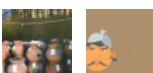




A POTFUL OF RICE FOR THE FUTURE

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A researcher and a farmer in Odisha show the way to preserve India's indigenous rice varieties, in face of tremendous onslaught from seed and chemical fertiliser companies.

BY K P PRABHAKARAN NAIR

I get as much or more average rice production on my land as those using chemical fertilisers and pesticides in this region... If land is not turned to non-food crops like tobacco, we could easily produce enough food with organic farming

In May 2009 super cyclone "Aila" swept the Sunderbans in eastern India. Thousands of hectares of rice were ruined overnight and the area was submerged in salt water. A handful of traditional rice farmers sowed three salt-tolerant rice varieties. These farmers were the only ones who harvested some rice the following winter.

These are not the imported and cross-bred "miracle high yielding hybrid rice" varieties about which our rice experts keep boasting day in and day out, all of which were devastated by Aila. But they are the result of the painstaking work of one person, who, over the years in a remote village in Odisha, is working to preserve our traditional rice varieties for posterity so that India does not lose its invaluable rice germplasms.

Lit by a kerosene lamp, the two-room hut just outside a sleepy hamlet in Odisha's Rayagada district could easily pass off as any farmer's house in this tribal region. A step inside and one is taken aback by the hundreds of earthen pots labelled with coded stickers stacked in a corner as well as under a bed. These pots treasure over 750 varieties of rice grains, some on the verge of extinction.

The keeper of the seed bank, Debal Deb, has been collecting and conserving these rare native varieties over the last two decades. He does not hire "trained" agricultural experts. His only helpers are the farmers who continue to depend on "heirloom" (traditional) seeds, which have a glorious past.

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Odisha is home to some of the rarest rice germplasms in the world. It has the Central Rice Research Institute (CRRI), now under the control of the Indian Council of Agricultural Research (ICAR). Its first director, the late Dr. Riccharia, was perhaps the best rice breeder world has seen. He was not the run-of-the-mill agricultural scientist of whom we have too many in the present day, but a committed man with a great vision for the future of rice in India. He wanted to preserve our rarest of the rare rice gene bank so that the poachers from the West would not snatch them away, as they did through a “hand-in-glove” operation in the early Sixties, when some of our own “scientists” gifted these to the Americans through the back door.

Had he lived and been allowed to work peacefully, India’s agricultural destiny would have taken another route, certainly in rice agronomy. He was not just a gifted rice scientist, competent and committed, but, above all, a patriot. But he would not succumb to the Western lure of money and dubious “awards”, and was hounded out of office.

Dr Debal Deb is a modern-day version of Riccharia. After a PhD from Calcutta University and Post Doctoral Research in ecological economics and marine and estuarine resources from the University of California, Berkeley campus in USA and at the Indian Institute of Science in Bengaluru, he has set out to accomplish what Riccharia could not. Adjacent to the hut, Deb’s “Rice Gene Bank” is a field where he grows these varieties to conserve their germplasm. But, this is no easy task. Barely half a hectare means Deb gets just four square metres of land to grow each variety, where he can plant only 64 paddy hills. This is just above the minimum viable size of about 50 hills required to maintain the genetic resource of a crop.

Then there is the problem of maintaining the genetic purity of landraces grown next to each other. The internationally recommended isolation distance of at least 110 metres is impossible to maintain on such a small-sized farm. But Deb has overcome this constraint by planting each variety surrounded by ones with different flowering dates. After harvesting and threshing the rice plants, he saves some seeds in his earthen pots, and distributes the rest among the farmers to promote their use and make people aware of their advantages over the imported hybrids. His conservation strategy was recently published in the reputed journal Current Science.

What does it take to maintain this rare rice gene bank and help the poor farmers?

It takes a lot of planning. Every year, it takes Deb and his committed “farmer assistants” several days and nights to map and allocate appropriate plots for all the 750-odd varieties before they transplant the seedlings. Even though rice is a self-pollinating crop, there is always the risk of cross-pollination. To avoid this, he surrounds planted variety with ones which flower on different dates. This prevents cross-pollination.

He then eliminates the “off-type” plants within each population at different life stages of the plant, based on their basal sheath colour, the presence or absence of awn (a needle-like plant part), grain colour and grain size. Based on matching these characteristics for eight years, he succeeds in preventing the likelihood of genetic inter-mixing. Thus, all the seeds distributed among the farmers are 100 per cent genetically pure, except some occasional or undetected mutations.

