Climate justice in the Pacific

Jo Chandler ***The Monthly April*** 2023

Dead coconut trees on the shore of Veraibari village, on PNG's Kikori delta. Photograph by Jo Chandler

The lack of global action on the climate crisis has left grassroots groups leading the fight against catastrophe in PNG

With the outboard cranked up, it takes about three hours to navigate from Kikori town downriver to the village of Veraibari on the Gulf of Papua. Skipper and spotter must pick a careful route through the meanderings of the delta, its murky avenues cutting through tangled green – a glimpse of the greatest expanse of mangroves in Papua New Guinea. Dodging driftwood, skirting sandbanks, they every so often throttle back to a crawl so as not to swamp the canoes of fishers and slow-lane commuters.

The first time Yolarnie Amepou made this trip was September 2013, and the freshly qualified zoologist was venturing into unfamiliar territory, far from her home in Madang on the other side of the country. She was starting fieldwork on a project monitoring one of the treasures of biodiversity the Kikori delta is famous for, the pig-nosed turtle. Known locally as *piku*, and scientifically as *Carettochelys insculpta*, it's the sole surviving species of its kind and itself in deep trouble.

Amepou recalls her skipper nosing their boat onto a wide beach. She crossed about 10 metres of sand to the tree line, then the same distance again to reach the teacher's house where she would stay. The Veraibari schoolhouse itself "was a good 20 or 30 metres away from where I put my boat". Returning to Gulf Province every September after the peak of the seasonal deluge – the delta "is one of the wettest places in the world, you get four to eight metres of rainfall a year" – Amepou has witnessed the disappearance of the sandy beach. The coconut tree she climbed with her phone the first year or two to catch a whisper of signal became a stump in the shallows. By 2019, the teacher's house was washed away and the teacher was living in the school, itself about to go under. Classes had shut down. Amepou learnt that a couple of old men she'd come to know as advisers and friends had been ferried up to Kikori and jailed. Why? "They suspected them of having done sorcery to bring up the waves."

Now director of the Piku Biodiversity Network, Amepou says, "The building up of land, the taking away of land, is part of the Kikori environment on the coast – it's very dynamic." She spends months on the delta each year, collecting data on a variety of endangered species, and absorbing human stories along the way. Shores have been shifting and populations moving over thousands of years, and the transitions have been woven into culture and myth. Some people are recognised for having the power to build up land, some to break it down. "So they have migration stories all over their tribal lands, of where they used to be. What's different now is it's exacerbated – it's faster, so fast that something's happening, something is going wrong. And they're like, 'How is this something that's humanly possible?'"

Amepou recognised that a powerful part of what was playing out was indeed the work of humans. But this was the dark shadow of industrialisation – sea-level rise as a consequence of the burning of fossil fuels. "I had been travelling the whole of the Kikori delta, and I knew that all these different villages were getting impacted by the sea coming up, the burial grounds going underwater." Saltwater spoiled streams and wells, and there were insufficient freshwater tanks. During dry spells her survey teams carted precious drinking water. But she said little in the villages about what she saw going on. She was busy enough with the sensitive challenges of her conservation work, such as trying to save a turtle that the world categorised as endangered and local households knew as dinner.

But then her blameless friends went to jail, and she thought it time to get more involved.

The people of Veraibari have heard little of the science of global warming. Newspapers are rarely seen. Digital networks are flaky or non-existent. Gulf Province has among the lowest social indicators in PNG, with the last survey on the subject (in 2011) putting adult literacy at just 4.4 per cent. To explain to locals why their world was suddenly changing, Amepou says, "I'd have to talk about industrialisation, and we know that even in the international community scientists had to talk a lot before people actually accepted the science that climate change was happening. They're still talking. So how do I even start with people in the village?"

She began with what was obvious: how the king tides were getting bigger; how seasonal cues and rhythms informed by generations of observation were shifting; how people were adjusting their fishing and planting to respond to new conditions. "That's climate change adaptation happening right there." She shared the news that "what you're going through isn't just happening in Kikori, it's happening throughout the world. Where your village is sinking, entire countries are sinking."

The accused men were released. Suspicions about sorcery eased, only to be replaced by new anxieties. "What is the real cost of this water rising very high, destroying the villages, destroying the property of the community?" asks Ara Kouwo, a community and Adventist church leader. He gestures out the window of his house, perched over the incoming wash of a king tide, towards a pair of toppled tank towers – "destroyed by the water, collapsed". Several times he speaks of the loss of his "good sandy beach" – the one Amepou landed on a decade ago. It was the heart and pride of the village, the place to receive visitors. "We are really struggling. We have lost our good properties, our graveyards have been destroyed, our sacred areas also have been destroyed, and we are really worried."

I have taken the twice-weekly flight from Port Moresby down to Kikori, then hitched a ride with the turtle team, to meet Kouwo after hearing about an urgent, ambitious project he is leading to move his entire village a couple of hundred metres inland. It will be Veraibari's fifth move in 50 years, he says. Detailed plans have been drafted, drawing on skills recalled from a community development workshop years ago. A relocation committee has cleared and pegged the site, and started milling timber. It's a huge, consuming endeavour, relying entirely on local initiative, knowledge, labour and financing.

