On a muggy June afternoon in the remote village of Pohumora in northeastern India, Anjana Taye haunches on the mud floor of her home and carefully pours into two bowls the cloudy fermented rice drink known as *apong*, a staple of the indigenous Mising community.

The rice in the *apong* was once abundant in the lush green Lakhimpur district of the Indian state of Assam, where indigenous communities have relied for centuries on the Brahmaputra River for their way of life. With damming and construction upstream, climate change and the domino effect of human responses, rice is now fast receding as a staple crop in this part of the world's largest exporter of the grain.

Several residents in Lakhimpur's Mising community told Nikkei Asia of intense changes in the Brahmaputra, in which generations of their tribe bathed, drank and fished. Now people living off the land are forced to change their diet, revisit how to earn a living and become part of India's staggering statistics on involuntary rural-to-urban migration.

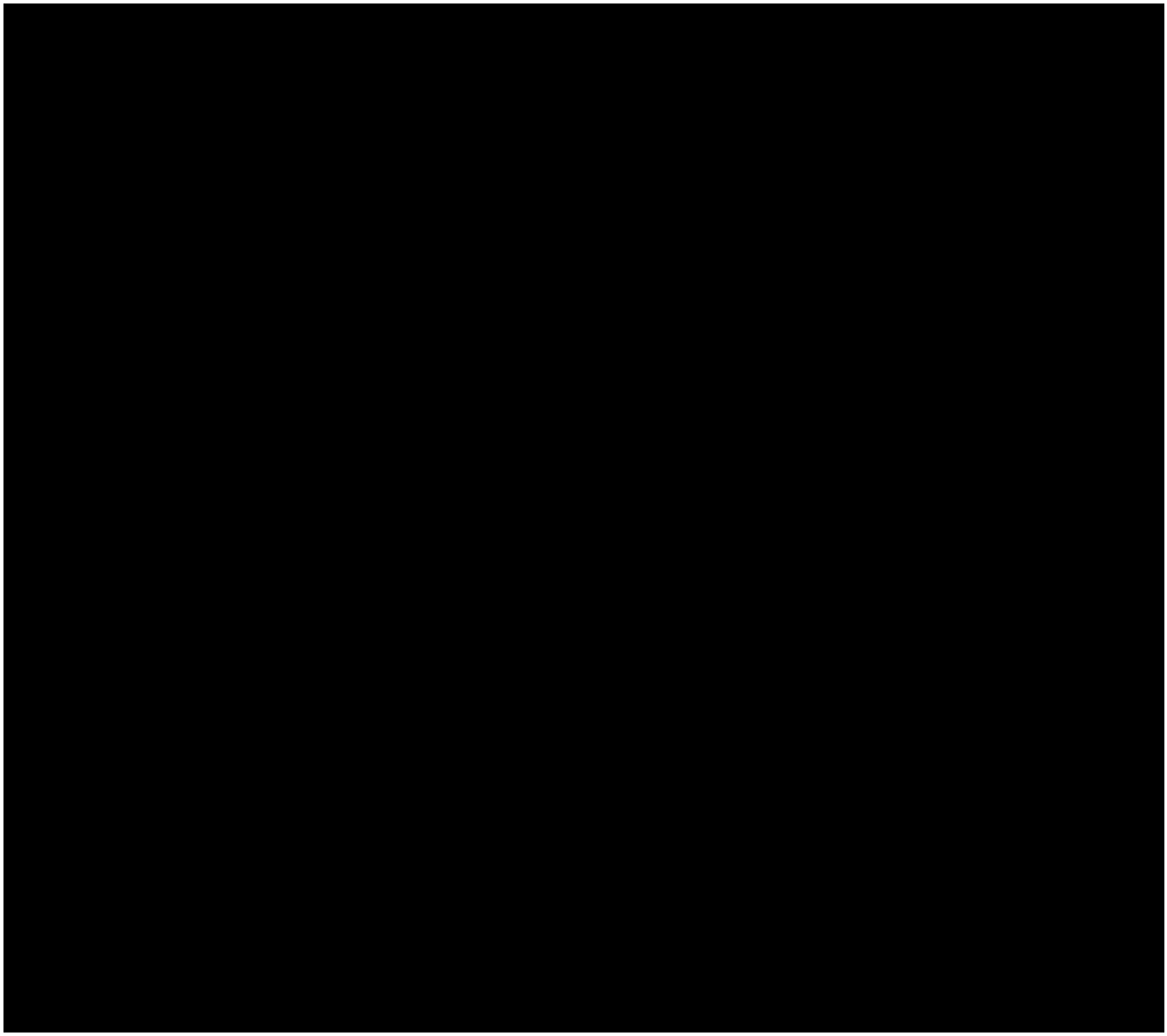
Indigenous Mising Tirumai Narah prepares for a ritual by the banks of the Ranganadi, a tributary of the Brahmaputra, in Pohumora, Assam. *(Photo by Prakash Bhuyan for Nikkei Asia)*

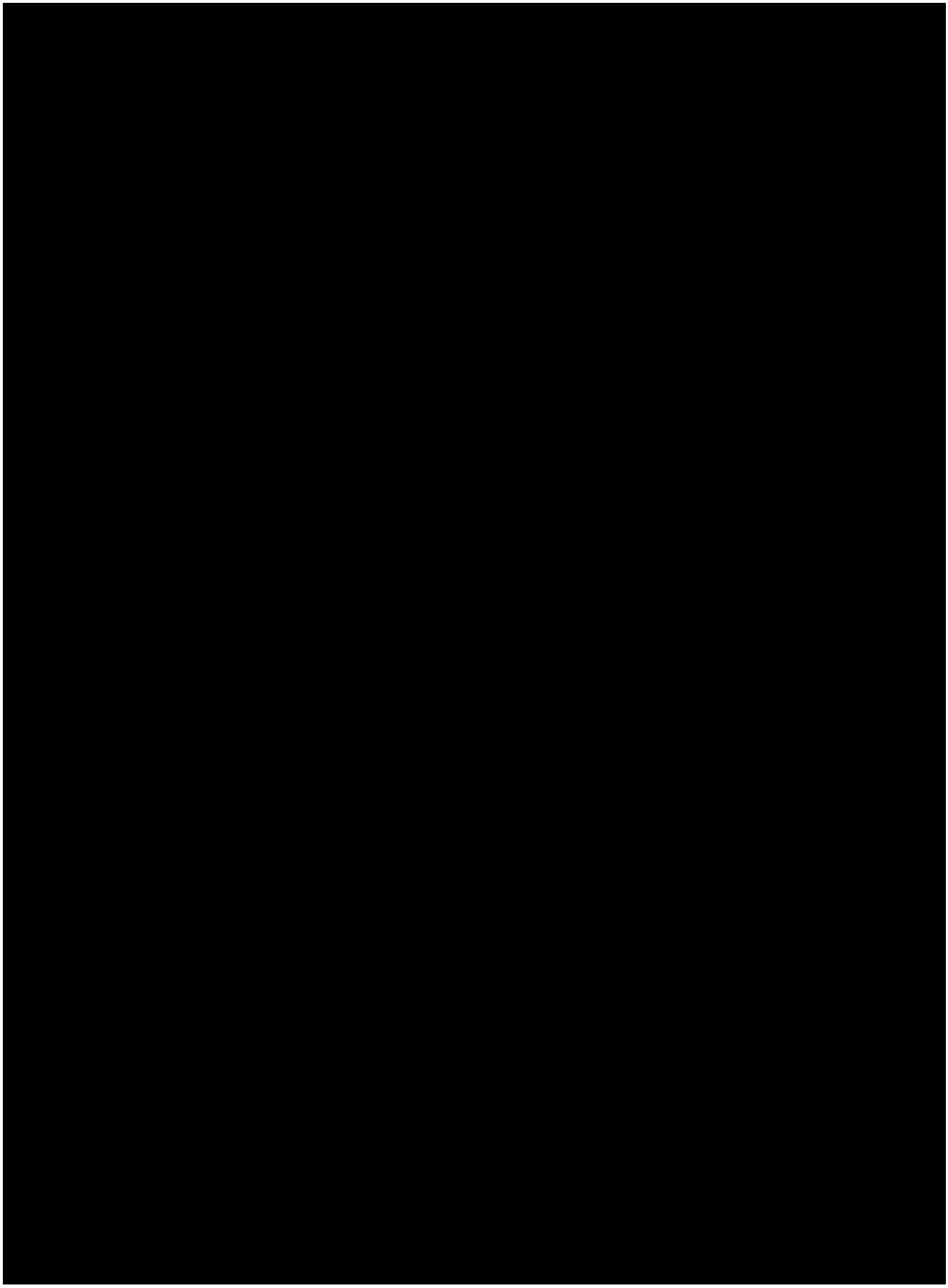
The story of the Brahmaputra, one of the world's largest rivers by discharge volume and one of its longest – is defined by geopolitics, water management and climate change – and their effect on the region's most disenfranchised.

