Chapter 7
Papua New Guinea as a Global Sustainability Leader: Confronting Per Capita Metrics with GIS Layers and Social Engineering

The sin of PNG has been the failure of either the national government or provincial governments to carry out formal resource planning as a way of defining future conservation action balanced against smart and well-located economic development
Closing remarks by Beehler and Latam (2020, p. 353)
…those responsible for defining the new state's independence realized the Australian vision for PNG's future was not entirely appropriate. Rather, PNG's first generation of national leaders sought to develop PNG by emphasizing what they believed was most suitable for PNG' s overwhelmingly rural village-based societies. Yet the need for continued economic support from Australia constrained the degree of freedom these leaders actually had in charting a new course for the nation.
Baraka (2001, p. 7/8)

Abstract Using best-available online data, and when compared to its colonial powers, Papua New Guinea (PNG) has a tiny human footprint, even more so when compared globally. Being a rural island society, usually with a nomadic component and public ownerships, that's how most of PNG lives and operates. Private wealth accumulation tends to be very small, hardly needed. And PNG has done that way fine for over 47,000 years. The per capita consumption in PNG ranks as one of the lowest in the world resulting in a carbon sink for global society. Seen from that angle, PNG does the global community a favor and provides a huge service, but is not much recognized or rewarded for it. It's even widely called a 'failed state' while staying in the tribal Wantokc governance for its natural resources. Blended with 'modernity,' here it's shown how PNG can be a global policy lead and how a society is to look like and to remain if global well-being, world peace, is actually wanted.

Keywords Papua New Guinea (PNG) · Sustainable governance · World peace

7.1 Introduction

The current resource consumption footprint of a Papua New Guinea (PNG) citizen—per capita—ranks among the world's lowest. In PNG people have their own way and

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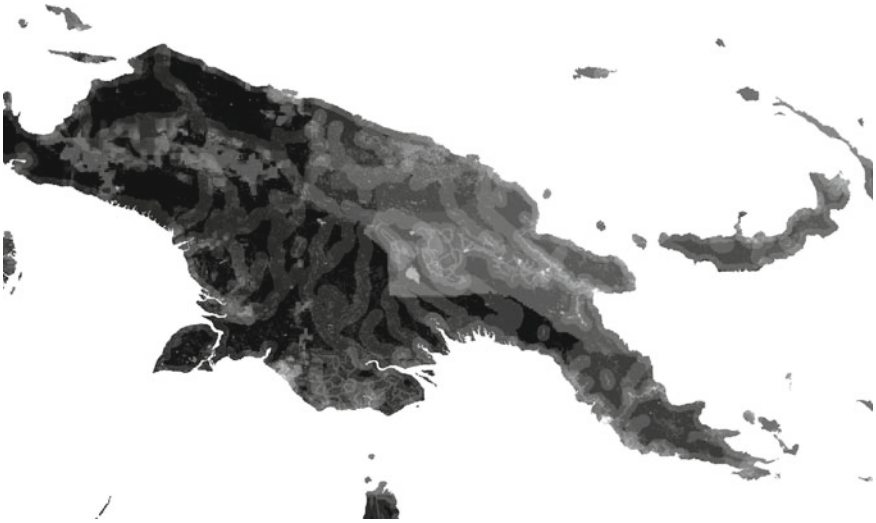

Fig. 7.1 Map of human footprint (dark = low, light = high) for Papua New Guinea, a nation with a Gross Domestic Product (GDP) of app $23.59 billion (GIS map source Huettmann, 2020) Note the different data sources for PNG sectors within, e.g. the Australian claimed\supported areas in the south

its locally celebrated, as part of being Melanesian (Narokobi, 1983) and the PNG statehood (Narokobi, 1975). This is not widely known, hardly promoted anywhere (but see Golub, 2014 for a critique). However, it's quite a typical situation for many tropical nations, e.g. in equatorial areas where there is almost no need for winter heating and thus PNG emits virtually nothing on that topic, e.g. when compared to Arctic or high elevation and latitude nations such as Canada or England! The human population is low, has little consumption and few private goods. Publically owned land sits at the core of people's attention, its shapes their identity (Baraka, 2001) (Figs. 7.1 and 7.2).

