

**TIMES
EVOKE**

THE WHOLE WORLD,
ON A GRAIN OF RICE...

So many of us, dear reader, enjoy our daily rice — indeed, the pearly grain is food for 3.5 billion people, more than half the world sweeping across Asia, South America and Africa. Yet, how many know the antiquity of this crop, originating 10,000 years ago in the Yangtze Valley, 8,000 years ago in the Ganga's floodplains and 3,000 years ago in the Niger River delta. Today, China, India, Indonesia and Brazil are among the world's largest producers, the global rice industry valued at \$324 billion. There are 40,000 rice varieties and 776 million tons produced annually, proliferating in pulaos, paella, jollof, jambalaya, idli and horchatas.

While it tastes simply delicious, the story of rice is a complex tale. The cultivation of irrigated rice symbolised the start of urbanism and long-distance trade in Asia — but it also mirrors brutal slavery, people stolen from Africa to America, where enslaved Africans, trying desperately to clutch onto their dignity, grew rice on the swamps of the South, enriching capitalists who resisted the close of plantations that enabled their gilded lives. Today too, each grain conveys the taste of the Anthropocene. As global temperatures rise, rice is feeling the heat — unpredictable droughts and downpours damage the crop, higher atmospheric carbon dioxide concentrations reduce nutrients in the plant, warmer nights lower yields while rising seas creep inland, their salt ruining fields.

Ironically, given how this plant feeds some of the world's most impoverished communities, rice is also an accused in the court of climate change — certain quarters claim the methane released by it increases global warming. This incenses climate justice activists who argue rice's emissions are nowhere near as significant in driving climate change as those produced by the indulgences of the rich West and its mindless mimics. Again, rice holds all the ironies of the Anthropocene — its monocropping has caused environmental degradation, taking up to 5,000 litres of water to produce 1 kilogram, increasing the use of fertilisers and fire, deployed to burn stubble, raising air pollution which, in turn, increases global warming that returns to coat rice.

There are solutions though. As Times Evoke's global experts emphasise, it is vital to know the antiquity — and significance — of rice to invest wholeheartedly in mitigations and protections. Scientific research is underway now to create less methane-emitting sustainable varieties while farmers are experimenting with tougher heritage kinds and alternative flooding and drying techniques that could ensure stable yields on a stronger planet. Join Times Evoke in discovering rice anew — every grain holds a story of eras past and times forthcoming.

'Rice was grown 10,000 years ago — it first linked India and Southeast Asia'

Dorian Q. Fuller is Professor of Archaeobotany at University College London. Speaking to Srijana Mitra Das at Times Evoke, he discusses rice's roots:

What is the core of your research?

I am both an archaeologist and a botanist. I collaborate on archaeological excavation projects where we recover preserved plant remains, consisting of the remnants of crops, weeds and wild, gathered foods as well as the wood fuel people used



for cooking and fires. From that, we study which crops existed in past cultures and different places and how agriculture, plants and the human diet have changed.

Where was the earliest evidence of cultivated rice found?

First, I should specify there are two distinct species of rice. There's an African rice, cultivated traditionally in parts of West Africa which has a separate origin, and there's Asian rice, grown in India, China, Japan, etc. Within Asian cultivated rice, there are two subspecies — Indica and Japonica, the former more dominant in South Asia, the latter in East Asia.

In terms of the earliest evidence for cultivation, that seems related to the Japonica subspecies or its ancestors in



A TRUE COMFORT FOOD: From the Nile valley to terraced fields in Vietnam, rice production prevails around Earth and feeds over half of the world's population

China — this comes from parts of the Yangtze River Basin, the Middle Yangtze, like Hunan province, the lower Yangtze around Zhejiang and tributaries to the north, like the Huaihe river. There's a good case to be made for multiple independent starts of cultivation in China going back 10,000 years.

Quite separately, you have an early use of wild rice in parts of northern India, especially in the Ganges River Basin, stretching into the Upper Ganges-Yamuna areas. When that was cultivated and domesticated is much debated — I'd say there is evidence for early cultivation in India 5,000 years ago and possibly even 9,000 years ago. Importantly, genetic evidence today shows there was ancient hybridisation

between East Asian Japonicas and the ancestors of India. Introduced rices from East Asia mixed with local varieties in India and produced something new — Indica rice as known today. That explains our picture from modern genomes and archaeological evidence. I think the hybridisation occurred around 4,000 years ago, with an introduced variety that came to India via trade from East Asia.