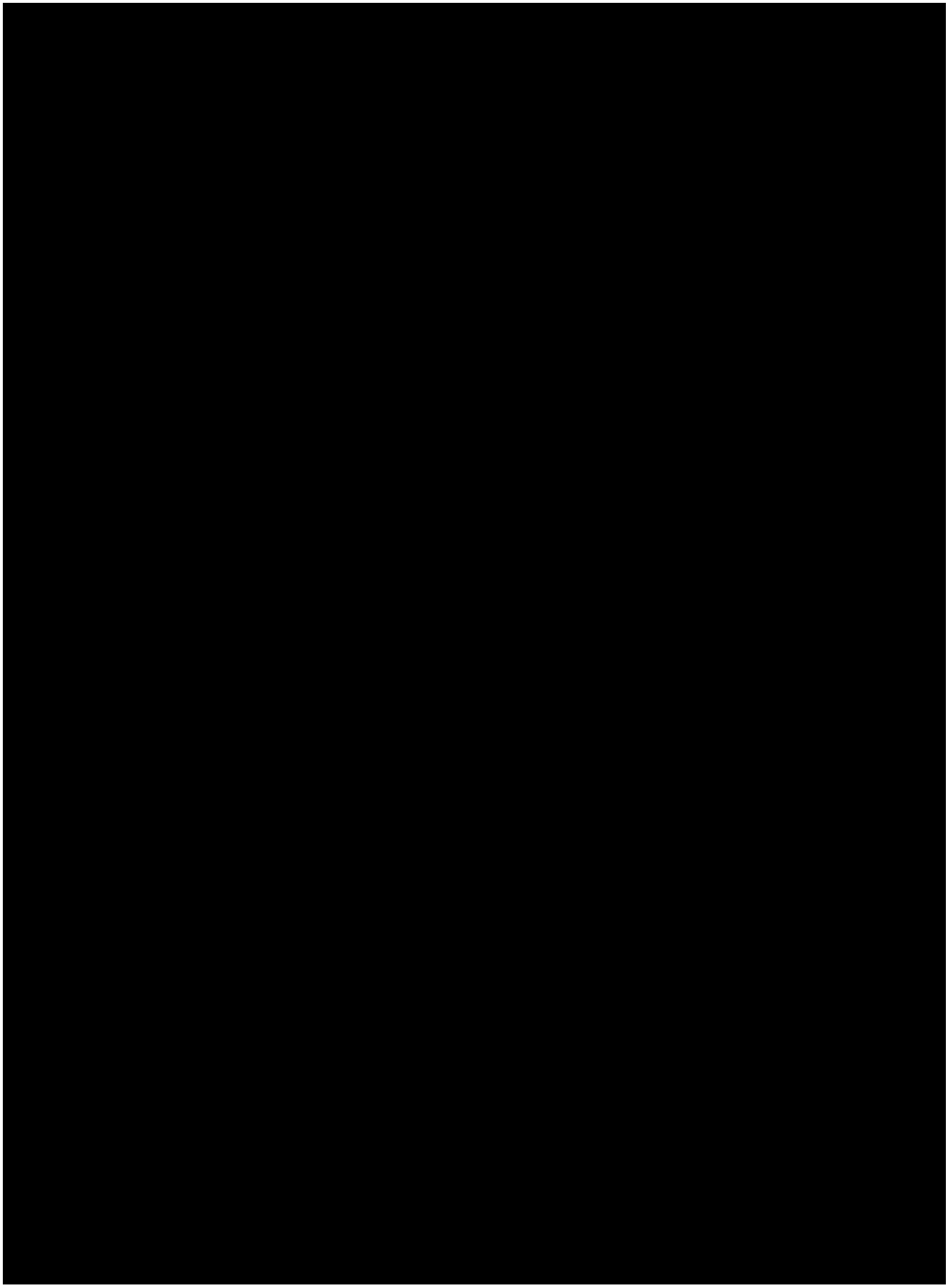
Birthed as the Yarlung Tsangpo in China's Tibetan plateau, the Brahmaputra winds through the Himalayas in Tibet and meanders into the Indian state of Arunachal Pradesh before offering itself to Assam. It then picks up speed, stampeding through Bangladesh to unite with the Ganges, ending its 2,900-kilometer course at the Bay of Bengal.

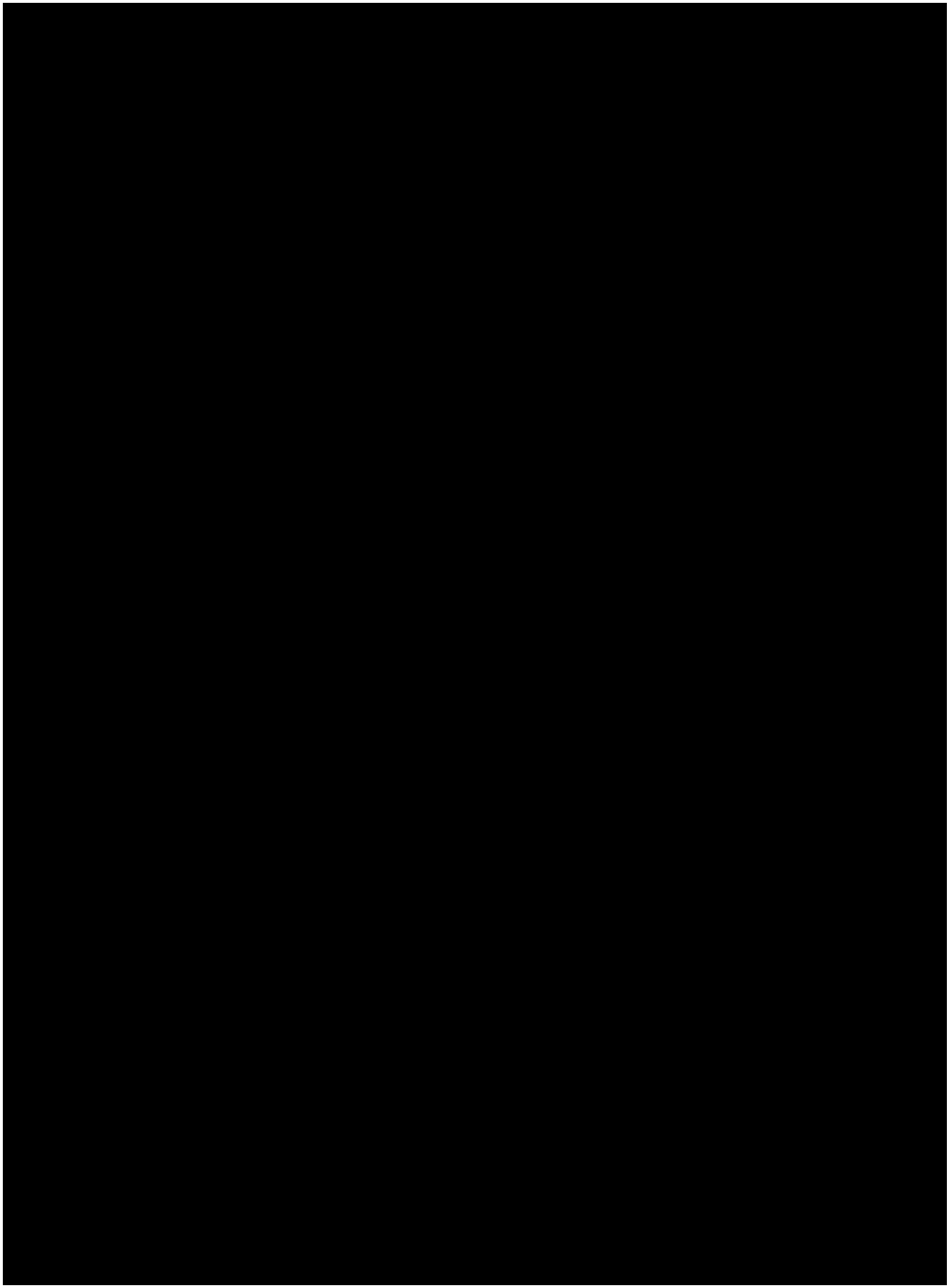
“The Brahmaputra is a source of life for more than 130 million people, the majority of which live in Bangladesh and India.”