This is the first of three stops on my itinerary. Next is Kavailo village on Karkar Island, two flights and a couple of hours' bumpy ride in a dinghy from PNG's northern coast, to meet a group of "*solwara* [saltwater] warriors". Taking instruction from YouTube videos and with little more equipment than pliers, masks and snorkels, they are working to regrow their bleached reef, recover their fishery and protect their rapidly crumbling shoreline.

Then to Goroka in the highlands, and a short drive in a venerable LandCruiser to meet farmers anxiously waiting on long overdue seasonal rains. On their patch of land at Safanaka in the lower Bena Bena district, a husband-and-wife team are experimenting with salvaged seeds and forest plants, and ancient and innovative agricultural methods. They share what they learn with dozens of women struggling to grow food for their families and for income, striving to adapt in real time to conditions that defy inherited knowledge.

With the exception of a trickle of Australian government support for the Goroka project, in each of these places people do what they must to save themselves. Because – despite the slur from then Australian environment minister Melissa Price in 2018, when she reportedly waved the promise of her chequebook at former Kiribati president Anote Tong and said "for the Pacific it's always about the cash"; despite then senator Ian Macdonald's accusation that Pacific leaders were using climate change to swindle Australia; despite so many years of dialogue in rarefied global forums about climate finance and justice, loss and damage – there's no funding in PNG for these measures. So says Dr Siobhan McDonnell, lawyer, anthropologist and senior lecturer at Australian National University's Crawford School of Public Policy, who has worked for 14 years on Pacific climate issues. She says there's simply "no funding for displacement and resettlement. No funding for mitigating against sea-level rise." Such facilities "literally don't exist in global financing right now, and yet this is a crucial issue across the Pacific", where people who have done the least to create the crisis are living it.

The headline hope out of otherwise woeful inertia at the United Nations COP27 meeting in Egypt last November was that maybe, finally, this might be changing; that climate justice might begin to find its way down from the firmament into real-world programs. McDonnell was in Sharm El-Sheikh as a negotiator for the Pacific, and was part of a campaign that achieved what Vanuatu called for 30 years ago, resulting in 200 nations agreeing to establish a fund requiring rich nations to pay for the loss and damage wrought by global warming on poorer countries. Proposals to reshape global climate finance and development also gained traction. While there's a long way to go in turning ambition into reality, these achievements signal a shift after decades of resistance and indifference from polluting nations. A loss and damage fund "creates a link between mitigation and responsibility for the first time in the UN climate system", McDonnell says. "It's a powerful and profound moment."

Now she's part of the next phase, striving with Pacific colleagues to ensure that when COP28 delegates gather in Dubai this November they will have in front of them solid proposals for the fund: who will pay, who will receive funding, and mechanisms for effectively delivering the money. By then it's also hoped that $100 billion of overdue climate finance promised by wealthy countries to poorer ones might finally have materialised. And that pressure on institutions such as the World Bank and development agencies to overhaul ponderous grants processes will have eased some of the blockages.

All of which provokes questions around what climate justice – real, useful, transformative – would look like. And how funding – for loss and damage, for adaption – might finally begin to find its way to where it needs to go. "The most powerful thing you can do is tell the story about what it's all costing at a local level," says McDonnell, "and then draw the line between the local and global. Because we're constantly trying to pull that global, multilateral conversation into the realm of reality."

In the absence of any other financial assistance, Veraibari will likely bankroll its relocation with earnings from an exploding, largely unregulated fishery. Chinese buyers have lately discovered the delta's giant fish, paying huge prices for the swim bladders that keep them afloat. The dried bladders are coveted as a collagen-rich, life-extending, albeit tasteless delicacy called fish maw, usually sliced into soup. The delta boasts barramundi a metre long, but for the Chinese market the fishermen mostly target another large species, one that's historically plentiful as locals don't much fancy the flavour. It's a variety of jewfish, *Nibea squamosa*.

Ara Kouwo, also a middleman in the trade, pulls out his paperwork showing the pricing scale. A 100-gram dried bladder is fetching up to 6000 Kina – about $2500 – twice what many rural PNG households might earn in a year. Which makes the shrivelled morsels drying on the clothesline nearby, pegged out like socks, worth a small fortune. More can be seen dangling in windows all over the village, drying in the hot breeze. In jumbled piles along the shore are the gillnets fishermen cast wide across the waterways to capitalise on this bonanza, which is buying and fuelling outboards, sending kids to school in town, and paying for neglected health needs. It's even built a fish plant with 24-hour power so they can process and transport their catch up to Kikori.

But dolphins, sharks, rays and turtles – the pig-nosed turtle among them – are also captured. Two dolphin species – the Australian humpback dolphin and the Australian snubfin dolphin – travel up the delta, the only place outside Australian waters where they are known. They were only discovered here a decade ago, in populations estimated at just 100 and 200 respectively. Yolarnie Amepou also runs a project monitoring them, and in the six months to May 2022, 79 dolphins – most of them snubfins – drowned in gillnets. Within just a year or two, "you're looking at the very real possibility of a local extinction if nothing is done," she says. She's also counted 164 sharks and rays dumped along one short stretch of shore after being caught as bycatch. There were more – she just stopped counting.

