Research Article

Extent of adoption of rice varieties recommended by Assam Agricultural University (AAU), Jorhat

■ **SATPAL BORTHAKUR, P. MISHRA** AND **D. BORTAMULY**

SUMMARY : At present, rice occupies about two-third of the total cropped area (25 lakh ha) in the state of Assam. Being the single major source of agricultural GDP, rice plays a significant role in the state economy. A study was conducted in districts of Karimganj, Lakhimpur and Jorhat of Assam to assess the extent of adoption of rice varieties recommended by AAU, Jorhat. A purposive sampling technique was followed and statistical methods such as percentage, frequency, mean and ranking were used for analysing the data. Data were collected through personal interview method during the period of 2010-11. A total of 360 respondents were interviewed with the help of the structured schedule. Among the various AAU recommended rice varieties cultivated in Karimganj district 'Ranjit' was the most widely adopted (100%) followed by 'Bahadur' (60.83%). In Lakhimpur district 'Ranjit' (62.50%) was followed by 'Mahsuri' (27.50%). Whereas in Jorhat district 'Ranjit' was adopted by 92.50 per cent respondents followed by 'Bahadur' (40.00%). Positive and significant correlation can be observed between the extent of adoption of AAU recommended rice varieties with age, family size and operational land holding.

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BACKGROUND AND OBJECTIVES

Rice is the most widely consumed staple food for a large part of the world's human population, especially in Asia. Rice occupies about two-third of the total cropped area in the state of Assam. Being the single major source of agricultural GDP, rice plays a significant role in the economy of Assam. Further, its importance in the consumption basket (the average monthly consumption per capita is about 13 kg) also speaks volumes on the rice orientation of the state (Barah *et al.,* 2001). Another noteworthy fact is that, rice is traditionally-grown throughout the year *viz.*, winter, autumn and summer seasons, with winter (*Kharif*) rice as the main crop in the state. Adoption of modern rice cultivars has increased a lot in the past three decades. However, modern cultivars continue to replace thousands of traditional cultivars (Chang, 1987). Assam Agricultural University has developed

many location specific technologies and released several noteworthy varieties of rice which is the primary crop in Assam. The average productivity of rice in Assam is much lower than the national level (Barah *et al*., 2001).

Singh (1992) reported that high technological gap existed in adoption of recommended technology in various field crops. Varietal attributes like ease of threshing, cooking and swelling quality are significant determinants of adoption (Adesina and Seidi, 1995). Also, labour availability, farm size, contact with extension services, market-oriented production, credit availability and gender orientation are the most common farm and farmer-specific attributes that influence adoption or non-adoption of a technology (Adesina and Zinnah, 1993). A mere increase of 50 kg rice/ha in Assam can lead to a total estimated income of more than Rs.125 crores from around 25 lakh ha of rice area in the state

This is possible when technology is most appropriate to the farmers' situation and needs

and technology dissemination processes are quicker and more efficient. Keeping the importance in view, it is very essential to assess the extent of adoption of rice varieties recommended by AAU in farmer's field in Assam.

RESOURCES AND METHODS

The study was carried out in the districts of Karimganj, Lakhimpur and Jorhat. These districts were purposively selected as these areas basically have rice research stations. Lakhimpur was selected along with the other two districts as it conducts research on deep water rice. The number of farmers interviewed in each of the districts was 120, taking the total sample size to 360 farmers. The data in the present study were collected directly from the farmers with the help of the structured schedule, through personal interview method. The statistical techniques used are frequency, percentage, mean and rank.

OBSERVATIONS AND ANALYSIS

In Assam, 4 types of rice are grown exclusively around the year. These are *Sali, Ahu, Boro* and *Bao*. These rice varieties are also known as 'Winter', 'Autumn', 'Summer' and 'Deep water rice', respectively. The findings pertaining to the adoption of each type of rice are presented below.

Extent of adoption of AAU recommended *Sali* rice varieties:

Data revealed that among the AAU recommended '*Sali* rice varieties' cultivated in the study area, Ranjit variety showed the highest percentage of adoption (91.94% in 2008-09) followed by Bahadur (38.33% in 2008-09) (Table 1). Mahsuri (22.22%) was also cultivated throughout the study area although its adoption percentage is not very high. Badshahbhog was cultivated by only 1.11 per cent respondents as it is still used for making pulao during festivals in

Table 1: Extent of adoption of AAU recommended *Sali* rice varieties in selected districts of the study area (n=360)

