



**ECOLOGICAL-  
ECONOMIC ACCOUNTS**  
TOWARDS INTEMERATE VALUES

**ARNIE SAIKI**



# **Ecological-Economic Accounts: Towards Intemperate Values**

**Arnie Saiki**

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Arnie Saiki

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## DEDICATION

*To my children, Otto and Marise. As you come to know peoples and planet, be attentive to the service before you. To my parents who have been most patient and supportive, and to Ruth, with whom I am grateful to share this life.*



## About the Author



Arnie Saiki is an independent researcher, writer and campaigner. He has been focusing on national accounting issues for over a decade and leading the Pacific Working Group on Data, Statistics and Valuation. In collaboration with the Pacific Island Forum Secretariat, he was a featured speaker on Pacific ecological regionalism at the World Bank Fragility Forum conference, SDG 16. He coordinated the Moana Nui conferences, a partnership between the International Forum on Globalization and Pua Mohala I Ka Po in 2011 and 2013. He has been writing and producing online content and organizing conferences for over a decade. In 2009, Arnie received a “We the People” grant from the National Endowment for the Humanities for his work on Hawai’i Statehood history, and he was the lead historical researcher for a federally-funded feature documentary, “State of Aloha.” He has been published in *American Quarterly* and several other publications. Arnie received his MFA from NYU, Tisch School of the Arts, and left the Performing Studies program at NYU as a PhD candidate.



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Dr. Transform Aqorau is deeply acknowledged for his invaluable comments and suggestions throughout the research and writing of the publication, and especially for his insights and wisdom expressed in the Foreword for this publication. A son of the Pacific, yet deeply rooted in his clan, village, culture and tradition, he taught me many challenging lessons over the years about accounting for our Ocean and land resources, and why the gross national product (GDP) is grossly inadequate as a measure of our people's wellbeing and development progress.

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I wish to thank the staff of the Institute for Mission and Research, based at the Pacific Theological College, for their friendship over the years, and particularly in the preparation for and the publication of this book. Their hard work and friendship over many years is immensely appreciated.

It is sincerely hoped that what is presented in the following pages will be considered seriously by governments, civil society and educational institutions, and individuals who genuinely wish to see another way of accounting for our resources and their riches and losses in the Pacific, and to help us to reframe our region's current development narrative.

## PREFACE

At the time of writing, we have been five months into the COVID-19 global pandemic, and six months have passed since the final drafting of this ecological-economic accounting proposal. We are in the midst of witnessing the global economy shift in ways that are both foreseeable yet dramatically unpredictable. Since the economic baselines of our national economies will have to be readjusted, many of the financial assumptions and detailed figures contained will no longer be applicable, particularly since we cannot forecast how some impacted sectors—like tourism or hospitality—will recover. While this data would certainly be different if measured today, I have left the values at their pre-COVID-19 levels as an example of how Intemperate Accounting would benefit the Pacific region.

As anticipated, there are other more predatory industries taking advantage of our economic insecurity. As a defensive response, it is both timely and necessary that a new regional ecological accounting framework be seriously considered for adoption, as more than ever it is important to prioritize the resilience, wellbeing and security of our peoples, communities and environment first.

Since the onset of the global pandemic and ensuing economic turmoil, our world has been engaging in a kind of soul-searching for new meaning regarding our ecological and social priorities, and looking for new directions that will move us towards a just and equitable world. New proposals for measuring our economy are appearing, and they all share a common vision that seeks to move away from the failures of GDP. The details may differ, and the intent driving this change may be motivated by different priorities, since all could be possible.

However, with this publication I would like to draw the attention of the reader to the fact that this equation is both *prescriptive* and *transitional*. What this means is that regions or countries can explore this proposal while maintaining coherence with their current national accounting system, and modulate the values according to the needs and wellbeing of each country or region. I anticipate that there could be first-movers who will seek to define the pace of that transition. But I would advise against racing to streamline or mainframe a single methodology, recommending, instead, thoughtful and robust analysis for all stakeholders. Intemperate Accounting allows for communities to test a variety of

methodologies while maintaining GDP.

Finally, I would add that funding mechanisms will evolve should countries or regions choose to adopt ecological accounting as a national or regional priority. How that is achieved can be a sticky and political question, but this is a resilience and sustainability issue, and it is vitally important that the countries and regions continue to be inclusive of all global players.

**Arnie Saiki**

July, 2020

## FOREWORD

I am honoured to write this Foreword on a subject that is going to be of immense importance to the Pacific Islands, if not the world, as we search for a new way in which we consider development of our rich natural resources and, more importantly, *account* for the development of these resources. This publication is going to be a major contribution to the discourse on weaving the new Pacific Islands, one that places our peoples and our cultural heritage at the heart of development. You will certainly find new inspiration in the way Arnie weaves the discussions and especially the justification for ecological accounting of development.

What good does it do for our peoples in the Pacific Islands if we allow for the extraction of our forestry resources and then suffer from the loss through poor quality environment, muddy streams, erosion of agricultural land, pollution of coastal habitations, and loss of materials to make traditional houses? There are many examples across the Pacific Islands, especially in Melanesia, of governments permitting large-scale exploitation of their natural resources—which they report as making a valuable contribution to their gross domestic product (GDP)—while their people suffer from the degradation of their environment. Our people’s traditionally valued clean air, clean rivers and streams, and very strong social networks that provided the safety net for our communities. Our pursuit of so-called development that promotes economic growth measured by increases in GDP has come at a social cost that is often not taken into account in the grand development scale. Our policy makers are often blindsided by the need to demonstrate to the World Bank and International Monetary Fund (IMF) that they are making progress by showing improvements to the GDP, but what is really there to show if, on the development spectrum, we reduce the quality of our social and economic wellbeing.

COVID-19 offers an opportunity to rethink our development strategy and chart a new and different economic trajectory. The isolation of the Pacific Islands, which has often been stated to be a constraint to development, is actually one of the reasons why of the 12 countries that are COVID-19-free, 10 are from the Pacific Islands. It behooves our leaders and policy makers not only to develop alternative development pathways, perhaps by developing our own economic union, but also to adopt an ecological approach towards

accounting for development. We need to see the whole cost of development, including the retention of our cultural values, social wellbeing and preservation of the quality of the natural environment, and not only the benefits as they contribute to the GDP. It will require courage and a determination to dare to be different, but we in the Pacific Islands are different. Our unique cultural values, traditions, dependency on the natural environment, and the fragility of the environment make it inevitable that we adopt a different perspective on the way we value our development. The call for ecological economic accounting is timely and appropriate. It is an idea and call whose time is actually overdue.

As we search for a new economic bubble, we have to avoid the mistakes that we have made in the past. What is obvious is that maintaining the status quo is not acceptable. I recall that, when we set out on the path to retake much of the value of our tuna resources from the powerful and rich foreign fishing companies, we were fated to fail, but we persevered because at the heart of what we were doing was simply a determination to improve the economic and social conditions of our peoples, in gratitude for what God has given to us. It is not rocket science but common sense. In the same way, accounting for all aspects of development, in a way that factors in the total impact and costs, is an idea whose time has come. It is simply about ensuring the total welfare of our peoples.

I would strongly commend this publication and congratulate Arnie and the Reweaving the Ecological Mat initiative for the timing of the publication.

**Dr. Transform Aqorau**  
CEO, iTUNA Intel

## PURPOSE AND OBJECTIVE

This publication outlines an ecological accounting methodology for the Pacific that will provide the basis for securing and promoting the wellbeing of Pacific peoples and cultures in the context of climate change and our need to envision and work towards a new development story.

The objective of an integrated ecological accounting approach to national and regional accounting in the Pacific is to provide the people and their communities, governments and civil society institutions with access to the development of new and resilient technologies. This will allow us to remain in our homes and restore our shared environmental wellbeing through our collective stewardship, as we have for generations, and assist us with the reframing of our region.

The ecological accounting methodology outlined in this publication will help realize the above objective by *raising the equity* of the Pacific as a whole. It does this by accounting for our vast biodiversity against environmental degradation and resource depletion, the loss of our ecological biodiversity, and leveraging the rise of carbon parts per million (CO<sub>2</sub> ppm) in the atmosphere against our ocean data.

## KEY TERMS

<b>ACP-EU</b>	Africa, Caribbean, Pacific-European Union
<b>AIIB</b>	Asia Infrastructure Investment Bank
<b>ADB</b>	Asian Development Bank
<b>BRI</b>	Belt and Road Initiative
<b>CROP</b>	Council of Regional Organizations in the Pacific
<b>EIA</b>	Environmental Impact Assessments
<b>FIMS</b>	Fisheries Information Management System
<b>FPIC</b>	Free, Prior and Informed Consent
<b>GDP</b>	Gross Domestic Product
<b>GDPR</b>	General Data Protection Regulation
<b>OECD</b>	Organization for Economic Cooperation and Development
<b>OPEC</b>	Organization of the Petroleum Exporting Countries
<b>PIC</b>	Pacific Island Countries
<b>PNA</b>	Parties to the Nauru Agreement
<b>PRSC</b>	Pacific Regional Stewardship Cooperative
<b>REM</b>	Reweaving the Ecological Mat
<b>SDG</b>	Sustainable Development Goals
<b>SEEA</b>	System of Ecological-Economic Accounts
<b>SMEs</b>	Small Medium Enterprises
<b>SNA</b>	System of National Accounts
<b>UNFCCC</b>	United Nations Framework Convention on Climate Change
<b>UNSD</b>	United Nations Statistical Division

# INTRODUCTION

Why are Pacific economies smaller than those of other nations? Why do Pacific nations perform poorly on many indicators of development? The typical answer to these questions emphasizes the region's unique vulnerabilities and dependencies, such as size, distance from markets, and climate and disaster risk. However, one could also argue that the dominant global paradigms of development and economics have failed the islands of the Pacific and have left us facing the brunt of the global climate crisis. Other developing countries have followed the path of industrialized states to achieve development gains at the expense of the environment. For example, China and Bolivia lifted their people out of poverty through massive carbon emissions in the case of China, and vast resource extraction in the case of Bolivia. Therefore, the Pacific faces a wicked problem that defies simple solutions: *How can we secure the future viability and wellbeing of the Pacific in the midst of a global climate crisis? What are the options for low-carbon, non-extractive approaches to wellbeing and development?*

The Reweaving the Ecological Mat (REM) project, as mentioned in the Acknowledgements, is an initiative that is being implemented by the Pacific Theological College in partnership with the Oceania Centre for Arts, Culture and Pacific Studies of the University of the South Pacific, and the Pacific Conference of Churches in the Pacific region. The initiative is premised on the Pacific indigenous worldview that ecology is the myriad of intricate relationships of people, land, forest and sea, and the norms (most often unwritten) that govern, connect and link them into a web of sustaining life and meaning. Much of this framework relates to how communities are to relate to their natural environment and the governing norms on the use of land, forest and sea resources. In most Pacific indigenous communities, there is always in existence an interdependent view of human's place in creation and their reliance on the natural environment for sustenance— and, conversely, their responsibility to protect and conserve.

The REM initiative takes the view that the 'ecological crisis' which the Pacific (and indeed the world) is now facing cannot be solved by scientific and technical knowledge and money alone. It needs the contribution of indigenous and faith-based ecological frameworks (knowledge, ethics and practices) to finding alternative solutions to developmental issues. It argues that indigenous and faith-based ecological frameworks have much to

contribute to addressing the ecological crisis. It is about the ecological wellbeing of Pacific communities, assisting them to develop their ecological indicators, both as measures of their own development progress and resilience and as a tool to monitor and assess their national development policies and projects. It is for this reason that ‘ecological accounting’ as a development measure is directly linked to how the REM initiative and the Pacific Theological College, as the publisher, understand ecology.

Understanding such an initiative requires knowledge about the *value* of our ecological biodiversity, as well as the *cost* of depleting and degrading our environment. When we speak about economics, we should be speaking about the values of our wellbeing, with a focus on environmental sustainability more than the accumulation of our financial wealth. Ashoka Mody, professor of international economic policy at Princeton University, argues that the *reason why economics matters* “is because we want people’s lives to be better; where we’ve gone wrong is in pursuing the wrong kind of growth. We can do a growth that ultimately helps people’s lives, and makes the climate change problem less daunting than it is.”<sup>1</sup> As the stewards of our environment with a traditional understanding of the patterns of natural climatic cycles, many of us recognise that how we engage with our environment has everything to do with our livelihood, from what we eat, where we sleep and how we find comfort and security to our health, work and education. As the economy changes, so do we, and that includes how we interact with our environment, our communities, and how we understand our relationship to the world.

