

Proceedings of the Inaugural Pacific Academy of Sciences Congress 2026

Harnessing the Knowledge of the Pacific



**International
Science Council**
Regional Focal Point for
Asia and the Pacific



**SASAKAWA
PEACE
FOUNDATION**

Acknowledgements

The Pacific Academy of Sciences undertakes its work with the support of the International Science Council Regional Focal Point for Asia and the Pacific (ISC RFP-AP), which provides both facilitation and funding for the Academy and its inaugural Congress. The Regional Focal Point is funded by the Australian Government Department of Industry, Science and Resources.

The Academy also gratefully acknowledges the support of the Sasakawa Peace Foundation, whose generous funding towards travel and event expenses enabled attendees from across the region to participate. This support helped reduce financial and geographic barriers to attendance and ensure a more inclusive and representative Congress.

The Academy also thanks the following organisations for their generous contributions of goods and services, which helped the Academy deliver a professional event while keeping it accessible to a wide range of participants:

- New Zealand High Commission to Samoa
- Eveni Pacific
- Greenology
- FreightPlus Samoa
- Exert

Finally, the Academy thanks the Organising Committee, the authors and presenters, the keynote speakers and session chairs, and the volunteers and staff who supported the Congress, as well as the host community of Apia, Samoa, for their generous hospitality.

Preface by the Chair & the President

It is with great pleasure that we present these proceedings of the inaugural Pacific Academy of Sciences Congress. This first Congress marks a significant milestone for our Pacific region, bringing together researchers, practitioners, and leaders to lay the foundations for a connected Pacific scientific community to come together and chart a shared course for a prosperous and thriving Pacific.

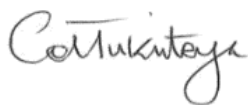
Science academies curate knowledge and scientific evidence, offer scientific advice to governments, inform public policy, and foster international collaboration. The Pacific for too long has been without a national or regional academy. The Pacific Academy of Sciences (Academy) addresses this gap to support national and regional development. The work presented in this volume signals our commitment to sustaining an Academy that is grounded in robust science and traditional knowledge. The contributions in these proceedings draw on climate science, oceans research, indigenous knowledge systems, health and medical research and social science that offer holistic perspectives on the complex challenges converging on our region.

Equally, the Congress and these proceedings highlight the value and importance of connection among Pacific scholars themselves and between our region and the wider world. The establishment of the Pacific Young Academy, and the funding support for emerging researchers from the region demonstrate our intention to nurture the next generation of Pacific scientific thinkers and leaders. Their voices, included in these proceedings, will be crucial in ensuring that Pacific perspectives shape global dialogues and that we continue to “think globally and act locally.”

The messages from our Opening Speaker Opening Address by Hon. Aiono Dr Alec Ekeroma, Minister of Education and Culture, Government of Samoa, our Dinner Speaker, Hon. Kinoka Feo, Minister for Higher Education, Research, Science & Technology, Government of Papua New Guinea, and keynote addresses repeatedly returned to one core idea: that a Pacific Academy of Sciences can and must serve as a trusted, independent and culturally grounded source of knowledge and advice for our region.

These proceedings chart the contours of a distinctly Pacific scientific agenda that is interdisciplinary, grounded in traditional knowledge, committed to capacity building and oriented toward the long-term sustainability of our islands, oceans and cultures. We trust that these proceedings will serve as a valuable resource for researchers, policymakers and communities across the Pacific and beyond, and that they will inspire further dialogue, partnership, and innovation.

On behalf of the Pacific Academy of Sciences, we extend our sincere thanks to all who contributed to this inaugural Congress and to these proceedings: presenters, chairs, panelists, students, community representatives, partners, and supporters.



Professor Sir Collin Tukuitonga
Pacific Academy of Sciences Board Chair



Professor Teatulohi Matainaho
Pacific Academy of Sciences President

Organising Committee & Volunteers

Committee Chair

- Dr Roannie Ng Shiu, Pacific Academy of Sciences

Selection Committee & Reviewers

- Prof Patila Amosa, National University of Samoa
- Prof Ioana Chan Mow, National University of Samoa
- Prof Jemaima Tiatia-Siau, University of Auckland
- Prof Jodie Hunter, Massey University

Local Manager

- Natalie Solomona, Pacific Academy of Sciences

Local Coordinators

- Lisi Maranata Iosefa, Pacific Academy of Sciences
- Filomena Ah Kuoi, University of the South Pacific

Communications

- Lisi-Malia Pereira, University of Auckland
- Wendy Wakwella, International Science Council Regional Focal Point for Asia and the Pacific

IT & Publications Support

- Grace Shaw, University of Auckland
- Sam Pilisi, University of Auckland

Rapporteurs

- Dr Eliorah Malifa, Monash University
- Kaita Sem, The Pacific Community (SPC)
- Measina Meredith, Pacific Academy of Sciences
- Roi Burnett, University of Auckland
- Serafi Tofilau, University of Sydney

MC

- Tapusalaia Terry Toomata, Former Ambassador for Samoa to People's Republic of China

Contents

Acknowledgements	2
Preface by the Chair & the President.....	3
Organising Committee & Volunteers.....	4
Introduction	6
About the Pacific Academy of Sciences.....	6
The Inaugural Pacific Academy of Sciences Congress 2026	6
Congress Outcomes.....	8
Session Summaries.....	11
Capacity Building	13
Opening Remarks	16
Keynote Addresses	20
Dinner Speaker	29
Session plenaries and abstracts	34
Climate Change Session	34
Marine Sciences and Fisheries Session	42
Environmental Sciences Session.....	45
Indigenous Knowledge Session.....	47
Climate Health Session	52
Biomedical Abstracts	54
Biochemistry Session	56
Energy Session	58
Resilience & Governance Session.....	61
Capacity Building Session	63
Information & Communications Technology Session.....	65
Teaching & Education Session.....	66
Ethics & Research Session	68
Appendix 1. Congress Programme.....	69
Appendix 2. Speaker Slides.....	81

Introduction

About the Pacific Academy of Sciences

The Pacific Academy of Sciences (the Academy) is a charitable organisation that is regionally led to provide an independent voice for science in the Pacific region. It is dedicated to:

- Supporting local and regional scientific practice;
- Increasing the visibility and influence of Pacific science and scholarship; and
- Amplifying Pacific Indigenous voices across global stages and spheres of influence.

The Academy serves the community of scholars, scientists, researchers, and academics working in, about, or of the Pacific region. This community engages with a broad range of disciplines including natural sciences, social sciences, applied sciences and technology, humanities and Indigenous knowledge, and all other forms of knowledge including those which are drawn from the cultures of the Pacific. The Academy also serves Pacific communities from the countries and territories of the Pacific region, and beyond.

The Academy was officially launched at the Commonwealth Heads of Government Meeting (CHOGM) in Samoa in 2024 and is registered as a Charitable Trust under the laws of Samoa. It is led by a Board of Trustees and Council with members who include leaders from across the region.

The activities are coordinated by the Academy's Secretariat, based at the National University of Samoa in Apia, Samoa.

The Inaugural Pacific Academy of Sciences Congress 2026

The inaugural Pacific Academy of Sciences Congress was held in Apia from 16 – 18 February 2026 with the theme: *Harnessing the knowledge of the Pacific*. The Congress sought to unite science, technology, humanities and Indigenous wisdom to influence action on issues of critical importance such as climate change, environmental sustainability and resource management, marine resource sustainability, biomedicine and health, genomics and molecular biology, renewable energy, information systems and technology and the preservation of Indigenous knowledge systems, culture and language. Leading researchers, policymakers, and innovators from across the Pacific and beyond were brought together at the Congress to discuss critical scientific challenges and opportunities for sustainable development in our region.

The key objectives of the Congress were to discuss:

1. Critical scientific challenges and opportunities for sustainable development in our region
2. Opportunities for cross-disciplinary opportunities including Indigenous knowledge, natural and social sciences, applied science and technology, and the humanities
3. How to support and advance science capacity and capability to build a Pacific science cohort to contribute to Pacific knowledge, education and research



Figure 1: Pacific Academy of Sciences Founding & Newly Inducted Fellows



Figure 2: Pacific Academy of Sciences Congress 2026 Attendees

Congress Outcomes

The congress met its core objective of harnessing the knowledge of the Pacific by bringing a diverse range of experts and early career researchers from the region, and those based overseas engaged in Pacific research with Pacific communities to critically discuss the scientific challenges and opportunities for sustainable development in the Pacific region. The breadth of disciplines enabled robust cross-disciplinary discussions on approaches and solutions to dealing with the complex challenges facing the Pacific region.

The second objective to support and advance science capacity and capability by building a Pacific science cohort to contribute to Pacific knowledge, education and research was also met. Supporting postgraduate Pacific students and early career researchers was a key feature of the Congress.

The specific outcomes for the two core objectives are listed below.

1. Harnessing the knowledge of the Pacific

Embedded within all the sessions was the key message that indigenous and traditional knowledge and Pacific epistemologies are not peripheral to science but central to building just and sustainable futures for Pacific communities in the region and beyond. Highlights from the Congress are presented below thematically.

Healthy islands, oceans and economies

- The oceans and marine systems, including mangroves and river systems, are at the heart of both ecological resilience and cultural identities. Protecting and safeguarding oceans and marine systems are a priority requiring global cooperation
- The ongoing impacts of climate change are affecting river systems and oceans through coral bleaching, ocean acidification and extended marine heatwaves. These have subsequent impacts on the Pacific blue economy particularly on tuna stocks which many Pacific countries rely on for income and protein
- Food security in the Pacific requires resilient environments, genetic diversity of food crops and early investment to ensure new crops are climate resilient rather than climate sensitive
- The inclusion of local communities and Indigenous knowledge is essential for climate mitigation and adaption activities. In addition, consideration needs to be given to gender roles and responsibilities, young people, and people with disabilities to ensure everyone in the community benefits from climate responses.

Healthy people

- Non-communicable diseases remain a persistent health challenge in the Pacific with climate change exacerbating health inequities in the Pacific. Addressing current high prevalence rates through multisectoral action and adequate resourcing is essential to ensuring healthy people, families and communities in the future
- Current research has demonstrated the potential for precision medicine and genomics to strengthen Pacific peoples immune system responses to pathogens and improve pharmacological treatments to disease. Most genomic research to date has excluded Pacific peoples despite growing burden of disease
- Protecting and scaling traditional knowledge in medicinal and therapeutic products has wide ranging benefits for sustainable development and health outcomes. Ensuring that medicinal traditional knowledge is protected for the benefit of Pacific communities rather than for-profit gain by well-resourced overseas institutions is an ongoing concern for the region.

Opportunities for Renewable Energy, ICT and technology opportunities

- Energy securitisation is an important goal for the Pacific region with the energy sector in the Pacific demonstrating its vulnerability to external global shocks. While Pacific countries are slowly moving toward renewable energy, there is an opportunity to speed up this uptake through community, national and international cooperation
- AI is already shaping our lives in fundamental ways, however, there are many risks that are unknown. Pacific data sovereignty ensures that Pacific communities are able to shape how AI uses Pacific data, rather than simply receive global technological and scientific agendas.

Ethics, teaching and research

- Strengthening Pacific ethics governance is critical so that research and scientific practice ensure the safety and protection of Pacific communities knowledge, information and traditions while also providing findings and/or solutions that benefits Pacific communities
- Research and ethics governance across the Pacific differ widely therefore, a regional or sub-regional solution would help countries and territories with limited capacity to strengthen their research and ethics governance systems
- There is growing potential for AI in teaching and research but it is important to simultaneously protect Indigenous and traditional knowledge, language and cultural knowledge
- Innovative leaders are increasingly integrating traditional knowledge, practices and cultural practices such as wayfinding and navigation into the school curriculum to better engage students in STEM subjects and improve numeracy rates.

2. *Building a Pacific science cohort now for the future*

Induction of new Fellows

- The Academy formally welcomed 13 new Fellows during an induction ceremony as part of the Congress opening
- The new Fellows bolstered the Academy's representation across the Pacific with two new Fellows from the North Pacific – Guam and Hawai'i.

Pacific Young Academy

- The Congress launched the Pacific Young Academy which included an inception meeting to discuss the shape, design and establishing committee to progress the Pacific Young Academy
- The inception meeting led to an early design workshop with 77 early to mid-career researchers who committed to progressing the Pacific Young Academy by firstly renaming the Pacific Young Academy to reflect the career progression and aspirations of the cohort
- During the Congress there is a commitment to work with the Te Apārangi Royal Society of New Zealand to further develop the Pacific Young Academy through partnership with the Pacific and Māori Early Career Forum and the *He Pito Mata: Pacific and Early Career Science Researchers Conference*, in Auckland in 2026.

Postgraduate workshops and masterclasses

- The Masterclasses for postgraduate researchers research were a success. As a result follow up Masterclasses with a hybrid format are planned for 2026 due to postgraduate and early career researcher demand.

Tupaia Research Grants

- The first round of the Tupaia Research Grants were launched specifically for early career Pacific researchers in the region to help kick start the careers of outstanding Pacific early career researchers whose research align with The Academy's priority research areas.
- There are three rounds with up to five grants available that are generously funded by the New Zealand Ministry of Foreign Affairs

Session Summaries

Climate Change

The Climate Change session focussed on the risks in relation to climate change the Pacific faces despite contributing less than 0.03% of global greenhouse gas emissions. Speakers highlighted the importance of Pacific led responses that combine scientific research, Indigenous knowledge, regional cooperation, and diplomacy to address challenges associated with climate change including sea-level rise, extreme weather events, climate (im)mobility, and loss and damage. Key topics covered in the session included food security, adaptation, diplomatic relationships and climate mobility. Together, the speakers emphasised the need for equitable climate finance, community-centred adaptation, and strengthened resilience to support a sustainable Blue Pacific future.

Marine Sciences

Across the session, three key themes emerged. First, community agency is driving innovative and resilient responses to climate challenges, from community-led coral restoration in Papua New Guinea to local stewardship of seagrass ecosystems in Vanuatu. Second, traditional knowledge remains fundamental for safeguarding natural resources and community wellbeing, with one speaker highlighting how Indigenous knowledge systems underpinned understandings of seagrass, its value and role in long-term environmental management. Finally, the session reinforced the important role of women in sustaining community livelihoods. Research from Papua New Guinea showed that women are central to fisheries through harvesting, processing, and marketing, yet their contributions are often under-recognised in decision making. Overall, the presentations demonstrated that community agency, valuing traditional knowledge, and recognising women's leadership are essential for building environmental resilience and supporting sustainable livelihoods across the Pacific.

Environmental Sciences

The environment session highlighted the value of combining traditional knowledge, local leadership, and innovation to address environmental challenges across the Pacific. A key theme was the resilience of Indigenous knowledge and practices, exemplified by Lionel Kakai's discussion of the Lau artificial islands in Solomon Islands, where physics-informed Indigenous engineering has enabled communities to withstand king tides and coastal hazards for centuries, often outperforming modern concrete seawalls. Speakers also emphasised the need for locally informed solutions, with research on Papua New Guinea's river systems demonstrating that more work is needed to understand tropical island ecologies and that conservation strategies are most effective when co-designed with local communities. Another important insight was that traditional ecological knowledge is not uniform within communities; rather, it is socially distributed, with men and women holding distinct knowledge shaped by their roles and interactions with natural resources. Looking ahead, the session explored opportunities to combine traditional practices with emerging technologies, including the potential application of AI and autonomous shipping technologies to improve environmental sustainability and resource management across the Blue Pacific. Together, the presentations reinforced that effective environmental stewardship requires both respect for Indigenous knowledge systems and openness to new approaches and technologies.

Indigenous Knowledge

The Indigenous knowledge session highlighted the importance of recognising Indigenous and Western knowledge systems as complementary rather than competing ways of understanding the world. Speakers emphasised that Indigenous knowledge is not static or confined to the past; it is a living, relational, and dynamic practice that continues to evolve and adapt alongside changing social and environmental conditions. A second key theme was the value of creating stronger connections between Indigenous knowledge holders, scientists, and policymakers. Presentations demonstrated how community-led conservation, biocultural approaches, and collaborative research can produce more effective and culturally grounded solutions to environmental challenges. Finally, the session underscored the urgent need to safeguard Indigenous knowledge from extraction, misrepresentation, and loss. Concerns were raised about the lack of regional mechanisms to protect Indigenous intellectual property, as well as emerging risks posed by technologies such as AI, which can reinforce existing knowledge hierarchies and overlook Pacific epistemologies. Together, the talks reinforced that protecting and empowering Indigenous Knowledge systems is essential for shaping sustainable and equitable futures across the Pacific.

Climate Health

The climate health session highlighted how climate change is escalating pre-existing health challenges across the Pacific, and globally. Speakers discussed how rising temperatures, droughts, flooding, sea-level rise, and environmental degradation are affecting food and water security, increasing disease risks, and placing growing pressure on communities and health systems. A recurring theme was the importance of robust, locally relevant data to better understand these impacts and develop effective climate-health responses. Presentations also examined the links between environmental change and chronic conditions and non-communicable diseases, including the contribution of salinisation to kidney disease, while highlighting how climate-related disruptions affect systems of care for older people and vulnerable populations. The session concluded with a focus on youth mental health, exploring how sleep and circadian rhythms may offer new pathways for understanding and improving wellbeing. Together, the talks demonstrated that climate resilience in the Pacific requires a holistic approach that connects environmental change with physical health, mental health, social systems and community care.

Biomedical Sciences

The biomedical session highlighted both the significant health inequities facing Pacific peoples and the opportunities for Pacific-led research to improve health outcomes. Speakers showcased emerging advances in cardiovascular health, immunogenetics, genomics, maternal health, and vaccine safety, emphasising the importance of generating data that reflects Pacific populations rather than relying on findings from other groups. Several presentations demonstrated how Pacific peoples have unique genetic profiles that can influence disease risk, immune responses, and treatment effectiveness, creating opportunities for precision medicine and more targeted healthcare. At the same time, speakers stressed that biomedical innovation must be accompanied by equitable, accessible health systems and strong community partnerships. Across the session, speakers emphasised that improving health outcomes for Pacific peoples requires investment in Pacific research capacity, sustained community engagement, and evidence-based approaches that are grounded in Pacific realities and priorities.

Biochemistry

The biochemistry session highlighted how scientific research can support both health outcomes and sustainable livelihoods across the Pacific. A key theme was the value of traditional medicinal knowledge, with research from Samoa demonstrating the biological activity of antimicrobial and anti-inflammatory compounds found in traditional plant medicines, while also exploring opportunities for income generation, crop diversification, and economic resilience through medicinal plant products. Speakers also emphasised the importance of protecting and investigating the Pacific's unique biological resources, which may contain compounds of significant pharmaceutical value. A second major theme was the growing threat of antimicrobial resistance (AMR), with presentations highlighting the substantial health burden AMR poses in the Pacific and the role of genomic surveillance in understanding and responding to emerging resistance. The session also underscored the links between climate change and health, with rising temperatures and extreme weather events identified as factors that may further accelerate the AMR crisis. Together, the talks demonstrated the importance of combining traditional knowledge, scientific innovation, and regional health security efforts to address emerging challenges in the Pacific.

Energy

The energy session highlighted the importance of Pacific-led approaches to energy transitions that place local priorities, cultural values, and community aspirations at the centre of planning and decision-making. Speakers emphasised that while renewable energy is essential for addressing climate change and strengthening energy security, Pacific Island countries must balance transition goals with the need to ensure energy remains accessible and affordable for all communities. Discussions also highlighted the significant challenges facing renewable energy development across the Pacific. Despite aspirational targets, including Papua New Guinea's goal of achieving 100% renewable energy by 2050, progress is constrained by barriers including land tenure complexities, governance and policy gaps, limited financing, and infrastructure constraints. Collectively, the presentations reinforced that achieving a sustainable energy future in the Pacific will require not only technological solutions, but also locally informed planning, strong institutions, and community-centred approaches that reflect Pacific realities.

Resilience & Governance

Across the presentations, sovereignty, security, and the influence of external actors emerged as central concerns for the Pacific region. Research from Guam highlighted the territory's role as a testing ground for emerging US military technologies, reflecting broader geopolitical tensions and their implications for local communities. Comparisons between the Arctic and Pacific demonstrated how energy systems function as both critical infrastructure and strategic assets, placing these regions at the centre of competing political and economic interests. In Cook Islands, research examined how tourism development has shaped land tenure and influenced the experiences of landholders in Rarotonga, raising important questions about governance and local control over resources. Meanwhile, research from Papua New Guinea highlighted the potential of scientific innovation and diplomacy to strengthen national autonomy and resilience. Together, the papers demonstrate how Pacific communities navigate the intersection of local interests, external influences, and long-term sustainability.

Capacity Building

The capacity-building session focused on strengthening Pacific research systems, institutions, and knowledge sovereignty. A key theme was the need to build and sustain Pacific research

capacity, with speakers highlighting the region's levels of national investment in research and development and the importance of establishing stronger research, development, and innovation systems that reflect Pacific priorities. Regional collaboration also emerged as a major focus, with initiatives such as PIURN demonstrating how partnerships between Pacific universities can support research training, student development, and knowledge generation across the region. Presentations further emphasised the importance of decolonising research and cultural heritage practices by centring Indigenous perspectives and ensuring communities have greater ownership of their knowledge and histories. Looking to the future, speakers explored the opportunities and challenges presented by AI for Pacific health, emphasising that it must be culturally safe, locally relevant, and implemented in ways that uphold Pacific data and knowledge sovereignty. Together, the session highlighted that building Pacific capacity is not only about skills and infrastructure, but also about empowering Pacific peoples to lead research, innovation, and knowledge creation on their own terms.

Information & Communications Technology

The ICT session explored how Pacific peoples can shape digital futures that are grounded in local values, knowledge systems, and priorities. A key theme was the importance of Indigenous theorising, with speakers challenging the assumption that Western theories are universally applicable and advocating for frameworks that better reflect Pacific worldviews, relationships, and lived realities. Data sovereignty also featured strongly, with discussions emphasising that Pacific communities must have greater control over how their data, knowledge, and cultural assets are collected, used, and protected, particularly as AI technologies become more widespread. Presentations further highlighted the need to strengthen cybersecurity through approaches informed by concepts such as kaitiakitanga, wantok, and talanoa, moving beyond imported models towards solutions that are culturally relevant and community-centred. Finally, speakers stressed that the meaningful adoption of digital technologies is essential for inclusive and resilient development, ensuring that digital transformation delivers tangible benefits for Pacific communities while reducing inequities and enhancing opportunity.

Teaching & Education

The teaching and education session focused on creating more inclusive and effective learning environments by centring Pacific knowledge, experiences, and student wellbeing. A key theme was the importance of culturally relevant teaching, with speakers demonstrating how mathematical concepts can be taught through Pacific practices and everyday experiences, helping students see themselves reflected in what they are learning. This leads to STEM subjects being more meaningful and accessible. Presentations also highlighted the critical role of quality learning resources, including textbooks, teacher materials, and digital tools, in supporting student achievement and engagement. Finally, the session explored alternative approaches to assessment, with competency-based assessment presented as a way to improve equity, reduce anxiety, and support student success, particularly during the transition to higher education. Together, the talks emphasised that education is most effective when it is culturally grounded, well-resourced, and designed to support diverse learners.

Ethics & Research

The research and ethics session emphasised the need for Pacific-led research governance that protects communities, knowledge, and data from extractive practices. Speakers highlighted the absence of robust ethics frameworks in many Pacific Island countries, creating risks around data ownership, intellectual property, and the use of research findings without adequate

community benefit or oversight. A strong theme throughout the session was the importance of re-centring Pacific knowledge systems and methodologies, particularly Samoan approaches such as talanoa and village governance structures, which prioritise relationships, respect, reciprocity, and community accountability. Presentations also challenged conventional research processes that impose unrealistic timelines and limit meaningful engagement, arguing instead for approaches that allow sufficient time to build trust and co-create knowledge with communities. Together, the talks reinforced that ethical research in the Pacific must move beyond consultation towards genuine partnership, data sovereignty, and community ownership of research outcomes.

Opening Remarks



Reverend Dr Latu Latai,
Excellencies, distinguished guests, ladies and gentlemen,
Talofa lava, malo le soifua, ma le lagi e mama.
Warm Pacific greetings to you all.

It is my great pleasure to welcome you to this historic occasion — the very first Congress of the Pacific Academy of Sciences. It is an honour to mark this milestone here on Samoan soil. I am indeed privileged to be addressing — and standing among — fellow academics, scientists, and researchers.

I share long-standing ties with many in this community. I was in the same class as Lohi Matainaho (now Prof at the Pacific Adventist University) at the University of Papua New Guinea Medical School in the late 1970s. For nearly 30 years, I had the honour of working closely with Dr Teuila Percival (now Assoc Prof and Dame Teuila) shaping community health in Auckland, and with Dr Collin Tukuitonga (now Sir Prof Collin) at the University of Auckland, advancing Pacific health and research.

While my esteemed colleagues have remained steadfast on the academic path, I must confess that my own journey took a different turn. In 2023, I stepped into health administration, and last year I ventured further — some might say I crossed over to the “dark side” — entering national politics.

Yet, I stand before you today reassured that the values of inquiry, evidence, and service that define academia remain my compass in public life. So perhaps I have not strayed too far after all — only taken a different pathway to serve.

I convey the sincere apologies of the Hon. Prime Minister, who was called away to attend to an urgent national matter. He has asked me to extend his warm greetings and best wishes for a successful Congress.

I wish to acknowledge and thank the International Science Council's Regional Focal Point for Asia and the Pacific; the Government of Australia; the Sasakawa Peace Foundation; the Australian Academy of Sciences; and the Royal Society of New Zealand. Fa'afetai tele lava for walking side by side with Pacific researchers since the Academy's inception. Today marks a significant milestone in our collective journey.

As Pacific neighbours, o tatou o le aiga o le Moana Tele, we must seize every opportunity to celebrate our shared strengths and achievements. Today is one of those moments. Our Blue Pacific family has much to be proud of.

Having previously worked closely with Prof Sir Collin Tukuitonga and Prof Sir Peter Gluckman, it gives me great pride to witness the establishment of the Pacific Academy of Sciences at our own National University of Samoa. I was the VC of the National University of Samoa from 2020 to 2023 when this was first mooted.

I am deeply passionate about elevating Pacific voices in science. I believe that regional challenges require regional solutions. Research and innovation hold the key to unlocking our potential — from exploring the skies above us to deepening our understanding of our oceans and lands. Science and the humanities are lifelines, helping us build resilient societies and improve the quality of life for our people — mo le manuia o tatou tagata.

This vision aligns closely with the Blue Pacific 2050 Strategy, which calls for a resilient, secure, and prosperous Pacific region grounded in our collective stewardship of the ocean and our shared future.

This is especially important as we consider the challenges ahead for our Pacific communities:

- Ensuring access to clean water and usable land — vai mama ma fanua aoga.
- Educating and empowering our next generation through higher education and STEM pathways — a'oa'oga mo fanau mo le lumana'i.
- Protecting our ocean from the impacts of climate change — puipuia le tatou Moana mai suiga o le tau.

These challenges demand creativity, innovation, and collaboration among diverse leaders. E lē mafai e se tasi ona faia na o ia. Science and research are fundamental pillars of this multidisciplinary approach.

For too long, the voices of the Global South — including the Pacific — have been underrepresented on the international stage. Decisions about our region have often been made without us. Research about the Pacific has, at times, excluded our people and our indigenous knowledge.

But that tide is turning. Ua liliu le tai ma le tofa mamao. We now have a clear and unified platform for Pacific scientific voices to be heard globally. The establishment of the International Science Council's Regional Focal Point reflects global recognition of this shift. The Pacific Academy of Sciences stands as a testament to our region's growing scientific capacity and knowledge generation.

Indeed, we have much to contribute — and much to address. Science is not a solitary journey. Deepening and strengthening collaborations with our neighbours will benefit us all. We cannot face collective challenges like climate change alone. Every collaboration and every conversation brings us closer to shared solutions.

This Congress itself is evidence of international collaboration in action — with friends from Australia, Japan, New Zealand, and across the Pacific coming together to support the elevation of our region's scientific capacity. As we celebrate these achievements, we must also consider the future of science in our region.

There is widespread concern about improving numeracy, literacy, and science education to ensure emerging generations have the knowledge they need to become future scientific leaders. As Minister of Education and Culture, I am committed to education reforms that strengthen foundational learning — *faitau, tusitusi, ma le numera* — and expand pathways in science, technology, engineering, and mathematics. Our reforms prioritise:

- Strengthening teacher training and support;
- Expanding early childhood education;
- Improving literacy and numeracy outcomes;
- Creating pathways into STEM and technical education; and
- Our teachers must be empowered and supported to strengthen the teaching of mathematics, science, and English at all levels.

We also face the challenge of brain drain — as many of our brightest young people migrate overseas. We must consider how to retain our talent, and when they do leave, how to keep them connected and engaged with our region. *Ia tumau pea le sootaga ma lo tatou atunuu.* We must nurture new generations of Pacific researchers. This is how we will meaningfully engage with the global scientific community and achieve our shared goals, including those outlined in the Blue Pacific 2050 Strategy. In this regard, I commend the Pacific Academy of Sciences for launching the Young Academy during this Congress — a much-needed regional initiative to mentor and support early- to mid-career Pacific researchers across academia, government, NGOs, communities, and the private sector.

The theme of this Congress, “Harnessing the Knowledge of the Pacific,” resonates deeply. Our region is rich in Indigenous knowledge. Pacific communities place profound cultural and spiritual value on our ocean and land as our shared heritage — *o measina a o tatou tuaa*. Our ancestors cared for these lands and seas for generations, and preserving that knowledge is vital to our societies, livelihoods, and identity.

Western science and indigenous knowledge have not always walked together. But today, the world increasingly recognises that truly sustainable solutions require both — like the two hulls of an *alia*, our double-hulled canoe — each strengthened by the presence of the other. Let this Congress be a platform for weaving indigenous knowledge and scientific inquiry together in culturally respectful ways. *Ia tatou galulue fa'atasi.* Let us strive for an equitable, diverse, and truly representative scientific system that honours all legitimate sources of knowledge — both old and new.

When I look around this room, I see an abundance of powerful Pacific voices. The Fellows of the Pacific Academy of Sciences bring immense talent, inspiration, and *mana*. I extend my warm congratulations to all new Fellows who will be inducted today, including Associate

Professor Dame Teuila Percival and Professor Satupaitea Viali of Samoa. Fa'amālō le tautua. May your contributions continue to uplift our people.

Friends, I speak to you with optimism and hope. E lelei le lumana'i pe a tatou galulue fa'atasi. Our people are a formidable collective of excellence, grounded in culture and community. Our aiga — our family — of scientific minds has the power to make waves not only across the Pacific but throughout the world. Indeed, you already have.

May this Congress mark the beginning of many more gatherings that celebrate Pacific scientific excellence, create pathways for future generations, and elevate Pacific voices on the global stage.

If this is your first visit to Samoa, e matou te fa'afeiloa'i atu ma le alofa. I hope you enjoy our warm hospitality and carry fond memories home with you. We look forward to welcoming you again.

