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Trishnalee Saikia

Subject Matter Specialist, Krishi Vigyan Kendra, Jorhat, Assam, India

PK Pathak

Director of Extension Education, Assam Agricultural University, Jorhat, Assam, India

M Neog

Associate Director of Extension Education, Assam Agricultural University, Jorhat, Assam, India

P Handique

Senior Scientist and Head, Krishi Vigyan Kendra, Sivasagar, Assam, India

S Borthakur

Senior Scientist and Head, Krishi Vigyan Kendra, Jorhat, Assam, India

H Gogoi

Assistant Professor, Assam Agricultural University, Jorhat, Assam, India

S Bhattacharjya

Subject Matter Specialist, Krishi Vigyan Kendra, Jorhat, Assam, India

Corresponding Author:

Trishnalee Saikia

Subject Matter Specialist, Krishi Vigyan Kendra, Jorhat, Assam, India

Adoption pattern of paddy varieties by the rice growers of Sivasagar district of Assam, India

Trishnalee Saikia, PK Pathak, M Neog, P Handique, S Borthakur, H Gogoi and S Bhattacharjya

Abstract

A large number of paddy varieties were released from Assam Agricultural University, Jorhat which are suitable for growing in different land and climatic conditions. In order to find out the adoption pattern of different varieties by the paddy grower a study was conducted at Sivasagar district of Assam. The study showed that farmers grow high yielding variety like Ranjit Sub 1 and local variety Soimari in flood affected areas. Whereas, in flood free areas majority of the farmers grow high yielding varieties like Ranjit, Shraboni etc. In respect of almost all the high yielding varieties high yield gap (ranging from 11.94% to 44.44%) was recorded between farmers yield and researcher yield which might be due non adoption of proper package of practices.

Keywords: High yielding variety, productivity, yield gap

Introduction

Agriculture in Assam is the most significant enterprise contributing 19 percent to the GSDP (Gross State Domestic Product) during 2016-17. Rice being the staple food of Assam, cultivation of rice crop occupies a major share in the total cultivable area of the state. During 2019-20, rice cultivation (2,40,0949 ha) was 60 percent of total cropped area (3,97,4812 ha). Four different types of Rice are cultivated in Assam during different season viz., *Sali* or Winter rice (June-July to Nov-Dec), *Ahu* or Autumn rice (Feb-Mar to May-June), *Boro* or Summer rice (Nov-Dec to June-July) and *Bao* or Deep-water rice (Mar-Apr to Nov-Dec).

Asra (semi-deep water) grown during April/May - Dec/January. These are grown, broadcasted or transplanted in the low-lying areas where the water depth can be upto 100 cms during the life cycle of the crop. These varieties are sown along with *Ahu* rice and harvested at the time when *Sali* rice is harvested, thus taking about 240-270 days from sowing to maturity.

Hill Rice, grown direct seeded in JHUM land as a major component of mixed cropping on slope lands or grown direct-seeded or transplanted in terrace and valley during April-September. These varieties take about 140-160 days from sowing to harvesting.

Assam Agricultural University being a pioneer institute in North Eastern India besides developing globally competitive human resources has a wide network of research stations to develop various technologies and disseminating these technologies to the farmers through a wide network of Krishi Vigyan Kendras. Rice being the staple crop, much emphasis was given to meet up the technological gap in rice cultivation in Assam during last five decades and through extensive research on plant breeding and genetics, AAU could able to developed altogether 113 numbers of crop varieties along with 2 numbers of animal varieties and 1 number of poultry breed with desirable traits catering the needs of diverse farming communities and was well adopted in six agro-climatic situations of the state and several were in pipeline for their release or notification. Out of the total AAU bred crop varieties, 55 varieties belong to rice, 7 green gram, 7 black gram, 2 lentil, 8 toria, 2 sesame, 8 sugarcane, 2 jute, 2 forage and 20 vegetables.

