



Rice Diversity and the Joy of Eid

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Introduction

Photo: Drying rice in the open air. **Credit:** Bioversity International/R.Vernooy

This brief presents the results of research supported by a grant from the Seeds, Soil and Culture Fund managed by RSF Social Finance, with the support of the New Field Foundation. The research focuses on the conservation and sustainable use of rice diversity in Bangladesh and how the rice varieties used and planted are intrinsically linked to religious festivals, food culture, land morphology and the climate that shape rice farming/cropping in this region. It also highlights the important roles played by Community Seed Wealth Centers (community seed banks) and the Nayakrishi farmers, who manage them, in ensuring the conservation of rice varieties that are in danger of disappearing, and in supplying farmers with diverse, good quality seed. UBINIG (Policy Research for Development Alternative) conducted this research to support the Nayakrishi Seed Network (NSN) of the Nayakrishi Andolon or New Agricultural Movement of Bangladesh, now active in three major

agroecological zones of Bangladesh, bringing together 300,000 farmers. The NSN is made up of regional Community Seed Wealth Centers (photo 1) and Seed Huts at the village level. Seed Huts typically conserve multiple varieties of all important traditional crops including cereals, pulses, vegetables and spices. Women seed custodians play key roles in the NSN. Community Seed Wealth Centers provide back-up to Seed Huts, carry out strategic research and organize capacity building.

Happiness in our food

The role of animals

Conserving diverse varieties of rice in Bangladesh is not just about conservation and nutrition; rice is a food crop that contributes to the happiness of millions of farming families on different cultural and religious occasions. Eid-ul-Azha – the second largest annual religious Muslim festival – was celebrated across Bangladesh on 12 August 2019, following the 10th moon day of the Arabic month of





Photo 1: The Tangail Community Seed Wealth Center. Credit: Bioversity International/R.Vernooy

Zilhaj (the twelfth and final month of the Islamic calendar). This festival is marked by the slaughtering of sacrificial animals, including cows, buffaloes, goats and sheep, and a few other animals. According to the Department of Livestock Services (DLS), 4.58 million cows and buffaloes, 7.20 million goats and sheep, and a substantial number of other sacrificial animals were available for slaughter throughout Bangladesh in 2019¹.

While during Eid-ul-Fitr (the Festival of breaking the Fast) people are busy buying new clothes, before Eid-ul-Azha people are busy buying cows or goats and sheep, according to their respective financial means. The festival is known as Eid Qurban (Qurbani Eid, in Bangla); some call it Bakri-Eid (Eid-ul-Bakara – the feast of cows, goats and sheep). It is also known as the Greater Eid² and marks the end of Hajj – the annual pilgrimage to Mecca. Sacrificing animals on Eid-al-Azha is a confirmed *sunna*

(*sunna mu'akkada*), which can be translated as a good practice, and not an obligation. Sacrifice is not a religious pillar in Islam; it is a prophetic practice of purification and a sign of trust in God. Muslims honour the willingness of the Prophet Ibrahim [Abraham] to sacrifice his son as an act of obedience to Allah's (God's) command. However, just before the Prophet Ibrahim sacrificed his son, God provided him with a lamb to sacrifice instead, thus sparing his son.

Not everyone in the Bengali villages sacrifices an animal, but it is very likely that each family (including the non-Muslims) will receive a share of their meat. These sacrificial animals are slaughtered ritually, in accordance with an ancient religious practice, after offering up the communal prayer, called Eid Jamaat. The meat from each animal is then divided into three parts. One share is given to the poor and needy, another is kept for

the home, and the third is given to relatives and neighbours.

Preparations are also made for food items that accompany the meat. The significance of this tradition lies in sharing both raw as well as cooked meat and passing down culinary knowhow from one generation to the next. Not only is the meat important, but a mix of special spicy and sweet rice-based dishes are also made on this occasion to accompany the meat dishes.

Here we present the typical food dishes from three rural areas (Pabna, Natore and Tangail District) and one city Dhaka in Bangladesh, focusing on the diversity of rice varieties most commonly/widely used in the preparation of traditional, local foods for the Eid-ul-Azha feast. In the three rural areas, where the Nayakrishi farmers have been cultivating the rice varieties in their respective areas and in Dhaka, the rice varieties are available in the organic food shop (table 1).

