

Seesawing: Coastal Change in Ngaraard, Palau

“You cannot really stop the power of the water,” said JeRome Temengil, site manager of the Kerradel Conservation Network, the local chapter of the Protected Areas Network (PAN) in Ngaraard State in the north of Babeldoab, the Republic of Palau’s largest island. “It actually shifted most of the sand away from the coastline. So you see where the sand stops and where the land is. You see the land that has been eroded under, so you see the tree roots on the coastline.”

The coastline in Ngaraard has a history of seesawing inland and offshore, which has been at odds with coastal infrastructure recently. Traditionally, the population of Ngaraard – currently around 2,000 people, Temengil estimates – lived inland in the hilly center of the state. “In years ago, people actually lived in the middle of the land because they were a mountain people. But right after, when we started having administrations – for example, like the Spanish and the Germans – that’s when we started moving to live on the coastline because it was closer to the ocean,” explained Temengil. When the coastline became the economic and social center on Ngaraard, the seesawing of beach erosion and accretion began to clash with the newly settled population.



It is important for Ngaraard’s planners and policymakers to understand these varying influences on Ngaraard’s physical environment in order to anticipate appropriate actions.
Source: JeRome Temengil.

A team of scientists assessed the coastline dynamics off a village on the eastern coast of Ngaraard for a case study in a coastal erosion and flooding guide, [Pacific Islands Coastal Change Toolkit](#). As the scientists walked the beach, talking with residents about what the coastline used to look like, they found that the north end of the beach had eroded while the south end had accreted. They noted evidence such as a line of ironwood trees

– which establish themselves right up to the waterline – that now had 150 feet of sand and small vegetation on their waterside – implying that the beach had accreted 150 feet in the trees’ lifetime. These coastal dynamics are attributed to erosion and accretion by wind-driven currents punctuated by dramatic storm damage.

Ngaraard’s eastern coastline is low and exposed to the easterly tradewinds and currents as well as infrequent but impactful storms. When storms do strike the coastline, storm surge floods the low-lying areas and washes away sand in some areas while building up sand in others, creating berms. These new berms change the interaction of currents with the coastline resulting in accretion in new areas over time – until the next storm comes.



The coastline in Ngaraard has a history of seesawing inland and offshore, which has been at odds with coastal infrastructure, such as roads and houses, recently. Source: JeRome Temengil.

Palau is just south of the main tropical cyclone, or typhoon, pathway, making their incidence relatively infrequent in Ngaraard. This made the recent landfall of 2 typhoons in the last 3 years all the more jarring. Natural climate variability causes sporadic periods of increased storm activity, such as that which Palau has experienced of late. In December 2012, Typhoon Bopha struck Ngaraard on its northeastern track from the equator to the Philippines.

“It really had a huge impact on intracoastal Ngaraard because the winds were coming from the east – and the east is much lower than the west side – so it destroyed a lot of houses. It created flooding that came through the villages. And so people had to move away from the east coast. And it took us months and months to recover. “

“And the second typhoon that came through, I think it was 2013, a year after. It also devastated the east coast,” said Temengil, referring to Typhoon Haiyan, the strongest typhoon on record. “Most of the crops – for example taro plants or beetle nut trees, most of the edible fruits – they were all destroyed.”

It is important for Ngaraard’s planners and policymakers to understand these varying influences on Ngaraard’s physical environment in order to anticipate appropriate actions. Climate service that provide information on natural climate variability and early warning for storm events are crucial in keeping Ngaraard’s residents safe.

Additionally, it will be important to understand and track how climate change will add to these dynamics. With time, climate change induced sea-level rise will amplify the flooding and abrupt coastal changes that typhoons bring. With a higher mean sea level, storm surge will be able to reach further inland, increasing the severity of flooding. Accelerated sea-level rise will inhibit the subsequent process of accretion and increase erosion. Climate change could also change the frequency or intensity of storms, which will be important to forecast for Ngaraard.

KEY MESSAGE

Know your physical/environmental setting – using locally-relevant indicators to understand and predict the impacts of a changing climate will help to ensure that products and services are appropriate to time and place.

Given the impacts of climate on the coast, Ngaraard is navigating a path forward ranging from agricultural research to spatial planning. “During the typhoon, most of our taro plants were destroyed by the salt water. And what Palau Community College is doing is they have more than five species of taro and they’re trying to figure out which of the taro is more resilient to salt water.” With these developments, Ngaraard’s agriculture will have a better chance of surviving coastal flooding events.

Another adaptation measure, discussed by Temengil and the assessment team, is relocating vulnerable infrastructure, including the town’s girls’ school located a few hundred feet from the beach, and residents who live close to the coast. This solution will not be as easily implemented as planting salt-resistant taro. The community, which has become accustomed to coastal living, doesn’t favor uprooting. “That’s something to the island people that’s very, very difficult – to relocate.

“I can tell you that, you know, if I talk to my own villagers on the east coast they’ll say no, we’re not moving we’re going to stay on our land. And that’s a little bit different than when the typhoon hit,” said Temengil. “When the typhoon actually hit us, they were thinking about moving. Now that things have really calmed down, then it’s not in their agenda.”

With the impacts of Typhoons Bopha and Haiyan freshly imprinted on the beaches, yards and building foundations, Ngaraard residents easily saw the benefit of moving inland. As their memory of the typhoon erodes with time, so too does the community’s motivation to relocate. Evoking that memory, Temengil said, is the key to engaging Ngaraard residents.

“They would be open, if you really show them the impacts – the damage to them from climate change. Right now if you’re talking to them, you’re just talking to them.”

Understanding the cultural context – the values, history and collective memory of the community – pertaining to adaptation decisions, such as relocation, is crucial to making those solutions work. Without the desire and support of the community, coastal planning will see little success.

KEY MESSAGE

Know your social/cultural setting – understanding community values, aspirations, and perspectives, as well as the sensitivity of assets critical to and the adaptive capacity of the community will drive adaptation from a grassroots level.

“We didn’t think about typhoons. Then we were hit by this super typhoon and everybody said it was an issue. We have to do this, we have to do that, to prepare for next time. But then, you know, months go by. Nothing is happening and no disaster comes our way, we tend to forget about it. Until it hits us. And this is what you call a lesson learned.”

The Pacific Islands Climate Storybook can be found at: <http://pacificislandsclimate.org/csdialogs/>
Climate Stories can be found at: <http://www.pacificislandsclimate.org/csstories/>

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