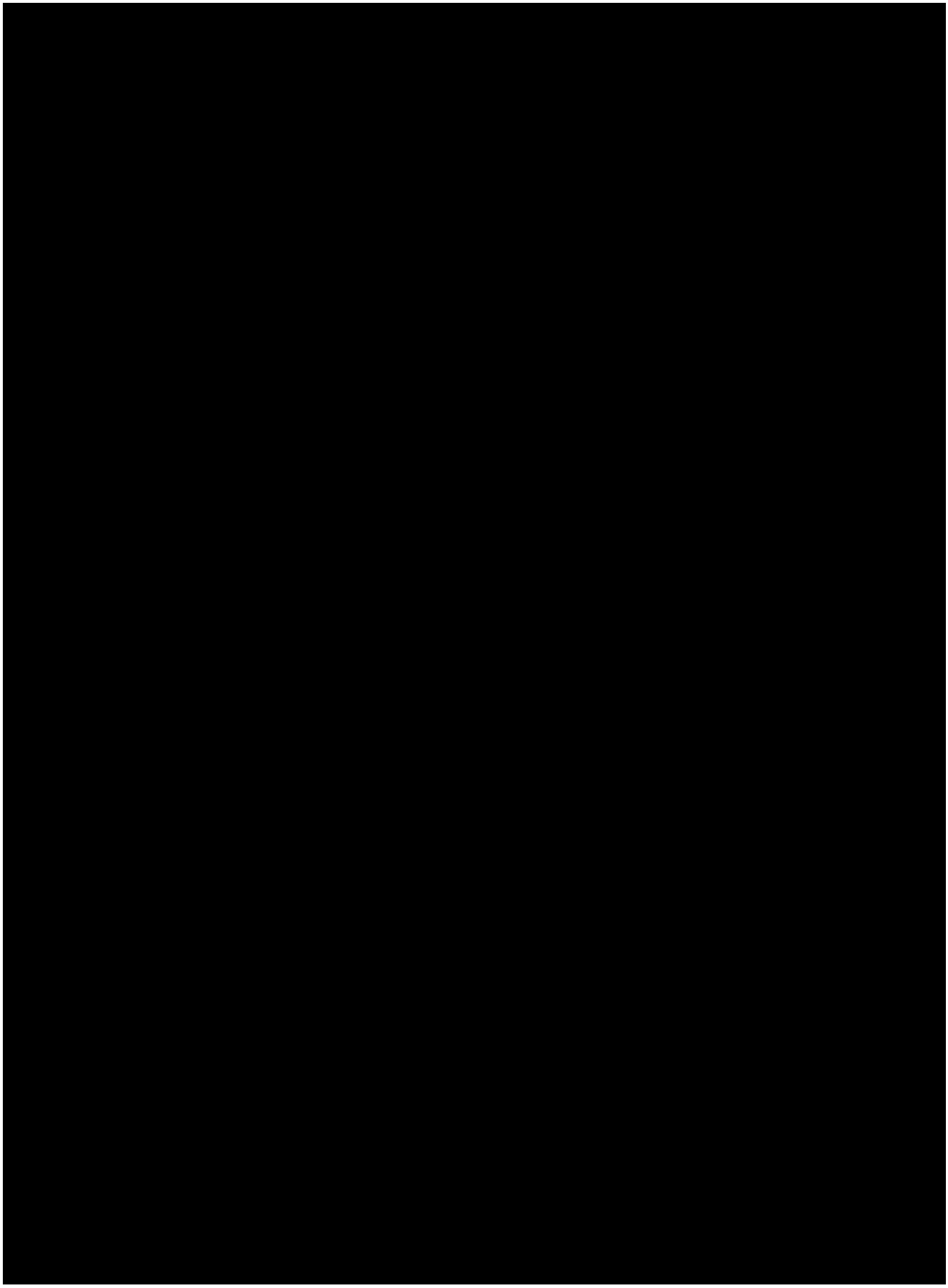
“Despite this, there is a lack of an established legal framework for cooperation between China, Bangladesh and India over the Brahmaputra River," Hangzo, an associate fellow at VIF, told Nikkei. "That has allowed China to act unilaterally and to opt against communicating with its riparian neighbors beyond the bare minimum.”