The role of different rice varieties

The most common dishes prepared in all four sites reviewed (Pabna, Natore, Tangail District and Dhaka city) are *payesh* (also known as *kheer*) and *firni*, both sweet dessert dishes made of rice and milk flavoured with dried fruit, nuts and spices; *pulao* (rice cooked with butter-oil and flavoured with hot spices); *khichuri* (rice with pulses, turmeric and spices); and *chaler-ruti* (rice-flour bread), that all go well with the different meat dishes.

Payesh (or kheer, photo 2) and firni (another type of rice pudding, made with coarsely ground rice) are both sweet dishes prepared with white and fine quality rice cooked in milk, sugar/molasses, coconut, nuts and other dry spices. At least eight different varieties of aromatic and non-aromatic white rice are



Photo 2: Payesh. Credit: UBINIG/Abul Kalam



Photo 3: Kalijira rice. Credit: UBINIG/Abul Kalam



Photo 4: Ruti. Credit: UBINIG/Abul Kalam



Photo 5: Kalobakri rice. Credit: UBINIG/Abul Kalam



Photo 6: Pakri rice. Credit: UBINIG/Abul Kalam



Photo 7: Kichuri. Credit: UBINIG/Abul Kalam

used for these dishes; they are: Bashmoti, Begun bichi, Chiniguri, Jamai aduri, Kalijira (photo 3), Kartik jhul, Najirshail and Paijam, all grown by the farmers themselves in these sites. In Pabna and Natore, five varieties are cultivated and used, while in Tangail six varieties were found to be used in the preparation of these dishes. Three varieties, Bashmoti, Chiniguri and Kalijira were commonly used in all the areas. In Dhaka city, Chiniguri and Kalijira (photo 3) are used, however, since the Dhaka market has a supply of rice from all over the country, Radhuni pagol variety, which comes from Dinajpur, was also found.

Pulao is rice cooked with butter-oil (ghee) and flavoured with hot spices. Aromatic and non-aromatic fine quality rice varieties are used for cooking *pulao*. These are Bashmoti, Chiniguri, Kalijira, Radhuni pagol and Ukun modhu.

Chaler-ruti (rice-flour bread, photo 4) is the main item that accompanies the meat (beef and mutton) dishes. In addition, **pulao** (rice cooked with ghee and hot spices) and **khichuri** (a mixture of rice, pulses/lentils, vegetables, turmeric and other hot spices) are also cooked, depending on the choice of family members. However,

each of the rice-based items uses different rice varieties.

Rice-flour ruti (*chaler-ruti*) are like chapatis (flatbread made from wheat): 13 red and 2 white rice varieties are used to make rutis (photo 4). These are: Ajoldigha, Bhorilota, BRR1 28 and BRR1 29 mixed with Kalijira (white variety), Chamara, Hijol digha, Jhuldhan, Kalobakri (photo 5), Kartik shail, Kartikjhul, Laldhepa, Pakri (photo 6), Sadadhepa (white variety) and Shaini dhan. Both white and red varieties are grown in two major cropping seasons known as Aus

(mid-March/April to mid-June/July) and Aman (mid-July to mid-November–December). Aus season covers the summer season paddy crop, while Aman season covers the monsoon to autumn season.

Khichuri is rice cooked with pulses/lentils, vegetables, turmeric and spices (photo 7). Fifteen rice varieties used to make this dish include: Ajoldigha, Bashmoti, Bhawailya digha, BRR1-28, BRR1-29, Chamara, Dholdigha, Hidi, Hijol digha, Kalobakri (photo 8), Kartikjhul, Matibhangor, Pakri, Pati shail and Patjag.



Photo 8: Kalobakri rice in the field. Credit: UBINIG/Golam Mustafa

Other dishes

Other dishes prepared for these special occasions include **semai** (handmade rice vermicelli) made with Boro Digha, Chamara, Laldhepa, Patjag, Sadadhepa and Sadadigha rice varieties; various forms of **pitha** (rice-flour cakes/dumplings), such as **shomser-pitha** (pitha filled with meat) are made using Chamara, Dhepor, Hijol digha, Kartikjhul, Laldhepa, Patjag and Sadadhepa rice varieties, while **teler-pitha** (sweet pitha made

with rice powder, molasses and deep-fried in oil) are made with Chamara, Hijol digha, Kartikjhul and Sadadhepa rice varieties in Tangail.

