

Rice Cultures of Bengal

Abstract: An estimated 15,000 folk landraces of rice are reported to have been cultivated in undivided Bengal in the 1940s. With the advent of the Green Revolution, a handful of high-yielding varieties (HYVs) replaced, and continue to replace, thousands of traditional farmer varieties (also called “landraces”). In the 1970s, the Bangladesh Rice Research Institute documented a total of 12,479 names, including synonyms. In West Bengal, the recorded number of landraces cultivated before the 1970s is 5,556 (Deb 2005, 2019a). Most of these old landraces of Bengal, from both sides of the international border, are now available in only a few gene banks, no longer cultivated in the region. The loss of the thousands of rice landraces from farm fields entails the erosion of a vast body of folk knowledge pertaining to the distinctive properties of different

varieties, derangement of local food cultures, and food insecurity for poor and marginal farmers, who no longer have the stock of landraces fine-tuned to local soil and climatic conditions, nor are able to buy the costly inputs. Just as the traditional rice fabric of the Philippines has disappeared with the extinction of the special rice variety that yielded the fiber, many of the culinary delicacies and the cultural significance of many rituals have vanished with the disappearance of special rice varieties throughout Bengal. Moreover, the loss of traditional knowledge associated with folk rice varieties, together with the abolition of the tradition of seed exchange within communities, has disintegrated the communitarian ethos among Bengali farmers, who are now dependent on external agencies for the supply of seeds, machinery, and knowledge.

Rice: Origin and Domestication in India

MOST OF THE RICE varieties cultivated in eastern India and Bangladesh belong to the *Indica* group of domesticated rice (*Oryza sativa*), although a smaller number of *Japonica* rice is also cultivated in the region, especially in deep-water areas (Wang et al. 2013; Travis et al. 2015). These two subspecies, or groups of rice varieties, evolved from independent domestication events in prehistoric time (Sweeney and McCouch 2007).

This cultivated rice, a staple of one-third of the world’s population, is a result of farmers’ selection and breeding of ancestral wild rice plants with favored traits over centuries (Salamini et al. 2004)—a process that Charles Darwin called “artificial selection” by early humans. While all wild relatives of rice “shatter” (their grains shed on the ground at maturity), cultivated rice is nonshattering, thus allowing harvest of all grains. This “nonshattering” trait was the earliest trait selected in the process of rice domestication (Doebly 2006). Similar traits selected over the course of domestication history include an increase in the number of seeds in the cluster of florets (called panicles), change in seed shape, adaptation of flowering time to local climatic conditions, and many others (Doebly 2006; Konishi et al. 2006). The ancestral wild relatives of the domesticated Asian rice are *Oryza rufipogon* and *O. nivara*, both of which contributed sets of genes to constitute the gene pool of the cultivated rice.

The process of rice domestication began about 12,000 years before present (YBP) in both China and India. Archaeological and genetic evidence suggests that the fully domesticated Indian rice was cultivated about 7,000 to 9,000 YBP, in the eastern Himalaya region, where several genes governing key domestication traits of *japonica* populations from eastern China introgressed into South Asian “proto-*indica*” cultivars, thus generating *indica* rice after many cross-differentiation-selection cycles (Fuller 2011; Huang et al. 2012). Domesticated *indica* rice then spread across the subcontinent between 4,000 YBP and 3,500 YBP. Recent archaeological evidence from several sites of the Harappan period indicates that domesticated rice was cultivated in northern India some 6,000 YBP (Bates, Petrie, and Singh 2017). Domesticated rice cultivation in the Bengal region began presumably about 4,000 YBP. During this long period, ancient farmers created thousands of landraces of rice, which are cultivars developed by indigenous farmers for growing in local land and climatic conditions, and to meet agronomic and gustatory requirements (Deb 2017).

Rice Genetic Diversity in Bengal

In this essay I deal with the cultural-historical-geographical land of Bengal that includes Bangladesh and the modern

Indian State of West Bengal (figure 1). The exact number of rice varieties grown in West Bengal and Bangladesh until the advent of the Green Revolution is not definitely known. However, an estimated 15,000 folk landraces are reported to have been cultivated in undivided Bengal in the 1940s (Bashar, Haque, and Zaman 2004) in different seasons.¹ Throughout Bengal, Aman (winter rice) varieties are grown from June to December, Boro (summer rice) varieties are grown from December to May, and Aus (autumn rice) varieties are grown from April to August (GRiSP 2013). With the advent of the Green Revolution, begun in 1965, a handful of high-yielding varieties (HYVs) replaced, and continue to replace, thousands of traditional landraces in South Asia (Morishima and Oka 1995; Thrupp 2000; Gao 2003). Within a period of 30 years of the Green Revolution, thousands of rice landraces have disappeared from farms of Bengal. According to unpublished records of the West Bengal State Rice Research Station, Chuchura, West Bengal farmers grew approximately 5,556 landraces until the late 1960s; of these, 3,500 varieties were shipped to the International Rice Research Institute in the Philippines during the period 1975 to 1983. Most of these varieties are no longer cultivated in Bengal (Deb 2005, 2019a). Bangladesh has witnessed a similar process of erosion of rice genetic diversity. In the 1970s, Bangladesh Rice Research Institute documented a total of 12,479 names, including synonyms (Bashar et al. 2004). Most of these varieties are now extinct from rice farms of Bangladesh. In the 1970s, about 7,000 rice varieties in Bangladesh were replaced by modern HYVs (Thrupp 2000), and further hundreds disappeared in the following decades. Hossain and colleagues' (2013) data indicates that about 416 traditional Aman varieties, 64 Boro varieties, and 241 Aus varieties are currently being cultivated in Bangladesh. Most of the old landraces of Bengal, from both sides of the international border, are now available in only a few gene banks, not in the hands of farmers (Venugadessan, Ramapriya, and Selvarajeswari 2016; Deb 2017).