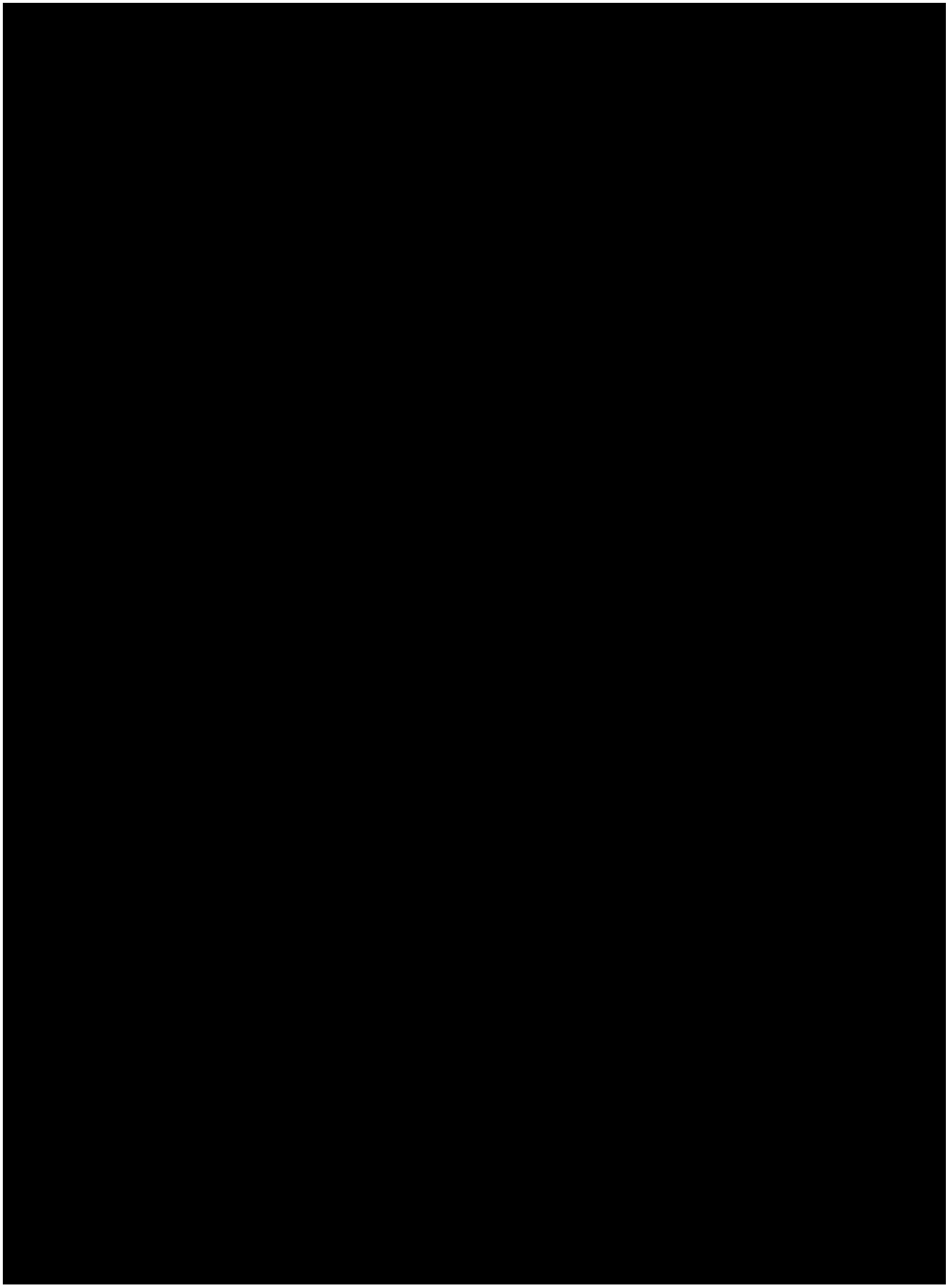


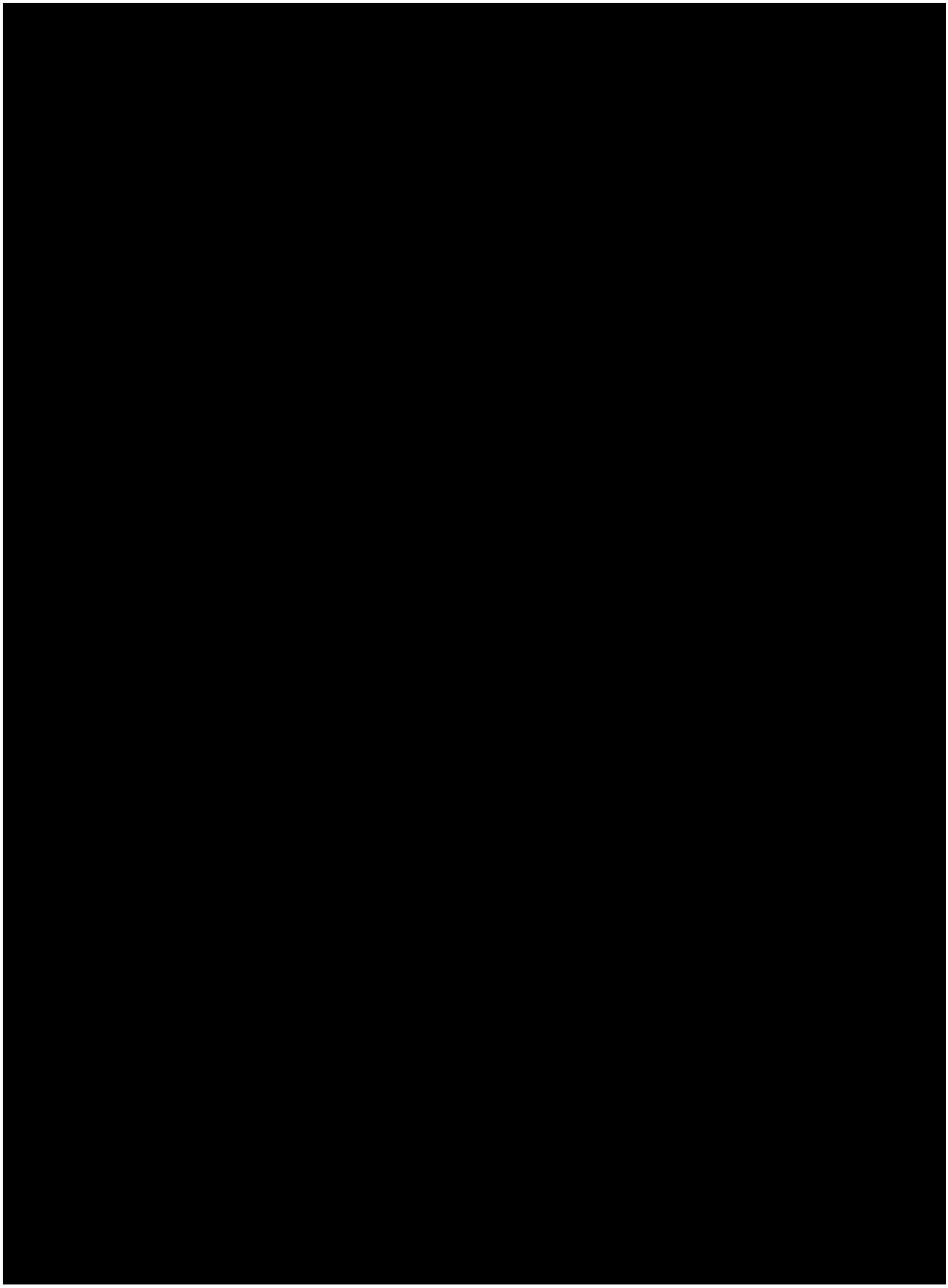


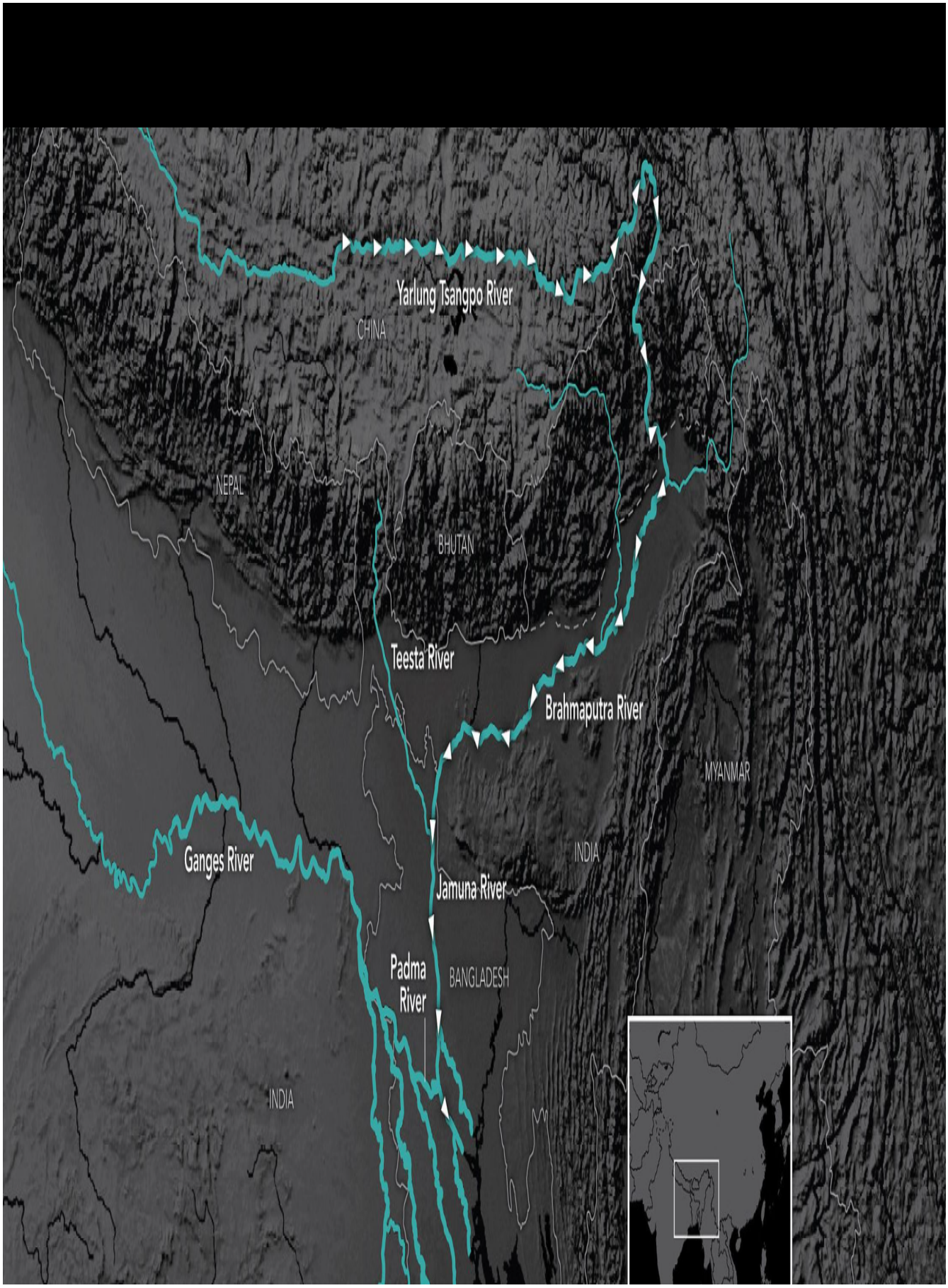










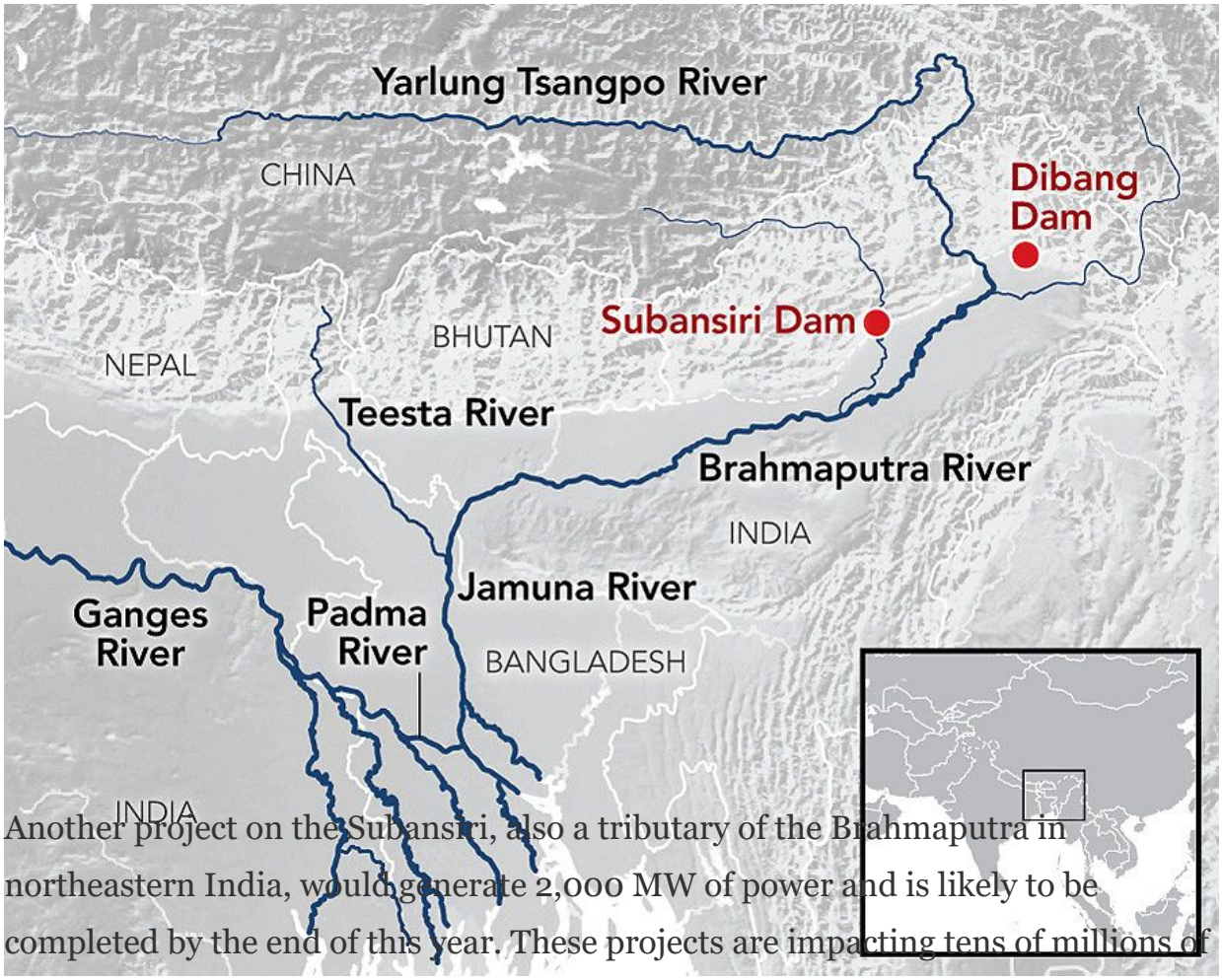

Yarlung Tsangpo River
CHINA
NEPAL
BHUTAN
Teesta River
Brahmaputra River
MYANMAR
Ganges River
INDIA
Jamuna River
Padma River
BANGLADESH
INDIA

India fears that unilateral dam construction by China could trigger flash floods or create water scarcity downstream. There is also concern that projects close to China's border with India, which slices through contested regions, give Beijing strategic leverage.

"Some 26 dams are under construction on the Yarlung Tsangpo," Srikanth Kondapalli, a professor of China studies at New Delhi-based Jawaharlal Nehru University, told Nikkei. He said India is most concerned about China's proposed 60,000-megawatt hydropower plant on the Yarlung Tsangpo in the Tibetan Autonomous Region, almost abutting India.

At the time of the project's announcement in 2020, state-owned contractor Power Construction Corp. of China said it was intended to promote national security. Shortly thereafter, India said any attempt to divert water from the Brahmaputra would be an "encroachment of the entitled rights of lower riparian states."

In response to China's actions, India is bolstering the hydropower ecosystem in its Northeast. It has approved a multipurpose dam on the Dibang, a tributary of the Brahmaputra in Arunachal Pradesh, an Indian state that China claims as part of Tibet. Expected to be commissioned in the next decade, it will be the country's largest hydropower project, with an installed capacity of 2,880 megawatts and an estimated cost of $3.9 billion.



Another project on the Subansiri, also a tributary of the Brahmaputra in northeastern India, would generate 2,000 MW of power and is likely to be completed by the end of this year. These projects are impacting tens of millions of people who rely on the Brahmaputra not only in India's Northeast but also across the border in Bangladesh.

Residents in the Lakhimpur district of Assam, an eight-hour train ride from the closest big city, Guwahati, are protesting the Subansiri project, worried it will further exacerbate a situation that is already causing seismic change in their lifestyles.

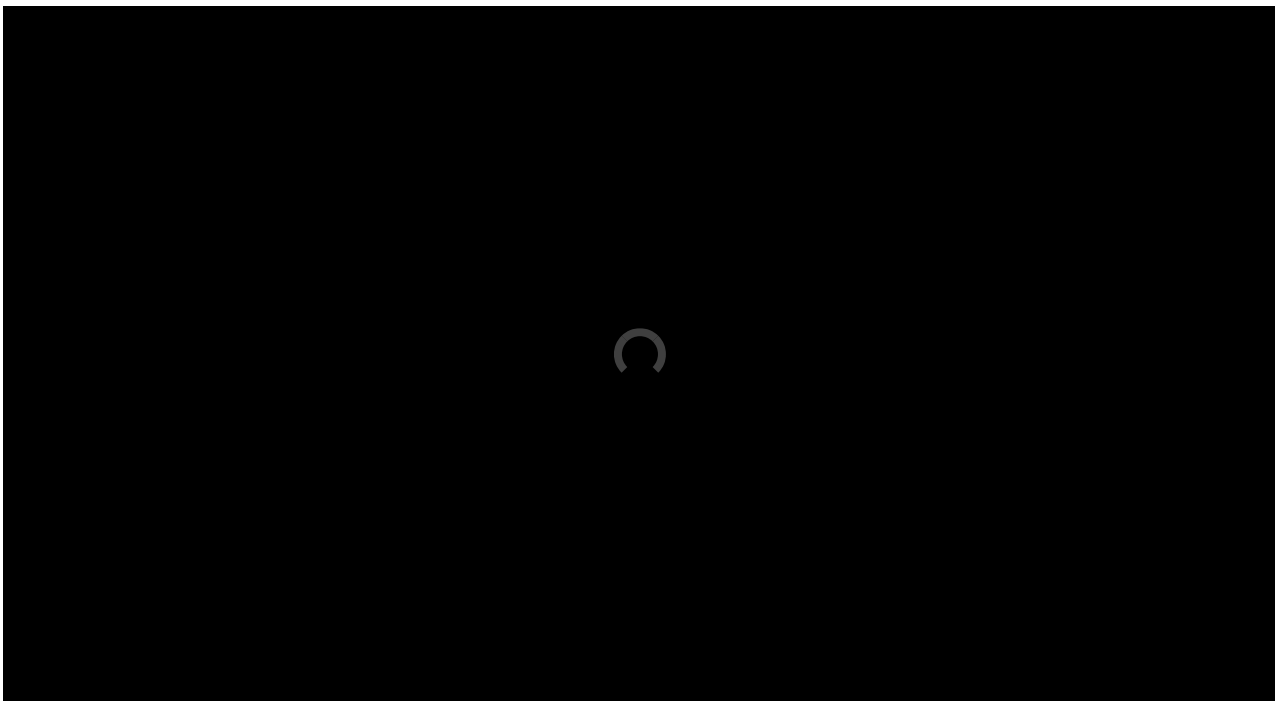
Anjana Taye and her husband, Jonai Taye, like many others in the region, for decades relied on rice farming for a living. But recent monsoons have forced farmers to sow rice multiple times in a season as each crop is ravaged by the raging river. "This affects both production quality and quantity," Jonai Taye said. "We are barely able to sell anything."