Soifua ma ia manuia.

Keynote Addresses

The slide features a background image of a colorful, abstract pattern resembling coral or a microscopic view. A dark blue rectangular box is centered on the slide, containing white text. To the right of the text is a portrait of Dr. Saia Ma'u Piukala, a man in a grey suit and blue tie, standing in front of a United Nations flag. At the bottom of the slide, there is a dark blue bar with white text and a logo.

**Keynote- Regional Director,
World Health Organization Western
Pacific Region**
Dr Saia Ma'u Piukala

PACIFIC ACADEMY OF SCIENCES 2026 CONGRESS

 Pacific Academy of Sciences

Honourable Ministers,
Distinguished representatives from Member States and partner agencies,
Esteemed colleagues from the International Science Council, the Australian Academy of Science, the Royal Society of New Zealand, the Sasakawa Peace Foundation and the Pacific Academy of Sciences,
Friends and family of the Pacific,
Ladies and gentlemen

Talofa lava and warm Pacific greetings to you all. It is a true honour to stand before you here in Apia for this historic, inaugural Congress of the Pacific Academy of Sciences. This year's theme - "Harnessing the Knowledge of the Pacific" - speaks directly to our shared purpose.

It reminds us that the strength of our Region- lies not only in scientific excellence, but in the deep knowledge systems, cultural wisdom and lived experience that have guided Pacific peoples across oceans and generations.

And this Congress comes at a moment that truly matters - a moment calling us to lead together for the health and wellbeing of our beautiful Pacific Region.

Just months ago in Fiji, Pacific Health Ministers reflected on 30 years of the Healthy Islands vision - a vision born on Yanuca Island that continues to guide us with clarity and heart.

That dialogue reaffirmed something profound: Healthy Islands is not just a health agenda - it is who we are as Pacific peoples.

It is how we raise our children, care for our environment, uphold dignity across the life course, and honour the ocean that holds our stories, our identities and our future.

From that reflection- emerged Healthy Islands 2050 - a renewed, future-focused direction, centred on climate resilience, people-centred systems, regional solidarity, and deeply Pacific ways of knowing and being.

And this direction, perfectly echoes our shared Western Pacific vision- of Weaving Health for Families, Communities and Societies - a vision co-created with all our Member States.

So today as we gather here in Apia, we take the next step: moving from vision to capability, from aspiration to action.

What we begin today becomes another weave in our collective mat - grounded in Pacific wisdom and strengthened by global science, ethics, trust, and shared responsibility for our Region and our planet.

Science has always been one of humanity's greatest tools-helping us control disease, protect ecosystems, adapt to crises, guide evidence-based decisions and build stronger futures. But across all these achievements, one truth stands out: science is a public good, and its credibility depends on ethical conduct, transparent processes, and community trust.

In the Pacific — where communities are close, where cultural memory is deep, and where research has not always honoured our realities — science must be ethical, equitable and anchored in Pacific experience.

Ethics is not bureaucracy. Ethics is infrastructure.

And sound science depends on sound data — and the people who collect it, analyse it, protect it and use it. Without investment in people and systems, we cannot achieve the SDGs, or evidence-based policy, or resilient national planning.

Today, we face a new frontier: artificial intelligence. Used wisely, AI can connect us to new knowledge, amplify indigenous systems, and unlock pathways we have not yet imagined. But AI will only serve the Pacific if it is people-centred, culturally grounded, and governed in ways that honour Pacific data sovereignty. And we are already seeing the risks — clear reminders of what happens when these principles are ignored. This is why the Pacific Academy of Sciences is so important: it ensures that science, ethics, governance and data integrity move forward together as the foundation of a strong Pacific scientific community.

The challenges before us — pandemics, extreme weather, ocean degradation, food insecurity, noncommunicable diseases — do not respect borders. They demand collaboration across sciences, across sectors, and across generations of indigenous knowledge holders.

The Pacific has always known this truth. The ocean has never divided us — it has connected us, as one Blue Pacific. The challenges we face today are a preview of the world's future. We are at the frontline — for us, the future is now — but that also means we are at the forefront of solutions. We feel the impacts early and intensely, but we also innovate early, adapt early, and lead early. Our lived realities make us not only witnesses to global change, but contributors to global knowledge.

Over the years, I have seen firsthand how the Pacific is stepping confidently into the global spotlight. Whether at major conferences, high level symposia, the World Health Assembly or the UN General Assembly — our voices are no longer at the margins. They are shaping agendas.

For decades, we sounded the alarm on climate change. We were the first to feel it, the first to document it, and the first to raise our voices with urgency. And yes — for many years, those warnings were ignored. But that is no longer the case.

Today, the world looks to the Pacific not just for evidence, but for leadership. Our strength — shaped by resilience, community and respect for nature — is now guiding global action. And climate change is only one example.

Across the Region, we confront dengue outbreaks, growing NCDs, anti-vaccine sentiment, and the resurgence of HIV. In each challenge, our compass remains the same: science, solidarity, and service.

We know that the health of one Pacific country is inseparable from the health of all. What touches one community, inevitably touches us all. That is the Pacific way — and it is this spirit of shared responsibility that guides us forward.

Here, through the Pacific Academy of Sciences, health science, environmental science, social science, humanities and Indigenous knowledge come together in integrity and partnership. Together, we show the world that the Pacific is not just receiving knowledge — we are generating it, leading it, shaping it. In an era of rapid change, scientific progress in our Region must be Pacific-led, Pacific-owned and Pacific-shaped.

Healthy Islands 2050 calls for knowledge creation rooted in who we are — where indigenous wisdom strengthens scientific inquiry, and research answers Pacific priorities. This is true leadership: Pacific researchers asking the right questions and contributing confidently to global science.

But leadership requires investment — in researchers, ethics committees, data stewards, and early-career scientists across our islands. It also requires strong, trusted data systems to ensure countries can design solutions that reflect their realities and aspirations.

I call upon the Pacific Academy of Sciences to use its power to convene, guide, and amplify this agenda- building networks, strengthening capacity, integrating Indigenous knowledge, and ensuring Pacific science not only participates in global progress— but shapes it.

Through all of this, WHO stands firmly with you. Science is at the heart of our mandate — and our credibility rests on evidence gathered through global and regional partnerships.

Here in the Pacific, WHO remains committed to supporting governments, institutions and communities — strengthening ethics, data systems and evidence-driven policy aligned with Pacific priorities.

Friends and colleagues, the work we do at WHO — and the work you lead at the Pacific Academy of Sciences — has never been more vital. At a time when science and medicine are being challenged, our commitment to evidence and to the people we serve matters more than ever.

We are navigating a moment when the broader ecosystem of sustainable development is under strain and multilateralism — something our Region depends on — is increasingly fragile. This is why partnerships like ours are essential.

Together, we protect the hard-won gains of science and public health.

Together, we ensure that progress is not lost, reversed or dismantled. And together, we remind the world that collaboration — not division — is the path to a healthy and resilient Pacific.

This Congress is more than a meeting — it is a milestone.

It brings together scholars, leaders, communities and partners united by a shared purpose: to advance trusted, actionable, Pacific-grounded knowledge.

May this Congress strengthen the partnerships we already cherish — and spark new ones that carry our Region forward.

May it open fresh pathways that broaden our vision, deepen collaboration and energize our work.

May it renew our confidence in the power and promise of Pacific science, advancing Healthy Islands and Weaving Health for All.

And may this Congress become a true Pacific hub — a place where we think globally, act locally and lead boldly, as only the Pacific can.

Let me close with a Tongan proverb- that captures the essence of our journey — pikipiki hama kae vaevae manava — binding our canoes together and sharing one breath as we move forward.

It reminds us that our strength lies in unity, in holding fast to each other, and moving with shared purpose across our Blue Pacific.

As we gather under the theme “Harnessing the Knowledge of the Pacific,” this proverb calls us to weave our wisdom, our science and our lived experience into a shared breath — a collective capability that carries our Region forward.

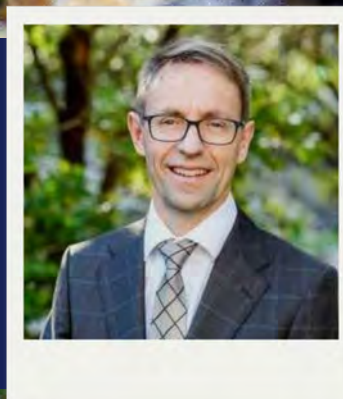
May we continue to bind our vaka, share one breath and paddle forward together — strong, united, and guided by Pacific wisdom — toward the healthy, resilient, and empowered future our Region deserves.

I wish you all a successful Congress.

Fakafeta'i lava. Thank you.

Keynote- Chief Executive, PHF Science, New Zealand

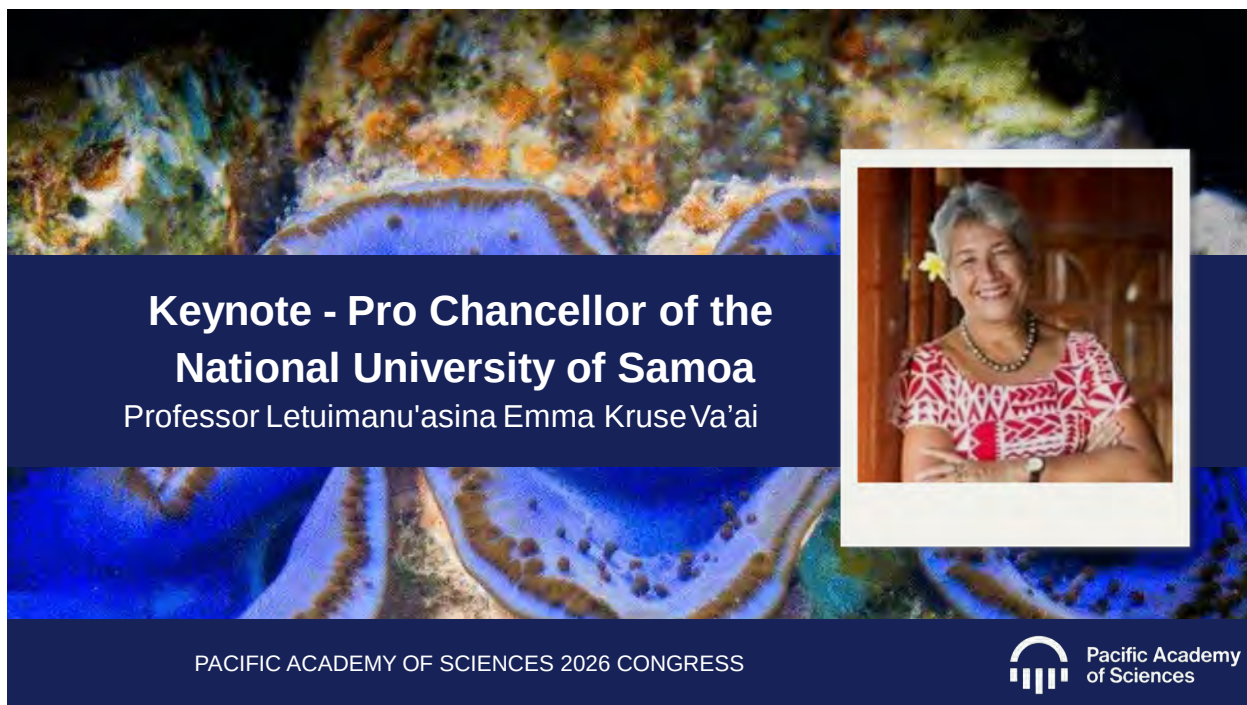
Professor Sir Ashley Bloomfield



PACIFIC ACADEMY OF SCIENCES 2026 CONGRESS



Professor Sir Ashley Bloomfield discussed the importance of trust in science in the current climate. Scientists and experts are the most trusted to lead on the innovation of new technologies. Listening and communication are the most important trust building actions scientists can take, and care should be taken to not only communicate the positives but also the negatives, and there is a need to allow communities to ask questions regarding concerns they may have. Entities including Public Health and Forensics Science (PHF) play a crucial role in this. PHF's purpose is to enhance and protect New Zealand's public health and justice systems to support economic growth and resilience, innovation, improved health and safety and security for people and communities. For over 20 years PHF has been a partner in many Pacific Island development projects, with an approach to work with and for country partners. PHF work at all levels with national, regional, provincial, local/community and institutions with work areas including water and environment, health, forensic science, and support for the Pacific Public Health Surveillance Network. MFAT remains a key partner for PHF's work in the Pacific and PHF continues to blend science and Indigenous knowledge so that it can create new insights, develop trust, and create impact to improve the wellbeing of people, communities and the planet.



**Keynote - Pro Chancellor of the
National University of Samoa**
Professor Letuimanu'asina Emma Kruse Va'ai



PACIFIC ACADEMY OF SCIENCES 2026 CONGRESS



Pacific Academy
of Sciences

O lea ua musa Lesagalala I Foga'a aua ua patilima Fe'epo e pei o le upu I le faiva o 'Aigofie. Ua malama ai nei i Ulugalua ma ua atuvaa si'i so'o fa'amoemoega tataua ina ua 'aina le liulua o le sa o tautai. Ua sina le galu ua silamio Taumeasina i lenei taeao, ua oloto manu o le tuasivi ina ua faaifo le lauamanu i paia ma mamalu o lenei taeao...

Distinguished guests, ladies and gentlemen, good morning to you all. It is my pleasant duty and honour as Pro Chancellor of the National University of Samoa to address you at this inaugural conference of the Pacific Academy of Sciences. A brief translation of our traditional Samoan greeting acknowledges this location or place at Taumeasina where we have gathered in the last 3 days. Creating much happiness and satisfaction in what we have achieved augurs well for the future - for we have cast out our nets and the hull of our shared canoe is filled to capacity. The moon and the sun signifying light and understanding have shone brightly upon the crest of the waves at point break, the birds sing in harmony from sea to mountain top and white terns dive in full circle and hover in acknowledgement of the dawn and setting sun; symbolic of this auspicious occasion. I thank Taia'o Dr Matavai Tautunu – Director of the Centre of Samoan studies for composing these lines for our last day.

It is indeed a significant celebratory milestone for the Pacific Region – with the launch of the Congress in 2024 and now this Symposium attended by and featuring some of the great minds of the Pacific Region. I congratulate Professor Sir Collin Tukuitonga; Li'amaia Dr Roannie Ng Shiu and their team for making this happen. I also want to again congratulate sincerely the new Fellows of the Pacific Academy of Sciences. Malo le saili, malo le galu, malo le tauata'i. You join a highly esteemed group from across the Blue Pacific, and we look forward to your continued work for the development of our islands, our nations and also to contribute the wider global community. Together with others I am in awe of the range and depth your work because as commonly known in the Pacific - we do not go out there to be commonly known for our achievements – it is more common to be meek and mild and keep on carrying on. So, thank you Pacific Academy of Sciences for this wonderful acknowledgement and celebration. So, the last two days have been astounding in terms of knowledge sharing and simply getting to know each



other. It's such a joy to host a convention that is buzzing with energy, innovation, passion et al. Meanwhile alongside I also felt a slight decline in my serotonin levels – melatonin and sunlight were mentioned yesterday -I am trying to sound scientific here, I felt I had imposter syndrome – yes, I was a participant but in fact not a scientist, what had I to offer to this highly esteemed professional gathering. However, inspiration and confidence came with listening to previous speakers whom I acknowledge with gratitude - the many excellent presentations which provided points of reference that confirmed some relevance to what I prepared to present this morning.

Firstly, I would like to talk about the National University of Samoa and why such developments matter to us as a small island developing state and the region. Secondly, I'd like to talk about the conveying of science information and knowledge through children's stories. Perhaps it's not a bad way to finish the conference sit back relax while I read you a story. Thirdly, I'd like to talk about language and science.

NUS is firstly famous for its \$5 tala budget that enabled its establishment through an Act of Parliament in 1984 with 45 students taking a university preparatory year program. One of those founding students is our current Vice Chancellor Professor Tuifuisa'a Patila Amosa amongst several other academic and administrative staff also serving at NUS.

The establishment of NUS was a pivotal act of nation building aimed at developing its human resource through education and training. It provided access to tertiary education for the many students who had potential but could go further with limited scholarships overseas and a host of other barriers outside of national control. Yet in due course with the establishment of the National University: access to quality education and training made them part of a professional and skilled technical workforce for the development of Samoa.

It was also an assertion of sovereignty and identity after 22 years of independence from colonial rule.

Today after 44 years NUS is the main provider for post school education and training and is responsible for most of the Samoan work force qualified at tertiary level. Prior to NUS only a mere fraction of the many students who passed university entry gained scholarships to NZ, Australia and later to USP Fiji as well as University of PNG. The rest of our young people with potential took up local employment or migrated often in search of further education or better employment prospects.

As so having decided to follow 'the road not taken ... it has made all the difference' ... because we would not have been able to develop our youth and workforce and country to such a degree as it stands today and certainly, we would not have had the capability to house the Pacific Academy of Sciences nor host this conference.

As it is for many other small island states, we established our national university to further assert our sovereignty - post independence and address national needs via local provision. The Centre of Samoan Studies is a key institute that serves to preserve and maintain Samoan language and culture.

We share the same challenges with many of our small island nation states, and this is part of the agenda for this conference as we collaborate and seek solutions for our unique social economic and environmental vulnerabilities. However; platitudinous as it may sound, it is important to have courage, to dream and work towards achieving goals and aspirations especially those which bring about a common good.

I now look at my second topic – the conveying of science information through children's stories. I take the example of environmental changes that impact on socially. As mentioned previously human activity is the principal cause of modern-day problems. The inconvenient truths of what we do and what is happening that impact negatively on us especially in the long run. My contribution to science together with others is writing stories so that children in the Pacific can see themselves in their environment in the books that are read in schools, the libraries, homes or sold in bookshops. Conveying knowledge and relevant messages at an early age is critical whether through traditional oral story telling or through reading and writing. Of course, I admit at this stage – there is a side issue of children preferring devices especially the cell phone over books but that is another challenge. The first story I want to show you as part of my work shows human activity for so called development. A little girl who loves playing in the mangroves and dipping her feet into the mangrove mud to form black socks is cognizant of the different attitudes and perceptions regarding the mangroves in her village. Some see it as a dark and gloomy place; some see it as a place to dump rubbish but others such as her grandmother see it as a place of birth and creation -a breeding space for fish and crustaceans of the sea that provide food security for their community. Overseas developers fill in the mangroves and build a hotel in accordance with the national plans for tourism. The fish and other catch for food are lessened for the inhabitants of this village, and the grandmother and little girl go to the market to buy fish which they normally would have procured within their own natural environment. The girl sees a man from the hotel with real socks getting into a car and she remembers her black socks from the swamp or the mangrove. Come to think of it – that is the background story to this Taumeasina hotel. This is part of where I live and grew up in the Vaimauga district where mangroves made up much of the coastal area and now filled as reclaimed land for residential and business purposes.

The next story is about Palolo fishing which was briefly mentioned yesterday with reference to seasonal manifestations of life and circadian rhythms, absence and presence of sun light and seasonal manifestations of birth and death in the natural world. Again, every child in Samoa hears about or experiences the rising of the palolo. And to have stories and pictures that record everyday local events reinforce a sense of belonging and understanding from oral storytelling to formal learning in school. From an early age information and understanding about the local environment and how it is important and respected and why --is conveyed. Some traditional practices have died out over time. The first time I witnessed this was in the village of Vaisala when in the early morning with the moon shining an old man came garlanded in beautiful scented mosooi lei together with a floating contraption also decked with fragrant flowers and held a lantern and container to hold his catch. He began chanting traditional greetings as if the palolo were a special guest as the palolo began to rise from the coral and fill up the water and swirl with the waves. It was a cosmic waltz between sun and moon and ocean within a short space of time just before dawn and then when the sun rose and its rays spilled into the sea – palolo melted into water and disappeared. Such scientific phenomenon is part and parcel of storytelling linked to cultural beliefs, practices and perceptions. Needless to say, the old man had the greatest catch. As to formal children's books in the classroom depicting such an event, it is truly amazing to see children handle and scrutinize the pictures and lastly the text to be read. It is a far cry from having only reading material from western countries featuring English children named Jack and Jill or Janet and John wearing winter clothing and playing in the snow. I am not opposed to children's books from other countries; I think we did benefit in knowing about other societies and cultures through such materials but all along our own stories, environment and images were absent and we needed to make them present. This becomes ever more important as we tackle many of the challenges which are both environmental and social. NUS also did research on trauma and effects of the 2009 tsunami on the children who

had experienced it. The pictures they drew were vivid and telling. The stories they wrote were harrowing and heartbreaking albeit in their children's language – the brief and broken sentences in Samoan captured what we did not see.

And lastly, I want to talk a little bit on language and science and education. There is a great need to update our own native or indigenous language as we grow the English language with the many words that are coined or borrowed outright to represent and articulate the many changes in the modern world. For example, we did not have a Samoan word for internet. Upega tafailagi means a net flung across the sky or the heavens so to speak. It is imperative that we pay attention to strengthen and develop our native languages alongside English. Admittedly we also need to master English if we want to be part of the wider world community. Our publish or perish mantra as academics is more often in an international language and it is more often English. English for many of us in the Pacific is our lingua franca – we all have different languages but with English we can share ideas and information. So as much as we are looking at maths as a problem to be addressed – we also need to establish competencies in English from an early age. Although the language of imperialism and colonialism – it is here to stay, and we use it as a tool to access knowledge and information as well as use it for communication. In a way we have appropriated it for our own purposes, and we do not always conform to strict rules of usage. The context of where we are and who we are speaking and writing to determines how we use English.

Being mindful of context therefore gives flexibility in usage. Science teachers are often heard using both languages to facilitate comprehension but, in another context, where one language is required such as an exam or with another person – language use is arbitrary and adaptable. I leave that with you and encourage Science teachers to not leave language development to language teachers only – the language you speak and use for your field of teaching and learning needs to also be mastered by students as science students and you as the science teacher is the most important facilitator.

Faafetai mo le avanoa – ia manuia le fonotaga Congratulations again to you all for a successful Conference and safe journeys to all who have come from afar.

Soifua.

Dinner Speaker



Reverend Dr. Latu Latai, Honourable Aiono Dr Alec Ekeroma, Samoa's Minister for Education and Culture, Excellencies, distinguished guests, ladies and gentlemen

As the hush in the Robert Louis Stevenson Museum after dinner settles around us like a soft tide, and I feel the weight of a simple truth: academic excellence is not a solitary sprint but a collective voyage—across islands, across disciplines, and across the world's many stories of learning. Tonight in Apia, we are not merely marking an inaugural congress; we are choosing a path forward that honours Pacific wisdom, keeps faith with global standards, and learns from the trajectories of others who have travelled and strived toward excellence.

Excellence, in our Pacific context, is a discipline of honesty. It requires clear questions, robust methods, and open reflection on what works and what does not. It is a discipline practiced in full acknowledgment of our local realities—the reefs and forests that shape our lived environments, the elders who steward ancestral knowledge, and the young researchers who bring new methods and fresh energy to age-old questions. Excellence must be inclusive: it must welcome Pasifika knowledge as a living guiding force, not a relic to be admired from a distance. There is a truth I've heard in many places in our region: we rise together, or we do not rise at all. A Samoan elder's voice travels far when it proclaims, "Together we rise," and in Port Moresby, a nurse-scientist has reminded us only recently that "when we listen first, we learn to act in ways families understand." These voices anchor our sense of purpose as we strive for an academy that serves the needs of people as much as it recognises excellence.

Let me begin with a PNG reflection that hopefully sets out clearly what I am trying to capture. In Milne Bay, in small coastal village, a research team began a pilot to map reef health by weaving traditional reef knowledge with community-led monitoring. Elders pointed to coral gardens known to families for generations, while young scientists learned to read the sea through both Indigenous signs and modern sensors. The outcome was not merely globally recognised

publications (for that is a undoubtedly a mark of excellence for academia) but also a living plan: a local reef management map that guided seasonal fishing rules, protected nurseries for fish, and sustained livelihoods. This exchange—elder wisdom shaping methods, data enriching a voice once spoken only in stories—embodies the heart of our Pacific path to excellence. It is a path that does not choose one form of knowledge production over another—they are not mutually exclusive.

In Port Moresby, health workers and researchers have shown how excellence translates into daily life. A nurse–data specialist collaboration tackled dengue and malaria by listening first, collecting essential information, and sharing findings in language families understand. They transformed a clinic wall into a living dashboard that families could read while waiting for care. The result was more timely responses to outbreaks, smarter resource allocation, and a sense of ownership among communities who know their streets and corners better than any model. This PNG vignette speaks plainly: excellence is not merely an ideal; it is a set of practices that improves health, education, and create opportunity.

In the Highlands of PNG, a school-based collaboration linked traditional planting calendars with simple rainfall data collected by students under a shade tree. The result was resilient crops, new soil-and-water practices, and a curriculum that breathes in both Tok Pisin and local languages. In these everyday classrooms, where a child reads a rainfall chart and hears a grandmother’s story, we glimpse what genuine excellence looks like: relevance, longevity, and place-conscious learning that is important for us to share globally through the best journals in the world. We have a unique story of excellence, and we should not shy away from telling the world about how we are tackling the most intractable problems that we face.

Let us anchor these Pacific stories and their relevance on the global stage where excellence is measured, discussed, and debated in the context of both (our) regional and global challenges. Global benchmarks define a framework: credible, reproducible research; high-quality publishing; transparent methods; rigorous ethics; and governance that can withstand scrutiny. Open science and robust data stewardship—open data, open access, transparent methodologies—must coexist with protections for Indigenous data sovereignty and rightful ownership of knowledge. Equity and inclusion must be explicit: diverse leadership, fair opportunities, and pathways that lift researchers from every island, language, and community. Open science is a principle, not a loophole; it serves people when it respects the knowledge we hold sacred.

In this context, I wish to acknowledge many of you who are leaders and thinkers in your respective fields of expertise in the region and in the world. Your work reinforces our belief that excellence is both locally grounded and globally credible. I offer my congratulations to the newly inducted Fellows of the Academy for your excellence and contribution towards the Pacific and Global knowledge.

As Minister responsible also for Sport, allow me to draw a simple parallel. As PNG prepares to launch the PNG Chiefs into the NRL, we know elite teams succeed only when they meet global benchmarks: disciplined high-performance programs, evidence-based coaching and sports science, transparent selection, anti-doping and integrity standards, video analysis, and relentless review against the best. Talent and passion are essential, but structure, fairness, and data-driven improvement turn promise into sustained performance on the global stage. So it is with our academy: rigorous methods, peer review, research integrity, secure and open data stewardship, international collaboration, and accountable governance are our high-performance system. Fair play in sport is research ethics in science; season fixtures are our research timelines; and fan trust mirrors public trust. If the PNG Chiefs are to be competitive in the NRL,

our scholars, too, must be competitive in the world's knowledge leagues—rooted in Pacific values, meeting global standards, and lifting our people with every win.

As we balance Pacific realities with global expectations, we also pay close attention to the broader lessons of the world. China's recent trajectory offers a consequential illustration. Over the past decade, China pursued a deliberate, large-scale upgrade of its universities and research system. Through sustained investment in faculties, facilities, and graduate pipelines, and through ambitious national programs to elevate flagship universities, China moved decisively toward the highest echelons of global standing. The story is not simply about rankings; it is about a policy architecture that prizes research intensity, talent development, international collaboration, and institutional autonomy—aligned with national development goals. Their experience shows how scale, strategic funding, and a clear aim to be globally competitive can reshape a country's scientific footprint. Yet it also reminds us that rankings alone do not define excellence—especially in a region where knowledge is deeply embedded in land, sea, and community. The Pacific must learn from that scale, but translate it into a Pacific-led, culturally grounded, community-centred path.

So how do we hold global benchmarks true while keeping Pasifika realities front and centre? Let me offer a possible thread for our path forward; one that weaves PNG voices, Pacific wisdom, and the broader global imperative:

First, anchor our excellence in credible, context-aware metrics. We will measure research quality and visibility through high-quality, peer-reviewed outputs, field-normalized indicators across disciplines, and sustained international collaborations. We will track impact not only in publications but in tangible outcomes: policy influence, better services, healthier communities, and the use of research by industry and society at large. We will value knowledge translation—how research informs practice and governance—without reducing it to a single metric. And we will insist on governance that is transparent, accountable, and capable of honest self-correction when data reveals better courses of action. Importantly, each member of the Pacific Academy of Sciences should be expected to pursue and demonstrate internationally credible scholarly excellence. This means a robust publishing record in respected journals, meaningful international collaborations, and demonstrable impact measured in widely recognised ways such as citations and reputable indices. The aim is not vanity metrics; the aim is to ensure our scholars are visible, respected, and able to attract and retain talent, funding, and partnerships that amplify Pacific voices on the world stage.

Second, align policy with long horizons and predictable investment. Global benchmarks require disciplined funding envelopes that support the full trajectory of research and development—from idea to impact. They demand robust talent pipelines: scholarships, joint graduate programs, regional centres of excellence, and mobility that strengthens both home institutions and the broader Pacific network. They require world-class infrastructure—laboratories, data centres, reliable connectivity, and dynamic platforms that allow Pacific researchers to collaborate as if they share a single room. And they require governance with integrity—independent program evaluation, risk management, and transparent decision-making that earns public trust. In parallel, we need to cultivate an environment where researchers who publish in high-impact venues gain equitable recognition and opportunities, and where excellent work is supported across languages and contexts so that Pacific science is both rigorous and accessible.

Third, integrate Pasifika knowledge as a central pillar of excellence. Indigenous knowledge is not a garnish; it is a living current that informs questions, shapes methods, and enriches outcomes. We must co-design research with communities, ensure fair benefit-sharing, and

honour customary protocols and sovereignty over data and knowledge. A PNG elder's tree-governance analogy reminds us that a knowledge system grows strongest when all roots are nurtured. A PNG teacher once observed that when Indigenous approaches are embedded in data collection, numbers gain deeper meaning because they are anchored in people's lived realities. And we must ensure that metrics themselves reflect this truth: that impact includes improvements in community well-being, cultural vitality, language maintenance, and ecological stewardship, as well as traditional academic indicators.

Fourth, the Pacific can and should scale up its own capacities, but we must ensure that growth serves local well-being, protects cultural integrity, and advances equitable development. We can adopt strategic planning, investments in talent development, and a strong emphasis on international collaboration whilst keeping a Pacific-centred agenda—with communities co-creating priority areas, governance that safeguards rights, and open-science practices that respect Indigenous data sovereignty.

The goal is not imitation but intelligent adaptation: learning from large-scale ambition while keeping our own values, ecosystems, and voices at the forefront. And part of that intelligence is ensuring that our members are not only credible in their fields but are trusted global ambassadors for Pacific science—teachers, mentors, and researchers who elevate collaboration, reciprocity, and shared benefit.