PNG also has just few private cars, little roads, few big cities, and it features just a few public transport options (= buses) with no railway. Subways are not heard of in PNG. People of PNG also eat primarily a vegetable-based local garden diet ("*greens*"). Industrial mass production of meat is very little; and all commercial meat and food (= sugar) production was actually imposed from the outside, usually through Australia, and mostly done by the western world for their own use and profit, e.g. chicken and strawberry. Also, PNG Airlines has a very tiny fleet, domestically and internationally. Despite the very benign PNG impact, PNG citizens are affected unduly by economic growth and CO_2-inflicted climate change: this economic growth is mostly just due to foreign-driven industrialization, globalization, international fishing, mining and LNG plants; it's the prime cause for PNG's microplastics, sea level rise and ocean acidification. It also creates impacts reaching from global change and temperature rise over to melting glaciers and associated change in water tables, coastal erosion, pandemics and global warfare as well as subsequent immigration

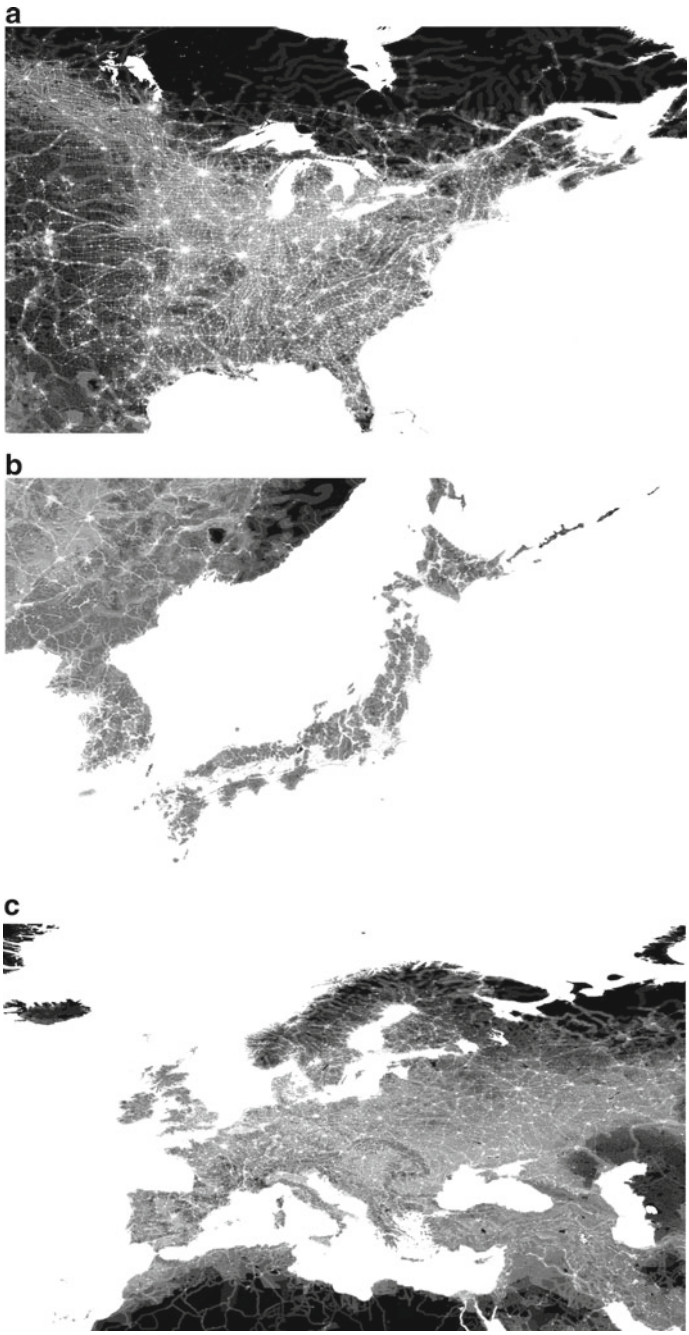

Fig. 7.2 For comparison, a map of human footprint (dark = low, light = high) zoom in for **a** Eastern US, **b** Japan and S. Korea, and **c** EU (see respective GDP values of app. $20.94 trillion, $5.06 trillion and $17.90 trillion, respectively)

