Received : 02.09.2022 | Accepted : 18.11.2022 | Online published : 15.12.2022
https://doi.org/10.54986/irjee/2022/dec_spl/30-34
IRJEE SOCIETY OF EXTENSION EDUCATION

RESEARCH ARTICLE

Preferences on Indigenous and High Yielding Varieties of Rice (*Oryza sativa* L.) by Tribal and Non-Tribal farmers of Assam

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ABSTRACT

Assam occupies a special place in the rice production and a home to many indigenous varieties of rice. The production and productivity of the Indigenous varieties are much less than the HYVs but some farmers still prefer growing indigenous rice along with HYVs. Therefore, the present study was undertaken to study the distribution pattern of Indigenous and High Yielding varieties of rice and to enumerate the farmer's preferences to Indigenous and High Yielding varieties of rice in Baksa district of Assam. A total of 160 numbers of both Tribal and Non-tribal farmers were selected for the study. The data were collected by means of personal interview schedule. Statistical tools employed to analyze the data included frequency, percentage, Mean and Standard Deviation. To know the distribution pattern of both Indigenous and High Yielding varieties of rice, two major areas viz. Area distribution and Varietal distribution were identified. The findings revealed that non-tribal farmers cultivated HYVs in 68.13 per cent area and tribal farmers cultivated in 31.87 per cent area. But in case of Indigenous varieties non-tribal farmers cultivated in 44.93 per cent and tribal farmers cultivated in 55.07 per cent area. The major HYV varieties grown by the non-tribal farmers were Masuri, Ranjit, Moniram and varieties grown by tribal are Ranjit, Bahadur and Masuri. The indigenous varieties grown by the non-tribal farmers mostly Nolbonni, Ballam Joha, Moinagiri and varieties grown by tribal are Phulpakhri, Tanagaguri, Parochokua bonni. Further, A comparative assessment of the preferences of both Indigenous and High yielding variety rice growers was performed and it was observed that tribal farmers preferred indigenous rice varieties because of their taste, cooking quality etc, and preferred HYVs because of yield, market demand etc. But non-tribal farmers preferred indigenous varieties because of their traditional delicacies, taste etc, and showed preference to HYVs because of cooking quality, market demand etc.

Key words: *Indigenous varieties; High yielding Varieties; Tribal farmers; Non-tribal farmers; Preferences*

Rice is the most important crop to millions of small farmers who grows it on millions of hectares throughout the region and to the many landless workers who derive income from working on these farms. In India, Rice production is an important part of the national economy. India is one of the world's largest producers of white rice and brown rice, accounting for 22.00 percent of all world rice production (*World Economic Forum*).

Among the rice producing states of the country, Assam occupied the 9th position in 2016-17, producing 40.70 lakh metric tonnes of rice. Assam is home to many Indigenous varieties of rice with three distinct rice seasons, namely, *Ahu, Boro*, and *Sali*. Indigenous rice which is cultivated by traditional method and does not have any proper package of practice variety-wise. Indigenous rice varieties which have good eating qualities, low risk, less care requirement, nutritional and medicinal value, taste, processing quality, storage etc are cultivated by the farmers still now. Some Indigenous varieties like *Tulshijoha, Nepali joha, Ballam joha, Parochokua bonni, Bordhan,* etc are preferred by small and marginal farmers which constitute the major rice growers in

Assam. A study conducted in Karbi Anglong district of Assam concluded that *Maireng*, a traditional rice variety was preferred over the High yielding variety named *Ranjit* by the farmers (*Hakmaosa, 2011*) and also (*Baruah,2016*) conducted her study in Jorhat district of Assam and found that traditional varieties *Sorujahingiya* and *Solpona* were preferred and got 1st position over High yielding variety *Ranjit.*