Although we have mostly adapted to the changes in our economy, the downside is that many of us have lost the intimacy with our environment, and some of us have become strangers to the land, missing or overlooking the subtle changes of our biodiversity. Changes to the freshwater table, salinization, pollution, contamination of the soil, the disappearance of flora and fauna—all of these factors contribute towards further alienating us from our deep relationship with our environment and increasing our reliance on industrialization. As a result, the overwhelming industrial outputs and the demand for economic growth and financial wealth have forced us into the dilemma of unsustainability, and now we have hit the tipping point of our inaction.

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1 Ashoka Mody, “An Economist Responds to Greta Thunberg,” interview with Kai Rysdall, *Marketplace*, 24 September, 2019, American Public Media, <https://www.marketplace.org/2019/09/24/an-economist-responds-to-greta-thunberg/>.

The question, then, is this: How do we solve this? Policy makers understand that this has to be solved systemically. But the large economies have been unable to make a move because the too-big-to-fail banks, corporations, industries, and all the mechanics of the present global economic system have been unwilling to or are incapable of budging. Moreover, for many in the seats of power, the accumulation of financial wealth remains a greater priority than global sustainability. Many are simply unwilling to make the changes and sacrifices necessary to reduce climate impacts, unless they are able to profit from them.

So, how do we move forward? The REM initiative underscores that it is up to the small economies to make the necessary changes that will return the planet to a sustainable place, and how we do that is to collectively change the way that we value our environment. This does not mean that we ignore the industrialization of the 20th century, but that we use the tools of the 21st century to shift us towards a place that is sustainable. Tools like *artificial intelligence*, *blockchain*, *smartphones* and *5G networks* are the hammer and nail of the 21st century, and investing in our education and labour is how we can work towards restoring our environment.

The restoration of our environment in the 21st century requires a careful selection of domestic economic-ecological policies and a considerable development of international, if not supranational, economic-ecological organization by developing countries. While they aim to be effective for the attainment of economic-ecological sustainability within the various countries and regions, the major aims of these policies should directly influence the international economic-ecological order. In other words, it is up to the regional institutions, the states, and the will of the people to implement this change. How we go about doing this is by changing the way we measure, value, and account for our relationship with our environment.



# 1. NATIONAL ACCOUNTS AND GDP

The inability to attribute a market value to a part of the ecosystem does not mean that it is not worthy of consideration in the public policy equation. Yet, the treatment of the environment in the national accounts and in public policy reproduces the arrogant ideology that only money is of value, that the market is the only source of knowledge. It suggests that all of life can be condensed to this narrow and soulless view, which precipitates us, at an ever increasing pace, towards the destruction of all forms of life on the planet.<sup>2</sup>—*Marilyn Waring*

National accounts are meant to mirror national economies. How countries measure their accounts affects the size and strength of what might elusively be defined as their economies—and that influences what they can leverage for investment, debt, exchange rates, purchasing power, the value of bonds, and how they value insurance for loss and damage. The measurement of national accounts is managed by a coherent set of standards and policies known as the System of National Accounts (SNA), which is managed within the UN Statistical Division.<sup>3</sup>

In *Capital in the Twenty-First Century*, a history of *national accounts*, the French economist Thomas Piketty writes that “one of the primary objectives was to calculate the total value of the land, by far the most important source of wealth in the agrarian societies of the day, and then to relate the quantity of landed wealth to the level of agricultural output and land rents.”<sup>4</sup> This occurred in the late 17th century. As colonization advanced, national accounts began to aggregate the value of the colonies, understanding very well that territories provided far more wealth than what could be accounted for in the Metropolitan state.

While the introduction of national accounts did not change the competition for territories and the quest for empire, what it did change was the fundamental way in which accounts were measured, and how that would inform the economic strength of currencies in what

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2 Marilyn Waring, “The System of National Accounts,” in *Women’s Voices on the Pacific—The International Pacific Policy Congress: Women for Mutual Security*, ed. Lenora Foerstel (Washington, DC: Maisonneuve Press, 1991), 76.

3 No Pacific Islands country is a member of the UN Statistical Commission.

4 Thomas Piketty, *Capital in the 21<sup>st</sup> Century* (Cambridge, MA: Belknap Press of Harvard University, 2014), 56.

was then a fledgling global state-administered trade system. Previous to this system, the accumulation of territories was predicated on the taking of resources, strategic land grabs, and transferring taxes and revenue to the Metropolitan state. National accounting provided states with a valuation system that would measure the strength of an economy through the movement of capital. In the 18<sup>th</sup> century, England, France and Spain dominated global trade, but as the family of nations grew and the treaty system became more entrenched, national accounting became essential for foreign banks to assess lending to states, just as banks would determine how much they could loan individuals based upon assets and job security.

There are many different variables that can be used to measure our economies; hence, it is more of an ersatz mirror than a true reflection. At the moment, GDP or Gross Domestic Product is the national accounting system that most states have adopted. Gross Domestic Product privileges production and consumption, trade of goods and services, research and development, and other economic indicators that make up a composite of indices weighted according to economic priorities. For example, in 2017 Amazon spent \$22.6 billion on research and development on products like the Echo smart speaker, Fire TV, and a variety of artificial-intelligence tools. This is accounted for in the GDP indicators of the United States, and it was only as recently as 2008 that R&D was adopted as a GDP indicator.

Despite the increasing importance of the environment and development in the 21st century, consumption remains heavily weighted in the current GDP system, and advanced economies continue to privilege their own industries and economic priorities. Generally speaking, the advanced economies share the credit for causing the most harm to the global environment through their accounting for production and consumption as financial incentives and economic gains. Developing countries, on the other hand, despite possessing most of the world's natural resources, have not equitably shared in the economic growth.

While there are many reasons for the disparities between advanced economies and developing countries, the one that is most often overlooked is the way in which economies are measured. For example, small developing countries with strong customary relationships to their land and resources do not generally engage in industrial manufacturing and do not have a financial infrastructure that encourages consumption.

Additionally, thousands of years of historical determinates have shifted the global economy in directions that have benefitted some cultural or geographical norms over others. However, we now live in a time when science demands rational changes to the way humans interact with the environment, and it is obvious that current growth accounting is failing the planet. By and large, however, national accounting ignores the priorities of developing countries, particularly in relation to accounting for ecological biodiversity and impacts.

But alternatives are possible. For example, in Soviet-era Russia, labour and transport were weighted more equitably in their MPS (Material Product System) national accounting system. As a means to raise the national economy, they did not treat the less populated and remote areas as deficits, but as an indicator to build regional interdependence. Even the United States uses an alternative system called NIPA, the National Income and Product Accounts. Somewhat perversely, it is the UN SNA that revises itself towards NIPA, rather than the other way around, meaning that many of the international proposals for revision are rejected unless the United States adopts them first.

Therefore, as a starting point we should accept that how statistical indicators are *mainframed* into complex aggregates that measure the size of economies is not written in stone. In fact, the UN Statistical Division continually updates the statistical indicators in the System of National Accounts. For example, in the 2008 National Accounts revision, Military Systems were moved from being an inventoried asset to a Fixed Asset (fixed assets being like bridges and tunnels that provide for economic activity), and national security was cited as the rationale for this shift.

Now is the time to seize the same opportunity to address what Pacific leaders have reaffirmed time and again as the region's single greatest security threat— climate change— by changing the economic outputs that exacerbate conditions leading to climate change. A regional grouping of Pacific Islands states adding ecological indicators to their national or regional accounting systems not only provides the greatest potential for reversing the impacts of climate change but can also raise their GDP to be more on par with other regions.

## 2. ECOLOGICAL ACCOUNTING

The System of Environmental Economic Accounting (SEEA) has made integrating ecological indicators into national accounts possible. As far back as 1993, the UN Statistical Commission unanimously recommended adopting a revised National Accounting System (SNA) that would provide a pathway towards an SEEA.<sup>5</sup> It took nearly two decades, and in 2012 the UN Statistical Commission adopted the framework. The objective of this framework is to measure the environment and its interactions with the economy. The SEEA explores

... how sets of statistical accounts can be compiled which will permit investigation and analysis of the interaction between the economy and the environment. Only by integrating the two areas can the implications of sustainability of different patterns of production and consumption be examined or, conversely, can the economic consequences of maintaining given environmental standards be studied. Policy makers setting environmental standards need to be aware of the likely consequences for the economy. Those determining the development of industries making extensive use of environmental resources either as inputs or sinks need to be aware of the long-term environmental effects.<sup>6</sup>

However, while the SEEA could help us understand how to place a value on biodiversity and degradation and how to incorporate it into the national accounting system, the last two decades have unfortunately seen the SEEA *undermined* by competing national and industrial interests. What started out as an international mandate to incorporate environmental degradation and resource depletion into our national accounting system ended up as an industry-specific guideline that measures environmental resources (such as water) and treats them as a commodity valued under patterns of *production* and *consumption*, and not in the context of their fundamental and complex role under *biodiversity* and *existence*. By integrating this statistical data with national accounts, the 2012 SEEA accounting

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5 United Nations Department for Economic and Social Information and Policy Analysis, Statistical Division, *Integrated Environmental and Economic Accounting—Studies in Methods: Handbook of National Accounting*, Series F, No. 61 (New York: United Nations, 1993), iv.

6 *Ibid.*, 1.

aggregate undermines the ability to provide us with the accounting tools to adequately value our ecological equity or wellbeing.

Nonetheless, since the SEEA was announced in 1993, a variety of approaches that seek to determine values for ecological biodiversity and how private interests might interact with our national accounting systems have been introduced. There are *Natural Capital* approaches that value the global stock of natural resources such as mangroves and crabs. *Ecosystem Service* approaches account for human interaction with the environment, valuating tourism or the labour required to regulate and support environmental resources. *Ecosystem Valuation Techniques* assign value to how Natural Capital and Ecosystem Services can be measured or valued in our economy. Further, how we approach valuation of our ecological assets is generally calculated through either direct-use or indirect-use value: direct-use meaning how Natural Capital would be valued in commodity markets; and indirect-use valuing market or non-market externalities like wellbeing, future generations, or the existence of ecosystems.

Most current approaches to valuating ecological assets are based on a cost-benefit paradigm that benefits financial institutions, industries and large economies over the ecological health of people. It is imperative for the health, security and wellbeing of our planet that we ensure the value of our ecological biodiversity is not undermined by financial or data investment schemes that privatize or peg ecological resources to, for example, carbon emissions or other capital expenditures that seek to offset pollution by purchasing carbon sinks. While carbon sequestration, or removing carbon from our atmosphere, is necessary, it should not be at the expense of our biodiversity or development needs.

The adoption of an ecological accounting framework should be seen as a viable pathway and positive first step, *not as an automatic big win for small island states*. Despite failing to include earlier models of degradation and depletion into national accounting systems, the SEEA's envisioning of environmental accounts as an economic indicator, for example, provides a gateway of possibilities for adopting ecological-economic accounting mechanisms.

The fact that national accounting systems have been dominated by large economies that privilege consumption and their own industries should not mean that non-industrial economies must adhere to the same system. Different countries, regions and economic systems will obviously have very different priorities concerning the value of their

environment. Therefore, Pacific states should see the early work of the SEEA as a *call to action* to initiate the critical task of building an ecological-economic paradigm. As the most fragile region, the Pacific should be at the centre of this movement, developing resilient strategies for our wellbeing.

This paper offers the Pacific a way forward by maximizing the opportunities provided through the SEEA, and adopting an alternative *intemperate accounting scheme* that provides developing countries and regions with an equitable way to account for wellbeing and ecological biodiversity that is commensurate with continuous customary knowledge, as well as the benefit of states and regions to participate fairly and equitably in the global economy.