My own collection of folk rice varieties, accessed from 1995 to 2004 for Vrihi rice seed bank (<http://cintdis.org/vrihi>), comprised about 396 varieties from West Bengal (Deb 2005). This number of accessions increased by the year 2012 to 526, which is perhaps the final number of the remaining rice landraces. However, at least 80 of these landraces are no longer cultivated, and several of them are surviving in single farms (Deb 2019a). As of this writing, the number of extant landraces surviving on farmers' fields in West Bengal might not exceed 400.

The loss of the thousands of rice landraces from farm fields entails the erosion of a vast body of folk knowledge pertaining to the distinctive properties of different varieties, derangement of local food cultures, and food insecurity for poor and



FIGURE 1: Map of Bengal, comprised by Bangladesh and the Indian state of West Bengal. Inset: Map of India and Bangladesh.

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marginal farmers, who no longer have the stock of landraces fine-tuned to local soil and climatic conditions, nor are they able to buy the costly “inputs” (Deb 2005, 2017). In the realm of traditional Bengali culture, the impact of the loss of rice genetic diversity has been insidious and disastrous. Just as the traditional rice fabric of the Philippines has disappeared with the extinction of the special rice variety that yielded the fiber, many of the culinary delicacies have disappeared with the extinction of special rice varieties throughout South Asia, such as the Sitabhog from Bardhaman and the *moa* of Jaynagar, as I will discuss below. Along with the loss of culinary nuances such as the flavor of a sweet or the texture of *khichuri* (a warm savory similar to *pasticcio*, from which the English get the *kedgeree*), we witness the extinction of varieties, characterized by their distinctive color, aroma, length of straw, and nutrient contents.

Rice in Bengali Culture

In Bengali culture, like many other cultures in Asia, “eating rice” is synonymous with “having a meal.” The Sanskrit word “anna” and the old Bengali word “odan” mean both “rice” and “meal.”² A standard Bengali expression, “Have you eaten rice?,” is a polite way to inquire, “Have you had your lunch [or dinner]?” This Bengali culture, especially the rice-based food culture, is similar in both West Bengal and eastern Bengal, which is now Bangladesh, across the border, and reaffirms the adage that cultural boundaries do not obey fluid political boundaries. With this understanding, we discuss here the rice culture of Bengal, covering all districts of both West Bengal and Bangladesh.

TABLE 1 THE USE OF RICE IN BENGALI RITES OF PASSAGE.

Rites of Passage	Rice in Use	Rituals Observed
Childbirth	Raw rice	Blessing of the mother and baby
Baby's weaning and first solid food	Parboiled, short grained rice meal	<i>Annaprāshan</i> : feeding rice meal to the weaned child
Marriage	Popped rice	<i>Lajbarshan</i> : Newlywed couple pouring popped rice in fire.
	Raw rice	<i>Badhubaran</i> : Welcoming the bride, who carries rice seeds on a pot on her head.
	Milled rice	<i>Kanakānjali</i> : Bride throws rice grains behind her, repaying debt to her mother.
	Aromatic rice	Treating guests with <i>Polao</i> and <i>Payes</i>
Death	Popped rice	<i>Smashanjatra</i> : casting popped rice on way to crematorium, to feed birds
	Cooked rice	<i>Shráddha</i> : giving alms and feeding guests

Complex rituals are associated with different phases of rice cultivation, from sowing to harvesting. Although Islamic influence has altered certain rituals related to rice sowing and harvest in most parts of Bangladesh, some of these are still observed as prominent ceremonies in the Bengali cultural calendar, in both West Bengal and Bangladesh. The harvest of winter rice is marked by a “new rice” (*nabanna*) festival, observed all over Bengal, followed by a month-long ceremony of Poush-Parban in which Bengali women prepare dozens of varieties of rice sweets. The sowing of Aus rice varieties is also marked by a ritual performed in the field in the month of April, with a range of flowers, followed by the colorful Spring Festival, Dol (called Holi in northern India). Rice is associated with all rites of passage in Bengali society. Table 1 gives a list of the specific uses of rice in different rites of passage in traditional Hindu Bengali culture, a part of which is observed in a considerable number of Bengali Muslim and Buddhist households as well (especially in the wedding ceremony), such as the use of short-grain parboiled rice for weaning ceremonies, more aromatic cultivars for wedding feasts, and certain popped rice varieties for mortuary rites.

