

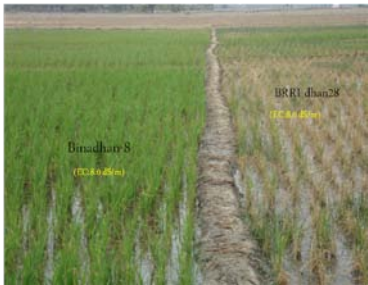

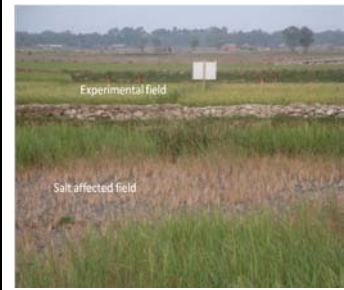


## Biotechnology Division

Programme Area	Research Collaboration with other division	
Biotechnology	Plant Breeding Division Crop Physiology and Quality Division Soil Science Division Plant Pathology Division Agricultural Engineering Division Entomology Division Agronomy Division	
<p><b>Salt tolerant rice varieties for boro ( dry) season :</b></p> <p><b>Binadhan-8:</b></p> <p>Binadhan-8 is a salt tolerant high yielding boro (dry) rice variety which is released in 2010 by National Seed Board( NSB). This variety can tolerate 12-14 dS/m at seedling stages and 8/10 dS/m till maturity. No shattering of matured grains. It is semi dwarf, early maturing and medium bold grain rice variety. Binadhan-8 requires 130-135 days to mature. Flag leaf is erect and remain grain till maturity. Under salt stress, grain yield is 5.5 t/ha and in non saline area, potential yield is 8.0 t/ha. This variety is most suitable in saline areas of Bangladesh and also other non saline areas. In past few years this variety is being widely cultivated in southern coastal regions of Bangladesh.</p>		
		

**Binadhan-10:**

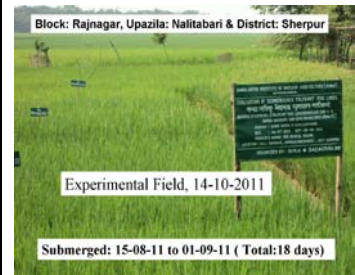
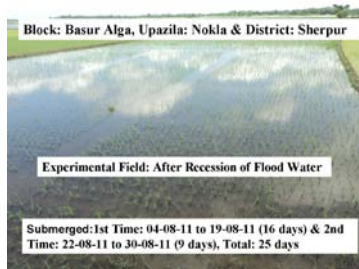
Binadhan-10 is a salt tolerant variety for boro season which can tolerate up to 12 dS/m of salinity. This variety is released in 2010 by National Seed Board( NSB). This variety is capable to produce 5-6 t/ha under salt stress. Binadhan-10 is early maturing (125-130 days). Flag leaf is erect and remain grain till maturity. Trunks and stems are strong, sturdy and remain erect (no lodging) even in stormy weather and no shattering. Disease incidence and pest attacks are very low. In non saline condition, potential yield is 8.5 t/ha. Grain is medium bold and bright colour. This variety is an outstanding and most popular salt tolerant rice variety which is being widely cultivated in southern coastal regions of Bangladesh.



**Submergence tolerant rice varieties:**

**Binadhan-11:**

Binadhan-11 is a submergence tolerant rice variety which is released in 2013. This variety can survive 25 days of complete submergence condition . It is an early maturing rice variety for aman season (duration 110-115 days) . This variety possesses green and erect flag leaves and leaves remain green till maturity. Medium long-slender grain and 1000-grain weight is 28.1 g. In submerged condition, average yield is 4.5 t/ha and 5.0-5.5 t/ha in non submerged condition.



**Binadhan-12:**

Binadhan-12 is a submergence tolerant rice variety for aman season, released in 2013. Under 25 days of complete submergence this variety can survive. In submerged condition, yield is 3.5 t/ha and 4.0-4.5 t/ha in non submerged condition. Leaves remain green till maturity. Medium short grain and 1000 grain weight is 16.0 g. This is a minikit type rice variety.