IN GRAINY DETAIL

Did rice cultivation change landscapes?
Yes — rice is unique among cereals in that it's a wetland species. It likes a lot of water, in contrast to wheat, barley or millets, all semi-arid dryland species. As rice needs water, its initial cultivation, whether in the Yangtze or Ganges Valley, was in naturally flooded areas. As rice agriculture spread upland and southwards through the Deccan in India, it reached dry areas requiring irrigation. People then created banded paddy fields that trapped rainwater — they started making artificial wetlands. That was transformative of the landscape.

Did this also change social structures?
Creating artificial wetlands and irrigation systems demands a lot of labour — alongside, irrigated rice is highly productive and feeds many more people. As rice cultivation expanded in India and Southeast Asia, it encouraged population growth and density, early urbanisation and the rise of social

hierarchy — the control of land, rice and labour to build irrigation works fed into more hierarchical societies.

Did rice also impact animal life?

Artificial wetlands are a challenge to plough — the water buffalo became suitable. They are native to India, where their domestication happened in the Harappan world independent of rice. As its cultivation grew, their use increased. Paddy fields also attract wetland small fauna and fish like carp. Some became sources of protein in traditional Southeast Asian systems and a co-management of various kinds of fish in rice paddies developed.



site in China, discovered in 2004. It was one of the first places where we could recover the spikelet base of rice, a very small structure that attaches the grain to the plant — it undergoes a key morphological change as a result of domestication, where the plant loses the ability to disperse itself by shattering and now requires planting and harvesting by humans. In this archaeological material, we could see the actual gradual change of the population away from the wild, shattering type towards the domesticated type. In 2006, I also visited the Lahuradeva site managed by the Uttar Pradesh State Department of Archaeology. It shows how people there were consuming rice 6,000 years ago, the debate being over how domesticated or wild that food was.

What are the implications of climate change for rice — and vice versa?

There are arguments that rice contributes to climate change because its wetland environments produce methane — that's not from rice itself but the methanogenic microorganisms in the wetland waters. Of course, most global warming is from fossil fuel use. But there is research now on ways to grow rice that reduce methane output while ensuring productivity. Meanwhile, climate change is altering rainfall distribution in time and space — that is challenging for rice-growing because it may increase water shortages and drought. Hence, more drought-tolerant species, like millets, are another direction for research.

How different is the rice we eat today, compared to ancient varieties?
There are continuities and changes. Interestingly, wild rice populations had red grains — now, that's relatively rare compared to white or brown rice today. Earlier, people selected varieties partly for aesthetics and because it was thought white rice cooks faster and tastes different. People also selected for fragrance, from basmati to jasmine. There is no evidence that any of the wild rices were fragrant though, so that's a mutation. There's been selection for stickiness in Southeast Asia with glutinous rices, which also didn't exist in wild varieties. So, in its long cultural history, humans have changed rice, from a more standard wild form to very different kinds across diverse cultures.

Did rice entail interactions across these ancient societies?

Yes. With the establishment of rice-based agricultural systems and early urbanisation in north India and the Ganges plains in the Iron Age around 3,000 years ago, craft specialisation started. Fine ceramics, stonework, beads, metallurgy, etc., began — these got traded over long distances. Our earliest evidence for contact between India and Southeast Asia is from there — you see the arrival of Indian-made ceramics, beads, etc., in Southeast Asia, alongside other Indian crops like mung and toor lentils turning up in sites in southern Thailand. Later, ideas of Buddhism and Hinduism spread in Southeast Asia but the first interaction was about craft and agriculture — supported by rice.

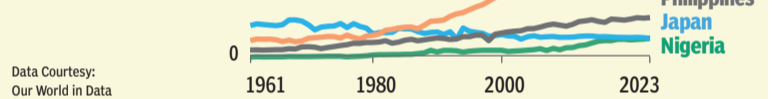
What are some of the most fascinating archaeological rice relics you've seen?
I've worked on the Tianluoshan



TREASURES: Fuller at Caoxieshan site, China, with rice remains of 3900 BCE

RICE PEOPLE: SOME MAJOR PRODUCERS

Rice production has exploded in recent decades, highlighting the relationship between growing populations and this sustaining food crop



Data Courtesy: Our World in Data

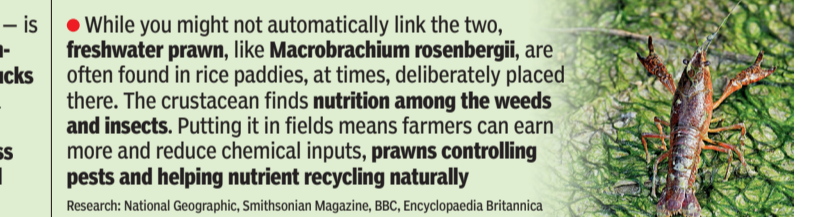


THEIR DAILY RICE...