Freshly harvested aman rice grains are considered sacred, and are used in auspicious ceremonies. Aman rice grains, along with durba grass (*Cynodon dactylon*), is an essential component of sacred rituals, and is used as a major component of votive offering to deities—in both Hindu and Buddhist ceremonies. Rice grains are used to pay homage to the elders and bless the young in ceremonies. Several ceremonies of *brata* (undertaking vows) involve expressing the desire for a bounteous rice harvest. The Toshla brata, for instance, observed in the month of Poush, requires women to visit the

rice field and chant praise of the deity in expectation of an abundant harvest of rice.³ The newlywed bride is welcomed into the groom's household with aman rice and durba grass. A traditional manner of giving respect (or to pay a fee) to teachers or spiritual guides is to give them a sizeable quantity of rice grains and fruits.

The diversity of folk landraces shapes the food cultures in different districts. Certain varieties are selected for their distinctive gastronomic and culinary qualities, and these varieties are used in special foods. Thus, the famous rice sweet, moa of Jaynagar in the district of south 24 Parganas, West Bengal, is characterized by the special aroma of Kanakchur, an indigenous landrace. The popped rice (*khoi*) of Kanakchur retains its mild aroma, which usually disappears from other rice grains after “popping” over the fire. A drastic decline in land area sown to this variety has led to the marketing of fake “Jaynagarer moa,” made from nonaromatic modern cultivars. Distribution of the seeds of Kanakchur from Vrihi rice seed banks from 1997 onward among several farmers and farmer organizations has revived cultivation of this variety.

An important aspect of culture is the flourishing of innovative spirit, which motivates people to create novel things. In the field of agriculture, indigenous farmers of Bengal created a plethora of stable varieties, each characterized by distinct agronomic traits and cultural uses, which in turn shaped the region's food cultures. A remarkable example of farmer innovation is Sateen, the triple-kernel rice (figure 2), which I discovered and accessed in 2001 from South 24 Parganas. Panicles of this rice bear approximately 58.3 percent spikelets containing one kernel, 34.5 percent with two kernels, and 7.2 percent with three kernels. The relatively high frequency of



FIGURE 2: *Sateen*, the triple-kernel rice.

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triplet grains, besides other morphological traits, distinguishes this landrace from Jugal, the double-kernel rice (Deb and Bhattacharya 2009). Unfortunately, like much of the crop genetic wealth of Bengal, this landrace is now extinct from the farmers' fields. Basudha farm happens to be the last repository in the country of this wondrous rice.

The cultural significance of rice genetic diversity is also linked to the aesthetic appreciation of different colors of rice hull, a range of awn length, and aroma—all of which were selected as favored traits in different varieties. Many of the folk varieties were in fact bred due to their aesthetic value. As Hawkes (1983) argues, the search for beauty has played an important role in the development and maintenance of intra-specific diversity in many crops, including rice. Different landraces are cultivated for the aesthetic appeal of their characteristic chromatic patterns on the hull—gold, brown, purple, and black furrows, purple apex, gold base, etc. (figure 3). The extra-long (> 40 mm) awns of Nata (from Puruliya) and Kaya (from Bankura and Paschim Medinipur) have not only aesthetic appeal but are effective deterrents to grazing by cattle and goats (Deb 2017). Unique morphological features once motivated farmers to conserve folk rice landraces, regardless of any particular agronomic benefit. Only two farmers in the Puruliya district were growing Hatidhan rice—only because the brown kernels of this variety are characterized by a “notched belly”—a rare trait in rice. The farmers, fascinated by the embryo-like appearance of its kernels (figure 3), were proud of growing this landrace.

The aesthetic preference for aroma motivated many farmer breeders to select and develop a range of aromatic varieties such as Badshabhog, Bhim-sal, Kalojira, Khaskani, Olee, Rani kajal, Shiuli mukul, and Tulsimanjari. Gustatory quality is another important driver for selection of varieties. Farmers of Bankura, Puruliya, Jalpaiguri, and South 24 Parganas grow Kelas, Dahar Nagra, Nalpai, and Moul, respectively, for making particularly tasty crisped rice (moori) from those rice varieties. Sita-sal and Banshkathi are favored in many villages of the Paschim Medinipur district because of their short cooking time, rich taste, and slender grains. Ajirman, Chandrakanta, and Manik Kalma are preferred for making beaten rice (chireh). Aromatic rice can be bold grained (e.g., Bhim-sal), long grained (e.g., Dehradun Gandheswari), or small grained (e.g., Khudikhasa), according to the preference of traditional farmers (Deb 2000, 2005).