Year	Variety	Karimganj (n=120)		Lakhimpur (n=120)		Jorhat (n=120)		Overall	
		F	%	F	%	F	%	F	%
2006-07	Ranjit	120	100	75	62.50	111	92.50	306	85
	Mahsuri	7	5.83	33	27.50	40	33.33	80	22.22
	Bahadur	73	60.83	8	6.67	48	40	129	35.83
	Manoharsali	31	25.83	0	0.00	0	0.00	31	8.61
	Badshahbhog	4	3.33	0	0.00	0	0.00	4	1.11
	Borjahinga	0	0.00	17	14.17	0	0.00	17	4.72
	Jahinga	0	0.00	7	5.83	0	0.00	7	1.94
	Solpona	0	0.00	16	13.33	0	0.00	16	4.44
	Prasadbhog	0	0.00	0	0.00	3	2.50	3	0.83
2007-08	Ranjit	120	100	81	67.50	111	92.50	312	86.66
	Mahsuri	7	5.83	33	27.50	40	33.33	80	22.22
	Bahadur	73	60.83	8	6.67	48	40	129	35.83
	Manoharsali	31	25.83	0	0.00	0	0.00	31	8.61
	Badshahbhog	4	3.33	0	0.00	0	0.00	4	1.11
	Borjahinga	0	0.00	17	14.17	0	0.00	17	4.72
	Jahinga	0	0.00	7	5.83	0	0.00	7	1.94
	Solpona	0	0.00	16	13.33	0	0.00	16	4.44
	Prasadbhog	0	0.00	0	0.00	3	2.50	3	0.83
2008-09	Ranjit	120	100	100	83.33	111	92.50	331	91.94
	Mahsuri	7	5.83	33	27.50	40	33.33	80	22.22
	Bahadur	73	60.83	17	14.17	48	40	138	38.33
	Manoharsali	31	25.83	0	0.00	0	0.00	31	8.61
	Badshahbhog	4	3.33	0	0.00	0	0.00	4	1.11
	Borjahinga	0	0.00	17	14.17	0	0.00	17	4.72
	Jahinga	0	0.00	0	0.00	0	0.00	0	0.00
	Solpona	0	0.00	12	10.00	0	0.00	12	3.33
	Prasadbhog	0	0.00	0	0.00	3	2.50	3	0.83

F = Frequency   % = Percentage

Karimganj district. Manohar Sali was also cultivated by 8.61 per cent respondents throughout the period of the study as it is still used by some of the farmers for making muri. Borjahinga was cultivated as a post flood Sali variety by 4.72 per cent respondents throughout the period of study. Solpona was cultivated for the same reason by 4.44 per cent respondents in 2006-07 and 2007-08. The number of farmers adopting AAU recommended varieties was increasing, as the most popular AAU recommended HYVs Ranjit and Bahadur showed an increase in the percentages of adoption (85.00% to 91.94% and 35.83% to 38.33%, respectively).

Extent of adoption of AAU recommended *Ahu* rice varieties:

Data revealed that only two out of the three sample districts cultivate *Ahu* rice (Table 2). Respondents of Jorhat district had stopped several years ago due to various reasons like cattle problem, lack of assured irrigation, weed problems etc. In the remaining two districts out of the eight AAU recommended *Ahu* rice varieties were cultivated. Out of these

Krishna had the highest percentage of adoption (14.44% for all three years covered under the study) followed by Kaveri (12.22% for all three years covered under the study). Although Krishna took more time compared to varieties like Disang, it had the highest number of adopters as it gave very impressive yields. Rangadoria had an adoption percentage of 8.88 in 2008-09 and *'Luit'* had an adoption percentage of 6.94 in 2008-09. About 6.38 per cent respondents cultivated Disang throughout the three years covered under the study. Moreover, 1.38 and 1.11 per cent respondents cultivated Joya and Gopinath, respectively throughout the three years covered under the study. Bala was also cultivated by 0.83 per cent respondents.

The biggest problem faced by the *Ahu* growing farmers is the stray cattle which are let loose by villagers who do not cultivate this type of rice. So, most of the respondents said that they cultivated *Ahu* varieties on plots adjacent to their homestead garden. This helped them to manage the stray cattle. Moreover, some of the respondents claimed that ever since the advent of the AAU recommended HYV's, their needs were fulfilled by the *Sali* crop alone.

