# Chapter 17
# Papua New Guinea and Climate Change (and REDD/REDD+): The 'Western Carbon Cult' as a New Hostile Relationship that Was Friendly Though Throughout Most of Mother Earth's History

*Climate activists are sometimes depicted as dangerous radicals, but the truly dangerous radicals are the countries that are increasing the production of fossil fuels.*
*—United Nations Secretary General Antonio Guterres (April 5th 2022)*
*Today, markets value forests more destroyed than standing.*
*Michael Somare, Papua New Guinea's Prime Minister in regards to REDD (as quoted in his public biography* https://en.wikipedia.org/wiki/Michael_Somare*)*

**Abstract** Man-made climate change affects nations like Papua New Guinea (PNG) in very harsh terms. People in PNG often do not really know and understand what caused it and how they can contribute to mitigate the actual cause of such all-encompassing change caused primarily by industrial nations from abroad. Instead, PNG did very well on climate change for over 47,000 years but was already used as a 'pawn' in the carbon sequestration game while global warming and $CO_2$ release increases essentially unabated. All relevant agreements and COPs have achieved little on that matter; $CO_2$ and such Greenhouse Gases (GHGs) are not much curbed whatsoever but rising. A 'Carbon Cult,' e.g. carbon sequestration programs like REDD and REDD+, have not been effective in changing these problems, essentially made it worse and thus failed on what they were to deliver in earnest. The ancient old-growth forests pay that price; all relevant metrics show that clearly. In the meantime, PNG and its islands feel the full impacts of sea level rise, ocean acidification, coral reef death and coastal erosion. Many cultures start to get moved, beyond 'just' the Carteret Islands and the Torres Strait region with vast risk planning scenarios on the rise affecting millions of people, villages and cultures.

**Keywords** Papua New Guinea (PNG) · Carbon sequestration · Carbon stock exchange · REDD+ · Climate change · Climate justice

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## 17.1 Introduction

As Papua New Guinea ranks at the bottom of the list for per capita carbon emissions (https://data.worldbank.org/indicator/EN.ATM.CO2E.PC), the virgin and ancient forests, the mangroves, wetlands and the peatlands of PNG became globally famous for their carbon sequestration storage trading capabilities (Fox et al., 2010; Melick, 2010). PNG was to safe the world by simply trading the $CO_2$ emissions away. Using capitalism and continue business as usual, the REDD 'Cap and Trade' scheme by the UN promised to get rid of the access carbon and distribute pollution quotas more equally and 'fairly'! It required that the $CO_2$ sequestrations are inventorized and known (Schmid et al., 2015 for an example of such applied equations in the tropics).

In December 2010, REDD was rebranded as REDD+ (https://unfccc.int/topics/land-use/workstreams/redd/what-is-redd). That way REDD lost its earlier, narrow focus on reducing emissions and carbon markets and got expanded (Martin, 2020 for REDD+ in PNG). This was to allow for a more holistic approach of the value of forests and the lives of the people who rely on them and live in them. Activities that could now be funded under such a program came to include "*non-carbon benefits*" including "*opportunities for wealth creation and wellbeing.*" While this sounds great initially, more ecological, such win-win rebranding is as neoliberal as it gets and allows to include many aspects unrelated to climate change and greenhouse gases, it remains dubious for progress on climate change (e.g. Spash 2006). Current climate facts of global warming and impacts speak to that effect clearly.

The Sepik river region—the birth area of the first PNG prime minister Michael Somare—became of world relevance for such climate services, and to trade them internationally (The Guardian, 2015). That's because PNG was one of the first tropical nations that received a compensation payment of many million US$s for climate change-related carbon sequestration services from the contaminating western nations (Zhongming & Wei, 2022; see Filer, 2010 for the western 'Carbon Cargo Cult'). It was a record deal and meant to start a process worldwide to distribute carbon more equally among nations and thus to reduce the carbon problem globally once and for all. But both of which has not really happened. Reportedly, Michael Somare was eventually very disappointed with REDD, and the deal fell somewhat apart.

Does anybody remember this, or care, and where did the money go, and the $CO_2$, and the trees?

The Sepik and PNG's carbon sequestration deals now carry quite a bad label; some money simply went away unaccounted (see The Guardian, 2015 for "*We are not perfect*" by Stephen Hooper, the Australian carbon developer who established the Sepik river REDD+ project,; see also REDD-Monitor, 2015 for details of project 'April Salumei REDD').