Fifth, operationalise a concrete, Pacific-wide path. Let us anchor this inaugural congress as a turning point and establish clear, internationally credible criteria for excellence that reflect Pasifika values. Create an Indigenous Knowledge and Innovation Council within the academy to guide ethical engagement, protect intellectual property, and co-create projects with communities. Launch a Pacific-wide data and research infrastructure that is secure, dynamic, and openly accessible in spirit but governed by sovereignty. Design regional PhD and postdoctoral fellowships focused on applied science for development challenges, co-designed with local communities and ecosystems. Publish an annual Pacific Excellence Report that narrates progress, success, and the hard-won lessons. And craft a communications strategy that is truthful, hopeful, and inclusive—celebrating achievements, acknowledging challenges, and inviting every Pacific Islander to participate in this grand enterprise. And crucially, answer to the world with confidence: our members' global recognition will come from sustained, ethical, high-impact scholarship, and from how well we translate that scholarship into benefits for our people and our oceans.

Finally, a vivid image to carry forward. Picture a vast canoe, carved with ancestral stories, gliding toward a horizon that some may call distant but which we know to be within reach when every oar is pulled in harmony. Each stroke represents a commitment: invest in people, protect the environment, respect Indigenous knowledge, and share benefits with the communities that shoulder the risks of inquiry. As the canoe moves, we hear voices across the Pacific—elders, teachers, students, researchers, farmers—echoing in many tongues: we are not passive observers of global change; we are authors of a Pacific-led future. In PNG, a nurse-turned-researcher speaks of shared inquiry where data and stories travel together; a village elder says, "The mountain teaches us to endure; the sea teaches us to adapt; the science we build must help both." A PNG student adds a practical note: science must belong to us all, built in our homes and in our schools. A grandmother from a coastal PNG village whispers: care for the land, care for the people, so that the next generation can dream with courage.

There will be moments when our resolve is tested—the temptations of expediency, the pressures of timelines and budgets, the friction between global ambition and local realities.

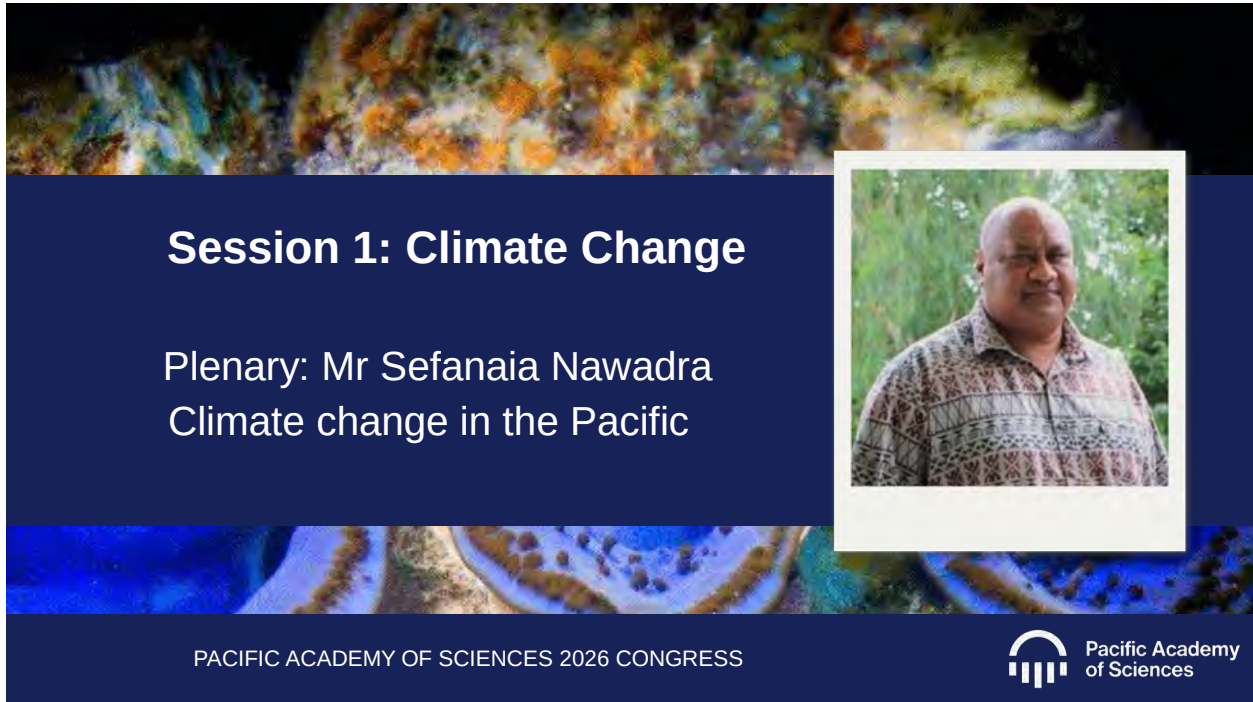
When those moments come, recall the PNG elder who framed governance as stewardship: we do not own the future; we inherit the responsibility to pass it forward. Let that be the safeguard for our institutions: accountability, transparency, and a readiness to pause, reorient, and improve in light of evidence. Let every voice—especially those on the margins—be heard, for they carry the insights that keep our science humane, relevant, and just.

As we close, I offer a PNG-centred thought that ties our regional journey to a global horizon. The sea does not belong to one nation; it belongs to all who navigate it. The Pacific's currents run with the world's currents, and our responsibility is to steer them toward equity and shared benefit. May this congress be a beacon—a lighthouse of credible metrics, transparent governance, and inclusive practice; a demonstration that excellence in science and education is not a spectacle for the few but a lifeline for the many. May the winds be favourable, the tides generous, and the next generation find a world wiser, fairer, and more resilient because of what we begin here in Apia, with Papua New Guinea and the broader Pacific standing together. And as our canoe continues its voyage, may every rower feel the responsibility and the joy of contributing to something larger than ourselves—the enduring promise of a Pacific that leads not by shortcuts, but by steadfast, inclusive, transformative inquiry.

Thank you for the privilege of your attention this evening. May our conversations tonight—and the work that follows—be guided by excellence, enriched by Pasifika wisdom, and conducted in service to our people and our seas.
God bless you all!

Session plenaries and abstracts

Climate Change Session



Session 1: Climate Change

Plenary: Mr Sefanaia Nawadra
Climate change in the Pacific



PACIFIC ACADEMY OF SCIENCES 2026 CONGRESS



Pacific Academy
of Sciences

Bula and warm Pacific greetings from the Secretariat of the Pacific Regional Environment Programme (SPREP)!

I thank the Academy for the opportunity accorded to SPREP to address you and for your focus today on the session topics of Climate Change, Marine, Environment and Indigenous Knowledge all of which are core to the work of SPREP.

SPREP was formed 34 years ago as the Pacific's Regional Intergovernmental Organisation with a mandate around environmental conservation, marine pollution and by extension the ocean and as climate change evolved as an issue it also became core to our mandate.

Today SPREP has 4 core programme areas – biodiversity conservation, climate change, environmental governance and waste and pollution with Ocean as a cross-cutting theme across all programmes. We are Secretariat to the Noumea Convention the Pacific node of the global regional seas network of conventions and we formed and host the Pacific Climate Change Centre. Our Vision is “A resilient Pacific environment, sustaining our livelihoods and natural heritage in harmony with our cultures” bringing in indigenous knowledge, culture and heritage.

Our Pacific Leaders have long recognised climate change as the single greatest existential threat to our existence. SPREP, in collaboration with other organisations of the Pacific, continues to lead in coordinating regional approaches to climate change:

- a) Supporting advocacy and negotiations through its work with Pacific SIDS to amplify Pacific voices within the various multilateral environmental agreements that our region has signed up to,
- b) UNFCCC including leading inclusion in the Paris Agreement a commitment to pursue efforts to limit the global temperature to 1.5 degrees
- c) Technical and Policy advice to countries for national implementation
- d) Projects and national and regional level to address agreed priorities
- e) Convening regional networks to coordinate action – Nature Conservation Roundtable, Cleaner Pacific Roundtable and the Pacific CC Roundtable – the Pacific Ocean Alliance under the Office of the Pacific Oceans Commissioner,

The Pacific's contribution to greenhouse gas emissions is a miniscule 0.03% of the global total but Pacific people and communities have long experienced the impacts of climate change and fully understand the negative effects on their livelihoods in some cases very existence - should the temperature exceed 1.5C. The adverse impacts of climate change currently faced by our Pacific people are many.

Sea Level Rise

Over the last couple of decades, sea level rise has been the main cause of coastal erosion threatening low-lying atolls and coastal communities, infrastructure, homes and culturally significant sites such as cemeteries. This has resulted in some communities in countries like Kiribati and Tuvalu being forced to relocate elsewhere due to loss of arable land and salinization of their groundwater, because of rising sea levels. The first work done in the region to study sea level rise was done by SPREP in collaboration with Flinders University and has since continued in a partnership funded by Australia between its Bureau of Meteorology, SPC and SPREP called COSSPAC.

Extreme Weather Events

In recent years, extreme weather events have occurred within our Pacific region with increased intensity and frequency, such as tropical cyclones and flash floods have caused considerable damage to homes, disrupted food systems and crippled national economies, as our small Pacific islands undergo the lengthy recovery process. It has also affected the mental health of individuals and communities.

Vanuatu suffered major setbacks in March 2023 after being hit by two cyclones in a matter of 3 days – Tropical Cyclones Judy and Kevin which resulted in a total estimated damages and losses of approximately USD 433million. Almost 50% of their GDP.

SPREP last year completed the 8-year VANKIRAP Project – the first full sized GCF Project to be completed in the region building Vanuatu's capacity in climate science including the construction of its first weather radar. SPREP leads the implementation of Weather Ready Pacific, a Pacific-led, Pacific Leader-endorsed initiative that addresses long-standing gaps in national meteorological and early warning systems. Weather Ready Pacific strengthens forecasting capability, early warnings, infrastructure, and human capacity to save lives, protect livelihoods, and support the delivery of Early Warnings for All across the Pacific. Weather Ready Pacific is designed by the Pacific, for the Pacific—ensuring that local knowledge, context, and leadership drive the delivery of weather, climate, water, and ocean services to safeguard lives and livelihoods across the region.

Marine Ecosystem Degradation

Any rise in global temperature is directly proportional to warmer oceans, and this has been confirmed to be the cause of marine ecosystem degradation. Warmer ocean temperatures correlate to coral bleaching, marine heatwaves and ocean acidification, which threaten fisheries and all other ocean-related ecosystems.

For countries like Palau which is a global leader in marine ecotourism with tourism comprising 70% of its GDP, such warm temperatures affecting their ocean biodiversity will lead to devastating results affecting their economy and the livelihoods of their communities, who depend on ocean-related activities for revenue.

There is particular concern on the impact to migratory species such as sharks, turtles, whales and tuna. Pacific tuna fisheries is recognised as the world's only remaining sustainable managed tuna resources due to the management efforts of our countries through the Forum Fisheries Agency and the Parties to the Nauru Agreement. Climate Change induced changes to ocean temperature affect tuna migration patterns meaning we may potentially lose the rewards of our good management. This is the subject of a major GCF regional project led by SPC.

Food and Water Security

The ongoing impacts of climate change will threaten the availability and supply of food and water. Droughts and the increased salinity of water undermine agricultural productivity and accessibility of fresh water. The outer islands of Federated States of Micronesia, Kiribati and Tuvalu are constantly faced with water shortages and are therefore depending on rainwater harvesting systems to meet this basic need. Some countries including Samoa have carried out research on various taro varieties to select what is more climate resilient for farmers, and to ensure a constant supply of this staple food crop.

Changing rainfall patterns have resulted in flash floods, which in some cases have wiped out whole farms with several months' supply of crops, on which communities depend on for sustenance and revenue.

Health

One of the widely known impacts of climate change is related to health in terms of increased water and vector-borne diseases such as malaria and dengue fever. Schools in Samoa closed for 4-5 weeks late 2025 because the rainy season meant an increase in mosquito populations and students congregating in the classrooms acted as the catalyst to spread dengue fever.

SPREP's Pacific Climate Change Centre have a three-year collaboration with the University of Melbourne funded by Australia where we train cohorts of Pacific middle managers to be able to respond to the issue of climate change and health. This partnership has led to a longer 5-year funded project to address climate change in the health sectors of four pilot countries in the Pacific.

Waste and Pollution

Waste and pollution are a major challenge for Pacific states with many islands lacking adequate infrastructure, financial and human resources to manage the issue. The ubiquity of plastic pollution particularly from single-use plastic, plastic products containing toxic chemicals is a human health crisis. Pacific island countries like Samoa are not producers of plastic products and like climate change are the most impacted with its impacts from waste and pollution exacerbated by climate change.

So, what is SPREP doing in the Pacific region to help combat the above-named impacts of climate change?

SPREP works alongside other regional agencies as part of the Pacific architecture in implementing regional frameworks and strategies our Pacific Leaders have endorsed which aims to benefit Pacific people and communities through the efficient deployment of available resources and facilitation of access to climate finance. The most recent of these is the 2050 Strategy for the Blue Pacific Continent which requires all stakeholders, inclusive of donors and partners, to secure the long-term wellbeing, prosperity, and security of the Pacific region and all its traditional custodians. There are 7 thematic areas of the Plan and SPREP leads Climate and Disasters with the SPC and Ocean and Environment with the Office of the Pacific Oceans Commissioner.

Climate Science and Information

Through its convening role under the Pacific Meteorological Council – PMC - SPREP coordinates Pacific priorities and brings together global and regional technical partners to ensure Pacific Members have access to the best available and most relevant climate and meteorological science for decision-making to safeguard Pacific lives and Pacific livelihoods.

SPREP supports and coordinates the delivery of integrated climate science and services through the Pacific Regional Climate Centre, strengthening seasonal forecasting, climate outlooks, and science-to-services applications that respond directly to national and sectoral needs.

SPREP supports Pacific Members in maintaining and enhancing national meteorological observation networks—recognising observations as the foundation for credible climate science, early warning systems, attribution studies, and long-term resilience planning.

Australia and New Zealand fund COSPPac, where SPREP bridges modern climate science with traditional and indigenous knowledge systems, ensuring climate information are culturally grounded, locally relevant, and co-produced with communities to support effective early warnings and actions.

Mitigation

In terms of mitigation interventions to reduce GHG emissions, PSIDS have always demonstrated leadership including through clean energy transitions and carbon-neutrality mechanisms, despite their negligible emissions – as noted before of 0.03%. Most of our Pacific Members have submitted their 3rd National Determined Contribution (NDC 3.0) commitments to the UNFCCC highlighting specific areas where they will achieve GHG reductions and maintain the global temperature below 1.5C.

Renewable Energy Transition

Transition from diesel-based electricity generation to renewable power using locally available natural resources such as solar, wind, hydro and bioenergy. Tuvalu and Vanuatu are targeting 100% renewable power generation by 2030.

Energy Efficiency

Energy Efficiency is the natural progression to lower demand on power generation plants and reduce fossil fuel dependence. Using efficient electrical appliances at home and the office, retrofitting old energy-intensive buildings and transport electrification are all examples of energy efficient activities to lower GHG emissions. Samoa made use of electrical vehicles during the Commonwealth Heads of Government meeting (CHOGM) it hosted in 2024.

Blue Carbon Ecosystems

Most of our Pacific coastal communities depend on the ocean for their sustenance and income, hence the importance of ensuring the marine ecosystems are taken care of. Replanting and rehabilitation of mangroves, seagrasses and coastal wetlands are some of the activities by these communities to protect their coastlines, their livelihoods but also for carbon sequestration.

Electrified Sustainable Transport

Transport is one of the highest emitting sectors in the Pacific. Countries have committed to electric mobility using electric vehicles and/or hybrid vehicles as well as decarbonising maritime transport through using low carbon sea vessels. The Marshall Islands with an EEZ of 2 million square kilometres and a huge fleet of sea vessels, has committed to reducing emissions by 40% below 2010 levels, by the year 2030.

SPREP has also commenced support to Pacific states address difficult waste streams generated from end-of-life e-vehicles and/or hybrid vehicles particularly the li-ion batteries.

Forest and Land Management

Increasing natural carbon sinks via the number of reforestation and conservation programmes has been another mitigation activity PSIDS have committed to. Fiji has committed to planting 30 million trees by the year 2034. Port Moresby in Papua New Guinea has committed to planting one million trees a year to combat climate change and improve air quality in their city.

Adaptation

SPREP has been supporting Pacific Members in the development of their National Adaptation Plans (NAPs) through national adaptation planning process, and updating climate impact, vulnerability and risks assessments.

This important document brings together critical adaptation actions that aim to protect Pacific island populations, infrastructure and lessen the economic costs related to extreme weather events and climate related disasters. These are not only listed but also costed, to ensure it is practical for potential partner assistance to support adaptation efforts. These actions include:

- Climate-Resilient Infrastructure: Elevated housing, flood barriers, and climate-proof roads and ports.
- Community-Based Adaptation: Local early warning systems, disaster preparedness training, and indigenous knowledge integration.

Ecosystem-Based Adaptation (EbA): Protecting coral reefs and mangroves to buffer storms and sustain fisheries.

- Conservation of watershed areas through NbS is fundamental for long term fresh water source and food security.
- Water and Food Security Enhancements: Rainwater harvesting, salt-tolerant crops, and sustainable land-use planning.
- Planned Relocation and Resettlement: Developing relocation frameworks for at-risk communities in atoll nations like Kiribati and Tuvalu.

Further to this, SPREP has been actively supporting Pacific Members to strengthen access to international funds and improving project implementation capacity, in our role as an accredited regional implementing entity for the Adaptation Fund and Green Climate Fund.

Loss and Damage

For more than three decades addressing climate induced loss and damage has remained a key priority for PSIDS. Vanuatu introduced the concept to the UN climate negotiations calling for the creation of an insurance scheme to support countries that are likely to be impacted by rising sea levels.

It has been a long journey for Loss and Damage (L&D) evolving from a concept in 1991, to a series of milestone achievements that include: the establishment of the Warsaw International Mechanism (WIM) at COP19 in 2013; launch of the Santiago Network at COP25 in 2019; and at COP27 in 2022 the establishment of the Loss and Damage Fund.

SPREP is currently implementing two projects to address Loss and Damage including through the UNFCCC process and convening regional and national dialogues. SPREP hosted the first Regional Pacific L&D Dialogue in July 2023 and the Second in August 2025 as well as the first L&D Pacific Youth Dialogue in August 2025, bringing together the region to tackle L&D as a collective front. It also conducted national level L&D dialogues in five Pacific islands with two more due in early 2026.

In-country support provided through two projects:

Loss and Damage Capacity and Capability Project

Funded by New Zealand and focused on the Cook Islands, Federated States of Micronesia, Niue, Solomon Islands, Tonga and Tokelau. Activities include national and state/island level L&D dialogues, development of regional and country level evidence base report, embedded research programme, media training and communications support, country level creation of project concepts for the Fund for Responding to Loss and Damage (FRLD) and country level pilot projects.

Building Our Loss and Damage (BOLD) Response Project

Funded by International Climate Initiative (IKI) The Federal Republic of Germany and focused on Fiji, Marshall Islands, Samoa, Tuvalu and Vanuatu. Activities include scaled down climate data, non-economic loss and damage methodology, development of L&D policy and pilot projects. SPREP also provides ongoing support to PSIDS through the Ad-Hoc Loss and Damage Working Group. This group meets quarterly to ensure PSIDS are informed on L&D progress and to feed the priorities and perspectives of PSIDS to the Pacific representatives on the Boards for the Santiago Network and the FRLD and the Executive Committee for the WIM.

Pacific Climate Change Centre (PCCC)

While you are in Samoa, I would like the opportunity to take you for a tour of the Pacific Climate Change Centre (PCCC), established in 2019 through a partnership between the Governments of Samoa and Japan with SPREP to help the Pacific region in building resilience by leading on:

- Knowledge Brokerage
- Science to Services and Applied Research
- Capacity Building
- Innovation

The PCCC has been active in strengthening regional capacity and driving climate action. The vision of the Centre is to 'catalyse climate action and investment for a resilient Pacific' with a mission to 'be a respected Centre of Excellence through knowledge brokerage, applied research, capacity building, and innovation'.

The PCCC has grown from a single technical cooperation project to multiple partnerships with strong support from Australia, New Zealand, and Japan through JICA, Wellcome Trust, University of Melbourne and other partners, where we at SPREP welcome you to partner with us.

The Centre has grown into a hub for collaboration and partnerships, delivering transformative initiatives across the Pacific. The PCCC mobilised over USD 15 million in climate finance and technical support. These achievements reflect the Centre's shared commitment to building resilience and securing a sustainable future for our Blue Pacific Continent.

As we look ahead, the PCCC's Strategy and Business Plan 2025–2030 sets the way to strengthen service delivery, regional positioning, and financial sustainability. This will ensure the Centre remains a trusted and effective Institution for climate change in the Pacific.

The Pacific Climate Change Research Roadmap 2025 – 2030 endorsed by the 32nd SPREP Meeting in 2025 and its main objectives is to enable multi-disciplinary research to connect communities, identify priority climate change related research needs of the Pacific and resources to better inform the implementation of the roadmap.

The PCCC has supported the collaboration between the Victoria University of Wellington and the National University of Samoa to host four Pacific Ocean Pacific Climate Change Conferences (POPCCC) and we will again be helping the collaboration continue with the Solomon Islands National University (SINU) hosting the 5th Conference this year and the Tonga National University in 2028.

Partnerships

What SPREP continues to demonstrate, whether through Weather Ready Pacific or the Pacific Climate Change Centre, is the work that we do, cannot be done alone. We serve a dynamic region with membership of 21 Pacific island countries and territories and 5 metropolitans. Partnerships are critical and why we work with others, including universities and research institutions across the region, as we value and understand the power and impact of research.

We have MOU with CROP agency peer the University of the South Pacific, as well as the Association of Pacific Rim Universities Flinders University, Griffith University, Melbourne University, Monash University, National University of Samoa, Pasifika Communities University, Solomon Islands National University, University of Auckland, University of Canterbury, University of Newcastle, University of Papua New Guinea and Victoria University of Wellington.

We collaborate in supporting conferences such as the recent Adaptation Futures 2025 with Canterbury University and convene roundtables aligned to our strategic priorities that have multi-stakeholders from across government, civil society, communities, universities and research agencies, the private sector and development partners. These include the Clean Pacific Roundtable, the Pacific Islands Roundtable for Nature Conservation, Pacific Climate Change Roundtable, the Sustainable Development Roundtable and the Partnership Dialogue. These partnerships ensure we at SPREP remain connected to purpose, understand impacts on the ground and through inclusivity enable Pacific solutions that contribute to a resilient Pacific environment sustaining our livelihoods and natural heritage in harmony with our cultures.