Table 2: Extent of adoption of AAU recommended *Ahu* rice varieties in selected districts of the study area (n=360)

Year	Variety	Karimganj (n=120)		Jorhat (n=120)		Lakhimpur (n=120)		Overall	
		F	%	F	%	F	%	F	%
2006-07	Luit	24	20.00	0	0.00	0	0.00	24	6.66
	Gopinath	4	3.33	0	0.00	0	0.00	4	1.11
	Joya	5	4.17	0	0.00	0	0.00	5	1.38
	Disang	23	19.17	0	0.00	0	0.00	23	6.38
	Krishna	52	43.33	0	0.00	0	0.00	52	14.44
	Kaveri	44	36.67	0	0.00	0	0.00	44	12.22
	Bala	3	2.50	0	0.00	0	0.00	3	0.83
	Rangadoria	0	0.00	0	0.00	29	24.17	29	8.05
2007-08	Luit	25	20.83	0	0.00	0	0.00	25	6.94
	Gopinath	4	3.33	0	0.00	0	0.00	4	1.11
	Joya	5	4.17	0	0.00	0	0.00	5	1.38
	Disang	23	19.17	0	0.00	0	0.00	23	6.38
	Krishna	52	43.33	0	0.00	0	0.00	52	14.44
	Kaveri	47	39.17	0	0.00	0	0.00	47	13.05
	Bala	3	2.50	0	0.00	0	0.00	3	0.83
	Rangadoria	0	0.00	0	0.00	29	24.17	29	8.05
2008-09	Luit	25	20.83	0	0.00	0	0.00	25	6.94
	Gopinath	4	3.33	0	0.00	0	0.00	4	1.11
	Joya	5	4.17	0	0.00	0	0.00	5	1.38
	Disang	23	19.17	0	0.00	0	0.00	23	6.38
	Krishna	52	43.33	0	0.00	0	0.00	52	14.44
	Kaveri	47	39.17	0	0.00	0	0.00	47	13.05
	Bala	3	2.50	0	0.00	0	0.00	3	0.83
	Rangadoria	0	0.00	0	0.00	32	26.67	32	8.88

Extent of adoption of AAU recommended *Bao* rice varieties:

Data revealed that Lakhimpur was the only sample district where *Bao* varieties were cultivated (Table 3). Among the AAU recommended HYV *Bao* rice varieties cultivated in Lakhimpur district, Boga Amana had the highest percentage of adoption (4.72% for the years 2007-08 and 2008-09) followed by Rangabau (2.50% for all three years studied) and Amana (1.11% for all three years considered). Maguri was also cultivated by 1.11 per cent farmers during the years covered under the study. It was seen that the number of respondents cultivating Boga Amana increased in 2008-09. The reason behind this might be the fact that it fetches a slightly higher price compared to the other *Bao* varieties like Amana.

Extent of adoption of AAU recommended *Boro* rice varieties:

Data revealed that Lakhimpur was the only sample district in the study area where *Boro* varieties were cultivated

(Table 4). Among the AAU recommended *Boro* rice varieties cultivated in Lakhimpur district, Joymati, Jyotiprasad and IR-36 were cultivated by 1.66 per cent farmers. Although, Joymati was cultivated throughout the period of study, Jyotiprasad was cultivated in 2007-08 and 2008-09 and IR-36 was cultivated in 2006-07. Incidentally the years covered under the study were the only years when *Boro* varieties were cultivated in Lakhimpur. It was a group of six farmers from Sherabbhati village that started in 2006-07 and stopped in 2009-10 as they faced a lot of problems with stray cattle. This forced the group to stop *boro* cultivation.

Correlation between extent of adoption of AAU recommended rice varieties with socio-economic parameters of respondents:

Data revealed that extent of adoption of AAU recommended rice varieties had positive and significant

Table 3: Extent of adoption of AAU recommended *Bao* rice varieties in selected districts of the study are (n=360)

Year	Variety	Karimganj (n=120) F	Karimganj (n=120) %	Lakhimpur (n=120) F	Lakhimpur (n=120) %	Jorhat (n=120) F	Jorhat (n=120) %	Overall F	Overall %
2006-07	Amana	0	0.00	4	3.33	0	0.00	4	1.11
	Rangabau	0	0.00	9	7.50	0	0.00	9	2.50
	Maguri	0	0.00	4	3.33	0	0.00	4	1.11
	B Amana	0	0.00	13	10.83	0	0.00	13	3.61
2007-08	Amana	0	0.00	0	0.00	0	0.00	0	0.00
	Rangabau	0	0.00	9	7.50	0	0.00	9	2.50
	Maguri	0	0.00	4	3.33	0	0.00	4	1.11
	B Amana	0	0.00	17	14.17	0	0.00	17	4.72
2008-09	Amana	0	0.00	0	0.00	0	0.00	0	0.00
	Rangabau	0	0.00	9	7.50	0	0.00	9	2.50
	Maguri	0	0.00	4	3.33	0	0.00	4	1.11
	B Amana	0	0.00	17	14.17	0	0.00	17	4.72

