

ASSAM'S FLOOD RESILIENCE MEETS A CHANGING LANDSCAPE

Livelihoods and generations of flood wisdom are tested as development reshapes Assam's risks

Aatreyee Dhar
feedback@livemint.com
NEPALI KHUTI/BONQUAL BALICHAPORI

By 12pm, the water was already at their necks. Krishna Prasad Sharma's wife and two sons had been calling for help while he delivered milk in nearby Sivasagar. None of them could swim, and the current tearing through Nepali Khuti, a dairy farming village in Assam, was strong enough by then to take whatever stood in its way. It was neighbours, a mother and her son, who came without hesitating, breaking through the ventilator of the trapped family's house with a bamboo pole and hauling all four onto the tin roof. There they sat out the rest of 19 July, watching the village disappear beneath them.

Below their rooftop perch, in a cowshed slowly filling with water, 24 Jersey cows stayed tethered exactly where they had been left that morning. There had been no time to free them. Whether they lived came down to luck, and luck did not come. Tied at the neck, the cows could not keep their heads above the rising water; their ropes pulled taut and became nooses. By the next morning, all but one were dead.

"When we came down to clean the cowshed the next day, only one cow had survived. The rest of them died of strangulation. Imagine tying a noose to the neck of a human," Sharma said.

Of the family's 80 chickens, 10 remained. Of eight goats, four. Their mid-size SUV, bought the year before with seven installments still left to pay, lay upturned on a wooden beam. But it was the cows the family grieved—not the car, not the silt piled through their rooms.

"We didn't have much time to think, and saving our lives was the priority. We had just 15 minutes," Sharma said. "But our grief has been for our cows. We can afford to buy cars and things we lost. But with the cows gone, we don't know how to run our lives." He estimates it will take four or five years to rebuild his dairy business.

That business was the mainstay of income for Sharma's family of four. His 24 cows produced roughly 150 litres of milk a day, sold in the markets of Sivasagar and Nazira for ₹50-70 a litre, culminating into a monthly income of about ₹2.25 lakh. Roughly half went back into the herd, on feed, medicine and shed upkeep; the rest covered the household, medical bills and school fees. The goats were insurance, sold only in emergencies for ₹10,000-18,000 each. The chickens were a smaller side business, fetching ₹330 a kilo. In one flood, nearly all of it was gone.

As most of India experienced a delayed start to this year's monsoon due the El Niño effect, Assam saw intense rainfall that triggered flash floods along the Brahmaputra and Dikhow rivers. According to the Assam State Disaster Management Authority (ASDMA), 106 people died in this year's floods, which hit 563 villages across 14 districts and affected more than 1 million livestock.

Nearly 40% of Assam—about 31,500 sq. km—is classified as flood-prone, according to the state's 2025-26 Economic Survey, which cites the Rashtriya Barh Ayog, India's flood control commission. That is nearly four times the national average, and close to a tenth of all flood-prone land in the country. Only about 16,500 sq. km have any flood protection.

Villages 133km from Nepali Khuti flood two or three times a year, fed by the Brahmaputra and two of its tributaries, the Dhansiri and the Gelabil. Some have learned to deal with the annual floods with knowledge passed down over generations, but even their resilience is being tested as rapid development exacerbates the impact.

LIVING WITH FLOODS

Before 19 July, Nepali Khuti looked like the kind of village postcards are made of: a settlement built on the milk trade, strung along the Dikhow river—a tributary of the Brahmaputra—with the blue line of the Naga Hills rising behind it. Now it lies under a crust of silt and debris dragged down from those same hills.

The rain had been falling hard since morning. The Dikhow was rising, carrying down splintered tree stumps torn loose somewhere upstream, but no one was alarmed. This looked like the regular flood they knew, the kind that creeps onto the road, maybe into a garden, and stops. By 11 am, it hadn't stopped. The river broke its banks and kept climbing until the water was at people's necks across the village.

