



## ENVIRONMENT

## Debal Deb: Seed warrior who has conserved 1,480 traditional rice varieties & shared them for free with over 7,600 farmers

*Deb resigned from his job at the World Wide Fund for Nature-India (WWF-India) in 1996 and began his native seed conservation journey without any institutional funding or support*

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In 1996, ecologist Debal Deb approached the West Bengal State Directorate of Agriculture's Rice Research Station, where native or heirloom rice varieties are conserved. Deb had collected 152 traditional folk rice varieties by travelling to remote and mostly tribal villages of Odisha, West Bengal and some other states and wanted the institute to maintain the seeds. The institute, however, refused to accept the seeds, saying he was pursuing the "unscientific and retrogressive" goal of reviving the forgotten folk rice varieties.



When Deb argued that none of the hybrid and high-yielding varieties could survive on dryland farms without irrigation, on deep-water farms or coastal farms with salinity, the institute's director asked him to leave the matter to agricultural science experts.

Deb was, at that time, working with the World Wide Fund for Nature-India (WWF-India), safeguarding wildlife. But conservation of heirloom seeds wasn't a focus area for many institutions back then. So he resigned from his job in 1996 and began his native seed conservation journey without any institutional funding or support.

Today, Deb has conserved 1,480 heirloom or native rice varieties (also called landraces), which he has shared with over 7,600 farmers across India free of cost.

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*Debal Deb addressing Agroecology trainees at his Basudha rice seed conservation farm in southern Odisha. Pic: Debal Deb*

"After resigning from my job, I settled in a village in West Bengal to set up a folk rice seed bank and exchange centre for farmers," says Deb, who has a PhD from Calcutta University and post-doctorate from the University of California, Berkeley (USA) and the Indian Institute of Science, Bangalore.

He named the seed bank Vrihi, the Sanskrit word for rice.



*Vrihi is now South Asia's largest open-access rice gene bank with seeds from India, Bangladesh, Sri Lanka, Pakistan, Philippines, Thailand, Korea and Italy.*

Vrihi's 1,480 varieties are grown every year on the Basudha farm in the foothills of southern Odisha's Niyamgiri mountain range. Spread over 1.7 acres in a tribal village of Rayagada district's Bissam Cuttack block, Basudha which means Mother Earth in Bengali, is surrounded by hills and forests. No external inputs are used at this organic farm, which is visited by hundreds of researchers, students, farmers and others every year.

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*Some of Vrihi's native rice seeds on display at an exhibition. Pic: Debal Deb*

"So far, we have shared seeds of heirloom rice with over 7,600 farmers from 11 states including Odisha, West Bengal, Tamil Nadu, Chhattisgarh, Assam, Meghalaya, Karnataka and Bihar," says Deb, now 61.

### ***The lost landraces***

According to the late Dr R H Richharia, one of the leading rice experts in India, more than 140,000 landraces were grown in the country until the 1970s when Green Revolution swept the country and hybrid seeds stormed the farms. "If we exclude the same variety of rice referred to by different names in different locales, this figure boils down to around 1,10,000 distinct varieties," says Deb.

However, most of them have been lost forever as farmers switched to hybrid seeds and stopped the cultivation of traditional varieties.



*“Out of 1,10,000 native rice varieties, no more than 6,000 rice landraces likely exist in fields across India,” he says.*

Deb recalls that in 1999, he collected a critically endangered rice variety named Agni-sal which had a fiery red grain and its stem was strong enough to withstand storms. “The next season I gave the seeds to a farmer who was looking for a variety that would flourish on his highland farm, which was swept by strong winds,” he says.

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The farmer returned the following year and had a great harvest despite a cyclone that had devastated the neighbouring farms. The year after that, however, an officer from the district’s agriculture department persuaded him to replace Agni-sal with a hybrid variety.



*Debal Deb addressing a gathering in the USA. Pic: Debal Deb*

“As a result, Agni-sal was lost from our accession. I rushed to Lataguri from where I had procured the sample from the donor farmer, only to learn that he had passed away the year before and that his son had abandoned that rice. Agni-sal, to my knowledge, went extinct from the world,” he rues.

