Performance of 7 Cultivars of FAG Rice in Moulvibazar and Habiganj Districts

2003-4 Boro Season

Funded by:

Poverty Elimination Through Rice Research Assistance (PETRA)
House #39, Road #23, Block-J, Banani, Dhaka-1213
Phone: 880-2-8817639-40, Fax: 8825341
E-mail: irri@bdonline.com

Prepared by:

Ratan Kumar Bhowmik
Md. Harun-Ar-Rashid

Implemented by:

Agricultural Advisory Society (AAS)
8/7, Block-B, Lalmatia, Dhaka-1207
Phone: 880-2-8113645, Fax: 880-2-8117781
E-mail: aas @bdcom.com

Table of Contents

BACKGROUND

Rice is the dominant crop in respect of both the cropped area output within the food grain sub-sector of Bangladesh. It is the nation's most strategic commodity. It contributes nearly 20% of GDP and occupies 75% of cropped land. Rice production provides nearly 50% of employment and 75% of calories consumed in the country. Furthermore, the rural and urban poor spend up to 60% of their income on it. By far the largest component of our agricultural produce is rice, which is the staple food of over 130 million Bangladeshis.

More than five thousand genotypes of rice have so far been collected and preserved, and more remain to be discovered in Bangladesh. It is suspected that a large number of genotypes were lost forever due to the induction of the modern high yielding varieties since the sixties of the past century to meet the food requirement of the ever-expanding population. However, many good varieties of the indigenous rice have survived under the invasion of the HYVs and have remained in cultivation due to their special characteristics. Three such characteristics that made the rice exceptional are fineness (small and elongated grain), aroma and glutinousness.

The present food production in Bangladesh is about 27million m. tons (2001-2002). The country seems to have attained a sustainable level self-sufficiency in food production. In general, farmers sell their paddy below its production cost. In particular, the price of coarse rice falls tremendously during and after harvesting the crop. On the other hand, the price of fine rice is comparatively stable, being higher yielding greater profit than do the coarse rice varieties. Thus, the Indian fine rice (Miniket, Sorna etc) is very popular in Southwest and Northern border districts of the country. Similarly, BRRI dhan 28 has already gained popularity all over the country. Bangladesh is an abundant source of genetic variations of fine, fine & aromatic and glutinous (FAG) rice. The production of these popular FAG rice varieties are location specific; their production being confined to certain traditional production pockets of Bangladesh (e.g. Dinajpur, Rajshahi, Mymensingh, Sylhet etc).

The agro-ecological conditions of the northeast are very diverse, providing suitable environment for growing rice varieties with wide genetic variations. Traditional varieties still continue to be grown in large areas of the region due to the particular conditions that prevail. The loss in gross production due to lower yields of fine varieties of rice is more than offset by their substantially higher prices. Consumers do not hesitate to pay higher prices for the FAG rice.

The demand of fine, fine & aromatic rice is much higher than production in the Sylhet region. Cultivation of FAG rice has tremendous potential in Sylhet region due to high market demand and to the desire among the resource poor farmers (RPFs) in the area to increase their net incomes from the production of these fine, fine & aromatic and glutinous rice cultivars within the traditional rain fed T. Aman cropping pattern. This tendency is bringing about a "sea-change" in the past slow growth in rice production in Sylhet region. There is considerable scope for export of surplus fine, fine & aromatic and glutinous rice to markets outside of Bangladesh, i.e., Middle East, Europe and North America.

According to Bangladesh Rice Exporters Association (BREA) statistics, Bangladesh exported 700 MT of aromatic rice in 2000, 780 MT in 2001 and 1,100 MT in 2002. In 2002 export verities included Chinigura (702 MT), Kalijira (273 MT), Kataribhog (120 MT) and Basmati (5 MT). Bangladesh's meager export of 1,100 MT of fine variety aromatic rice and in 2002 went to the US, UK, Canada, Australia and Middle Eastern destinations mainly to feed the ethnic consumers. On the other hand, neighbouring Thailand, Pakistan and India continued to command the world aromatic rice market by exporting over ten lakh, five lakh, and four lakh MT respectively in 2002. The issue of Bangladesh's failure in capturing the potential world market of aromatic rice, where 7 million MT is traded annually, government plans to work out a time bound action plans to give a big push to aromatic rice export from Bangladesh.