### 3. OUR OCEAN OF DATA

The Blue Pacific seeks to recapture the collective potential of the region's shared stewardship of the Pacific Ocean based on an explicit recognition of its shared 'ocean identity,' 'ocean geography' and 'ocean resources.' Through the Blue Pacific Forum, Leaders seek to reaffirm the connections of Pacific people with their natural resources, environment, culture and livelihoods.<sup>7</sup>

In an article on the Fourth Industrial Revolution, Klaus Schwab, founder and Executive Chairman of the World Economic Forum, concluded,

In the end, it all comes down to people and values. We need to shape a future that works for all of us by putting peoples first and empowering them. In its most pessimistic, dehumanized form, the Fourth Industrial Revolution may indeed have the potential to 'robotize' humanity and thus to deprive us of our heart and soul. But as a complement to the best parts of human nature—*creativity, empathy, stewardship*—it can also lift humanity into a new collective and moral consciousness based on a shared sense of destiny. It is incumbent on us all to make sure the latter prevails.<sup>8</sup>

Data stewardship may simply be a 21st century rendering of what Pacific peoples have done for generations, which is to account for people's sustainable interaction with the environment. There are no better stewards for gathering that data than the customary rights holders of each locale. Customary stewards have often been treated as wards of the state, unproductive communities that did not contribute to the economy and were left to maintain their subsistence-based economies. Underdeveloped and underserved communities had little appeal for investors unless they were attached to commodity resources in extractive industries. The value for these residents was minimized, and accounted for as a necessary expenditure, while shareholders and those sitting at the corporate board sought to maximize

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7 The Blue Pacific seeks to recapture the collective potential of the region's shared stewardship of the Pacific Ocean based on an explicit recognition of our shared "ocean identity," "ocean geography," and "ocean resources." Pacific Islands Forum Secretariat, "Pacific Regionalism and the Blue Pacific," <https://www.forumsec.org/pacific-regionalism/>. The Blue Pacific Forum Leaders seek to reaffirm the connections of Pacific people with their natural resources, environment, culture and livelihoods.

8 Klaus Schwab, "The Fourth Industrial Revolution: What it Means and How to Respond," *Foreign Affairs* (12 December 12, 2015), <https://www.foreignaffairs.com/articles/2015-12-12/fourth-industrial-revolution>.

their profits to the point where those living in subsistence communities became renters in their own land.

How has this paradigm worked? There is only one answer. It hasn't. It hasn't worked for the environment, it hasn't worked for the health of the communities, and it hasn't worked for the Pacific Islands. Data stewardship, and what has been called the Fourth Industrial Revolution, has an opportunity to change the paradigm in line with how the world as a whole is changing. But this may require a changing of alliances. The paternalistic relationships that we have had with our old colonial administrators may never have had our best interests for development at heart, for if they did our health and wellbeing indicators would be more on par with the more advanced economies. This is not to say that we throw away our alliances, but that we accept the fact that the region has multiple players with varying degrees of interest.

For example, the British may be trusted auditors, the EU fair regulators, the US creative at packaging investments, while China provides 21st century access and infrastructure, and Australia, Japan and Southeast Asia may be good markets for providing small and medium-sized enterprises. All these partners would benefit from fair and equitable exchange if the region owned and managed its ecological resources, rather than foreign interests trying to privatize them for their own benefit.

What this ecological accounting provides is a route forward for the Pacific to lead the world in valuing ecological biodiversity. By being the first to create a new ecological approach towards restoring the planet, the Pacific can attract the capacity to establish a new framework to reverse the negative impacts of industrialized economic activity. This leadership requires funders, technology, trade and development, and the Pacific would be far more effective than the old colonial establishment would have us believe.

One consideration is that the AIIB is the right investment bank to create the security, and the EU is the right institution to pay the premiums, while it is the Pacific that holds the security based on ecological factors. Once this program is set up, the Pacific can immediately attract a myriad of new data-driven companies to invest in ecological R&D products that will help to restore and reverse climate change. However, it is also imperative that we own our data and IP systems.

**“Data stewardship may simply be a 21st century rendering of what Pacific peoples have done for generations, which is to account for people’s sustainable interaction with the environment. There are no better stewards for gathering that data than the customary rights holders of each locale.”**

**Myth 1:  
Data Governance is only for large economies—False**

There are data lakes and data streams ... but what about the ocean of data, the literal ocean? The ocean data is vast, and it is the Pacific that should be designing and implementing the tools it needs to adequately manage our regional data. This is predicated on the idea that the Pacific needs to account for its own data, because the value of that data is what is going to raise the equity of the Pacific.

The value of data governance cannot be quantified at this time, as it will have to harmonize with international markets. But the market does not exist yet, and it is the Blue Pacific Framework that can establish the baseline for a global metrics of environmental and economic accounting. We will be unable to value our regional data if we do not own it.

**Myth 2:  
Pacific Island Statistics are too small to impact GDP —False**

GDP is calculated with statistical data. Algorithms aggregate various sets of data indicators that measure *volume*, *value* and *price*. The Pacific Ocean has volume that is grossly undervalued, and will likely be under-priced if we do not act decisively and quickly. How do we give value to that volume? By actively measuring and managing our ocean of statistical data, which in this case will be the intemperate baseline. We create the infrastructure that will provide wages and more formalized employment to communities and those living in remote islands to practice what they have done for centuries. It is

simply because of an accounting decision that biodiversity and Pacific Island assets have not been included in the accounting matrix in the same way that, for example, oil has been valued for OPEC countries.

### **Myth 3: Markets do not Value Environments—False**

How do you give value to volume? You **account** for it by measuring it and managing that data. And how do you price it? You price it according to the cost of building out the infrastructure. The development of that infrastructure would be leveraged against Equalization. And it is through leveraging that Equalization that a market will form.

“The Blue Pacific”—imagine how much the Pacific Island community as a whole would gain by creating opportunities for those communities on distant islands, where their presence really would be an economic asset rather than a burden or deficit, to manage data collection ... all for the purpose of treating biodiversity and sustainability as an indicator in the national accounting system.

As Pacific Islanders, we are the traditional stewards of this region and we have a deep understanding of our Ocean’s health, life and changes. Our strength is not industrialization, it is stewardship and sustainability, and we know that the value of our ecological biodiversity is worth far more than the value of carbon expenditures. To participate as equitable partners in the global economy we need to assemble our ecological baseline in a global economic context. Without that data we have no way of participating in the global economy as equals. We need to evaluate our numbers and own that data.

In building our ecological baseline, measuring the plus and minus shifts in new ecological aggregates might function as inventory. Certainly this inventory should provide for the income for data stewards, the traditional or customary stewards living in remote islands or villages. At the 4th United Nations Environmental Assembly held in Bandung in 2018, a high-level discussion paper was circulated on the case for a digital ecosystem of the environment, which stated in part:

A common vision is essential for building an *open digital ecosystem of data, algorithms and insights* that can generate trustworthy information in

real time about the state of the environment and interactions between the economy, society and the environment. These insights need to be transformed into actionable evidence that can be easily understood by decision-makers, investors, consumers and citizens alike to maximize inclusion, transparency and accountability.<sup>9</sup>

Data stewardship is a service that includes conducting inventories, collecting statistics, publishing data, determining conditions and trends, examining and analyzing changes, summarizing data, describing, compiling, measuring, researching, monitoring and managing lists of information. These are all real jobs from both public and private institutions. Methodologies that we employ should be defined within the Pacific, and although those with advanced degrees in the field of environmental science from Asia, Australia, Europe and the United States may currently have enhanced opportunities, Pacific peoples will quickly catch up as we develop our own methodologies and pedagogical applications.

A regional regulatory agency, or what we might call the “Pacific Regional Stewardship Council,” could be tasked with auditing and assessing this data so that it harmonizes with predictable accounting processes. For example, by treating stewardship as labour, a stewardship council can provide the regulatory service for integrating the technical conservation monitoring and compliance framework. Incorporating ledgering programs like blockchain, a stewardship council can quickly account for our data in our aggregate of ocean.

The argument for Pacific regionalism is not so much an issue of ‘if’ but of ‘when’. While finding a framework for political or economic integration may be daunting considering the various priorities of Pacific Island states and territories, ecological integration is an agenda whose priorities are both customary and supranational. Policies we set will not only affect us, but can be scalable to be used globally.

As Pacific Islanders, we have a tremendous potential for leading in the way we account for our ecological assets. I would argue that we even have the mandate for doing so. The Parties to the Nauru Agreement (PNA) in the Pacific Islands Forum Fisheries Agency is

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9 United Nations Environment Program (UNEP), “The Case for a Digital Ecosystem for the Environment: Bringing Together Data, Algorithms, and Insights for Sustainable Development,” United Nations Environment Assembly, 5 March, 2019, 15.

a great example of how a regionalized Pacific can raise the value of our region, as it has increased economic benefits by over 2 billion dollars.<sup>10</sup> And again, it is important that if we are to move on to creating our ecological baseline, our data remains under the private ownership of communities. *Data collection is labour, and our data should be protected as a commodity no different from how we treat our tuna stock.*

Regional data policy has to include binding global enforcement policies. By monitoring and regulating our ocean of data, we should be able to enforce provisions that will protect our wellbeing, economic and ecological security. As an example, in May 2018 the EU enforced the GDPR (General Data Protection Regulation), which manages data compliance and privacy for EU citizens. This regulatory provision enforces the idea that our data belongs to us. The EU is correct in this assessment, particularly since the fundamental architecture of this information and communication technology was publicly funded. Digital technologies are transformative, and information and communication technologies should not privatize and capitalize on our personal data for their own financial gain, particularly with a spurious consent process. Similarly, the Pacific cannot allow private industry to capitalize on our ecological data, particularly when we are the customary stewards who best understand the ebb and flow of our biodiversity.

By owning our data, we will be able to leverage our ecological data for economic gain and control its value, thereby setting a global standard that is not based on carbon pricing but on sustainability. In much the same way that OPEC controls oil pricing, the Pacific needs to control the value of our ecological biodiversity. Multi-billion-dollar tech companies—which are now as powerful as the too-big-to-fail banks—will need to work with the various regions regarding how we collect, gather, audit and regulate our ecological data. Asserting a similar logic, the Pacific Islands governments have already announced that the worst climate change violators have put Pacific peoples at risk, and it is just a matter of time before a legally binding agreement will be signed. And since we are dealing with global existence values—something for greater than privacy impacts—*we need to be able to monitor and use data measurements to force compliance.*

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10 A. D. Yeeting, H. P. Weikard, M. Bailey, et al., “Stabilising Cooperation through Pragmatic Tolerance: The Case of the Parties to the Nauru Agreement (PNA) Tuna Fishery,” *Regional Environmental Change* (2018): 890.

## 4. THE INTEMERATE BASELINE APPROACH

### **What is it?**

The intemerate baseline is central to establishing an ecological baseline for biodiversity that attributes a value that includes labour, stewardship and management of statistical data. *Intemerate* means “inviolable, pure, undefiled.” When applied to accounting, we are talking about valuating what is inviolable, pure and undefiled.

Unlike accounting schemes that offset the degradation of ecosystems and the depletion of resources linked to climate change against carbon trades, climate bonds or privatization, the intemerate baseline approach proposes to set a value for its ecological data that is based upon *equalization*, highlighting the measurable *offsets* of ecological indicators and financializing the *restoration* and *preservation* of this value, rather than the commodity itself. This approach inversely mirrors how national accounting systems value the consumption and production of commodity resources. To be clear, the intemerate baseline is NOT a replacement for GDP; rather, it is designed as a national accounting aggregate for countries whose non-industrial priorities are excluded from the existing national accounting process.

### **How do we define our baseline?**

To build our intemerate baseline we need to understand that while restoring our biodiversity exactly as it was may not be possible, our interactions with the environment *are* restorable. Historically, if we can establish a baseline of data to measure the offsets of where we are now against where we were then, then we may be able to restore our customary interaction with our environment. Using this data baseline, financial instruments can be used to predict the rate of how these changes might be met in the future, as these financial investments could also be utilized to create new technologies and provide for the labour to reduce those intemerate offsets back towards the baseline.

Examples of quantifiable changes in natural resources and biodiversity would be loss of mangroves, decrease in the freshwater table, and the decline in species such as sea cucumbers. These are all natural resources with inherent values that should be used to define traditional economies in the Pacific.