Some farmers in certain areas (mostly Tribal dominated areas of Bodoland) prefer growing Indigenous variety of rice along with HYVs because of more production and income. It can be also found that there are still distinct differences in socio-cultural values which have resulted in disparity in adoption and preferences of Indigenous and HYVs between tribal and non-tribal farmers although live in same area and proximity. Considering the above facts, questions may be raised as to why it is that one group prefers more the traditional varieties over HYVs, even in the 21st Century. Is the socio-cultural assimilation so slow as to hinder acceptance of better technology affecting livelihood or our planners' strategies have failed to upgrade livelihood. So, to answer all the above queries the present study was conducted with the following objectives *viz*. To study the distribution pattern of Indigenous and High Yielding varieties of rice and to enumerate the farmer's preferences for Indigenous and High Yielding varieties of rice.

METHODOLOGY

Baksa District of Assam had been selected purposively for the study as large numbers of High yielding along with Indigenous varieties of rice are grown there. As per the data provided by the Agricultural Department Officials, Assam, 2018, about 65.00 per cent of rice areas are under HYVs and 35.00 per cent of areas are under Indigenous varieties in this district. Moreover, the district has a sizeable presence of tribal (*Bodo, Kachari, Adibasi, Rabha* etc) and non-tribal farmers (Assamese). A total of eight villages were selected to carry out the study. Both Tribal and Non-tribal farmers were selected separately from the total rice-growing farmers of the villages. Twenty farmers (both Tribal and Non-tribal) were selected from each of the eight selected villages by proportionate random sampling method (on the basis of the total tribal, non-tribal population in the village). So, a total of one hundred sixty (N=160) numbers of farmers were selected for the study which was conducted in the year 2018. Out of the total, one hundred and four numbers of non-tribal and fifty-six numbers of tribal farmers go for the cultivation of High yielding varieties and again fifty-nine numbers of non-tribal farmers and forty-two numbers of tribal farmers go for the cultivation of Indigenous varieties. The present study included two descriptive variables viz. distribution pattern and farmer's preference along with thirteen independent and one dependent variable. A research schedule consisting of both open-ended and semi-structured questions was prepared for the collection of data. The collected data were properly tabulated and analyzed with the following statistical techniques i.e., Frequency Distribution, Percentage, Mean and Standard Deviation

RESULTS AND DISCUSSION

Distribution pattern of Indigenous and High Yielding varieties of rice : To know the distribution pattern of both Indigenous and High Yielding varieties of rice, two major areas *viz*. Area distribution and Varietal distribution were identified in the study which is elaborated as below.

Area distribution : It is observed in Table 1 that non-tribal farmers grew HYVs at an average area of 1.20 ha and tribal farmers grew HYVs at an average area of 1.04 ha. Out of the total area of 183.27 ha where HYVs were grown by the farmers, non-tribal farmers used 68.13 per cent of the total area against 31.87 per cent of tribal farmers. This finding is in contrast with the findings of (*Baruah, 2016*) who reported in her study that, in case of HYVs, out of 100 percent, 46.67 percent of the farmers grew HYVs of rice in an area of less than 0.017 ha and are in same line with the findings of (*Kumbhare et al.,2011*) who found that out of total number of respondents, the overall extent of area of adoption of recommended SRI practice by the respondents was 72.40 per cent in the state of Tamil Nadu.

Table 1. Distribution of respondents according to area under HYVs rice

	Non-tribal (n_1=104)	Tribal (n_2=56)	Total farmers (N=160)
Area	124.87 ha (68.13%)	58.40 ha (31.87%)	183.27 ha (100.00)
Mean	1.20	1.04	1.15
S.D	0.69	0.42	0.61

Table 2 depicted that tribal farmer grew Indigenous varieties at an average area of 0.35 ha area and non-

tribal farmers grew Indigenous varieties at an average area of 0.26 ha. Tribal farmers preferred Indigenous varieties more over the non-tribal farmers as out of 34.50 ha under Indigenous rice they cultivated them in 55.07 per cent of the total area. This finding is in the line with the findings of (*Baruah, 2016*) who clearly indicates that majority of the respondents (77.50%) cultivated Indigenous rice varieties in an area of 1.10ha and above.