In this wild place, the chronicles of industry, economy, power and nature play out and collide in the raw. About 20 kilometres west of Veraibari, and running the length of the delta, is the pipeline opened by Chevron in 1992 to service PNG's first major oil and gas field. Now majority owned by Santos, it still funnels oil from the highlands to ships waiting in the gulf. About another 20 kilometres west over the mangroves, as the kumul flies, lies the country's latest and greatest pipeline, servicing ExxonMobil's US$19 billion PNG LNG natural gas project, which then snakes under the gulf to Port Moresby for processing and shipment. These fuels are exported and burned for the comfort and profit of people far away, the emissions finding their way into the atmosphere, and eventually delivering devastating tides and weather.

It strikes me, after 14 years (on and off) reporting from all over PNG, that climate damage is the most tangible return many grassroots people have ever known on those gazillions of gallons of extracted fossil-fuel wealth. Certainly, there's little evidence of it in the social and economic indicators across Gulf Province, or in the marketplace at Kikori, where stallholders selling fish, meat, fruit and vegetables say they see householders holding tight to their remaining cash when royalty payments are low or late. Meanwhile ExxonMobil has proudly boasted its support for conservation efforts across the gulf, including contributing to the Piku Biodiversity Network.

The modelling presented for the PNG LNG project indicated it would double GDP. It "was going to change Papua New Guinea – that was the promise we got," says Amepou. The reality has fallen well short, as any number of analyses have documented. "If Papua New Guinea as a country had high expectations, just imagine what Kikori – as the place that would host this pipeline – the expectation it had. And if Papua New Guinea as a country realised that none of that came to pass, and we're very disappointed, the people of Kikori are even more disappointed. But they're already used to being disappointed by the things that are promised but never eventuate. So … we waited for the hero to come and save us, and I think maybe after 47 years of independence, we realised there's no heroes coming … the hero that you waited for is actually you."

In the delta, “water is our garden that we harvest, that’s where we get our income”, says Kouwo. Yes, his village is worried about how long the fish-bladder market, which underwrites their relocation, will last. They are worried about the turtles and the dolphins. But they don’t see another option. The only assistance they’ve ever known was a delivery of sandbags from the provincial government, which they dutifully filled and staked out. The bags soon washed away, their shredded remains now part of the mess of debris dumped by the tide. “If we see help from the Papua New Guinea government, or maybe from Australia or other countries, then we will stop these fishing activities,” Kouwo says. “But right at this current stage, there is no [other] hope for us … and we are in fear. When we kill all the mothers of the fish, we are in trouble.”

Amepou tries to support the community with information around sustaining their fishery and reducing bycatch. But she also sees what they carry – “the weight of losing your home, the emotional trauma” – and the knowledge that nobody’s coming to save them. “What do you prioritise when you are fighting for your life?” she asks. “Do I save myself first? Do I save my child first? Do I save the dolphin first? Stopping the fishery is unrealistic, because if someone’s drowning, if they’re fighting for their life and you cut that rope that’s holding them, they’re not going to be thankful to you for that. They’re not.”

She observes the people of Veraibari as they work to secure basic services, manage their fishery, relocate their homes out of harm’s way, quell fears and tensions, plan for the future. “They are handling all of this. This one little group that is not as well informed as the rest of us. We’ve burdened them to carry all this by themselves. It is very, very unfair.”

Papua New Guinea – Australia’s closest neighbour, largest aid recipient and former colony – is described by the World Bank as one of the most at-risk countries in the climate-changed world due to its exposure to what are still called “natural” disasters: extreme floods, droughts and cyclones. Compounding that is its “lack of coping capacity”. Amid the lofty pronouncements on “vulnerability” and the hospital pass of “resilience”, it’s appropriate to pause to observe what should be self-evident – that the lexicon of development is really quite the audacious mindfuck: blame shifting; obscuring colonialism and extractive, exploitative industry; indicting nature for human-driven misdeeds.

There are any number of locations in PNG where the impacts of climate change are hitting and communities have initiated, as a matter of necessity, some kind of response. This represents a formidable burden when some 87 per cent of the population live on ancestral, customary land and rely on fishing, horticulture and hunting for subsistence and income. I settle on visits to Veraibari, Kavailo and Safanaka because they promise insight into a range of the realities. I am not so much concerned with cataloguing physical evidence of the conditions they confront, as we outsider journalists have tended to do in the service of sceptical or ambivalent home audiences (and editors). Rather, my interest is in exploring what local people have chosen to tackle and prioritise, and why, and what lessons might be found in their actions if the world is indeed serious about supporting them.

Siobhan McDonnell’s challenge to “tell the story” in ways that join the dots on climate justice requires honouring these dimensions, too often missing in dispatches. This was one of the core deficiencies identified in Western media coverage through the Covering Climate Now initiative launched in 2019 and led by Columbia University, to strengthen global news coverage of climate change issues. As Fijian climate activist Ernest Gibson told me in 2021 when I asked what outsider journalists most often got wrong in climate storytelling, “We have never been victims.”