Fig. 7.3 A typical garden and village site in Papua New Guinea: the engine of global sustainability; and perhaps the future of the world's wilderness?

chaos and human tragedy and suffering. The socio-economic impacts sit at the core of this discussion. Many of those activities act in synergy, with a lag effect and mostly caused 'by the western nations' and 'for the western nations' while PNG pays most of the true costs, clean-up and otherwise, e.g. long-term effects affecting future generations. It's more than a double whammy for PNG. Many of those impacts came from across the border (e.g. Lasslett, 2012), and globally (Stiglitz, 2003), fully approved by academic advisors, now many are also applied in PNG itself, but against the will of many of the PNG people, e.g. in the Fly River pollution (Kirsch, 2014) or Sepik river issues (Cousteau & Richards, 1999). For Ramu River, as one example of many, the author heard of, and saw, similar environmental issues (Examples of a natural live in PNG are shown in Figs. 7.3, 7.4, 7.5, 7.6, 7.7, 7.8, 7.9, 7.10, 7.11 and 7.12; Table 7.1).

7.2 Papua New Guinea Compared with the Colonial Outside World

Compared to the western lifestyle, the citizens of PNG live essentially without harming much the global environment, that is, true socially, economically and environmentally. When it comes to the carbon footprint specifically, PNG is one of the lowest consumers in the world releasing man-made CO_2; and instead the large forests and wetlands of PNG sequester carbon (e.g. the Guardian, 2015 for a topical review and citations within); it acts as a global carbon sink and as a temperature

Fig. 7.4 Pigs and coconuts in the garden: A genius but well-proven approach to sustainability overall (much better than any neoliberal industrialization effort ever can be)

regulator for land, sea and atmosphere. This is known but not much awarded by the U.N. (example of PNG consumption patterns shwon in Fig. 7.13).

PNG provides essential ecological services to the world; all done for free and based on a huge expertise accumulated for millennia (many details shown in Flannery, 1998)! Same can be said for consumption of nuclear power and waste production, plastics, electricity, industrialized foods and water or industrial contamination. In PNG, the +700 languages have no words for such terms. The creation, consumption and release of such contamination products in PNG are once more miniscule when compared to most other nations in the world. And having one of the highest rainfalls in the world, traditionally PNG's rural community has virtually no water-use footprint neither. All of this occurs while the world, certainly adjacent Australia, is struggling and fighting for fresh water and for good quality drinking water and man-made CO_2 release (e.g. Mercer et al., 2007). Water is not really the core issue in PNG, not to be (it actually now is a concern and that's just relatively recent artefact where the outside world takes advantage of cheap mining, low costs of environmental violations, inexperience, absurd governance structures, strange plumbing schemes, and remoteness affecting the initially pristine water cycles and handlings in PNG; some global resource examples provided in Stiglitz, 2003).

And that tiny environmental footprint of ancient PNG—more than 47,000 years old—is not a small feat whatsoever! It's a gift to the world widely unrecognized. Many nations wish to have a low carbon footprint by now, if they just could!

Fig. 7.5 A 'castle' in Papua New Guinea, fabricated from palm trees and some tropical timber, and earthquake-proof

With such a tiny human footprint, the PNG culture does indeed offer a sustainability model for the world. PNG runs a modified natural 'garden' to feed its people on a finite space. PNG is doing a fine-tuned and sophisticated gardening already for millennia. It does that without industrial fertilizers and industrialized debt-causing or seed-destroying DNA-bred GMO plants. It does no relevant harm to nature or the ecosystem or the nation, or for the world for that matter. It's for a small and rel. appropriate human population on the PNG landmass. The PNG society lifestyle is as benign as it gets, and it is quite sustainable. PNG is a cradle of human farming for many species, e.g. yams.