Rice grains are often a component of ceremonial arts in Bengal. Elaborate graffiti is created by using white rice powder emulsion on the walls and floors of houses on auspicious religious and cultural occasions. Occasionally, pigmented rice grains are arranged in intricate *mandala* patterns, as shown in figure 4. Certain ceremonies are associated with specific rice varieties, which in turn are conserved by the continuation of the ceremonies. Jamainadu and Jamai-sal are named after the Bengali son-in-law (Jamai), who is ritually pampered during the Jamai Shasthi ceremony in early June with a range of gustatory delicacies (Deb 2000, 2005). Deulabhog, Gobindabhog, Mohanbhog, Mohanras, Radhatilak, and other varieties are sought for preparing rice pudding (payes) and other sweet dishes during various religious and cultural ceremonies, especially at Lakshmi and Gobinda puja celebrations. Bengali nursery rhymes have perpetuated memories of a few traditional rice varieties for their special gastronomic uses. For example, the popped rice (khoi) of Binniand Hamairice, the beaten rice (chireh) of Chandrakanta and Kalam kathirice, and the rice pudding of Chini Atop and Tulsimukul were most favored in ancient Bengal.⁴ Binni rice starch is also an important material for use in the traditional handloom industry of Bangladesh (UBINIG 2015).

Folk Epistemology and Rice Nomenclature

The patterns of nomenclature of folk rice varieties are an interesting topic of research that I can only gesture toward here. It demands deeper ethnographic work on local epistemic systems. A few varieties such as Subal-sal, Asit Kalma, and Deb-dulali bear the names of the farmer breeders who created them. The panicles of Khejurchhari and Narkelchhari have



FIGURE 3: A selection of rice varieties of Bengal. Diverse colors of the hull (top row) and kernels (bottom row) of: (from left) Kalo moti, Kanakchur, Kelas, Kernal, Kalaturi, Kalo nuniya, Jal kamini, Hati dhan, Tulsibhog.

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clustered branches, which look strikingly similar to the date palm and coconut inflorescence, respectively. The panicles of Tulsimukul and Tulsimanjari are reminiscent of the tulsi (*Ocimum sanctum*) inflorescence. Several names also depict their respective grain color: Lal Badshabhog, Lal Binni, Lal Dhepa, and Lal Jhulur are red rice; Kalo Boro, Kalo Jira, Kalo Mota, and Kalo Nuniya grains are black; and the grains of Sada Chenga, Sada Dumrah, and Sada Kaya are whitish in color. Grain width is also indicated in some descriptive names by incorporating “mota” (bold) and “saroo” (thin) terms.

However, such direct associations to the nomenclature are rare. Many of the varieties bear animal names, albeit without any association with the eponymous animals: Ghora-sal (horse), Hatidhan, Hati-panjar (elephant), Hansguji (duck), Hanuman jata (langur), Murgi-sal (fowl), Siyal-sal (fox), and so on. Many varieties commemorate mythological characters, such as Bhim-sal, Lakshman-sal, Meghnad-sal, Raban-sal, Radhatilak, Ram-sal, and Sita-sal, among others. Names of deities are also abundant: Bishnubhog, Durga-sal, Gobindabhog, Gopalbhog, Indra-sal, Kali ashu, Kali komad, Kartik-sal, Laksh-michura, Lakshmi dighal, Lakshmi jata, Narasinghajata, Thakur-sal, and others. Historical characters such as Gouranga and Nityananda are commemorated in the landrace Gour-Nitai. The only landrace that commemorates a person from

modern history is Hamilton, a salt-tolerant variety, named after Sir Daniel Hamilton (1860–1939), a philanthropic Scottish businessman who established the first settlement of farmers, and began cultivation in the Gosaba island of the Sunderban deltas in 1903. The Sunderban farmers, who had developed this variety, suitable for cultivation in coastal saline lands of the Sunderban, named it in grateful recognition of their benevolent friend. Some elite varieties such as Rajbhog, Raja-sail, Rani kajal, and Badshabhog serve to connote their strong aroma and fineness of grains, apt to the tastes of kings, emperors, and queens. These varieties are used on special occasions such as wedding ceremonies, or to treat a distinguished guest. The only varieties that bear the names of specific kinship terms are Boubhog, Boudulali, Bourani, Jamai-sal, and Jamainadu, which connote only two kinship terms, namely, “bou” (wife) and “jamai” (son-in law), implying these two are culturally important relations in patrilineal Bengali households.

RICE AND NUTRITION

Food security, however, includes nutritional security and easy access of the poor to healthy food. Folk rice varieties serve to achieve this goal of food security, with a range of nutrients. Several folk rice varieties containing iron, riboflavin, and

TABLE 2 NUTRACEUTICALLY IMPORTANT METAL CONCENTRATIONS IN GRAINS OF SELECTED FOLK RICE VARIETIES.