Early on, PNG actually became world famous for confronting the U.S. at a climate conference meeting about its inaction within the wider community of concerned climate change nations (The New York Times, 2008; The Guardian, 2015; see for no actions to this very day, e.g. by Australia phrased here with Ludlam, 2021, The Guardian 2022a, 2022b). It was PNG that spoke up, while most other

nations remained quite or used 'diplomatic pathways' and ineffective tone, including Australia (a nation otherwise being so concerned about PNG and its well-being)! PNG leaves a mark in the man-made climate change topic that it sees itself increasingly confronted with.

The climate change debate is ubiquitous and affecting many aspects of ancient life. In PNG, it's for instance the question whether humans, or the climate, killed off the species that became extinct in the Sahul region (Flannery, 2002; Wroe et al., 2013). It's a question that Beehler and Laman (2020), Diamond (2011) touched upon, but here comes a more direct inference then: Climate as the main driver (as stated by Flannery, 2002 and elegantly expressed as 'Future Eaters')!'

After colonialism and globalization, man-made climate change marks another new chapter for PNG as a victim from outside forces as it otherwise always adapted well, and lived, with the more or less 'natural' climate for millennia (apart from stochastic events like hurricanes, volcanos and climate-driven landslides due to rain, volcano outbreaks, tsunamis, the universe, etc. let's say).

PNG is among the rainiest and cloudiest place on earth; the relevance of clouds—as part of the global climate discussion—cannot be understated for PNG (Beehler & Laman, 2020). But it's the wider atmosphere that PNG people have no direct control over (Figs. 17.1 and 17.2).

At minimum, with man-made climate change PNG—its people and habitats—will already face known losses due to sea level rise, coastal erosion, coral reef die-off and ocean acidification (e.g. Dixon et al., 2021). A new concept is to be developed and followed for PNG, *sensu* (Robinson et al., 2022; see Pittman et al. 2021for seascape). Like elsewhere in the world, many PNG citizens and Melanesians are to move and lose their local coastal homesteads, etc. (Game et al., 2011; Stone & Obura 2013). It's as if the world, the environment and Mother Earth even turned against PNG once more. In times of man-made climate change, one is to run to the hills; coastal erosion (Figs. 17.3 and 17.4) and spoilage of freshwater in coastal wells leaves no other options. And PNG has those hills, e.g. when compared to Australia! Thus, not all is doomed in PNG with man-made climate change (Figs. 17.5 and 17.6).

## 17.2 Papua New Guinea Will Be Hit Hard by Industrial Man-Made Climate Change Regardless

While PNG being widely innocent, powerless and a true victim in the global climate change arena, let's look closer what PNG has now to deal with in a changing climate that is man-made by a few powerful and dominating nations of 'the west' and the north (that includes here Australia). PNG is arguably on the receiving end, once again, and it's almost the identical actors than in the colonial and globalization game before. Essentially, Captain Cook hits from the other end, but again.

Progress on the climate change front remains insufficient, as widely noted in the public (see Ludlam 2021 for public protests in Australia and worldwide; The Guardian, 2022b). There is no need to be a cynic in understanding that PNG will not only be hit by a climate change caused primarily by the western/industrial world

**Fig. 17.1** Ghosts and spirits are watching whatever happens

(see first law case on that issue of Climate Impact Litigation unfolding with German Energy company RWE vs the people of the Lake Palcacocha in Peru, Latin America; The Guardian, 2022c). But it will also be hit hard by its subsequent mitigation efforts that are set up even more imperialistically to beat climate change (Martin, 2020). Seeing how climate policies stall and are unfolding, the set of latter policies to combat climate change are primarily designed '*by the west for the west*' while the remaining world is left outside, certainly PNG. That's how most modern policy settings have gone now, again. It simply reflects the earlier colonial and global power structure; it unfolds under an increasingly rotten capitalistic framework as the platform (Rich, 1994). It's the track record of power, and it will benefit those who write the policies on behalf of others they are to serve and to deal with in good terms

So to start that discussion, below the first set of facts that knowingly will hit PNG during times of climate change, based on the author's experience first hand in the field:

**Fig. 17.2** Clouds from the ocean as an inherent part of Papua New Guinea's climate and for climate change forecasting

**Sea level rise**: King tides are already having a more serious impact; full island evacuation is becoming reality now, e.g. Torres Strait and Carteret Island (Connell, 2016; see Nunn, 2012 for wider Pacific Island regions).
**Ocean acidification**: Ocean acidification involves various chemical changes in the ocean ecosystem, namely what is referred to as 'saltwater.' It's an unavoidable consequence of $CO_2$ increases in the atmosphere and occurs globally, also in waters of PNG and it affects coral reefs and the system overall.
**Coral Reef decay**: Coral Reef Bleaching (e.g. Foale, 2006), see Dixon et al. (2022) for no 'safe zones' and climate refuge boundaries for coral reefs.
**Temperature rise**: Due to warming, the single one glacier on the Indonesia side is already melting for many decades (Flannery, 2002), and almost gone now.[1]