This is indisputable at the global level, where, as a diplomatic collective, Pacific leaders and communities have been shaping the conversation and response for decades. We all owe our best hope to the “1.5 to Stay Alive” pushback from small island nations against weak ambition in the Paris COP21. And again, at Sharm El-Sheikh, Pacific Island determination was pivotal in securing the loss and damage fund. Journalists ought to talk about that, Gibson challenged – “about the tired eyes, the aching feet and the chapped lips that, day in and day out, fight to ensure we maintain the strides we have made and sustain a culture of progress”. (Oceania scholar Professor Katerina Teaiwa, responding to the same question, counselled against ever starting any story wading on shore from a dinghy – such tropes “are just going to reek of every arrival going back to the 1500s”. And I tried, really I did.)

Victim mythology also pervades media reporting of the climate “frontline”, despite more than a decade of it being called out by innumerable activists, leaders and scholars of Oceania. They argue that doomism and “drowning islands” narratives – those populated with powerless and passive climate “victims” – are distorting, indulgent, supercilious and insidious, lumping disparate populations into an assumed, collective fate. It’s not that Pacific people are deniers, or are unaware of the pressing realities, says McDonnell. Rather, “they’re choosing to act in a way that creates agency, and that creates a narrative beyond just being a victim. And that’s profoundly important.”

An authentic narrative would also recognise that the people of Oceania have been responding to naturally dynamic conditions for millennia. Even as global warming supercharges change, climate impacts will vary in speed and intensity from place to place. In coastal terms, as University of Melbourne geographer and Pacific climate specialist Professor Jon Barnett has observed, what plays out will depend "on their geology, local wave patterns, regional differences in sea-level rise, and in how their corals, mangroves and other wildlife respond". Doomism threatens to short-circuit useful responses, Barnett warns, and the harm doesn't end there. He's also co-authored work on how "drowning islands" tropes perpetuate colonial representations of Pacific Islands as "sites of backward-ness, insularity, constraint, fragility and weakness". An alternative take, drawing on Katerina Teaiwa's insights, might instead recognise qualities such as hope, transformation, power, beauty, empathy, care and wellbeing.

In the Pacific, local action is powerful. The state is often a remote presence. "We've got all this focus on our political systems as the space where climate action should or could happen, and it kind of overstates the capacity of the political system to deliver that change," says Pacific anthropologist and development specialist at University of Melbourne Dr John Cox. Meanwhile, on the ground there are existing, strong networks providing local leadership and governance – women's church groups, for instance. It's a good rule of thumb, Cox says, that "climate adaptation and resilience building needs to be done at the lowest appropriate level". So, such networks offer benefits, as well as challenges.

The value of local partnerships and affiliations is everywhere in the development vernacular. But perhaps emboldened by their success running programs through the years of COVID isolation, or maybe just because they've had a gutful, local Pasifika specialists are calling out "tick the box" programs that proclaim local leadership but don't actually engage with it. Colonial attitudes still shape development and humanitarian approaches in the Pacific, Tongan women's rights activist 'Ofa-Ki-Levuka Guttenbeil-Likiliki declared in a plainspoken, quickly viral oration delivered at the Australasian AID Conference last November: "That sense of we know better, we are better, and we are here to make things better."

Drawing on her experiences and research for the International Women's Development Agency, Guttenbeil-Likiliki described outsider experts running roughshod over highly sensitive local programs, and how she nearly quit her work after 16 years supporting women and children in crisis. "I wanted [experts] to understand their colonial approaches and break the pattern," she said. "I wanted them to just stop and hand over the resources to the NGOs on the ground." Urging a long overdue shift from "power over" to "power to", she finished by sharing a Hawaiian proverb:

The top of the cliff isn't the place to look at us;
Come down here
Learn of the big and little currents, face to face.

Arriving in Kavailo on the southern coast of Karkar Island, I'm ushered to a chair in the shade of a rain tree and politely asked to explain myself to around 50 men and women and a wayfaring audience of kids. I've delivered similar presentations to countless communities as a rite of entry, of seeking permission, but it's always a confronting process, trying to explain the journalistic mission. Not least because in return for their precious time I can promise precisely nothing. My stories are like prayers, I say. I send them into the world with hope but no expectation. I believe in their potential or I wouldn't have come. On the last point, I don't confess a nagging crisis of professional faith.

Ward councillor Bobby Sarwau, 43, says he's witnessed erosion of the seashore over his lifetime. The change has been quick, and not just in the rising tide. He and the other fishermen find they can no longer rely on the traditional calendar or methods to find their catch. It's very confusing, he says. Local understanding of climate change and ocean science is fragmentary, gleaned mostly from educated diaspora and students on visits home. He's gained some insights into marine conservation issues through a network of coastal people fighting off some immediate threats to their waters, such as seabed mining and the dumping of toxic tailings by the Chinese-owned Ramu Nickel mine. Sarwau introduces himself as the chairman of the Karkar *solwara* warriors.

