

Debal Deb | The barefoot conservator

Debal Deb's indigenous rice bank is a brave effort to counter Indian agriculture's dash towards genetic erosion



Debal Deb at his home in Kolkata with five of the rice varieties that he grows on his farm. Photo: Indranil Bhoumik/ Mint

Freedom from extinction | Debal Deb

The Sunday morning in July marked the fifth straight day of rain in the fecund foothills of the Niyamgiri range in western Odisha's Rayagada district. The delayed showers heralded the year's busiest period for ecologist **Debal Deb** and his right-hand man Dulal as they prepared Basudha—a 2-acre farm unlike any other in India—for an intricately planned growing season.

Wrap your mind around this: Over the coming days, the farm would see the planting of 1,020 indigenous varieties of rice—part of a remarkable effort under way since 1996 to rescue a sliver of India's genetic diversity from extinction.

This wouldn't just mean planting 1,000 varieties of rice saplings on a plot one-tenth the size of Mumbai's Oval Maidan, and watching them grow. Maintaining the genetic purity of each of these heirloom varieties, year on year, necessitates an intricate sowing plan crafted by Deb, 53, and his colleagues, so that no two neighbouring varieties flower at the same time, thus guarding against cross-pollination. Deb

published his methodology in the *Current Science* journal in July 2006, after field-testing it for six years. The constant addition of vanishing varieties to Deb's growing collection—last year, it numbered 960—means the plan needs seasonal redesigning.

Rice—daily sustenance for a majority of Indians—is a grass species, believed to have been domesticated over 7,000 years ago in a broad region extending from the north-eastern Himalayan foothills to southern China and South-East Asia. Over the centuries, human hands selected thousands of different strains, evolved in response to specific ecological niches. The undulating region of western Odisha, called the Jeypore tract, was one of the world's leading areas of diversification, where a great number of rice varieties, also called landraces, were developed by cultivators—"the unnamed, unknown, and greatly talented scientists of the past," as Deb describes them.

In the 1960s, when Deb was growing up in Kolkata, India was estimated to have over 70,000 such rice landraces. According to a 1991 *National Geographic* essay, just 20 years later, with scientists and policymakers chasing high yields through aggressively pushed modern, input-intensive hybrids, over 75% of India's rice production was coming from less than 10 varieties.

This devastating and irreversible genetic erosion from India's farms continues: For example, rice varieties from West Bengal that Deb collected just five years ago are no longer being cultivated. The disappearance is insidious. "It can result from something as innocuous as a farmer dying, and his son dropping the variety," says Deb. "I witnessed this on a farm in Birbhum, with a rare two-grained variety called Jugal."

An Indian Institute of Science alumnus and a former Fulbright Scholar at the University of California, Berkeley, US, Deb abandoned his job at the World Wildlife Fund in the mid-1990s after struggling to convince colleagues to fund documentation of Bengal's vanishing rice varieties. "Conservation organizations suffer from what I call mega-fauna species syndrome," he says, acerbically. "Tigers—yes. Rhinos—yes. But if some earthworms or beetles are going extinct because of chemical pollutants on a farm, who cares?"

Deb headed out to villages in search of indigenous rice, often travelling on bus rooftops or by foot; an iconoclast by temperament, the small, wiry man still abjures institutional links, relying on teaching assignments in European and American universities and donations from friends to sustain Basudha. He particularly sought out areas that were remote, un-irrigated, and had marginal farmers who could not afford chemical inputs and seeds from the market. "The places Indian elites like to call 'backward', such as tribal areas, were those with the greatest chances of having retained these varieties over time," says Deb. "When I would find such a variety, I would ask the farmer's family for a handful, explain why I wanted it, thank them for preserving a vital part of our heritage, and urge them to not give up cultivating it."

Deb has collected 1,020 *desi* rice varieties over the past 18 years. They come from 13 states across north-eastern, eastern and southern India. Kashmir, with two indigenous varieties, is the latest entrant to the seed bank, which Deb has named Vrihi, Sanskrit for rice. There are seeds that will grow in soils with high salinity, or conditions of submergence; others are drought- or flood-tolerant; yet others are resistant to attacks from varying pathogens; some are suited to dryland cultivation. There are medicinal varieties as well as 88 aromatic varieties.

These landraces—embodying centuries of accumulated knowledge—and farmers who can work with them are crucial for sustainable ecological agriculture, argues Deb. Annual seed conservation training and a distribution effort centred on the small farmer complement his in-situ conservation project, resulting in an informal personal network of about 3,000 cultivators.

Farmers who approach Basudha for seeds get them free of cost, with a plea to grow them and in turn become distributors to other farmers, to help reduce the chances of the variety becoming extinct.

Last December, having heard of the seed bank, 40 Malkangiri farmers travelled over 200km to Basudha's doorstep and demanded indigenous seeds for their farms. "Not one asked about yield or market price," says Deb. "It was a very moving moment for us." Deb is also proud that the farm stands on common land in Rayagada's Adivasi village of Kerandiguda: its residents invited Deb after taking seeds from his bank, and hearing that he was in search of a place to house his project.

The communitarian ethos defining Deb's work contrasts sharply with agricultural policymaking, where the voices of the small farmer—the largest group of Indians—are often impossible to detect. Take, for example, a gene bank built in recent years by the Odisha government. Located in a government building in Bhubaneswar, 900 varieties from across the state are sealed in aluminium foil packets, and preserved at zero degrees in an impressive facility. It is a laudable effort. Only, how does an average farmer access it?

Officials watching over the collection say they cannot give farmers seed samples to cultivate since these might fall into the wrong hands (seed companies that might exploit the genes for developing new proprietary seed lines). Never mind that the entire collection was built with farmer contributions from across the state. Why does the state not officially release these *desi* varieties in the market to encourage use and, thereby, survival? The release process, admit bureaucrats, is skewed towards modern, commercial varieties developed by breeders in government labs or private seed companies.

Besides being inaccessible to the average farmer, says Deb, official gene banks neglect the process of life's co-evolution by freezing seeds in time. "Bring out seeds of a pest-resistant variety after 30-40 years. They will have lost some major traits of defence since in the meantime the pest has evolved," he says. "They might be useful for research but are not geared towards our farmers in the field."

Deb counters the official argument that indigenous varieties result in inferior yields: "I have several varieties which outperform the so-called high-yielding varieties." High yields do not ensure food security, he reminds, pointing out that India is home to record stockpiles of rice and wheat, as well as a quarter of the world's undernourished.

Over lunch—greens, vegetables, *dal* and rice combining eight different varieties from the farm—Deb asks if we can evaluate our heirlooms in money. "Imagine a unique painting, a sari...an ornament which has been in your family for 200 years—would you sell it off to make money?" he asks. "That's how these indigenous rice varieties are—they are our culture."

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