This IS a modern life and culture and must be seen that way (compare with Golub, 2014 for 'grassroots' in PNG), and in the days of 2023. It's what most of the western and industrial world seeks (e.g. German 'Coconut cult' https://en.wikipedia.org/wiki/August_Engelhardt) but what they do not achieve (see O'Coonor et al., 2020; compare with Dublin & Tamaka, 2015 for Japanese Sayotoma and Ainu approaches practiced on Pacific islands just north of PNG).

So where is the reward for PNG, and how recognized? Where is the PNG-owned copyright for such a global remedy and management? There is not a single mentioning and recognition of such an OUTSTANDING contribution in the U.N., in the U.N. Aichi targets and SDGs, or in any of the COPs on Climate Change, nor in the IPCC.org or with majpr NGOs for the matter of fact. It simply goes by the wayside. And even major experts on the PNG and environmental subject remain quite silent

Fig. 7.6 Water taxi, part of the coastal fabric and a life line in Papua New Guinea (Note the generic lack of live vests)

about it, e.g. Martin (2005), Diamond (2011a), Laman and Scholes (2012), Beehler and Laman (2020).

Why is that?

Here sits exactly the crux: low impact metrics usually come with modern-style (created) poverty and thus those metrics are not so interesting—hardly achievable or wanted—for western nations, whatever they say and claim (win–win situation, e.g. 'have a small car, a small house and combat climate change' as promoted in "Inconvenient Truth" by Al. Gore, etc., https://en.wikipedia.org/wiki/An_Inconvenient_Truth).

Overall, and despite its reputation (Gosarevski et al., 2019; Smith, 1974), PNG is very peaceful for the world overall; already the bartering and trading of goods all over PNG requires a functioning system of human interaction for survival (see Golbu, 2014 for Yame; another typical example shown in the oil of the tigasso tree (*Campnosperma*), that was known, harvested and traded for its amazing properties throughout ancient times in the Sepik region and beyond among different tribes and ecosystems (it was later picked up as a global commodity by international business people for the organic health market, etc.). '*PNG ingenuity*' indeed is 'a thing' (Narokobi, 1983). And it exists for everybody who just looks at PNG.

Intense resource conflicts for oil and gas in PNG versus the world—as a type of international warfare—are very few. There is no global warfare that PNG really engages in, or is occupied with. PNG has no real international enemies and virtually no drones to kill people, nor a relevant number of airplanes, or warplanes or

Fig. 7.7 Papua New Guinean village and garden foods are very healthy indeed

bombs for that matter. PNG can hardly defend its coastline and EEZ (see Radio New Zealand 2018 reporting on 18 missing PNG fisheries observers). The actual harm that truly comes from PNG is miniscule, certainly when compared on a per capita basis with nations like Australia, NZ, Switzerland, Canada, the U.S., or surely the EU—as an acclaimed center of civilization and colonial power; but just think of Iceland, or Finland and their heating costs and its wider lifestyle subsidized by the EU (milk, energy, diesel and coffee, sugar, broccoli, oranges and bananas). Finland now gets support from the NATO to remain a western-style democracy (vs. a Russian-style influence). Or even worse, think of Norway—as a nation and a royal kingdom—a stench whaling supporter but all just kept afloat by the NATO and oil consumption (now using mining-intense electro cars). Norway would otherwise likely be consumed by its neighbors, namely Russia, or Sweden and Denmark (see the track record of Norwegian history and Royal courts in Scandinavia, specifically Denmark and its crown). Arguably, ancient Viking raids onto existing and neighboring kingdoms are not sustainable but added to some Norwegian wealth while the Vikings exploited civilzations and used slaves extensively and in a rather cruel manner; Brink (2021). Instead, PNG is not given any credit for being among the lead on global metrics of peace, low consumption and no relevant impact for a local island that left its neighbors mostly alone; the exchange with Micronesia and Polynesia was through bartering, at best (but see modern aspects in Figs. 7.14, 7.15 and 7.16). Historically, PNG took not a strong role outside of PNG.