With the money from paddy cultivation dwindling, the Tayes tried briefly to grow winter crops such as small potatoes, pumpkins, mustard and gourds before realizing that the months outside the monsoon season left the river dehydrated and rendered the sand deposits infertile.

Indigenous community members, activists and experts have said upstream dam construction has coincided with the expansion of sandy floodplains and excessive flooding in the past couple decades.

"Any miniscule intervention in the entire Brahmaputra basin will have an impact in some part of the river basin," said Mirza Zulfiqur Rahman, an Assam-based researcher who wrote his doctoral thesis on transboundary rivers. "Catastrophic floods are not a single, localized or an episodic event, but the effect of multiple events and cumulative dam-induced hazards spread across a particular river basin."

The changing river is also forcing indigenous communities to alter their diet. Fish in the Lakhimpur district were once so abundant that a household would catch 2 to 3 kilograms and share the haul with the entire village, residents said. Now the river is shallow and dry during the summer and winter.



Indigineous Mising fisherman Mego Pawe shows his meager haul after 3 hours of fishing in the Ranganadi, a tributary of the Brahmaputra in Pohumora, Assam. *(Photo by Prakash Bhuyan for Nikkei Asia)*

"Typically the freshwater fish species require wetlands as spawning grounds," Samrat Choudhury, author of the book "The Braided River: A Journey Along The Brahmaputra," told Nikkei in an interview. "But over the years a lot of wetlands are disappearing ... barriers are being built along the Brahmaputra which is blocking these wetlands off."

Foraged vegetables such as fiddlehead ferns, elephant apples, bamboo shoots and banana stems are standing in for the centuries-old diet of fish and rice.

Taye said that a lack of fish is forcing the indigenous community to the nearest grocery store, where they buy alternative food items such as chunks of soy protein and paneer – a cheese made from curdling milk with an acid. "We are trying to get accustomed to the new items," she said.

The geopolitically critical Brahmaputra provides about 30% of India's freshwater resources, and 70% for Bangladesh.

A man walks across the Ranganadi, a tributary of the Brahmaputra in Assam that was several feet deep until about 20 years ago. *(Photo by Prakash Bhuyan for Nikkei Asia)*

The main source of tension is not simply the dams' existence but what happens to the waters they control. “Modern engineering techniques have provided downstream countries with options to manage their own waters,” Mominul Haque Sarkar, an advisor of Bangladesh’s Center for Environmental and Geographic Information Services (CEGIS), a government-funded research body, told Nikkei.