Vinaka vaka levu

~~~

Tina Newport, University of Auckland

***Adaptation and climate mobility***

This presentation draws on findings from a Climate (Im)mobility research project, a Pacific-led, MFAT-commissioned study conducted across 17 communities in seven Pacific countries. Grounded in a research approach that is both *of* the region and *for* the region, the project used co-designed, community-centred methodologies that recognised communities as the first beneficiaries of the knowledge generated. Findings show that climate mobility is both an adaptation strategy and a source of loss, with decisions to move, stay, or host shaped by relationships, identity, cultural obligations, and connections to place. Indigenous and local knowledge reveal that losses associated with climate change are multidimensional, negotiated, and often intergenerational, extending beyond material impacts to encompass cultural, social, and spiritual wellbeing. The research highlights the importance of locally led, approaches to Loss and Damage that align with community governance systems, support cultural resilience, and strengthen wellbeing in the face of climate change

George Carter, Australian National University

***Science to advance Pacific Diplomacy and Development***

The paper examines how scientific research supports diplomatic negotiations by informing fair climate finance and development access for Pacific states and SIDS. It highlights the Multidimensional Vulnerability Index as a tool for assessing systemic risks and guiding equitable policies, while noting remaining challenges requiring Pacific Academy of Science engagement for further progress.

## Marine Sciences and Fisheries Session

Ceceilia Louis, University of the South Pacific

### ***Assessing seagrass health and community knowledge in urban and rural Vanuatu***

Seagrass beds are among the most valuable natural marine resources in the Pacific, yet they are among the most threatened coastal ecosystems globally due to human activities and changing climatic conditions. Many coastal and marine protected areas have been established over recent years, yet seagrasses often get overlooked compared to other marine ecosystems like mangroves and coral reefs. This research involves an assessment of seagrass condition, using a range of standard characteristics, within intertidal zones adjacent to Utanlang (rural) and Eratap (urban) villages in Efate Island, Vanuatu (South Pacific).

Mapping of potential pollutant/disturbance point sources, and surveying community knowledge of seagrass beds was undertaken. Based on the data collected (1) seagrass beds in Eratap (urban) were seen to be in better condition than those in Utanlang village (rural); (2) most of the potential pollutant/disturbance sources identified were along creeks and included resort infrastructure; (3) over 70% of rural community respondents valued seagrasses as the main habitat for small fishes and turtles and believed that disturbances such as strong waves, heavy rain and run-off were the key causes of degradation of seagrass beds. The study results on seagrass condition are contrary to the findings of previous studies and the possible reasons for this are discussed. Based on community knowledge, conservation management related-activities are recommended at both local and national level to mitigate disturbances and protect seagrass ecosystems.

Emma Oliver, Papua New Guinea University of Natural Resources and Environment

### ***Community-led coral restoration and climate-resilient gene banking in East New Britain, PNG***

Pacific Island communities depend heavily on coral reef ecosystems for food security, cultural practices, and local economies. Yet, accelerating climate change, coastal development, and destructive fishing practices continue to degrade reef health, threatening both biodiversity and community livelihoods. This paper presents a community-led marine conservation model developed in East New Britain Province, Papua New Guinea, focused on coral restoration, climate-resilient coral gene banking, and youth capacity building.

Drawing from three years of implementation through the ENB Sea Keepers program and partnerships with local organizations, the project combines scientific monitoring with Indigenous knowledge systems to restore coral reefs, assess climate-resilient coral species, and strengthen community stewardship. The initiative has successfully established test coral nurseries, conducted long-term coral health assessments, and integrated environmental education with financial literacy to empower coastal youth and women. Early results demonstrate measurable coral growth, strong community ownership, and increased local understanding of reef ecosystem services.

This paper will share findings on coral growth performance across multiple nursery sites, discuss community engagement strategies that improved local participation, and highlight how Indigenous ecological knowledge influenced site selection and monitoring behaviours. It also



proposes a scalable framework for Pacific communities to establish their own coral gene banks to improve resilience against bleaching events.

By combining scientific practices with traditional leadership structures, this model contributes to long-term marine resource sustainability, enhances local capacity, and provides practical pathways for Pacific communities facing climate-related marine degradation. The findings underline the need for locally driven conservation approaches and offer a replicable method for restoring coral ecosystems across the Pacific region.

Regina Gwaibo, Papua New Guinea University of Natural Resources and Environment

***A Comparative Study of Women's Roles and Contribution to the Fisheries Sector in Papua New Guinea***

Introduction: Women play essential but often undervalued roles across Papua New Guinea's fisheries sector, from small-scale coastal harvesting to processing, marketing, and community management. However, their contributions differ significantly between regions and fisheries types. This study aims to generate evidence to better recognise, support, and empower women in fisheries.

Purpose of the Study: The overall aim of this research is to compare women's roles, participation, and socio-economic contributions across selected fisheries communities in PNG, and to identify factors that enable or limit their involvement.

Research Objectives:

- To document the range of roles women occupy in small-scale, artisanal, and commercial fisheries.
- To assess women's economic and social contributions to household income and community fisheries management.
- To compare regional differences in women's participation and identify cultural, social, and institutional factors influencing their involvement.
- To recommend strategies for strengthening gender-inclusive fisheries development.

Methodology: The study will use a mixed-methods approach, including:

- Field surveys with women involved in fishing, processing, and marketing.
- Key informant interviews with community leaders, fisheries officers, and industry representatives.
- Focus group discussions to explore barriers, opportunities, and community perceptions.
- Comparative analysis of two or more regions (e.g., coastal vs. inland, islands vs. mainland).

Expected Outcomes:

- A clearer understanding of how women contribute to the fisheries value chain in different regions.
- Identification of socio-cultural and economic barriers to women's full participation.
- Evidence-based recommendations for gender-responsive fisheries policies, training, and support programs.

Significance: This study will contribute to improving gender equity in the fisheries sector, supporting national development goals and informing government agencies, NGOs, and community stakeholders working to enhance women's livelihoods and leadership in PNG fisheries.

## Environmental Sciences Session

Sushil Kumar, University of the South Pacific

### ***Environmental sustainability and resource management***

The Pacific Island Countries (PICs), with scattered land areas and vast oceans, are home to communities rich in natural resources, diverse social and vibrant cultures, but are vulnerable to various impacts, including climate change. They heavily depend on fragile ecosystems and finite natural resources for their livelihoods, energy, food security, etc. Extreme natural hazards/disaster events, such as king tides, swells, storm surges, tsunamis, earthquakes, volcanic eruptions, and tropical cyclones, adversely affect coastal regions. To discuss creative, locally driven, and technologically enabled approaches to resource management and environmental sustainability tailored to Pacific realities, this panel will bring together researchers, policymakers, and community leaders. The discussion will be based on several thematic areas, not limited to community and traditional ecological knowledge, climate resilience and adaptation, people-centred development, sustainable resource management, ocean and environment, technology and innovation, digital connectivity, and green energy smart ports, in line with the 2050 Strategy for the Blue Continent and the UN's Sustainable Development Goals.

Dawnie Katovai, Solomon Islands National University

### ***Traditional knowledge for effective forest conservation in Fiji and Solomon Islands***

The Pacific region is home to diverse ecosystems and rich traditional knowledge systems developed by Indigenous peoples and/or local communities (IPLCs) over generations of co-existence. This paper specifically explores the significance of Traditional Ecological Knowledge (TEK) in forest use and resource management within Fiji and the Solomon Islands. This study was conducted across five coastal communities, utilizing the Indigenous concepts of tok-stori and talanoa. The thematic analysis led to five key themes. The findings suggest that subsistence activities were the primary driver of forest interactions. The results also established that the deep, long-lasting relationships that IPLCs have with their forests are strengthened by increased interactions with the forest and reliance on a diverse range of forest resources. Findings also indicate that the type of traditional knowledge participants held about their forest was strongly influenced by the frequency of their direct engagement (whether frequent or occasional) and by gendered roles. Knowledge on traditional trees, defined as trees valued by IPLCs for their utilitarian purpose, varied markedly between men and women. Generally, men identified more traditional trees with fewer specific uses, while women identified fewer traditional trees linked to a wide range of uses. This distinct variation in knowledge strongly reflected their traditional gender roles in the community. Traditional and/or clan leaders were identified as key players within communities, supporting the existence of strong hierarchical governance structures that oversee forest access and resource use. Site-specific threats and solutions were also identified, emphasizing that conservation efforts should integrate TEK to ensure solutions are culturally relevant and scientifically supported.

Lionel Kakai, Solomon Islands National University

***Indigenous knowledge systems in Solomon Islands, focusing on the engineering traditions of the artificial islands***

This poster examines Indigenous knowledge systems in Solomon Islands, focusing on the engineering traditions of the artificial islands in Lau Lagoon, Malaita, and how these practices can be understood and strengthened through the lens of physics in the Pacific. For generations, lagoon communities have applied sophisticated techniques in constructing and maintaining artificial islands using coral boulders, tidal-flow awareness, and close environmental observation. These traditions demonstrate an intuitive understanding of key physical principles, including buoyancy, material density, wave energy dissipation, and structural stability.

With climate change accelerating sea-level rise, coastal erosion, and increasingly unpredictable wave patterns, these artificial islands face growing challenges. The poster proposes a collaborative framework that integrates Indigenous engineering knowledge with modern physics tools such as fluid-dynamics modelling, seabed geophysical assessment, and sustainable materials research. Applying physics to analyse wave–structure interactions and evaluate long-term island stability can support informed, community-driven adaptation strategies.

Echoing discussions from the Physics Summit in Nadi (2025), the poster also highlights the role of physics in enhancing livelihoods through renewable energy solutions, climate-resilient housing, and localized early-warning systems. By placing Pacific Indigenous knowledge at the centre, this work promotes artificial islands as cultural heritage sites and living laboratories for sustainable, physics-informed innovation across Solomon Islands and wider Pacific region.

Utne Enoch, Papua New Guinea University of Natural Resources and Environment

***Evaluating the river continuum concept and in tropical Papua New Guinea Rivers***

This research aims to investigate the conformity of macroinvertebrate communities to the River Continuum Concept (RCC) in two rivers of East New Britain, Papua New Guinea. The study will employ a combination of field sampling and laboratory analysis to assess (1) the diversity of macroinvertebrate communities and (2) their ecological roles longitudinally. By utilizing standardized sampling techniques and statistical analyses, the research will evaluate how macroinvertebrate communities vary longitudinally and whether these patterns align with RCC predictions (Vannote et al., 1980). The significance of this study lies in its potential to enhance our understanding of tropical river ecosystems, inform conservation strategies, amidst challenges of climate change anthropogenic pressures.

## Indigenous Knowledge Session

A banner for Session 4: Indigenous knowledge. The background features a vibrant, abstract image of coral reefs in shades of blue, orange, and green. On the right side, there is a Polaroid-style photo of a woman, Elilala Fihaki, speaking into a microphone. She has a white flower in her hair and is wearing a black jacket over a green top. The text on the banner is white and centered.

**Session 4: Indigenous knowledge**

Plenary & Panel Lead: Elilala Fihaki  
Kollective Konsult Ltd

PACIFIC ACADEMY OF SCIENCES 2026 CONGRESS

 Pacific Academy of Sciences

Fakafetai lasi. Fakatalofa atu kia koutou katoa. Talofa lava. Kia orana. Bula vinaka. Malo e lelei, halo olgetta, kam bane ni mauri, warm Pacific greetings.

First, I acknowledge the land, the ocean, and the people of Samoa. I pay tribute to our ancestors, whose knowledge continues to guide us. Thank you to the Pacific Academy of Sciences for convening this inaugural congress.

My talk today is from lived experience, my journey, moments that shaped my thinking about Indigenous knowledge.

I want to begin with a memory from Tuvalu, my home. On our low-lying islands, the land, the ocean, and the people are inseparable. Knowledge is not written down — it is lived.

We learned by observing, by doing, and by taking responsibility: to our families, to our communities, and to the environment that sustains us.

We knew when the breadfruit would bear. We knew how the tides would shift. We knew which plants healed, which fed, and which protected. We never called this Indigenous knowledge. It was simply how life is organised, sustained, and passed on.

### **Indigenous Knowledge as a Relational System**

What we call Indigenous or Traditional Environmental Knowledge is not a list of facts but a relational system linking people, place, time, and responsibility. Holistic and intergenerational, it is tested and sustained through practice, ritual, story, ceremony, and everyday work. Anthropologists such as Roy Rappaport note that knowledge is stabilized through ritual,



repetition, and social enactment; in the Pacific this appears in planting calendars, fishing methods, food preparation, weaving, and stewardship.

Working across environment, education, climate adaptation, gender and community resilience, the same truth appears: Pacific communities do not merely preserve knowledge; they continually adapt it. Indigenous knowledge is dynamic, responsive to changing seas, shifting climates, and social change.

As Epeli Hau'ofa reminds us, the Pacific is not a scatter of small islands but a sea of relationships: genealogical, ecological, and historical. Knowledge is oceanic: it moves, it connects, it adapts, and it remembers.

### **Tension: Translation, Recognition, and Power**

But in institutional spaces, Indigenous knowledge is often treated as supplementary to Western science—framed as cultural, informal, or anecdotal. It has often required translation into formats that dominant systems recognise as legitimate.

This shaped my own education. When I did my masters almost 20 years ago, Indigenous knowledge was not recognised as a source of knowledge creation. In an early assignment, I highlighted that science is privileged over common sense, tradition, and revelation, and that when other forms of knowing are contradicted by science, science almost always wins. That framing reflected the intellectual environment many of us were trained within.

At the time, my critique was not yet described as Indigenous epistemology. Naturally, I questioned why Pacific societies, were treated as epistemically lacking simply because their knowledge was not produced through formal scientific methods.

I navigate this tension often. Ideally, Pacific knowledge should be recognised on its own terms. But in policy, climate adaptation, and academic spaces, translation is sometimes necessary — not because Indigenous knowledge is lacking, but because institutional systems are limited.

I think here of Futa Helu and the 'Atenisi Institute, where Pacific and Western intellectual traditions stood side by side without hierarchy. 'Atenisi demonstrated that Pacific knowledge can be rigorous and globally comprehensible without surrendering its identity.

### **Honouring the Scholars Who Fought for Epistemic Space**

We are here today because Pacific scholars and knowledge holders pushed back.

Think of Konai Helu Thaman, Unaisi Nabobo-Baba, Frances Koya, David Gegeo, Kabini Saga, Epeli Hau'ofa, Teresia Teaiwa, Teweiariki Tearo — and many others whose work challenged disciplinary norms.

I also acknowledge researchers like Randolph Thaman and William Aalbersberg, whose empirical studies have demonstrated what Pacific communities have always known: that “Indigenous knowledge is rigorous, contextual, and evidence-based”.

The space we occupy today, where Indigenous knowledge is discussed within an Academy of Sciences, exists because of their scholarship, leadership, and refusal to accept epistemic marginalisation. We stand on their shoulders, and with that comes responsibility.

## **PhD: A Forward-Looking Contribution**

My research interest sits within this tension. I am not trying to define or codify Pacific knowledge. Rather I am exploring how we might design frameworks that allow Indigenous knowledge to engage institutions, science, policy, education, without being diminished, extracted, or stripped of relational depth.

In practice, I weave Pacific frameworks into research and action. I use the Kakala model, prioritising the last two phases- *malie* (calm, preparatory) and *mafana* (warming, relational), to design methodologies that value care, consent, and ceremony as much as data. In a study on Civil Society Organisations (CSOs) accessing climate finance, we extended these phases beyond contractual timelines. We spent two years after contract, building relationships, sharing priorities, and establishing trust before the final report was released with actionable recommendations. That relational investment ensured local ownership and practical uptake when funding pathways became available.

As an Academy, you are setting the bar. Engage Indigenous knowledge not as supplementary, but as foundational. That means asking difficult, practical questions:

- Who defines excellence?
- Who decides what counts as evidence?
- How do we design systems that respect knowledge validated through practice, relationship, and responsibility?

Harnessing the knowledge of the Pacific is not extraction for external validation. It is building institutions where Pacific knowledge can lead, innovate, and shape futures, locally and globally. Practical steps include co-designed research agendas, advisory roles for knowledge holders with decision authority, funding models that support long-term intergenerational work, and evaluation criteria that recognise relational evidence.

In closing, I integrate the spirit of Tuvalu into every realm of my professional engagement, development, governance, research, socialising and community work. The future of Pacific science is not defined by a binary choice between Indigenous knowledge and Western science. Rather, it necessitates grounding the work in Pacific epistemologies and establishing the conditions for their self-authorship as equal partners, recalling the *Alia* analogy, in the global knowledge systems.

Reclaiming Indigenous knowledge is not nostalgia but collective self-authorship: the power to define, validate, and evolve knowledge on our own terms. *Fakafetai lasi*. Thank you.

Jeffery Noro, University of Melbourne & Yolarnie Amepou, Piku Biodiversity Network Inc.

***Weaving Worlds: Biocultural knowledge, local contexts, and the future of science in the Pacific***

This panel explores biocultural diversity as a foundational principle for sustainable science in the Pacific—recognising that biological, cultural, and linguistic systems are interdependent and co-evolve within shared social–ecological landscapes. Bringing together Pacific researchers, practitioners, and Indigenous knowledge holders, the discussion highlights how local knowledge systems guide conservation, food and water security, and climate resilience. The panel will demonstrate how merging Indigenous knowledge with modern science can yield more equitable, context-responsive research partnerships. Led by the Melanesia Bio-Cultural Network (MBCN) under the Oceania Institute at the University of Melbourne, the session underscores the critical role of universities and regional networks in strengthening science–policy linkages and supporting Pacific-led innovation for a sustainable future.

The Melanesia Bio-Cultural Network (MBCN) is a regional platform established under the Oceania Institute at the University of Melbourne to strengthen partnerships between universities, Indigenous communities, and policymakers across Melanesia. MBCN connects researchers and practitioners in fields spanning ecology, biotechnology, communication design, and cultural heritage to co-develop locally grounded scientific and community programs. Its mission is to advance biocultural diversity as a core framework for sustainability, drawing on the deep knowledge systems of the Pacific to inform global science-policy dialogues. Through collaborative research, capacity-building, and advocacy, MBCN seeks to empower Pacific communities to shape the future of science in their own terms.

Maulupeivao Betty Ofe-Grant, Auckland University of Technology

***Re-centring the Ocean: Pacific Epistemologies, Indigenous Intelligence, and the Decolonisation of Artificial Intelligence***

Across the Pacific, the ocean connects people, cultures, histories, and knowledge. It is a teacher, an archive, and a pathway through which understanding is carried across generations. Yet, in contemporary Artificial Intelligence (AI), this way of knowing is absent. AI now shapes global research, public decision-making, and dominant definitions of intelligence, but it does so from a narrow epistemic view. This paper examines how Indigenous Pacific epistemologies are excluded from AI systems, why this exclusion constitutes digital epistemic violence, and the implications for Pacific scholars. It also explores how Pacific thought offers ethical and relational alternatives.

Large Language Models (LLMs) are trained primarily on Western, English-speaking, and internet-visible sources. Their "human-like" responses, therefore, reflect Western cognitive patterns. Atari et al. (2023) demonstrate that LLM behaviour aligns closely with WEIRD populations: Western, Educated, Industrialised, Rich, and Democratic (Henrich et al., 2010), which contrasts with Indigenous and non-Western worldviews. Ignoring cross-cultural diversity raises significant ethical concerns, as LLMs reproduce WEIRD-biased behaviours learned from WEIRD-biased training sets. This results in digital epistemic violence, where Western cognition becomes the global standard of "human intelligence" (Naous et al., 2024; Schwobel et al., 2023).

Pacific knowledges are excluded because they do not appear in digitised English datasets. This mirrors the epistemic violence critiqued in Pacific research (Ofe-Grant et al., 2025) where

relational methodologies such as Talanoa (Vaiotei, 2006) and Teu le va (Anae et al., 2009) must be repeatedly justified within Western norms. In AI, however, this erasure occurs before scrutiny even begins: Pacific concepts are filtered out during the data collection. AI then recycles Western data into claims of "universal truth," automating colonial hierarchies at scale and functioning as a "technological coloniser".

The growing use of AI tools in academic peer review further entrenches these hierarchies. Systems built to reward Western ideals of clarity, objectivity, and scientific rigour frequently mark Indigenous storytelling, communal authorship, spiritual framing, and relational analysis as "unclear" or "insufficiently articulated." This reinforces a narrow definition of scholarship and pressures Indigenous writers to conform to AI-recognised forms of English and epistemic style. Over time, AI-assisted reviews risk producing structural patterns of rejection and exclusion of Indigenous scholars from publication and recognition.

To counter this, the paper draws on Pacific epistemologies to propose the metaphorical ocean as an ethical and epistemic guide for reimaging AI.

Re-centring the ocean in AI ethics requires diversifying datasets, cultural representation, and reconsidering what constitutes intelligence and whose knowledge informs technological development. The paper concludes with recommendations for ethical AI practice, including the transparent disclosure of AI use in peer review, cultural competency, protection of Indigenous data sovereignty, and the inclusion of Indigenous community consent in data sets.

## Climate Health Session

Li'amanaia Roannie Ng Shiu, Pacific Academy of Sciences