Some constrains to increase rice export from Bangladesh- local aromatic varieties are short and bold-type grain while global preference is tilted towards long and slender type like Basmati (India and Pakistan) and Jasmine (Thailand), low yield resulting high price, poor milling and grain recovery, and erratic domestic market. However, currently there is a levy of 46 US dollars per MT of rice to European Union. The government needs to gain levy and quota-free access to European markets. Moreover, the important issues are to select desired rice varieties and maintain uniformity and better management at every levels of aromatic rice production.

The sub-project on Fine, Fine & Aromatic and Glutinous rice (FAG) variety has been undertaken in the Northeast region of Bangladesh. It aimed to promote opportunities to build upon the lessons and experience learned from local resource poor farmers with technical inputs from BRRI, AAS and facilitated by HEED Bangladesh.

In 2003-4 Boro season, AAS extended its study area and further tested the performance of 7 cultivars of FAG rice in Moulvibazar and Habiganj districts. The methods of field-testing for 7 cultivars of FAG rice during 2003-4 Boro season and their findings are presented in the following sections of this performance report.

Purpose

The purpose of the seasonal report of "2003-4 Boro" of the sub-project on production and marketing of FAG rice through farmer's participation in Northeast region in Bangladesh has been to compile the findings and lessons learned from the sub-project activities in Moulvibazar and Habiganj districts of Sylhet division and to share the conclusions of these findings and lessons among the network partners, relevant scientists, exporters and other relevant stakeholders in the country.

METHODOLOGY

Location/Research Site

The FAG rice sub-project has been at first implemented in 5 upazilas of Moulvibazar district since 2002 T. Aman season. But in 2003-4 Boro season AAS has extended this program at Chunarughat and Madhabpur upazilas in Habiganj districts. In Moulvibazar out of 5 upazilas, sub-project has been implementing in Sadar and Srimangal upazilas by AAS, and in Kamalganj, this sub-project has been implementing in Kulaura and Rajnagar upazilas by HEED-Bangladesh. In 2003-4 Boro season, the sub-project activities were implemented by AAS at 10 villages in Moulvibazar district and 7 villages in Habiganj district. These villages were selected by the assigned agronomist using the AAS developed village selection strategy and process.

Group formation and farmers selection

Resource poor farmers groups for FAG rice were formed at 53 villages during 2002 T Aman season. Among the 53 groups, 17 groups were selected for 2003-4 Boro season. Each resource poor farmer group (RPFG) was formed with 10 resource poor farmers (RPFs) with a coordinator at each project village. Farmers for trial and demonstration on FAG rice were selected with cooperation of group coordinators of the RPFGs and using pre-determined selection criteria at each project village.

Farmers Training

Farmer's group formation and participatory training was conducted at the beginning of 2003 Boro season. At the beginning of the training, farmer's knowledge of FAG rice cultivars and their production practices were collected. Later improved production practices of FAG rice were matched with farmer knowledge in a participatory process. Through this participatory presentation and discussion, farmer's learning of FAG rice technology was clarified among the participating farmers. The training process and its output documented for sharing among the participating farmers and other stakeholders.

Varietal Trial

Four trained resource poor farmers were selected for varietal trial in 2003-4 Boro season. The farmers were selected from four upazilas of Moulvibazar and Habiganj districts for varietal trial using AAS developed farmers' selection strategy and criteria. Mr. Khashru Miah was selected from Mohammadpur village in Sadar upazila, Moulvibazar, Mr. Nikesh Goup was selected from Uttar Varaura village in Srimajgal upazila. Mr. Gius Uddin was selected from Ushainagar village in Chunarughat and Mr. Karim Miah was selected from Krishnapur village in Madhabpur upazila under Habiganj district (Annex-II).

A total of 7 FAG rice cultivars were selected for varietal trial to assess their performance in northeast region of Bangladesh. Accordingly, seeds of 7 cultivars were collected from different sources (Annex-I). Seeds of 7 FAG rice cultivars were distributed (500 gm of each cultivar) among the seven trial farmers. Seeds of 7 cultivars were sown (500 gm each cultivars) with special care during 23 November 2003 to 15 December 2003 in seedbed for raising quality seedlings. Post showing seedbed management practices were provided by the farmers under the direct supervision of the assigned agronomist of the subproject.

The seedling age ranged at 40-45 days old was transplanted during 5-24 January by the trained four farmers in the project areas.

2-3 seedlings per hill for each cultivar were transplanted in the prepared trial plots at 4 villages in four upazilas.of two districts. The rest of 92 demonstration plots in 17 villages were transplanted with 3-4 seedlings per hill. The spacing between rows was 20 cm and 15 cm between the hills both for trial and demonstration plots.