“Dams in fact yield benefits as if you restore water in a reservoir; it means you can ensure water flow during the lean period by releasing water from the reservoir,” Sarkar said. “The problem is with the water-sharing methods. If you don’t bring the downstream countries on board while constructing dams and lack political will and intention to give fair share, then the downstream countries are badly affected.”

Freshwater resources per capita have plunged about 70% each in India and Bangladesh over the past six decades, as populations have increased and water storage has fallen. Some parts of India have already run out of water, and experts are warning of an acute water shortage in the region in the coming decade.

This has made data-based flood planning a priority for India, the world's most populous nation. In 2002, China agreed to share with India information on rainfall, the river's water level and discharge volume during each year's monsoon season.

But Beijing stopped sharing data in 2017, when the two nations were involved in a 73-day border standoff in Doklam, at the intersection of Bhutan, China and India. China at the time said it was unable to share information due to “upgrading and renovation” of “relevant hydrological stations.”

It refused, once again, to share data after the 2020 Galwan Valley clash along the disputed Himalayan border left 24 soldiers dead, sources close to the Indian government told Nikkei. China did not respond to Nikkei Asia's request for comment.

“China’s politicization of the data … should be opposed within and beyond the region.”

Experts fear that set a bad precedent for the weaponization of water. “China can blast a dam and trigger flash floods and loss of property and life,” said China studies professor Kondapalli. He cited an incident from 1938 when Chinese armies breached the southern dyke of the Yellow River to stop Japan’s military advance into Henan province. An article on the website of The Water Center at the University of Pennsylvania, written by senior fellow Scott Moore, calls this “the largest-scale and most destructive use of water as a weapon in modern history.”

Buddheswar Morang wipes the sweat off his face, sitting in his two-room flood-resilient mud hut perched on bamboo stilts. The height of these makeshift homes by the Brahmaputra and its tributaries in Northeastern India can change every year, depending on the previous year's flood water level — the higher the waters, the more elevated the home. Some hang their bedsteads from rafters to sleep a few inches above the floor, which still runs the risk of getting flushed.

Also an indigenous Mising, he echoes the Tayes' dismay about how the volatile water supply has upended lives. The once yawning river is now shallow but surges into the village during the monsoons. Having to plant rice multiple times means he can no longer make ends meet from agriculture – long the mainstay of the village.

Both Morang and the Tayes have adult children who have been forced to leave for the cities to help their families.

In the state of Assam, rural-to-urban migration has surged in the past few decades. More than 10 million people migrated to urban settings within the state in 2011 alone, the last time India ran its census.

While indigenous people find it hard to maintain their culture when forced to migrate, cities across South Asia are also coming under pressure.

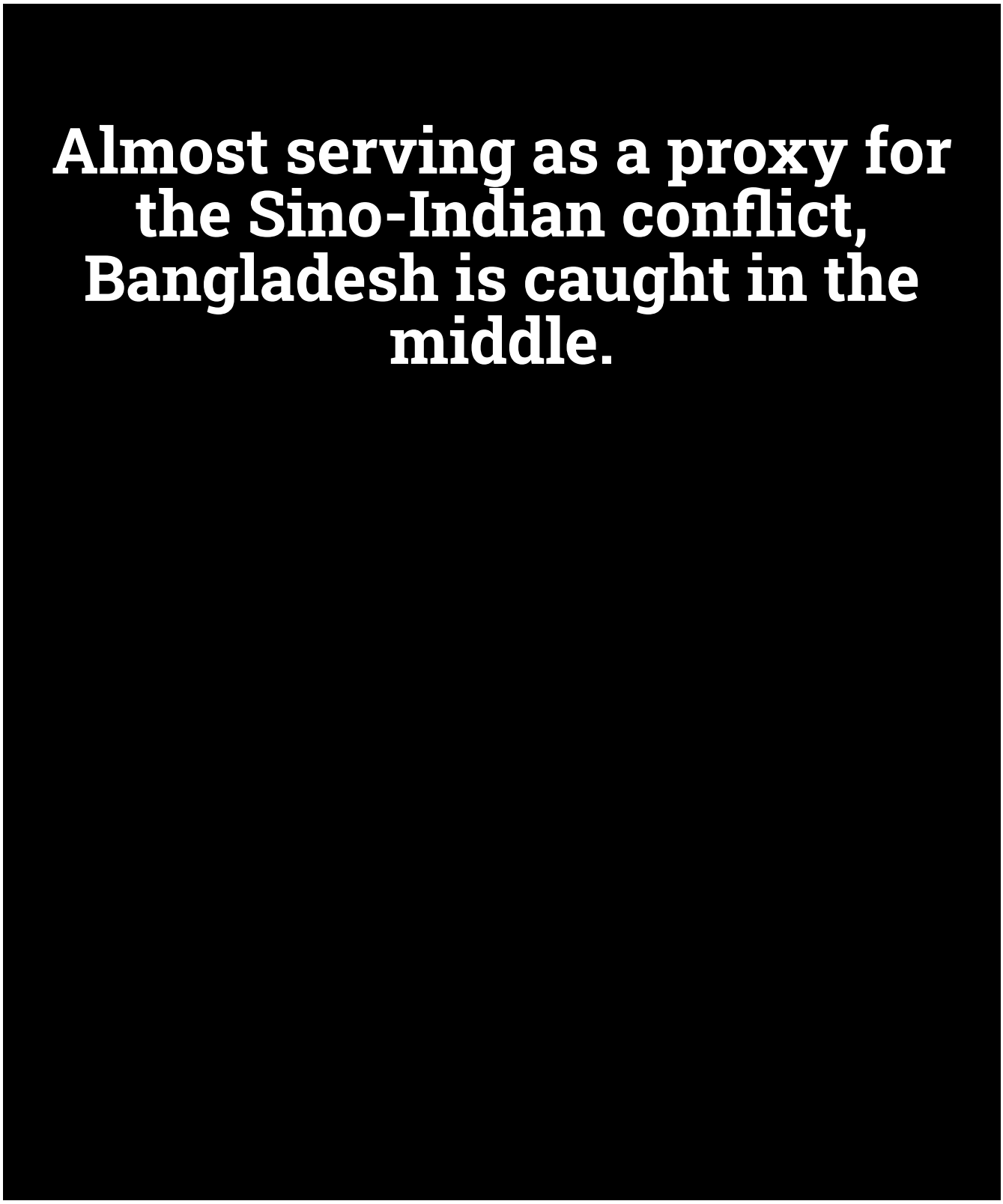
The region's megacities will see their populations grow at least 50% by 2050, according to global think tank Institute for Economics and Peace. The report included New Delhi, Kolkata and Dhaka as cities that are "unsustainable."

“[Rivers] are not just a carrier of water but also of fertile, mineral rich sediments which form the basis of the food security of the downstream,” environmental researcher Manshi Asher told Nikkei. “When dams are built, they curb the flow of the river, and stop the flow of sediment. This ... impacts the availability of irrigation.”

India is also worried about China’s South-North water transfer project, which involves drawing water from southern rivers and supplying it to the arid north. It is estimated to divert up to 44.8 billion cubic meters of water per year upon completion, according to a statement by Beijing.

“It is being actively watched and monitored,” a source in the Indian Ministry of Water Resources, who asked to remain unnamed, told Nikkei. “We are downstream at the end of the day, and ultimately the power [to control water] is in their hands.”

Just beyond India's northeast, Bangladesh faces a more intense struggle as the lowest riparian state in the region.



Thousands rendered homeless in Bogura, on the banks of the lower stream of the Brahmaputra (called the Jamuna in Bangladesh), migrate to other islands every year. Flooding in Bangladesh displaces a million people on average annually, according to the Internal Displacement Monitoring Centre. *(Photo via Getty Images)*

Dhaka blames India for its water issues. “The narrative is like this: if India is building a dam [to counter Chinese activities] and there is a shortage of water in Bangladesh, nobody will blame China, the immediate blame will come on India,” Pankaj Jha, former deputy director of India’s National Security Council Secretariat, told Nikkei. “So India has a double whammy as it has to deal with China and also has to take care of Bangladesh.”

Altaf Ali, a boatman in his 60s with a heavy tan and a weary face, is nostalgic for the days of bustle. Based in Chilmari, a once-vibrant river port that served as a vital conduit for trade and commerce in the colonial era, Ali is used to ferry boats carrying bags of long and slender Katari Bhog rice and sacks of jute fiber to a port near the capital city of Dhaka.

“Now there is no route as there are *chars* [river islands formed of silt flowing downstream] everywhere,” Ali told Nikkei.