All primates love rice — from Sumatra to Sri Lanka, monkeys are often found around rice paddies, being omnivores that eat fruits, vegetables, some grains and seeds. Langurs also frequent rice fields, seeking sustenance and water. This irks farmers, becoming a human-animal conflict — few consider how humans, by relentlessly cutting down forest habitat, have forced monkeys into a world which is far from welcoming



The glorious heron — which can grow up to 4 feet tall — is often found nesting near lush rice wetlands. These fish-rich swamps are a great draw for birds ranging from ducks to egrets, plovers and cranes. These birds do humans a favour by consuming several pests that can spoil crops — today, many of these winged species face habitat loss as rice fields experience varying water levels, chemical contamination and ruinous exposure to saline seas



While you might not automatically link the two, freshwater prawn, like *Macrobrachium rosenbergii*, are often found in rice paddies, at times, deliberately placed there. The crustacean finds nutrition among the weeds and insects. Putting it in fields means farmers can earn more and reduce chemical inputs, prawns controlling pests and helping nutrient recycling naturally

Research: National Geographic, Smithsonian Magazine, BBC, Encyclopaedia Britannica

'Rice is sacred to Japan — part of history and cosmology, it faces climate change now'

Emiko Ohnuki-Tiernay is William F. Vilas Professor of Anthropology at the University of Wisconsin-Madison. She tells Srijana Mitra Das at TE about rice, crisis — and stability — in Japan:

Connecting to Emiko Ohnuki-Tiernay is a little surprising because the professor is sitting against a backdrop of billowing breezes over a shimmering blue ocean, framed by swaying palms. Yet, we are discussing a nation known for its snowy peaks, cherry blossom trees — and rice.

Hence, TE began by asking Ohnuki-Tiernay about her research. She replied, 'The first period of my anthropological work was on the Sakhalin Ainu, so-called hunter-gatherers. Later, my work turned towards emphasising what I call

'symbolic meanings' rather than quantitative economic values, etc. I work on cultural meanings for Japan and study the historicisation of culture as you cannot understand periods of Japanese society without understanding historical processes. So, my work is now about symbolic cultural values and meanings and a historicisation of culture.'



HOW TO MAKE ICONS: This print shows cherry blossoms as equivalents of rice



RIPPLES IN THE LAND OF THE RISING SUN... The Japanese fondness for rice is intertwined deeply with culture and identity — a rice crisis into June 2025 sparked intense feelings

Rice plays a role in both. Why is it so significant in Japan? Ohnuki-Tiernay explains, 'Major grains often became the symbol of collective identities of people. As I've written, both Germany and Russia

adopted wheat as a symbol.' There is an important distinction in the world of signs though — the anthropologist tells TE, 'There is a history of meat versus plant emphasis in food which mirrors a difference. In the West, the king as hunter is an important concept. So, Versailles and other palaces in France were situated next to an imperial forest for the king to showcase his power by hunting a wild animal, which he'd then distribute to his subjects. In Japan, hunting never took that kind of cultural, symbolic or economic value. Instead, as wet rice agriculture began around the end of the 9th century BC, rice became a very important part of society — and the foundation of the imperial system. Instead of being the supreme hunter, the Japanese emperor's role was to oversee a stable climate for agriculture. Even when the imperial system lost power and a warrior class took over, it was

the exclusive right of the Emperor to oversee rice rituals — the most powerful shogun could not take over that role. That is the historical overview of how rice became important and carried quantitative value. Today, although the Japanese have become much more affluent, meals still have rice. That symbolic value continues.'

Rice remains a powerful reminder to Japanese society of the stability it cherishes. In recent months, Japan has undergone a rice crisis, with shortages in supply growing demand and sky-rocketing prices,

NO, THANKS: Ohnuki-Tiernay showcases a 1993 cartoon showing Bill Clinton offering rice balls to then-PM Hosokawa



leading to imports. The atmosphere was so tense, a joke — the former farm minister, jested he was gifted so much rice, he didn't have to buy any — cost a politico his job.

This wasn't the first time rice stirred up heated passions. As Ohnuki-Tiernay recounts, 'Japan's government tried to prohibit imports but in 1993, Bill Clinton pushed for the opening of the rice market. Even those who paid more for rice tried to prevent that, although finally, every political party yielded.' The moment carried some bitterness as some in Japan felt the nation had been forced into importing rice different from its own varieties.