The trial plots were fertilized with urea, TSP, MP and Gypsum at the rate of 65 kg, 75 kg, 90 kg and 50 kg per hectare. Farmers provided the post transplanting management such as weed control, irrigation and top-dressing with urea as per guidelines.

Yield component data and plant height (cm) were collected from 16 hills at 4 spots (4 hills/spot for each variety of varietal trial plots separately. Three representatives (average) hills were harvested for 7 cultivars for the yield component from each farmer varietal trial plot separately. Later, panicles were detached from three representative hills for each cultivar separately. After drying the detached panicles both filled and unfilled grains were threshed and counted manually at the zonal office AAS, Srimangal. Thereafter, 1000-grain weight was taken and adjusted at 14% moisture content for 7 FAG rice cultivars from each farmer trial plot.

The crop was harvested by keeping two hills at the border of the four sides to avoid the border effect for appraising the 7 cultivars. After harvesting the crop, threshing, drying and cleaning were done for each cultivar from each farmer, trial plot separately. The grain-yield, yield contributing characters, growth duration and plant height at 7 FAG rice cultivars for each farmers trial plots are provided accordingly in Table 1 to 8.

Assigned Agronomist of the subproject collected primary data of cost and return of 7 cultivars of FAG rice from trial plots and demonstration plots at different project villages. Later, the collected data on cost and return of 7 cultivars calculated and presented in Table 10.

Farmers Field Demonstration

Seeds of 6 FAG rice cultivars were distributed (1.5 kg of each cultivars) among the 92 farmers at Habiganj and Moulvibazar districts. The seeds of 7 FAG rice cultivars sown in seedbed during 20 November to 20 December 2003 by the 92 farmers in project areas.

The seedling age ranged at 40-50 days old was transplanted during 30 December 2003 to 30 January 2004 by the trained 92 farmers in the project areas.

The respective demo farmers provided post transplanting cultural management practices as per guidelines developed during the farmers training sessions. The grain yield data collected and adjusted at 14% moisture content for each demo farmers and variety-wise average grain yield is provided in Table 1.

Field day

A total of 341 resource poor farmers (RPFs) participated at 5 field days at trial and demonstration villages in Moulvibazar and Habiganj districts during ripening stage of 2003-4 Boro season. At each field day, after field visit farmers participated in open discussion about the varietal assessment based on their knowledge and learning during field visit. During field day, project staffs acted as facilitators. Moreover, field days were informal, highly participatory and very cost effective ways to disseminate the accumulated knowledge and lessons. Farmer's assessment on the 7 FAG rice cultivars is summarized and presented in Table 11.

Findings

The performance of 7 FAG rice cultivars was evaluated through varietal, cost and return analysis and farmers participatory assessment at field day during 2003-4 Boro season at 17 villages in Moulvibazar and Habiganj districts. The findings of FAG rice study during 2003-4 Boro season is given below:

Varietal Trial Information

Among the 7 FAG rice cultivars the average grain yield from trial plots was highest with 3.56 t/ha in Lakhai and followed in order by 3.38 t/ha in Parbatjira, 3.14 t/ha in Posushail, 3.12 t/ha in Rata Boro, 3.10 t/ha in Begun Bechi, 2.95 t/ha in Samudra Fena and 2.79 t/ha in Boro Beruin. Among the all-trial plots Lakhai (Karim Miah) gives the highest grain yield 3.91 t/ha (Table 1 & 2).

The average tillers per hill was highest with Posu Shail (18.27) and followed in order by Boro Beruin (18.01) and Parbatjira (17.13) and the remaining 4 cultivars ranged from 15.65 to 16.69 tillers per hill. Among the all-trial plots Parbatjira (Khoshru Miah) gives the highest tiller 21.62 (Table 1 & 3).

The average panicles per hill were highest with Parbatjira (11.45) followed in order by Posu Shail (11.38), Rata Boro (11.11), Begun Bechi (10.76), Samudra Fena (10.56), Boro Beruin (9.87) and Lakhai (9.59). Among the all-trial plots Samudra Fena (Gius Uddin) gives the highest panicle 12.76 (Table 1 & 7).

The average number of filled grains per panicle was highest with 127 in Parbatjiara followed by 108 in Begun Bechi and the remaining 5 cultivars ranged from 46 to 76 filled grain per panicle. The average number of unfilled grains per panicle was lowest with 13 in Boro Beruin and highest with 37 in Parbatjira (Table 1).

The average 1000-grain weight was lowest with Parbatjira (8.86 gm) followed by Begun Bechi (11.99 gm). However, 1000-grain weight fluctuates between 8.26-24.16 gm of the seven tested cultivars (Table 1).