Yet, with all this rice diversity present in Bangladesh, it is incredible that the market cannot offer enough rice diversity for the different festivals. People living in urban areas have a limited choice of rice varieties (Chiniguri, Kalijira and Najirshail). Organic food shops such as Shashya Prabartana, offer

another aromatic variety called Radhuni pagol, which can be used for *Pulao* and *Khichuri*. There is more diversity in the villages than in the cities. Similarly, for making *ruti* (rice-flour bread), there is more diversity of white and red rice flour in the villages, while in the city the only varieties on sale are “un-parboiled” or Atap white rice. There are many plain rice varieties in the categories of white and red coarse rice such as Chamara (red), Katak (white) and Tepa boro (red).

Table 1: Rice varieties and their culinary uses linked to the Eid-ul-Azha festival

Special culinary dishes	Type of dish	Non-aromatic white rice variety	Aromatic white rice variety	Red rice variety
Payesh (or kheer)	Sweet rice pudding, prepared with white and fine quality rice cooked in milk, sugar/molasses, coconut, nuts and other dry spices.	Begun bichi, Chiniguri, Jamai aduri, Kalijira, Kartik jhul, Najirshail, Pajjam	Bashmoti	
Firni	Sweet rice pudding, made with coarsely ground rice cooked in milk, sugar/molasses, coconut, nuts and other dry spices.	Begun bichi, Chiniguri, Jamai aduri, Kalijira, Kartik jhul, Najirshail, Pajjam	Bashmoti	
Pulao	Rice cooked with butter-oil and flavoured with hot spices	Chiniguri Kalijira, Ukun modhu, Radhuni pagol	Bashmoti	
Chaler-ruti	Rice-flour bread, similar to chapatis	Kalijira and Sadadhepa		Ajoldigha, Bhorilota, BRRI-28, BRRI-29, Chamara, Hijoldigha, Hijoldigha, Jhuldhan, Kalobakri, Kartikjhul, Kartik shail, Laldhepa, Pakri, Shaini dhan
Semai	Handmade rice vermicelli	Patjag, Laldhepa, Sadadhepa, Boro Digha, Sadadigha		
Khichuri	Rice cooked with pulses, turmeric and spices	Bhawailya digha, Dholdigha, Hidi, Matibhangor, Pati shail, Patjag	Bashmoti	Kalobakri
Pitha	Rice-flour cakes/dumplings			Chamara, Hijoldigha, Kartikjhul, Patjag
Shomser-pitha	<i>Pitha</i> filled with meat	Dhepor, Laldhepa, Sadadhepa		
Teller-pitha	Rice-flour cakes/dumplings with molasses deep-fried in oil	Sadadhepa		Chamara, Hijol digha (in Tangail), Kartikjhul

Four-cell analysis of the rice varieties used during Eid-ul-Azha

It is evident that crop and animal diversity both play a key role in the country's religious and cultural celebrations. How is this diversity faring nowadays in rural areas? It is important to assess whether the wide diversity of rice varieties needed for the festivals is grown by many or only a few farmers (photo 9). It is also important to understand what role community seed banks (supported by UBINIG) can play in providing access to seed needed to maintain the diversity (to read more about UBINIG's work with community seed banks, see Sobhan et al., 2015; UBINIG, 2018). To carry out such an assessment, four-cell analysis was used to measure the richness and evenness of varieties used by the farmers (Box 1). In Delduar Upazilla (Tangail district) the following results were obtained (Figure 1 and Table 2):

Box 1. Four-cell analysis

Four-cell analysis is a participatory tool to assess the abundance (richness) and distribution (evenness) of local crop and crop varietal diversity within a farming community or a larger geographical unit, such as a (micro) watershed, based on farmers' knowledge of the status of their crops (Sthapit et al., 2012). The tool can be used in a single mixed group session or in smaller groups disaggregated by social variables such as sex, age or class. When repeated over time it can provide valuable insights to the changes that are occurring in the diversity in that specific area, e.g. identify loss of one or more species or cultivars. Interviews with knowledgeable farmers about these trends can help to identify the factor(s) responsible for the changes (Vernooy et al., 2018).