Kavailo's growing population is being squeezed into a shrinking strip of land as the water comes up. The village is separated from the Bismarck Sea by a narrow spit at the mouth of Kavailo Bay. There's no option here of relocating inland, says Sarwau partly because of an adjacent coconut plantation.

Christine Musas, a grandmother of five who is deeply worried about the shortage of land to grow food, is less concerned about the plantation: "it sustains our lives a little bit, the mothers and others work and get a little bit of pay". The problem, says Musas, is that every portion of the increasingly crowded island is spoken for: "ten steps and you go to the other village".

She enlists the analogy of a house. "Coastal people are living on the verandah … Inland people are living inside the house. If the verandah is damaged, we cannot move inside – there's already people, [it's] occupied."

Diminishing access to fresh water is a daily worry. Saltwater has crept into wells and streams. "Recently we made a culvert using cement, and then we fetch the water out from it," says Musas. "But the sea level is rising and within the next five to 10 years, our water will be spoiled." A 2018 report by Water Aid ranks PNG as having the second lowest rate of access to safe water close to home in the world after Eritrea, at only 37 per cent. It's the only non-African nation in the "top 10" of this grim ranking.

A couple of years ago, Sarwau secured some materials from the provincial government to build a sea wall. It was more substantial than the one in Veraibari, but it nevertheless soon failed. Hearing rumours that mangroves might provide useful protection, Sarwau says, "we did try a nursery of mangroves, but it didn't work because the current is too strong. So, we sit down again and we come up with a new concept to preserve our land." Observing the way the current and waves move in front of the village, and where the sand and stones wash up, he's persuaded that a little jetty built in the right place might capture some of the material in a natural barrier and fortify the beach for a time. But that requires materials and equipment.

Meanwhile, a coral restoration project is under way on the fringing reef. Lutheran pastor Matei Ibak came upon the concept in the course of his activism with the *solwara* warriors. Nearly five years and a lot of time underwater later, the nursery is well established, he says. But his team is desperate for expert guidance on how to grow and maintain it.

I pull on a diving mask and follow the project leader, Mugau Dalid, into the so-warm turquoise waters to have a look, floating over a shallow boneyard of bleached and broken corals. In the deeper water we come to a bank of steel frames the size of bed mattresses – materials salvaged out of the failed sea wall and wired with bouquets of iridescent blue-purple coral. More specimens are fixed to lengths of rope, and others planted directly on the sea floor. Dalid is experimenting with various methods, informed by trial and error. Bright fish, large and small, forage in circles.

The cuttings are taken and propagated from the hardiest specimens, those that have survived bleachings. Dalid says the nearby fishery is showing signs of recovery, but the sea here is also under pressure from industrial fishing, and locals have to paddle further and further to find their catch. It's a gamble to put resources into this project with no expert guidance and scarce resources, when time could be spent on more immediate, tangible needs.

I'm also mindful of concerns from eminent marine scientists that coral restoration is a kind of bluewashing, a distraction from the catastrophe playing out across global reefs from the dual shocks of cascading bleaching and ocean acidification, once characterised to me as "having two rhinos run at you from different directions". As Professor Terry Hughes, coral expert and indefatigable defender of the Great Barrier Reef, has tweeted: "Planting corals on every reef would cost many billions of dollars. It's like regrowing the Amazon with pot plants."

But low-technology projects such as the one at Kavailo are entirely feasible and potentially successful, according to Professor Baruch Rinkevich, an Israeli oceanographer, coral restoration specialist and Intergovernmental Panel on Climate Change lead author on oceans. I recount to him what I've observed on the Kavailo reef to get his take on whether it has any prospect of being viable. He compares the future of reefs to the cultivation of manmade forests – no, such measures won't replace natural reefs any more than pot plants, or even a plantation, might replace the Amazon. But they could sustain functional reef communities "until some better solutions might come along". These are "the reefs of tomorrow", he says, "not the reefs of today or yesterday. I accept the notion that many coral species and other fish and invertebrate will disappear, but at least those that can stand climate change will be there."

The catch is that to succeed, coral regeneration requires both intimate local knowledge and scientific guidance. There are "a few simple tricks", Rinkevich says – for example, installing nursery beds that can be lowered out of harm's way during bleaching events or storms. He wants to see programs that would pay people in reef-dependent communities all over the world to build and maintain coral nurseries, providing a local resource and a public service.

"I'm very positive about this, but of course it should be done correctly," Rinkevich says. It's not hard to teach – he could jump on Zoom and do it now. But there's the catch – to access the internet, Pastor Ibak and his team need fuel or boat tickets to travel to Madang town on the mainland, then money to log on to an often patchy service. An earthquake in September knocked out the internet across the province for months. The lack of access to even basic information on what to expect from the changing climate threatens to undo the hard work and ambitions of people to secure their future. They are flying blind.

Before I leave Christine Musas, I ask her if she has any questions for me. She wants to know how bad it is going to get – the wild weather, the sea-level rise. Like Yolarnie Amepou in Veraibari, I struggle: where to start? I think about the scientific

warnings and projections, louder and worse over so many years. I try to summarise something useful and honest, keenly aware I'm not talking to someone here about what they might do to modify their lifestyle choices to reduce their impact. The hope-versus-grief indulgence is a world away.