[1] The glaciers and snow areas of New Guinea have been studied for many decades and were a piece of research early on, e.g. for British explorations (as described by Beehler and Laman (2020); see citations within). Mt. Hagen was climbed by many Alpine celebrities, e.g. Reinhold Messner. Flannery (1998) has referred to the changes early on. The areas were heavily 'collected'. Still, no relevant climate change actions have come from it, see The Guardian (2020a, 2020b) for public

**Fig. 17.3** Coastal erosion, it's for real in Papua New Guinea and elsewhere!

The snow pack on the PNG side disappears in the same fashion. Elevational gradients get pushed up, e.g. for limiting farming species, diseases like malaria, and affecting harvest timings (Beehler & Laman, 2020).

**Humidity changes**: This is a massive topic in PNG because it affects the ecology, namely disease spread, agriculture, forestry and wider weather patterns. Clouds are very relevant in that discussion but poorly studied.

**Carbon sequestration**: PNG has tropical peat lands as well as ancient forests. All of which are known to sequester carbon at a record rate.

**Invasive Species**: One can easily recognize that invasive species are on the rise, usually due to a harmonizing habitat and landscape caused by the overruling

statements. The melting areas play virtually no role for adjacent Australia and its essentially ongoing climate change denial (see Ludlam, 2021 for details).

**Fig. 17.4** Coastal erosion also affects king tides making impacts even more severe; that process comes with many surprises including rare but then dramatic impacts as well as spoilage of drinking water in coastal regions and wells

economic regime. As this business plan is fully rolled out more in PNG, it will bring with it invasive species; many examples can be found already, and it is done on the cost of PNG endemic species. For instance, the UN did so for many decades already with devastating effects, e.g. in the Sepik region (see Beehler & Laman, 2020, and citations within).

**Diseases**: Many diseases are now found in PNG that do not originate in PNG, and/or never were an issue there and for their impact; malaria comes to mind, e.g. moving further in altitude and new strains, including avian influenza, and commercial plant diseases.

**Human wealth and poverty gap**: In tribal times, village life had its wealth limit, and true poverty was somewhat buffered by the much smaller range between rich and poor and the family structures; there hardly were any rich people or an upper class and caste. Thus, there were fewer poor people in the society (while human power imbalances remained).

**Human migration**: The refugee crisis on Manus island is a classic indicator. The other aspects are actually the mountains, which are safe from sea level rise. People from the islands will enter the safer lands above sea level, including highlands and mountain villages. Many of those are along the trail system that have been used for bartering between islands and the interior.

**Fig. 17.5** Coastal housing in 'real live' including kitchen and outhouses

**Human conflict and warfare**: It's clear that many parts in PNG were not so peaceful among tribes; aggression plays a big factor, against other tribes and domestically (see Flannery, 2002; Gillison, 1993 for examples). However, international warfare in PNG remains widely unheard of (there is one case of PNG army fighting with Spirito Santo because PNG was asked to engage, based on French and international efforts). PNG has no really big or relevant army to start with, and PNG virtually picks no fights with its neighbors or abroad. However, as climate change changes the set up and fabric of nations, PNG can see such conflicts coming easily, such as climate refugees from islands or adjacent nations. When compared with the Ghurka soldiers from Nepal in WW1 and WW2, the famous PNG warriors never really engaged on the global battlefield abroad.

**Lag effects**: It can easily be assumed that climate change will not only affect the situations now, but for decades to come, likely centuries. The lag effects can be dramatic, when thinking of the causes being entirely man-made, made by just a few nations (mostly colonial ones) and their leaders.

**Synergy effects**: Already the list of effects shown here is devastating when taken individually. However, it appears to be much worse when it all comes together, combined, just like real ecology and real live is (Table 17.1). Thus far, an underestimate is reported.