Rice Varieties	Iron (mg/kg)	Zinc (mg/kg)	Copper (mg/kg)	Reference/Source
Kabiraj-sal	31.4	20.3	0.4	Deb et al., 2015
Kelas	34.6	44.9	1.7	Deb et al., 2015
Kurai	54.4	23.0	1.8	Deb et al., 2015
Baid dhusuri	150.85	21.68	2.77	Sen Gupta et al., 2017
Champa	25.7	27.5	7.2	Sen Gupta et al., 2017
Dudhé bolta	130.9	24.8	0.7	Sen Gupta et al., 2017
Garib-sal	11.9	155.3	19.3	Sen Gupta et al., 2017
Kundapullan	28.9	32.8	3.0	Sen Gupta et al., 2017
Kalishankar	20.2	27.9	1.9	Sen Gupta et al., 2017
Madraraj	56.3	23.6	3.8	Sen Gupta et al., 2017
Bhut moori	24.4	38.5	7.8	Sen Gupta et al., 2017
Ghasraiz	21.9	0.9	0.0	Sen Gupta et al., 2017
BPT 5204 [#]	8.9	37.9	12.9	Sen Gupta et al., 2017
R68144-2B-2-2-3*	9.8	NA	NA	Haas et al. 2005

- HYV

*- Transgenic iron-fortified rice

NA - Data not available

labile starch have been identified. Dudhsar (syn. Dudheswar) of West Bengal is believed to enhance milk production in lactating mothers. Parmai-sal rice is believed to promote growth in children, while parboiled Kabiraj-sal rice is prescribed for convalescing patients (Deb 2017). Unfortunately, there remains a paucity of information about the nutritional and medicinal properties of traditional rice varieties, owing chiefly to a prevailing institutional neglect of the value of traditional crop varieties and a general lack of interest in research in traditional agrobiodiversity.

Rice contains chiefly starch, and also small quantities of soluble proteins and lipids; in addition, several folk varieties are a rich source of micronutrients like beta carotene (a precursor of vitamin A), various B vitamins like thiamin, riboflavin, and niacin, and minerals like iron and zinc, stored in the bran. Dozens of rice varieties from Bengal are also found to be rich in omega-3 fatty acids and antioxidants (Ray et al. 2014; Ray, Deb, and Poddar Sarkar 2021).

Peripartum anemia, a serious iron deficiency during and after pregnancy, is prevalent in rural Bengal due to deficiencies in iron and folic acid in the regular diet. The starch of a few rice landraces, such as Kelas of Bankura and Bhutmoori of Paschim Medinipur, is believed to cure anemia in women during and after childbirth. (Deb 2019a). My team's recent

study reveals that at least 80 folk varieties, including these two landraces, contain more than 20 milligrams of iron per kilogram of rice grain. Table 2 gives a list of a few representative folk varieties, rich in nutritionally and medicinally important minerals, compared to a modern HYV and a genetically engineered iron-fortified rice. The highest levels of iron were recorded in the grains of Harin kajli, Dudhébolta, and Baid dhusuri rice, which range from 131 to 151 mg/kg (Deb, Sen Gupta, and Pradeep 2015; Sen Gupta et al. 2017). My team also made a serendipitous discovery of the presence of a considerable amount of metallic silver deposited in the bran of Garib-sal, a medicinal landrace from the Puruliya district (Sen Gupta et al. 2017). The presence of silver nano-particles can kill pathogenic microbes (Kyaw et al. 2017), a fact that plausibly explains the traditional use of the rice to treat gastroenteric infections (Deb 2019a).

THE EROSION OF BIOCULTURAL DIVERSITY

As I have shown throughout this essay, shared language and food cultures, among other things, are important components of the cultural identity of a community. Both of these have significant associations with rice cultivation and consumption in Bengal. Not only are the rice varietal names and their

connotations—as shown earlier—predicated on this folkloristic background, but their end uses also are shaped by different cultural-religious ceremonies. Conversely, different rituals used to be traditionally dependent on the availability of certain specific rice varieties. Thus, the worshipping rituals of Lakshmi and Narayan in most farmer households were considered inauspicious if the aromatic Gobindabhog or Gopalbhog rice was not used in preparing the rice pudding. In wedding ceremonies, aromatic rice was once an essential menu item for treating guests. With the modernization of agriculture, most of the heirloom rice varieties have been replaced with a few modern nonaromatic varieties, with a detrimental impact on Bengal's food culture. The disappearance of important rice varieties has weakened the specificity of many rituals. Thus, in the absence of Jamainadu and Jamai-sal rice, the Jamai Shasthi celebration loses its agrarian context in the farmer household. When none of the auspicious rice varieties such as Gopalbhog, Gobindabhog, Mohanbhog, or Thakur-sal are available, the gustatory enjoyment and the solemnity of the rituals of Lakshmi and Satya Narayan puja ceremonies are depleted. In particular, several folklores associated with these ceremonies refer to the specific rice varieties, whose absence makes the ceremonies incomplete and unsatisfactory.