Amongst the AAU bred rice varieties, the most promising were the *Sali* or winter rice varieties like Ranjit and Bahadur and *Ahu* or autumn rice varieties like Lachit, Luit and Chilarai, which were not only extensively grown in Assam but also become popular in neighboring states. AAU has also developed *Boro* or summer rice varieties like Jaymoti, Bishnuprasad, Jyotiprasad, Dinanath, Swarnabh and Kanaklata, which replaced the traditional rice varieties to a great extent. Varieties like Joymati and Kanaklata are also well known for their cold tolerance ability.

Moreover, several bao or deep-water rice varieties like Padmapani, Padmanath and Panindra have also been released along with some other varieties viz. Jalashree, Jalkunwari and Plaban that are suitable for growing in flash flood situation and can withstand submergence up to 15 days. The submergence tolerance gene of rice called Sub-1 has also been identified and has been incorporated in some high yielding rice varieties that had led to development of varieties like Ranjit Sub-1 and Baahadur Sub-1, which were now becoming popular amongst the farming communities with a potential yield ranging from 6.5 to 7.0 t/ha. In addition, AAU has developed rice varieties like Gitesh and Prafulla, which are recommended for staggered planting up to 60 days. A high yielding Bora or glutinous rice variety called Aghoni was also developed by the University along with an improved premium or scented rice variety called Ketekijoha and Bakul joha, which got popularity in the export market of the nation. Another three high yielding varieties of rice namely Disang, Dikhow and Kolong has been recommended for growing under the pre and post flood situations, so as to combat the heavy loss to rice crop grown during Kharif season caused by recurrent flood. Amongst the 8 newly developed rice varieties two viz., Shraboni, Mulagabhoru and Numali are high yielding (4500-5000 kg/ha) and multiple resistant medium duration varieties and another 4 varieties viz., Chakra lahi, Diphalu, Dhansiri and Manah are high yielding long duration varieties suitable for growing in waterlogged situation. Moreover, Panchanan has been developed as a deepwater variety, Padumani, a semi deep water scented rice variety and Haccha has been recommended as a short duration variety suitable for growing both as direct seeded upland and transplanted crop during ahu season.

All these paddy varieties were tested in all districts of Assam through On Farm Trials and demonstrated through various demonstration programmes under KVKs and Research Stations all over Assam. But the status of adoption of the crop varieties is very much essential for further improvement. So, the present study was undertaken at Sivasagar district of Assam to see the adoption pattern of AAU's major rice varieties with the following objectives.

1. To know about the adoption pattern of the major Sali rice varieties released by Assam Agricultural University by the farmers of Assam.
2. To analyse the productivity of the Sali rice varieties and their yield gap

Methodology

Three development blocks from the undivided Sivasagar district of Assam namely Dimow, Gaurisagar and Mahmora block were selected randomly. On the next stage three villages from each development block were selected randomly. Fifteen (15) farm families from each village were taken into consideration for data collection. Thus, a total of 135 farm families were selected for data collection. Data were collected using personal interview method.

Results

Farmers Profile

Majority of the sample farmers in the study area were small (46.67 percent) and marginal farmers (23.70) while, large farmers consist of only 2.96 percent. Average land holding of the sample farmers varied from 0.74 hectares in case of marginal farmers to 10.01 hectares in case of large farmers in the district.

Table 1: Distribution of Farm families according to different categories

Category	Block-wise Number of respondent farmers			Total	Average land holding (ha)
	Dimow	Gaurisagar	Mahmora		
Marginal	12 (26.67)	11 (24.44)	9 (20.00)	32 (23.70)	0.74
Small	19 (42.22)	21 (46.67)	23 (51.11)	63 (46.67)	1.24
Semi Medium	10 (22.22)	7 (15.55)	9 (20.00)	26 (19.26)	2.83
Medium	3 (6.67)	4 (8.89)	3 (6.67)	10 (7.42)	4.34
Large	1 (2.22)	2 (4.44)	1 (2.22)	4 (2.96)	10.01
Total	45 (100)	45 (100)	45 (100)	135 (100)	

Figures in the parentheses are percentages

Major Sali rice varieties cultivated

It was observed from the Table 2 that in flood affected areas of the district, the major Sali rice varieties grown by the sample farmers were Ranjit Sub 1 and Soimari. Out of these two varieties Ranjit Sub 1 is a HYV of Assam Agricultural University, whereas Soimari is a local variety. In flood free areas farmers grew Sali rice varieties like Ranjit, Mulagabhoru, Masuri, Shraboni, Keteki Joha, Konjoha, Kola Joha, Malbhog, Bokul Bora, Ronga Bora, Aghuni Bora, Difolu etc. Among these varieties Konjoha, Kolajoha, Ronga Bora are local varieties and the rest are high yielding varieties released from Assam Agricultural University except Masuri.