Fig. 7.8 Want some lemon tea? It's grown in the garden

So instead, and going with the colonial narrative, one may read that PNG is 'violent' and has one of the highest crimes in the world (e.g. Salak, 2001, or West, 2006). Its capitol Port Moresby is flagged accordingly and its rural areas are high in crime rates like rape, domestic violence and gang violence, rascal'ism (Table 7.2).

And yes, compared to the west the industrial-driven education level in PNG is pretty low, and so is its income. PNG lacks the western education designed for industrial processes, including computing. But most PNG citizens know how to operate a garden and the forests; grassroots! PNG can hardly afford to operate an international airline nor a relevant industrial workforce, army or reliable police force (e.g. Gosarevski et al., 2019). Just like many tropical nations (e.g. see Huettmann, 2015 for Central America as a similar example), PNG has no car brand or car manufacturer, no relevant software company and no hardware producer. PNG makes no military weapons, did not contribute to a genocide or produces airplanes nor is it involved in the weapon trade (other than smuggling perhaps driven by Australia or Asia, Schloenhardt, 2006). PNG languages have virtually no words or concepts for it. PNG features the 'bow and arrow,' the ancient ax, and gangs can produce shotguns from water pipes (Salak, 2001). Killings are frequently done by machete. While embedded in the local bartering and markets, PNG as a nation has a relatively small (financial) market and a low amount of registered taxpayers even (Baraka, 2001;

Fig. 7.9 Watercress maintained in a riverbed

Chan, 2016). It all sits in the garden instead; not metal coins or plastic money printed in Australia drives the local economy but betel nuts and bartering for garden products do. PNG should be a feast for ecological macroeconomists and sustainability but has received little of such study recognition (Table 7.3).

PNG does have a few tuna canneries—foreign-owned—and those are not only an environmental nightmare, but also create large social problems (see Sulivan et al., 2003; Beehler & Laman, 2020 for examples). Same can be said for mining, certainly with a long list of very serious impacts (see Cousteau & Richards, 1999; Kirsch, 2014, PNG Mining Watch https://mine.onepng.com/, etc. Note the detailed absence of such problems reported in Beehler & Laman, 2020 as supported by a Gold Mine Join Venture but celebrating PNG's beauty; see chapters in this book).

The mentioned education level deserves a second look though: '*Learning' for what*? Who benefits and what for? PNG citizens are fully trained in PNG life, what else is needed really? Trained workforce tends to serve industry, often located abroad, which not only makes rich people richer but also exploits the environment, and often the worker and the family itself. Man-made climate change is primarily caused by industrialization and globalization; not as a PNG product! Remember, PNG is running 'gardens' which is widely organized in family groups instead. Wantok rules and PNG have virtually no feudal system. So what again is a modern education good for? Considering that religious missions have such a stronghold in PNG education, what did they really achieve last 200 years, for PNG and its citizen? They have no good track record.

Fig. 7.10 Harvesting some watercress

Needless to say, PNG has no top ivy league school and the relevant goal often consists of getting into an Australian or New Zealand school, if ever. How many graduates of PNG are in the UK or the U.S. for that matter?

And then, no wonder, the PNG education consists by now of an Australian remake (see O'Donoghue, 2009; Rena, 2010 for a syllabus review), while the schools are still widely in the hands of the church and Australian syllabi, also based and funded outside of PNG, e.g. through AussiAID, helped by New Zealand, and the U.S. (http://www.pngembassy.org/religion.html). PNG has little of its own on those matters. This is social engineering in its pure form, and it has no good outcome. Why would it?

7.3 Reality View on PNG Metrics, Crime and Socioeconomics and Human Footprint

When just looking at Tables 7.1 and 7.2, compared to Figures 7.1, 7.2, 7.3 and 7.4 it becomes clear that it is not the PNG citizen who drives the problems, it's primarily the industry, their governance and efforts helped from abroad all operating under a wider framework (*sensu* Ostrom, 1990; Ostrom et al., 1993). The U.N. mandate via

Fig. 7.11 Some forest beetles, those ones are eatable

Australia proves to be quite disastrous for PNG and its wilderness lifestyle indeed. This is a common feature, as seen in the Pacific Rim, Central American side (see Huettmann, 2015 for details and reviews), the connected Arctic of the Pacific, Alaska and its disease problems affecting industry, people, landscapes and its wider set up (Gulyaeva et al., 2020 for poultry industry and wildlife influenza hotspots and spread in Asia and Pacific Rim; Huettmann & Hueffer, 2021 for examples of rabies, humans and its species).

