

**Collection, Characterization and
Conservation of Indigenous rice varieties of
Assam and Meghalaya**

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&
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Introduction:

Conservation of Agro biodiversity with special reference to the cereal crops is a major intellectual challenge before the agricultural scientists, policy makers and also farming communities and needs timely and adequate focus and attention from all the stakeholders.

The traditional practice of cultivating multiple varieties with agro climatic adoptability had the advantage of preventing pest and disease infestation to a greater level. It also provides for developing new varieties with desired traits for further agricultural development. However, due to the use of fewer HYVs over large areas for enhancing productivity and production has reduced the crop resistance to a lower level thereby requiring more chemical application as nutrient supplement and pesticides.

In India, particularly the North East, a secondary center of origin for rice, a large number of indigenous varieties existed suiting the local agro climatic condition. Under the extension programme run by the state department with the technical support of Assam Agricultural University a large number of these varieties disappeared from the field replaced by high yielding varieties with better yield potential. Loss of these varieties is genetic erosion since many of the good traits like disease resistance; flood resistance etc. also lost forever which could have helped in developing new plant varieties with additional traits.

The project was designed to collect and characterize a few indigenous rice varieties of Assam and Meghalaya, with a focus on their nutritional qualities for household food security of rural communities. It was tried to see the spread and abundance of these indigenous varieties together with their nutritional aspects.

Study look into the type of soil they grow, duration of crop life, whether they grow well on lowland or up land etc were scrutinized.

Rationale:

Rice is the major staple food for not only in Assam, but in entire North East region, which is a secondary centre of origin for *indica* cultivar. And very naturally Assam is home to many indigenous varieties of rice with three distinct rice seasons; namely- ahu (autumn paddy), boro (summer paddy) and Sali (winter paddy). Among these Sali paddy is the most popular and widely practiced one cultivated as submerged paddy with adequate standing water up to the maximum tillering stage. Assam also falls in a special agro-ecological zone in the country with different rainfall and weather patterns. There are some endemic varieties found in the region such as the sticky rice which is glutinous in character like as *Bora dhan*, the aromatic rice known as *joha* etc.

But with the expansion of area under HYVs and constant promotion of HYVs by the concerned authorities there is a genuine threat to the indigenous varieties, the area under which is fast shrinking, leading to a gradual process of genetic erosion.

An in depth study into the degree and extent of the gradual loss of these indigenous varieties with their causes and possibility of remedial measures and type of incentives required to conserve these varieties *in situ* is essential before they go extinct.

The cultural linkage to crop diversity is often overlooked since it is subtle in nature and requires minute observation to understand. For example, the popular cultural festival of Assam, the Bihu, celebrated during three times a year is fully evolved out of an agrarian economy. Each of the three bihu is celebrated in different season of the crop length of the rice crop. Bohag bihu or Rangali bihu is celebrated during the pre –seed sowing season, The *kati bihu* or *kongali* is when the crop attains milky stage as it attracts insect pest and therefore earthen lamps are placed on the paddy field to act as light trap. It is said “*kongali*” which means lack of abundance, since the previous year’s stock is almost in exhaust and the new harvest is yet to happen. It is more about rituals than celebration or jubilation. “Magh Bihu” or the ‘Bhogali Bihu’ which means plenty in vernacular is celebrated after the harvest of the winter paddy, during the month of January.

The present study:

The study had precisely three components- collection, characterization and conservation of indigenous rice varieties of Assam and a few for Meghalaya.

The collected samples along with photograph have already been submitted. The variety list along with their agronomic characteristics and the future conservation strategy is furnished.

Collection of varieties:

The collection was done in Jorhat and Golaghat district of Upper Brahmaputra Valley Zone of Assam. In Jorhat Mallow Pathar area and Majuli was considered since these areas are having long tradition of cultivating indigenous varieties. Although sixty seven varieties were collected a few varieties were got damaged hence their characteristics could not be cross checked with the samples collected.

Moreover since the farmers do not keep proper farm inventory for many information like yield and durations the investigators had to depend much on their recall memory.

The agronomic characteristics of the varieties collected are given below.