For the Pacific, oral histories, wellbeing indicators, and data on our Ocean (sea temperature, ocean acidification, algae blooms, sea level rise, corals, coastal vegetation, coastal processes of erosion, population demographics, area, etc.) have already mostly been collected but are scattered across several institutions and corporations. The measurements for many of these datasets and records go back decades, yet to date there has been little effort to coalesce this information into a cohesive data set that is *owned* by the region and that can be used to establish an ecological baseline for the region. If we do not have physical data, records of production or accounts of reciprocity, then our traditional elders might be the only ones who have a customary memory of crop output, planting seasons, markets, or the relationship that the local ecosystem plays in food production. This may seem like a massive undertaking if it were conducted institutionally, but technology has changed so that citizens can now provide and manage the accounting data.

Most of these values would be back-cast on a timeline. For example, with the carbon offsets, back-casting the data to 1987 will establish the baseline for meeting the 350ppm, the internationally agreed upon marker for safe sustainable CO<sub>2</sub> in the atmosphere. The year 1987 was also when the Brundtland Commission called for action on climate change.

### **How will it help restore our wellbeing and support our development?**

Establishing a data baseline that measures the point at which our interaction with the environment was more sustainable would allow us to account for the changes to our wellbeing and measure them as offsets in our national accounts, or the amount at which our environment is out of line.

Utilizing this data, we could measure and quantify the costs of reducing these offsets towards restoring our environment—that is, what investments in infrastructure, technology and labour would be necessary to restore our environmental indicators back to the baseline. Managing our ecological and statistical data will enhance our national accounts and will be both scalable and inclusive of labour, business and governance.

Paying for these costs could initially be the function of equalizing our GDP to the EU, an actionable agenda item between the ACP and EU countries. And while there are other funding sources, meeting the obligations of the ACP-EU Cotonou Agreement is simply the first consideration. After equalization, as ecological data becomes a market driver; the value of this data will set the market, especially as financial instruments and labour are

able to monetize the link between the ecological data and the stewardship for restoring our ecological biodiversity.

As long as we can establish methodologies for accounting for a data baseline in our region, we would know that the value of our environmental data is directly proportionate to the assets and revenue of urban and industrial centres that contribute to environmental

**“We who inhabit the most remote islands, mountains and forests should be the first to set the value of our ecological data, because the economy of the 21st century will depend on us meeting our ecological and development goals. ”**

degradation and depletion. In other words, the planet’s health may be dependent on cities and industries immediately providing capital for us to account for and restore our environment. There is no better example of how to achieve economic equilibrium in equitable and fair trade than by valuing all of the externalities around our ecological biodiversity in proportion to the assets of cities and large urban areas. As this equalization exchange continues, the value of our ecological data will likely adjust to an equilibrium that will bring equity between the regions.

In January 2020, the World Economic Forum published the article, “Here’s why Accountants could be the Climate Heroes we all Need.” The article admits that “A new accounting standard is no panacea and there is no denying the fact that drafting an unconventional accounting standard and gaining approval of all the stakeholders is a momentous task. If implemented, though, this could set a precedent for fundamentally altering the existing economic model.”<sup>11</sup>

It should be emphasized that it will be the *collective* act of measuring offsets by all Pacific Islands countries that will provide the leverage we need for restoring our climate and valuing our ecological biodiversity. We who inhabit the most remote islands, mountains

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11 Zubair Abid Arain, “Here’s why Accountants could be the Climate Heroes we all Need,” World Economic Forum, 07 January, 2020, <https://www.weforum.org/agenda/2020/01/accountants-can-hold-fossil-fuel-companies-to-account-heres-how/>.

and forests should be the first to set the value of our ecological data, because the economy of the 21st century will depend on us meeting our ecological and development goals. Since Pacific peoples are the most qualified to restore Pacific environments, what we need is access to equalization to develop infrastructure programs and services that will assist with this restoration.

## 5. REGIONAL ECOLOGICAL INTEGRATION

While there are several competing narratives regarding what the “Blue Economy” should look like, what follows is a formula based upon a regionalism that is *ecologically integrated*, benefitting both local customary needs, the states and regional institutions, and relevant to the shifting rules of globalization. Note that this formula is designed to adjust GDP.

The accounting of the intemperate baseline could be tested through standard statistical input-output tables where the sum for each intemperate indicator might be recorded as  $N_i$ . The difference of the set data of the intemperate baseline will provide the value for  $N$  by *dividing the current average measurement from the ecological or “intemperate” baseline*. An aggregate of local measurements, unique to each intemperate baseline, will be audited by the region, then factored to find the product  $N$ . Hence,  $K$  is the *product* of deviations *factored* by both the CO<sub>2</sub> ppm in the atmosphere, as well as the *products* of the *difference* of each  $N$  aggregate.

For clarity, each indicator needs to be translated into quantifiable data sets. For example, when measuring ocean acidification or sea temperature, raising the value of 0.1 degrees is not the same as a one-inch change in the fresh water table. Therefore, the degree to which some of these indicators are measured should reflect that. If 100 is something akin to an end-of-the-world scenario, we need a methodology to determine what the values are for each account.

As another example, if there is an oil spill in a community, and there is loss and damage, there would be a change in the biodiversity, and the numerical change of data will represent the changes to that baseline. This would include a cost that would not only be fixed to commodity or resource loss from conventional accounting, but also a cost associated with the changes to the baseline. This could be factored in several ways—for example, the length of time before the ecosystem is “restored,” or through the cost of clean-up and restoration. It is likely that the cost of restoration is lower than the time it takes for an ecosystem to fix itself.

What needs consideration is that if a regional ecological accounting scheme is adopted, a calculus of Area and Population should be explored to determine how data equity should

be divided among the states. Additionally, how Pacific Island governments disperse equity funds to participating communities should be varied to determine what systems work best. These are going to be some of the critical questions that will be brought up in the regional policy space as we move forward.

## 6. THE INTEMPERATE ACCOUNTING EQUATION:

$$M\$ = R + V$$

1) Monetary Factor:  $M\$ = R + V$

2) Regional Accounts:  $R = (w)ZP$

3) Ecological Assets:  $V = K \times Q$

4) Equalization (for Pacific):  $Q = PP \times ZEU/PACP$

5) Impact Factors:  $K = C \times N$

6) Carbon Offsets:  $C = \frac{\text{CO2 ppm current}}{\text{CO2 ppm baseline}}$

7) Intemerate Offsets:  $N = \prod_{i=1}^n N_i$  where  $N_i = \left( \left| \frac{(x_i - x_0)}{x_0} \right| + 1 \right)$

## 7. ACCOUNTING TERMS AND DEFINITIONS

**(M\$)** the *Monetary Factor* is the new integrated value of the region when adopting the ecological accounting framework.

**(R)** or *Regional Accounts* considers GDP (Z) with Social Responsibility/Wellbeing factors (W).

**(Z)** represents *GDP* (current). With this variable we modify a country's GDP and account for it as a *regional* sum (Z). We use the modifiers A, C, P, EU, and (+) (other developing countries outside ACP) to represent Africa, Caribbean, Pacific, and the high-income EU economies as ZA, ZC, ZP, ZEU, or ZACP+, respectively.

**(W)** indicates *Wellbeing, Welfare and/or Social Responsibility factors*. For the Pacific, the Alternative Indicators of Wellbeing for Melanesia were considered a variable, however, because these indicators could be directly correlated to money; wellbeing would then lead to double accounting. Also, considering that the Intemerate Accounting scheme is designed to increase social and ecological wellbeing, correlating wellbeing as a monetary factor is redundant. There are other social responsibility and welfare measurements whose values can be enumerated to account for wellbeing in various sectors, like agriculture, consumption, health or peace, for example, including the GINI index for measuring economic inequality. There is so much that could be incorporated.

**(V)** is the *Value of our Ecological Assets*. How we account for (V) by including two factors, the *Impact Factor* (K) and the *Equalization Factor* (Q).

**(P)** represents *Population*. In this proposal we use the modifiers A, C, P, EU, and (+) (other countries outside ACP) to represent Africa, Caribbean, Pacific, and the EU economies as PA, PC, PP, PEU, or PACP+ respectively.

**(K)** the *Impact Factor* is the product of the CO<sub>2</sub> ppm (C) and what we call the Intemerate Offsets (N). K is the economic driver of the equation.

**(C)** is the *Offset of the annual average measurement of CO<sub>2</sub> ppm in the atmosphere*. Currently, according to data from the Mauna Loa observatory in Hawai'i, the average mean of carbon dioxide in our atmosphere is 412 parts per million. If the baseline is set to 350 CO<sub>2</sub> ppm—and we are currently at 412 CO<sub>2</sub> ppm—then the quotient is 1.1771 when we divide the offset from the 350 baseline.

$$C = \frac{\text{CO2 ppm current}}{\text{CO2 ppm baseline}}$$

**(N)** the *Intemperate Formula* calculates any number  $N_i$  offset situations. Each situation becomes a multiplier feeding into **(K)**, the *Impact Factor*, and thus **(N)** is the product **(II)** of all  $N_i$  offsets. For any given  $N_i$  offsets,  $x_o$  is the baseline for that situation,  $x_i$  is the current value of that situation, and  $\frac{(x_i - x_o)}{x_o}$  represents the difference factor of that situation. All difference factors are calculated as positive using the absolute sign  $|\quad|$ , and 100% (1) is added so that each factor can serve as an independent multiplier that increases **(K)** and thus **(Q)**. Whether  $x_i$  represents an increase or decrease relative to  $x_o$ , it is the change that is reflected here in the environmental and biodiversity factors. For example, if the difference factor is -20%, the  $N_i$  multiplier for that offset is 120% (1.2).  $N$  is the product of any number of selected factors, which gives equal weight to each factor. However, it is conceivable that weighting factors could be applied. Also note that if there is no change in the environmental / biodiversity factors at all, each  $N_i = 1$ ,  $N=1$ , and  $Q$  is unchanged.

**(Q)** the *Equalization Factor* is an endowment by the high-income OECD economies to jump start and mainframe the ecological accounting process. Equalization equalizes Low-Income Populations (PACP+) with the GDP ( $Z$ ) of the high-income industrialized economies, providing for access to loans, bonds, insurance and other financial instruments. Equalizing GDP per capita offsets the degradation and depletion factors that the industrialized economies have been most responsible for and conforms to many objectives established in international fora like ACP-EU, the SDGs, the UNFCCC, and the BRI.

### a) Expressing the Monetary Factor (M\$)

At its most fundamental expression, and approaching this as if the Pacific were an economic/ecological integrated region, our Regional Accounts begins with the simplified expression:

$$(M\$ = R + V)$$

where

- R is the variable for our *regional accounts*
- V represents the inferred value our *ecological assets*.

When expanded, the Monetary Factor is expressed as:

$$M\$ = (w)Z_p + \left[ \frac{C_{ppm\ current}}{C_{ppm\ baseline}} \right] \left[ \prod_{i=1}^n \left( \left| \frac{(x_i - x_o)}{x_o} \right| + 1 \right) \right] \left[ P_P x \left( \frac{Z_{EU} + Z_{ACP}}{P_{EU} + P_{ACP}} \right) \right]$$

There are many independent variables that inform the calculation of M\$. By choosing a single variable (like  $Z_p$ , GDP of the Pacific region) and holding the rest constant, the equation is linear ( $y = mx + b$ , with  $w$  as the slope ( $m$ ), and  $V$  as the constant in this example), and modelling can inform different aspects. The Monetary Factor will increase with increasing GDP of the Pacific; however, the *rate* of rise would depend on the wellbeing factor,  $w$ . With a low wellbeing factor, rising Pacific GDP has less impact on the Monetary Factor. On the other hand, a high wellbeing factor facilitates rises in the Monetary Factor concomitant with rising GDP of the Pacific. If, instead, the GDP of the Pacific is held constant, rises in wellbeing translate to increases in the Monetary Factor. However, the rise is limited by Pacific GDP. This demonstrates how wellbeing and Pacific GDP work in concert.

Interestingly, in this same example, if wellbeing or Pacific GDP were near zero (unlikely), the Monetary Factor would be dependent solely on Ecological Assets. Examining the other variables, the Monetary Factor increases with increasing population of the Pacific, increasing CO<sub>2</sub>, and increases perturbations to intemperate baselines. In the unlikely circumstance that  $Z_{18}$  went to near zero, the Monetary Factor would solely depend upon Regional Assets.