While many people will not admit it, the western governance system comes with massive problems, catering a one-sided industrialization the most; wildlife and habitat come last (Taber & Payne, 2003 for problems with one of the largest budgets on wildlife management worldwide). Sustainability is virtually impossible to achieve within that. This is based on the western system of governance and its law, which is widely failing (details exposed for instance in The Secret Barrister, 2018 with thorough detail). Needless to say that 'modern' PNG is to follow exactly those types of legal systems and concepts now, compared with the older tribal system and community governance that worked for millennia and had sustainability at the root.

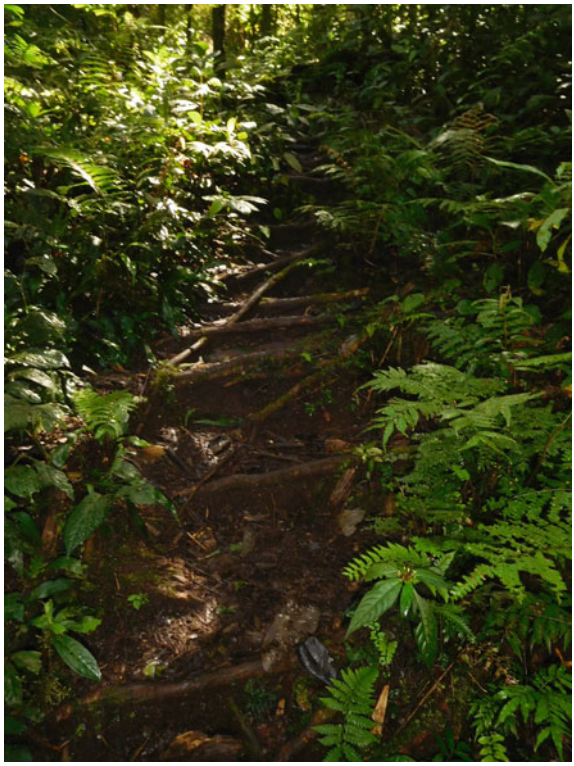

Fig. 7.12 Stairs of an ancient forest trail in rainforest Papua New Guinea

7.4 Education What for and for Whom?

See it that way, why pursuing industrial efforts and educations so costly when all it achieves is just destruction, certainly destruction of the ancient PNG life, fabric and environment wholesale? The more English is taught, the more the many local languages will disappear; effects are shown, e.g. Kulik (2019) for lost culture, lifestyles and sustainability. English is a language of money, not well evolved and suited for PNG and the western money world is in a massive crisis anyways, certainly on the sustainability aspect. So now what?

The presented numbers and maps and pixels beg the question: modernity what for, education what for, and education for whom? (Rooney & Papoutsaki, 2004) Arguably, educated urbanized people are pretty wasteful for nature and its resources as they have higher demands and thus higher consumption and subsequent footprints. Computers make that point well and none pay back to nature, whatever they say and claim otherwise (Kuehr & Wiliams, 2007) (Figs. 7.17, 7.18, 7.19, 7.20 and 7.21).

Table 7.1 A typical selection of per-capita metrics of PNG citizens

Metric	Value (=How often occurring)	Source	Comment
CO_2 emissions	Among the lowest on earth	Various sources	Exact and agreeing numbers are hard to come by, but in virtually all sources PNG ranks at the bottom of the list
Starting of international or global wars	1	Public record	Coconut war A strange brief conflict involving French and US and asking PNG to fight Vanuatu at Espiritu Santo
Participation in a global war	3	Veenendaal (2021)	PNG joined fights in WW1 and WW2, but was essentially dragged into it to a Japanese invasion and being part of different colonial empires at that time Coconut war
Heating costs for winter	Nil	FH pers. obs.	
Cars per capita	<1	FH pers. obs.	This number changes a bit in urban areas