Characterization:

Characterization could not be done for all the varieties for which information sheets were filled since material were not found and facts could not be ascertained. Although the forms were filled up in consultation with farmers certain characteristics like seed shape, rice colour etc could not be cross checked.

Sl. No	Name and characteristics of varieties
1.	Ronga Bow: It is a long duration varieties with a crop duration of up to 9 months (270 days). It grows on low lying clay type soils. It is a suitable variety for flood affected areas and can withstand heavy flood and inundation. Average yield is 14 mon per bigha (560kg/bigha). The rice grain is long and yellow. The rice gives a full feeling after eating. The rice cooks slowly with dry separate grain. It is used for a special Assamese recipe called “handoh guri” which is popular during festivals like Bihu.

2.	<p>Soru Jahinga: Grows well on Medium and low land with sandy to clay type soil. Plant height is medium. Yield per acre is around 1600kg.It cannot tolerate either flood or drought.</p> <p>The grain is yellow and the rice colour is whitish. Rice is slim and cooks easily.</p>
3.	<p>Kon Joha: It grows well on Medium land with clay type soil. Plant height is medium. Crop duration is around 170 days. Grain type is small and yellow. Rice is small and yellowish. Used both as regular meal and special recipes in festivals.</p>
4.	<p>Boga Joha: The variety grows on Medium to low land on Black to sandy soil. Yield goes upto 8 mon per bigha. Maturity period is 4months. Grain colour is yellow and the rice is white. Rice grain is small and finer. Generally used for side dish and the grain are slightly sticky.</p>
5.	<p>Bor Jahingia: Grows on medium to low land. Grows both on sandy to clay type of soil.Crop duration is around 180 days. Plant height is tall. Average yield is around 10-12 mon per bigha. Grain type is long and red. Rice colour is white and medium sized.</p>
6.	<p>Basanti</p>
7.	<p>Ikora Sali: Grows on medium to low land on clay type of soil. Plant height is tall. Crop duration is around 180 days.Average yield is around 15-16 mon per bigha. Grain type is fat and red in colour with having an antenna on the tip of the grain. Rice is white in colour.</p>
8.	<p>Jaboli</p>
9.	<p>Mothong</p>
10.	<p>Ampakhi: Gros on medium land with clay type soil. Crop duration is of five(5) months. Plant height is medium.yield goes up to 15-16 mon per bigha.The variety cannot tolerate flood. The grain is slim and grain colour is whitish. Rice colour isalso white. The grains are dry and separate when cooked.</p>
11.	<p>Monuhor Sali: Grows on medium land to low land on clay type soil.Crop duration is around 170 days.Plant height inf 16-17 mon per bigha. Grain type is long and yellow. Rice is slim and white. Cooks slowly.</p>
12.	<p>Jangoni Bora: It is a long duration variety with crop period of six months. Grows well on medium land. Grows both on sandy to clay type soil. Plant height medium. Yield varies from 8-12 mon per bigha. Grain colour is red and the rice colour is yellowish. It is used especially in ceremonies as sweet items.The grain is fat/round with sticky grains.</p>
13.	<p>Ako Sali: Long duration variety with crop duration of six months. Grows well on Low land. Plant height is tall type. Yield goes up to 10-13 mon per bigha.Rice cooks slowly with dry and separate grains. The rice grain is yellow and the rice</p>