## b) Regional Accounts (R)

$$R = (w)ZP$$

Note that this is scalable to both interregional and intraregional. The regional account multiplies Wellbeing ( $w$ ) with regional GDP ( $ZP$ ).

- ( $ZP$ ) indicates the sum of our regional GDP.
- In our intemperate accounting equation, Wellbeing ( $w$ ) is factored with ( $ZP$ ).

Globally standardized wellbeing indicators, like the GINI Index and the Global Peace Index, can be converted into percentages and accounted for as a *multiplier* of GDP, reducing GDP figures until the target numbers are met (at 100% or 1).

For example, if the combined Wellbeing factor were .6 (60%), and we multiplied that with the nominal GDP of Pacific Island Countries, then

$$R = \$20.04 \text{ billion} = (w)ZP = .6 \times 33.4 \text{ billion.}$$

If ( $w$ ) increases to 75% (7.5), and  $ZP$  were to raise to \$40 billion, then  $R = \$30$  billion.

Decreasing GDP ( $Z$ ) via Wellbeing ( $W$ ) may appear counter-intuitive, but the rationale is to increase wellbeing while decreasing the reliance on traditional GDP accounting. The increase to the Monetary Factor ( $M\$$ ) in the Pacific region will be made up through the accounting of our Ecological Assets ( $V$ ).

## c) Ecological Assets (V)

Ecological Assets are measured by a different set of indicators from traditional GDP. Just as GDP measures production, consumption, distribution, and exchange of goods and services, the value of our Ecological Assets is measured by the offsets of CO<sub>2</sub> parts per million in the atmosphere, population, and the offsets of our intemperate baseline.

Our accounting for  $V$  will include two factors, the *Impact Factor* ( $K$ ) and the *Equalization Factor* ( $Q$ ).

$$V = K \times Q$$

**NOTE:** *It is important that this value does not necessitate an immediate rejection of our GDP, meaning that we do not need to throw one out to use the other. They can be “tuned” so that the rate of conventional GDP can shift in accordance with local/regional/global ecological mandates. The objective is to implement ecological accounts with a rational way forward, providing us with more equitable wellbeing within the global economy.*

#### **d) The Impact Factor (K)**

The first variable of our Ecological Value ( $V$ ) is the Impact Factor ( $K$ ), where  $V$  equals Impact Factor ( $K$ ) x Equalization ( $Q$ ). The impact factor ( $K$ ) is the product of the CO<sub>2</sub> ppm ratio ( $C$ ) and what we call the intemperate offsets ( $N$ ).

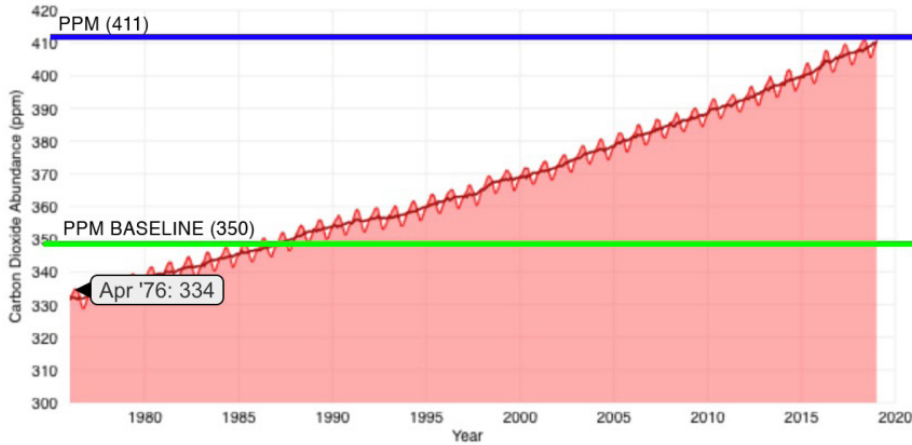
$$K = C \times N$$

#### **e) Carbon ppm Offsets (C)**

( $C$ ) represents the offset of the annual average measurement of CO<sub>2</sub> ppm in the atmosphere. Currently, according to data from the Mauna Loa observatory in Hawai’i, the average mean of carbon dioxide in our atmosphere is 412 parts per million. If the baseline is set to 350 CO<sub>2</sub> ppm—and we are currently at 412 CO<sub>2</sub> ppm—then the quotient is 1.1771 when we divide the offset from the 350 baseline.

$$C = \frac{\text{CO}_2 \text{ ppm current}}{\text{CO}_2 \text{ ppm baseline}}$$

If the baseline were measured according to 1987 averages (in green, see chart below), it would indicate all the changes to ecosystem variants in the various ecological aggregates since then, and would also provide us with a goal to which we should aspire to return—zero-out. It is the changes in the annual average measurement of our ecosystem measured by 1987 averages that determine the pluses and minuses of our biodiversity in national accounting terms.



The line in blue indicates where we are now, and the objective is to raise the value of our national accounts according to the yearly average of CO<sub>2</sub> ppm. Even though the region would “financially” benefit from a rise in CO<sub>2</sub> ppm, the overall economic objective is to return to the 1987 baseline. The advanced industrialized economies are paying a sliding percentage of their GDP when CO<sub>2</sub> ppm rises. It is a punitive payment—an enhanced taxation if you will—and when CO<sub>2</sub> ppm is reduced, then the countries pay less until the 1987 baseline is met. I discuss how this system would work in more detail below.

$$C = 412\text{ppm} \div 350\text{ppm} = 1.1771.$$

### f) Intemerate Offsets (N)

$$N = \prod_{i=1}^n N_i \text{ where } N_i = \left( \left| \frac{(x_i - x_o)}{x_o} \right| + 1 \right)$$

The intemerate formula ( $N$ ) calculates the combination of any number of offset situations. This equation  $\prod_{i=1}^n N_i$  represents all the different measurable situations multiplied together. All difference factors are calculated using the absolute sign  $\left| \right|$ . Whether  $x_i$  represents an increase or decrease relative to  $x_o$ , it is the change of environmental and biodiversity factors that is accounted for.  $N$  is the combination of any number of selected factors. One (1) or 100% is added to each difference factor so that it amplifies  $K$ . All the difference factors could be combined together by multiplying. In this case, equal weight

is given to each factor; however, it is conceivable that weighting factors may need to be applied.

With  $\Pi$  as the combination by multiplication of all the measureable indicators included in the baseline,  $N$  then represents the combined deviation from the baseline (or mean, if statistical averages are used) value, and it is that deviation (+/-) that raises the value of the Ecological Asset. Note that it makes no difference, for example, if there is suddenly more or less coral spawning or the fresh water table is rising or falling. It is the changes to the biodiversity away from the baseline that are being recorded.

Intemperate offsets are similar to the carbon baselines in that what  $N$  measures are the offsets from what we attribute as being the “zero” *restored* intemperate baseline. What is different is how we account for that data. This accounting system is the inverse of traditional accounting methods where the upward hike of data measured on a growth chart is seen as positive. For the intemperate account, the positive flow happens during contraction, when data approaches zero, or the intemperate baseline.

Dividing the current atmospheric measurement with the 350 CO<sub>2</sub> ppm baseline is based on a singular monitor of atmospheric data that is globally standardized, while the data for Ocean acidification, sea level rise, coral bleaching, coastal vegetation, the fresh water table, flora and fauna biodiversity, erosion, radiation, pollution, and other extreme events like an oil spill will rely on information from communities and be regulated by an auditing process. These changes to the environment and biodiversity are scalable from local communities to remote islands to vast swathes of ocean area. The *initial data* will establish local baselines that will come from the continuous customary knowledge of a community’s relationship with the environment. This data will have to be aggregated into data streams that flow into specific categories.

Looking at the equation, then, the subscript “ $i$ ” is the counter that accounts for different ecological factors,  $N_1 \times N_2 \times N_3$ , and so on.

As an example, looking at the research and monitoring map on the National Oceanic and Atmospheric Administration website, we can view the mooring data for ocean acidification.

While the values of these moorings contain some inconsistent fluctuation, there is also a recognizable pattern of consistency. Quality control cites each data entry as being affected

by bad seawater, questionable seawater, bad air measurements, and the like. Nevertheless, the data is relatively consistent. Changes to the average yearly measurements can be applied to the intemperate baseline. The average percentage change of each mooring over one year, for example, may be 3.59%, and that is typical year after year from 2010 to 2018. As an example,

$$N_1 = 1.0359$$

The subscript “*i*” following the N is just a counter; it would thus read:  $N_1 \times N_2 \times N_3$  and so on.

The date that we set the baseline is something that should be discussed regionally, but in terms of the advanced industrialized economies’ responsibility to pay, setting the baseline back to 1983 (the year the Report of the World Commission on Environment and Development was released) or 1992 (the year the UNFCCC was launched) shines a light on just how much time has passed without an ecological-economic agreement. President Bush withdrew the United States from the Kyoto Protocol in 2001, and now President Trump has withdrawn from the Paris COP. A global ecological economic agreement looks no closer to being ratified now than it did 20 years ago. It is imperative for the world that the regions adopt a cohesive plan independent of the United States.

By utilizing a combination of subjective and objective values, we can reverse some of the negative accounting that has treated customary knowledge as an economic liability, including those whose customary locales are remote islands.

### **g) The Equalization Factor (Q)**

$$Q = \left[ P_P \times \left( \frac{Z_{EU} + Z_{ACP}}{P_{EU} + P_{ACP}} \right) \right]$$

Global GDP is \$84.9 trillion. The global population is 7.7 billion people. Global warming is a direct influence of anthropogenic human activity mostly caused by industrialized countries and the ongoing over-weighted value for production and consumption of a carbon-based economy. Equalizing the value of global ecological data requires a combination of good science and an agreeable methodology for compiling public data. While each

variable may have a myriad of contentious values connected to it, equalization is the basic information that does not distinguish areas beyond national jurisdiction (ABNJ), carbon markets, population density, debt, or ecological and biological significant areas (EBSA), to name a few. While each of these factors can complicate this aggregate, in this simple form the values are evenly distributed and fair, and can later be revised as necessary.

*Equalization* immediately assigns a *value baseline* to our ecological data. While the value baseline is a dependent variable that is set by the external values of *Population* (P) and *GDP*(Z) (however that may look in future revisions), this baseline data cannot be traded or exchanged in data markets. Invoking the sentiment of James Bond's eponymic catchphrase, "shaken not stirred," equalization is to be "*leveraged not sold.*" There are other ecological data factors (a combination of exogenous and endogenous factors) that will create accumulation and reduction values which can be traded and exchanged in data markets within the Impact (K) section.

Equalization expands the access to goods and services, infrastructure, loans, bonds, insurance and other financial instruments by equalizing the population of developing countries with the advanced industrialized countries.

As an example, if we start with the ACP-EU Cotonou Agreement,<sup>12</sup> equalizing the 79 African, Caribbean and Pacific countries with the 27 EU member states, we would be equalizing the average GDP per capita of the European Union with the average GDP of the ACP countries. In this scenario, by fulfilling development and environmental commitments contained in the Cotonou Agreement (particularly the principle that partners to the agreement are equal), this report proposed that the EU provides the *premium*, via the Asia Infrastructure Investment Bank (AIIB) which will hold the *insurance* on the premium

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12 The ACP Group's main objectives are: "sustainable development of its Member-States and their gradual integration into the global economy, which entails: making poverty reduction a matter of priority and establishing a new, fairer, and more equitable world order; coordination of the activities of the ACP Group in the framework of the implementation of ACP-EC Partnership Agreements; consolidation of unity and solidarity among ACP States, as well as understanding among their peoples; establishment and consolidation of peace and stability in a free and democratic society." The Cotonou Agreement is a close partnership based on a series of principles: "The partners to the agreement are equal; the ACP countries determine their own development policies; cooperation is not only among governments: parliaments, local authorities, civil society, the private sector, economic and social partners play a role as well; cooperation arrangements and priorities vary according to aspects such as countries' levels of development." ACP-EU, "Overview: Cotonou Agreement," [http://ec.europa.eu/europeaid/where/acp/overview/cotonou-agreement/index\\_en.htm](http://ec.europa.eu/europeaid/where/acp/overview/cotonou-agreement/index_en.htm).

as part of the Belt and Road Initiative, while the ACP holds the *equity*. While this would involve some monetary commitment for building the infrastructure and implementing programs, the equalization factor does not mean a cash pay-out. Rather, it is established for regions to recognize the value of a region's ecological data. Also, it is important to note that not all regions will have the same indicators as there are different priorities, and that the value of equalization is to account for the baseline data.