What is the greatest challenge to this strenuous path in preserving India’s rich rice bio diversity?

This rare rice gene bank, named Vrihi, faces the greatest threat from two sources: First, an unscrupulous farmer might clandestinely hand over some of these rare seeds to multinationals or their compatriot Indian poachers, who are in a “hand-in-glove” operation, as happened in the Sixties, engaged either in research/development or in pure seed business for profit.

Recently, a parallel exercise in Odisha by Natwarbhai, a retired school teacher in his eighties, came to grief in this way. A committed organic farmer, Natwarbhai, though not as meticulous as Deb, has a collection of 360 rare local rice varieties, including the rarest of the rare, the black Kali Jiri. He recounts sadly how an institution from Chennai run by a famous scientist took some samples of this rare rice variety from his rice fields, and



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then claimed credit for the variety as its own.

The second threat is official apathy. The massively funded ICAR and CRRRI will simply have nothing to do with Vrihi. One cannot fathom the reason.

It is important that some committed non-governmental organisation comes forward to take the torch forward, ensuring that when Deb is no more this unique work is not lost to the nation. It is also essential to ensure that this resource does not fall into the hands of unscrupulous persons. It is not just a question of accession, but also of keeping all the varieties alive in situ, every year, maintaining their genetic purity, distributing the seeds free of cost to needy farmers, and training them in seed-saving techniques, which are unfortunately being forgotten very rapidly.

Indigenous farmers are willing to grow these rare varieties for their intrinsic, aesthetic and rare cultural traits (tolerance of salinity, diseases, etc.), not for pecuniary gain. It is just a matter of faith in the land's traditional rice culture. These farmers must remain the custodians of the treasure created by Deb. He has applied for the registration of some landraces with the Protection of Plant Varieties and Farmers' Rights Acts, and, he hopes to secure Intellectual Property Rights (IPR) in the name of farmers' communities. He has also tried to secure the IPR of the knowledge of the folk rice varieties by publishing a book in 2000 and conferring the copyright on Vrihi.

He confesses his inability to vouch for absolute protection from bio-piracy. It will be a tragedy if any part of this heritage falls into the wrong hands, as happened with Natwarbhai's Kali Jiri rice. The only way of preserving his work is through an organisation that can ensure that Deb's monumental work is saved for future generations.

Natwarbhai is, of course, the other innovator living in Odisha, and his story is equally remarkable. His conservation work alone is an immense contribution to the Indian legacy, but there is more to his profile. Natwarbhai lives in Narishu village near Niali in Cuttack district and has practised organic farming for more than a decade now. He swears by its potential to feed India's bulging population and says that some of the varieties he grows yield, on average, more than two tonnes/acre. This is more than the so-called imported and cross bred high-yielding varieties that farmers around him get after using loads of chemical fertiliser, insecticides and pesticides to boost yields. And he spends much less, since his main inputs are cow dung, natural pesticides when occasionally needed, and labour.

Natwarbhai, his friend Rajendra and Jubraj Swain have been active in relief work after the super-cyclone. They set off to find traditional rice varieties, travelling over 5,000 km within the state, and also a little outside, to locate them. They have brought back dozens of varieties still grown by the so-called backward farmers.

He tried them all, noting down their names, characteristics, and productivity. He and Jubraj Swain continued their search and activity even after Rajendra died of cerebral malaria, something common in these parts of India, as in Africa, in the remote villages where tribals and poor people live. They have collected 360 varieties, 90 per cent of these from Odisha. The aim is to collect a total of 500 varieties.

Even this is only a fraction of what Dr Richharia had (25,000 plus). The point to be noted is the unbelievable wealth of rice germplasm of India. Thus, if one grows all these varieties (360 of them) in small plots, one could eat a new variety each day round the year, and need not have to cultivate a single variety year in, year out, as is being advised by our agricultural "experts".

“ All that changed with the “green revolution” hype. And now, with behemoths like Monsanto in the game of genetically modified seeds, the idea is to control the rice production of this vast land with a few genetically bred varieties that will, if permitted, eventually eliminate all of our native rice varieties ”

India's rice diversity is so vast—anything between 50,000 and 3,00,000 varieties. Yet, why are we always being told that the imported “dwarf” varieties are the only panacea for our rice agronomy? Among Dr Riccharia's collection were some very high yielding strains, some with exquisite flavour, some with nutraceutical, and others with pharmaceutical properties.