The average growth duration was lowest with Posu Shail, Samudra Fena, Boro Boroin (137 days) and highest with Parbatjira (151 days). The average growth duration of Lakhai and Rata Boro were 140 and 142 days respectively (Table 1).

The average plant height was highest with Begum Bechi (144.30 cm) followed by Parbatjira (140.25 cm). The average plant height of the remaining five cultivars ranged from 125.36 to 136.69 cm (Table 1).

Cost and Return of FAG Rice

Cost and return of the main product and by-product of 7 cultivars of FAG rice is provided in Table 10.

The net-return on cash cost basis of the most tested cultivars of FAG rice was found economically encouraging. The net-return on full cost basis of the most tested cultivars of FAG rice was found economically discouraging.

Similar trend of findings were observed for benefit-cost-ratio and net return in terms of gross value of the product (%) with the cash cost basis and full cost basis of 7 tested cultivars of FAG rice.

Thus, most of the tested cultivars of FAG rice were found economically viable with farmers on cash cost basis with better farm-gate price for FAG rice.

However, the per hectare net-return on cash-cost basis was highest with Parbatjira (Tk.32,852), followed in order by Begun Bechi (Tk.27,337), Samudra Fena (Tk.24,308), Rata Boro (Tk.22,097), Boro Beruin (Tk.20,914), Lakhai (Tk.19,580) and Posu Shail (Tk.17,395) during 2003-4 Boro season. Similarly, the benefit-cost ratio on cash cost basis was highest with Parbarjira (6.14), followed in order by Begun Bechi (5.31), Samudra Fena (4.72), Rata Boro (4.46), Boro Beruin (4.19), Lakhai (3.95) and Posu Shail (3.67) during 2003-4 Boro seasons (Table 10).

Varietal assessment during field days

At the end of each field day at trial sites participating farmers ranked the FAG rice cultivars and provided their specific comments about seven cultivars.

Among the seven fine and aromatic rice cultivars, farmers ranked Parbatjira as the best followed in order by Begun Bechi, Rata Boro, Samudra Fena, Lakhai, Pasu Shail and Boro Beruin (Table 11).

Conclusion

Actually there was no enough FAG rice cultivar at Boro season as like as T. Aman season in our country. Among the tested 7 FAG rice cultivars the performance of Parbatjira was found to be the best followed in order by Begum Bechi and Rata Boro during 2003-4 Boro season in the project area. In 2002-3 season the performance of Parbatjira was also the best. Thus the subproject (AAS component) identified Parbatjira as having a tremendous potential for producing such rich during Boro season in Sylhet region. Porbatjira is fine grain rice and its grain size is the lowest among the tested FAG rice cultivars. Although Parbatjira and Begun Bechi were rejected by the farmers during 2003 T. Aman season but during Boro 2003-4 season they are highly accepted by the farmers as like as 2002-3 Boro season. The yield capability of Parbatjira was medium but its overall acceptability was found to be very high among the farmers in Moulvibazar and Habiganj districts. This high level of acceptability was consistently assessed and documented during farmer's participatory field days/ visits at trial and demo sites during 2003-4 Boro season. Moreover, profitability of Parbatjira is also very high when compared with the other six FAG cultivars tested. The implication of this is that the resource poor farmers (RPFs) fare better with FAG rice than with non-FAG rice alternatives. They and their families are benefiting in important economic ways from the introduction of high value FAG rice cultivation in the project areas.

Average panicle production per hill with tested FAG rice cultivars was medium with satisfactory grains per panicle and the proportion of filled grain production. Thousand-grain weight is the lowest with Parbatjira followed in order by Begun Bechi and Rata Boro.

Recommendation

The sub-project will take initiative to disseminate Parbatjira, Begun Bechi and Rata Boro FAG cultivars in Moulvibazar district (Sadar and Srimangal upazilas) through cost effective approach using AAS developed RPFGs of FARMSEED network.

The variety selection process will continue through farmers field trial and demonstration followed by varietal assessment using farmers participatory field days and rice quality test.

The sub-project needs to develop a clean seed supply system of traditional FAG rice cultivars in the project areas. This will be done with the help of BRRI. The FARMSEED strategy and network should also be used for this purpose.

FAG rice is high value as compared with coarse rice and should be introduced among properly trained and motivated resource poor farmers (RPFs) both within and outside the project areas.

FAG rice production system should be developed for acceptable cultivars using AAS established RPFGs, its FARMSEED and FAG rice sub-projects in the project areas. A farmer driven FAG rice seed procurement linkage should be developed with private sector outlets and HEED Bangladesh.