We grasp hands and share our fears for our children. But I can't know her fears. My "white *meri*" – white woman – distress is authentic yet also fraudulent. I clamber inelegantly into the dinghy and wave thanks and goodbye. Reeking, as Teaiwa might observe, of so many departures since the 1500s.

David Kulimbao collects me in his ute from the Eastern Highlands provincial capital of Goroka for the short drive east to his home in the lower Bena Bena district. The jagged landscape should be lush, but it's limp with thirst, pale and dusty. Choking smoke settles in the folds. "People are making fires in the big bushes," Kulimbao says. "They burn down and cut down most of the trees for making [food] gardens, and that reduces the running of the water – the little creeks that feed the bigger ones." Many people have lost this year's crops, which they rely on for food and to sell for income. Some 70 per cent of households in PNG are dependent on subsistence agriculture, and hence mightily exposed to climate hazards.

Rain should have come in August, but when I visit it's mid September and Kulimbao says there's not been a drop in seven months. He keeps a meticulous daily record. "All the people are suffering. They are unable to plant any food at all. The land is getting very, very dry." At 1600 metres above sea level, we're a world away from anxieties about rising seas, but, just as in Kavailo and Veraibari, finding fresh water to drink, cook and bathe is a struggle. The creeks are filthy and people are getting sick, particularly kids.

The rate of stunted, underweight or wasted children in PNG is one of the worst in the world – almost 50 per cent by a 2010 survey. Recent data is scarce but there's no indication things have improved. A 2017 analysis by Frontier Economics estimated that malnutrition could be the cause of up to 76 per cent of all deaths of children under five across the country's community and health facilities.

On one end of the spectrum of whacks from climate change are the violent and sudden events, such as the strengthening fury of tropical cyclones. Winston in Fiji in 2016 and Pam in Vanuatu in 2015 – the most intense ever recorded in the southern hemisphere – fit the expected pattern. Such dramatic disasters make headlines, at least for a time, jolting political and emergency responses. But PNG's experience of the 2015–16 El Niño provides shattering insight into the hidden, cascading reverberations of "slow onset" disasters. Climate scientists sounded the alarm in April 2015. In August, veteran Australian National University agricultural scientist and PNG specialist Professor Mike Bourke was in Western Province and telling officials, journalists and anyone who would listen that the conditions had the potential to outstrip 1997 in producing the worst drought in recorded history.

Frosts had wiped out staple sweet-potato crops across the highlands, sending families down to drought-ravaged lower altitudes, delivering seismic waves of displacement and, inevitably, sickness, as malnourished, vulnerable people were pushed into unserviced proximity. I glimpsed the fallout in Daru that December as people flocked into town. Kids coming in from the bush were turning up at school with leprosy. This on top of a drug-resistant tuberculosis epidemic and other ills raging through packed settlements with inadequate clean water and no sanitation.

The death toll was presumed in the thousands. A damning independent evaluation of Australia's response later concluded that it was "less than adequate" on multiple fronts: that "it took DFAT some months to focus on the crisis and along with other donors the bulk of assistance was delayed until 2016". This was largely blamed on poor assessment protocols, and on the PNG government not officially requesting assistance.

Unless it persists, droughts such as the one I observe playing out in Eastern Highlands are unlikely to generate a blip in the media. The visibility of such events is also a matter of climate justice, experts have long argued. The reality being experienced by populations needs to be seen and recognised in time for people to make decisions to mitigate and respond earlier, on their own terms and according to their own priorities, not wait for an acute crisis and international emergency responses.

Kulimbao stops the ute at Safanaka on a patch of land that might be a mirage, pulsing with verdant growth and the brilliant blue flash of the swallowtail butterfly. Anna Kulimbao, David's wife and project partner, is waiting with the fruits of their labours displayed on a tarpaulin: piles of nuts and seeds, varieties of beans and yams, breadfruit, corn, cassava, forest figs prized as a remedy for many ills, leafy greens, tomatoes, tropical fruits and – the bounty of a recent experiment – a crop of exotic mushrooms, which yield a nutritious meal just two weeks from go to whoa. There's *kaukau* (a sweet potato) – the staple food for two thirds of rural Papua New Guineans – including specimens of new, drought-tolerant varieties. Jars are

packed with painstakingly processed slivers of dried cassava and pandanus nut that can be rehydrated into soups and stews, and flour milled from banana trees.

There are chickens, goats, a young pig being fattened for their son's graduation three years hence. And a rabbit house – David Kulimbao has bred them for decades for meat and the market. Today there are just two cherished breeding pairs in the hutch, huge white bunnies that snuggle into his arms. "I haven't done any breedings due to climate change," he says. "There's not enough for me to feed the rabbits." Manure from all these creatures is mulched with *kunai* grass and spread over the crops – no fertilisers, no chemicals.