### ***Climate health equity across the Pacific***

Climate change is a public health issue, with the Pacific region at the forefront of climate health inequities. Pacific communities in all nations are grappling with frequent severe weather events such as flooding, droughts, rising sea levels, and warming sea temperatures, impacting food and water sources and increasing the risk of vector-borne diseases. These climate impacts exacerbate existing development challenges, posing threats to human health and straining local communities and governments' economic, social, health, and security systems. The scarcity of nutritious foods, including protein sources from the sea and fresh produce, is a risk factor for both communicable and noncommunicable diseases (NCDs), which are of particular concern in the Pacific region. The adverse effects of NCDs on Pacific communities have led health authorities in the region to identify a dual crisis stemming from the climate emergency and the NCD epidemic, jeopardising the lives, livelihoods, and wellbeing of the Pacific region. This presentation focuses on key insights and learnings from the 2024 Lancet Countdown Small Island Developing States Report to highlight impacts of heat on health while reflecting the usefulness, application and relevance of global measures in climate change to the Pacific region when developing climate resilient action policies for Pacific communities.

Narelle Warren, Monash University

### ***Chronic illness and environmental change in Pacific Small Island States***

Many health conditions do not resolve neatly. Even if a condition is resolved, wellness—the absence of any malady—is always temporary (Dumit, 2012): new risks, new infections, new degenerations are often overlapping and interacting (Singer et al., 2017). Ageing, long-term illness, disablement, complications and terminal illness can all be framed by the processes and technologies of chronicity. Technologies can prompt transformations: for example, from non-communicable disease to viral infections (e.g. cervical cancer) or from communicable and fatal to chronic (e.g. HIV/AIDS). Of increasing concern is the contribution of environmental change to chronic health states. This paper explores how transitions in understandings and experiences of illness are shaped by complex contexts, with a particular focus on environmental factors, and discusses the implications of this interdisciplinary thinking for Small Island States of the Pacific.

Carlos Chirinos, Monash University

### ***Ecosyndemics, ageing care, and local knowledge in climate-challenged communities***

In this presentation, I offer a preliminary theoretical reflection on how the concept of ecosyndemics—the intertwined effects of health conditions, social vulnerabilities, and ecological disruptions—can inform the study of ageing care in rural contexts affected by climate change. These ideas represent an initial conceptual approach within the CLIMAGECARE project, prior to fieldwork in villages along the Spain–Portugal border. This region faces severe demographic decline, recurrent forest fires, intensifying heatwaves, and rising temperatures, all intersecting with the ageing of local populations. Rather than presenting empirical findings, I critically examine how these dynamics challenge dominant frameworks of care and health, and how they raise pressing questions of social and climate justice. At the centre of this reflection is the role of



older people's situated knowledge—rooted in historical practices of communal care, environmental management, and self-care—which I propose to understand as part of the ecosyndemic process itself: not only as cultural knowledge, but as a dynamic system that interacts with health vulnerabilities and ecological stressors. I argue that these knowledge systems are not only cultural resources but also potential foundations for alternative approaches to care and climate-related responses beyond resilience, a concept I interrogate for its individualistic bias, discursive risks, and political uses. This tentative discussion aims to open a debate on how integrating local knowledge into theoretical frameworks can contribute to more just and community-oriented responses to climate-related health challenges. Are older people's care experiences themselves a form of local knowledge? Can vulnerability be understood as a knowledge system with an active, non-dependent dimension? What role do communal care practices play in shaping local knowledge under climate crisis conditions?

Nicola Ludin, University of Auckland

### ***Circadian rhythm and youth mental health***

Biological rhythms are everywhere, regulating the daily cycles of sleep and activity that are fundamental to mental health. Many young people experience Sleep and Circadian Rhythm Disruption (SCRD), where morning light exposure is crucial to stabilising these rhythms, and stable rhythms in turn improve mental health. Accordingly, our ideas focus on SCRD as a non-stigmatising gateway to treating anxiety and depression. Through this talk, we seek your collaboration in co-design to close knowledge gaps and implement interventions for the long-term flourishing of Pacific young people.

## Biomedical Abstracts

Corina Grey, Ministry of Health, New Zealand

### ***Trends in Cardiovascular Disease***

Cardiovascular disease (CVD) remains the leading cause of adult mortality across the Pacific region, with recent trends showing a growing absolute burden and persistent inequities. A recent analysis of Global Burden of Disease (GBD) Study data showed that, among 31 countries across the Asia Pacific region, the 10 countries with the highest rates of age-standardised CVD mortality and disability-adjusted life years due to CVD were all in the Pacific, including Nauru, Solomon Islands, Marshall Islands, Vanuatu, Federated States of Micronesia, Tuvalu, Fiji, Kiribati, Samoa and Niue. Factors contributing to the increasing burden of CVD include population growth, ageing, and exposure to modifiable risk factors, such as tobacco use, excess body weight, hypertension and diabetes. The GBD analysis also showed an inverse relationship between human resources for health (HRH, which includes a range of health care worker roles) and CVD mortality. Addressing CVD requires a coordinated, equity-focused approach that prioritises prevention, early detection, and community-based care. Investment in workforce development, essential medicines and referral pathways is also critical to improve timely access to treatment, alongside regional collaboration to support data sharing and sustainable service delivery.

Nicola Hawley, Yale School of Public Health

### ***GROW Study: Genetics, gestational diabetes, and health outcomes in American Samoa***

**Background:** Gestational diabetes mellitus (GDM) is linked with adverse health outcomes for both mother and infant and increases the risk of type 2 diabetes mellitus (T2DM) and long-term metabolic dysfunction postpartum. American Samoa experiences among the highest prevalence of GDM globally, with estimates suggesting 26-42% of women develop the condition. To date, no studies have attempted to understand the underlying etiology of GDM in Pacific Islanders or examine population-specific progression from GDM to T2DM. The GROW study will characterize glucose homeostasis, diabetes progression, and the impact of a Pacific-specific variant (rs373863828) in the CREBRF gene, which is known to protect against T2DM, on glucose metabolism during and after pregnancy.

**Methods:** We are establishing a prospective cohort study of 350 pregnant women in American Samoa, enrolled in their first trimester and followed through 18 months postpartum. Participants will be genotyped for CREBRF rs373863828 and undergo frequently sampled oral glucose tolerance test (fs-OGTTs), glycated haemoglobin (HbA1c), and continuous glucose monitoring (CGM) measurements to identify glycaemic patterns across the perinatal period. Participants will complete questionnaires assessing reproductive health history, diet, physical activity, sleep, and psychosocial health. We will examine associations between CREBRF genotype and glucose homeostasis across pregnancy and postpartum and evaluate risk of GDM and subsequent T2DM. We will also explore associations between CREBRF genotype, changes in insulin secretion in pregnancy, and risk of adverse birth outcomes.

**Discussion:** Findings from this study are expected to inform precision medicine approaches to diabetes prevention, refine public health policies and clinical guidelines, and support

community-based interventions aimed at reducing GDM and T2DM among Pacific Islander women and more broadly.

Note: This is a study that is currently enrolling, we will have some preliminary data to present at the meeting, but enrolment will continue through 2027.

Jim Buttery, University of Melbourne

***AI-Powered Vaccine Misinformation Monitoring with WhatsApp Support***

The vaccine infodemic of misinformation in social and electronic media has already caused immense harm in the Pacific, including the 2018 Samoa measles outbreak where a vaccine safety incident was used to amplify misinformation by anti-vaccine groups resulting in loss of life saving measles vaccine coverage. Our AI powered VaxPulse infodemic management tool surveys vaccine misinformation and alerts local authorities to emerging problems. VaxPulse is an additional Whatsapp chat tool supporting local immunisation workers giving them immediate answers to families vaccine safety questions to help support their community vaccine confidence while recording which questions are emerging locally. We will discuss VaxPulse and the proposed pilot studies in Samoa and Fiji.

## Biochemistry Session

Sekotilani Aloï Gray, Women in Business Development Inc

### ***Traditional plants, medicine and economic resilience***

For over thirty years, Women in Business Development Inc. (WIBDI) has worked to empower rural Samoan families to achieve sustainable livelihoods through providing access to knowledge, skills, finance, and markets. Building on this foundation, WIBDI is now applying natural products chemistry as a practical tool for social and economic impact. Through scientific investigation of crops or raw resources grown by its network of rural family farmers, WIBDI is expanding beyond traditional export products such as virgin coconut oil and koko Samoa to unlock value from underutilised plant species, particularly those used in Samoan traditional medicine.

By complementing traditional knowledge with chemical analysis and product development, this work aims to identify bioactive botanical components from Samoan native species, scientifically characterize and support their traditional uses, and translate research outcomes into viable value-added products. This approach not only diversifies income streams for farmers but also creates pathways for validated nature-based products that support health, resilience, and local enterprise development. Through this endeavour, WIBDI also aims to engage and educate the Samoan youth in natural products research, increasing awareness of science-based career pathways beyond conventional options and fostering the next generation of researchers and community-focused scientists.

Sakiusa Baleivanualala, University of Otago / Fiji National University

### ***AMR genomic surveillance in Fiji: lessons for Pacific health security (Sakiusa Baleivanualala, Adriu Sepeti, Swastika Devi, Sajnel Sharma, James Ussher)***

As the hub of the Pacific, Fiji plays a critical role in regional health security and is increasingly recognised as a hotspot of antimicrobial resistance (AMR). This has led to the establishment and operationalisation of a national AMR genomic surveillance system as part of the Te Niwha funded AMR reference laboratory and pathogen genomics capability project.

Using Oxford Nanopore Technology (ONT), the system targets WHO critical priority pathogens, including carbapenem resistant *Acinetobacter baumannii*, *Pseudomonas aeruginosa* and Enterobacterales. Samples from all major public and private hospitals are centralised under standardised protocols, ensuring consistency in processing and comparability of data nationwide. Genomic sequencing is complemented by phenotypic antimicrobial susceptibility testing, including evaluation of novel antimicrobials, creating an integrated platform for outbreak detection, transmission mapping and evidence based public health action.

Lessons learned during implementation are presented here to support other countries in similar contexts to adapt and replicate this model. Key lessons include the value of proactive engagement with external stakeholders, including ministries of health, hospital leadership, international collaborators and regional public health networks, to secure alignment, resources and long-term commitment. Adapting laboratory infrastructure to meet ONT requirements in a small island setting was essential, ensuring reliable environmental controls and power supply. Building capacity through hands on training, ongoing mentorship and involvement of healthcare professionals in interpreting genomic results has fostered strong local ownership. Addressing

logistical barriers from overseas supplier reliance, extended shipping times and customs clearance required forward planning and local stockpiling. Establishing secure data management systems has strengthened trust, reporting efficiency and collaboration. Long term sustainability will depend on stable funding, integration of genomics into routine surveillance and strengthened regional partnerships.

Fiji's model provides a practical and adaptable blueprint for Pacific Island Countries and other resource limited settings facing AMR threats.

# Energy Session

Martin Atkins, University of Waikato

## ***Pacific-led energy modelling: centring local voices and cultural values in transition planning***

Pacific Small Island Developing States (PSIDS) face a unique energy challenge characterised by ambitious climate commitments and high renewable energy targets, yet they remain acutely vulnerable to climate impacts and reliant on costly fuel imports. Despite these realities, few PSIDS have developed robust, costed, and sequenced energy transition plans that can reliably guide their pathways toward sustainable energy futures. In this context, energy systems modelling becomes essential to evaluate the technical and economic feasibility of transition options, clarifying key trade-offs and testing strategies against system constraints such as reliability, resilience, and infrastructure readiness.

However, energy modelling is often perceived as a neutral, purely technocratic exercise. This view overlooks how underlying assumptions about what the model includes and excludes, how futures are projected, and what is treated as feasible, shape scenario construction and narrow the range of “thinkable” futures. Moreover, these technical modelling approaches almost always sideline cultural dimensions, values, relationships to land and resources, and local decision-making norms by treating them as “out of scope” rather than as realities that shape what communities will support, prioritise, and sustain.

This talk reflects on how Indigenous and culturally grounded approaches can sit alongside energy systems modelling to strengthen scenario work. It focuses on making assumptions visible, widening what counts as plausible, and improving how results are interpreted and communicated. It does not claim any single framework is a universal solution. From a PhD supervisor’s perspective, I will share experiences supervising a PhD student researching energy transition options for Samoa using energy systems models, where a fa’afaletui approach has been used as one practical example to support scenario development and to guide interpretation and communication of results.

More broadly, the talk argues that modelling for PSIDS should not be something done to Pacific communities or imported wholesale through external templates. Pacific Island voices and priorities need to shape the questions asked, the scenarios built, and the way results are framed, so modelling supports decisions that communities recognise as legitimate and useful. This is especially important in development settings, where external funding and donor timelines can inadvertently steer both modelling agendas and policy choices. A more locally grounded modelling practice can help ensure energy transitions are Pacific led, rather than primarily driven by outside assumptions or interests. Embedding culturally grounded approaches is not an add on but an essential step for producing scenarios that communities can act on with confidence.



Amit Prakash, University of Fiji

### ***Renewable energy adaptation and challenges for Pacific Islands in achieving SDG 13***

Renewable Energy Adaptation and Potential Challenges for Pacific Island Countries

Sustainable Development Goal (SDG) 13 articulates the gravity of combating climate change and its impact. The goal focuses on building resilience communities, integrating climate actions into policies, improving education and mobilizing funds for climate mitigation and adaptation. The success of achieving the other 16 Sustainable Development Goals is heavily dependent on attaining SDG 13 as climate change interrupts all aspects of development and progress. Pacific Islands countries with its natural landscapes of islands that are dispersed are more vulnerable to climate change. While the Pacific is battling climate mitigation with the rest of the world simultaneously efforts are for climate adaption. There are a lot of potential to replace traditional non-renewable electricity generation with renewable energy. This study focuses on exploring the adoption of renewable energy practices in selected Pacific Island countries. Furthermore, the average end-user tariff will be assessed with the aim of establishing a possible causation between the renewable energy generation and average end-user tariff for selected Pacific countries. Pacific Stats data set will be utilized. In addition, to strengthen the progress of renewable energy projects, the availability of funds to combat climate change will be explored. Contributions of regional organizations (such as SPREP) towards climate related projects will be visited. The findings will contribute to the existing assessment of renewable energy projects. Moreover, Pacific Island Country specific examples of renewable projects will be explored. More importantly, this study will guide policy makers in Pacific to gauge the progress in achieving SDG 13.

Francis Sakato, Independent Consumer and Competition Commission

### ***Advancing renewable energy for sustainable growth and energy security in Papua New Guinea***

Renewable energies such as solar PV, wind power, hydro power and geothermal have the potential to enhance energy security, mitigate climate change, generate income, create employment and generate foreign exchange savings (Papua New Guinea Department of Petroleum and Energy, 2017). The Papua New Guinea National Energy Policy (PNGNEP) recognizes that provision of reliable, affordable and accessible energy contributes to economic and social development for the country. Renewable energies offer a broad range of ecologically and economically sustainable ways of power generation, while at the same time reducing greenhouse gas (GHG) emissions.

Renewable energy technologies for large-scale electricity generation have made significant progress in recent years. Some renewable energy technologies have become cost-competitive with conventional energy generation, such as hydropower and biomass, as well as wind and geothermal power on favourable sites. If recent cost reductions continue, this will soon include some applications of solar energy technologies. In many cases, however, supporting policies are still the main driver of deployment.

Renewable energy deployment requires an enabling environment to provide conditions that are conducive to the required investments. In Papua New Guinea, there is need for a dedicated policy framework that guide and support development and deployment of renewable energy. The Government through the National Energy Authority can help shape the enabling environment by supporting adoption of policy and regulatory frameworks, removing administrative barriers to renewable energy investments and use, and raising the attractiveness

of such investments. Promotion of supporting policies on renewables can help achieve better outcomes including improving technology cost-competitiveness; creating jobs; promoting a sustainable level of domestic production and increasing market share; and moving towards a more sustainable, clean and secure energy system.

## Resilience & Governance Session

Kenneth Kuper, University of Guam

### ***Guam: Military Testbed and Microcosm of US-China Tensions***

This article argues that Guam serves as a critical testing ground for emerging US military technologies and strategic doctrines, with particular attention to the Enhanced Integrated Air and Missile Defence System (EIAMDS). By examining recent missile defence tests and ongoing military projects, I highlight how Guam's strategic significance, colonial status, and geographic isolation can exacerbate the island's vulnerability rather than ensuring its security. Ultimately, I argue that Guam emerges not merely as an isolated military testbed but as a microcosm reflecting broader geopolitical tensions, offering crucial insights into the future trajectory of US-China competition and global security dynamics.

Sieni Tiraa Te Puna Vai Marama Cook Islands Centre for Research

### ***Land tenure and tourism: Evolving relationships in Rarotonga, Cook Islands***

Me kare e enua, kare o te tangata turanga vaevae  
Without land, people have no foundation

From land springs life but also marks the end of life as loved ones are buried on the same land as their homes in the Cook Islands. Thus, land represents the full circle of life and is proclaimed by some Cook Islands elders as being one in the same. Despite the deep connection between people and place, the structural external forces have inevitably changed the rights to and use of land. Some may argue that the values that underpin land have changed as a result of the evolving customary systems. The concept of land tenure is often described as complex due to its intangible nature and the entanglement between customary and statutory law systems (Antonio & Griffith-Charles, 2019).

The Cook Islands like many islands in the Pacific was traditionally organised on the basis of different social levels (Atanraoi & Crocombe, 1995; Commonwealth of Australia, 2008; Crocombe, 1964). Before European contact, the principles of customary land tenure involved power dynamics and was based on historical and cultural settings that worked for its time. However, the power dynamics of the former time were not all harmonious with oral histories revealing many chiefs having reigned with violent force (Crocombe, 1964). Back then the paramount chiefs and their sub-chiefs held the Mana (power) with communal existence being central to the livelihoods and survival of people (Crocombe, 1964; Crocombe & Holmes, 2014). To this day, there are undercurrents of this traditional system through customary approaches that have shaped land outcomes.

However, the missionary era and then the colonial period that followed led to a major shift in power dynamics, establishing dominant hierarchies and foreign systems of governance that significantly altered and transformed traditional power structures (Crocombe et al, 2008). This period was strong and shaped power relationships that continue to influence contemporary land tenure issues in the Cook Islands. The added dynamic through economic development provided the impetus of the colonised government to individualise land title. Today the main economic driver for the Cook Islands is tourism. Tourism development has significantly shaped land

tenure and this research seeks to understand its relationship and how it has unfolded over the last twenty years.

To begin investigating the relationship between land tenure and tourism development on Rarotonga, one must first understand the dual governance frameworks. These encompass customary approaches to land tenure alongside legal, post-colonial governance structures. This understanding is crucial to unravel the extent to which tourism has influenced land tenure over the past twenty years. This research therefore seeks to investigate how Rarotongan landholders experience and perceive the relationship between tourism development and land tenure. Eight guiding questions was posed to twelve participants, and from their responses three core themes with associated sub-themes emerged, ultimately unpacking this complex relationship.

Leasi Vanessa Lee Raymond, Alaska Center for Energy and Power

### ***Self Interest or Altruism? How Arctic and Pacific Small Island Energy Systems Shape U.S. Security***

The Arctic and Pacific regions play an outsized role in U.S. national security today. In both regions, global powers are competing for influence through economic, military, and diplomatic pressures, actions that at times go against U.S. strategic interest. As competition intensifies, the U.S. faces a critical choice: secure these regions solely for strategic advantage or build durable partnerships that strengthen community resilience.

While Alaska and Pacific small island states possess critical resources and strategic geographies, resilience in both regions is hampered serious energy security challenges. In 2025, Typhoon Hylong destroyed Alaskan community energy infrastructure and spilled bulk fuel storage for remote communities such as Kipnuk and Kwigillingok. In 2022, when the Hunga Tonga-Hunga Ha'apai volcano erupted, corrosive ash not only damaged the Kingdom of Tonga's ports and airport, it severely impacted the electricity distribution system. Resilient energy systems in the Arctic and Pacific safeguard U.S. military readiness; but for local communities, they ensure basic survival, economic stability, and cultural continuity. This chapter examines how Arctic and Pacific energy systems are both strategic assets and critical infrastructure and asks whether the U.S.' approach in these regions will be driven by self-interest, altruism, or a balance of both.

## Capacity Building Session

Roi Burnett, University of Auckland & Kaita Sem, The Pacific Community (SPC)

### ***Pacific Academy of Sciences Pacific R&D report and SDG goals***

This report provides the first regional baseline assessment of Research and Development (R&D) investment and capacity across ten Pacific Small Island Developing States. Findings show that R&D systems remain constrained by limited domestic investment, small research workforces, and reliance on donor funding, despite growing priorities in climate resilience, agriculture, marine resources, and health. The report highlights the need for stronger science, technology and innovation policies, improved data systems, enhanced regional collaboration, and Pacific-appropriate metrics to support sustainable development and strengthen national research capacity.

Mathilde Souchon, Pacific Islands Universities Regional Network (PIURN)

### ***PIURN: Advancing regional collaboration and sustainable development in Pacific higher education***

Universities serve as powerful drivers for regional development. From the creation of The University of the South Pacific in 1968 to the newly established National University of Vanuatu in 2020, the Pacific region demonstrates a diverse and evolving landscape of higher education institutions. The universities play a pivotal role in the education, research and training of future generations. Their role was recognized by the 2050 Strategy for the Blue Pacific Continent under the Education, Research and Technology pillar to enhance people-centred development and contribute to the socio-economic and cultural advancement of the Pacific Islands.