This passion can be traced back to the role rice plays in Japanese cosmology. As elaborated, 'The origin of rice was, of course, the middle stream of the Yangtze River. That went to Korea and the Koreans brought wet rice agriculture to Japan — however, the imperial household had to invent how rice originated in Japan itself. So, the Kojiki, an 8th century chronicle of history and myths, states how rice came from the stomach of the deity of food. For the Japanese, the stomach is a very vital part of the body and thus, rice became extremely important — every single grain is supposed to house the soul of deities. Thus, rice became sacred and a symbol of Japanese collective identity.'

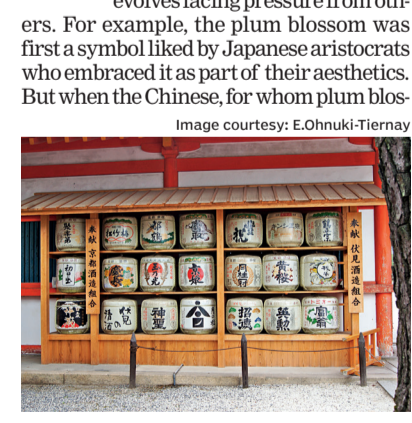
Today, with growing urbanisation overshadowing traditional fields, and globalisation bringing bread and pasta to Japanese tables, rice faces challenges. Perhaps the greatest threat is climate change, with its shifting of water and temperature. As Ohnuki-Tiernay says, 'In 1993, Japan experienced a rice crisis because of changing climate. Until recently, the Japanese government was in charge of rice supplies — some years, it even subsidised farmers to not produce anything, so prices would stay stable. That system is under pressure now — with climate change, the government is strained on how to manage rice. Most Japanese families

once had a favourite local rice supplier but today to what extent they can offer quantities is linked to environmental changes,' Ohnuki-Tiernay adds, with a characteristic enigmatic tone, 'Rice remains of enormous cultural significance. So, we will see.'

Other countries, like China and India, also consume rice as a staple. Why is Japan's use of it, in ideas and identity so different? The anthropologist replies, 'Japan is the only country which relies only on rice as a staple. India has wheat and rice and so does

China — Chinese dumplings are important. India and China therefore have two major sources of staples — in Japan, it's only rice.'

A symbol can symbolise both belonging — and strain. TE asks Ohnuki-Tiernay if, as rice grown in Japan undergoes challenges, whether this has meaning for Japanese identity? She replies, 'It's interesting how collective identity evolves facing pressure from others. For example, the plum blossom was first a symbol linked by Japanese aristocrats who embraced it as part of their aesthetics. But when the Chinese, for whom plum blossoms were symbolically key started becoming a dominant other, the nobles chose cherry blossoms — a deity is thus supposed to come down on the petals of the cherry blossom to rice paddies. Again, if there are pressures to fortify the collective identity of the Japanese, we will see to what extent rice plays a dominant role.' The anthropologist leaves us thinking of her words, against the backdrop of a glorious Hawaiian isle where, too, rice is a loved dish.



HEAVENLY PRESENT: Rice wine is offered to deities, as seen here in the Heian shrine

READERS WRITE

Dear Times Evoke,
Thank you for the wonderful page on tourism (22nd June) and Emily Thomas' excellent feature where she beautifully articulated how the evolution of maps reflects society's power structures and shapes our understanding of which places are deemed 'important'. Emily Thomas' knowledgeable perspectives on travel were truly fascinating. Also, Thomas seamlessly took readers towards the need to conserve Earth's resources. As a teacher, I was left thinking, what could be a better example of in-depth opinion and persuasive writing? Thanks, TE, for wonderful work as always.
— Anita Mahendra Kapadia, Mumbai

I am fascinated by the contexts in TE's headline 'From spaceflights to doom tourism'. Emily Thomas' knowledgeable perspectives on travel were truly fascinating. Also, Thomas seamlessly took readers towards the need to conserve Earth's resources. As a teacher, I was left thinking, what could be a better example of in-depth opinion and persuasive writing? Thanks, TE, for wonderful work as always.
— Jayshree, Bengaluru

My Sunday just doesn't feel right until I go through TE! The connections drawn between travel and nature by Sasha Pack and Emily Thomas were so engaging. The page looked beautiful and Thomas left me thinking of travel books which connect to humanity's inner roamer, dreaming of the real meaning of mountains, rivers and shores.
— Atul Saxena, Bhopal

TE's travel edition was amazing! I loved 'Beyond Visa Regimes' on the world of animals and birds. By nature, all species are nomadic and love to explore. But it's good to be a traveller, not a tourist beyond limits. I love TE — you make me feel like I have a companion and I learn many extraordinary things by reading you.
— Priyanka Samanta, Hyderabad

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