Also, to be clear, the Equalization Factor is by no means devised to be *solely* an ACP-EU initiative; rather, it seeks to equalize the developing economies with the High-Income OECD industrialized economies, encouraging the harmonization and cooperation of *all* the advanced economies with the other low-income countries and regions. Considering that climate change is a global existential issue, it is rational to motivate the financing of climate initiatives globally and equitably, and launching this in the Pacific first provides feasibility outcomes to be tested in real time.

While equalization is primarily an effort both to raise the national accounts of developing countries and to address climate change, it should not be used to invalidate the immediate impact on donor/aid relationships. However, as sustainable investment and infrastructure facilitates greater access to trade, technology, and mobility for developing countries, we should see an inverse decrease upon aid dependency. Additionally, an Equalization Factor ( $Q$ ) included in the Ecological Value of our national accounts should provide greater direct investment towards meeting the 2030 agenda of the 17 Sustainable Development Goals.<sup>13</sup>

Following the example of the EU-ACP Cotonou Agreement, the GDP of the EU ( $ZEU$ ) is currently about \$18.5 trillion. The sum of the population ( $PEU$ ) is approximately 513 million people. The GDP per capita ( $ZEU/PEU$ ) of the EU is about \$36,212.

The sum of the nominal GDP estimates for the 79 ACP countries ( $ZACP$ ) is about \$2.001 trillion. These are the countries that have a high priority for both poverty eradication and sustainable development. Although many other countries face the same fragility factors and development needs as the ACP countries, the harmonization and coordination already established within the ACP forum can pursue this as an action item agenda.<sup>14</sup>

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13 See United Nations, "Sustainable Development Goals: 17 Goals to Transform Our World," <https://www.un.org/sustainabledevelopment/>.

14 See Organisation of African, Caribbean and Pacific States, <http://www.acp.int/content/secretariat-acp>.

The total population of the ACP is about 1.122 billion and, according to 2018 World Bank estimates, GDP per capita is about \$1,783. In contrast with the EU, the disparities between industrialized and developing countries are even more disparate, so that equalization can only be seen as just and equitable. If we were to account for the larger OECD group that includes, among others, Australia, Japan, the US and the UK, the GDP is about \$52.3 trillion with a population of 1.141 billion. *The average GDP per capita for the OECD is \$40,713, which is 2283% greater than the GDP of the \$1,783 ACP average!*

Equalization (Q) is derived from combining per capita averages between the advanced and developing countries. Having this Equalization Factor (Q) allows for the up-access to funding that will provide for the needed infrastructure and economic baseline to aggregate new *ecological assets* that will raise both the monetary factor, wellbeing, and the *GDP per capita* of the ACP.

This regional ecological accounting framework accounts for the data of the 17 small countries and territories represented by the Pacific Islands Forum, and could remain open to other non-PIF administrations like American Samoa, Guam, Hawai'i, Northern Mariana Islands, Rapa Nui and West Papua.

The combined Population (P) of the ACP countries is about 1.1 billion, and if we were to equalize the GDP per capita we could raise the GDP per capita for ACP countries from \$1,783 to \$12,589.

$$Q = \left[ \left( \frac{Z_{EU} + Z_{ACP}}{P_{EU} + P_{ACP}} \right) \right]$$

$$Z_{EU} + Z_{ACP} = \$20.595 \text{ trillion}$$

$$P_{EU} + P_{ACP} = 1.635 \text{ billion}$$

$$Q = \$12,589 \text{ per capita}$$

Focusing now on the Pacific, the World Bank accounts for GDP of small Pacific Island States at about \$9.6 billion (nominal). However, the World Bank does not account for Papua New Guinea or the territories in their small island states assessments, and if we are to include them so that it conforms to the membership of the Forum Island Countries, then

the sum of our regional GDP ( $Z_P$ ) currently amounts to about \$33.4 billion, using World Bank estimates.

$$Z_P = \$33.4 \text{ billion}$$

In comparison, the Caribbean GDP ( $Z_C$ ) is \$250 billion and African GDP ( $Z_A$ ) is \$1.67 trillion.

The combined population ( $PP$ ) of the Pacific region is about:

$$PP = 11.5 \text{ million.}$$

When we convert that to a percentage of the ACP population, the Pacific represents about 1.15% of the 1.11 billion ACP population. In comparison, the Caribbean population  $P_{ACP}/P_C$  is 40.14 million (3.6%), and the African population  $P_{ACP}/P_A$  is about 1.06 billion (95.35%).

Pacific Equalization ( $QP$ ) is derived from multiplying  $PP$  with the average  $Z_{total}/P_{total}$  (\$12,589), which amounts to \$144.8 billion.

$$QP = \left[ P_P \times \left( \frac{Z_{EU} + Z_{ACP}}{P_{EU} + P_{ACP}} \right) \right]$$

$$QP = \$144.8 \text{ billion}$$

Comparatively, equalizing the population factor, the Caribbean is ( $QC$ ) \$505.3 billion, and Africa ( $QA$ ) is \$13.3 trillion.

When we combine  $Q$  with the Impact Factor  $K$ , our Ecological Assets  $V$  will determine the value through which bonds, insurance and other financial instruments could be leveraged and accounted for. *Our Pacific Ocean of data, including the accounting of our Marine Protected Areas, are our Pacific regional assets and should have an exogenous or fixed value in our regional economy that is resistant to fluctuations from being publicly traded or valued by private foreign markets.*

As part of the local and regional economy, adopting this framework will attract new investments in restoration services and financial instruments measured against the value of Equalization, leading to the expansion of new ecological markets and SMEs.

## h) Our Ecological Assets

Looking again at the variables of the accounting equation for the Pacific, we see the following:

- 1) Monetary Factor:  $M\$ = R + V$
- 2) Regional Accounts:  $R = (w)ZP$
- 3) Ecological Assets:  $V = K \times Q$
- 4) Equalization:  $Q = \left[ P_P \times \left( \frac{Z_{EU} + Z_{ACP}}{P_{EU} + P_{ACP}} \right) \right]$
- 5) Impact Factors:  $K = C \times N$
- 6) Carbon Offsets:  $C = \left[ \frac{C_{ppm \text{ current}}}{C_{ppm \text{ baseline}}} \right]$
- 7) Intemperate Offsets:  $N = \left[ \prod_{i=1}^n \left( \left| \frac{x_i - x_0}{x_0} \right| + 1 \right) \right]$

Using the examples given, this is what our Monetary Factor would look like when we include our Ecological Assets.

**NOTE:** *There is only one instance of  $N$  in this example, and that in the intemperate accounting paradigm; there will be hundreds more, reflecting the restoration of our ecological biodiversity, which is why we require the data baseline and the technological capacity to build up our data networks.*

- 1)  $M\$ = R + V$   
 $\$196.603 \text{ billion} = \$20.04 \text{ billion} + \$176.563 \text{ billion}$
- 2)  $K = C \times N$   
 $1.2193 = 1.1771 \times 1.0359$
- 3)  $V = K \times Q$   
 $\$176.563 \text{ billion} = 1.2193 \times \$144.8 \text{ billion}$

*NOTE: Raising our regional ecological assets will provide for a greater Monetary Factor which will need to be distributed equitably across the region.*

## 8. CASE SCENARIOS

To help clarify the intemperate baseline for the Ecological Accounting module, several potential case scenarios were presented at the REM meeting. While, on the one hand, the intemperate baseline is scalable and can be used to account for the region, state, islands or villages, it is not an accounting mechanism that can be used as a direct exchange for capital, meaning that the value of the *baseline data* should not be directly transferable to cash-in-hand payments for rendered services.

This is not to say that payment services cannot be built into the intemperate system. The design of intemperate accounts is to allow for a variety of services to use this baseline in a way that will incentivize and financialize ecological economic growth. The intemperate baseline is designed to provide an incentive and rationale for creating new small and medium-sized enterprises that will stimulate ecological services for measuring data, restoring environments, creating climate mitigating technologies, and inventing new resilient infrastructure to help us stay in our island homes and maintain our ecological biodiversity.

The case scenarios described below consider how intemperate accounting can be scaled down and provide a useful way for maintaining our ecological resources. Environmental Impact Assessments remain an important tool for navigating regulatory barriers against certain forms of development, and Free Prior and Informed Consent (FPIC) is a right that should be enshrined in international legal frameworks. Intemperate Accounting could provide alternative options for how communities choose to engage with industries and markets. The intemperate baseline is designed to provide a genuine alternative to what extractive industries, resource depletion and environmental degradation offer.

While the intemperate baseline can be utilized for financing the restoration of the ecological biodiversity, EIAs and FPIC provide the regulatory barriers to prevent depletion and degradation to begin with. *It is this harmonious interaction between regulatory regimes and ecological accounts that will provide for the robust ecological-economic incentives that raise the equity and wellbeing of the region.*

## CASE SCENARIO 1: The Crabs of Munda (as told by Rev. Cliff Bird, edited for clarity)



“Munda is a conglomerate of five small villages in New Georgia, a province in Western Solomon Islands. Munda’s residents depend on the island’s land crabs, which spawn from October to February, as part of their normal diet. Today, their food security is threatened.

During World War II, Japanese forces built a small airstrip at Munda, and following the war it served as a basic commercial airfield. In 2015, the government decided to upgrade the airstrip to an international airport. With financial assistance from the New Zealand government, they expanded the airstrip and airport facilities. The development sits directly in the crabs’ migration path.

When the airport was just a runway, during mating season the crabs would travel to the beach to release their eggs. It was a time of repopulation. It was also the time when people would go to the beach to harvest crabs for food. That was the cycle.

The airport was completed in 2018 and received its first international flight in March 2019. A three-meter-high fence, which is topped by barbed wire and extends underground to prevent animals from digging below it, now surrounds the airstrip. From October 2019 to February 2020, thousands upon thousands of crabs tried to make their way to the sea only to die at the fence. There are also thousands of dead crabs on the road, flattened by increased traffic. At the two ends of the International Airport there is access to the shore that is not used by the crabs.

Munda's 10,000 to 15,000 people are highly concerned and want action taken. The crab population has decreased, not only affecting one of their primary food sources but also having a serious cultural impact. Crab harvesting on the beach is a social activity and a prime opportunity for young men and women to meet. The decrease in crabs has led to a decrease in potential marriages.

I have participated in the harvesting of crabs—my family would go to the beach to fill large buckets. On any given night you would find lines of people three to four kilometres long, collecting crabs. You would see many torch lights. Looking at the given land area of approximately 400 square meters, you would be looking at about 1,000 crabs in each sample, all heading to the beach. It was quite a sight.

Now, in order to harvest crabs, residents have to travel further into the bush, and go through a more complicated process. You have to feel for soft spots in the soil—indicating crab burrows—with your feet. There are also relationships between crabs and the growth of certain plants and birds. Birds know how to follow the soft paths. The barrier along the runway is disrupting many natural processes, causing a long list of potential damages. All of this could be restored if the airport just removed those barriers.”

One of the ways the intemperate baseline can address this case study is for the community to look at the fence's full impact—ecological, social and cultural—on the community. From a decimated crab population to a decrease in the sale of buckets and torches, the fence has wide-ranging impacts with financial repercussions.

How do we measure this to establish a baseline (either existing data or memory that can be verified through the triangulation of evidence-based events)? The baseline is the x-axis and measured by time, and the y-axis is the accounting of the various events. In this case,  $n_1$  is the crab population;  $n_2$  is the population of a bird that may be impacted by loss of crabs;  $n_3$  may be the loss of a plant that was dependent on the soft soil of the crab habitat.

If we were only accounting for GDP, we would be weighing the decline of sales of shovels, buckets and torches, and maybe the changes in price due to the loss of crabs to the overall revenue provided by the airport. Using the old GDP calculation, an airport provides far more revenue, while the loss of land crabs may be simply seen as an external loss. However, by including an intemperate accounting model, the gain in revenue for accounting the ecological biodiversity and the cultural social impacts provides a clear justification for redesigning and rebuilding the fence to restore access for the land crabs to spawn and return to their natural habitat.