The couple use their garden to demonstrate integrated agriculture, working mostly with local women to improve their yields. They're also trialling a vanilla hot house as an income project for disabled people. Because of the drought, their immediate focus is on food preservation and water management. Their small non-government organisation – the Community Development Workers Association – grew out of a food security and livelihoods partnership with the Baptist Church in the 1990s. These days it squeaks by on a shoestring. Its approach is holistic, incorporating conflict resolution and gender equity alongside ecology and environmental awareness, maximising garden production to save vanishing forests.

Dr Lilly Sar, of the University of Goroka, says that forests provide a critical storehouse when cultivated crops fail, "but there's pressure on the land, so people are selling their resources, their natural resources that will look after them in extreme climate conditions like we experience in Bena now". She works with farmers on projects incorporating agricultural research with indigenous knowledge, and liaises with the Kulimbaos on a program supported by the Australian Centre for International Agricultural Research. "David has played a very big role in looking at how people are still able to work without expensive fertilisers, that you can have a sustainable practice," Sar says. "You protect the land and it looks after you."

Having documented the fallout of two shattering El Niños in PNG, Mike Bourke says that future food security will require increasing cash income for rural people, and the development and planting of cultivars and crops that can cope with extremes of wet and dry – precisely the programs the Kulimbaos and Sar are pursuing. Warmer temperatures mean there will be opportunities to grow some new crops at higher altitudes, Bourke says, but sweet potato, on which highlanders rely for most of their calories, is highly sensitive to too much heat or moisture. The United Nations Development Programme cites studies indicating a decline of sweet potato yields by as much as 10 per cent by 2050, together with losses across other key crops: cassava, maize, rice, sugarcane and taro.

Hard work and customary knowledge will not be enough in the changing reality, Sar says. She points to the food storage techniques the Kulimbaos are teaching. "A lot of people don't dry food because in PNG we think we have the soil, we have the weather, and we just have an abundance of food … we're not prepared for difficult times," she says. Then there's the insects, weevils and blights that capitalise on the changing conditions. And the fraught issue of establishing irrigation systems, again not something that has been a substantial concern here in the past, but becoming imperative as dry conditions persist.

But there are no easements over customary land. "If irrigation pipes are lying across different people's land, we have issues – social issues," Sar says. She's talking about the potential for conflict. "Tanks will not last. You need an irrigation system, but an irrigation system comes with responsibility." How do you recognise the rights of the various landowners and share the water? David Kulimbao – an outsider originally from Enga Province to the west – has been trying to navigate these sensitivities with his neighbours, not altogether successfully, and at some risk. Tribal tensions in the highlands are acute.

The day I fly out of Goroka, an eminent local man is murdered and his death ignites a powder keg. Hundreds of families in the district flee for safety, and the question of who killed him and why develops into a matter of national and international intrigue. Regardless, I wonder at the labyrinthine pressures and how they connect, and worry about the consequences: the shutdown of services and programs for weeks – including the Kulimbaos' workshops – compounding the hardships of the drought.

John Cox has written recently with Dr Almah Tararia about how climate impacts become drivers of conflict as growing populations compete for diminishing resources. They amplify existing vulnerabilities, producing complex entanglements of cause and effect that demand nuanced and locally sensitive responses. Communities are fractured. Some people look for explanations through allegations of sorcery, as occurred in Veraibari. Violence related to such accusations is being reported at alarming rates around PNG.

"There's no climate resilience that doesn't include having good health services or having kids educated up to a decent level," Cox says. It's not just about the environmental risks they are facing, "they are already vulnerable economically and socially because of poor services and poor livelihood opportunities."

"The policymakers really have to start looking at what's happening in communities," says Sar. Decisions by government and development agencies are too remote from grassroots realities. "Come and see what they can do with water," she says. "Water is the biggest issue. They're resilient people. These people work … they're surviving. They'll grow anything – they know how to farm, give them the water."

Months later, I still check in regularly with the Kulimbaos on WhatsApp. Tensions from the fighting rumbled for a long time, but services, such as they are, have largely resumed. As for the rain, David Kulimbao sends a photo of his logged readings since the day I left. Into January he was deeply worried, sending reports from local farmers that the *kaukau* and yams "are getting more green leaf and no good tubers" and "the weather patterns that our *tumbuna* [ancestors] follow to make gardens is lost". Many people were living on rice.

But since mid January the wet has arrived, and it's a big one, cutting up the roads and breaking the drought with a vengeance.

The concept of climate "loss and damage" feels slippery and obscure when its bandied about in global forums. But in Veraibari, Kavailo and Safanaka it gains form, recognisable in the terms Siobhan McDonnell uses to define it, as the erosion and vanishing of ways of living.

It's the violation of homes, gardens, sacred places. The mess left behind when the ecologies, economies and seasons upon which daily lives and enduring custom were built are disrupted. It's the distress when people are "increasingly faced with choices that are not through their own making", McDonnell says, "and then you see the horror and absolute environmental degradation that comes through their ways of life being completely upended".