In the absence of specific folk rice varieties, not only is the semiotic significance of diverse rituals undermined but many of the culinary delicacies also become divested of their original flavor, historical context, and social meanings. As discussed above, with the disappearance of Kanakchur rice, the special flavor of the famous Jaynagarer *moa* is no longer found. *Sitabhog*, a famous sweetmeat of the Bardhaman district, was originally prepared from the eponymous rice variety, which is now extinct. Today's *sitabhog* is made with some modern rice variety (such as Swarna or IET-7029), yet bears the name of the rice that is now lost, and its flavor long forgotten. Similarly, various rice varieties traditionally considered appropriate for the taste and flavor of diverse rice dishes (table 3) are either forgotten or extinct from Bengal's food cultural landscape. The extinction of hundreds of rice landraces that were traditionally preferred for making diverse culinary delicacies in different districts of Bengal on both sides of the international border has led to a truncation of the diversity of food cultures. Some of the rice sweets, such as Chapra pithé and Shukchi pithé, are now obsolescent in the districts of Sunamgunj in Bangladesh and Purba Medinipur in West Bengal, respectively, owing to the unavailability of the appropriate rice varieties, and no modern varieties can impart the desired texture and flavor of these rice cakes. Modern HYVs have also replaced the sticky rice varieties with high amylose

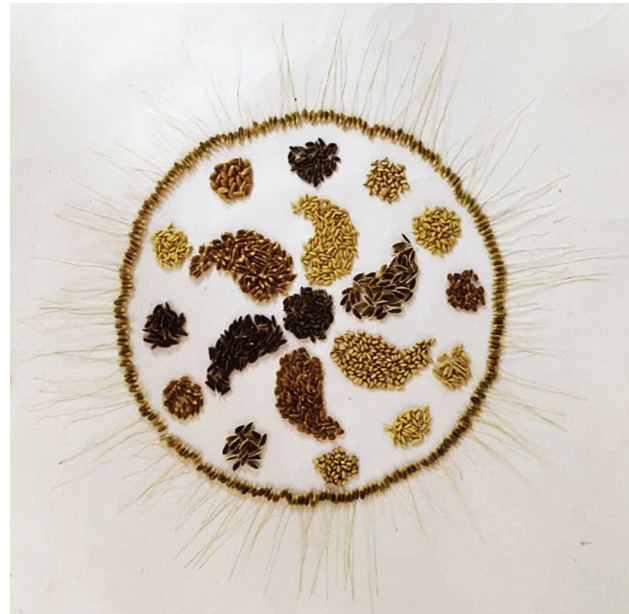


FIGURE 4: Ceremonial decoration with different rice grains.

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content, a necessary ingredient for some specific kinds of rice sweets; thus, those delicacies are no longer cooked in Bengali households. For instance, a special variety of pati-saptah that was once a delicacy of Dinajpur district of Bangladesh is now forgotten because the sticky rice Kalo dumrah is no longer available.

DIMENSIONS OF DECAY

A major consequence of agricultural modernization through homogenization of rice diversity is an increased risk of food insecurity in the face of climatic vagaries (Deb 2017, 2019a). The nonagronomic consequence is not confined to the decimation of the local food cultures alone. With the large-scale introduction of modern rice cultivars, the significance of various other aspects of traditional Bengali culture associated to rice diversity is also forgotten. Most of the rice landraces traditionally considered to be auspicious for certain cultural ceremonies are now either lost or forgotten. With the rapid advancement of industrial agriculture, in pace with the westernization of values and urbanization, numerous typically Bengali ceremonies of observing vows (*brata*) such as Toshla and Punyipukur, closely linked to local rice cultures, are no longer observed anywhere in Bengal; Itu puja, Ind puja, and Neel shasthibrata are now obsolescent. At the same time, the diversity of crop landraces and their end uses associated with these ceremonies are also forgotten, lost. Several folk songs and dance forms associated with many of these vows and

TABLE 3 REPRESENTATIVE RICE VARIETIES CONSIDERED TO BE APPROPRIATE / AUSPICIOUS FOR PREPARING DIFFERENT FOOD ITEMS AND THE DISTRICTS OF THEIR USE IN WEST BENGAL AND BANGLADESH.