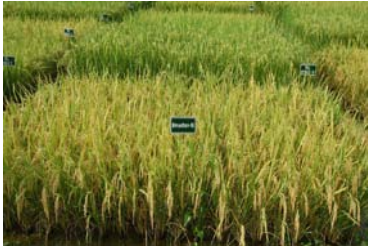
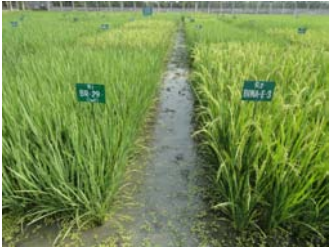
**Premium quality rice variety:**

**Binadhan-15:**

Premium quality and photo-insensitive aman rice variety which is released in 2014 by National Seed Board (NSB). Crop duration is 115-120days. Medium and slender grain, 1000 seed weight 21.0 g. Average yield is 5.4 t/ha. Growing area is all over the country





<p><b>Short duration rice variety:</b></p> <p><b>Binadhan-16:</b></p> <p>Short duration and photo-insensitive aman rice variety which is released in 2014 by National Seed Board (NSB). Duration of this variety is 100-108 days, 8-10 days earlier than Binadhan-7, 1000 seed weight 27.4 g. Medium slender grain. Average yield is 5.6 t/ha. Growing area is medium to high land in all over the country. Different types of rabi crops, mustard and potatoes can be cultivated after harvest of this short duration variety.</p>		
		

## MUTANTS IN PIPELINE

### Proposed Binadhan-17GSR

- Suitable for Aman season
- Duration: 112-118 days
- Require less input
- Disease and insect tolerant
- Yield: 7.0 t/ha (average) in aman season

### Mutants of NERICA-4 and NERICA-10

Four drought tolerant NERICA mutants ( $N_4/350/P-4(5)$ ,  $N_4/250/P-1(2)$ ,  $N_4/250/P2(6)-26$ ,  $N_{10}/350/P-5-4$ ) has been selected from NERICA of Africa which is under experiment at Barind area in farmers level.

### Dual salt-submergence tolerant rice lines:

Dual salt-submergence tolerant rice lines (B-10 and B-11) were selected which is under experiment at salt and submergence prone areas of farmer's field.

## Production Technology

### **Land for cultivation:**

Loam and clay loam soil suitable for rice cultivation.

### **Regional adaptation:**

#### **For salt tolerant variety:-**

Suitable for cultivation both saline and non-saline area. But yield is higher in non-saline area.

#### **For submergence tolerant variety:-**

Suitable for cultivation in flash flood free and flash flood prone areas in aman season. Flash flood prone areas where flood water stay for 20-25 days sustain of land suitable for cultivation of this variety. It gives more yield in flood free areas.

### **Seed selection and treatment:**

To obtain good yield use healthy and diseases free seed. For seed treatment use 25 g vitavax-200 for 10 kg seeds.

### **Seed rate:**

For rice cultivation 25-30 kg/ha or 10-12 kg/acre seed is needed.

### **Seedbed preparation:**

**Boro season:** Optimum time for seedbed is from November 1<sup>st</sup> week to 2<sup>nd</sup> week.  
(Mid kartik)

**Aman season:** Optimum time for seedbed is from June 2<sup>nd</sup> week to July 2<sup>nd</sup> week.  
(1-30 Agrahayan)

### Seedling age:

Variety	Season	Seedling age	Remarks
Binadhan-8	Boro	35-40	For better yield 35-40 days aged seedling should be transplanted in 2/3 seedling per hill from the month of December 2 <sup>nd</sup> week to 3 <sup>rd</sup> week (End of Agrahayan to 1 <sup>st</sup> week of poush).
Binadhan-10	Boro	30-35	Optimum time for transplanting 25-30 days aged seedlings. For better yield transplanted in 2/3 seedling per hill. Short duration so urea should be apply in optimum dose in right time.
Binadhan-11	Aman	20-25	Transplant 20-25 days aged seedling to cultivable next season crops
Binadhan-12	Aman	20-25	Transplant 20-25 days aged seedling. Transplanting the aged seedlings will reduce the yield.
Binadhan-15	Aman	20-25	Sowing seeds in between from last week of June to 1 <sup>st</sup> week of July will facilitate to cultivate the robi crops.
Binadhan-16	Aman	20-22	Short duration variety. Transplant 20-22 days aged seedlings. Due to earliness next crops like wheat, potato, mustard and other robi crops will be cultivated in time.

### Fertilizer application:

Apply full dose of TSP, MOP, Gypsum and zinc during final land preparation. No need application of urea during final land preparation. Apply the recommended dose of urea into three split (7, 30 and 55 days) after transplanting. Application of

type of urea varied upon the lifespan of variety. For short duration rice variety like Binadhan-11, Biandhan-12, Binadhan-15 and Biandhan-16 apply urea into two split (20 and 40 days). Follow leaf color chart during application of urea dose. Maintain 2-3 inch water and keep weed free during urea application.