For a village that has kept Jersey cows



(Clockwise from above) 'Chang ghor' and livestock kept at higher ground in Bonqual Balichapori village; children relocate sheep to a safer place by a boat after floodwaters submerged low-lying areas, in Morigaon district, Assam, on 17 July; the lone Jersey cow, out of two dozen at Krishna Prasad Sharma's cowshed, that survived the flood that tore through Assam's Nepali Khuti village in July; and Hopun Dao shows the foodgrain she has preserved inside a traditional drum called 'dhuli' used by the Mising community.

for generations, the flood imposed an impossible order of priorities: save yourself, then try to save the cows. People lashed banana trunks into makeshift rafts. Others climbed onto the roofs of parked Tata Magics—the shared vans that connect the village to towns and cities—or crowded into the handful of homes and temples built on slightly raised footings.

Some 133km away, in Bonqual Balichapori, a village in Golaghat district that's home mostly to the indigenous Mising community, residents have negotiated living with the water and started building around it.

Their bamboo stilt houses, called 'chang ghor', stand 12-13 feet off the ground. When the rivers rise, water simply pools beneath the floors. Livestock, mostly pigs, stay dry on the roads. Children swim through the floodwater care-free, markers of resilience built over three or four decades. On 19 July, the same rain system that nearly killed a family in Nepali Khuti caused only routine damage here.

The Brahmaputra itself stayed calm.

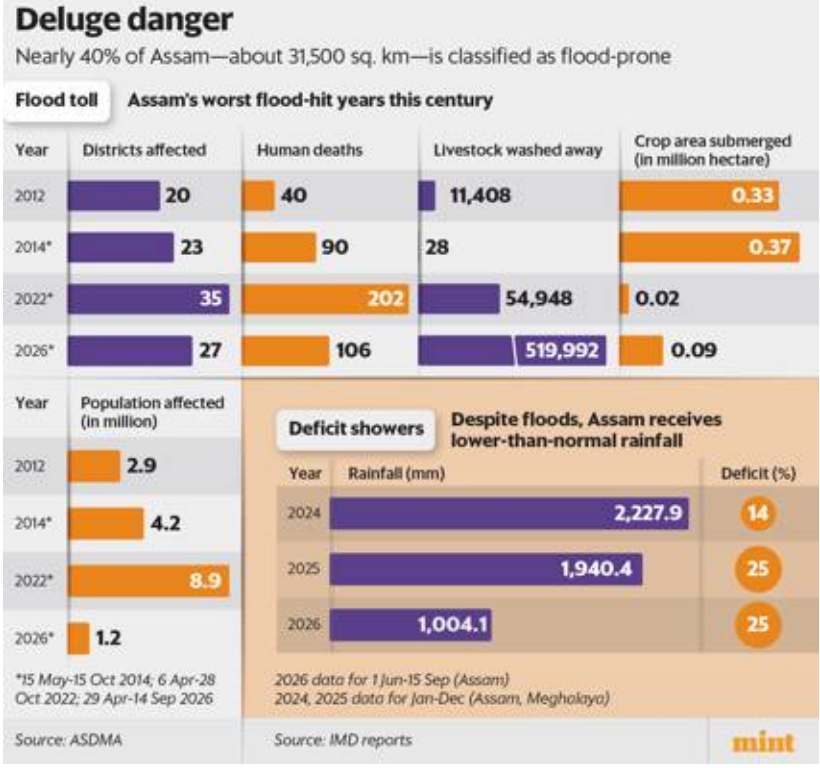
Seventy-year-old Bina Loi lives in a house with a cemented exterior built around a stilt 'chang ghor' frame. Her husband, Bholoi Dao, runs the household on milk from their 30 cows, ferrying them by boat each morning across two

or three bends of the Brahmaputra to graze on a grassy island, then back to a riverbank shed each evening.