### ***Bringing farmers back to traditional varieties***

To ensure that the remaining folk rice varieties are not lost, Deb, a strong votary of farmer-led agrarian models and open-source seeds, has been promoting the non-commercial exchange of seeds.

This is the only way to bring farmers back to cultivating indigenous varieties. “We individually germinate rare seeds in clay pots and they are irrigated with cow urine before being given to farmers,” he says.

*In return for receiving any native rice variety for free from the Vrihi seed bank, the farmer has to give seeds for at least one folk rice variety.*



Farmers are also encouraged to share the seeds with others in their community.

“Farmers from South India, some indigenous growers and the tribal people I am working with in Odisha, Maharashtra and Tamil Nadu are giving more importance to traditional varieties as they value heirloom seeds also for their cultural and religious significance. The tribals in Odisha especially don't want to sell rice as they consume it themselves because of its taste, aroma and medicinal benefits,” he says.

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*Bhutmuri (meaning ghost's head) is an indigenous rice variety rich in iron and B vitamins. Similarly, Paramaisal rice has high levels of antioxidants, micronutrients and labile starch, which can be converted into energy rapidly.*

Indigenous varieties are also well-suited to local climatic conditions and can withstand calamities as well. For example, the traditional lowland farmers used to grow flood-tolerant rice, which grew taller with rising water levels.



*Traditional or folk rice varieties come in varied shapes, sizes and colours. Pic: Debal Deb*

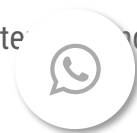
This underwater “stem elongation” property is present in native varieties such as Lakshmi Dighal, Jabrah, Pantara and Rani Kajal. Another type of flood-tolerant variety can withstand prolonged submergence in floodwater. “One of the genes governing submergence tolerance is SUB1, found in several Bengal landraces,” Deb says.

### ***Maintaining genetic purity***

Deb trains farmers to maintain the genetic purity of seeds by avoiding cross-pollination. Yet, some of them come back with new traces in their crop. “That implies that the variety had crossed with pollen from some other variety grown in a neighbouring plot. To prevent this cross pollination, I adopted my ‘flowering asynchrony’ method.”

“This entails planting all landraces in different plots in a manner that no neighbouring varieties share the same date of flowering,” he explains.

The minimum number of plants required to maintain all the genetic endowments of a given landrace is about 50. At Basudha, they grow 64 individual plants of each variety on only four square mete





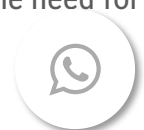
Any “off type” plant, arising from chance mutations is marked out to maintain the genetic purity of each germ line. “Most of these varieties are also maintained by a majority of recipient farmers without any loss of purity,” he adds.

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Farmers sow all their seeds every year. Otherwise, most of the rice would fail to germinate the next year. Due to this, the seeds conserved on farms continue to co-evolve with diverse pathogens and pests that come up with time.

*Basudha conservation farm's nursery beds, from which 64 individual plants of each variety are transplanted onto a 4 square meters of land. Cross-pollination is precluded by following the 'flowering asynchrony' method. Pic: Debal Deb*

In contrast, seeds in government-owned seed banks are dried and preserved at minus 20 degrees Celsius, keeping them viable for almost 35 years. “Frozen in time, they are separated from the evolving life forms in the outer world. When grown out after 35 years, they will have lost any inherent resistance to specific pathogens, which will meanwhile have evolved into newer strains,” Deb says, emphasizing the need for on-farm conservation of seeds instead of in-situ seed banks.



In the early years, he used his savings to collect rare seeds from across India and distributed them for free to farmers. Beginning in 2000, donations from friends and supporters began to pour in which now make up for the majority of the funding.

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Having spent nearly three decades preserving indigenous rice varieties, Deb's goal remains what it was in the 1990s – to free the farmers from the clutches of corporates selling hybrid seeds, which require chemicals, and a lot of water and have to be bought from the market every year.

While a lot of awareness has been generated about native seed conservation since his 1996 visit to the West Bengal State Directorate of Agriculture's Rice Research Station, Deb knows it's an ongoing journey. And while it's impossible to bring back landraces lost forever, it's very much possible to conserve whatever remains.

*(Rashmi Pratap is a Mumbai-based journalist specialising in business, financial and socio-economic reporting)*

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*Dipanjan Dey* says:

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