

# Kiribati struggles against rising sea levels

*Much of the Pacific island nation could be inundated in a few decades, experts say*

By Mike Ives  
New York Times

**TARAWA, KIRIBATI** » One clear bright day last winter, a tidal surge swept over an ocean embankment here in the remote, low-lying island country of Kiribati, smashing through the doors and windows of Betio Hospital and spewing sand and debris across its maternity ward.

Beero Hosea, 37, a handyman, cut the power and helped carry scared mothers through the rubble and water to a nearby school.

"If the next one is combined with a storm and stronger winds, that's the end of us," he said. "It's going to cover this whole island."

For years, scientists have been predicting that much of Kiribati could become uninhabitable within decades because of an onslaught of environmental problems linked to climate change.

And for just as long, many here have paid little heed. But while scientists are reluctant to attribute any specific weather or tidal event to rising sea levels, the tidal surge last winter, known as a king tide, was a wake-up call.

"It shocked us," said Tean

Rube, a pastor with the Kiribati Uniting Church. "We realized. OK, maybe climate change is real."

Pacific Island nations are among the world's most physically and economically vulnerable to climate change and extreme weather events like floods, earthquakes and tropical cyclones, the World Bank said in a 2013 report. While world powers have summit meetings to negotiate treaties on how to reduce and mitigate carbon emissions, residents of tiny Kiribati, a former British colony with 110,000 people, are debating how to respond before it is too late.

## Bleak picture painted

Much of Kiribati, a collection of 33 coral atolls and reef islands scattered across a swath of the Pacific Ocean about twice the size of Alaska, lies no higher than 6 feet above sea level. The latest climate models predict that the world's oceans could rise 5 to 6 feet by 2100. The prospects of rising seas and intensifying storms "threaten the very existence and livelihoods of large segments of the population," the government told the United Nations in a report last year. Half of the 6,500-person village of Bikenibeu, for instance, could be inundated by 2050 by sea-level rises and storm surges, according to a World Bank study.



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**Tooben Iareko, 6, plays on rebar being used to build a new sea wall to replace one that failed during last year's king tide in Betio, a town on the island of South Tarawa in Kiribati.**

The study lays out Kiribati's future in apocalyptic detail. Causeways would be washed away, crippling the economy; degraded coral reefs, damaged by warming water, would allow stronger waves to slam the coast, increasing erosion, and would disrupt the food supply, which depends heavily on fish supported by the reefs. Higher temperatures and rainfall changes would increase the prevalence of diseases like dengue fever and ciguatera poisoning.

Even before that, scientists and development experts say rising sea levels are likely to worsen erosion, create groundwater shortages and increase the intrusion

of saltwater into freshwater supplies.

In response, Kiribati has essentially been drawing up plans for its demise. The government has promoted "migration with dignity," urging residents to consider moving abroad with employable skills. It bought nearly 6,000 acres in Fiji, an island nation more than 1,000 miles away, as a potential refuge. Fiji's higher elevation and more stable shoreline make it less vulnerable.

Anotong, a former president who pushed through the Fiji purchase, said it was also intended as a cry for attention from the world. "The Issue of climate change is real, serious, and we'd like to do

something about it if they're going to take their time about it," he said in a recent interview. But packing up an entire nation is not easy, and might not be possible. And many Kiribati residents are skeptical of the need to prepare for something that could be decades away.

The skeptics include the rural and less educated residents of the outer islands who doubt they could obtain the skills needed to survive overseas, and Christians who put more faith in God's protection than in climate models. "According to their biblical belief, we're not going to sink because God is the only person who decides the fate of any country," said Rikamati Naare, new's editor at Radio Kiribati, the state-run broadcaster.

## World Bank project

The Fiji purchase was not the first effort to address Kiribati's perilous future. The World Bank-led Kiribati Adaptation Program, begun in 2003, developed water-management plans, built coastal sea walls, planted mangroves and installed rainwater-harvesting systems. The bank says the project, which cost \$17.7 million, has conserved freshwater in Tarawa and protected about 1 mile of Kiribati's 710 miles of coastline.

But a 2011 government-commissioned report

cast doubt on whether the World Bank project helped Kiribati prepare for climate change. And while the mangroves and water management plans have helped, a 2014 study said the first round of sea walls, made of sandbags, had proved counterproductive and caused more erosion.

"Adaptation is just this long, ugly, hard slog," said the study's lead author, Simon Donner, a professor of geography at the University of British Columbia in Vancouver.

Denis Jean-Jacques Jordy, a senior environmental specialist at the World Bank, acknowledged that "we had some issues" with the first sea walls but said subsequent ones made of rock were better designed.

There is no shortage of ideas to avert Kiribati's environmental fate. China's construction of artificial islands in the South China Sea shows the promise of sophisticated island-engineering technology, experts say. Tong commissioned a study on raising Kiribati's coastline.

But such measures are financially unrealistic for a resource-poor, aid-dependent country like Kiribati. "It's not about the place going underwater," Donner said. "It's about it becoming prohibitively expensive to live in. That's the real challenge for Kiribati."

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