The family spent about ₹50,000 hiring labourers and excavators to raise their riverbank against erosion locally called 'bheti'—an investment that protects a livelihood earning of ₹14,400-18,000 a month from 12-15 liters of milk sold daily at ₹40 a litre.

For widowed indigenous women, saving livestock can mean survival itself. Hopun Dao, 40, works at other people's fields for a daily wage. Her husband died 12 years ago; her children are grown now, one of them earning ₹500-600 a day at the Numaligarh Refinery.

When floodwater reaches the base of her house's bamboo poles, she slides in a new vertical pole to carry the weight down to safer ground and elevate her 'chang ghor'. She also builds a raft of lashed bamboo poles, a 'bui', and moves her four goats, nine chickens and one hen to higher ground.



Hopun Dao is not new to shifting places due to the river. In 2010, the river island that held her old village, Madhya Bonqual, began breaking apart, and residents relocated to where Bonqual Balichapori sits today.

She believes another flood is coming before the monsoon season ends in September, so she has stored her rice—an indigenous variety called 'bou dhaan'—in a bamboo drum called 'dhuli', and taken her weaving loom off the floor. On it she weaves the pinstriped cloth of the Mising community, sometimes sharing thread with her daughter-in-law, who sews gamochas and sells them for ₹120 each.

She has also packed her Aadhaar card, PAN card, voter ID and birth certificates alongside food, clothes and utensils, ready to leave at short notice. "I am staying on all toes for the next flood. I have bundled up everything—clothes, utensils and documents," she said. "Priority would be saving our lives first, but I have hung the weaving loom on the wall of my home instead of keeping it on the ground. I spent ₹1,200 buying it, and I make my own clothes from it."

Hopun Dao farms two bighas of land—okra, beans, gourd, potatoes, a leafy green called 'lopha haak', and bao rice—saving

her own seeds so she rarely has to buy food. Except during the six months a year when floods submerge her fields, when she spends ₹1,000 a month or more just to eat. Her livestock is the cushion beneath that: chickens can bring in ₹25,000 or more, goats another ₹3,000-5,000. She and her neighbours also practice a system called 'aadhin', in which someone who raises another person's livestock splits the eventual sale profit with the owner.

AMPLIFIED IMPACT

Floods affect an average of 931,000 hectares—roughly 2.3 million acres—every year. Last year's government survey put the cost at ₹2,781 crore, with about ₹2,769 crore spent on emergency repairs to infrastructure. Rescue operations took ₹63 crore, housing damage ₹28 crore, and losses to farmers, artisans and fisheries about ₹10 crore. This year's figures aren't out yet.

Much of that spending flows through Nabard's Rural Infrastructure Development Fund, created in 1995 with an initial ₹2,000 crore corpus. Assam has drawn nearly ₹9,450 crore from it to date, with the largest shares going to rural education infrastructure (30%) and flood control (28%).

Since the National Water Policy prompted the state's Outlined Plan for Flood Control, Assam's water resources department has focused on embankments, bank protection, drainage and erosion control along the Brahmaputra and Barak—an approach some researchers say leans too hard on engineering at the expense of local knowledge.

"The government needs to spend more on adaptation rather than post-flood measures and embankments, which are top-down in nature," said Rajiv Sutradhar, a development economist at North-Eastern Hill University.

A World Weather Attribution analysis published on 14 August found that this year's rainfall in Assam was not historically extreme but its impact was amplified by dense population and deep socio-economic vulnerability. Unplanned urbanization, deforestation and reliance on rigid infrastructure like embankments, the study found, have eroded the region's natural capacity to absorb water.

Assam's rainfall actually stayed below seasonal norms; it was neighbouring Nagaland's 181% above-normal rainfall—493% in Mokochung district alone—that triggered the 19 July floods.