Varietal distribution : The findings presented in Table 3 indicate that majority of non-tribal farmers cultivated *Masuri* (91.34%) followed by *Ranjit* (80.76%), *Moniram* (70.19%), *Bahadur* (63.46%), *Baismuthi* (59.61%), *Swarna Masuri* (41.35%), *Swarnashap-1* (28.84%), *Aghoni bora* (6.73%) and *Keteki joha* (4.80%). But the in case of tribal farmers, they cultivated *Ranjit* (87.50%) more followed by *Bahadur* (82.14%), *Masuri* (73.21%), *Baismuthi* (64.28%), *Moniram* (60.71, %), *Swarna Masuri* (30.35%), *Swarnashap-1* (19.64%), *Aghoni bora* (16.07%) and *Keteki joha* (12.50%).

But when considered as total farmers, *Masuri* was cultivated by majority (85.00%) followed by *Ranjit* (83.12%), *Bahadur* (70.00%), *Moniram* (66.87%), *Baismuthi* (61.25%). *Masuri* is very dominantly cultivated by non-tribal farmers though *Ranjit* was cultivated mostly by tribal farmers. These findings are in contrast with the findings of (*Borthakur, 2013*) who reported that the variety *Ranjit* was cultivated by all (100%) respondents whereas, only 5.83 per cent of the respondents cultivated *Mahsuri* in his study conducted in Jorhat district of Assam.

It has been revealed in above Table 4 that out of 19 Indigenous varieties, 12 are cultivated by non-tribal farmers while 18 are cultivated by tribal farmers. Indigenous varieties like *Phulpakhri* (83.33%), *Tangaguri* (71.42%), *Parochokua bonni* (69.04%), *Nepali joha* (59.52%), *Nol bonni* (59.52%) etc are dominantly cultivated by tribal farmers while *Nol bonni* (64.40%), *Ballam joha* (62.71%), *Moinagiri* (59.32%), *Tulshi joha* (52.54%), *Nepali joha* (42.37%) etc. are first five Indigenous varieties cultivated by non-tribal farmers.

If we consider total farmers, then *Nol bonni* (62.37%), *Ballam joha* (56.43%), *Moinagiri* (56.43%), *Nepali joha* (49.50%), *Phulpakhri* (46.15%) *Tulshi joha* (44.55%) are dominantly cultivated in the sampled area. The non-tribal farmers were not growing varieties like *Tangaguri, Tengre, Bordhana, Kotipura joha, Koli joha, Nor joha* and *Siyali joha.*

Table 2. Distribution of respondents according to area under Indigenous rice.

	Non-tribal (n_1=59)	Tribal (n_2=42)	Total farmers (N=101)
Area	15.50 ha (44.93%)	19.00 ha (55.07%)	34.5 ha (100.00)
Mean	0.26	0.35	0.34
S.D	0.20	0.3	0.26

Table 3. Distribution of respondents on HYVs rice varieties

Varieties	Non-tribal (n_1=104)		Tribal (n_2=56)		Total farmers (N=160)	
	No.	%	No.	%	No.	%
Ranjit	84	80.76	49	87.5	133	83.12
Bahadur	66	63.46	46	82.14	112	70.00
Moniram	73	70.19	34	60.71	107	66.87
Swarna Masuri	43	41.35	17	30.35	60	37.50
Masuri	95	91.34	41	73.21	136	85.00
Baismuthi	62	59.61	36	64.28	98	61.25
Swarnashap-1	30	28.84	11	19.64	41	25.62
Keteki joha	5	4.80	7	12.50	12	7.50
Aghoni bora	7	6.73	9	16.07	16	10.00