To conduct a four-cell analysis, we draw a 2×2 matrix on the ground (or a large sheet of paper) and use the four squares to identify: (1) Crops that are grown in a large area by many households; (2) Crops that are grown in a large area by few households; (3) Crops that are grown in a small area by many households; (4) Crops that are grown in a small area by few households. Four-cell analysis allows researchers to:

- Measure the abundance (richness) and distribution (evenness) of local crop diversity
- Identify common, unique and rare/endangered species and varieties
- Document trends and identify the reasons why each crop/variety is in a dynamic state within a community
- Explore potential interventions to address the challenges identified, such as the loss or disappearance of a crop or a cultivar.



Photo 9: UBINIG staff visits the fields of seed hut members to assess crop diversity. Credit: Bioversity International/R.Vernooy

Figure 1: Four-cell analysis of rice varieties conducted in Delduar Upazilla (Tangail district) villages during Eid-ul-Azha (2019)

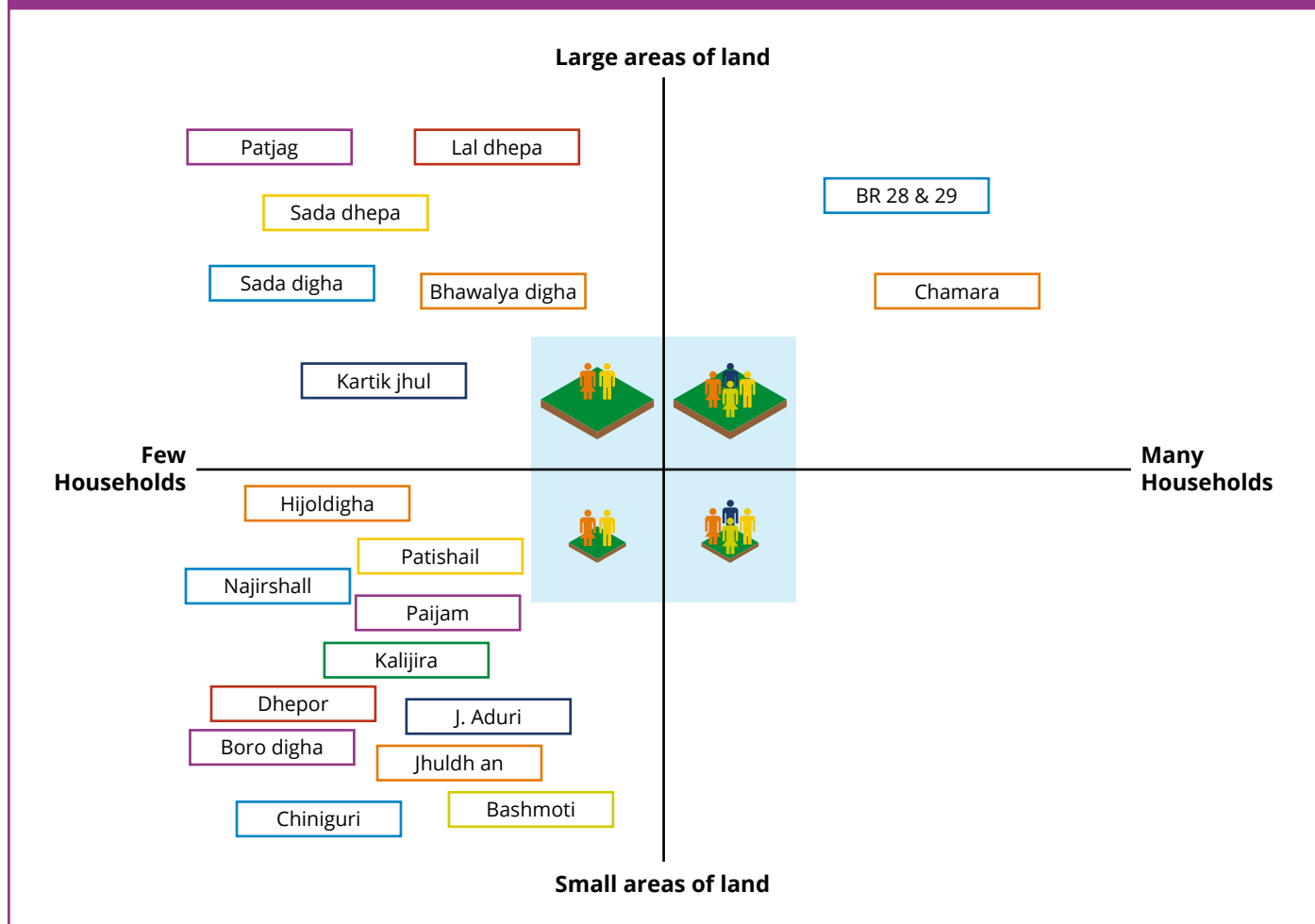


Table 2: Analysis of rice varieties in terms of land, water, seeds, usefulness and market demand in Tangail

Land area	Many households	Few households	Reasons for choosing these rice varieties
Large Area	<p>Varieties chosen:</p> <p>Chamara: flood resistant; farmers have the seeds; grown on low-lying land.</p> <p>BRRI-28 and BRRI- 29: both varieties mature in 140 days; good market demand; farmers have the seeds; can be grown on all types of land.</p>	<p>Varieties chosen:</p> <p>Bhawailya Digha Kartik jhul Lal Dhepa Patjag Sada Digha Sada Dhepa</p>	<p>Bhawailya Digha and Kartik jhul: good market demand; flood resistant; can be grown in waterbodies.</p> <p>Patjag: grown in low-lying fields with water; rainfed; long-duration rice.</p> <p>Lal Dhepa and Sada Dhepa: grown in char/beel land with water; good yield; good for <i>pitha</i>.</p> <p>Sada Digha: drought resistant (can survive water shortages); good for fodder.</p>