**Fertilizers dose:**

Variety	Land area	Apply different fertilizer dose (kg)				
		Urea	TSP	MOP	Gypsum	Zinc
Binadhan-8	Per hectare	217	110	70	45	4.5
	per acre	87	45	28	18	1.8
Binadhan-10	Per hectare	217	110	70	45	4.5
	per acre	87	45	28	18	1.8
Binadhan-11	Per hectare	150-180	110-120	50-70	-	-
	per acre	60-72	44-48	20-28	-	-
Binadhan-12	Per hectare	150-180	110-120	50-70	-	-
	per acre	60-72	44-48	20-28	-	-
Binadhan-15	Per hectare	148-178	111-124	49-74	49-59	2.0-4.9
	per acre	60-72	45-55	20-30	20-24	0.8-2.0
Binadhan-16	Per hectare	148-178	111-124	49-74	49-59	2.0-4.9
	per acre	60-72	45-55	20-30	20-24	0.8-2.0

N.B: Fertilizer dose varied locationwise. Apply fertilizer according to local recommendation.

**Fertilizer application technique (for flood prone area):**

If land is submerged with flood water application of fertilizer dose will be different. In this case apply recommended dose of fertilizer during the final land preparation:

Rice variety	Amount of land	Apply different fertilizer dose (kg)			
		TSP	MOP	Gypsum	Zinc
Binadhan-11	per acre	55-60	10-15	8-12	3.5-4.5
Binadhan-12	per bigha	22-24	3-5	3-4	1.2-1.5

If the flood occurs early growth stage of rice, recession of flood water after 10 days application of urea 45 kg/ha (18 kg/acre and MOP 23 kg/ha (9 kg/ha). After 20-25 days of 1<sup>st</sup> split of urea application 45 kg/acre should be applied in 2<sup>nd</sup> split. Application of urea varied according to soil fertility status in different locations.

#### **Water management in submerged land:**

1. Take necessary steps to keep the land well-drained.
2. Drainage the salt water make canal.

#### **Fertilizer management:**

1. Full doses of TSP, MOP and ½ dose of nitrogen fertilizer should be applied during final land preparation.
2. In boro/dry season rice crops need more nitrogen.
3. According to application of organic fertilizer, in aman season 30-60 kg/ha. and in boro season 60-90 kg/ha. nitrogen fertilizer can be applied.
4. 30 kg zinc sulphate/ha. should be applied during final land preparation.

#### **Take steps after recession of flood water:**

1. After recession of flood water silt and sand deposit over the leaf surface which cause the stomata closed and leaf burn. Clean water should be sprayed over the leaf surface after recession of flood water which will carry good result for the survive plant.



2. After 7-10 days recession of flood water remove aquatic weeds, other weeds and rice rotted leaves from the fields.
3. Suitable for cultivation in flash flood free and flash flood prone area in aman season. Flash flood prone areas where flood water stay for 20-25 days sustain of land suitable for cultivation of this variety. It gives more yield in flood free area.
4. Normally in flooded field where water remain 10-14 cm is suitable for this varieties. But these varieties should not be cultivated in the field where water remains 35-40 cm.

### **Management of saline soil:**

Flashing the saline soil with non-saline water will reduce salinity during final land preparation. If the soil salinity 10dS/m during tillering, heading and ripening then flash the land with non- saline water. In saline soil two points should be remember-

1. To use quality seeds of salt tolerant variety
2. Seeds should be sown in non-saline condition.

### **Disease and insect pest management:**

These varieties are less attack by disease and insect pest. If necessary, pesticides should be applied. This variety is moderately resistant to stem borer. Tilt 250 EC 1ml or Bavistin 1g mixed with per litre water should spray after appearance of sheath blight. To control blast Rinoson 50 EC or Topsin methyl 2ml mixed with per litter water should spray. IPM is the best method to control of insect pest. Diazinon-10 (granular) 6.8 kg/acre, Sobicron 25 EC 20 ml/10L for 200 m<sup>2</sup> area should be applied when rice field attack by stem borer, leaf sucking insect, grasshopper and other insect, or should be consult with nearest agricultural office.

### **Harvesting and seed storing:**

After harvesting grain should be threshed in such a way that seeds of other rice varieties should not mixed. Seeds should be dried at 12-14% moisture level kept in steel, plastic or drum for 6-8 months. Seed storage container must be air tight.