Table 4. Distribution of respondents on Indigenous rice varieties

Varieties	Non-tribal (n_1=59)		Tribal (n_2=42)		Total farmers (n=101)	
	No.	%	No.	%	No.	%
Phulpakhri	13	22.03	35	83.33	48	46.15
Moinagiri	35	59.32	22	52.38	57	56.43
Swagmoni	22	37.28	18	42.85	40	39.60
Tengre	0	0	14	33.33	14	13.86
Tangaguri	0	0	30	71.42	30	29.70
Bordhana	0	0	7	16.66	7	6.93
Kalamdani	12	20.33	15	35.71	33	32.67
Nepali joha	25	42.37	25	59.52	50	49.50
Kupti joha	8	13.55	12	28.57	20	19.80
Kotipura joha	0	0	9	21.42	9	8.91
Koli joha	0	0	6	14.28	6	5.94
Ballam joha	37	62.71	20	47.61	57	56.43
Tulshi joha	31	52.54	14	33.33	45	44.55
Nor joha	0	0	16	38.09	21	20.79
Kon joha	23	38.98	0	0	23	22.77
Siyali joha	0	0	7	16.66	7	6.93
Parochokua Bonni	12	20.33	29	69.04	41	40.59
Nol bonni	38	64.40	25	59.52	63	62.37
Tengre bonni	16	27.11	22	52.38	38	37.62

Table 5. Comparative distribution of tribal and non-tribal respondents according to preferences of Indigenous and HYV's

Preference factor	Tribal farmer Indigenous varieties (n_2=42) No. (%)	Non-tribal farmer Indigenous varieties (n_1=59) No. (%)	Tribal farmer HYVs (n_1=56) No. (%)	Non-tribal farmer HYVs (n_1=104) No. (%)
Taste	42 (100.00)	49 (83.05)	25 (44.64)	104 (100.00)
Colour	29 (69.04)	43 (72.88)	21 (37.5)	67 (64.42)
Cooking quality	37 (88.09)	39 (66.10)	45 (76.78)	104 (100.00)
Traditional delicacies	34 (80.95)	50(84.74)	10 (17.85)	12 (11.53)
Value addition	36 (85.71)	0(0.00)	18 (32.14)	0 (0.00)
Low operational cost	35 (83.33)	47 (79.70)	0(0.00)	0 (0.00)
Low production cost	35 (83.33)	47 (79.70)	0 (0.00)	0 (0.00)
Less farm care	32 (76.19)	49 (83.05)	0 (0.00)	0 (0.00)
Low input required	31 (73.81)	46 (77.97)	7 (12.50)	15 (14.42)
Disease tolerance	28 (66.66)	37 (62.71)	14 (25.00)	49 (47.11)
Pest tolerance	31 (73.80)	46 (77.96)	8 (14.28)	38 (36.53)
Flood tolerance	26 (61.90)	35 (59.320	23 (41.07)	0 (0.00)
Draught tolerance	26 (61.90)	35 (59.32)	23 (41.07)	0 (0.00)
Low fertilizer efficiency	33 (78.57)	43 (72.88)	5 (8.92)	0 (0.00)
Market demand	28 (66.67)	32 (54.23)	56 (100.00)	79 (75.96)
Long storage (>4year)	31 (73.80)	36 (61.01)	0 (0.00)	0 (0.00)
Less milling loss	18(42.85)	25 (42.37)	43 (76.79)	82 (78.85)
Yield	0 (0.00)	0 (0.00)	56 (100.00)	83 (79.80)

Farmer's preferences to Indigenous and High Yielding varieties of rice : A comparative assessment of the preferences of both indigenous and high yielding variety rice growers was performed.