Small area		<p>Varieties held/planted:</p> <p>Bashmoti Boro Digha Chiniguri Dhepor Hijoldigha Jamai Aduri Kalijira Najirshall Paijam Patishail</p>	<p>Chiniguri, Kalijira, Najirshall: lower yield; need to grow on medium and high land; compete with Rabi crops for harvesting.</p> <p>Bashmoti, Jamai aduri, Jhul dhan, Paijam: seeds are disappearing; Bashmoti straws are shorter.</p> <p>Boro Digha: has a long straw; flood resistant; good for human food and fodder for cows; seeds are disappearing.</p> <p>Dhepor: needs land with water; seeds are disappearing.</p> <p>Jhul dhan: good for <i>pitha</i> and <i>payesh</i> but cannot be husked in mills.</p> <p>Patishail: flood resistant; grown on low-level land.</p>



Photo 10: Tangail. Credit: Bioversity International/R.Vernooy

Tangail is in the flood plain agro-ecological zone. It has many low-lying lands with water (photo 10). Middle- and high-level lands are very rare. Nineteen different rice varieties were used for *pithas*, *payesh*, *ruti*, *pulao* and *kichuri* during Eid-ul-Azha. Of the 19 varieties, only three (Chamara, BRRI-28 and BRRI-29) are grown by many farming households and on a large amount of land. Farmers have the seeds and two of these varieties (BRRI-28 and BRRI-29) have good market demand. Six varieties (Bhawailya Digha, Kartik jhul, Lal Dhepa, Patjag, Sada Dhepa and Sada Digha) are grown by a few farming households on a large amount of land. These varieties include

stress-tolerant (particularly to flood water) varieties and varieties with longer straws (for fodder). Due to road construction that causes prolonged waterlogging, which does not recede in the same way as flood water does, farmers with land in these prolonged waterlogged areas cannot grow these varieties, even though they are flood resistant. The non-availability of suitable waterlogged land elsewhere restricts their cultivation to Tangail District.

The rice varieties grown by few farming households and on smaller area of land are facing the challenges of lower yield, non-availability of appropriate land and shorter straw. However, the

most important reason for limited cultivation of these varieties is the lack of seeds in farmers' collections. The seeds are disappearing. Thus, the Nayakrishi farmers, who grow these rice varieties and the community seed banks they belong to, have an important role to play in helping to conserve the endangered varieties.