## CASE SCENARIO 2: Mangroves



A village in Madang, Papua New Guinea depends on its mangroves, which harbour fish and edible types of shellfish. For the last three years a fishing company has been discharging its waste into the mangrove area, so the community has not been able to go in and harvest their food. That is the scenario.

This situation addresses multiple accounts. Let's say that the market value of the day's catch for the fishing company is \$1000, which is what the fishing company makes at the market. This \$1,000 dollars provides wages for the fisherman, gas, insurance, boat fees and upkeep, and the cost of supplies. Further, it provides revenue for the market and, if the fish were purchased by a restaurant, revenue for the restaurant. So the total value of the

catch might amount to \$5,000 in total revenue from line to table. Out of that, let's say that 20 percent went to taxes, so \$1,000 would provide for government revenue and would be accounted for in the overall GDP or  $Z$  of a country's economic output—and this is for just one fishing boat's catch for the day. With the addition of the Wellbeing indicator modifying GDP, where the country only has a moderate score of .5 ( $w$ ), the economic output would only be recorded as half or  $(w)Z$ . But that reduction does not reduce wages, market values, prices at restaurants or government revenue, only the final recording of national outputs, measured by  $M\$=R+V$ .

If the government were to regulate the boat's discharge of waste and provide infrastructure and service for waste removal for all shipping boats on all days, improving the food security and traditional gathering of food for coastal communities, it would increase the wellbeing factor by 5 percentage points, providing the government with incentive for raising wellbeing in order to meet the full potential of its GDP account.

The Monetary factor ( $M\$$ ) is a combination of GDP ( $Z$ ) and the Ecological Assets ( $V$ ), or  $(M\$=R+V)$ . By reducing the offsets caused by the boat's waste and discharge and restoring the biodiversity of the mangroves, this will add value to the Ecological Assets, thereby raising the Monetary Factor. Not only will the people have restored access to their food security, but the government will also financially benefit from the act of accounting, restoring, and stewarding.

### CASE SCENARIO 3: The Pristine Island



Photo credit link: <https://www.cruisemapper.com/ports/monuriki-island-port-3795>

Monuriki Island in Fiji is uninhabited and completely raw. It is where the movie *Castaway* was shot. Pristine islands like this might very well be a baseline island with no offsets to restore, and so the value of its ecological data may simply be recorded as “1.” However, should there be an oil spill nearby, or damage caused by tourism or another film shoot, intemperate accounting would create greater incentive to restore the ecological baseline instead of ignoring it, thereby holding those responsible for degradation responsible.

## CASE SCENARIO 4: Wagina Island bauxite mining



Due to a lack of proper environmental assessment and consultation with the communities of the Solomon Islands' Wagina Island, there is currently a legal case regarding the ecological impacts and environmental degradation of a proposed bauxite mine.

While mining licenses already require EIS consultation, particularly with people who live by subsistence farming, fishing and seaweed farming, intemperate accounting would provide viable options for maintaining the ecological biodiversity of an area.

Intemperate accounting complements FPIC in that communities could have access to alternative revenue streams which, depending on how FPIC is adopted in each country, will likely outweigh the revenue and development that extractive industries provide. Often

consent processes are more about exchanging resources for revenue, but with the intemperate accounting model the paradigm shifts to decide what model of revenue communities want to adopt.

A steady stream of revenue that is attached to the ecological baseline could be a viable alternative to whatever revenue or development projects extractive industries have been offering.

## 9. METHODOLOGY

Samoa has often been asked the question of how it has managed to attain political stability over the years. There is no straightforward answer. What we are sure of is that the foundation of our culture, namely the matai (chiefly) system, has significant bearing on stability, evident in Samoa through its collective decision making and responsibilities that extend from family to village, district and national (parliament) levels. In essence we have been able to integrate well the best of our customs and traditions and the values we have adopted from our world without borders.<sup>15</sup>—*Tuilaepa Sailele Malielegaoi, Prime Minister of Samoa*

By now there should be little question that the region is in need of an ecological accounting framework, and one of the primary concerns we should consider is how we implement a framework. Which framework? Under what particular time constraints and funding parameters? Who pays? Who leads? Who benefits? Additionally, how do we implement a Pacific Islands methodology that could quickly be integrated between the region, the states, businesses, industries and customary communities, utilizing indigenous cultural processes that would engage the participation and consent of customary peoples? It is a challenging endeavour.

While there are many studies focusing on indigenous epistemology, pedagogy and methodology, how we promote a regional climate discourse and solution-based program that is inclusive of the indigenous and customary rights-holders of the region should not prevent us from moving forward with an ecological-economic framework. In trying to apply a framework for indigenous statistics, there are epistemological concerns over “... what is counted as knowledge, who can and who cannot be knowledgeable, and the hierarchy of how knowledge is valued. In traditional (Western) quantitative methodologies the epistemic designation of knowers and knowledge is value-ranked along a culturally, racially and socially laden continuum. Hierarchies of knower and knowledge by subject/object position exist in which the usual position of the Indigene is limited to data source.”<sup>16</sup>

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15 Honourable Prime Minister Tuilaepa Sailele Malielegaoi, public address, Global Focus Summit, Auckland New Zealand, 25 February, 2020, <https://www.facebook.com/samoagovt/posts/2983826814981654>.

16 Maggie Walter and Chris Anderson, *Indigenous Statistics: A Quantitative Research Methodology* (Walnut, CA: Left Coast Press, 2013), 94.

Linda Tuhiwai Smith, whose work on indigenous epistemology has promoted strategies for decolonizing top-down bureaucratic methodologies, frames the indigenous experience as an imperialist one, and reminds us that indigenous communities need their own indigenous research protocols and methodologies.<sup>17</sup> But what is not often factored is *time*, so the question looms: How do we apply a methodology using indigenous consent protocols when, with every year that passes, the impacts of climate change are more threatening?

It is not within the scope of this work to analyse what single methodology should be employed. The institutions of our churches, schools, governments, funding partners, community organizations and indigenous bodies will be better informed to approach the unique challenges entailed in coordinating how local communities engage with a new regional ecological framework. This is not to say that indigenous processes like FPIC should be a secondary consideration. Rather, it is to say that we should consider not only a top-down or bottom-up approach, but rather a *triangulated methodology* that can evaluate the participation, rights, responsibilities and needs of peoples in a manner that is expedient.

The one overwhelming factor that supersedes the formal way through which consent processes are adopted is climate change. Measurements like CO<sub>2</sub> parts per million in our atmosphere, ocean acidification, changing migratory patterns of pelagic fish, the loss of fresh water tables, and so on, each have severe long-term impacts on the sustainability of the region's livelihoods and Pacific Ways. Not acting has consequences. If we are to adopt the kind of resiliency frameworks that will allow us to reverse or mitigate the impacts of climate change, *time, area, population, environments and economics* are the criteria that we need to account for.

An ecological accounting framework of this magnitude needs to be immediate and comprehensive, and while it must be effective and compliant, it must also be flexible, auditable, and allow for adaptive processes. It is not enough to follow a bureaucratic top-down hierarchical structure where the relationship that flows within the management of bureaucracies oversees a pass/fail system or seeks to be quota driven. And while the accumulation of data is necessary, we need to be inclusive of not only the various indigenous systems but also the practical processes of the region, the states, local customary practices,

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<sup>17</sup> Linda Tuhiwai Smith, *Decolonizing Methodologies: Research and Indigenous Peoples* (Dunedin, NZ: Zed Books, University of Otago Press, 1999), 4.

business, industry and finance. Our methodology must be inclusive of the various options for gathering that data, such as interviews, observations, questionnaires, varieties of research, and how all of that intersects with already established protocols.

Transform Aqorau, the former CEO of the PNA, discussed data systems with me recently, and expressed some of the problems that he faced with the PNA Integrated Management System. It is too complicated a story to explain here, but the take-away reaffirmed that the engine for Pacific Regionalism needs to be built with the Pacific holding the equity of data ownership as well as the intellectual property of its system. In other words, *the Pacific needs to own its data and the system upon which it is built.*

While the policy space for an ecological accounting system has many fingers in it—from UNESCAP to the World Bank, private conservation trusts like Pew and Conservation International, and other private industries or non-regional national institutions (made manifest in programs like Marine Protected Areas or other mining/mapping initiatives, and by regional institutions like SPC, the variety of CROP agencies and other donor agencies)—what remains true is that there already exists a tremendous amount of ecological data on the Pacific. Yet we should ask why the Pacific remains underserved and underdeveloped, and without a cohesive or comprehensive data policy.

Considering the amount of existing data, if these agencies really sought to benefit the livelihood and resilience of Pacific Peoples, true development would entail assisting in the building of a regional facility to own and manage its own data. For this reason, we should consider a triangulated methodology over a top-down, bottom-up one. It is already evident that what would NOT work for the region is a top-down, multi-sector approach for gathering that data, excluding customary rights holders from owning their data. What comes to mind are Maritime Protected Areas (MPAs). The data in these MPAs should belong to the Pacific, and foreign consortiums that manage MPAs should not treat that data as their own and account for it in future accounting matrixes.<sup>18</sup>

According to educators Cohen and Manion, an approach towards triangulating methodologies is not just about validation or reliability, it is about deepening and widening one's understanding of complex information. "It can be used to produce innovation in

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18 Arnie Saiki, "Measuring Regional Progress for a Blue Economy," in *Oceans Governance: Shaping our Future—A Joint Australia National University and University of the South Pacific Initiative*, State, Society & Governance in Melanesia (Canberra: Australia National University, In Brief, February 2017).

conceptual frameworks and can lead to multi-perspective meta-interpretations.” However, they continue, “It is easy to slip into invalidity; it is both insidious and pernicious as it can enter at every stage of a piece of research. The attempt to build out invalidity is essential if the researcher is to be able to have confidence in the elements of the research plan, data acquisition, data processing, analysis, interpretation and its ensuing judgment”<sup>19</sup> or *value* as it pertains to ecological accounts.

Despite some of the politically motivated tensions within the Forum Fisheries Agency, PNA’s Fisheries Information Management System provides a working blueprint of how regional data systems can work in the Pacific. While PNA’s FIMS is developed for the fisheries sector, an ecological information management system is scalable to include a multi-sectoral system that would include ocean acidification, average temperatures, water tables, changes to the biodiversity of remote islands, and other climate changes. Technology shifts that include blockchain and mobile measuring devices and communication infrastructure like 5G can facilitate the engagement of customary stewards living in isolated areas or remote islands, once again showing that customary people are not economic liabilities but tremendous assets who have been largely ignored, displaced or uncounted in the accounting of Pacific Island assets.

As a matter of expediency, if the large economies are not responding with the same sense of urgency as is the Pacific, it is simply because the large economies believe that the cost of that risk is *affordable*. However, now that their economies and livelihoods have been on the frontlines—as with the recent climate damage faced by Japan with typhoon Hagibis, and the forest fires and hurricanes in the U.S. and Australia—that risk cannot be afforded much longer.

**“With a new system of integrated ecological accounting—the Intemperate Accounting Framework—the Pacific is in the position to lead a new global paradigm that is not only fair and equitable for Pacific Island States and Territories, but also for other regions that share our predicament. ”**

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<sup>19</sup> Louis Cohen, Lawrence Manion, and Keith Morrison, *Research Methods in Education*, 6<sup>th</sup> ed. (London: Routledge Press, 2007), 141-144.

## **10. RECOMMENDATION: A ROADMAP FOR INTEGRATED ECOLOGICAL ACCOUNTING IN THE PACIFIC**

With a total regional gross domestic product of about \$33.4 billion, the Pacific Island Forum member states, encompassing about 28 million km,<sup>2</sup> represent an area of the Pacific just slightly smaller than Africa. While our islands' distance from larger nations and remoteness have often been seen as barriers to economic development, the Pacific has been an important economic engine that has generated billions of dollars for foreign companies. As with extractive corporate operations elsewhere, from Ecuador to Nigeria, the environmental costs of extractive industries in the Pacific have not been taken into account as part of financial calculations. Furthermore, economic measures in the Pacific have never factored in Pacific cultures' integral relationship with their environment.