## Achievement:

### 1. Best Youngest Scientist Award-2012



### 2. Bangabandhu Jatiya Krishi Purashkar-1418

### 3. Outstanding Achievement Award-2014



১ ডিসেম্বর সোমবার ঢাকায় মন্ত্রিপরিষদ সভায় প্রধানমন্ত্রী শেখ হাসিনার কাছে বাংলাদেশ পরমাণু কৃষি ইনস্টিটিউট-এর বিজ্ঞানী ড. মিজা মোফাজ্জাল ইসলামকে বিশ্ব খাদ্য ও কৃষি সংস্থা (FAO) ও আন্তর্জাতিক পারমাণবিক শক্তি এজেন্সি (IAEA) প্রদত্ত 'অসাধারণ অবদানের স্বীকৃতিপত্র' হস্তান্তর করছেন বিজ্ঞান ও প্রযুক্তি প্রতিমন্ত্রী হুমায়ুন কবীর। প্রিন্স মিউটেশন ব্রিডিং-এর মাধ্যমে খাদ্য নিরাপত্তা ও টেকসই কৃষি উন্নয়নে অবদান রাখায় ড. মোফাজ্জালকে এ বছরের সেপ্টেম্বরে FAO এবং IAEA এর পক্ষ থেকে এ স্বীকৃতিপত্র প্রদান করা হয়।-পিআইডি

**Scientists & staff information:**

Name	Designation	Area of Specialization	No. of Publication	Telephone (091) (091-67601)	Mobile	e-mail
Dr. Mirza Mofazzal Islam	Principal Scientific Officer and Head	Plant Breeding, Molecular Plant Breeding, Mutation Breeding, Molecular Genetics and Biotechnology.	104	091-66068 (Res.)	01716-280720	mirza_islam@yahoo.com
Sultana Razia	Scientific Officer	Mutation Breeding and Marker aided Selection	1	-	01950-468646	<a href="mailto:srazia2002@gmail.com">srazia2002@gmail.com</a>
Md. Ashraful Islam	Scientific Officer	Mutation Breeding, Molecular Genetics and Biotechnology	-	-	01671-450833	<a href="mailto:ashbina13@gmail.com">ashbina13@gmail.com</a>
Nazmul Islam	Scientific Assistant -1	-	-	-	01719-028281	<a href="mailto:n.islambina@gmail.com">n.islambina@gmail.com</a>
S.M Rashedul Hoque	Scientific Assistant -2	-	-	091-52363(Res.)	01712-754296	sumonkgb@gmail.com
Md. Nazmul Hasan	Lab Assistant -1	-	-	-	01731-397444	-
Md. Ramjan Ali	Field Assistant -1	-	-	-	01740-570505	-

<b>Project No.</b>	<b>Project Title</b>
<b>1.</b>	Growing/Screening of M1, M2 and M3 generation of different landraces and exotic rice germplasm using molecular markers
<b>2.</b>	Evaluation of M4 and M5 generation of NERICA rice mutant lines for drought tolerance using phenotypic and molecular markers
<b>3.</b>	Zonal yield trial of some promising NERICA rice mutants for drought tolerant
<b>4.</b>	Marker-assisted backcrossing (BC2F2 of Binadhan-7×FL-478) for development of salt tolerant rice lines
<b>5.</b>	On-firm trial of one promising Green Super Rice line
<b>6.</b>	Evaluation of selected salt tolerant rice lines with better grain quality in multi-location trials
<b>7.</b>	Evaluation of promising submergence tolerant rice germplasm in multi location trials
<b>8.</b>	Screening, purification and morpho-molecular characterization of coastal rice landraces for salt tolerance
<b>9.</b>	Screening of high yielding breeding rice lines possessing both salinity and submergence tolerance (with Sub1)
<b>10.</b>	Screening of both salinity and Zn deficiency tolerance elite breeding rice lines
<b>11.</b>	Association mapping for salinity and drought tolerance in rice genotypes
<b>12.</b>	Evaluation of Transgressive Segregants in Stress tolerant rice lines
<b>13.</b>	DNA fingerprinting and molecular characterization of varieties/mutants via molecular markers
<b>14.</b>	Gene isolation and development of salinity/drought tolerant rice varieties using gene technology
<b>15.</b>	Evaluation of NERICA mutants and some selected varieties in aus season