Four-Cell analysis for rice varieties used in Natore and Pabna during Eid-ul-Azha

In Natore and Pabna, the following results were obtained (Figure 2 and Table 3):

Figure 2: Four-cell analysis of rice varieties used in Natore and Pabna villages, during Eid-ul-Azha (2019)

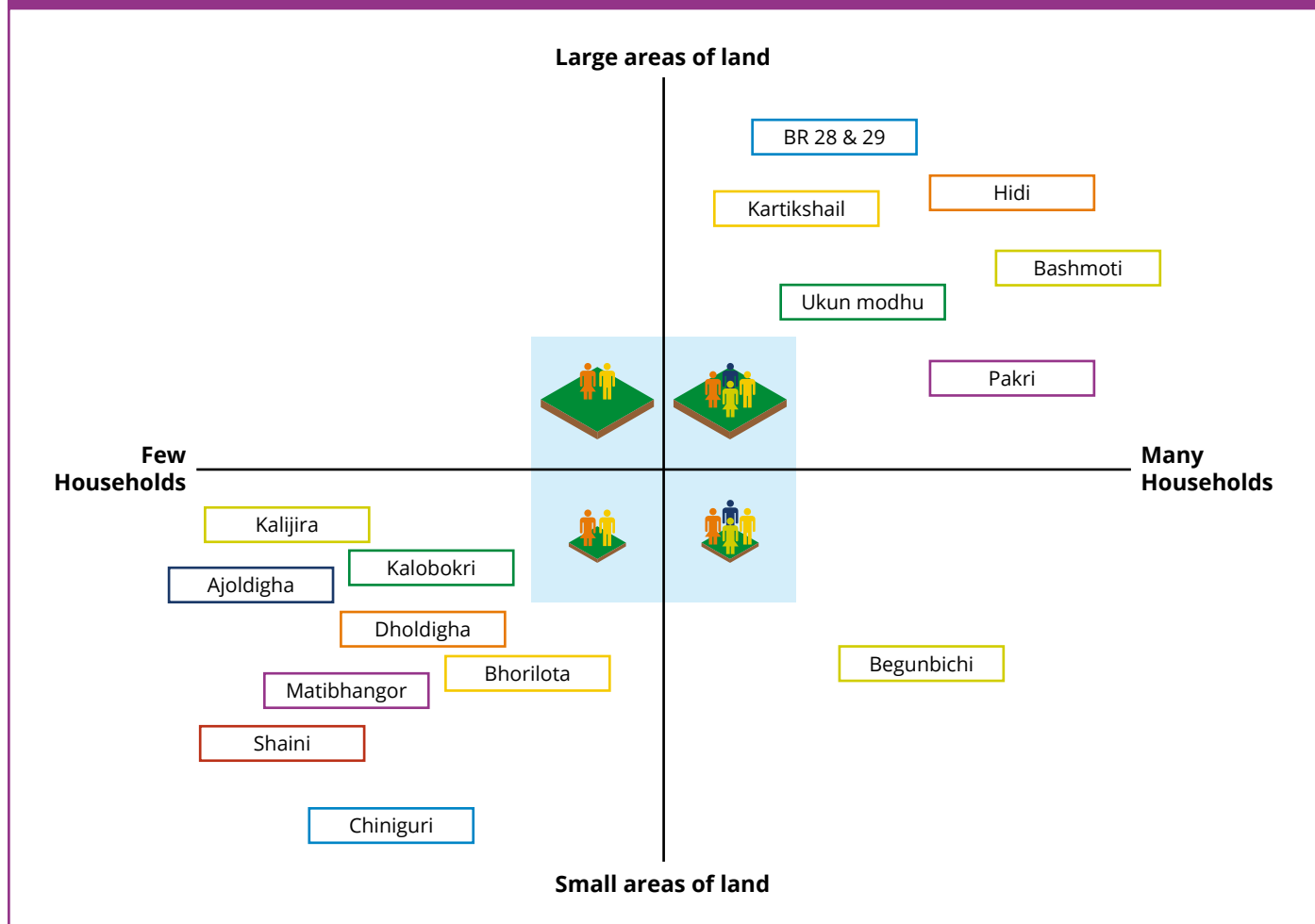


Table 3: Analysis of rice varieties in terms of land, water, seeds, usefulness and market demand in Natore and Pabna