The distinction matters, said Anamika Baruah, a professor of ecological economics at the Indian Institute of Technology, Guwahati: the difference between a flood hazard and a flood risk. "The rainfall associated with this year's floods was certainly capable of producing flooding, but the rainfall itself was not exceptional in today's climate," she said. "What turned that hazard into such a severe disaster was the way people, infrastructure and livelihoods are distributed across the landscape, and how the landscape itself has changed."

A NEW PILOT

Assam does have an early-warning system. Its disaster management authority receives flood alerts—ranked low, moderate, high or very high—from the North Eastern Space Applications Centre 12-48 hours in advance, then relays them to district authorities and emergency responders. But the SMS alerts that reach the public only say whether rainfall will be low, moderate or high—not how to prepare on the ground.

That gap showed this year in Bonqual Balichapori, where residents said the

alerts gave them no real warning. It was their own read of a slow-onset disaster that led them to move their livestock to the embankments along the Brahmaputra before the water came. Their preparations—stilt houses, boats, storage practices, an inherited sense of when to move the animals—reflect generations of living with the river. Researchers say that knowledge shouldn't replace forecasting, but preparedness plans should draw on it.

According to Tirtha Prasad Saikia, director of the North East Affected Area Development Society (NEADS), a civil society group that has worked extensively on disaster preparedness and climate action in Assam, it was the difference in preparedness for each kind of flooding that gave one community an edge over the other.

"With relatively slow-onset flooding, communities often have some time to observe the situation, move household assets, shift livestock and make arrangements for evacuation," Tirtha said. "Fast-onset disasters are much more difficult. The window between the warning and the actual impact can be extremely short. Preparedness is not simply about infrastructure. It is about the preparedness of people, households and community institutions. Social capital becomes particularly important when there is very little time to respond."

A new pilot in Guwahati is trying to achieve that. On 24 August, IIT-Guwahati announced an AI-powered early-warning initiative for the city, called Lodestar, developed with partners in the Netherlands; faculty members Anamika Baruah and Debanga Neog presented the proposal to Assam chief secretary Ravi Kota and senior city officials. The planned dashboard will offer 1-, 3- and 6-hour flood forecasts, drawing on resident input, artificial intelligence, CCTV feeds and rain sensors to flag flood-prone areas, according to the IIT-Guwahati announcement. An ASDMA-led task force has been formed to bring the system to life.

Baruah, who was part of the meeting, said Lodestar is meant to be more than another forecasting tool. The goal is to

monitor hazards at a finer scale and connect scientific data to what communities actually need to decide how to act, suited to a city like Guwahati, where flooding can vary sharply block by block, she said. That requires reliable, real-time rainfall gauges, water-level sensors and local monitoring combined with forecasting models, she said, calling Guwahati a test case she hopes to replicate elsewhere.

"We cannot engineer our way out of flood risk," Baruah said. Embankments and other infrastructure have their place, she said, but can just as easily shift or concentrate risk elsewhere instead of eliminating it. The way forward, in her view, is a mix of better land-use planning, well-designed structural protection, restored wetlands and drainage, local risk assessment, reliable early warning, evacuation planning and community preparedness. "That is ultimately the shift from looking at the hazard to understanding the risk," she said.

None of it—the dashboards, the sensors, the crores of rupees routed through Nabard—will bring back Krishna Prasad Sharma's herd, or has worked out the lives of Hopun and Bholoi Dao who are drawing on their inherited traditional knowledge largely to survive floods. "With the cows gone, we don't know how to run our lives," said Sharma. "Maybe we have to migrate."

mint
KEY
NUMBERS

1 MILLION+

The number of livestock affected across 563 villages and 14 districts in Assam during this year's floods.

31,500 SQ. KM

The area classified as flood-prone in Assam, making up close to a tenth of India's total flood-prone land.

₹2,781 CRORE

The estimated cost of flood damage in Assam in 2025, including losses to infra, housing, farmers, artisans and fisheries.



Liked this story?
Share it by
scanning the
QR code.