Food Item	Brief Description	Favoured Rice Varieties and Districts of Use (in parentheses)
Muri	Crisped rice	Benaphool, Mukhibalam, Noichi, Rup-sal (Bankura), Malsira (Jalpaiguri, Gaibandha), Bhutmuri, Jatakalma, Mallick-sal, Nata (Paschim Medinipur), Jhinge-sal, Raghu-sal (Puruliya), Kajaldheki (Mymansingh), Kadam-sail, Sonakathi (Rajshahi), Nakuchi (Jhalkathi) Lal aush, Megi, Mugi mansara (South 24 Parganas)
Khoi	Popped rice	Akshay rani, Hansguji, Majhi-jhulur, Nagra-sal (Puruliya), Balam (Bardhaman, Birbhum), Balaram-sal, Lakshmi kajal (Nadia), Kanakchur, Paloi, Tal mugur (South 24 Parganas), Kashia binni (Dinajpur), Lakhai, Kaya (Paschim Medinipur), Kalo nuniya (Cooch Behar), Paari (Maldah), Sada dhepa (Tangail), Lokma (Jhalkathi)
Chireh	Beaten rice	Agniban (Nadia), Shal-keleh (Nadia, Jessore), Ajirman (Howrah), Balam, Bardhamannagra (Bardhaman), Chandrakanta, Raghu-sal (Bankura), Jata Leta-sal, Nata (Paschim Medinipur), Lakshmi jata (Hooghly), Raja-sail (Khulna), Nara hasoi, Saban-sal (Birbhum), Tengra patnai (Tangail)
Murhki	Sweetened khoi (mixed with palm jaggery or sugar)	Sadabalam (Murshidabad), Rajlakshmi (Puruliya), Hatichampa, Kanakchur (South 24 Parganas)
Moa	Flavoured ball of Murkhi	Kanakchur (South 24 Parganas)
Bhat	Steamed rice Non-aromatic	Asitkalma, Asanleya, Bakulphul, Benaphul, Kelas, Noichi (Bankura), Bahurupi, Jhinge-sal, Majhi-sal (Puruliya), Banshkathi, Dudh-sar, Gangajali, Kabiraj-sal, Mugai (Paschim Medinipur), Kajal-kathi, Kartik-sal (Jalpaiguri), Chapa khushi, Darka-sal, Lebu-sal, Leta-sal (PurbaMednipur), Bochi (Jalpaiguri), Dadkhani (Jessore and North 24 Parganas), Mughal-sal (Netrakona), Orameteh (Howrah), Ratulaush (Hooghly), Sadabalam (Murshidabad)
	Aromatic	Badshabhog, Banshphul (Netrakona), Chini atop (Barishal), Gayasur (Mymansingh), Gobindabhog (Nadia, Bardhaman), Jirasari, Rambok (Darjeeling), Kalojira, Kalo nuniya (Cooch Behar, Jalpaiguri), Kaminiabhog (North 24 Parganas), Kataribhog (Netrakona, Tangail), Kharishabhog, Sitabhog (Bardhaman), Dehradun gandheswari, (South 24 Parganas), Khaskani (Bankura), Mohanmala, Lilabati (South 24 Parganas), Marichmukul (Puruliya), Rani kajal, Shiulimukul, Swarnakanti (Paschim Medinipur), Tulsimukul, Tulsimanjari (Birbhum)
Panta	Steamed rice soaked overnight in cold water, semi-fermented	Dadkhani, Meghna (Nadia, Khulna), Nabanna-sal, Tengra-sal (Bardhaman), Rangi (Puruliya)
Khichuri	A porridge of rice, beans and vegetables, sometimes egg and minced meat (cf. pasticcio)	Bochigondri (Puruliya), Boloigenti (Dinajpur), Chengarangi (Maldah), Dadkhani (Jessore and North 24 Parganas), Durga (Nadia), Gentu, Mota dhusuri, Thupi-sal (Puruliya), Haldiguri, Rani kajal (Paschim Medinipur), Harinkhol, Sylhetbalam (Netrakona, Chittagung, Sylhet), Kantarangi, Khira-sal, Nara hasoi (Birbhum), Rasaraj (Bardhaman), Jatai balam (Satkhira)
Payes	Rice pudding	All aromatic varieties (86 varieties)
Patisaptah	Rice pancake	Kalojira (Cooch Behar), Kalaturi, Lilabati, Dar-sal (South 24 Parganas), Jhinge-sal, Danaguri (Bankura), Chhoto nuniya (Jalpaiguri), Kataribhog (Paschim Medinipur), Chini atop (Barishal), Kataribhog (Jessore), Kalijira (Netrakona)
Asképiþhé	Steamed rice sweet	Kaya (Bankura), Lathi-sal (Puruliya)
Shukchipithé	Rice pancake	Mugai (PurbaMedinipur)

(continued)

Table 3 (continued)

Food Item	Brief Description	Favoured Rice Varieties and Districts of Use (in parentheses)
Chapra pithé	Baked and light-fried rice cake	Pashu-sail (Sunamgunj)
Pulipithé	Fried rice cake, stuffed with coconut and jaggery	Bakulphool (Bankura), Dar-sal (South 24 Parganas), Kamalbhog, Mugai (PurbaMedinipur), Raja-sail (Netrakona), Gambir (Jessore), Mulmuli (Gaibandha)
Gokulpithé	Fried rice cake, stuffed with coconut and cheese, soaked in sugar syrup	Raja-sail, Gulse-mota (Netrakona, Barishal)
Purpithé	Steamed cake, stuffed with coconut and jaggery	Lata-sal (PurbaMedinipur)
Bhapapithé	Steamed rice cake	Dudhraj (Kushthia), Gobindabhog (Nadia), Chini-sail (Tangail), Halud ganthi (Puruliya), Jami nadu (South 24 Parganas)
Jhalpitha	A savory of rice cake, cooked with hot spices	Rata-sail (Sylhet)
Chongapitha	Rice cake cooked with milk in a bamboo culm	Biroin (Sylhet, Chittagang, Mymansingh)
Polao	A sweet pilaf, the Bhadu ceremony, cooked with saffron and raisins, usually without meat.	Iyor-chal (Netrakona), Banshkathi (Birbhum); short-grain aromatic landraces

SOURCE: Personal survey data; Partha (2019)

ceremonies are no longer performed. Women of Bankura and Puruliya districts, where Bhadu ceremony was once ritually observed, have now forgotten the lyrics of the associated songs and the specific dance forms. Even women above 60 can hardly recall the lyrics beyond a few lines of the songs.