	colour is white. The grain type is fat and round.
14.	Kati Sali: It grows on medium to low land. Grows well on black to sandy soil. Plant height is tall type. Crop duration is 150-160days.Yield varies from 10-12 mon per bigha. Grain colour is light yellow and rice is whitish with fine surface. Grain type is small.
15.	Swagmoni Bora: Grows well on medium to low land and on black to sandy soil. Crop duration is around 180 days with medium plant height. Yield is around 10 mon per bigha. The grain colour is brownish yellow and rice colour is whitish. The grain type is long. Rice is sticky when cooked. Used as side items.
16.	Malbhog Sokoua It grows well on up and medium land with sandy soil. Maturity period is 5 months. Average yield is 1120 kg per acre. It cannot tolerate either floods or drought. The straw from this variety is soft. Rice grain is fat and round. Rice cooks easily with sticky rice. The rice is used for special festival and ceremonies as “cheera”.
17.	Kola Bora Grows well on low land with black and sandy soil. Croup duration is around 180 days. Plant height is tall. Yield goes up to 500 kg. per bigha. It cannot tolerate floods or drought. Grain colour is black. The straw from this variety is soft. Rice cooks quickly with sticky rice.
18.	Kekua Bao: Grow well on low land with black soil near river side. Crop duration is 180-210 days. Plant height is tall Yield goes upto 15 mon/bigha(1 mon=40kg, 7.5 bigha =1hectare). Grain is reddish brown and large grain. Rice is red in colour and takes time to cook.Having spike on the from side of the grain. The variety is flood tolerant.
19.	Bokul Bora: Grows well on medium land with clay type soil. Also seen to be grown on sandy loam soil. Crop duration is around 150-155 days. Plant height is medium. Yield per bigha varies from 8-12 mon. The grain is brownish yellow and long and large grain type. The rice colour is yellowish. The rice cooks quickly with sticky rice.
20.	Neghari Bao:
21.	Makhon Bora: Grows on medium to low land with black to sandy soil. Crop duration is around 180 days.Plant height is tall type. Yield goes up to 18-20 mon per bigha. Average yield is around 15-16 mon per bigha. The grain type is brownish yellow and the rice colour is reddish. Gets cooked quickly with sticky

	grains.
22.	Bansi Sali: Grows well on medium land with sandy to clay type soil. Crop duration is of six months .Plant height is tall. Yield per bigha varies from 16-20 mon. Grain colour is red and the rice is yellowish. The grain type is long. Non-sticky when cooked. Cooks quickly.
23.	Cheni Champa: It grows on medium land with sandy to clay soil. The crop duration is of around 150 days. Plkant height is tall type. The average yield is 14-16 mon per bigha. The variety cannot tolerate flood. The grain type is slim and grain colour is whitish and the rice is light yellow.
24.	Joha: Grows on medium land with clay type soil. Crop duration is 155-165 days. Plant height is medium. Average yield is 5-6 mon per bigha. The grain type is slim and colour is black. The rice colour is yellow with smooth surface.having a typical aroma. Mainly used in festivals.
25.	Swag Moni: Grows on medium land with sandy to clay soil. Crop duration is around 150 days. Plant height is medium and average yield is 13-14 mon per bigha. Grain type is fat rounded, and colour is red. Rice colour is white. The rice after cooking is non-sticky.
26.	Gethu: Grows on medium to low land with black soil and clay soil. Planr height is tall. Crop duration is 180 days. Average yield is 12-14 mon per bigha. Grain type is fat/ round and yellow in colour. Rice colour is white. Used for regular meals. Rice cooks slowly and heavy to digest.
27.	Solpona: Grows on medium land with sandy to clay soil. Plant height is medium and crop duration is 180days. Average yield is around 12-13 mon per bigha.Rice grain is white and long and colour of the rice is red.On cooking dry and separate grains. Used for meals.
28.	Ghew Bora: Grows on Medium land with clay type of soil. Maturity period is around 160 days. Plant height is tall. Average yield is 7-8 mon per bigha. Grain is long and colour is red. Rice colour is also reddish.
29	Sokoua: Grows on Medium land with clay soil. Crop duration is 160 days. Plant height is tall. Average yield is 7-8 mon per bigha. Grain is slim and yellow. Rice colour is white. Used especially for sweet items in ceremonies and festivals. Non-sticky rice.
30	Helosi Bora: Grows on medium land with clay type of soil. Crop duration is 150 days. Plant height is medium. Average yield is 8-10 mon per bigha. Grain type is fat and colour is red. Rice colour is white. Rice is sticky on cooking. Used for special items only , not for regular meal.
31.	Bhug Prasad: Grows on Medium land and on clay soil. Crop duration is 180 days. Plant height is medium. Average yield is 13-15 mon per bigha. Grain type is slim