Masuri is a Malaysian variety introduced in India. The most popular variety of Sali rice was found to be the Ranjit which was cultivated by 70.37 percent of the farmers covering an area of 22.67% of total area. This might be due to the production of the variety as well as the grain quality. Kola joha was found to be cultivated by 54.07 percent farmers, of course it covered an area of 8.43 percent of total area. Another popular variety Shraboni was cultivated by 44.44 percent farmers which covered an area of 17.71 percent of total area which was next to Ranjit. Thus, it was observed that among the specialty rice the local varieties are still popular among the farmers of the Sivasagar district.

Table 2: Major Sali rice varieties cultivated by the sample farmers of Sivasagar district of Assam

Sl. No.	Variety	Dimow	Gaurisagar	Mahmora	Total No. of farmer	Percentage of total farmers	Area (ha)	Percentage of total area
A) Flood affected area								
1	Ranjit Sub-1	5	7	3	15	11.11	6.0	4.74
2	Soimari	2	21	24	47	34.81	7.33	5.80
B) Flood Free area								
1	Ranjit	27	27	41	95	70.37	28.67	22.67
2	Mulagabhoru	0	0	10	10	7.41	4.00	3.16
3	Masuri	10	10	40	60	44.44	10.00	7.91
4	Shraboni	35	7	15	57	42.22	22.40	17.71
5	Keteki Joha	11	0	4	15	11.11	2.00	1.58
6	Kon Joha	10	13	24	47	34.81	6.27	4.96
7	Kola Joha	25	21	27	73	54.07	10.67	8.43
8	Malbhog	15	10	12	37	27.41	4.93	3.90
9	Bokul Bora	12	11	13	36	26.67	4.93	3.90
10	Ronga Bora	5	25	25	55	40.74	10.00	7.91
11	Aghuni Bora	20	15	10	45	33.33	3.33	2.64
12	Difolu	0	2	0	2	1.48	0.80	0.63
Total Area							126.47	100.00

Yield and Yield gap

It was observed that average productivity of the Sali rice varieties in the sample farmers fields was much less than the researcher yield in respect of all the high yielding varieties. Yield gap was found as high as 44.44 percent in Mahsuri and

Aghuni bora and as low as 11.94 percent in Difolu variety. It was recorded that even for the most popular variety in the study area i.e. Ranjit the gap was 30%. The higher yield gaps might be due to the fact that the farmers did not follow recommended scientific package of practices.

Table 3: Average Productivity of the Sali rice varieties in the sample farms of Sivasagar district of Assam

Sl. No	Variety	Average farmers' Yield (q/ha)	Researcher Yield (q/ha)	Yield Gap (%)
1	Ranjit	42	60	30
2	Ranjit Sub-1	45	60	25
3	Shraboni	42	55	23.64
4	Ketekijoha	30	45	33.33
5	Aghuni bora	30	54	44.44
6	Mulaghabhoru	36	55	34.54
7	Difolu	45	51.1	11.94
8	Kon joha	27	-	-
9	Masuri	30	54	44.44
10	Kola Joha	30	-	-
12	Malbhog	26.25	-	-
13	Bokul Bora	26.25	45	41.67

Summery

The sample farmers adopted the high yielding varieties of paddy released from Assam Agricultural University, Jorhat. But the farmers yield in case of all the varieties were much less than the researcher yield in the study area. This might be due to the fact that the sample farmers did not follow the scientific package of practices like application of recommended fertilizers, line transplanting, seed treatment, soil treatment, proper plant protection measures etc.

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