Categories	Many households	Few households	Reasons for planting the rice varieties
Large Area	<p>Varieties planted:</p> <p>Bashmoti BRRI-28 BRRI-29 Hidi Kartikshail Pakri Ukun modhu (BRRI-34)</p> <p>BRRI-28 and BRRI-29: both grow in 140 days; good market demand; higher yield; farmers have seeds; can be grown on all types of land.</p> <p>Ukun modhu is a numbered rice (BRRI-34); similar to Begun bichi, Chiniguri and Kalijira, but not as tasty; has a higher yield.</p>		<p>Bashmoti: grown in medium- and high-level land; can be cultivated in Aman and Boro season; fetches a good price; has a higher yield.</p> <p>Hidi: a favourite rice for farmers; can be grown in high- and low-level land.</p> <p>Kartik shail: a favourite rice for farmers; can be grown as Aus-Aman mixed; early harvesting in (Kartik) October; known as poverty-saving rice; tastes good.</p> <p>Pakri: can be grown in high or low land; water tolerant; yield is satisfactory; can make <i>chira</i>, <i>muri</i> and <i>pitha</i>.</p>
Small area	<p>Varieties planted:</p> <p>Begun bichi: Has lower yield but is considered essential for festivals and special occasions.</p>	<p>Varieties planted:</p> <p>Ajoldigha Bhoriyota, Chiniguri Dholdigha Kalijira Kalobokri Matibhangor Shaini</p>	<p>Chiniguri, Kalijira: lower yield; need medium- and high-level land; compete with rabi crops for harvesting; Kalijira replaced by Ukun modhu (BRRI-34) that has a higher yield.</p> <p>Kalobokri: a drought-resistant variety that needs high level land, which is lacking. Drought situation is changing.</p> <p>Ajoldigha, Dholdigha: need low land and more water, which is lacking. Lower yield.</p> <p>Matibhangor: can be grown in less water; has low yield.</p> <p>Bhoriyota, Shaini: need deep water.</p>

Bashmoti, Hidi, Kartikshail and Pakri have some very important attributes (see Table 3). For this reason, many farmers continue to cultivate these varieties on a large area and use them for regular household food consumption and special occasions. On the other hand, special aromatic rice varieties such as Chiniguri and Kalijira needed for *pulao* and *payesh* are being replaced by a modern high-yielding variety called Ukun Modhu (BRRI-34). Only Begun bichi variety continues to be cultivated despite its low yield, mostly in small areas, for the preparation of food for festivals. Kartikshail is very important for poor families that may not have a stock of rice for the whole year. Planting an early harvesting rice variety saves them from poverty and hunger. In recent years, Kalobakri, a drought-tolerant variety, has been affected by rains during the dry season, diminishing yields and depleting seed stocks as a result.

Conclusions

The data gathered provides us with key information and take-home messages about the importance and significance of the rice varieties that are cultivated in the three study areas of Bangladesh:

- Farmers cultivating diverse rice varieties have more choice when preparing food items on important social, cultural and religious occasions.
- Nayakrishi farmers continue to cultivate many local varieties for subsistence needs and important festivals, even though these varieties have a lower yield.
- The land type in villages is a determining factor in the cultivation of different rice varieties. Land suitable for local varieties is becoming scarcer due to construction of roads

and other physical facilities, creating waterlogging.

- Climate change is affecting the traditional flood- and drought-tolerant varieties. Rainfall and temperature patterns are changing and becoming more unpredictable.
 - Introduction of high-yielding modern varieties is affecting the cultivation of local varieties and replacing some of them.
 - Local aromatic rice varieties have a high demand in the market and prices are high,
- incentivizing farmers to plant them.
 - Many farmers are unable to maintain rice diversity due to shortage of seed in their household collection.
 - The Community Seed Wealth Centers and seed huts can play an important role in ensuring the conservation of varieties that are in danger of disappearing (photo 11). They can also supply farmers in need with diverse, good quality seed.



Photo 11: Seed huts maintain crop diversity at community level. Credit: Bioversity International/R.Vernooy

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Notes

¹ Dhaka Tribune, July 16, 2019 <https://www.dhakatribune.com/bangladesh/2019/07/16/11-18-million-animals-in-stock-for-eid-slaughtering>

² https://en.wikipedia.org/wiki/Eid_al-Adha

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Photo 12: Drying rice in the open air. Credit: Bioversity International/R.Vernooy

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