	and white. Rice colour is yellowish. Cooks quickly and non-sticky type.
32.	Noga Sali: Grows on medium and low land with clay type soil. Maturity period is 5 months. Plant height is medium. Average yield is 1960 kg per acre. It cannot tolerate either flood or drought. The straw from this variety is hard. Grain type is fat and round. Rice cooks quickly and dry, separate grains. It is possible to store this rice for a long period without spoiling.
33.	Kutkuti Sali: Grows on Medium land with sandy to clay type of soil. Crop duration is 160 days. Plant height is tall. Average yield is 17-18 mon per bigha. Grain is fat and rounded yellow in colour. Rice colour is white. On cooking rice is non-sticky. Used for regular meals.
34.	Maloti
35.	Bet Gutti: Grows both on Medium and Low land with clay type of soil. Crop duration is 150 days (+/-5). Plant height short type. Grain is fat and rounded and colour is yellow. Rice is slightly reddish. Cooks quickly and and non-sticky.Gives a “full” feeling after eating.
36.	Jahingia: Grows on medium to low land with sandy to clay type of soil. Crop duration is around 150 days. Plant height is tall. Average yield is 17-18 mon per bigha. Grain type is long and red. Rice is non-sticky type.
37.	Kola guni : Medium to low land and with sandy to clay type soil. Plant height is medium. Average yield is 16-17 mon per bigha. Grain type is small and yellow. Rice colour is typically red and easily identifiable.
38	Miya bao: Grows on medium to low land. Plant height is tall. Average yield is 15-16 mon per bigha. Crop duration is 190-210 days. Grain type is long and yellow in colour. Rice is also long and white.Cooks slowly and heavy to digest.
39.	Na –gayan Sali: Grows well on medium and low land. Plant height is tall. Crop duration is around 180 days. It cannot tolerate floods. The straw from this variety is hard. Grain type is small. Rice have an aroma and cooks slowly. Average yield is 12-14 mon per bigha
40	Mamonsinga bao: Grows on low land with black soil. Crop duration is 180-210 days. Average yield 14-15 mon per bigha. Grain type is flat and brow in clour . Rice is typically red in colour.Cooks slowly and heavy to digest.
41	Fapori bora: Grows on medium land. Maturity period is 5 months. Plant height is medium. Average yield is around 2380 kg per acre. This variety can tolerate flood or drought. The rice have an aroma and grain type is fat and round. This rice is used for special festivals and ceremonies.

42	Laki Sali: It grows well on medium land. Plant height is medium. Average yield is around 2520 kg. per acre. It cannot tolerate floods or drought. The straw from this variety is hard. Grain type is fat and round. Rice cooks slowly. The rice gives a full feeling for long.
43	Kola jaha: It grows well on medium land. Plant height is medium. Average yield is around 2520 kg. per acre. It cannot tolerate floods or drought. The straw from this variety is hard. Grain type is fat and round. Rice cooks slowly. The rice gives a full feeling for long. It is possible to store for a long period without spoiling. Grain is black in colour.
44	Man bora: Grows well on medium land on clay type soil. Maturity period is 6 months. Plant height is tall. Average yield is 8-9 mon per bigha. It cannot tolerate floods or drought. The straw from this variety is soft. Grain type is slim. Rice cooks quickly and sticky grains. Not used as regular meal.
45.	Mugi Sali: Grows on medium land on clay type soil. Maturity period is 5 months. Yield of variety is 1400 kg per acre. The straw from this variety is soft. Grain type is fat and round. Rice cooks quickly and dry, separate grains. On cooked rice remains fresh to long period.
46	Boga maguri: The variety grows on medium and low land on clay type soil. Maturity period is 6 months. Plant height is tall. Average yield is 1680 kg per acre. It cannot tolerate floods or drought. The straw from this variety is soft. Grain type is fat and round. Rice cooks quickly and dry, separate grains. It is possible to store this rice for a long period without spoiling.
47	Amona Bao: On low land and black soil. Also grows on sandy soil. Plant height is tall. Grain type is fat and white. Rice colour is red. Average yield is 15-16 mon per bigha. It takes time for cooking. Gives a "full" feeling after eating.
48	Jili Baw: Grows on low land and black soil. Crop duration is 210 days. Plant height is medium. Average yield is 10-12 mon per bigha. Long white grain with yellowish rice.
49	Biria Bhonga Baw: Grows on low land with black type of soil found near river side. Plant height is tall. Average yield is around 12-15 mon per bigha. Grain type is long and brown and rice is red in colour. Rice cooks slowly and heavy to eat. Crop duration is 190 to 210 days. Resistant to flood and inundation.
50	Kholihoi Baw: Grows on low land with black soil near river side. Plant height is tall and crop duration is around 200-210 days. Average yield is around 15-18 mon per bigha. Grain type is fat round having yellow and brown stripe. Rice is red in colour and separate on cooking. Cooks slowly and gives a "full" feeling after eating.