All that changed with the “green revolution” hype. And now, with behemoths like Monsanto in the game of genetically modified seeds, the idea is to control the rice production of this vast land with a few genetically bred varieties that will, if permitted, eventually eliminate all of our native rice varieties.

In brinjal, Monsanto, through its native collaborator Mahyco (Maharashtra Hybrid Seed Company) clandestinely used the native “Gullai Badnekai” (it's a Kannada name meaning Round Brinjal, which is highly nutritious, tasty and resistant to many pests and diseases) to bring out it's Bt brinjal. However, with the moratorium on Bt brinjal in place, the company had to put on hold its commercial production.

How does Natwarbhai keep track of this diversity, year after year? He says he and his colleagues keep an album in which they note down each variety's characteristics. Sudhir Pattnaik of the Oriya journal Samadrusti showed an album of two volumes, which had tiny packets of each kind of rice variety, with key features of their growth, performance, and values written alongside.

An important question is: While diversity is very welcome, will it feed India's burgeoning population? Natwarbhai is quite categorical: “Without doubt. First, I get as much or more average rice production on my land as those using chemical fertilisers and pesticides in this region. Secondly, I can grow pulses as the next crop after rice, and then gourds or other crops as the third, all in the same patch of land. And I get better fodder and mulching material. Overall productivity is therefore higher than what my neighbours get, who use new seeds each year, supported by chemicals. If land is not turned to non-food crops like tobacco, we could easily produce enough food with organic farming”.

So why are Natwarbhai's neighbours not switching to organic? He explains that the government and corporations are constantly providing “incentives”—subsidies on chemical fertiliser, insecticides and pesticides, and filling the farmers' minds with promise of bumper harvests and high returns.

Another important reason is that farmers here are mainly sharecroppers, who have to follow what the land owners dictate. He added that though the tall native rice lodged during excessive rains, which the dwarf varieties did not, productivity did not fall sharply provided it did not rain incessantly.

An important factor to note is that boosting yields by unbridled use of chemical fertiliser, irrigation and pesticide cannot be sustained in the long run, as amply proved in Punjab, the “cradle” of the green revolution. Soil degradation and salination have gone hand in hand with increasingly non-potable ground water caused by excessive loading of nitrates (from the unbridled use of urea, a yield-boosting nitrogenous fertiliser), drying aquifers and vanishing biodiversity, which is the result of continuous rice-wheat monoculture. There is enough evidence from various parts of the world—including the West where it originated—that industrial-type chemical agriculture is unsustainable, yet it is blindly aped by Indian farm “experts”.

Natwarbhai sees some hope, however. His neighbours are slowly getting slowly interested in his endeavour. He and others have organised dozens of farmers' meetings and offered free seeds to those willing to test them out—on condition that if they have a good harvest they will return twice the quantum lent. This will go to a “seed bank” maintained by Natwarbhai.

The journal Samadrusti has also done its bit in outreach. Unfortunately, the government of the day and other civil societies turned out to be quite indifferent to the commendable

endeavour of Natwarbhai.

In a recent address to an international conference on biodiversity in Hyderabad, Prime Minister Manmohan Singh said: “Biodiversity, found in our forests and our fields, could provide us keys to the solutions of the future. So we need to build a movement to conserve traditional varieties of crops”.

Nice words, but the government’s agricultural policies and programmes have systematically destroyed the diversity and knowledge of thousands of years of intelligent and innovative farming systems. The so-called green revolution is the best example, for which India has paid a heavy price, in terms of degraded soils, vanished biodiversity, dying aquifers, polluted water and environment. Increasingly, our small farmers are being marginalised, and the control of India’s farming sector has been handed over to the corporate sector.

The latest example is the position taken by agriculture minister Sharad Pawar, who is strongly in favour of genetically modified crops. Once this becomes the official seed policy, any residual biodiversity in a large body of crops will simply be a thing of the past. The entire seed industry will be controlled by agribusiness giants like Monsanto. India’s ability to sustain its food production will simply suffer an ecological and sociological collapse.

The policy planners do not seem to learn from history. For the Roman empire, the food bowl was North Africa. Once its soils desertified, the empire collapsed. Santayana’s prophetic words, “Those who do not learn from history are condemned to relive it” will come true in India’s case well.

(K P Prabhakaran Nair is an agricultural scientist, based in Kerala, with more than three decades of experience in research, teaching and development in Europe, Africa and Asia. He is best known for “The Nutrient Buffer Power Concept”, a soil management technique, which is an alternative to chemically driven agriculture of the “green revolution”.)

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