Altaf Ali on his boat along the Brahmaputra in Chilmari, Bangladesh. The receding river has resulted in a loss of navigability, and hence a loss of income. *(Photo by Faisal Mahmud for Nikkei Asia)*

> "During dry seasons, the river water recedes so much that there is no navigability. I have no work then."
>
> -Altaf Ali, boatman in Bangladesh

The number of *chars* on the Brahmaputra has more than tripled in the past two decades, according to data from the Water Development Board of Bangladesh.

While the formation of riverine islands in one of the world's most populous nations has impeded navigability and eroded livelihoods, they have also become home to more than 5 million people.

Vulnerable to sudden and forceful flooding as well as erosion, *char* dwellers struggle to produce or buy enough food, and malnutrition is common, according to the U.S. Agency for International Development. But land is scarce in Bangladesh, three times more densely populated as its neighbor India, and people are drawn to any land that can offer life.

Ali, himself a resident of a *char,* said the loss of navigability from the expanding chars has caused a spectrum of harm, ranging from incomes to healthcare accessibility. “In earlier times, we could use the river route, now we have to change vehicles twice and traverse through longer roads,” he said.

The changing course of the Brahmaputra in Bangladesh. *(Photos via CEGIS Bangladesh)*

"We can't read the river anymore. It has gone away from us," said Siraj Mia, a resident of *Notarhandi,* a remote village on the banks of the Brahmaputra in northern Bangladesh, just on the other side of the Indian state of Assam.

For years, farmers like Mia dug canals and maneuvered water from the metamorphosing Brahmaputra into their rice fields. But the river has drifted far from the farmlands, forcing them to dig up groundwater for their crops, which has driven up costs.

"All of our money is spent on irrigation. We have shifted to maize, wheat and vegetables as those require less water than rice," Mia said, his salt and pepper beard glistening in the harsh noon sun.

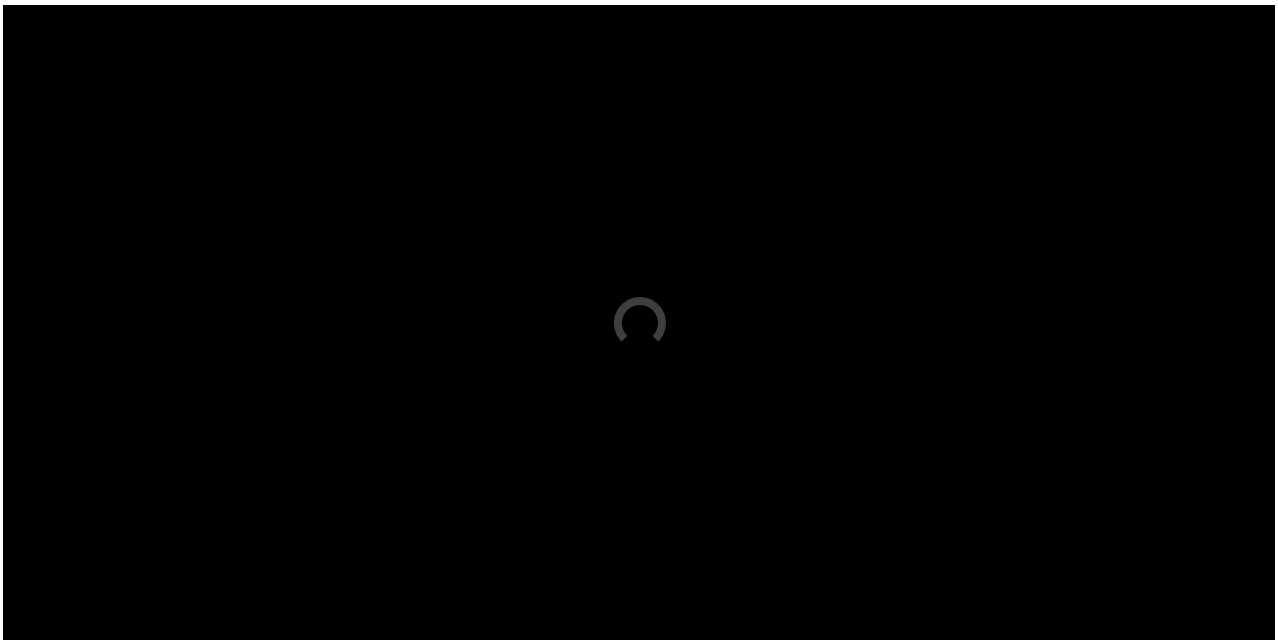
Siraj Mia near his farm in Kurigram, northern Bangladesh. *(Photo by Faisal Mahmud for Nikkei Asia)*

“In the last few years, instead of eating our own [cultivated] rice, we are buying it from the market. This would have been unthinkable for our ancestors.”

The cost of irrigation has surged more than 400% in the past two decades, agricultural officer of Chilmari, Sultan Ahmad, told Nikkei as he pulled out dusty binders of data from heaps of ledgers on shelves around the office. He said the excessive drawing of groundwater has created another problem: the presence of heavy metals in the produce.

Some samples of produce showed 0.06 milligrams of lead per liter and smaller amounts of cadmium. Consuming even small amounts of either can be harmful, the U.S. CDC says on its website.

Excessive groundwater pumping on a global scale is also causing water table depletion and land subsidence. From 1993 to 2010, groundwater pumped from the earth has resulted in the planet's axis tilting nearly 80 centimeters to the east, a new study published by Geophysical Research Letters said in June. The net water lost from underground reservoirs in that time period is estimated to be more than 2 trillion tonnes.



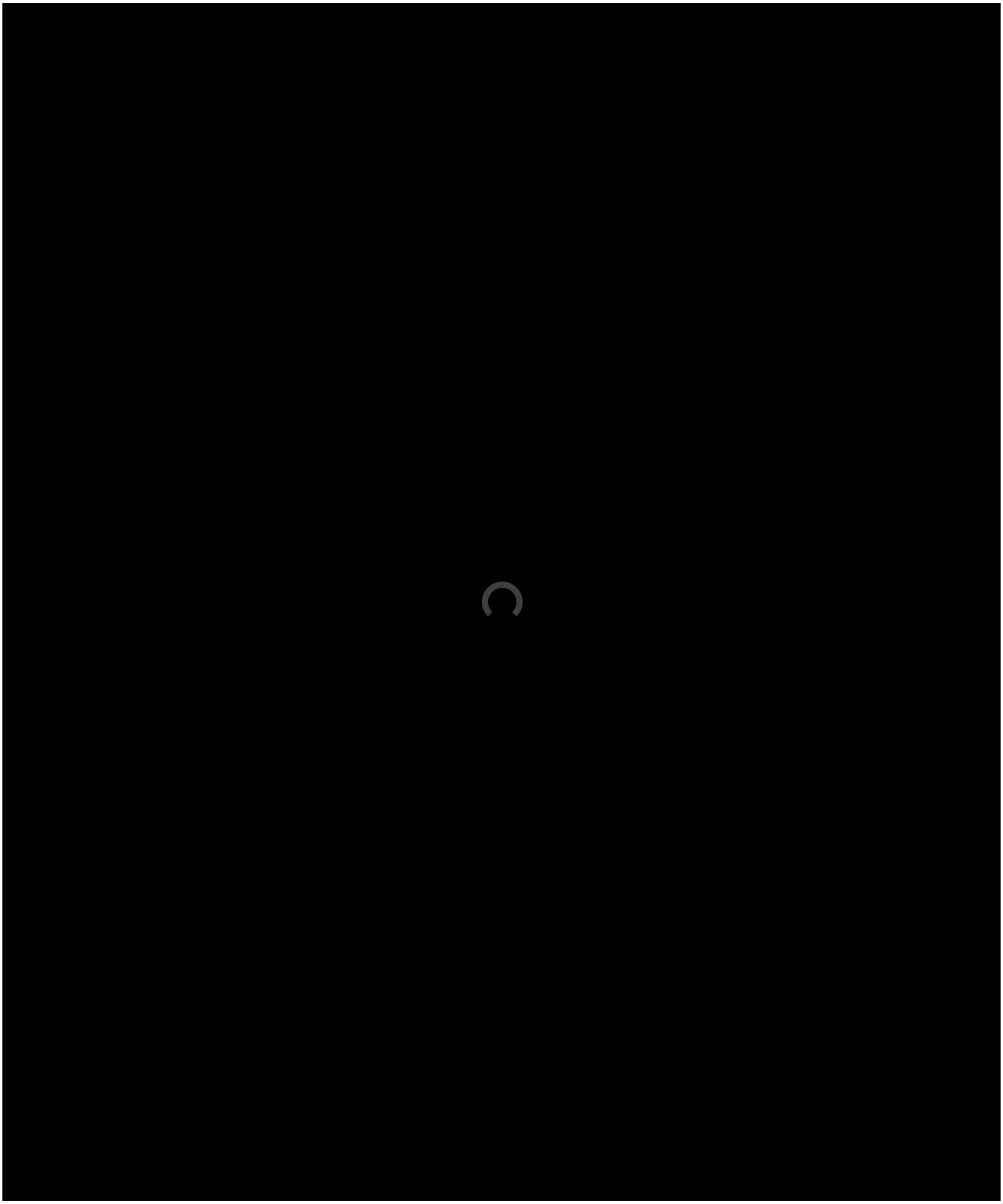
The once-vibrant Chilmari river port by the Brahmaputra sits deserted on a hot afternoon in July 2023. *(Photo by Faisal Mahmud for Nikkei Asia)*

Both Ali and Mia have a vague understanding of why the Brahmaputra has changed so much. At the village tea stall, where agricultural advice and uncorroborated information on current affairs are doled out with equal zeal over endless cups of tea, they have heard that India has been building dams that have been reducing the river's flow in Bangladesh. There have also been murmurs about China and its dams. "Big countries, big matters. What can we do?" Mia told Nikkei.