**Fig. 17.6** Faces of climate change in Papua New Guinea: the future matters

## 17.3 There Are no Winners: What Good Has Man-Made Climate Change to Offer for Papua New Guinea?

Not much; simply when judged by the science record. There is no win–win, nor is there an 'opportunity', any good potential or 'winners and losers' (O'Brien & Leichenko, 2003). Instead it's all loosing for PNG—and for most of the world/mankind—when it comes to man-made climate change. As an island ocean nation PNG will pay an incredible bill on the climate change front, for years to come. PNG will not catch up with Australia, or with any other larger Asian nation on techno-solutions. PNG will remain within the Melanesian group, its set of 'failed states' and within its problems an approaches. Melanesia and PNG are certainly planned to be mined regardless (Kirsch, 2014 for 'Mining Melanesia'); see seafloor mining to come. PNG will be pushed into new directions it had not seen before, and the refugee list is likely to get longer for PNG, Australia and New Zealand (see, for instance, Luetz & Havea, 2018; Slee, 2019; the latter already flooded and carry many generic conflicts of integration (e.g. for such ongoing conflicts in the region on islands just see the recent tragic Christchurch bombing; The Guardian, 2021). A major misconception here is that PNG is a mainland with some islands. Instead, PNG is an ocean EEZ and an island nation with a larger block of land in its western side. The climate change impacts for PNG are on a similar state than they are for Torres

**Table 17.1** List of minimum effects and impacts of climate change that are known and which can be expected to occur in PNG

| Climate change effect | PNG impact | Comment |
|---|---|---|
| Global temperature rise | Glaciers and snow packs are melting, and have done so for many years already | Already seen in PNG, e.g. Beehler and Laman (2020) |
| | Palm trees moving up in elevation and produce more mature fruit there | |
| | Crop species can be planted in higher elevations | |
| | Malaria moves upward | |
| | Sub-alpine fires occurred in El Nino years | |
| Sea level rise | King tides reach higher | Already seen in PNG |
| | Coastal erosion PNG-wide | Already seen in PNG |
| | Carteret Island inhabitants got relocated already | An ongoing situation in Melanesia (Beehler & Laman, 2020, p. 89) |
| Ocean acidification | Affecting ocean water quality | Widely overlooked and poorly studied but massive impacts |
| Change of temperature, rain and weather patterns | Seasons are broken up and harvests are more diverse | Already seen in PNG, e.g. Beehler and Laman (2020) |
| | Rainfall patterns changed | |

Islanders or Guam and Kiribati (e.g. Dixon et al., 2022; Stone & Obura, 2013): Even a slight sea level rise will have devastating effects for PNG and its villages, cities, ports and beaches along the coast. It's of national impact and global proportion (sometimes referred to as 'biblical').

**Textbox: REDD and REDD+: What it is, what it does, and why it fails (=has virtually no valid open access inventory data, etc.)**

REDD is an older and highly inefficient—if not perverted—concept to distribute $CO_2$ and other Green House Gas (GHG) emissions throughout nations of the world. It's biased because it favors an ideological approach (capitalism but as the root of the initial problem) to trade $CO_2$, based on the initial idea that one can use money to compensate for $CO_2$, and that one simply asks others in exchange to pollute less, while the own pollution levels remain 'as is' or can even increase (as we currently experience worldwide, all as approved in a REDD framework).

In such a world, pollution can be traded and bought, it can be transferred into the coin-space (=money). It's like as if your life and death can be bought; one cannot. There is 100% no need entire nations, and the world, fall for such concepts. It's nothing but a common and very harmful paradigm, but as

adopted by money-rich nations in their chosen discipline of Environmental Economics (in contrast to Ecological Economics)—promoted at their institutions and outlets. It fails globally. It fails conceptually. And it fails in reality. It has a certain perversity to it, and in the following some simple reasons:

- To get an estimate what the national pollution levels are, one first would need an assessment with a fixed and consistent protocol. That's what REDD achieves. REDD+ is an update from that scheme, a more flexible one but which makes it more complicated for an inventory.

  The way how this relates to PNG is that PNG has vast tracts of carbon sinks, peatlands and old-growth forests that actually, offer such a carbon buy-out for polluting nations, e.g. Norway and Germany (see The Guardian, 2015 for public overview; see also for an Indonesia-Norway payment in Mongabay, 2022). However, neither the world, nor $CO_2$ quotas, CO2 release or PNG itself have really benefitted from such schemes. Where the money went is less clear also, but the REDD narrative remains.

  As REDD is to be based on data, we are short-founded on those data deliveries; where are they? Kujala et al. (2022) showed the need for such inventory schemes, which are to be linked with databases of global dimensions, as typically done now as best-professional practice (e.g. Huettmann, 2015). But it's already here where the carbon trading scheme falls short: modern book keeping.