Established in 2013, the Pacific Islands Universities Regional Network is a consortium of 16 universities from the Pacific Islands Countries and Territories (PICTs), whose vision is to enable closer and meaningful collaboration among researchers and to collectively empower the Pacific Universities to become key contributors to finding solutions for challenges facing the region. Serving as a collaborative platform to connect university, the presentation explores the role of PIURN as a catalyst to harness knowledge in the region, in advancing climate resilience and sustainable development for the region.

Through its different programmes, the network fosters collaborative research initiatives, addressing critical regional issues. Examples of PIURN-funded projects include tackling threats to Food Security in Fiji, New Caledonia, Papua New Guinea and Vanuatu; reviewing Climate-action policy; integrating traditional knowledge in interdisciplinary research; and developing legal framework to climate induced migration. These projects, aligned with the United Nations Sustainable Development Goals and the Pacific's priorities, allow to pool expertise, data and resources from various universities. This collaborative approach not only enhance research capacity but enables the co-creation of knowledge, serving the needs of the Pacific communities.

Another critical aspect of PIURN's mission, which is to empower the new generation of Pacific leaders, researchers and professionals to better serve the needs and aspirations of the Pacific communities, in accordance with the education, research and technology pillar of the 2050 Strategy for the Blue Pacific Continent, is the organization of its biennial conferences, a key platform for the 16 PIURN member universities. While primarily targeted at these institutions,

the conferences are also open to the Oceanian academics (Australia, New Zealand, Hawaii). Hosted in one of the network institutions, these regional events offer an opportunity to showcase research contributions from scholars and students, foster academic partnerships between the PICTs, and facilitate regional networking and collaboration.

Therefore, academic and scientific regional cooperation being at the core of the PIURN, this presentation underscores the transformative potential of the network for Higher Education Institutions across the region. It also highlights both the successes and challenges achieved by PIURN and its members, while also identifying future impactful opportunities. This presentation emphasizes the critical value of regional collaboration within the research landscape, aiming to develop sustainable solutions that address the unique needs of Pacific communities.

Craig Shapiro, The Ohio State University

***Capacity building for cultural heritage and archaeology***

Envisioning an ethical future for cultural heritage and preservation spaces is overdue, and archaeologists have the opportunity to engage in allyship through reimagining the field. Many archaeologists recognize how the discipline has historically perpetuated a status quo of inadequate cultural stewardship in the Global South and are reflexive about how the field has contributed to the legacies of colonial oppression. To engage in future work that is pointedly Indigenized and decolonial, archaeological allyship requires using our collective access to colonial museums, connections within major research institutions, and public/private partnerships to create ethical frameworks that center culturally affiliated communities. Increasing indigenous representation, repatriating Indigenous ancestors and cultural belongings, and developing sustainable ethical frameworks for cultural stewardship institutions are all necessary outputs. This paper proposes a combination of questions to consider and methods to implement for cultural heritage practitioners interested in motivating their respective partner institutions to develop better practices regarding artifact collections and the communities those collections represent. This model may also serve as a pathway for museums and institutional collections to appease anticolonial public sentiment in the interest of self-preservation and intends to engage the wider discipline in critical thought while considering the responsibility of cultural stewardship moving forward.

Layla Thomas, Pūtahi Manawa Fatu Malosi & Lucy Keung, University of Otago

***From Gener-AI-tion to Generations - The future of science-based education***

This project addresses key gaps in health- and patient-education around cardiovascular disease and Pacific models of care. Pacific health medical curriculum is taught at both the University of Auckland and Otago with limited physical capacity. Using AI technologies to create electronic learning resources will add to the suite of learning tools for all medical undergraduate and postgraduate students. Patient education resources are usually static and in paper form and more suited to those who take up information by reading. These traditional resources leave behind those who learn by auditory, visual, and kinaesthetic modes—approaches often underutilised in current resources. The key aim of this project is to co-design and develop culturally appropriate, online teaching and learning resources that serve both Pacific communities and health professionals. These resources will integrate Pacific knowledge systems and lived experiences to enhance relevance, engagement, and ultimately better health outcomes for future generations of Pacific peoples. This session will outline the challenges and benefits of AI use in this space.



## Information & Communications Technology Session

Imtiyaz Hussein, University of the South Pacific

### ***Indigenizing Cybersecurity Frameworks for Enhanced Resilience for Pacific Island Countries***

Pacific Island Countries (PICs) are acutely vulnerable to cyber threats due to limited resources, small technical workforces, and challenges inherent to remote connectivity. Crucially, traditional Western cybersecurity frameworks fail because they are individualistic, centralized, and rely on transactional, low-trust models that conflict with the PICs' communal societies and dispersed communities.

This proposal addresses the existing capability gap (cited in Boe Declaration) by moving beyond "copy-pasting" foreign models.

We aim to achieve genuine, sustainable resilience by integrating traditional Pacific governance and knowledge systems—such as Kaitiakitanga (Data Stewardship), Wantok/Matai Systems (Decentralized Incident Response), and Talanoa (Relationship-Based Threat Intelligence)—into digital policy.

This shift will transform citizens from passive "users" into active "stewards" of their digital infrastructure, resulting in a robust, indigenized cybersecurity framework for the region.

Ravneil Nand, University of the South Pacific

### ***Adoption and impact of digital technologies in Pacific Islands, with a focus on Information Systems for inclusive and resilient development***

The research centres on the adoption and impact of digital technologies in Pacific Islands, with a particular interest in how Information Systems can support inclusive growth and community resilience. Specifically, investigating the challenges organizations face in adopting technologies, considering factors such as infrastructure limitations, cultural practices, and organizational readiness. The preliminary of the research centres on rural schools' adaptation of technology such as hand-held device uses in Tonga. The digital divide in pacific island countries can be narrowed by inclusive growth. By exploring broader themes in Information Systems such as digital transformation, we can extend to understanding how digital innovation can empower pacific island countries, support education, and improve governance. By advancing this research, the aim is to inform policymakers and organizations working to bridge digital divide in the pacific. The Pacific academy of sciences represents a valuable opportunity to situate my work within the broader IS community, gain new perspectives, and ensure that my research continues to address both theoretical advancement and real-world relevance.

## Teaching & Education Session

Kamuela Yong, University of Hawaii - West Oahu

### ***Strengthening Indigenous Pacific knowledge in mathematics education and community***

Across the Pacific, our peoples have long carried deep mathematical knowledge embedded in navigation, voyaging, and the relationships between people, place, and environment. Yet these intellectual traditions remain underrepresented in contemporary mathematics education and in the broader mathematical community. This talk highlights ongoing efforts to strengthen Indigenous presence in mathematics through curriculum grounded in Pacific ways of knowing, particularly the mathematical foundations of traditional navigation and sailing. I will share examples of how these practices emerge naturally in geometry, trigonometry, modelling, and problem-solving in ways that resonate with our youth and affirm their identities. I will also discuss the importance of cultivating a strong community of Indigenous mathematicians who support one another, mentor emerging scholars, and work collectively to reshape the field. Together, these efforts move us toward a future in which Pacific voices and perspectives are not only included in mathematics but help define its direction.

Elizabeth Angstman, University of New South Wales

### ***Competency based assessment: Enhancing mastery, equity and wellbeing in higher education***

Higher education faces mounting challenges: a student mental health crisis, concerns about assessment integrity amid rapid advances in AI, declining engagement, and government calls to broaden participation. Together, these pressures demand a fundamental rethink of assessment practices. One promising response is competency-based assessment, which prioritizes mastery over competition.

Competency-based assessment moves away from ranking students with numerical marks and instead ensures all learners achieve clearly defined outcomes. Students have to pass hurdle assessments, which they are allowed to attempt multiple times, showing that they are proficient at all the required core competencies. This approach is grounded in six principles: clear learning outcomes, proficiency standards, multiple opportunities to demonstrate mastery, aligned pedagogy, skill-focused activities, and competency as the threshold for passing. By focusing on mastery, competency-based assessment can enhance learning, equity, and wellbeing. It can also raise academic standards by requiring competence across all core areas, foster a growth mindset through iterative learning, and encourage creative risk-taking without fear of penalty.

At UNSW, this model has been trialled in 25 courses across 13 schools, spanning all faculties. Students were surveyed on their experience, including whether they valued the approach, its impact on enjoyment of learning, peer relationships, and assessment-related stress. Results were overwhelmingly positive. Students reported that the model helped them focus on learning rather than marks, reduced anxiety, and fostered collaboration. Rich qualitative feedback highlighted a shift toward deeper engagement. Staff also noted benefits, including improved participation, fewer grade-related queries, and—in some contexts—reduced marking workload. These findings will be presented in detail.

Examples of implementation include Physics 1A, a large introductory course with over 1,500 annual enrolments, a first-year law course, and the Master of Clinical Psychology program—all of which received positive student feedback. These cases illustrate the adaptability of competency-based assessment across disciplines and levels.

Implementation is not without challenges. Institutional systems often rely on numerical grades for program transfers and external reporting, and competency-based models require robust feedback mechanisms. However, the benefits for learning, equity, and student wellbeing make this approach a compelling model for universities navigating a rapidly changing educational landscape. Future work will explore strategies for scaling this approach and its long-term impact on graduate outcomes.

Talavou Sulu, National University of Samoa

### ***Evaluating the Impact of Teaching and Learning Resources on SSLC Mathematics Performance in Samoa***

This study evaluates the impact of teaching and learning resources (TLRs) on student performance in the Samoa School Leaving Certificate (SSLC) Mathematics examination, addressing the persistent national challenge of low pass rates and the lack of empirical evidence for effective resource allocation. Utilizing a Mixed-Methods Survey Design, the research collected and triangulated quantitative data from 113 SSLC students and 18 Mathematics teachers, supplemented by qualitative interviews to provide contextual insight. The Input-Process-Output (IPO) Model framed the analysis, employing Multiple Regression to identify predictive variables and ANOVA/Chi-square to examine critical associations.

Findings conclusively demonstrate that resource utilization (Process variables), not mere availability, is the most significant factor driving academic outcomes, challenging assumptions that funding alone is the primary solution. Specifically, Teacher Notes Usage ( $\beta=0.34, p=0.008$ ) and Textbook Usage ( $\beta=0.28, p=0.021$ ) were identified as the strongest positive predictors of student performance. Furthermore, a significant association was found between home Internet Access and SSLC performance ( $p=0.041$ ), highlighting a critical digital equity gap, confirmed by 61% of teachers reporting limited or no internet access in schools. The study concludes that improving SSLC Mathematics outcomes requires a strategic shift from general resource inputs to prioritizing pedagogical capacity and equitable utilization of core materials. Recommendations call for targeted investment in standardized teacher guides, robust professional development for digital integration, and infrastructure support to close the critical utilization and equity gaps.

## Ethics & Research Session

Fogamomi Nicollo Moeono (Moderator), Global Shapers Apia Hub / University of Waikato

Jasmine Koria, Open University of the United Kingdom

Vensel Margraff, University of Auckland

Johannes Uili, National University of Samoa

Faumuina Ivan Afamasaga, Ah Liki Investments Company Ltd

### ***Panel: Re-centring Samoan Knowledge: Qualitative and Quantitative Methods for Ethical Community-Based Research***

Research in Samoa is often shaped by external agendas and extractive data practices that do not reflect local realities or priorities. This panel aims to show how Samoan-led qualitative and quantitative approaches can replace extractive models and strengthen ethical, community-based research across Samoa.

Featuring four Samoan researchers working in education, engineering, youth development, and community studies, the panel will demonstrate practical ways to design research that centres community priorities, cultural integrity, and reciprocity. Despite working in different disciplines, all panellists share a commitment to methods grounded in Samoan values and local/ traditional ways of knowing.

A central theme of the session is extractivism, understood as the removal not only of natural resources but of community knowledge, cultural labour, and decision-making authority. Such practices appear in donor-driven initiatives, academic studies, and foreign investment processes that often overlook local governance systems and limit community agency.

To address this, the panel highlights Samoan, traditional models such as the talanoa, the fa'afaletui, village governance structures, and youth-led participatory approaches for research. These frameworks prioritise relationships, accountability, and the ethical circulation of knowledge, offering practical alternatives that ensure communities retain control over how their contributions are used.

The session also demonstrates how traditional qualitative frameworks can be integrated with quantitative tools, including engineering data, environmental monitoring, and mixed-methods analysis. This integration enables research to remain culturally grounded while meeting technical and policy needs in areas such as climate change, energy transition, education, and community development.

The panel concludes by offering clear, practical guidance for designing research that moves beyond standard consultation and towards meaningful co-creation with communities. Participants will gain principles for ethical engagement, data sovereignty, and long-term partnership building—approaches that uphold Pacific values while producing rigorous, relevant evidence. In doing so, the session positions Samoan-led methodologies as essential foundations for ethical, community-centred research that strengthens resilience and supports Pacific futures.

## Appendix 1. Congress Programme



**Pacific Academy  
of Sciences**

### 2026 Congress Programme

16.02.2026 - 18.02.2026 | TAUMEASINA ISLAND RESORT



**International  
Science Council**  
Regional Focal Point for  
Asia and the Pacific



HOSTED BY  
**Australian  
Academy of  
Science**



**SASAKAWA  
PEACE  
FOUNDATION**







Pacific Academy  
of Sciences

## 2026 Congress Day 1

16.02.2026 | 8AM - 5PM | TAUMEASINA ISLAND RESORT

|         |                                                                                                                                                                                    |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7:00am  | Registration Opens                                                                                                                                                                 |
| 8:00am  | Traditional Samoan Welcome - 'Ava Ceremony (optional) <ul style="list-style-type: none"><li>• NUS Centre for Samoan Studies</li></ul>                                              |
| 8:45am  | Welcome & Prayer - Lotu <ul style="list-style-type: none"><li>• Rev. Dr Latu Latai</li></ul>                                                                                       |
| 9:00am  | Opening Remarks - Prime Minister of Samoa <ul style="list-style-type: none"><li>• Hon. La'aulialemalietoa Leuatea Polataivao Fosi Schmidt</li></ul>                                |
| 9:15am  | Congress Photo                                                                                                                                                                     |
| 9:30am  | Coffee Break                                                                                                                                                                       |
| 10:00am | International Science Council & the Pacific Academy of Sciences <ul style="list-style-type: none"><li>• Professor Sir Peter Gluckman &amp; Professor Teatulohi Matainaho</li></ul> |
| 10:10am | Keynote - Regional Director, World Health Organization Western Pacific Region <ul style="list-style-type: none"><li>• Dr Saia Ma'u Pi'ukala</li></ul>                              |
| 10:40am | Partner's Message - Sasakawa Peace Foundation <ul style="list-style-type: none"><li>• Dr Mitsutaku Makino</li></ul>                                                                |
| 10:45am | Partner's Message - Australian Academy of Science <ul style="list-style-type: none"><li>• Professor Frances Separovic</li></ul>                                                    |
| 10:50am | 2025 PAS Fellow Induction Ceremony <ul style="list-style-type: none"><li>• Professor Teatulohi Matainaho</li></ul>                                                                 |

FOR MORE INFORMATION VISIT OUR WEBSITE [PACIFICSCI.ORG](https://PACIFICSCI.ORG)







Pacific Academy  
of Sciences

## 2026 Congress Day 1

16.02.2026 | 8AM - 5PM | TAUMEASINA ISLAND RESORT

12:00pm Lunch

### Session 1: Climate Change

12:45pm

**Plenary:** Mr Sefanaia Nawadra

- *Climate change in the Pacific*
- Logotonu Meleisea - *Climate change and food security*
- Tina Newport - *Adaptation and climate mobility*
- George Carter - *Science to advance Pacific Diplomacy and Development*

### SPREP/UAO MOU Signing

### Session 2: Marine

#### Panel with Q&A:

1:55pm

- Luisa Young - *Mapping mangrove blue carbon in Fiji: new methods and preliminary findings*
- Ceceilia Louis - *Assessing seagrass health and community knowledge in urban and rural Vanuatu*
- Emma Oliver - *Community-led coral restoration and climate-resilient gene banking in East New Britain, PNG*
- Regina Gwaibo - *A Comparative Study of Women's Roles and Contribution to the Fisheries Sector in Papua New Guinea*

2:45pm Poster presentations

FOR MORE INFORMATION VISIT OUR WEBSITE [PACIFICSCI.ORG](https://PACIFICSCI.ORG)





Pacific Academy  
of Sciences

## 2026 Congress Day 1

16.02.2026 | 8AM - 5PM | TAUMEASINA ISLAND RESORT

### Session 3: Environment

3:00pm

- Sushil Kumar - *Environmental Sustainability and Resource Management*
- Dawnie Katovai - *Traditional knowledge for effective forest conservation in Fiji and Solomon Islands*
- Lionel Kakai - *Indigenous knowledge systems in Solomon Islands, focusing on the engineering traditions of the artificial islands*
- Utne Enoch - *Evaluating the River Continuum Concept in tropical Papua New Guinea rivers*

### Session 4: Indigenous knowledge

Plenary & Panel Lead: Elilala Fihaki

3:55pm

Jeffrey Noro - *Weaving Worlds: Biocultural Knowledge, Local Contexts, and the Future of Science in the Pacific*  
Yolarnie Amepou - *Piku biodiversity network*  
Betty Ofe-Grant - *Re-centering the Ocean: Pacific Epistemologies, Indigenous Intelligence, and the Decolonisation of Artificial Intelligence*

4:45pm

Wrap up

- Professor Tuifuisa'a Patila Amosa

Depart for Congress Welcome Cocktails at Aggie Grey's Hotel & Bungalows

FOR MORE INFORMATION VISIT OUR WEBSITE [PACIFICSCI.ORG](https://PACIFICSCI.ORG)





Pacific Academy  
of Sciences

## Welcome Cocktails

16.02.2026 | 8AM - 5PM | TAUMEASINA ISLAND RESORT

SHERATON SAMOA AGGIE GREY'S  
HOTEL & BUNGALOWS



|        |                                                                                                                               |
|--------|-------------------------------------------------------------------------------------------------------------------------------|
| 5:00pm | Cocktails begin<br>Harbourside Room at Level 1, Sheraton Samoa Aggie Grey's Hotel & Bungalows                                 |
| 5:30pm | <b>Remarks   Launch of the Pacific ResearchHub</b> <ul style="list-style-type: none"><li>Hon. Aiono Dr Alec Ekeroma</li></ul> |
| 6:30pm | NUS Faculty of Business & Entrepreneurship Students Performance                                                               |
| 7:00pm | Cocktails conclude                                                                                                            |

FOR MORE INFORMATION VISIT OUR WEBSITE [PACIFICSCI.ORG](https://PACIFICSCI.ORG)







Pacific Academy  
of Sciences

## 2026 Congress Day 2

17.02.2026 | 8AM - 5PM | TAUMEASINA ISLAND RESORT

- 7:45am** MASTERCLASS: SAVVY Media Training (optional)
- Indira Stewart & Dacia Herbulock, Science Media Centre (New Zealand)

- 8:50am** Welcome

- 9:00am** Keynote – Chief Executive, PHF Science, New Zealand
- Professor Sir Ashley Bloomfield

### Session 5: Climate Health

- 9:30am**
- Li'amaruaia Dr Roannie Ng Shiu - *Climate health and resilience in the Pacific*
  - Narelle Warren - *Chronic illness and environmental change in Pacific Small Island States*
  - Carlos Chirinos - *Ecosyndemics, ageing care, and local knowledge in climate-challenged communities*
  - Nicola Ludin - *Circadian rhythm and youth mental health*

- 10:25am** Morning Tea & Poster Presentations

### Session 6: Biomedical

- 10:50am**
- Corina Grey - *Trends in Cardiovascular Disease*
  - Chris Puliueva - *Immunogenetic landscape of Pacific peoples in Aotearoa NZ*
  - Nicola Hawley - *GROW Study: Genetics, gestational diabetes, and health outcomes in American Samoa*
  - Jim Buttery - *AI-Powered Vaccine Misinformation Monitoring with WhatsApp Support*

FOR MORE INFORMATION VISIT OUR WEBSITE [PACIFICSCI.ORG](https://PACIFICSCI.ORG)





Pacific Academy  
of Sciences

## 2026 Congress Day 2

17.02.2026 | 8AM - 5PM | TAUMEASINA ISLAND RESORT

### Session 7: Biochemistry

- 11:40am**
- Baro Gise - *Advancing fluorinated compound synthesis for innovative drug and agrochemical development*
  - Sekotilani Aloï Gray - *Traditional plants, medicine and economic resilience*
  - Sakiusa Baleivanualala - *AMR genomic surveillance in Fiji: lessons for Pacific health security*

**12:30pm** Lunch & Poster Presentations

### Session 8: Energy

- 1:15pm**
- Martin Atkins - *Pacific-led energy modelling: centering local voices and cultural values in transition planning*
  - Amit Prakash - *Renewable energy adaptation and challenges for Pacific Islands in achieving SDG 13*
  - Francis Sakato - *Advancing renewable energy for sustainable growth and energy security in Papua New Guinea*
  - Maurizio Cirrincione - *From Diesel Dependence to Hydrogen-Ready Microgrids*

### Session 9: Resilience & Governance

- 2:00pm**
- Kenneth Kuper - *Guam: Military Testbed and Microcosm of US-China Tensions*
  - Sieni Tiraa - *Land tenure and tourism: Evolving relationships in Rarotonga, Cook Islands*
  - Samson Leri - *Biotechnology and science diplomacy: Advancing sovereignty and resilience in Papua New Guinea*
  - Leasi Vanessa Lee Raymond - *Self Interest or Altruism? How Arctic and Pacific Small Island Energy Systems Shape U.S. Security*

FOR MORE INFORMATION VISIT OUR WEBSITE [PACIFICSCI.ORG](https://PACIFICSCI.ORG)







Pacific Academy  
of Sciences

## 2026 Congress Day 2

17.02.2026 | 8AM - 5PM | TAUMEASINA ISLAND RESORT

2:50pm Afternoon Tea

### Session 10: Capacity

3:15pm

- Roi Burnett & Kaita Sem – *PAS Pacific R&D report and SDG goals*
- Mathilde Souchon – *PIURN: Advancing regional collaboration and sustainable development in Pacific higher education*
- Craig Shapiro – *Capacity building for cultural heritage and archaeology*
- Aniva Lawrence – *From Gener-AI-tion to Generations – The future of science based education*

### Session 11: ICT

Plenary & Panel Lead: Robert Davison

4:05pm

Panel

- Jacinta Faalili-Fidow – *Pacific Data Sovereignty and AI*
- Imtiyaz Hussein – *Indigenizing Cybersecurity Frameworks for Enhanced Resilience for Pacific Island Countries*
- Ravneil Nand – *Adoption and impact of digital technologies in Pacific Islands, with a focus on Information Systems for inclusive and resilient development*

5:05pm

Closing reflections & wrap up

- Professor Muagututia Ioana Chan Mow

FOR MORE INFORMATION VISIT OUR WEBSITE [PACIFICSCI.ORG](https://PACIFICSCI.ORG)







Pacific Academy  
of Sciences

## 2026 Congress Dinner

17.02.2026 | 6.30PM - 9PM | TAUMEASINA ISLAND RESORT

ROBERT LOUIS STEVENSON MUSEUM



**6:00pm**

Shuttles depart from Taumeasina & Aggie Greys  
Free Tour of Robert Louis Stevenson Museum

**6:30pm**

Arrive at Robert Louis Stevenson Museum

**7:00pm**

Welcome and Prayer

**7:10pm**

Guest Speaker: Papua New Guinea Minister for Higher Education,  