Senior government officials in Bangladesh have expressed concern about transboundary rivers and the consequences of actions by neighbors upstream on their otherwise fertile farmland.

A delta nation formed of more than 200 waterways connected to the Ganges and Brahmaputra rivers that course from the Himalayas through India before arriving, Bangladesh generates only 8% of its water and sediment within its borders.

“As the lowest riparian country of the Brahmaputra whose lifeline depends on the water of transboundary rivers, we are simply a victim of geography and the wishes of our neighbors,” Mohammad Abul Hossain, a member of the Joint River Commission (JRC) created in 1972 by India and Bangladesh, told Nikkei.

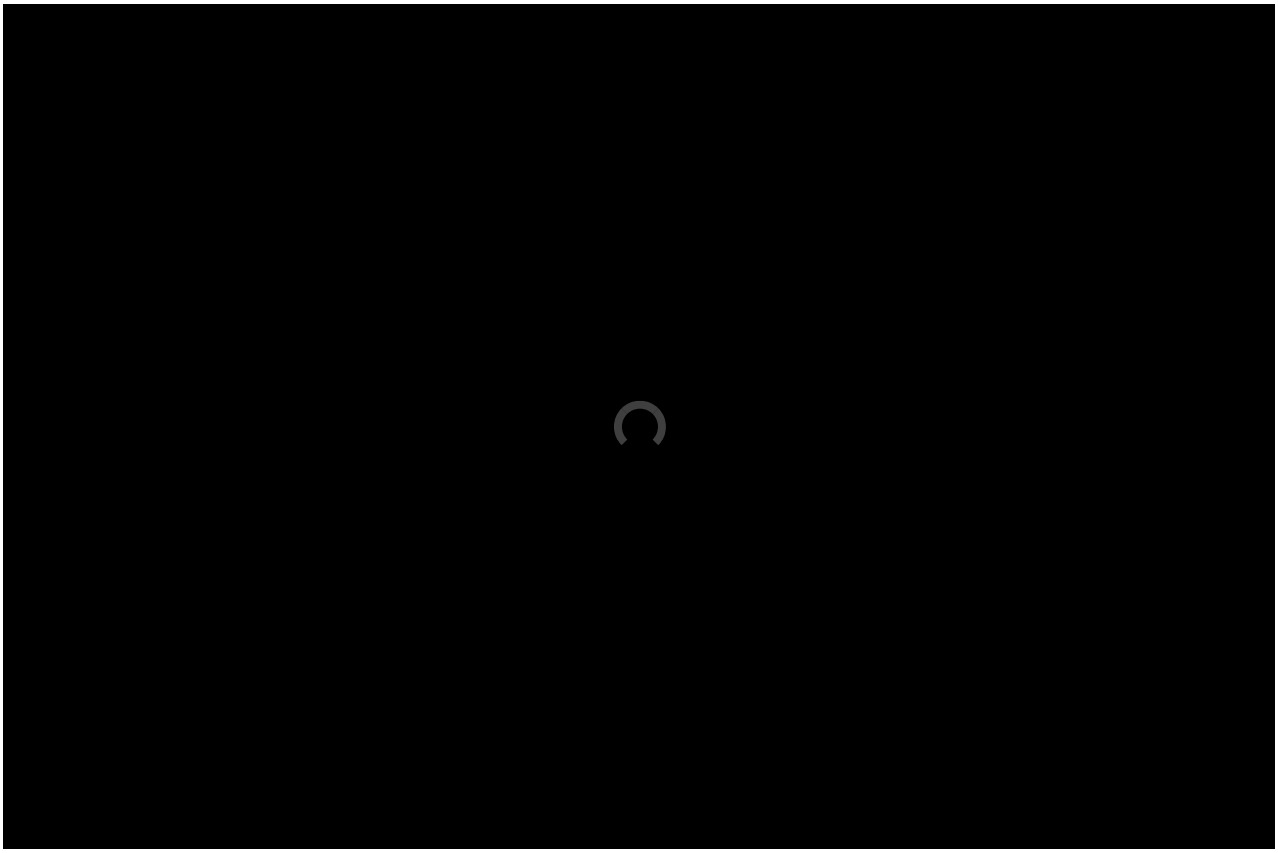


Despite 54 transboundary rivers, only one treaty exists between Bangladesh and upstream India. The biggest success of the JRC is in fact the 1996 Farakka treaty of the Ganges — the other major transboundary river that also originates in China's Tibetan plateau and, along with the Brahmaputra, accounts for nearly 90% of Bangladesh's inland water.

The 30-year treaty was the culmination of decades of negotiations. "We have to have treaties like the Ganges to ensure our fair share of water from the transboundary river. Unfortunately, we have not been able to sign any such treaty in the past few decades," Hossain said.

A failure to sign a water-sharing treaty for the Teesta, a major tributary of the Brahmaputra, is viewed by many as the thorniest bilateral issue between India and Bangladesh. Dhaka has long expected Delhi to agree, but the political leadership of West Bengal, through which the Teesta enters Bangladesh, has been reluctant to come on board.

West Bengal Chief Minister Mamata Banerjee has said her state needs the water for its own citizens. Meanwhile, Bangladesh Prime Minister Sheikh Hasina has come under criticism for failure to resolve the Teesta situation. Both female leaders, known for their strength and political aptitude, have elections looming next year. Hasina faces national elections, and Banerjee would like a more prominent role in the 2024 fight against India's ruling Bharatiya Janata Party.



West Bengal Chief Minister Mamata Banerjee and Bangladesh Prime Minister Sheikh Hasina confer at Visva-Bharati University in West Bengal, India, in May 2018. *(Photo via Getty Images)*

Frustrated by the impasse meanwhile, Bangladeshi authorities are mulling other options to manage their water resources. Beijing has offered Dhaka a loan of nearly $1 billion to maintain the Teesta's water levels during the dry season.

A senior Bangladesh government official, who requested anonymity, told Nikkei that Bangladesh "is seriously considering

China's offer" but wants to move forward with caution and avoid getting tangled in geopolitical warfare between India and China.

Anisul Islam Mahmud, a lawmaker from the opposition Jatyio Party who previously helmed both the ministries of foreign affairs and water resources, spoke more openly with Nikkei. "Bangladesh has been trying to get its fair share of Teesta water from India for long without success," he said.

"I don't see any harm in going on board with the China-funded project," Mahmud said, "as the center in India has lost the bargaining chip by not being able to convince West Bengal to sign the Teesta treaty."

He added that Dhaka must convey the message to Beijing that the construction of dams and unilateral withdrawal of water in Brahmaputra will "severely affect Bangladesh."

"For managing transboundary rivers, the carrot and stick policy will bring no good if you think from a regional point of view," Mahmud said. "Rivers are forces of nature and it should be managed through consultation and consensus among the stakeholders. Otherwise it will backfire [for everyone]."

Inidigneous Mising bathe in the Ranganadi, a tributary of the Brahmaputra in Assam. The river used to be wider than the currently elevated banks and was at least six feet deep. *(Photo by Prakash Bhuyan for Nikkei Asia)*

Back on the other side of Bangladesh in India, and on the other side of the river from the village of Pohumora, former rice farmer and an indigenous Mising Girish Chandra Taye runs a school. He strolls to the river bank, points at the sand deposits and says, “That’s where we lived until the ‘80s.” He’s now on elevated land and will probably have to move again.

"Given how China has become where it weaponizes everything ... tomorrow if they start doing it [weaponizing water], what are the levers you are left with?" Harsh V. Pant, vice president of studies and foreign policy at Indian think tank Observer Research Foundation, told Nikkei.

"I think that question will always be on India's mind and in the minds of other countries which are watching."

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*(This article is the second in a **three-part series** in which Nikkei Asia will explore the effects that the actions of upstream nations – exacerbated by climate change – have on countries downstream.)*

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