F = Frequency   % = Percentage, B Amana = Boga Amana

Table 4: Extent of adoption of AAU recommended HYV *Boro* rice varieties in selected districts of the study area (n=360)

Year	Variety	Karimganj (n=120) F	Karimganj (n=120) %	Lakhimpur (n=120) F	Lakhimpur (n=120) %	Jorhat (n=120) F	Jorhat (n=120) %	Overall F	Overall %
2006-07	Joymati	0	0.00	6	5.00	0	0.00	6	1.66
	Jyotiprasad	0	0.00	0	0.00	0	0.00	0	0.00
	IR-36	0	0.00	6	5.00	0	0.00	6	1.66
2007-08	Joymati	0	0.00	6	5.00	0	0.00	6	1.66
	Jyotiprasad	0	0.00	6	5.00	0	0.00	6	1.66
	IR-36	0	0.00	0	0.00	0	0.00	0	0.00
2008-09	Joymati	0	0.00	6	5.00	0	0.00	6	1.66
	Jyotiprasad	0	0.00	6	5.00	0	0.00	6	1.66
	IR-36	0	0.00	0	0.00	0	0.00	0	0.00

F = Frequency   % = Percentage

correlation with age (r = 0.3977**), family size (r = 0.2571**) and operational land holding (r = 0.1979*) (Table 5). This means that as the age, family size or operational land holding increased there was more adoption of AAU recommended rice varieties. The reason behind this may be the fact that an experienced or older farmer has seen the drastic difference between the traditional varieties and the AAU recommended varieties as they have cultivated several varieties over the years. This makes him a better judge of the benefits of the recommended varieties as he can compare them to his own past experiences. Also, a farmer who has a large family may be forced to adopt recommended varieties to increase his income which in turn helps him in taking care of his large family recommended rice varieties and operational land holding. This finding is similar to the findings of Goswami *et al*. (2010).

Table 5: Correlation co-efficients of extent of adoption of AAU recommended rice varieties with socio economic parameters of the respondents

Sr. No.	Socio-economic parameters	'r' value Overall
1.	Age	0.3977**
2.	Educational level	-0.2067*
3.	Family size	0.2571**
4.	Family member engaged in farm activities	-0.0785
5.	Social participation	-0.3483**
6.	Types of house	0.1393
7.	Main occupation	0.1080
8.	Information sources used	0.1251
9.	Operational land holding	0.1979*
10.	Total annual income	-0.1072
11.	Training exposure	-0.0586
12.	Economic motivation	-0.0863
13.	Scientific orientation	-0.1258

* and** indicate significance of values at P=0.05 and 0.01, respectively

Moreover, a farmer with larger land holdings has more scope to adopt new recommended varieties and this may be the reason behind the positive and significant correlation between the extent of adoption of AAU. Further more, extent of adoption of AAU recommended rice varieties had negative and significant correlation with educational level (r = -0.2067*) and social participation (r = - 3483**). This means that as the educational level or social participation of a respondent increased, there was less adoption of AAU recommended rice varieties. This may be due to the fact that a respondent who is socially very active gets less time to tend to his farming matters and hence, shows less extent of adoption of recommended rice varieties.

Conclusion:

The study implies that all the sampled respondents were cultivating AAU recommended rice varieties to a certain degree

However, in Lakhimpur district it was seen that most of the respondents had never heard of several popular varieties like Ranjit and Bahadur till 2005. This shows that the level of extension work going on in the state of Assam can be improved as the above-mentioned varieties have been available for cultivation since 1992. Also, these areas are very suitable for cultivation of varieties like Ranjit as the farmers found out after 2005 and every following year more and more farmers started adopting it. This also shows that farmers residing close to a rice centric RARS is much more likely to come across new AAU recommended varieties as respondents from Karimganj and Jorhat had been exposed to the abovementioned varieties in the mid 1990's. Moreover, this indicates that farmers residing in districts that do not have an RARS will probably get even less information and opportunities regarding new varieties released by AAU. So, AAU should try to improve the quality of extension work going on in districts that do not have a rice centric RARS to ensure a better bridge between the laboratory and the fields. It can be observed from the study that the extent of adoption of AAU recommended rice varieties had positive and significant correlation with age, family size and operational land holding.

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