It's the men under Ara Kouwo's house on the delta as the king tide rolls up in the night – knee-deep wrangling logs and debris, pushing them away from the stilts holding us up out of the water. Fishermen in their canoes struggling to untangle dolphins from their nets. Christine Musas feeling "heavy" with the worries of women on her island, and "how we can sustain ourselves within this little land that we are living in". David and Anna Kulimbao and their neighbours waiting in the highlands with their stockpiles of seeds, watching for the signals from the birds and bats that the rains are coming, and meanwhile slicing, boiling, squeezing and drying cassava for hungry times.

"How do they continue to remake lives and recreate futures for themselves and their children when so much of what they previously understood about the world is fractured?" asks McDonnell. "They are the really big questions that sit at the heart of all these diplomatic, refrained debates. There's a profound injustice that sits at the heart of all this." That is what the long overdue establishment of the loss and damage fund at COP27 so belatedly recognises. Attention must now turn to the urgent matter of how it might be practically delivered.

"It has to be innovative. It has to look different," says McDonnell, who is in the thick of Pacific efforts to shape it. "It has to have a regional presence. It has to be able to touch the ground in very profound ways, and to work alongside existing institutional structures." The key to all of it is new and additional funding, not, as a Samoan envoy attending the 2021 COP summit bluntly put it, "money you shift from one pocket to the other, because that really doesn't help us".

"The biggest gaps we've got at the moment are around understanding Pacific ways of life," McDonnell says. "We really don't have financing products that are very satisfactory for small-scale agricultural production, or changes in livelihoods that might come with climate change. We don't currently have adequate funding for large-scale displacement and relocation and resettlement."

McDonnell observes that, historically, the UN climate governance system has not worked well for the Pacific. The flow of money through mechanisms such as the UN Green Climate Fund, established to get funding for climate action to developing countries, is too slow, much of it goes to mitigation rather than adaptation, and the nations most eligible struggle to get access. (Australia hasn't recommitted to the fund, after the Morrison government stopped contributing to it in 2019.) The bottom line is that for smaller nations, let alone community organisations, "there are just phenomenal barriers in accessing climate finance," McDonnell says. "The question is, who has the expertise to deliver to a grassroots level? How do we engage those voices? What does that look like? And these are the perennial challenges in development."

There are bold ideas emerging. Last October, a month before world leaders, their negotiators and fossil-fuel lobbyists travelled to Egypt, representatives from villages, churches, and youth and community organisations across Oceania gathered for three days of *talanoa* – story sharing – on Kioa Island in Fiji to draw up a list of priorities for Pacific leaders to take to COP27. The ambition, explains Joseph Sikulu, one of the convenors and managing director of community network 350 Pacific,

was to overcome the burden of travel on activists and local leaders, and understand the priorities of grassroots communities, and to put those into plain language – "not highly technical, not full of jargon".

The Kioa Declaration included the following: "For far too long, the realities of our people have been used to highlight the urgency of the climate crisis. Fatigue from the constant retelling of stories and the burden of reliving the trauma connected to them without seeing any tangible changes has placed a heavy weight on the communities we serve." Its demands include access to climate finance. Sikulu says that support needs to recognise that these are organisations whose members may not have high literacy, and who may not have bank accounts let alone accountants and auditors. The declaration proposes a finance mechanism where organisations can share resources, and a user-friendly platform where anyone can begin the process of requesting funding and get help with the protocols and paperwork around funding applications, monitoring and evaluation.

The choice of Kioa Island to host conversations about loss and damage, and future migration, and reverberations across the Pacific, was not accidental. The island was purchased in 1946 by people from Vaitupu in Tuvalu, reportedly as an insurance policy against future land scarcity. A short boat-ride away is Rabi Island, where the people of Banaba, an island of Kirabati – among them Katerina Teaiwa's forebears – were moved in 1945, allowing the British Phosphate Company "unfettered access" to the phosphate under Banaba's villages and burial sites, shipping it out to fertilise and grow the Australian and New Zealand economies. The stories of these migrant communities, their experiences of voluntary and involuntary mobility, the ripples of people's movements over space, place, culture and time, informed the dialogue and the declaration.

Teaiwa has spent 25 years as a researcher and thinker, delving into the story of Banaba and what it reveals about Oceania, the world and the future. In her writing, lectures and talks, she argues that industrial activities such as phosphate mining are part of the continuum that has landed us where we are. "Climate change is the culmination of all the effects of all the resource extraction, land desertification and degradation, excessive production and consumption powered by fossil fuels and the pollution of lands and waterways," she says. It took hundreds of thousands of years to make Banaba, and 80 years to destroy it. Today, a defiant community of fewer than 300 maintain a presence on the blighted island. "Banaba and the Blue Pacific can teach us how to observe and understand what happens to people and to the planet when you exploit such resources."

By nature of their connection and their isolation, Pacific places become microcosms for what is happening around the planet, Teaiwa argues. "And at this critical point, maybe they provide opportunities to change our thinking so that we don't keep repeating the mistakes of the past. That's what I think the Pacific can do for the world."

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Jo Chandler

Jo Chandler is a freelance journalist who writes on human rights, development, climate and science. She's a senior lecturer at the University of Melbourne's Centre for Advancing Journalism.

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