The erosion of traditional rice varieties has had a further impact on visual aesthetics of Bengal's material culture: the roofs of the beautiful "bungalow" huts in Bengal villages are no longer thatched with paddy straw but have been replaced by corrugated tin and asbestos sheets—despite the obvious discomfort of living under a tin roof in hot seasons—primarily because the modern paddy straw is too short and nondurable for thatching. Today, the village landscape of Bengal is bereft of its eponymous "bungalow" architecture with thatched roofs. To the modern Bengali farmer, market-oriented considerations override the direct use value (e.g., comfortable living) and aesthetic value of traditional architecture. In the case of traditional crop varieties, quantitative grain yield considerations are superior to any unique visual or chemical trait.

The most insidious disruption of indigenous culture that agricultural modernization has brought about is the loss of the communitarian ethos around the seeds and the community sharing of innovations and knowledge. Until the 1970s,

hundreds of landraces were created by unnamed, unknown farmer innovators, who shared their creations with all members of the community. The farmer who created the amazing triple-kernel variety Sateen; the farmer who selected and stabilized the germ line for the "notched belly" kernel character of Hatidhan; and the farmers who discovered the medicinal property of Garib-sal never claimed an intellectual proprietorship over their innovations. In the 1990s, Mr. Asit De, a farmer in the district of Bankura, created a new rice variety named Asit Kalma (Deb 2005), and distributed the seeds for free among numerous farmers to cultivate. Like all traditional innovations, which are widely accepted by the community and transmitted across generations, regardless of any written documentation to authenticate it (Deb 2009), this new variety was incorporated into the local culture as a common property of all farmers. Seeds in all agrarian cultures were once a commons, to be openly shared among members of the community and exchanged with other communities (Bray 1994; Sajise et al. 2012; Song et al. 2019; Deb 2019b). The disintegration of the seed commons began in the 1960s, when national and transnational seed corporations turned the crop seeds into a commodity. Farmers are now inculcated into the habit of buying modern seeds every year, and abandoning their heirloom seeds, which lose their viability after a year

of disuse. This process has further contributed to the decimation of hundreds of landraces, and concomitantly, the abolition of the culture of seed exchange among members of the community. The loss of the traditional seeds, combined with the erosion of the tradition of free sharing of seeds and agroecological knowledge among farmers, has led to a decline of self-reliance of the indigenous farmers, who now rely entirely on seed supply from the private seed companies, and wait on statutory agricultural institutions for the knowledge about the new seeds. Since 1997, Vrihi has been engaged in the effort to revive the tradition of exchange of farm-saved seeds, as a liberatory measure to extricate farmers from a dependence on seed corporations and exogenous seeds.

In closing, I deem it necessary to reiterate that the process of erosion of the enormous diversity of rice grown in Bengal, begun in the 1960s with the Green Revolution, ushered in the process of rapidly undermining vernacular languages, customs, and material culture, along with the capacity of the average Bengali to appreciate the value of their heritage, from the style of architecture, gastronomic specialties, to life cycle rituals. The homogenization of rice genetic diversity poses a threat not only to food and nutritional security of the population but also to the cultural identity of the people of this productive region. From an estimated 15,000 landraces of rice in the 1940s to about 1,250 in the entire land of Bengal, on both sides of the international border, marks a massive, 12-fold reduction in the varietal diversity, accompanied by a drastic obliteration of the distinctive material culture, folklore, diversity of culinary art, and tradition of community seed exchange in the region. 🍌

Declaration

This work received no funding support from any funding agency. There is no conflict of interest.

Acknowledgments

I am grateful to Amit Bera, Debdulal Bhattacharya, and Pavel Partha for providing me with valuable pieces of information about the culinary uses of different rice varieties in different districts of Bengal. I am also grateful to two unknown reviewers and the editors for their helpful suggestions on an earlier draft of the manuscript.

NOTES

1. The Indian Province of Bengal was partitioned in 1947 into the Indian State of West Bengal and East Pakistan, which later became independent in 1971 as the Republic of Bangladesh.
2. Kabikankan Mukundaram, the composer of the sixteenth-century classic *Chandimangal*, wrote, “ভেল বিনা কৈলুঁ নান, করিলুঁ উদক পান, শিশু কাল্দে ওদনের তর . . . to describe his poverty.

3. “তুঁম-তুঁমলি, তুমি কে।
তোমার পূজা করে যে —
ধনে-ধানে বাড়ন্ত,
সুখে থাকে আদিঅন্ত।” (Tagore 1943: 32)
4. “কলমকাঠির পাতলা চিঁড়া হামাই ধানের খই।
চিনি-আতপ চালের পায়েস খাবে এসো সই।”

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