Gomati. Locally popular Champali was used as local check.Each demonstration plot was 0.44 ha and applied full package of practices with recommended dose of fertilizer 60: 60: 40 kg NPK/ha. The frontline demonstration (FLD) was conducted to study the gaps between the potential yield, extension gap and the technology index. In the present evaluation study, the data on output of rice cultivation was collected from the FLD plots, besides the data on local practices commonly adopted by the local farmers of this region were also collected. To estimate the technology gap, extension gap and technology index, the following formulae have been used [1].

1. Technology gap = Potential yield – Demonstration yield
2. Extension gap = Demonstration yield – Farmers yield
3. Technology index = [(Potential yield – Demonstration yield)/ Potential yield] x 100

The soil of the demonstration plots were acidic in nature (pH 4.85- 5.53), medium in organic carbon (0.51-0.62%), low available N (230-245 kg/ha) and P (8.28-9.14 kg/ha) and medium in available K (236.17- 256.5 kg/ ha).

RESULTS AND DISCUSSION

The highest yield of 50.18 q/ha was recorded under FLD plots of variety Gomati during 2010 (Table 1) with three consecutive years average yield of 47.10 q/ha. However, among the four varieties tested, Gomati produced

highest average yield of 49.56 q/ha. The results indicated that the front line demonstration has given a good impact over the farming community of Garo Hills as they were motivated by new agro-technologies applied in the demonstration plots. Yield of rice was, however varied in different years, which might be due to rainfall condition, climatic aberrations, as well as the change in the location of the demonstration plots. The high yielding varieties of rice was performed extremely well when compared with local check variety Champali. The percentage increase in yield was 68.89, 73.64 and 77.0 in Ranjit, Swarna Mahsuri and Gomati, respectively with average increase of 73.18 % in yield of four HYVs (Table 2). The technology gap which corroborates to the gap in demonstration yield over potential yield of 71 kg/ha for Ranjit to 544 kg/ha for Gomati. The technology gap observed may be attributed to dissimilarity in soil fertility status and weather conditions. Hence, location specific recommendations appear to be necessary to bridge the gap between the yields of different varieties. A very wide gap was recorded in yield of demonstration variety and local check variety of Champali. The highest extension gap was found in the variety Gomati, closely followed by Swarna Mahsuri and Ranjit which emphasized the need to educate the farmers through various means of adoption of improved high yielding varieties and improved agro-technologies to reverse the trend of wide extension gap. More and more use of HYVs by the farmers may subsequently change this alarming trend of galloping extension gaps [2]. The new technologies will eventually lead to the farmers to disenchantment discontinuance of old varieties with new technology. The technology index showed the feasibility of evolved technologies at farmer's field (Table 2). The lower the value of technology index more is the feasibility of the technology. The lowest technology index of 1.48 for the variety Ranjit and highest technology index of 9.89 with Gomati. But the range of technology index showed that the gap of new technologies evolved at research stations and farmers' field was 1.48 to 9.89 percents. Lower the value of technology index, more is the feasibility of the technology demonstrated [3]. The technology index indicated that the varieties of sali rice had performed its optimum under the Garo Hills condition and this will accelerate the newer varieties to increase the productivity of rice in Garo Hills condition. One of the main reason associated with the non replacement of local varieties with their test and aroma as well as adaptable to climatic aberrations, but the gross as well as net return was higher in newer evolved varieties because their exist wider yield gap of 19.29 q/ha to 21.56 q/ha. The analyzed data (Table 3) indicated that the higher net return of Rs. 32,972/ha was fetched by the Gomati variety closely at par with Swarna Mahsuri variety which might be due to higher productivity. The benefit cost ratio was also recorded higher in Gomati followed by variety Swarna Mahsuri and Ranjit. Hence, higher B:C ratios proved economic viability of the interventions made under FLD [4] in rapeseed and mustard [5] in moth bean. The wider gap of average net return of sali rice cultivation was Rs.17088/ha over local check which might be due to higher yield of high yielding varieties [6].

CONCLUSION

The high variability in rice yield was observed among farmers even in homogeneous domains. The high yielding varieties of rice performed extremely well in Garo Hills when compared with local check variety Champali. Biophysical, socio-economic, management, institutional, and policy factors are responsible for yield and profit gaps. The highest extension gap was found in the variety Gomati followed by Swarna Mahsuri and Ranjit which reflects the need to educate the farmers through various means for adoption of improved high yielding varieties and improved agro-technologies to reverse the trend of wide extension gap. Identification of problems/causes for such gaps and development of possible mitigation measures and minimize the knowledge gap between researchers, extension staff and farmers by developing and using viable mechanisms to transfer new knowledge and techniques from researchers to farmers and collect feedback to re-orient research on issues critical to farmers.

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LIST OF TABLES

Table no. 1: Mean performance of HYV Rice (q/ha) pooled over different locations in Garo Hills

Rice varieties	2010 (q/ha)	2011 (q/ha)	2012 (q/ha)	Pooled (q/ha)
Ranjit	48.00	47.50	46.37	47.29
Swarna Mahsuri	49.81	48.15	47.54	48.62
Gomati	50.18	48.57	49.93	49.56
Champali (Local check)	30.0	28.3	25.7	28.00

Table no. 2: Productivity of rice, yield gaps and technology index

Rice varieties	Demo	Productivity (kg/ha)	%	Technology	Extension	Technology

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	nstration (No.)	Potential	Demonstration	Local check	increase over local check	gap (kg/ha)	gap (kg/ha)	index
Ranjit	45	4800	4729	2800	68.89	71	1929	1.48
Swarna Mahsuri	10	5000	4862	2800	73.64	138	2062	2.76
Gomati	6	5500	4956	2800	77.00	544	2156	9.89
Total/Avg	66	5075	4849	2800	73.18	251	2049	4.71

Table no. 3: Economic performance of rice in Garo Hills

Rice varieties	Average yield (kg/ha)	Cost of cultivation (Rs/ha)	Gross return (Rs/ha)	Net return (Rs/ha)	B:C ratio
Ranjit	4729	26500	56748	30248	2.14
Swarna Mahsuri	4862	26500	58344	31844	2.20
Gomati	4956	26500	59472	32972	2.24
Local check	2800	19000	33600	14600	1.77
Total/Avg. Demon.	4849	26500	58188	31688	2.20