Modern, privately owned milling systems suitable for FAG rice processing should be introduced in the project areas. Both IRRI and BRRI can play a key role in developing improved milling systems for FAG rice processing and packaging in the project areas.

The sub-project should take initiative for linkage development among FAG rice producers, millers (using improved FAG rice processing systems) and wholesale/ retail market outlets (both domestic and international).

Table 1: The average results of 7 FAG rice cultivars tested in 2003-4 Boro season.

Sl No.	Variety	Tiller per hill (Nr)	Panicle per hill (Nr)	Filled grain per panicle (Nr)	Unfilled grain per panicle (Nr)	1000 grain weight (gm) at 14% moisture	Growth duration (days)	Plant height (cm)	Yield (t/ha) at 14% Mois-ture
1	Lakhai	15.65	9.59	69	18	21.68	140	128.11	3.56
2	Parpatjira	17.13	11.45	127	37	8.86	151	140.25	3.38
3	Posu Shail	18.27	11.38	62	28	21.40	137	125.36	3.14
4	Rata Boro	16.69	11.11	68	22	14.42	142	136.69	3.12
5	Begun Bechi	16.32	10.76	108	29	11.99	149	144.30	3.10
6	Samudra Fena	16.11	10.56	76	26	17.95	137	133.15	2.95
7	Boro Beruin	16.17	9.87	46	13	24.16	137	133.13	2.79

Table 2: Performance of Lakhai variety at trial plots in 2003-4 Boro season.

Sl No.	Variety	Tiller per hill (Nr)	Panicle per hill (Nr)	Filled grain per panicle (Nr)	Unfilled grain per panicle (Nr)	1000 grain weight (gm) at 14% moisture	Growth duration (days)	Plant height (cm)	Yield (t/ha) at 14% Moisture
1	Khoshru Miah	15.65	8.21	64	18	21.35	141	125.87	3.03
2	Nikesh Goup	15.37	8.00	69	20	21.67	135	128.39	3.80
3	Gius Uddin	14.91	9.87	70	19	21.50	145	130.19	3.53
4	Karim Miah	16.68	12.31	74	16	22.20	138	128.00	3.91
	Average	**15.65**	**9.59**	**69**	**18**	**21.68**	**140**	**128.11**	**3.56**

Table 3: Performance of Parbatjira variety at trial plots in 2003-4 Boro season.

Sl No.	Variety	Tiller per hill (Nr)	Panicle per hill (Nr)	Filled grain per panicle (Nr)	Unfilled grain per panicle (Nr)	1000 grain weight (gm) at 14% moisture	Growth duration (days)	Plant height (cm)	Yield (t/ha) at 14% Moisture
1	Khoshru Miah	21.62	11.25	123	31	9.05	155	138	3.48
2	Nikesh Goup	14.31	11.00	136	41	8.45	150	143	3.56
3	Gius Uddin	14.06	12.47	140	33	8.95	156	145	3.71
4	Karim Miah	18.56	11.08	109	42	9.00	142	135	2.78
	Average	**17.13**	**11.45**	**127**	**37**	**8.86**	**151**	**140.3**	**3.38**

Table 4: Performance of Posu Shail variety at trial plots in 2003-4 Boro season.

Sl No.	Variety	Tiller per hill (Nr)	Panicle per hill (Nr)	Filled grain per panicle (Nr)	Unfilled grain per panicle (Nr)	1000 grain weight (gm) at 14% moisture	Growth dura-tion (days)	Plant height (cm)	Yield (t/ha) at 14% Moisture
1	Khoshru Miah	21.18	10.12	53	26	20.60	148	129.18	2.76
2	Nikesh Goup	16.31	11.32	64	32	21.45	130	126.43	3.13
3	Gius Uddin	17.43	12.00	59	22	21.10	137	116.84	3.00
4	Karim Miah	18.18	12.10	72	30	22.45	133	129.00	3.67
	Average	**18.27**	**11.38**	**62**	**28**	**21.40**	**137**	**125.36**	**3.14**

Table 5: Performance of Rata Boro variety at trial plots in 2003-4 Boro season.