51	Ronga Joha: Grows well on medium and low land with clay type soil. Maturity period is 160 days. Yield goes up to 600 kg. per acre. It cannot tolerate floods or drought. The straw from this variety is soft. Grain type is small. Rice cooks quickly and dry separate grains. It is possible to store this rice for a long period without spoiling.
52	Soru Sokoua: Grows on medium land and on sandy soil. Crop duration is about 150 days. Plant is tall type. Average yield is 10-12 mon per bigha. Grain type is fat and having brown and yellow stripes. Rice colour is white.
53	Kola Bora: Grows on low land with black soil. Also grown on sandy soil. Plant type is tall. Crop duration is 180 days. Average yield is around 12 mon per bigha. Grain type is slim and red and the rice is small and yellow. Rice cooks quickly and is sticky type.
54	Rongdoi: Grows on medium to low land with black to sandy soil. Crop duration is 160 days. Plant height is tall. Average yield is around 12-13 mon per bigha. Rice grain is small and yellow. Rice is white. Cooks slowly and produce non-sticky rice. Heavy to digest.
55	Doria: Grows on medium to low land with black and sandy soil. Crop duration is 150 days. Plant height is tall type. Average yield is around 12 mon per bigha. Grain type is slim and yellow rice colour varies from red to white.
56	Sial Najia Bora: Grows on medium land to low land with black to sandy soil. Crop duration is 160 days. Plant height is medium. Average yield is around 12 mon per bigha.
57	Pakhi Bora: Grows on medium land and on red soil. Crop duration is around 180 days. Plant height is medium. Average yield is around 12 mon per bigha. The grain is peculiar with having a “wing” kind of covering around it and hence the name “pakhi” bora which in Assam se means wing .Grain is fat and rounded and is red in colour . The colour of the “eing” is yellow. Rice is small and white in colour. On cooking produces sticky rice and used only for side receipes not for regular meals.
58	Monipuri: Grows on low land and on clay type soil. Crop duration is 180 days. Plant height is medium. Average yield is around 20 mon per bigha. Grain type is long and yellow. Rice is white and cooks slowly.
59	Adolia: Grows on medium land and on black soil. Crop duration is of six months. Plant height is medium. Average yield is around 14-15 mon per bigha. Grain type is fat/ round and yellow in colour . Rice is white in colour. Heavy to digest.
60	Ronga solpona: Grows on medium land with black soil. Plant height is medium. Crop duration 180 days. Average yield is around 15 mon per bigha.

	Grain type is long and reddish and the rice clour is white.
61	Hatidotuwa: Grows on medium up land with black to sandy soil. Crop duration is of 180 days. Plant height is medium. Average yield is around 10-12 mon per bigha. Grain type is slim and yellow in colour. Rice colour is white. Rice cooks quickly.
62	Haripuwa sakua: Grows on medium land with black soil. Crop duration is around 180 days. Plant height is tall. Average yield is around 15 mon per bigha. Grain type is fat and red in colour. Rice is small and white. Used for traditional items like “komal chawl”, “ sandoh”, “ murhi” etc , used in festivals. Not used for regular meals.

Conservation strategy:

The varieties are being conserved both *in-situ* and in gene bank .

A “Community Seed Bank” has been established attached with NECR office at Dergaon.

For *in-situ* conservation a “Rice Diversity Park” is planned to be established in selected villages in Golaghat district. Twenty to twenty five varieties will be taken in the first year on ten square meter plots. Some of the agronomic features including that of plant height, penicle length and actual crop duration etc can be actually measured only with replication. The information already gathered can also be cross checked after cultivation.

The “Rice Diversity Park” would be established in association with the rural communities with leased in land. Proper seed selection, screening for any impurity, seed treatment, sowing and transplanting would be done under direct supervision and monitoring under NECR. Qualified manpower would be deputed for the entire crop period. We will seek separate funding for this.