However, it is possible to measure Pacific nations' economic welfare in a way that recognizes and accounts for the bond that people have with their environment, particularly in a context of increasing loss and damage associated with environmental degradation and resource depletion. With a new system of integrated ecological accounting—the Intemerate Accounting Framework—the Pacific is in the position to lead a new global paradigm that is not only fair and equitable for Pacific Island States and Territories, but also for other regions that share our predicament, such as the Caribbean, Indian Ocean, Africa, and other non-aligned countries, as well as the advanced OECD economies.

If this seems ambitious, it is. To note, the Economic Cooperation Act or Marshall Plan, which changed the course of the 20<sup>th</sup> century (for better or worse), started in 1948, and while the program technically ended in 1951 its impact continues to be felt today.<sup>20</sup> The

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20 What ensued in those three years and the decade that followed was that the United States took control of the Bretton Woods Institutions, the World Bank and the IMF; wrote new rules for global trade by unilaterally walking away from the International Trade Organization, and cut global trade partnerships in half with the anti-communist GATT; took control of most of the colonial distribution of resources in territories; broke post-war agreements with the Soviet Union, launching the Cold War; started NATO; blocked the People's Republic of China from having a seat at the UN until 1972; launched the anti-communist ICFTU (now ITUC), a new international

Marshall Plan was an *exclusionary* policy that U.S. Senator Arthur Vandenberg described as leading the world “for a hundred years to come.”<sup>21</sup> Now it is time for an *inclusionary* policy that can fix and heal nearly a century of exclusion and environmental destruction.

Today, in the midst of change due to the coronavirus pandemic, much of the world is still reeling from this instability. In visualizing the immediate near future, Pacific leaders, understanding that decades of post-colonial activity have provided very little in the way of security and development, now have a chance to embrace genuine security by adopting a regional ecological-economic platform.

### **The recommendation to governments and civil society institutions is a thirty-year visualization: The 2020-2050 Intemperate Accounting Framework**

This thirty-year visualization to adopt and implement a regional ecological-economic platform for national measures of wellbeing precludes that Pacific Leaders stand on the shoreline as the waters of change recede, and resolutely wait for the tide to come crashing back in.

- **2020:** Regional Ecological Integration is formally introduced to PICs as part of a Regional Wellbeing program. Feasibility studies are created at the international level, and the University of South Pacific begins to expand its Environmental Studies program to adopt Ecological Accounting.
- **2021:** Three islands launch pilot programs, and MOUs are signed with funders to promote this experimental initiative. Observer states and territories study this framework, particularly its interactions with Environmental Impact Assessments (EIAs) and Free Prior and Informed Consent (FPIC). Some foreign governments

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trade union to replace the truly international WFTU (World Federation of Trade Unions); maintained influence over national accounting systems, and used its own NIPA (National Income and Product Account) system to define global accounting rules by prioritizing their own industries (like military systems, research and development, and rejecting household accounts and environmental degradation and resource depletion); and, perhaps most ambitious of all, asserted the dollar as the international trade currency, which is still being used punitively as a restrictive compliance mechanism against countries which do not conform with US national interests.

21 “Keep Iron Curtain from Atlantic,” *Cairns Post*, 3 March, 1948, 1, <http://nla.gov.au/nla.news-article-42575390>.

seek to undermine the framework, claiming a lack of data transparency will lead to corruption. Interventions led by environmental campaigners begin to target the UN Statistical Division, demanding that new priorities are included in the ecological-economic accounting programs. Donor nations are split, as some fail to recognize Pacific-led attempts to revise national accounts. Other countries, however, recognize it and support the nationalization-regionalization of data ownership.

- **2022:** China revises its national accounts to include environmental-economic accounts. While the ecological priorities are different from the intemperate accounting model, they are quick to recognize a Pacific ecological accounting framework, and studies are done to harmonize the regional framework within an economic cooperation.
- **2023:** Competing ecological accounting programs are explored by other countries and institutions in the advanced economies and in other developing and emerging economies, but most are based on privatization models, or programs that seek to exploit ecological values for corporations and investment cabals of their own national accounting methodologies. While aid-based models provide short-term benefits, it is clear they do not provide the potential for long-term benefits that the proposed intemperate accounting program envisions. There will be a push within the international fora to standardize ecological accounting within the SDGs and UNFCCC, and the introduction of a Pacific model recognized by the BRI causes some disruption, but the EU and some of the other AIIB funders will promote this new arrangement, influencing the UN Statistical Division's National Accounting System. The Caribbean and Africa begin to implement regional ecological accounting programs to harmonize with the Pacific and Chinese model.
- **2024:** Geopolitically, the global economy is still up in the air, and while the large economies and cooperations remain unsettled, the Pacific takes a leadership role in defining its ecological accounts and its interactions with EIAs and FPIC in a way that is open to a new multilateralism.
- **2025:** All the Forum Member states begin to shift towards an ecological accounting framework. 5G networks are fully implemented to monitor the ecological changes to our ocean environment while providing new data for other industrial sectors,

like shipping and fisheries. Indigenous nations within Australia, Canada, New Zealand and the United States which have begun to explore ecological accounting models now seek cooperation with the Pacific model, and look at strategies for generating trade and investment independent of national policies. While there have been disputes in the region over how data equity should be dispersed among member states, and differences within each state over the disbursement of public funds, they are now resolved.

- **2027:** The region has fully implemented ecological accounts into their national accounting system and the funders begin to see the promise of a return on their investments, particularly as new investment devices are created, by leveraging them against intemperate offsets. The 10-year moratorium on Deep Seabed Mining is still in effect, and PICs see a far greater return with ecological accounting. The extractive industry has turned its attention to urban mining and reclamation. The privatization of the waste industry has boomed, and mining investors have shifted their attention away from degradation and depletion, as the UN National Accounting System has begun to treat environmental degradation and resource depletion as a deficit in national accounting aggregates.
- **2030:** Other regions and economies begin to implement similar accounting systems. The Pacific has fully implemented its operational accounts. Costs and insurance risks due to climate change have exacerbated industrialized economies and the world has shifted its ecological-economic priorities. The Pacific ecological framework is the model that most of the world seeks to implement in their national accounting policies, and the effects of being a driver of the global economy are acknowledged by the increase in international capital in this sector. Several Pacific island companies have created “floating habitats” and remote maritime transport has become a model for new liveable infrastructure, as shoreline communities seek affordable resilient technologies to withstand increased climate impacts.
- **2035:** There is early evidence that the accounting framework is working and the ecological offsets are beginning to contract. Funds from the Equalization factor (Q) have ended, but the Pacific has little need of it as their economies have strengthened and are on par with much of the world.

- **2040:** There is optimism regarding a global reversal of some of the negative climate impacts, and countries are aggressively competing to close the gap and return to what has become a mythical “1989 baseline.”
- **2050:** Our children’s children read about the ecological debacle of late-stage capitalism and the Pacific is seen as a catalyst towards leading a global climate reversal.

To effectively implement the above road map and to prepare for an Intemperate Accounting Framework, the following six steps are necessary, although these are not the only ones:

- Assemble a *feasibility study* to outline a working plan.
- With the National Statistics Office, develop an *accounting side table* for ecological data.
- Collect local data and begin an *ecological audit* of the area.
- Develop a *network system and database*, using the PNA’s Fisheries Information Management System (FIMS) as a model.
- Develop an *educational program* on Ecological Accounting in conjunction with Environmental Science departments at our local universities.
- Invite AIIB and EU to negotiate a *funding mechanism*.

In order to adopt the intemperate ecological framework, the first activities we need to undertake entail a six-step multifaceted agenda. As the intemperate accounting framework is scalable to area and population size, determining what ecological data are relevant for a particular locale will require data information. This ideal model will be to collect the data from 1994, when the United Nations Framework on the Convention of Climate Change entered into force, as well as the when the UN Convention on Biological Diversity and the Convention of Combat Desertification were adopted as the “Rio Convention.” That was the year the 197 countries recognized that there was a climate problem and ratified cooperation to cut emissions.

There are many models for data that can be utilized and incorporated into our data sets, and harmonizing local measurements with data sets from other international institutions should help facilitate compliance. Compiling this data can include oral history as well as documentation. *It’s all about the data.* Without data, we cannot begin the accounting process as described by the intemperate accounting formula.

In a recent report produced by the European Union, researchers write:

The State of the Pacific Ocean case study is a demonstration of how Copernicus Marine Service might be used to inform decision-making in a region that regards itself as data poor, especially for ongoing monitoring of biological variables. The perception of data poverty results from limited capacity to access, display and analyse data (Holland 2018). The Copernicus Marine Services State of Pacific Ocean challenges those perceptions of data poverty by demonstrating the richness of the data available to inform decision-making in the Pacific Islands.

Our hope is that the State of the Pacific Ocean atlas serves as a springboard to begin stakeholder engagement and dialogue on how to use the available data to inform decision-making. In the 2018 Pacific Island Forum Leaders meeting, the Pacific leaders of the 16 Forum member countries prioritized climate change and blue economies. Optimizing utilization of the available data requires further dialogue at the science policy interface to generate the robust products required to inform decision-making.<sup>22</sup>

Concurrently, we will need to work with funding partners to apportion funds to develop the infrastructure and the data system framework.

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22 Elisabeth Holland, Karina von Schuckmann, Maeva Monier, Jean-François Legeais, Silvia Prado, Shubha Sathyendranath, and Cecile Dupouy, “The Use of Copernicus Marine Service Products to Describe the State of the Tropical Western Pacific Ocean around the Islands: A Case Study,” Copernicus Marine Service Ocean State Report, Issue 3, *Journal of Operational Oceanography* 12 (2019): 43–48. DOI: 10.1080/1755876X.2019.1633075.

## CONCLUSION

As stewards of our vast liquid continent, we are a population of about 11.5 million. There is no reason why the Pacific should remain as an underperforming, least-developed region. Our underdeveloped economy is especially magnified when one considers how Pacific resources have been used to advance the GDP of large industrial powers, and how much of the region is used as a carbon sink for CO<sub>2</sub> in the atmosphere.<sup>23</sup> As a region we continue to face the negative impacts of colonization, militarization, severe pollution, health disparities from radiation poisoning, and unfair access to equitable trade. As a result of being excluded from a system of national accounting, we—as well as other poor-performing regions of the world, like Africa and the Caribbean—have been subjected to tremendous insecurity. By changing the way we account for our ecological data, we can contribute our own technologies that will provide fair access to infrastructure designed to deliver genuine security and wellbeing to our planet.

The objective for an ecological accounting scheme is twofold. The first objective is to *raise the equity of the region* as a whole by accounting for our vast biodiversity against environmental degradation, resource depletion and the loss of our ecological biodiversity, and leveraging the rise of carbon parts per million (CO<sub>2</sub> ppm) in the atmosphere, which scientists have identified as being one of the leading sources of climate change, against our ocean data.<sup>24</sup>

Second, we should implement a *regional, yet scalable, accounting scheme that ensures fair and equitable trade and sustainable development*.<sup>25</sup> As climate insecurity increases, raising our national accounts will provide us with access to the development of new, resilient technologies that will allow us to remain in our homes and steward our region as we have for generations. How we achieve this is through ecological data governance.

*Data is the boat that the Pacific does not want to miss.*

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23 Holli Riebeck, “The Ocean’s Carbon Balance,” NASA Earth Observatory, 1 July, 2008, <https://earthobservatory.nasa.gov/features/OceanCarbon>.

24 E. J. Dugokencky, B. D. Hall, S. A. Montzka, G. Dutton, J. Mühle, and J. W. Elkins, “Atmospheric Composition [in *State of the Climate in 2017*],” *Bulletin of the American Meteorological Society* 99, no. 8: 46–49.

25 United Nations Statistical Commission, “Overview: Better Data, Better Lives,” <https://unstats.un.org/unsd/statcom/>.



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*“We need to see the whole cost of development, both to the retention of our cultural values, social wellbeing and preservation of the quality of the natural environment, and not only the benefits as they contribute to the GDP. It will require courage and a determination to dare to be different, but we in the Pacific Islands are different. Our unique cultural values, traditions, dependency on the natural environment, and the fragility of the environment make it inevitable that we take a different perspective to the way we value our development. The call for ecological economic accounting is timely and appropriate. It is an idea and call whose time is actually overdue.”*

*Dr. Transform Aqorau*