Sl No.	Variety	Tiller per hill (Nr)	Panicle per hill (Nr)	Filled grain per panicle (Nr)	Unfilled grain per panicle (Nr)	1000 grain weight (gm) at 14% moisture	Growth duration (days)	Plant height (cm)	Yield (t/ha) at 14% Moisture
1	Khoshru Miah	18.43	10.87	65	16	14.10	148	132.25	3.17
2	Nikesh Goup	14.47	9.46	61	24	13.66	142	139.31	2.89
3	Gius Uddin	17.29	12.56	76	21	15.27	140	135.12	3.24
4	Karim Miah	16.57	11.56	71	26	14.67	137	140.10	3.20
	Average	**16.69**	**11.11**	**68**	**22**	**14.42**	**142**	**136.69**	**3.12**

Table 6: Performance of Begun Bechi variety at trial plots in 2003-4 Boro season.

Sl No.	Variety	Tiller per hill (Nr)	Panicle per hill (Nr)	Filled grain per panicle (Nr)	Unfilled grain per panicle (Nr)	1000 grain weight (gm) at 14% moisture	Growth duration (days)	Plant height (cm)	Yield (t/ha) at 14% Moisture
1	Khoshru Miah	19.87	11.05	112	32	12.35	155	148.20	3.18
2	Nikesh Goup	15.81	8.62	96	29	11.35	145	142.52	3.95
3	Gius Uddin	14.06	12.25	119	28	12.10	143	145.69	3.30
4	Karim Miah	15.56	11.12	107	26	12.17	152	140.79	3.00
	Average	16.32	10.76	108	29	11.99	149	144.30	3.10

Table 7: Performance of Samudra Fena variety at trial plots in 2003-4 Boro season.

Sl No.	Variety	Tiller per hill (Nr)	Panicle per hill (Nr)	Filled grain per panicle (Nr)	Unfilled grain per panicle (Nr)	1000 grain weight (gm) at 14% moisture	Growth duration (days)	Plant height (cm)	Yield (t/ha) at 14% Moisture
1	Khoshru Miah	18.21	10.51	83	28	17.89	142	135.57	3.26
2	Nikesh Goup	13.64	8.75	75	20	18.00	134	128.94	3.21
3	Gius Uddin	16.31	12.76	76	22	17.97	137	135.21	3.17
4	Karim Miah	16.29	10.25	69	34	17.95	135	132.91	2.16
	Average	**16.11**	**10.56**	**76**	**26**	**17.95**	**137**	**133.15**	**2.95**

Table 8: Performance of Rata Boro Beruin variety at trial plots in 2003-4 Boro season

Sl No.	Variety	Tiller per hill (Nr)	Panicle per hill (Nr)	Filled grain per panicle (Nr)	Unfilled grain per panicle (Nr)	1000 grain weight (gm) at 14% moisture	Growth duration (days)	Plant height (cm)	Yield (t/ha) at 14% Moisture
1	Khoshru Miah	17.21	10.00	52	13	24.10	138	137.31	2.95
2	Nikesh Goup	14.68	8.06	45	10	24.00	135	132.10	2.78
3	Gius Uddin	16.62	11.56	42	13	24.40	140	130.00	2.64
	Average	**16.17**	**9.87**	**46**	**13**	**24.16**	**137**	**133.13**	**2.79**

Table 9 : Average yield of 7 cultivars of FAG rice demonstration at farmer's field.

Sl. No.	Variety	Plot (Nr)	Average Yield (t/ha)
1	Lakhai	5	3.35
2	Parbatijira	7	3.26
3	Posu Shail	6	3.28
4	Rata Boro	5	3.32
5	Begun Bechi	6	3.15

6	Samudra Fena	3	2.86
7	Boro Beruin	3	2.91

Table 10 : Cost and return of 7 FAG rice cultivars for 2003-4 Boro season

Item		Pasu Shail	Lakhai	Rata Boro	Boro Beruin	Samudra Fena	Begun Bechi	Parbatjira
Paddy Yield (kg/ha)		3140	3560	3125	2650	2950	3100	3380
Price of paddy (Tk./kg)		7.25	7	8.75	10	10	10.50	11.25
Straw Yield (kg)		2512	2848	2500	2120	2360	2480	2704
Price of straw (Tk/kg)		0.45	0.45	0.45	0.45	0.45	0.45	0.45
Gross return (T//ha)		23,895	26,201	28,469	27,454	30,828	33,666	39,242
Total cost (Tk/ha)								
i)	Full cost basis [a]	20,132	21,310	23,570	23,140	21,225	21,690	22,520
ii)	Cash cost basis [b]	6510	6621	6372	6540	6520	6329	6390
Net return (Tk./ha)								
i)	Full cost basis	3763	4891	4899	4314	9603	11,976	16,130
ii)	Cash cost basis	1785	19,580	22,097	20,914	24,308	27,337	32,852
Benefit cost ratio								
i)	Full cost basis	1.18	1.22	1.20	1.18	1.45	1.55	1.74
ii)	Cash cost basis	3.67	3.95	4.46	4.19	4.72	5.31	6.14
Net return in terms of gross value of the product (%)								
i)	Full cost basis	15.74	18.66	17.20	15.71	31.15	35.57	41.10
ii)	Cash cost basis	72.76	74.72	77.61	76.17	78.85	81.20	83.71

[a] Full cost includes human labours, bullock power, seed, fertilizers, insecticides, interest on working capital and land rent.