Table 7.2 A selection of per-capita socioeconomic metrics of PNG citizens

Metric	Meaning	Source	Comment
Infant mortality	Conditions at birth	Various	Usually birth is given in the bush, not all in hospitals; exact metrics are difficult to obtain
Life expectancy	A generic index of healthcare and pension support	Various	Exact metrics are difficult to obtain; like with the above numbers those are usually best for local areas
Literacy rate	Western schooling	Various	Fails to express Gardening or Conservation and most Sustainability efforts
Cancer rate	Difficult interpretation and depending on cancer type	NA	A complex disease not 'just' related to industrial factors Betel nut chewing is cancerogenus also
Domestic violence	A complex PNG problem in society	NA	PNG is notorious for such high metrics with women and children being affected the most; but exact numbers are virtually not collected
Break-ins	Poverty-related	NA	PNG urban areas are notorious for crime rates, details are poorly kept

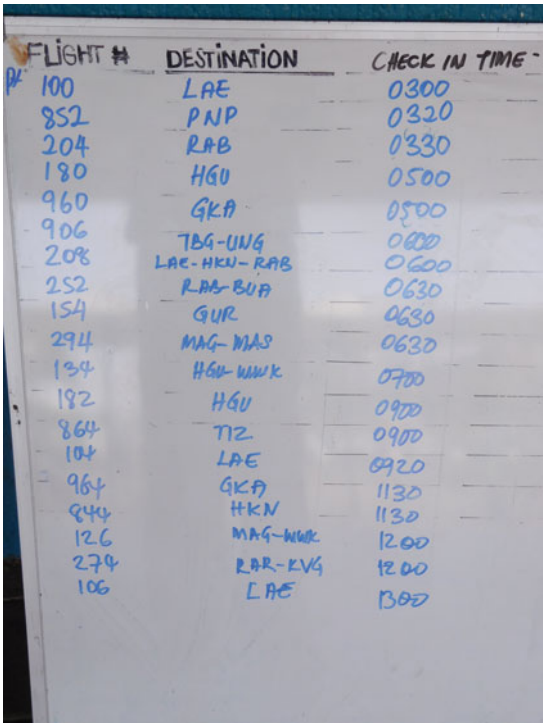

Fig. 7.13 Flight schedule format and details in a domestic Papua New Guinea flight; compared to other nations and airports that is a very low impact

7.5 Papua New Guinea as the Global Sustainability Leader and Role Model

PNG and its citizens remain a global showcase for low environmental impact. Living a PNG live will result in less global environmental suffering; certainly the atmosphere and the water will benefit. It's a live with a local emphasize embedded in global actions, and with resolving local issues, including its challenges for sure. Live is never easy and the ying-and-yang remains; the good and bad forces of live and the universe. Having a different governance emphasize, PNG is actually quite free of any feudal structure and can provide happiness and balance for the seeker.

There are very absurd but ongoing tendencies though to engage and entangle PNG into the wider capitalistic, neoliberal and global marketplace that failed elsewhere (Gosarevski et al., 2019). PNG gets involved in maintaining an airline, in stock markets, a treasury, plastic money, and even worse, a supermarket economy and army support abroad. The recent import of 'clean' drinking water from Australia, a dry nation already running short of water while PNG has one of the highest rainfalls in the world, is a classic scheme in that (see Figs. 7.17, 7.18 and 7.19 on water and practical ingenuity in PNG). Using neoliberalism in education makes it even worse (Carter, 2017).