It is revealed from Table 5 that tribal farmers prefer Indigenous varieties of rice mainly because of their taste (100.00%), cooking quality (88.09%), local brew making (85.71%), low operational cost (83.33%), low production cost (83.33%), traditional delicacies (80.95%) etc. These findings are in line with the findings of (*Asante et al., 2013*) who investigated in tribal areas of Ghana that most farmers (72.00%) preferred their rice to be fluffy, soft and taste when cooked. But in the case of non-tribal farmers, they prefer Indigenous varieties because of their traditional delicacies (84.74%), taste (83.05%), less farm care (83.05%), less operational cost (79.70%), less production cost (79.70%) etc. These findings are same with the findings of (*Patil et al.,2000*) who conducted a study in Raigad district of Maharashtra and found that the reason of growing local varieties because of its good taste, fine-grained, yield more straw and resistance to pests and diseases.

In case of preferences of HYVs, tribal farmers prefer HYVs mainly because of yield (100.00%), market demand (100.00%), less milling loss (76.79%), cooking quality (76.78%), taste (44.64%) etc. But non-tribal farmers prefer HYVs because of cooking quality (100.00%), taste (100.00%), market demand (75.96%), less milling loss (78.85%), yield (79.80%) etc. These findings are in contrast with the findings of (*Singh et al.,2010*) who conducted a study in Jabalpur district of Madhya Pradesh and found that the reason for not preferring HYVs of rice because of its less market demand and lack of regulated markets.

Based on the percentage distribution of the two groups of respondents (tribal and non-tribal), it can be concluded that though both the groups differ in terms of percentage distribution in preference criteria for both (Indigenous and HYVs) but the preference factors differ in variety and ethnicity wise.

CONCLUSION

The present study was undertaken to study the distribution pattern of Indigenous and High Yielding varieties of rice and to enumerate the farmer's preferences for both the varieties of rice in Baksa district of Assam with a total of 160 numbers of both tribal and non-tribal farmers. The study revealed that non-tribal farmers cultivated HYVs in 68.13 per cent area and tribal farmers cultivated it in 31.87 per cent area and in case of Indigenous varieties, non-tribal farmers cultivated in 44.93 per cent and tribal farmers cultivated in 55.07 per cent area. The major HYV varieties grown by the non-tribal farmers were *Masuri* (91.34%), *Ranjit* (80.76%), *Moniram* (70.19%) and

varieties grown by tribal are *Ranjit* (87.50%), *Bahadur* (82.14%) and *Masuri* (73.21%). The Indigenous varieties grown by the non-tribal farmers are *Nolbonni* (64.40%), *Ballam Joha* (62.71%), *Moinagiri* (59.32%) and varieties grown by tribal are *Phulpakhri* (83.33%), *Tanagaguri* (71.42%) and *Parochokua bonni* (69.04%). Further, it was observed that tribal farmers prefer Indigenous rice varieties because of their taste (100.00%), cooking quality (88.09%), local brew making (85.71%) etc. and prefer HYVs because of yield (100.00%), market demand (100.00%), cooking quality (76.78%) etc. But non-tribal farmers prefer Indigenous varieties because of their traditional delicacies (84.74%), taste (83.05%), less farm care requirement (83.05%) etc. and showed preference to HYVs because of cooking quality (100.00%), taste (100.00%) and cooking quality (75.96%) etc. So, we can conclude that few HYV like *Masuri, Ranjit* have been utilized to a great extent for many years, therefore seed replacement should be advised to keep the production efficiency at a high level and at the same time we cannot ignore the importance of few Indigenous varieties like *Phulpakhri, Moinagiri,* etc. which are still preferred by the farmers. So, breeding programme should be taken up with the blending of both varieties to develop more improved varieties with certain improved practices of rice cultivation. In a study conducted by (*Lalthamawii N.K. P, 2022)* in Mizoram, it was found that the paddy growers were aware of certain improved practices of rice cultivation but they were not making the best use of it. Therefore, the government should focus on awareness and adoption of improved practices for better production of rice to achieve state-level food security.

CONFLICTS OF INTEREST

The authors have no conflicts of interest.

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