[b] Cash cost includes seeds, fertilizers, insecticides, irrigation and interest of the out flow cash.

* Grain and straw is considered at 1: 0.8 for this cost analysis.

Table 11 : Assessment of 7 FAG rice cultivars during farmer's field days.

Sl No.	Variety	Ranking	Farmers Comments
1	Parbatjira	1	Plant is stout and lodging does not occur. Number of tiller is more and long duration variety. Rice is small, fine and tasty to eat. Market price is high. It is suitable for Moulvibazar district.
2	Begun Bechi	2	Plant is deep green, hard, long and lodging does not occur. Long duration variety. Rice is small and round shaped. Its market price is high.
3	Rata Boro	3	Plant is green and long. Leaf is wide. Its number of tiller is more. Plant is not Stout and lodging occurs easily. It has drought tolerant capacity. It has slightly good aroma. Rice is small and fine. Farmer's comments that it is good for diarrhoeal patient.
4	Samudra Fena	4	Plant is hard. Number of tiller is more. It looks like Begun Bechi but bigger in size. There are black spot in front of and at the end of the rice. It has good aroma. Price of rice is high.
5	Lakhai	5	Short duration variety. Rice (unhusked) colour is red. Rice size is medium, coarse and has slight aroma. Yield is good.
6	Posu Shail	6	Plant is short. Leaf colour is deep green. Short duration crop. Plant is stout and lodging does not occur. Rice size is medium and coarse. Rice is aromatic and tasty to eat.
7	Boro Beruin	7	Plant is medium in height. Leaf colour is blackish-green. Rice is long and medium coarse. Rice (husked) colour is reddish-white. It has slight glutinous character. It is very tasty to eat and price of rice is high.

Annex I : FAG rice varieties and their seed sources

Sl No.	Variety	Quality of Rice	Source
1	Parbatjira	Fine, small	Srimangal, Moulvibazar
2	Begun Bechi	Fine, small	Madhabpur, Habiganj
3	Samudra Fena	Coarse, aromatic	Srimangal, Moulvibazar
4	Rata Boro	Small, aromatic	Pakundia, Kishoreganj
5	Posu Shail	Coarse, aromatic	Srimangal, Moulvibazar
6	Lakhai	Coarse, slightly aromatic	Srimangal, Moulvibazar
7	Boro Beruin	Long, Glutinous	Sadar, Moulvibazar

Annex-II : List of trial farmers at Moulvibazar and Habiganj districts during 2003-4 Boro season

Sl No.	Farmer's Name	Father's Name	Varieties Name	Village	Union	Upazila
1	Khoshru Miah	Safar Miah	Parbatjira, Begun Bechi, Samudra Fena, Rata Boro, Posu Shail, Lakhai, Boro Beruin	Mohammadpur	Giusnagar	Sadar, Moulvibazar
2	Nikesh Gopup	Gopesh Goup	Parbatjira, Begun Bechi, Samudra Fena, Rata Boro, Posushail, Lakhai, Boro Beruin	Uttar Varaura	3, Srimongal	Srimangal
3	Gius Uddin	Mukter Miah	Parbatjira, Begun Bechi, Samudra Fena, Rata Boro, Posushail, Lakhai, Boro Beruin	Ushainagor	8, Satiguri	Chunarughat
4	Karim Miah	Sardar Miah	Parbatjira, Begun Bechi, Samudra Fena, Rata Boro, Posu Shail, Lakhai	Krishnagar	Madhobpur	Madhobpur

Annex III: List of demo farmers in different upazilas of Moulvibazar and Habiganj districts during 2003 T. Aman season.