Research, Science & Technology  
• Hon. Kinoka Feo

**7:40pm**

Dinner

**8:00pm**

EFKS Apia Performance

**9:00pm**

Dinner concludes  
Shuttles depart Robert Louis Stevenson Museum

FOR MORE INFORMATION VISIT OUR WEBSITE [PACIFICSCI.ORG](https://PACIFICSCI.ORG)





Pacific Academy  
of Sciences

## 2026 Congress Day 3

18.02.2026 | 8AM - 4PM | TAUMEASINA ISLAND RESORT

- 8:00am** Pacific Young Academy Workshop (optional)
- Li'amaia Dr Roannie Ng Shiu & Eunike Kitiseni

- 9:00am** **Keynote – Pro Chancellor of the National University of Samoa**
- Professor Letuimanu'asina Emma Kruse Va'ai

### Session 12: Teaching & Education

- 9:30am**
- Kamuela Yong – *Strengthening Indigenous Pacific knowledge in mathematics education and community*
  - Jodie Hunter – *Recognising strengths and resources*
  - Elizabeth Angstman – *Competency based assessment: Enhancing mastery, equity and wellbeing in higher education*
  - Talavou Sulu – *Evaluating the Impact of Teaching and Learning Resources on SSLC Mathematics Performance in Samoa*

- 11:00am** Morning Tea & Poster Presentations

### Session 13: Ethics & Research

- Plenary: Donald Wilson
- Pacific Ethics Governance Mapping Study

- 11:30am** Panel: *Re-centring Samoan knowledge: ethical, community-led research methods and frameworks*
- Fogamomi Nicollo Moeono (Moderator)
  - Jasmine Korja
  - Vensel Margraff
  - Johannes Uili
  - Ivan Afamasaga

FOR MORE INFORMATION VISIT OUR WEBSITE [PACIFICSCI.ORG](https://PACIFICSCI.ORG)







Pacific Academy  
of Sciences

## 2026 Congress Day 3

18.02.2026 | 8AM - 4PM | TAUMEASINA ISLAND RESORT

12:25pm

Closing remarks, reflections and wrap up  
• Professor Sir Collin Tukuitonga

12:40pm

Official end of PAS Congress 2026 and Lunch

2:00pm

MASTERCLASS: Qualitative Research Methods for Postgraduate Students  
• Narelle Warren

4:00pm

End of Day 3 and Congress.



FOR MORE INFORMATION VISIT OUR WEBSITE [PACIFICSCI.ORG](https://PACIFICSCI.ORG)





Pacific Academy  
of Sciences

## 2026 Congress Poster Presentations

16.02.2026 - 18.02.2026 | TAUMEASINA ISLAND RESORT

- Fogamomi Nicollo Moeono - *Re-centring Samoan Knowledge: Qualitative and Quantitative Methods for Ethical Community-Based Research*
- John Paul Leauanae - *Findings from a study on at-risk students enrolled in a Foundation Mathematics course at the National University of Samoa*
- To'oa Brown - *Developing an mRNA-based vaccine for measles virus*
- Varea Vaurasi - *Improving tissue culture techniques for the promotion of local ginger propagation in Samoa, focusing on organic additives and plant growth regulators for accelerated multiplication and disease-free plant production*
- Vensel Margraff - *Tropic Framework: Contextualising Tsunami Resilience for Pacific Island Countries (PICS)*
- Asetoa Sam Pili - *Exploring how Pacific traditional knowledges of sustainable living can enhance wellbeing and inform alternative approaches to burnout*
- Ramona Stephanie O'Connor - *Testing and adapting a regional agriculture and forestry research collaborative framework: The Regional Research Agenda*

FOR MORE INFORMATION VISIT OUR WEBSITE [PACIFICSCI.ORG](https://PACIFICSCI.ORG)



## Appendix 2. Speaker Slides



# Climate Resilience & Food Security

Pacific Academy of Sciences  
Congress  
16-18 February 2026  
Apia, Samoa



## The CePaCT Experience

Logotonu Meleisea Waqainabete  
Program Leader – Genetic  
Resources  
Land Resources Division, SPC

## Climate change is biological

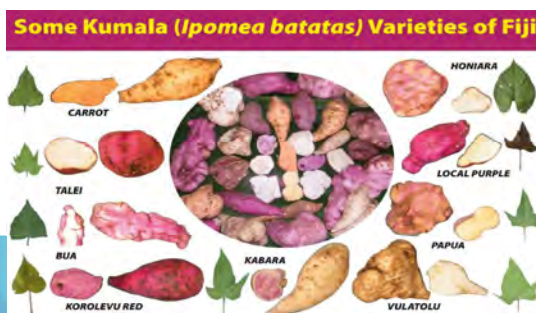


- Rainfall patterns shifting
- Longer droughts
- Stronger cyclones
- Increasing pest and disease pressure
- Changing cropping and fruiting seasons
- Environmental change → Biological consequences



# Resilience is diversity

- Soil, water, and practices matter
- But genetic diversity also matters
- Varieties respond differently to stress
- Diversity spreads risk



## A Hard Lesson: Samoa's Taro Leaf Blight

- Early 1990s devastation
- Genetic uniformity increased vulnerability
- Regional access to diversity enabled recovery
- No island is self-sufficient in plant diversity





# Why CePaCT Exists

- Established 1998 by the Pacific Community
- Many Pacific crops are vegetatively propagated
- Cannot be stored as dry seed
- Field collections are vulnerable
- Science is not optional — it is necessary



## Science-Protection, Prevention & Distribution

- In vitro conservation
- Controlled laboratory conditions
- Pathogen testing (molecular & serological)
- Cleaning infected materials
- Phytosanitary integrity





Pacific  
Community  
Communauté  
du Pacifique

- 



Pacific  
Community  
Communauté  
du Pacifique

- [illegible]



# Using Molecular Tools Strategically

- SSR and DArTseq genotyping
- International collaboration
- Data-guided conservation priorities
- Reduced duplication
- Stronger adaptive potential



## Building Pacific Scientific Systems

- Regional universities
- Applied science systems
- Young Pacific scientists
- Science grounded in Pacific realities

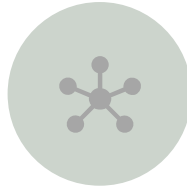




# Harnessing Pacific Knowledge



**REGIONAL PUBLIC  
GOODS THROUGH  
SCIENCE**



**SHARED  
INFRASTRUCTURE AND  
EXPERTISE**



**INTEGRATING FARMER  
KNOWLEDGE +  
SCIENTIFIC TOOLS**



**GENETIC RESOURCE  
SYSTEMS ARE  
FOUNDATIONAL**

## Fa'afetai tele lava.



# Science to Advance Pacific Diplomacy and Development

Salā Dr George Carter

Head of Department of Pacific Affairs

Director Pacific Institute

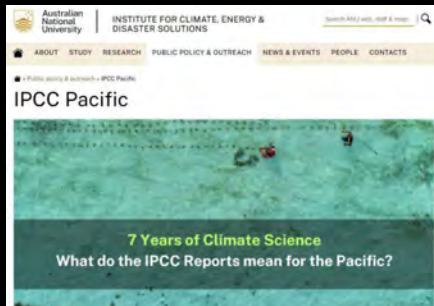
The Australian National University

[george.carter@anu.edu.au](mailto:george.carter@anu.edu.au)



## Climate Change :Research Brokerage to Science Diplomacy

- UNFCCC social research, and negotiation support
- IPCC universities regional organisations awareness climate action
- Space Governance and UN Expert Group MVI





# Advancing a Pacific Islands Space Capability

## Objectives

1. **Pacific Indigenous Astronomy** multi-level dialogue between indigenous groups and communities as to what are their aims, aspirations, opportunities for space technologies in the Pacific.

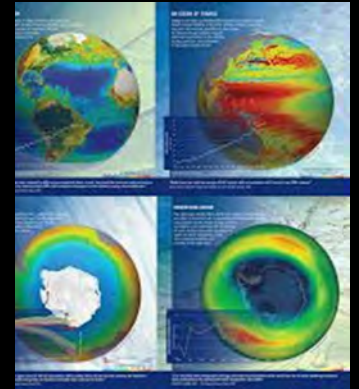
2. **Climate Change/Development:** Assess the current uses and opportunities of space-based Earth Observation technologies in the Pacific.

3. **Pacific Space Community** (of research and practice. Create connections to other researchers in Australia (ANU/GA), NZ and USA/NASA) on Earth Observation.

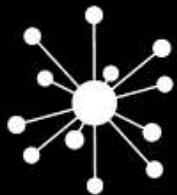
4. **Pacific Governance:** Communicate to industry, investors, Pacific leaders the potential and desire for space sector advancement.

5. **Pacific Space Literature:** Generate a body of open-source policy analysis on Pacific space sector opportunities.. Showcase Pacific opportunities to IAC25 participants

The long-term objective will be to embed participation and benefits within the region to build a Pacific space ecosystem. Moreover, by building on the established indigenous experience in the Aerospace sector, the Pacific space sector will form enduring collaboration with the Australia and New Zealand space ecosystem.



# Connecting Pacific Space Ecosystem



**InSpace**  
ANU INSTITUTE FOR SPACE

National Governments and local community – private sector, the Emerging Space Sector

Earth Observation – Secretariat of the Pacific Community, Secretariat of the Pacific Regional Environment Program

Pacific Regional Security : Boe Declaration – Pacific Islands Forum

Australian Space Agency

Aoteroa New Zealand - Maori Aerospace Sector

NASA National Administration Space Agency – Indigenous Astronomy

UNOOSA –UN Office Outer Space Agency

SINC – Space for Island Nations Conference

Pacific UNIVERSITIES



NEW ZEALAND  
SPACE AGENCY



Australian  
Space Agency



# Multidimensional Vulnerability Index

- Complements GNI per capita with structural vulnerability metrics
- Measures economic, social, environmental exposure + limited resilience
- Focus: Small Island Developing States (SIDS) hit by multi-shocks
- Evidence for UN/IMF negotiations on climate finance, debt relief
- Unified SIDS voice (e.g., AOSIS) via shared scores/profiles
- Science-policy bridge: Data → negotiation power



## Specific MVI Indicators: Core Dimensions for SIDS

| Dimension     | Examples                                                              |
|---------------|-----------------------------------------------------------------------|
| Economic      | Export concentration, tourism/remittance dependence, debt ratios SDGS |
| Environmental | Cyclone/flood exposure, coastal population %, water stress            |
| Social        | Poverty rates, health/education capacity, remoteness                  |

### CHALLENGE – DATA SCARCITY

- Weak stats offices: Infrequent surveys, short time-series
- SIDS-specific issues (e.g., multi-island dispersion) hard to quantify
  - Risk: Under-scores vulnerability, hurts finance access



# Pacific Solutions to Data Gaps

- National: Train stats offices, improve disaster/tourism data
  - Regional: SIDS "hubs" for shared tools/methods
  - Universities : research centres
  - Partners: UN/OECD pilots, AI/remote sensing for climate metrics
- 
- Refine MVI: SIDS-led iterations, better SIDS indicators
  - Data investments = diplomacy leverage
  - Global buy-in: OECD/World Bank testing for allocations
- 
- Science: Quantify shocks (e.g., sea rise + tourism drop) → MVI score
  - Diplomacy: SIDS cite in UN for adaptation funds/debt pauses
  - Outcome: Vulnerability-informed finance rules

**MVI empowers SIDS via science-backed diplomacy, despite data hurdles being actively bridged**



## Assessing the condition & Community Knowledge of Seagrass beds in Vanuatu – A case study of Eratap and Utanlang Village



Pacific Academy of Sciences Congress  
Apia, Samoa  
February 16<sup>th</sup> 2026

By Ceceilia Carol Louis







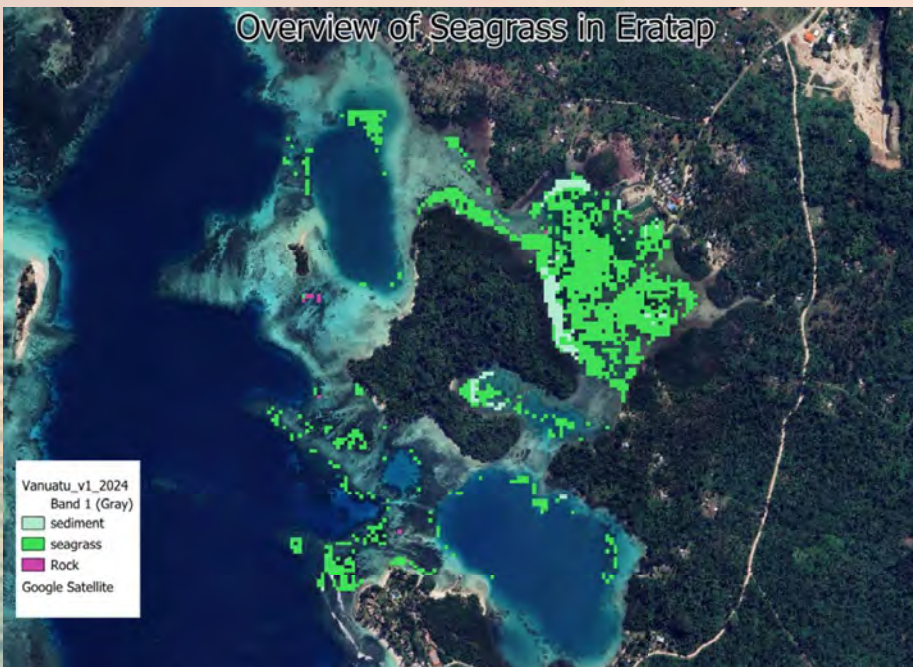
Site 2: Utanlang Village



Site 1: Eratap Village

### Research Objectives

- ❖ To assess and compare the condition of selected seagrass beds in Vanuatu (Rural vs Urban);
- ❖ To identify and map potential disturbance and/or pollutants points sources adjacent to selected seagrass beds in Vanuatu; and
- ❖ To survey local resource owning communities for their use, understanding and perceived knowledge (value) of their seagrass beds.



- ❖ Total population – 7,648 (VNSO, 2020)
- ❖ Five seagrass species -*Enhalus acoroides*, *Halophila ovalis*, *Halodule uninervis*, *Cymodocea rotundata*, *Thalassia hemprichii* (seagrasswatch.org.Vanuatu)
- ❖ *Enhalus acoroides* dominant species



*Enhalus acoroides*



*Halophila ovalis*



*Halodule uninervis*



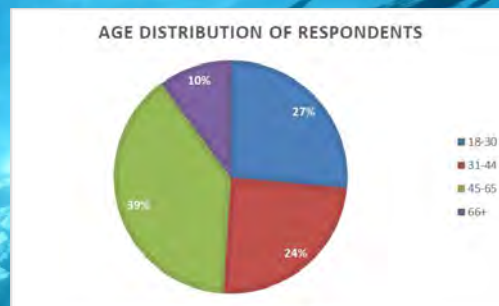
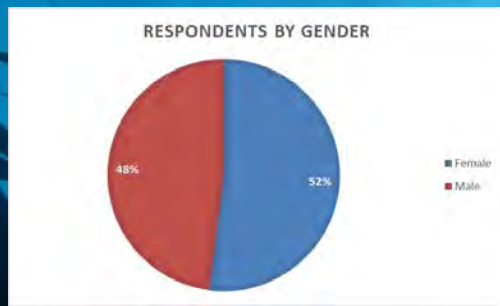
*Cymodocea rotundata*



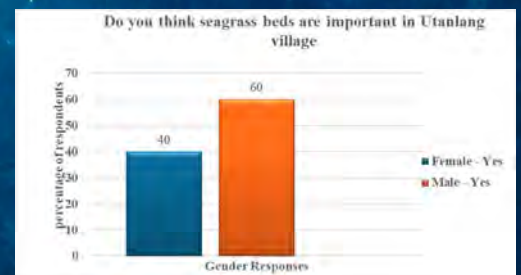
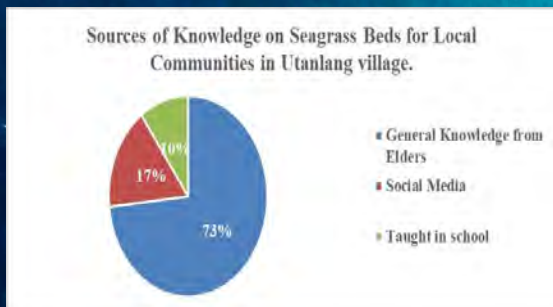
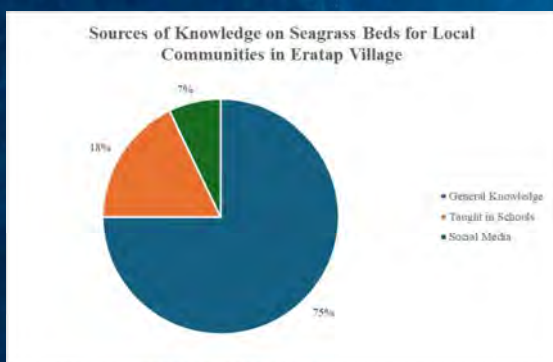
*Thalassia hemprichii*



## Survey Overview

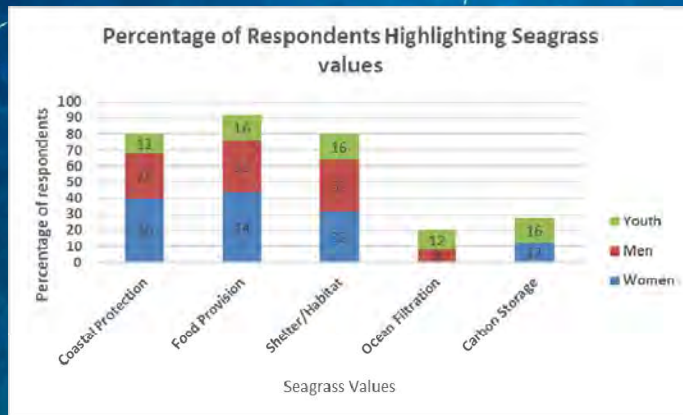


## Community perception and knowledge sources

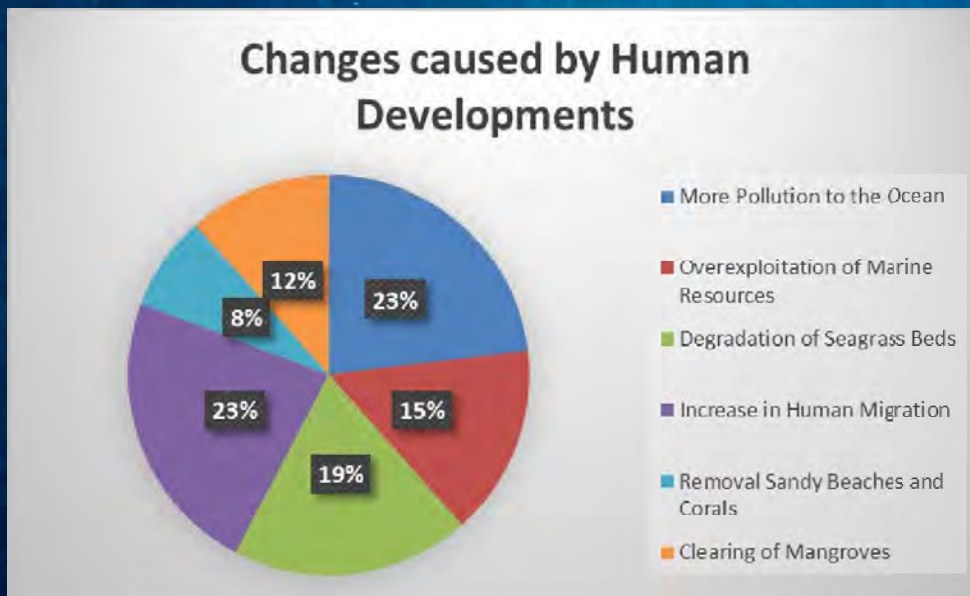




## Findings



## Threats to Seagrass Ecosystems



- ❖ Increase in Human Migration & More pollution to the Ocean
- ❖ Estimated Loss rate: 7% per year globally (SPC World Seagrass Day 2024 Report)



## Summary

- ❖ Community Understanding of seagrasses mostly comes from community knowledge/Traditional knowledge.
- ❖ Significantly more women than men perceived seagrass as important in Eratap and more Men perceived seagrass as important than women in Utanlang.



## Way Forward

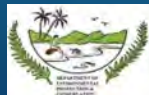
- ❖ Protecting & Restoring = triple win for communities – Climate, Biodiversity, Culture
- ❖ Effective community stewardship of blue carbon ecosystems is essential to maintain the integrity of carbon stock and ecosystem services
- ❖ Manage the activities done by people for the resource







Tankiu Tumas 😊  
Any questions

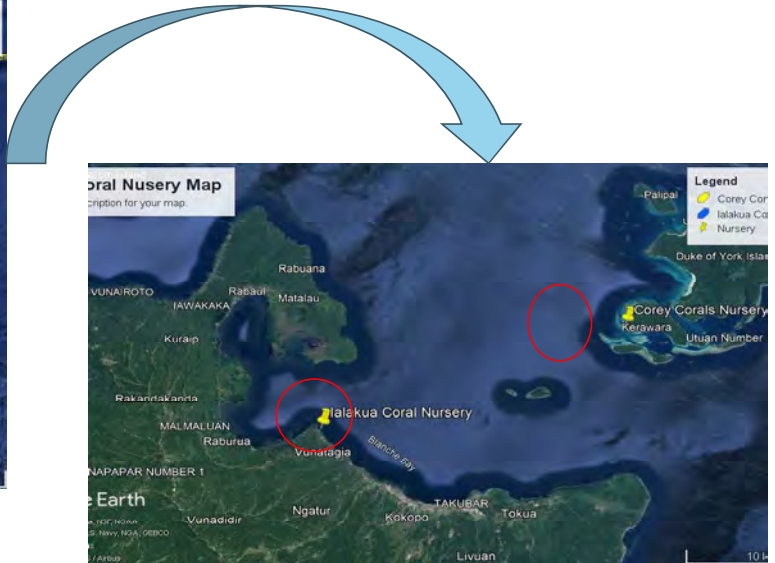


# COMMUNITY-LED CORAL RESTORATION AND CLIMATE-RESILIENT GENE BANKING IN EAST NEW BRITAIN, PAPUA NEW GUINEA.

PROJECT FUNDED BY KYEEMA FOUNDATION & WWF - AUSTRALIA

EMMA OLIVER - ENB SEA KEEPERS | PNG UNIVERSITY OF NATURAL RESOURCES AND ENVIRONMENT

# STUDY AREA AND COMMUNITY CONTEXT



## CORAL SPECIES SELECTION, GENOTYPE DIVERSITY, AND FRAGMENT COLLECTION

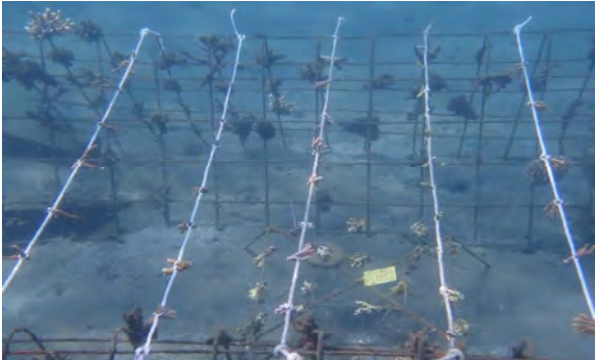


Pocillopora Species





## PROJECT TIMELINE

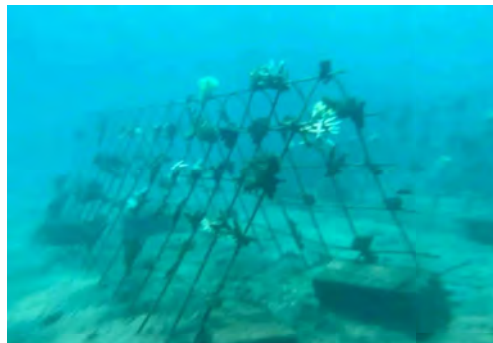
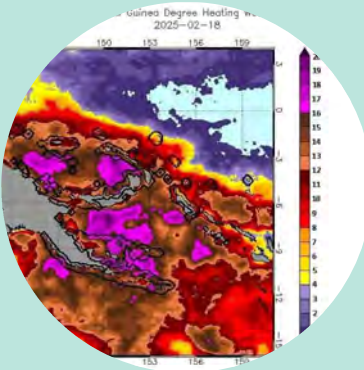


The Duke of York nursery was established in October 2023,  
and Ialakua Village in August 2024.

From September 2024 to March 2025, we experienced the longest and most intense marine heatwave  
ever recorded by the community.

This event shaped all of our results.

## DISTURBANCE EVENT



- DURING THIS PROLONGED HEAT STRESS:
- WE RECORDED 100% MORTALITY OF THE ORIGINAL ACROPORA STOCK AT BOTH NURSERIES.
- TEMPERATURE RANGE WHEN ESTABLISHED: 26-28 DEGREES CELSIUS, TEMPERATURE RANGE DURING BLEACHING RANGE: 29-33 DEGREES CELSIUS
- WHILE THIS WAS A MAJOR LOSS, IT ALSO ACTED AS A NATURAL SELECTION EVENT, SHOWING US WHICH CORALS AND WHICH SITES COULD SURVIVE FUTURE CLIMATE CONDITIONS.

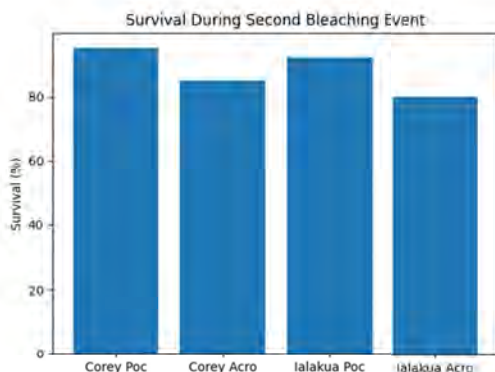
# Post-Bleaching Response

**AFTER THE HEATWAVE, WE REPLANTED BOTH NURSERIES WITH: POCILLOPORA AND NEW ACROPORA FRAGMENTS. THESE NEW COLONIES WERE THEN EXPOSED TO A SECOND, MODERATE BLEACHING EVENT (SEPTEMBER 2025-JANUARY 2026), WHICH ALLOWED US TO TEST THEIR RESILIENCE.**



## **SURVIVAL DURING SECOND BLEACHING**

- SURVIVAL DURING THE SECOND BLEACHING WAS HIGH AT BOTH SITES:
- BETWEEN 80 AND 95 PERCENT.
- THIS SHOWS A MAJOR IMPROVEMENT IN RESILIENCE AFTER REPLANTING.
- SO MORTALITY WAS NO LONGER THE MAIN ISSUE — THE KEY DIFFERENCE BECAME GROWTH.

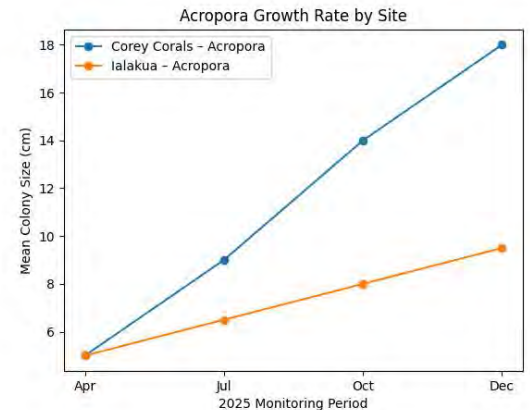
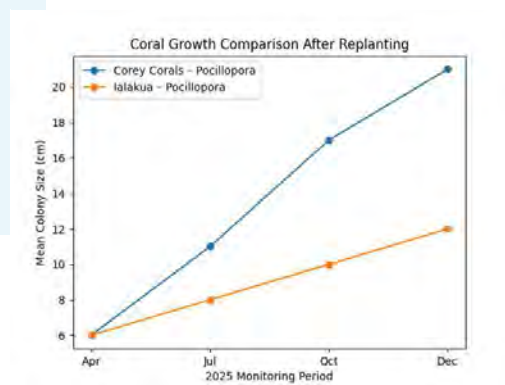


Post-replanting coral survival exceeded 80–95% at both sites, indicating increased resilience.



## GROWTH COMPARISON (MAIN RESULT)

- *Here we see the strongest result of the study.*
- *Although survival was similar, growth at Corey Corals was more than twice as fast as at Ialakua.*
- *This indicates that:*
- *site conditions, particularly water flow, temperature, and sedimentation, directly control restoration success.*



## ○ Acropora Recovery Potential



New Acropora colonies survived at both sites. However, their growth remained strongly site-dependent. This tells us that Acropora recovery is possible, but only in environmentally suitable locations.

# INTERPRETATION

- From this we learned three key things:
- First, marine heatwaves are now the primary driver of coral selection.
- Second, thermal-suitable and well-flushed sites recover much faster.
- Third, community-run nurseries can function as reef seed banks for climate-resilient corals.
- This shifts restoration from planting corals to storing and scaling resilient genotypes.



## TAKE-HOME MESSAGE & ACKNOWLEDGEMENT

The 2024–2025 heatwave did not end coral restoration in East New Britain.

It revealed:

1. Which corals can survive, and which sites can support recovery.
2. Through community leadership, these survivors are now being propagated to support future reefs.

Thank you to the communities of Ialakua and Duke of York, PNG UNRE Students, and our youth monitoring teams, and our project partners, Kyeema Foundation and WWF- Australia.

Thank you.





# BOINA TUNA/ THANKYOU



## **A comparative study of women's role and contribution to the fisheries sector in PNG**



Regina Gwaibo (MSc)

Fisheries Department – School of Natural Resources (UNRE)

16 February 2026

# 1. Introduction

2

## 1.1 Global Perspective



Women play critical roles in the fisheries sector and contribute significantly to household livelihoods and food security.

An estimated 90 million women are engaged in fisheries- related activities worldwide. However, they often remain invisible to policymakers who have traditionally and mistakenly perceived fisheries as predominantly a male dominated sector (FAO, 2016).



<https://www.google.com/url?sa=t&source>



## 1.2 Regional Perspective

Across many Pacific Island countries, women account for approximately 56% of annual small-scale production, ([Harper et al., 2013](#)).

Despite this substantial contribution, decisions regarding the management and conservation of coastal fisheries are traditionally made by male community leaders, elders and chiefs with limited or no participation from women ([Amos, 2024](#)).

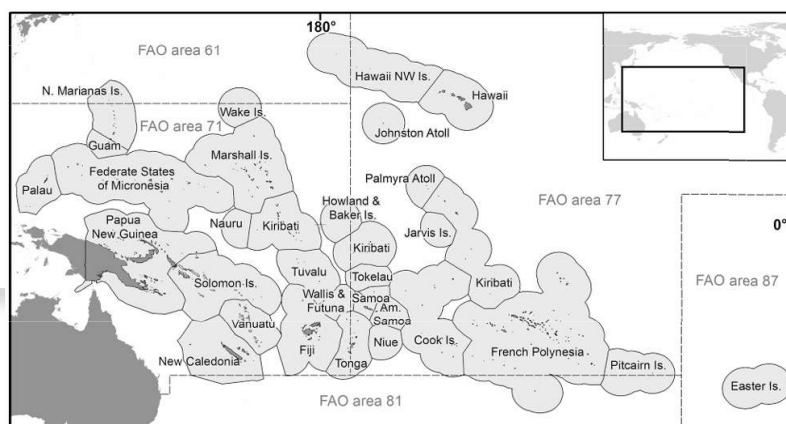


Fig. 1 Map of Pacific island countries, states and territories and their EEZs, as well as FAO statistical area boundaries (areas 61, 71, 77, 81, 87)



4

## 1.3 National Perspective

Koki Fish Market, Port Moresby, PNG - 2024



In Papua New Guinea, approximately 85% of the rural population is engaged in agriculture and fisheries ([JICA, 2010](#)).

Although women's contributions are increasingly being recognized, there remains a lack of comprehensive quantitative data describing the scale and economic value of their participation.



PIURN conference, Lae, PNG - 2025



Interviewee

5

## 1.4 Research Gap

There is not much known about the detailed impact of cultural norms, traditional power structures and gender-biasness on women's ability to access, control and benefit from fisheries resources and decision-making processes.

### Hypothesis

#### Null Hypothesis ( $H_0$ ):

The cultural and socio-economic factors within the communities **does not have an effect** on the roles and contributions of women in the fisheries sector.

#### Alternate Hypothesis ( $H_1$ ):

The cultural and socio-economic factors within the communities **does have an effect** on the roles and contributions of women in the fisheries sector.

6

## 1.5 Aim

To examine and analyze women's roles, contributions, and influencing factors in the fisheries sector.

### Objectives:

1. To identify and analyze the cultural, social and economic factors that influence women's roles and contributions in the fisheries sector.

2. To assess the significance of age as a determinant in the roles and responsibilities undertaken by women in the fisheries sector.

7

## 2. Methodology

### 2.1 Study sites

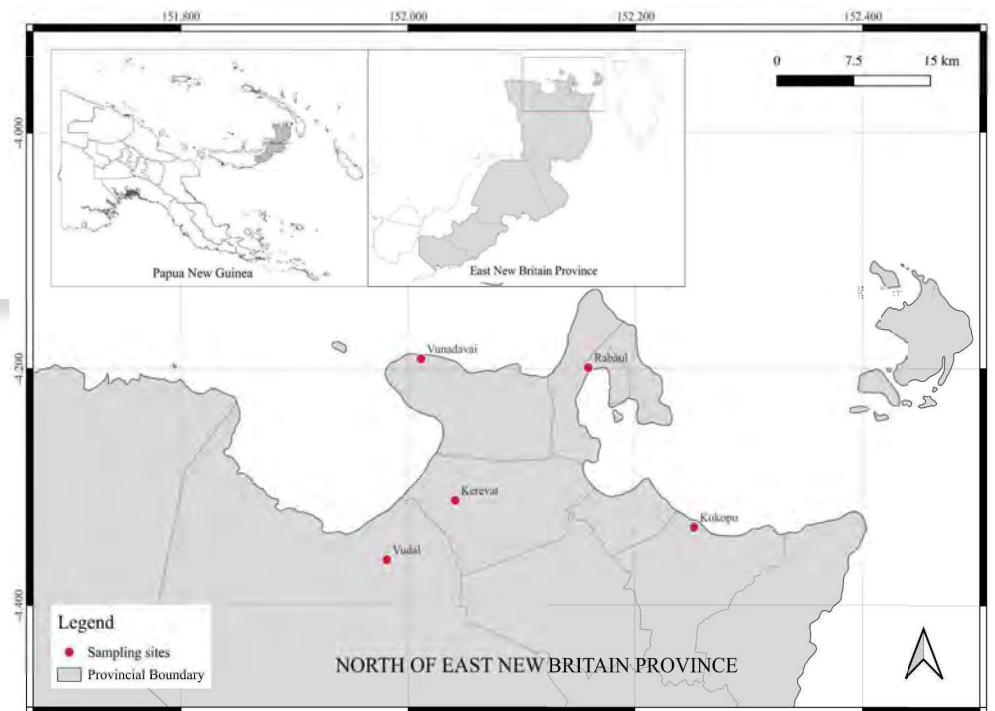


Figure 1. Sampling location in East New Britain Province - PNG.

## 2.2 Research Design

### Semi- Structured Interviews

#### 1. Research Materials



#### 2. Research Participants



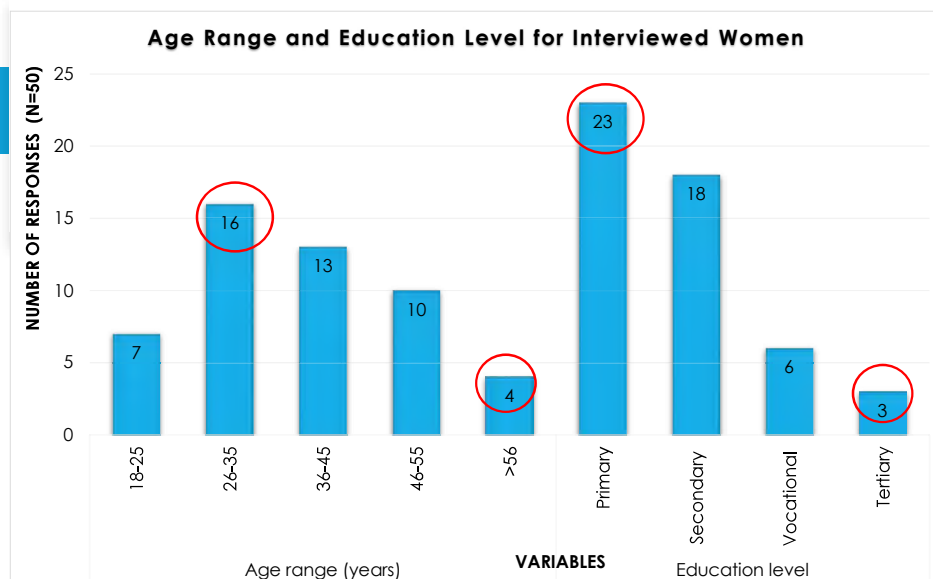
#### 3. Sampling technique - SRS



10

## 3. Key Results

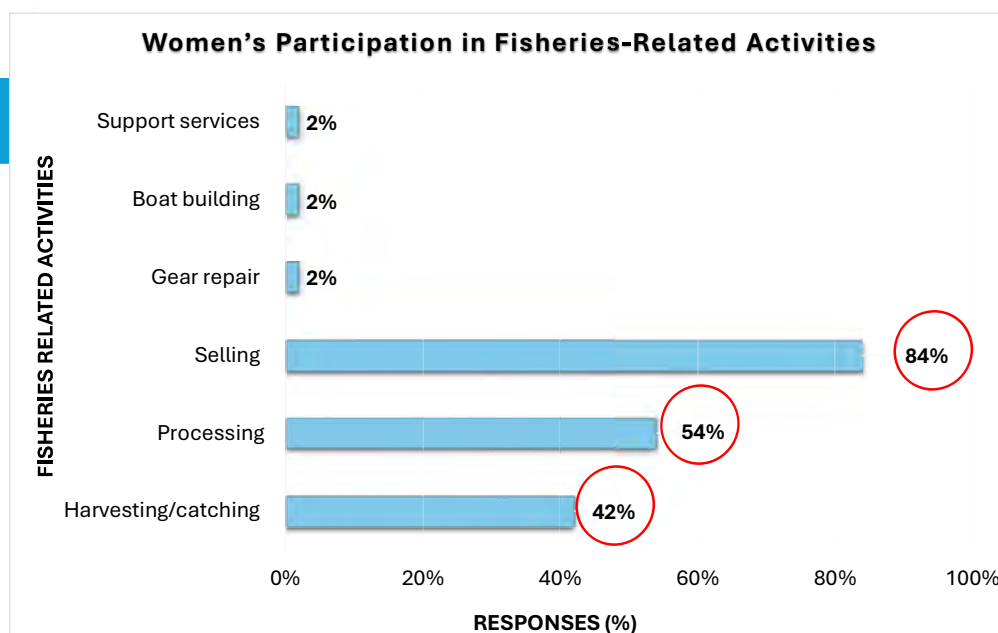




Most women in the higher age range were found in the communities rather than markets.

Women's participation in fishery communities is dominated by younger demographic, yet many possess low formal education due to family and work priorities (Jones, 2023).

**Fig 2.** A bar graph indicating two variables ( **Age range and Education Level**) and the number of responses from the total sample size.

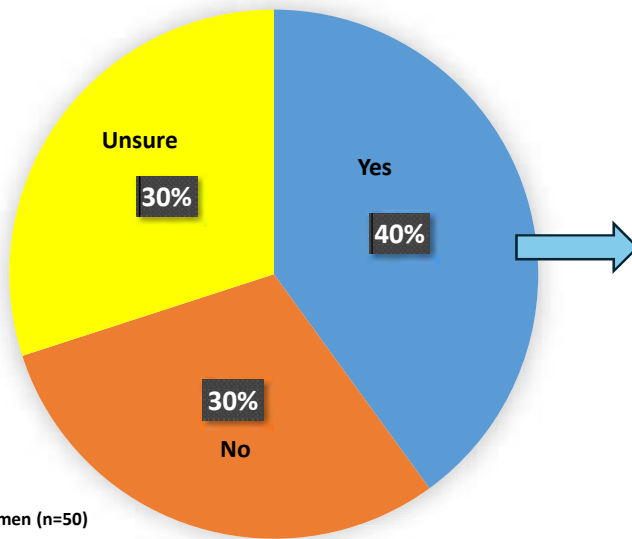


Fish selling/marketing takes the highest toll - **(84%)** .

Fish processing and harvesting with 54% and 42%, respectively.

**Fig 3.** The graph shows the responses in percentage (%) for each of the fisheries related activities.

### Perception of Distinct Differences in Fisheries Roles



#### Beliefs driven by customs

- Pregnant women are not allowed to fish and be near the sea.
- Women experiencing their monthly cycles are not allowed near the sea.

#### Workload

- Older women do more work compared to younger women.

#### Division of Work

- Older women tend to do more of the harvesting and selling whilst younger women do the processing.

**Fig 4.** Three categories for the question; “Are there any distinct differences in types of fisheries role?”, from the overall sample.

14

## Key challenges



Overall, these outcomes contribute directly to climate resilience and sustainable community-led coastal management.

15

## Conclusion

- Women in East New Britain Province (PNG) are actively engaged across multiple fisheries-related activities, including harvesting, processing, and marketing fish, while simultaneously facing substantial social and economic challenges.
- Therefore, this study supports the Alternate Hypothesis (H1), confirming that cultural and socio-economic factors significantly influence the roles and contributions of women in the fisheries sector.

16

## Pacific Academy of Sciences

Theme: Climate, Ocean, Small Island Developing States, Sustainability  
Status: In progress

## Acknowledgment

17

Next step...

Proposed PhD thesis “**A synthesis of women roles and participation in small scale fisheries management across Pacific communities**”



Pacific Academy of  
Sciences Inaugural  
Congress 2026

Pacific Academy of  
Sciences Inaugural  
Congress 2026

Pacific Academy of  
Sciences Inaugural  
Congress 2026

Pacific Academy of  
Sciences Inaugural  
Congress 2026

Thank you for listening 😊

---

Email: [rgwaibo@unre.ac.pg](mailto:rgwaibo@unre.ac.pg)



# Environmental Sustainability and Resource Management

## South Pacific Perspective

**Professor Sushil Kumar**

Professor of Physics: Space and Atmospheric Physics  
School of Information Technology, Engineering, Mathematics  
and Physics, STEMP

**Fax: +679-3232247/9294859: [sushil.kumar@usp.ac.fj](mailto:sushil.kumar@usp.ac.fj)**

# Three Pillars of Sustainability



# Environmental sustainability

**Environmental sustainability:** managing natural resources in a way that meets present needs without compromising future generations (preserves the natural environment)

Resource management focuses on the **responsible planning, use, conservation, and** restoration of natural resources, including land, water, energy, forests, and biodiversity.

**Ocean and coastal sustainability**, which refers to the responsible management and protection of marine and coastal ecosystems, is critical for the South Pacific Region, which is threatened by **Climate Change Impacts and Natural Hazards**.



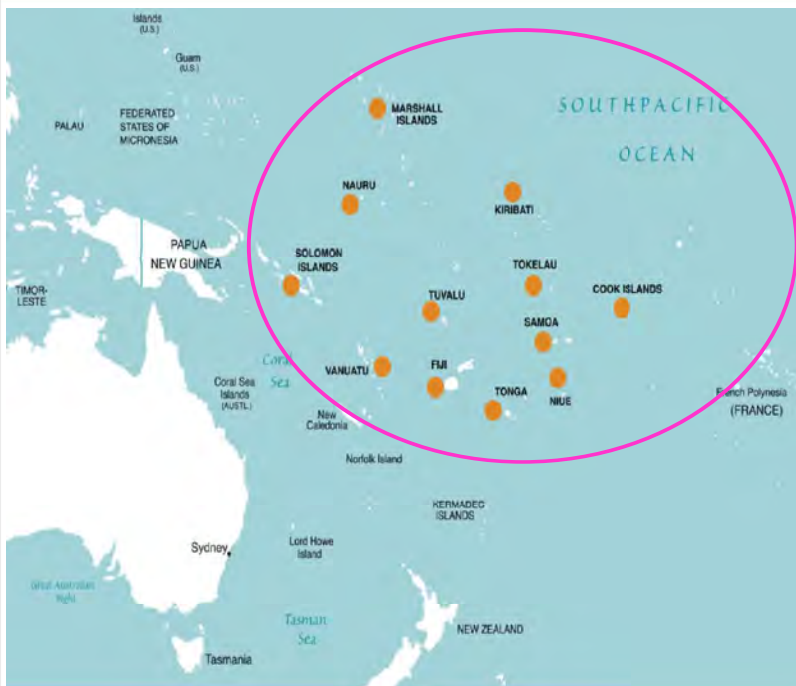
## Environmental Sustainability and Resource Management

The Pacific Island Countries (PICs), with scattered land areas and vast oceans, are home to communities rich in natural resources, diverse social and vibrant cultures, but are vulnerable to various impacts, including climate change. They heavily depend on fragile ecosystems and finite natural resources for their livelihoods, energy, and food security etc. Extreme natural hazards/disaster events, such as king tides, swells, storm surge, tsunamis, earthquakes, volcanic eruptions, and tropical cyclones, adversely affect coastal regions. To discuss creative, locally driven, and technologically enabled approaches to resource management and environmental sustainability tailored to Pacific realities, this panel will bring together researchers, policymakers, and community leaders. The discussion will be based on several thematic areas, not limited to Community and Traditional Ecological knowledge, Climate Resilience and Adaptation, people-centered development, sustainable resource management, Ocean and Environment, Technology and Innovation, Digital Connectivity, Green Energy Smart Ports, in line with the 2050 Strategy for the Blue continent and the UN's Sustainable Development Goals.

# Presentation: Outline

- A. 2050 Strategy for the Blue Pacific Continent**
- B. Climate Change- Natural Hazards Impacts**
- C. Blue Economy and Ocean Accounting**
- D. Autonomous Shipping**
- E. What can we do for Environmental Sustainability?**

## A. 2050 Strategy for the Blue Pacific Continent



*Our vision is for a resilient Pacific Region of peace, harmony, security, social inclusion, and prosperity that ensures all Pacific people can lead free, healthy, and productive lives*

# Why is the 2050 Strategy Important?



1. Our 18 Member countries and territories have successfully forged a community of nations that coexist peacefully and work collectively on a range of key regional issues so all Pacific people can lead free, healthy and productive lives.
2. But our region continues to face significant challenges including the **impacts of climate change**; slow economic growth; poor health and education outcomes; and **significant ocean and land-based environmental degradation**. On the other hand, we have great strengths including our culture and traditions, a youthful population; and significant island and ocean resources.

P A S Congress, Apia, Samoa, 16-18 February 2026

# Why is the 2050 Strategy Important?



3. In recognition of this, the 2050 Strategy for the Blue Pacific Continent will guide how we navigate these challenges and leverage our strengths as a region for the next three decades.
4. In short, the 2050 will take forward our ambition and our determination to secure a prosperous and sustainable future for our people.
5. The 2050 Strategy encapsulates how we can best work together to achieve our shared vision and aspirations. It is based on the firm recognition of the strategic, cultural, and economic value that our Blue Pacific region holds when we have a shared commitment to protect and leverage this value.



# 2050 Strategy for the Blue Pacific Continent: Thematic Areas

## Seven (7) Thematic Areas:

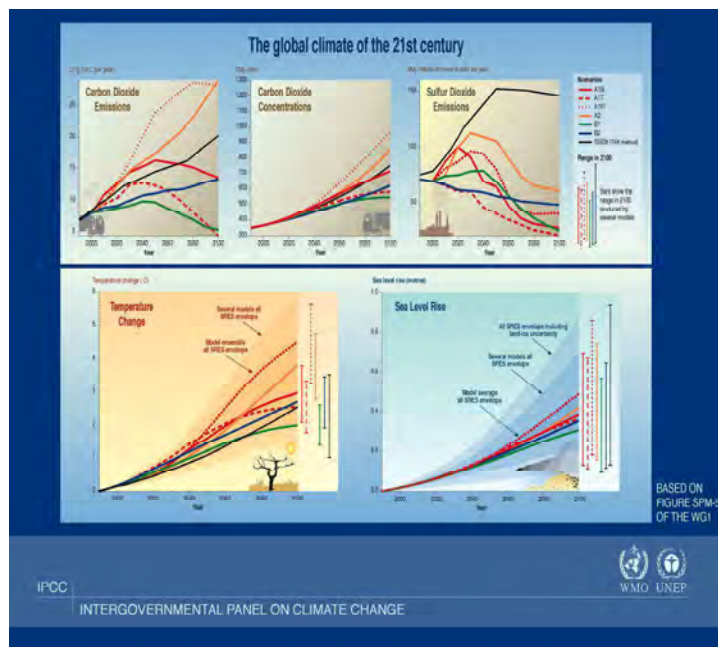
1. Political Leadership and Regionalism;
2. People-Centered Development;
3. Peace and Security;
4. Resource and Economic Development;
5. Climate Change and Disasters;
6. Ocean and Environment; and
7. Technology and Connectivity.

Each of the Thematic Areas contain **5 Strategic Pathways**:

1. Governance;
2. Inclusion and Equity;
3. Education, Research and Technology;
4. Resilience and Well-being; and
5. Partnership and Cooperation.

## B. Global Climate of the 21<sup>st</sup> Century:

### Temperature and sea level Scenarios

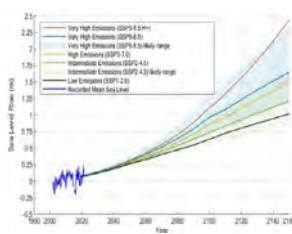
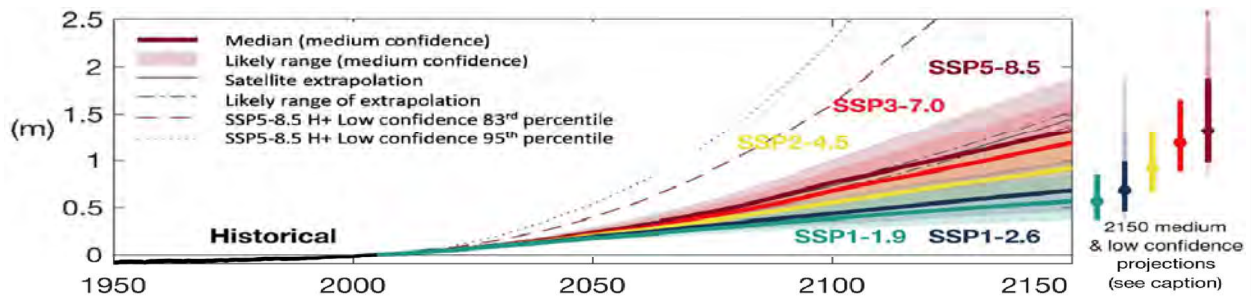


- Reports/literature shows that sea level has risen 0.20m from 1901 to 2018 at an average rate of 1.7 mm/year.
- Rates of sea level rise accelerated ranging from 2.1 mm/year for the period 1993 to 2002, 2.9 mm/year for the period 2003 to 2012 and increasing to 4.4 mm/year for the period 2013 to 2021.
- The rise of global mean sea level in the 20th century was faster than any other century in the last three millennia, and the rate has increased since the 1960s.

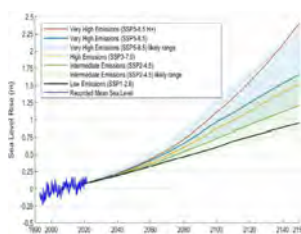
## Projected Global Mean Sea Level under Different SSP Baseline Scenarios

**Ref: Report is published by the Pacific Region Infrastructure Facility (PRIF): Feb 2022**

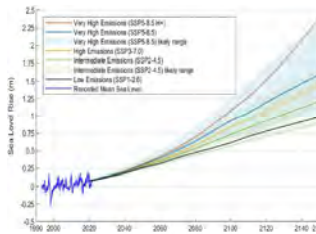
### Projected Global Mean Sea Level under Different SSP Baseline Scenarios



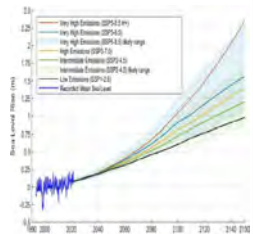
**Federated States of  
Micronesia**



**Tonga**



**Kiribati**



**Tuvalu**

## What Does this mean for the Pacific?

### Sea Level Rise

(adds to effects of storms and high tides)

#### Kiribati

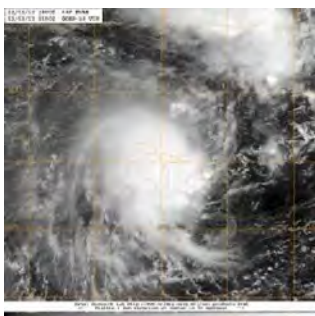


## I like this Cartoon



## What Does this mean for the Pacific?

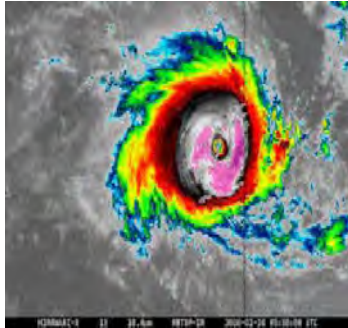
### Extreme Weather Event: TC Evan, December 2012: Samoa





# What Does this mean for the Pacific?

## Extreme Weather Event: TC WINSTON, February 2016 Fiji



**STRONGEST  
EVER  
306 KM /HR  
recorded**





## C: Blue Economy and Ocean Accounting

**In the Pacific Region and mainly the countries of South Pacific Region, up to 100% population live in the coastal regions.**

Globally, 40% of the world's population lives within 100 kilometers of the coast.