- Further, the real money in REDD sits not in the assessment or in the data, but in the actual market trading and $CO_2$ valuation (which is a large multitude of the actual field work cost, and which is politically assigned but rather large). With that, REDD turns highly political and gets used in that wider framework of nation, global and strategic debt economies. The political economy has a base driving all relevant aspects of life now.
- Lastly, quotas are easily computed and simulated. With just 193 or so nations in the world, and very few main actors and political blocks among them (e.g. U.S., China, EU, G8 and OPEC), any trading negotiation scenarios can easily be captured, quantified, computed and predicted with AI and supercomputers for optimizations beneftting the ones in power. One can easily BUY-OUT entire nations and their quotas, and then control the market. And as if that has not happened and was part of set up to use REDD. That way REDD and its schemes get manipulated, the free $CO_2$ market falls easily apart and it turns 'perverse' where pollution gets cheaper and $CO_2$ rises, thanks to the commercial approaches with REDD at the center. Poor nations pay the cost, so does the world.

Simply put, REDD lacks progress, lacks data, lacks a good vision, a shown track record and lacks an achievement and $CO_2$ and GHG reduction with a real plan and sustainability. Global warming remains on the rise. That is certainly true for PNG where the entire forestry sector is rooted in lack of data and subsequent corruption (see associated chapters in this book; Beehler & Laman, 2020 for repeated details and facts).

## 17.4 Thinking It Through in More Detail: Climate Change in PNG and What is to Come

Clearly, man-made climate change is driven by industrialization, consumption and globalization with a *laissez-faire* approach to environmental issues (see Stern et al., 2006). Thus, any of those modern items are to be reassessed in that framework. PNG's 47,000 old past has little do with it (Table 17.2).

The list of items in Table 17.2 is quite long and stands in good contrast to what most western people and leading nations should better mitigate and what their governments promote (national well-being, win-win; we do all we can...). The modern world, as we know it, can hardly function any further within the classic paradigm. And so either we set ourselves quotas and accept limits, or stop industrialization as a concept, or engineer our way out of it, find other creative solutions, remain organic, are very lucky, or all of those together. Even the best possible avenues, Steady State Economics and Ecological Economics (Czech & Daly, 2014; Daly & Farley, 2010, Spash 2006) will face massive implementation problems with the realities of climate change to be scaled put (Farley & Kunkel, 2018).

The current level of $CO_2$ is man-made and caused the global warming, with many implications to come still. It's a global change. Impacts by methane and other GHGs and their feedback loops are hardly mentioned or studied yet; certainly not for PNG.

**Table 17.2** List of actions and items that have a large man-made carbon ($CO_2$) footprint making climate change more severe

| Action that increases man-made $CO_2$ | Citations | Relevance for PNG | Comment |
|---|---|---|---|
| Travel of goods from abroad | Klose (2015) | PNG receives a large amount of products from abroad, namely Australia and China | |
| Travel of goods to markets abroad | Klose (2015) | PNG has a major focus on export products in Asia | |
| Use of fossil fuel | IPCC.org | PNG does not burn much fossil fuels but produces oil and gas, and mining products | |

Whereas PNG has a minor $CO_2$ footprint and did not cause the global problems. It's the economy, industrialization, as promoted by the colonial nations and a few others that create once more a major headache for PNG. PNG can hardly change in how it was set up by global powers abroad.

## 17.5 Man-Made Climate Change Adaptation the PNG Way

While a poster child for adaptation, it's easy to see that PNG is a passive player in the world's Climate Change arena. Also, modern PNG has a poor governance structure at hand, and it is locked in into acolonial and British Commonwealth legacy of problems; with Australia, the U.S. and China driving many decisions for PNG, directly and indirectly. Mining, oil & gas and the natural resource extraction model as the prime business scheme for PNG. Harvesting virgin rainforest blocks and stressing coral reefs and the oceans does certainly not help. That leaves not much options then.

So what should be done?

Arguably, the PNG culture stands as a good role model over time to combat climate change. PNG and its tribal culture indeed is rather resilient. But who wants to be, and to live like PNG? Many people of the west do oppose, as already the vast loss of expats shows (see also Lutton, 1981 for university library move from Port Moresby to Perth!).

And such dramatic changes come with costs, costs of human lives either way; difficult to envision any other. There will be suffering, caused by the west again, with nations located literally on the far opposing side of the planet. But we are one, after all.

While I favor cultural life adjustment toward nature, and living close with it and in it, and in the nature of 'now,' there is no good solution in sight to truly deal with man-made climate change benefitting everybody (but see Loewen 2021). Instead we see a one-sided approach with many loosing parties. Be ready for the life boat and run for the hills.

The current policy inaction and lock-in by earlier governance, e.g. mortgages and student loans, debt trading of entire nations by private companies, the International Monetary Fund (IMF) policies, etc. make a relevant change virtually impossible for climate change.

Now where does that all leave us?

It would be great of the wider framework, globalization and corporations and large nations and their cultures if they would save us; unlikely though. Presumably the local efforts and individual work toward survival—for a better life—is where the power sits, bottom up.

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