Sl No.	Farmer's Name	Village	Union	Upazila	District
1	Kabir Miah	Kadupur	Giusnagor	Moulvibazar Sadar	Moulvibazar
2	Karim Miah	"	"	"	"
3	Siddique Miah	"	"	"	"
4	Siter Miah	"	"	"	"
5	Safique Miah	"	"	"	"
6	Ahad Miah	"	"	"	"
7	Ranu Debnath	"	"	"	"
8	Monor Miah	Akbarpur	"	"	"
9	Rashid Miah	"	"	"	"
10	Islam Miah	"	"	"	"
11	Kamal Miah	"	"	"	"
12	Sayadur Rahman	"	"	"	"
13	Khaledur Rahman	"	"	"	"
14	Tarag Miah	Ranguria	"	"	"
15	Sohab Miah	"	"	"	"
16	Moynu Miah	"	"	"	"
17	Siter Miah	"	"	"	"
18	Jahid Miah	"	"	"	"
19	Shahidul Haque	West Varaura	3, Srimangal	Srimangal	"
20	Khaga Miah	"	"	"	"
21	Proval Chandra Shil	"	"	"	"
22	Mannan Miah	"	"	"	"
23	Jamal Uddin	"	"	"	"
24	Abdur Rahim	"	"	"	"
25	Munaim Miah	"	"	"	"
26	Dipok Boidda	"	"	"	"
27	Subinoy Deb	Uttar Varaura	"	"	"
28	Abani Deb	"	"	"	"
29	Kabir Miah	Uttar Varaura	3, Srimangal	Srimangal	Moulvibazar
30	Gulbahar Begum	"	"	"	"
31	Jotti Boidda	"	"	"	"

Sl No.	Farmer's Name	Village	Union	Upazila	District
32	Mamun Miah	"	"	"	"
33	Ahmmad Miah	"	"	"	"
34	Anojit Deb	East Varaura	"	"	"
35	Ajoy Deb	"	"	"	"
36	Mono Deb	"	"	"	"
37	badrul Islam	"	"	"	"
38	Ashik Miah	"	"	"	"
39	Sufin Miah	Lalbug	"	"	"
40	Kharul Miah	"	"	"	"
41	Kaium Miah	"	"	"	"
42	Anwara Begum	"	"	"	"
43	Ahad Miah	"	"	"	"
44	Sakhawat Miah	Bongaon	Asidron	"	"
45	Nurul Islam	"	"	"	"
46	Kabir Miah	Vunobir	Vunobir	"	"
47	Shahin Miah	"	"	"	"
48	Lachu Miah	"	"	"	"
49	Wahid Miah	"	"	"	"
50	Subahan Miah	"	"	"	"
51	Mashuk Miah	Patriqual	Vunobir	Srimangal	Moulvibazar
52	Nashir Miah	"	"	"	"
53	Harish Miah	"	"	"	"
54	Basit Miah	"	"	"	"
55	Mohosin Miah	"	"	"	"
56	AulrN Miah	Pirergaon	9, Ranigaon	Chunarughat	Habiganj
57	Nannu Miah	"	"	"	"
58	Ayub Ali	"	"	"	"
59	Kabir Miah	"	"	"	"
60	Lal Miah	Pirergaon	9, Ranigaon	Chunarughat	Habiganj
61	Motin Miah	"	"	"	"
62	Nur Miah	Ponargaon	8, Satiajuri	"	"
63	Abdur Rouf	"	"	"	"
64	Abdul Haque	"	"	"	"
65	Kadom Ali	"	"	"	"

Sl No.	Farmer's Name	Village	Union	Upazila	District
66	Babul Miah	"	"	"	"
67	Sahid Miah	"	"	"	"
68	Abdur Rahman	Ushainagar	"	"	"
69	Sahad Miah	"	"	"	"
70	Alauddin	"	"	"	"
71	Sohel Miah	"	"	"	"
72	Noyan Miah	"	"	"	"
73	Ahammad Ali	Shakpara	"	"	"
74	Gafur Miah	"	"	"	"
75	Tahir Miah	"	"	"	"
76	Minara Begum	Mirnagar	Andiura	Madhabpur	"
77	Jahura Begum	"	"	"	"
78	Mazeda Begum	Mirnagar	Andiura	Madhabpur	Habiganj
79	Abeda Begum	"	"	"	"
80	Jahanara Begum	"	"	"	"
81	Farida Begum	"	"	"	"
82	Peara Begum	Adaoir	Adaoir	"	"
83	Hamida Begum	"	"	"	"
84	Rahima Begum	"	"	"	"
85	Parvin Begum	"	"	"	"
86	Mafua Begum	"	"	"	"
87	Rafiqul Islam	Krishnanagar	Madhabpur	"	"
88	Mono Miah	"	"	"	"
89	Mahafuz Miah	"	"	"	"
90	Nasiruddin	"	"	"	"
91	Hannan Miah	"	"	"	"
92	Karim Miah	"	"	"	"