Table 7.3 Islands and a selection of their conservation issues compared with Papua New Guinea

Island name	Conservation issue	Citation	Comment
Japan	Human footprint, various species extinctions, e.g. wolves and fisheries	Brazil (2022)	A major civilization with one of the world's leading GDPs, but still in debt and in a vast ecological crisis, e.g. overfishing and nuclear energy; global disputes about whaling and fisheries (including thuna)
Guam	Human footprint, various species extinctions, habitat loss invasive species	Rogers (2011)	A small island nation Invasive species problems like Brown Tree Snake
Iceland	Human footprint, various species extinctions, Climate change	Thordarson and Höskuldsson (2014) Huettmann et al. (2016)	An important western contributor but based on a rel. small human population still with a vast per capita human footprint, including tourism, whaling, fisheries and bauxite processing
Greenland	Human footprint, Climate change, Indigenous people conflict (via Denmark)	https://www.atlanticseabirds.info/greenland	A large landmass but ice-covered and dominated by Denmark. Much mining efforts, vast problems related to contamination and climate change melting ice sheets
Borneo, Malaysia	Human footprint, Habitat loss, e.g. oil palms, Indigenous people conflict	Cushman et al. (2017)	Massive loss of rainforest habitat
Hawaii	Human footprint, Habitat loss Indigenous people conflict		A U.S. state with a very large GDP and many environmental problems, e.g. due to industrialization: habitat modification, invasive species and climate change

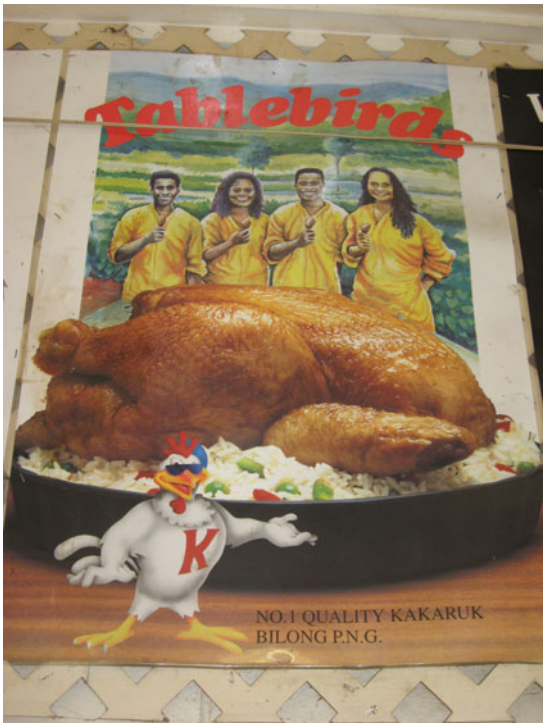

Fig. 7.14 Domestic industrial chicken, quite a new food in Papua New Guinea that otherwise as a nation could feed itself as one of the Megadiversity countries. In such places, it should be impossible to starve, or to be poor for that matter

Fig. 7.15 Chicken transport in a public bus, reality to food security and zoonotic diseases in Papua New Guinea

Fig. 7.16 A typical mass chicken transport into the remote villages. Packaged chickens on a crate at an airport. Another reality of livestock, food and disease handling in tropical nations, western style

Fig. 7.17 Plumbing, pipes and running water, a reality need for anybody on earth

Fig. 7.18 Natural fence in Papua New Guina, sustainable gardening, e.g. to keep the pigs at bay

Fig. 7.19 Papua New Guinea ingenuity

Fig. 7.20 Clouds and the atmosphere: a safeguard for Papua New Guinea's environment and life style but widely ignored and highly mismanaged

Fig. 7.21 Beauty in the eye of the beholder: Papua New Guinea and its lifestyle must not be destroyed

As a token participation, PNG is also part of UN Blue Helmet peacekeeping efforts abroad (2 soldiers listed; see also background information here https://news.un.org/en/story/2010/09/353842-papua-new-guinea-moves-closer-contributing-first-blue-helmets-un-missions), and PNG is part of the Antarctic Treaty System (ATS). PNG famously spoke up at COPs against the industrialized world on climate change within U.N. events (see Kevin Conrad in Bali's COP; The Guardian, 2015), but how much CO_2 was truly reduced for PNG and its citizens?

And so for climate change and PNG: What comes, what causes and what gives? PNG does 'make a weather' overall (see Fig. 7.20 on clouds as an essential icon and for its rainfall).

The issue here is less to make PNG a sole global leader rather than to acknowledge, rethink, reflect and adjust to a culture and approach similar to PNG and where PNG can showcase its achievements for the world to learn from. Why not?

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