**All these people get their value from Oceans and coastal regions through a sustainable Blue Economy, which means ocean and coastal ecosystems provide them with considerable economic and environmental benefits.**

**The Blue Economy in the South Pacific is centered on various sectors such as fisheries, aquaculture, tourism, maritime transportation, renewable energy, and biotechnology.**

## Blue Economy

**The maritime Transport business is an important sector in the regional and globalized market in terms of public transport, containerships, and oil and gas tankers.**

**Coastal tourism is the largest sector important sector of the Blue Economy, including diving, windsurfing, boating, wining, and dining, where coastal hotels. It is also the largest sector of local, regional, and international employment. It contributes up to 50-60 % of Ocean accounting.**

**There are new and large subsectors that are contributing to the blue economy, such as ocean energy: wind farms, ocean wave energy, and wave and tidal energy systems. There is a lot of potential, but it is not harnessed.**

## D. Challenges in the Maritime Transport: South Pacific Region

The Pacific Island Countries (PICs), have much in common. Most important in this regard are their essentially **maritime character, the small size of their economies, and their remoteness from major markets.**



The most important of these challenges are:

- long distances between ports;
- small populations and far-flung communities;
- low trade volumes;
- imbalance in trade, with exports usually far outweighed by imports; and
- widely varying port facilities with generally inadequate funding for
- their operation and maintenance.

**Ref.** Oceanic Voyages  
Shipping in the Pacific:  
ADB Report  
2007 Asian Development  
Bank

All rights reserved.  
Published 2007.  
Printed in the Philippines.

## Domestic and regional leadership track record

- Micronesian Center for Sustainable Transport (MCST), Framework (2015)
  - First Pacific country national action strategy for transport decarbonization
- Pacific Blue Shipping Partnership (2019)
  - RMI and Fiji led call for \$500m blended finance investment in domestic shipping transition in 6-8 Pacific countries
- Fiji Low Emission Development Strategy – Maritime/land (2018)
- Priority Project Pipelines (2020-21)
  - Maritime, Land, aviation – Fiji, Kiribati, Tuvalu, Palau
- Cerulean Project
  - first ever Public Private Partnership, first new build low carbon Pacific commercial vessel



## D Autonomous ships: Autonomy?

Autonomous ships can achieve a 6% reduction in fuel consumption compared with conventional ships (Kretschmann et al., 2017).  
And an environmental impact on reducing NOx and CO2 emissions.

The degree of autonomy and description presented by International Maritime Organization (IMO)

| Degree of Autonomy                                  | Description                                                                                                     |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| Ship with automated processes and decision support  | Seafarers are on board to operate and control shipboard systems and functions. Some operations may be automated |
| Remotely controlled ship with seafarers on board    | The ship is controlled and operated from another location, but seafarers are on board                           |
| Remotely controlled ship without seafarers on board | The ship is controlled and operated from another location. There are no seafarers on board                      |
| Fully autonomous ship                               | The operating system of the ship is able to make decisions and determine actions by itself.                     |

## E: What can be done to Sustainability

### Other than Governments

- Contributions of youth and early-career professionals to sustainability?
- the role of the private sector in sustainable resource management
- How can universities contribute to environmental sustainability?
- What can be the community participation and contribution in environmental sustainability
- What role can technology play in sustainable resource management?

# Summary

- Environmental sustainability requires an integrated action across governments, the private sector, academia, and communities.
- Strong policies and their implementations, scientific Research & innovation, climate resilience, adaptation, and mitigation, climate finance, international cooperation, and behavioral change are essential.
- Sustainability, rather than being an optional agenda, must be a central pillar of sustainable development planning and implementation.



# Thank You Vinaka Vaka Levu







# The Role of Traditional Knowledge in Enhancing Effective Forest Conservation

**Dawnie Daphne Katovai<sup>1\*</sup>; Eric Katovai<sup>2</sup>;  
Junita Ngai<sup>3</sup>; Sarah Pene<sup>1</sup>**

<sup>1</sup> School of Agriculture, Geography, Environment, Ocean and Natural Sciences, The University of the South Pacific, South Pacific, Laucala Campus, Suva, Fiji.

<sup>2</sup> Faculty of Science and Technology, Solomon Island National University, Honiara, Solomon Islands

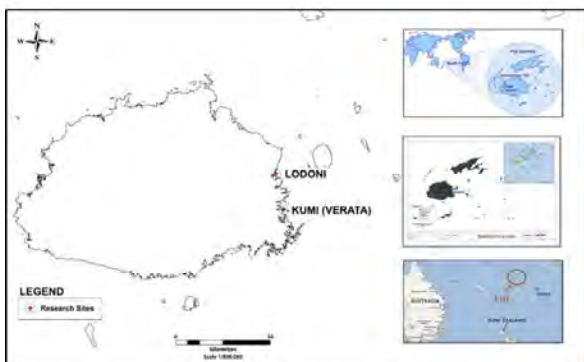
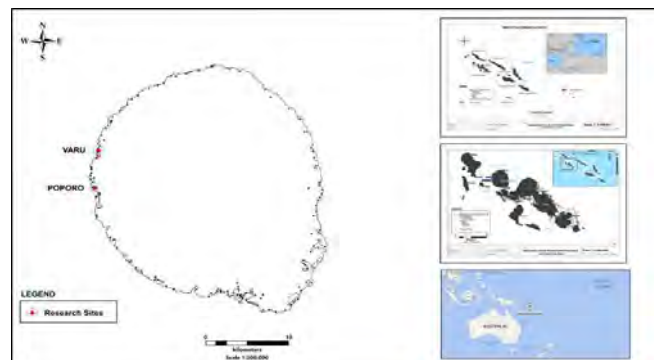
<sup>3</sup> Monitoring, Evaluation, Research, Learning and Adaptation, Forum Fisheries Agency, Honiara, Solomon Islands



## FIJI SITES



## SOLOMON ISLAND SITES



# Coastal Forests: Importance and Knowledge Gaps

## Importance



- ☐ Ecological roles
- ☐ Repositories of culture and tradition
- ☐ House traditionally valued species

## Gap in Framing



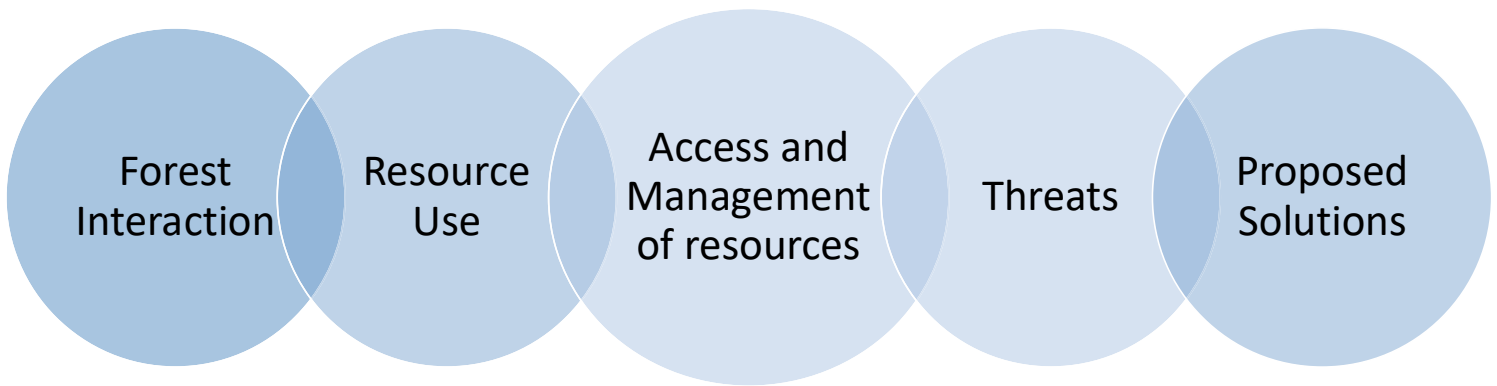
- ☐ Widely Recognized in conservation
- ☐ Often treated a community level knowledge
- ☐ Gendered knowledge is often overlooked

## Study Approach

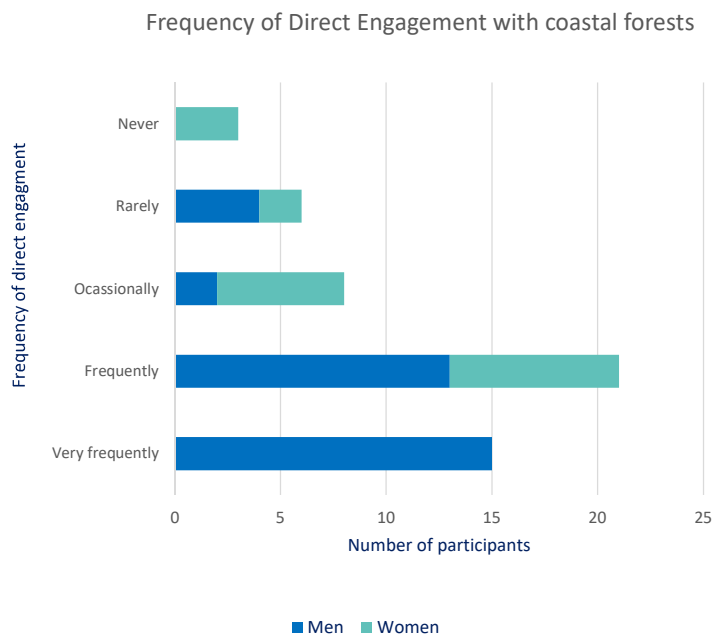
- Community Engagement
  - Cultural protocols observed and FPIC obtained
- Data Collection:
  - Talanoa/Tok Stori
  - Met participants where they were
- Analysis: Thematic analysis
  - 5 themes emerged



# Key Themes from Thematic Analysis



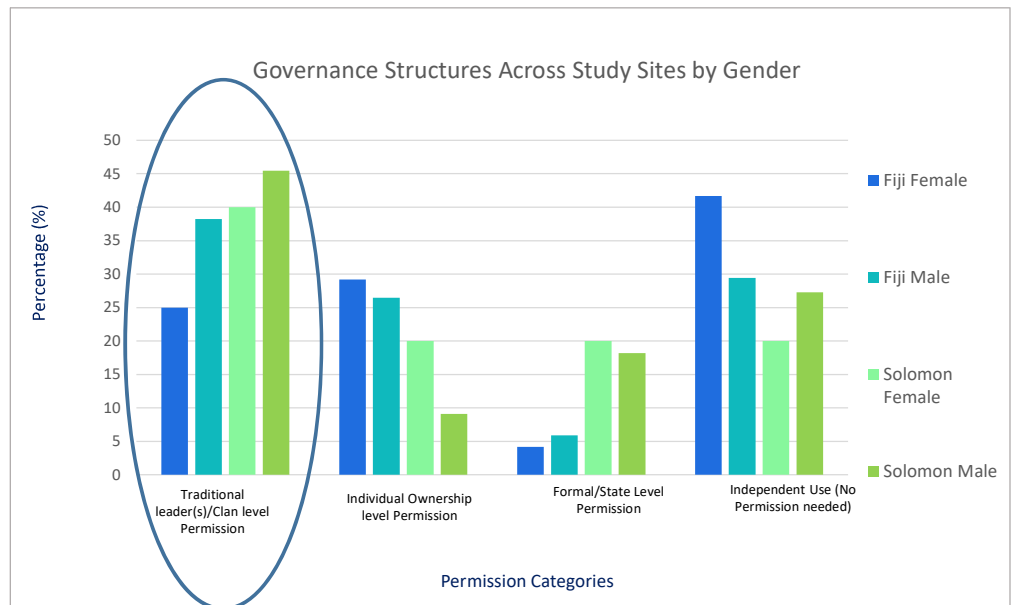
## Patterns in Knowledge Distribution



- TEK is not homogenous within communities
- Similar trends in both Fiji and Solomon Islands
- Knowledge is shaped by
  - Gender, frequency of direct engagement, purpose of visit and type of resources collected
- Direct forest engagement = richer traditional knowledge

# Who Governs Resources?

Traditional or clan leaders are key to forest access and resource rules



## Perceived Threats

| Shared Perceived Threats                                                                                            | Fiji Specific Concern                                                                                                                                                                           | Solomon Is. Specific Concern                                                                                                                                                      |
|---------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>Human activities</li> <li>Climate Change</li> <li>Extreme weather</li> </ul> | <ul style="list-style-type: none"> <li>Men: Climate change, extreme weather, over, harvesting, smothering impact of <i>Merremia peltata</i></li> <li>Women: introduction of Mahogany</li> </ul> | <ul style="list-style-type: none"> <li>Men: Climate Change, logging, extreme weather, overharvesting</li> <li>Women: lack of a chief and lack of respect for authority</li> </ul> |



# Local Solutions to Threats

| Shared Local Solutions                                                                                                                     | Fiji                                                                                                                                                                                                                                                  | Solomon Islands                                                                                                                                                                                                                                                                                                                             |
|--------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Replanting Traditionally valued trees</li> <li>• Minimise unnecessary cutting of trees</li> </ul> | <ul style="list-style-type: none"> <li>• Men: Foster collaboration (Research &amp; planting), eradicate <i>Meremia peltata</i>, establish nurseries, community programs to clean around trees</li> <li>• Women: Stop planting one species.</li> </ul> | <ul style="list-style-type: none"> <li>• Men: partner with companies promoting Sustainable Development, Form community associations, Collaborate with students for tailored program, talk with community how to look after trees, stop monoculture</li> <li>• Women: Strengthen Chief system and forming registered associations</li> </ul> |

## How TEK Enhances Forest Conservation

- TEK is socially distributed, not uniform
- Effective conservation of coastal forests must be informed by both women and men
- Conservation strategies should be co-created with local communities
- Socially distributed TEK strengthens forest governance and resilience.



Thank you for listening

Pacific Academy of Sciences Inaugural Congress  
Apia, Samoa, 16 - 18 February 2026

## Indigenous Knowledge Systems in Solomon Islands, Focusing on the Engineering Traditions of Lau Artificial Islands

Lionel C Kakai (PhD)  
School of Sciences, Solomon Islands National University

### Background and Context

Indigenous knowledge systems in Solomon Islands such as the knowledge and practices used to build the artificial islands of Lau Lagoon (Malaita), shows understanding of how materials, structures and the environment work together. These human-made islands were built over many generations by carefully piling coral rocks, managing tidal water flow, and choosing safe locations. As a result, the artificial islands provide coastal protection from waves while also sustaining local communities living in the lagoon.

From a Pacific Physics view, these coral-built artificial islands in the Lau Lagoon provide valuable case studies of sustainable and coastal engineering that fit the local environment and culture.



### Indigenous Engineering and Physics Principles

Although constructed without formal physics and math formulations, Lau Lagoon artificial islands seemed to embody key physical principles such as:

- Wave energy attenuation and dissipation through irregular coral wall structures and profiles;
  - Load distribution and stability through interlocked coral boulders, gravel, sand and seaweeds;
  - Porosity and drainage allowing gradual energy loss and reduced uplift;
  - Sediment transport control shaped by tidal currents and wall geometry
- It seems that community observations and their selection of site within in the Lau Lagoon align closely with these physical mechanisms.

### Intention

To document Indigenous knowledge and practices and then use Physics engineering analysis to understand their effectiveness in addressing changes in the local and Pacific environment.

### Study Design

This study proposed to combine traditional knowledge with Physics principles using four approaches:

- Community Knowledge – Interview artificial islanders on how they select sites, quarry coral, build walls, and repair islands after big tides or storms;
- Structures & Materials – Check coral walls, foundations and artificial island material composition as well as heights. Do tests on coral rocks for strength, shape, density and porosity;
- Water & Wave Models – Use computer modelling or construct a wave tank to demonstrate how waves hit the artificial islands, how energy is reduced, and how sediment moves;
- Hybrid Designs – Explore and design low-cost prototype revetments combining coral walls with modest use of concrete or other modern materials while keeping them environmentally and culturally safe.

### Expected Outcomes

- Substantial wave energy and height reductions under different coral wall geometries - compare to community views and experiences.
  - Coral wall stability and integrity from irregular coral profiles and maintenance outperform flat rigid walls;
  - Higher porosity improves wave energy dissipation coupled with vertical elevation relative to wave run-up reduces overtopping risk.
- Hybrid design performance may suggest that modest integrated use of concrete and local materials can reduce structural strain while maintaining Indigenous and Physics design principles.



### Implication



"New seawalls also protect low-lying atolls in Tuvalu, and more will appear in Kiribati, Tonga, Solomon Islands, Fiji and other island nations, many with funding from the Australian government and international development organizations" (<https://www.abc.net.au/news/2025-05-01>)

### Main Focus

Lau Lagoon artificial islands are not relics of the past—they are physics-informed Indigenous engineering systems offering viable, culturally grounded solutions for future coastal resilience in the Pacific.

—Harnessing Pacific Knowledge—



- **Name:** Utne ENOCH
- **Affiliation:** Tutor-Division of Fisheries & Marine Resources- PNG UNRE
- **Program:** MSc Student, European Union-Forest, Climate Change and Biodiversity (EU-FCCB) Masters Program in Freshwater Ecology
- **Origin:** Papua New Guinean

2

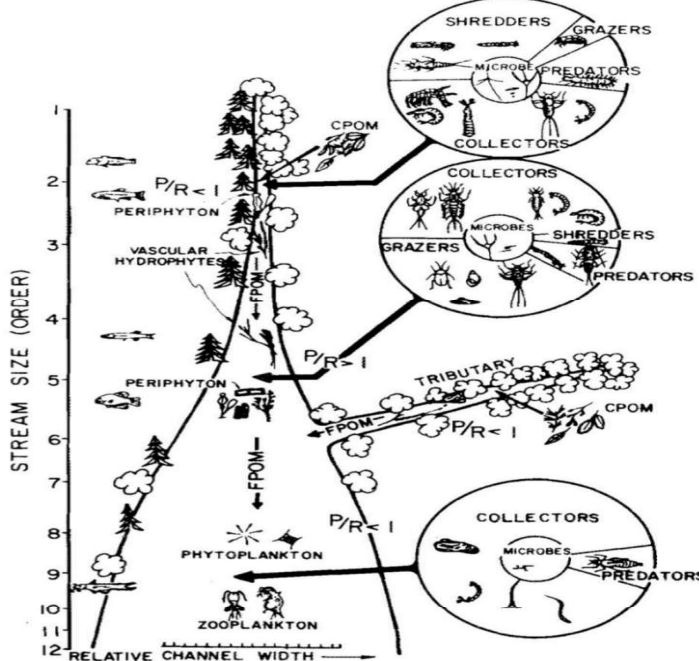
## Research Topic

### **Do Tropical Island River Macroinvertebrates Conform to the River Continuum Concept? Report of a preliminary study of Two Rivers in East New Britain, Papua New Guinea**

**Utne ENOCH** (MSc Candidate)  
&

**Lloyd P. WERRY**  
Division of Fisheries & Marine Resources  
Papua New Guinea University of Natural Resources & Environment (PNG  
UNRE)





**Figure1.** Generalized description of the relationship between stream size (order), energy inputs and ecosystem function expected under the RCC (Vannote et al., 1980)

4

**Diversity of aquatic macroinvertebrate assemblages and their functional feeding groups in the streams of Kota Marudu, Sabah**

<sup>1</sup>Vian V. Chaw, <sup>2</sup>Andrew B. H. Wong, <sup>3</sup>Arman H. Fikri

<sup>1</sup>Institute for Tropical Biology and Conservation, Universiti Malaysia Sabah, Sabah, Malaysia; <sup>2</sup>Water Research Unit, Universiti Malaysia Sabah, Sabah, Malaysia. Corresponding author: A. H. Fikri, arman@ums.edu.my

**Abstract:** Increasing human activities at Kota Marudu (an economic and agricultural hub of northern Sabah) affects water quality and related ecosystem services. However, the impacts of these human activities on the aquatic invertebrate assemblages in tropical streams were poorly understood. Thus, the objective of this study was to determine the biological diversity and functional feeding groups of aquatic macroinvertebrate assemblages of sub-tropical streams under different types of land use. Valley streams and aquatic macroinvertebrates were collected from 8 streams, in 8 sampling trips. A total of 22591 individuals were identified with 136 genera and 17 orders corresponding to 3 main faunal phyla (Arachnida, Mollusca, Arthropoda). Biodiversity indices and biotic indices showed significant spatial differentiation. The biodiversity of aquatic macroinvertebrate assemblages was highest at forested streams and lowest at streams from agricultural lands. In addition, the functional feeding groups also showed significant difference between the forested streams and human-disturbed rivers. Shredders and predators were more abundant in forested streams. In general, land use is an important factor influencing the structure of aquatic communities.

**Key Words:** biological diversity, land use, macrobenthos, tropical streams.

**Spatial Variations in the Distribution of Benthic Macroinvertebrate Functional Feeding Groups in Tropical Rivers**

Marielle Kristine T. Doong<sup>a</sup>, Jonathan A. Anticamara<sup>b,c</sup>, Francis S. Magbanua<sup>a,c</sup>

<sup>a</sup>Institute of Biology, University of the Philippines Diliman, Quezon City 1101, Philippines, <sup>b</sup>Email: jaanticamara@up.edu.ph, <sup>c</sup>Email: fmagbanua@up.edu.ph

<sup>b</sup>UP Diliman Invertebrate Museum, Institute of Biology, University of the Philippines Diliman, Quezon City 1101, Philippines

Received 26 May 2021 Accepted 21 June 2021 Published 30 June 2021  
DOI: <https://doi.org/10.51264/mj.v2i1.11>

**Abstract**  
Functional feeding group (FFG) is an approach that classifies macroinvertebrates based on their utilization of organic matter food resources. Across streams and rivers, variations in the distribution of FFGs reflect the unequal distribution of food resources, which are affected by varying environmental conditions and disturbances to the ecosystem. In the tropics, the distribution of FFGs does not follow the pattern observed in temperate streams. This study aims to (1) determine the FFGs present in selected Philippine tropical streams, (2) assess the variations in FFG distributions and how the distributions vary across space, and (3) evaluate how FFG distributions are affected by certain environmental factors and habitat structure. Benthic macroinvertebrates were collected in 2010 from five sites and assigned to their primary FFG based on published literature. Across study sites, the macroinvertebrates collected were classified into gathering collectors (total  $n = 4,640$ ), scrapers ( $n = 1,670$ ), filtering collectors ( $n = 1,545$ ), predators ( $n = 632$ ), and shredders ( $n = 270$ ). Within and between sites, these FFGs varied significantly. Variations explained the upstream-downstream and north-south variations in the mean of FFG abundance in width and depth of the stream, discharge, temperature, pH, riparian vegetation, and habitat stability and variability. This study reveals that the FFG approach is a useful bioassessment tool in tropical aquatic systems. However, there is still a need for verification of the findings in other streams and seasons.

## Research Gap

RCC has been tested mainly in temperate rivers & continental tropical systems;

- Malaysia: Fikri et al., 2020
- Philippines: Doong et al., 2021
- PNG: Klecka, 2015
- PNG: Yule, 1996

-Research examined RCC in tropical island streams esp. functional feeding groups (FFG) distribution relative to patterns observed in temperate systems remains sparse.

**Aquatic insects of a lowland rainforest in Papua New Guinea: assemblage structure in relation to habitat type**

Jan Klecka

Laboratory of Theoretical Ecology, Biology Centre of the Academy of Sciences of the Czech Republic v.v.i., Institute of Entomology, Branišovská 31, České Budějovice, Czech Republic, 37005

E-mail: jan.klecka@entu.cas.cz

**Running title:** Aquatic insects of a lowland rainforest in Papua New Guinea

**Trophic relationships and food webs of the benthic invertebrate fauna of two aseasonal tropical streams on Bougainville Island, Papua New Guinea**

CATHERINE MARY YULE<sup>1</sup>

<sup>1</sup>Department of Zoology and Australian Centre for Tropical Freshwater Research, James Cook University, Townsville, 4811, Australia.

**ABSTRACT:** The trophic ecology of Konaia Creek, a small mountain headwater stream draining rainforest in the aseasonal tropics on Bougainville Island, Papua New Guinea, was examined and a food web was constructed. The major source of energy in Konaia Creek was allochthonous detritus, most of which had been terrestrially degraded to fine particulate organic matter rather than entering the stream as leaf litter. This fine detritus was collected by the filter-feeders (mostly Simuliidae and also Hydropsychidae) which formed the dominant functional feeding group (64.4% of the fauna). These filterers processed most of the allochthonous detritus and made the energy available to other trophic levels, rather than shredders (1.7% of the fauna) which perform this role in temperate headwater streams. Collector-gatherers made up 22.7% of the fauna, carnivores, mostly Odonata, Decapoda (crabs) and Hydrobiidae, comprised 2.8% of the fauna and grazer-scrapers made up 7.4%. The latter were inhibited by low in-stream production owing to heavy shading and the instability and absence of the substrate due to frequent spates. In comparison, the trophic ecology of the nearby, coastal, Bovo River (with a catchment mainly in rainforest but mostly cleared with introduced species at the study site) was quite different and it was dominated by collector-gatherers (74%) and grazer-scrapers (15%).

**KEYWORDS:** Aseasonal tropical trophic ecology, Bougainville Island, food webs

5



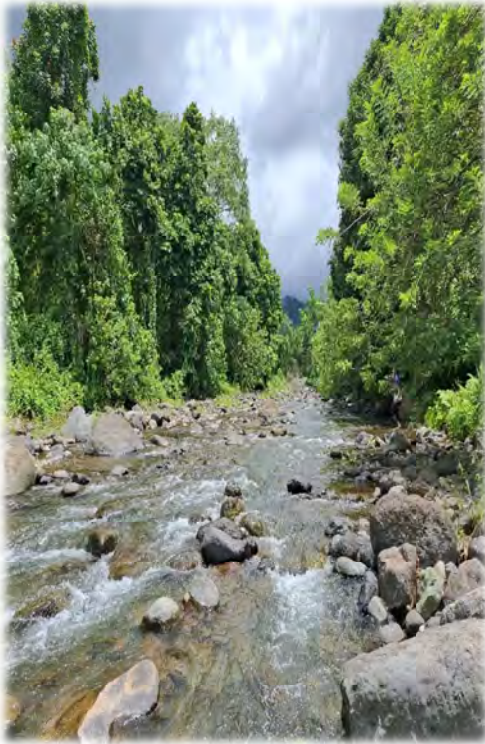
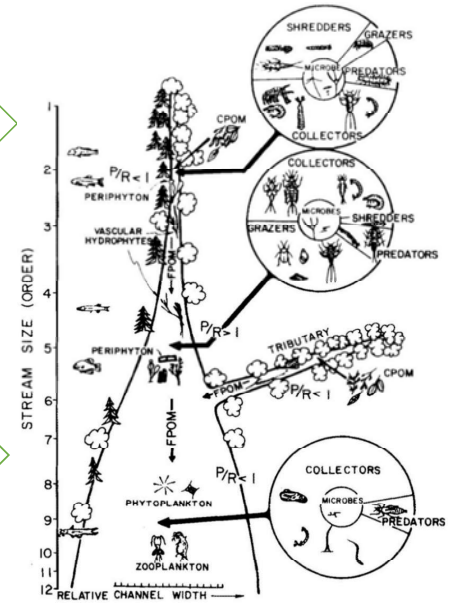


Image of Tavalue Headwater

1. What is the taxonomic composition of macroinvertebrates within the two rivers?

2. Do macroinvertebrates functional feeding groups (FFG) vary along the longitudinal gradient of the two Rivers?

## Research Question

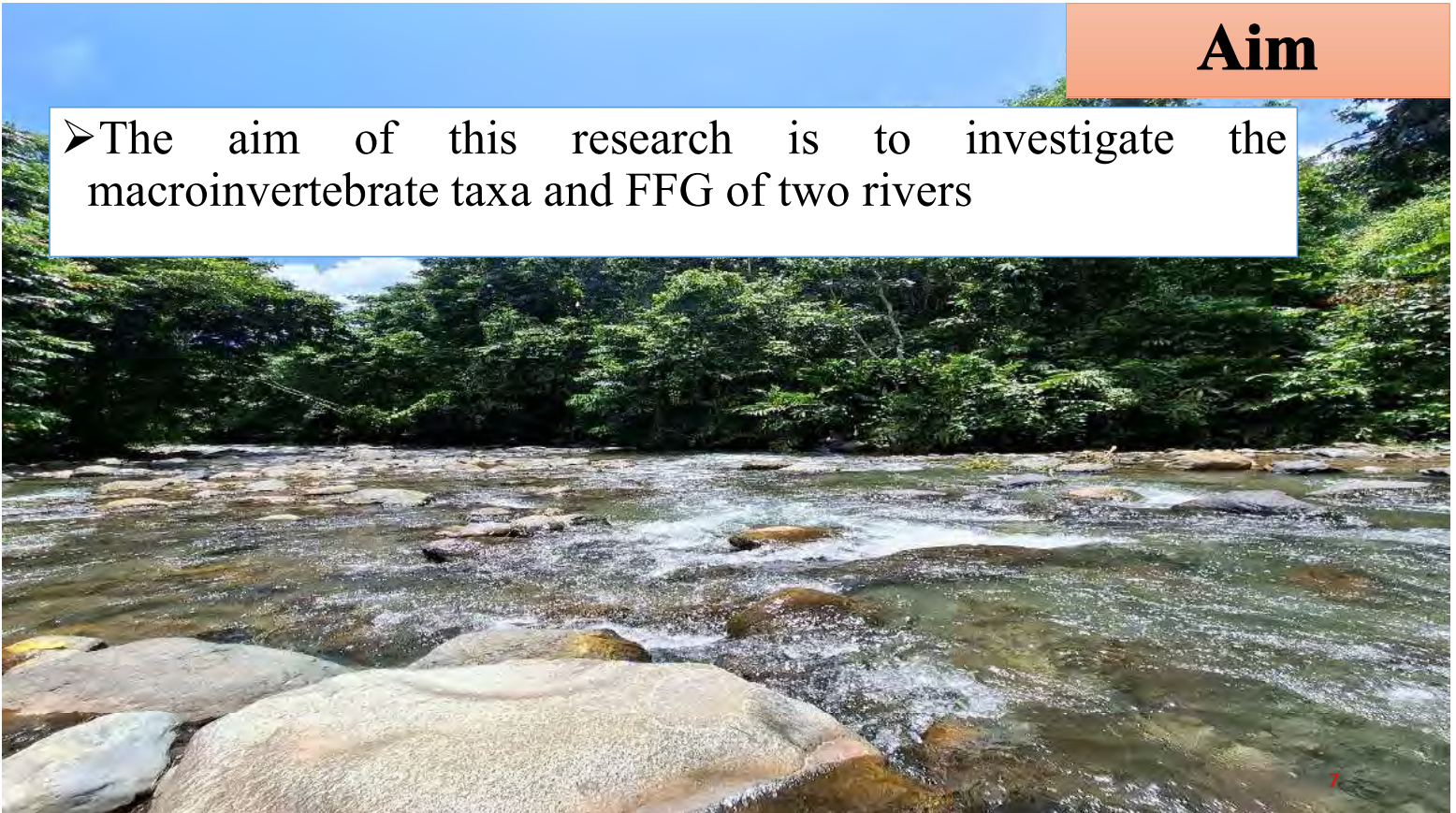


RCC by Vannote et al. 1980

6

## Aim

➤ The aim of this research is to investigate the macroinvertebrate taxa and FFG of two rivers



7



# Methodology

## Sampling sites

- Kerevat and Tavalue rivers chosen for their natural pristine ecological state.
- Similar stream characteristics (stream width, flow, substrate & riparian vegetation)
- Minimal human activity

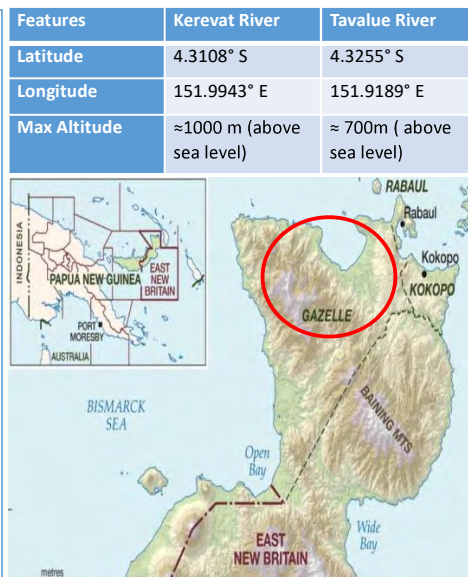


Figure 2. Study area showing the Tavalue & Kerevat Rivers with roads and 100m asl-in East New Britain Province, PNG.

8

## SAMPLING DESIGN & DATA COLLECTION

- Three sampling sites selected along each river
- 7 replicates at each sampling site (21 replicates for each river)
- Surber sampled at only riffle-run segments
- Disturbed the substrate in Surber area (0.09m<sup>2</sup>) for aprox. 2 minutes
- Bugs washed using bare hands from submerged organic debris and coarse substrate
- Randomly sampled 6 to 10 meters interval

# Methodology



Kerevat Headwater sampling

9

## Data collection

- Samples were collected and hand-sorted after sampling
- Placed into labelled bottles in 70% ethanol



10

## Data Processing

- In the lab macroinvertebrates were identified and sorted into:
  - Order and Family level
  - Functional Feeding Groups (FFG)
  - Individual count for each family & FFG
  - Ephemeroptera (mayflies), Placoptera (stone flies), & Tricoptera (caddis flies) (EPT)
- Identification using *The Waterbug Book* (Gooderham & Tsyrlin, 2002)
- Dissecting microscope used for identification



Lab data processing

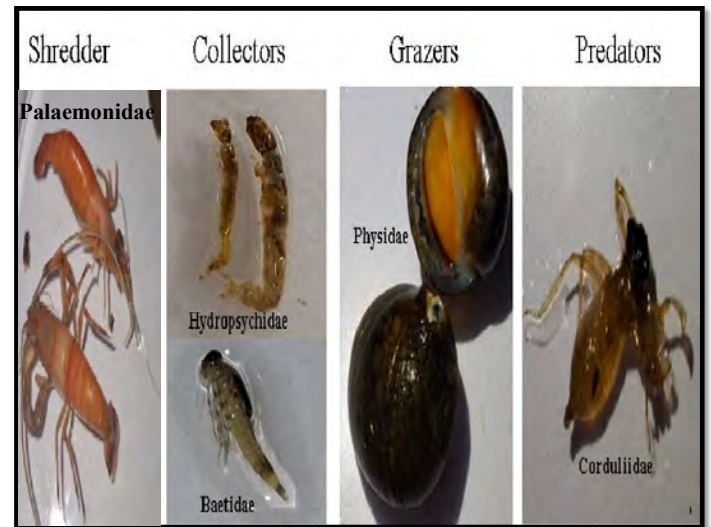


11



## Data Processing

- FFG data was organized in a spreadsheet and visualized as staked bar charts to illustrate composition and diversity of feeding strategies.
- EPT data was organized in tabular format to highlight spatial variation in diversity across headwaters, middle reaches and lower reaches.
- EPT Index was calculated:
- $EPT\ Index = [(E + P + T) / \text{total macroinvertebrates}] \times 100$



Examples of tropical freshwater macroinvertebrates representing different FFG (Shredders, Grazers/Scrapers, Collectors & Predators).  
Photo by Utne Enoch, Tavalue & Kerevat Rivers, PNG, 2024.

12

Table 1. EPT Index for Tavalue and Kerevat River

| Reaches        | Order         | Family            | Tavalue (%) | Kerevat (%) |
|----------------|---------------|-------------------|-------------|-------------|
| Head Water     | Ephemeroptera | Baetidae          | 4.6         | 10.4        |
|                |               | Leptophlebiidae   |             | 25.0        |
|                | Plecoptera    |                   | 0           | 0           |
|                | Tricoptera    | Polycentropodidae | 40.0        | 0           |
|                |               | Hydropsychidae    | 55.4        | 64.6        |
|                | EPT Index     |                   | 36          | 48          |
| Middle Reaches | Ephemeroptera | Baetidae          |             | 10.8        |
|                |               | Leptophlebiidae   | 12.7        | 1.5         |
|                | Plecoptera    |                   | 0           | 0           |
|                | Tricoptera    | Hydropsychidae    | 87.3        | 83.3        |
|                |               | Hydrobiosidae     | 0           | 4.4         |
|                | EPT Index     |                   | 69          | 68          |
| Lower Reaches  | Ephemeroptera | Baetidae          | 0           | 92.3        |
|                |               | Leptophlebiidae   | 0           | 6.2         |
|                | Plecoptera    |                   | 0           | 0           |
|                | Tricoptera    | Hydropsychidae    | 100         | 0           |
|                |               | Hydrobiosidae     | 0           | 1.5         |
|                | EPT Index     |                   | 14          | 89          |

## Result & Discussion

-No records of Plecoptera across all sites suggest that specific micro-habitats (like loss, cool gravel) or low temperature they require were not present

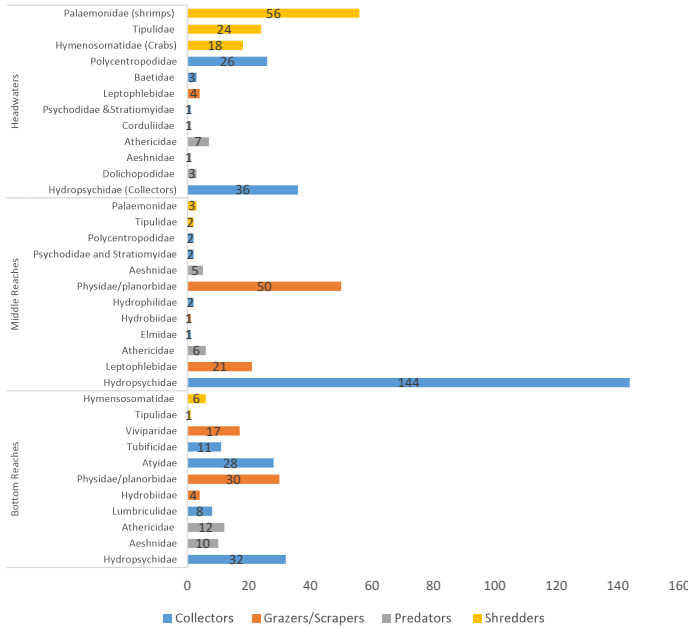
-Increased Hydropsychidae downstream indicates a steady flow of organic particles (FPOM)

- Kerevat river EPT increased down stream indicated homogenous vegetation cover with minimal disturbances
- Lower section of Tavalue river face different environmental pressures, such as sedimentation or slower flow, which limits diversity to only the hardies Hydropsychidae.
- Overall Water Quality: Middle reaches is relatively high due to availability of food and low pollution.

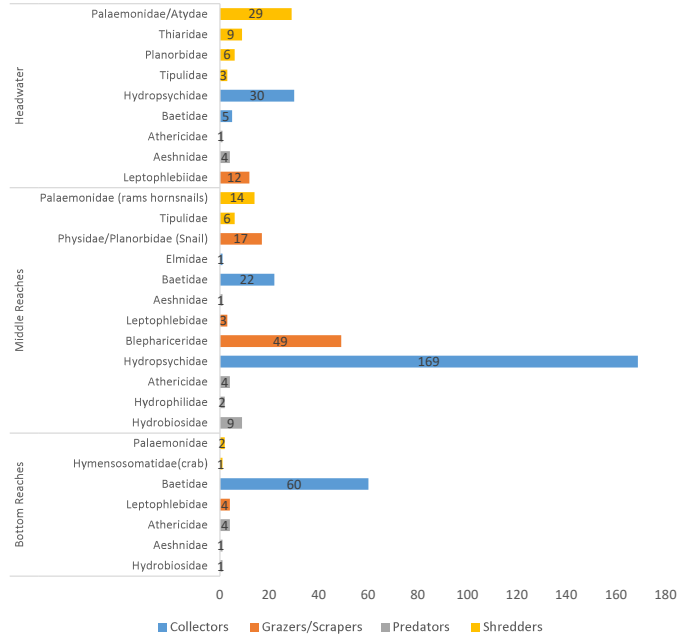


## Result & Discussion

A). Taxa FFG Distribution-Tavalue River



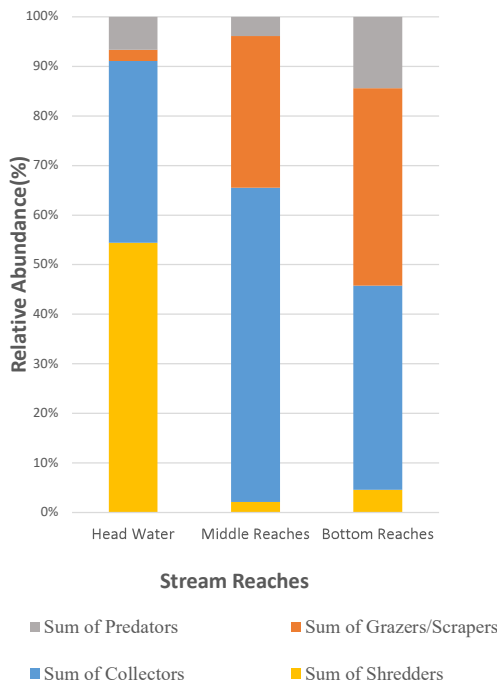
B). Taxa & FFG Distribution- Kerevat River



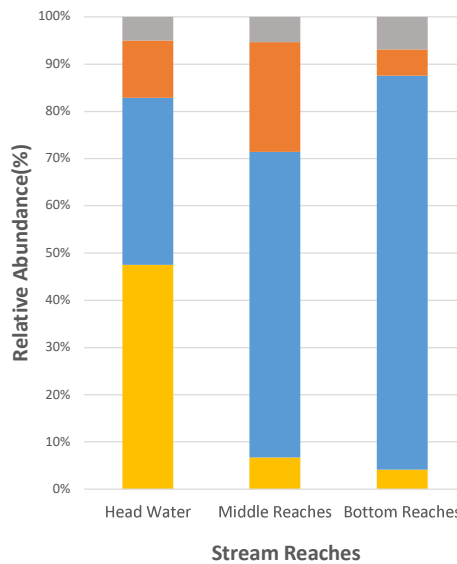
**Figure 4:** Taxa and FFG distribution of the Tavalue and Kerevat Rivers across three distinct sections: Headwaters, Middle Reaches and Lower/Bottom Reaches

14

A). Functional Feeding groups-Tavalue River



B). Functional Feeding groups- Kerevat River



**Figure 3.** Relative abundance of macroinvertebrates functional feeding groups (FFG) across stream reaches (head waters, middle, bottom) of Tavalue and Kerevat Rivers.

## Result & Discussion

- Conform to RCC but shredders niche occupied by crustaceans (crabs & shrimps) & Gastropods
- Persistence of shredders downstream-shorter stream lengths & the presence of homogenous riparian vegetation from head to mouth
- Hydropsychidae dominate as collectors: Ecosystem engineers & Passive Filterers
- Grazers/Scrapers: increase in grazers in certain reaches-exposed substrate with less riparian vegetation
- Deviations due to anthropogenic influences (Tavalue): land use changes affect the functional aspects

# Conclusion and Recommendation

- Results show a general conformity of functional macroinvertebrate profile to River Continuum Concept
  - (from shredder-dominated assemblages in the headwaters to the collector-dominated assemblages in the downstream sections)
- Crustaceans and gastropods function as the primary shredders - Classic EPT shredders are low/absent
- No Plecoptera - Absence of Plecoptera taxa in both rivers noted. Anthropogenic activities pose risks to ecological integrity
- More studies needed to properly assign/review model
  - Shorter stream/river length (head to mouth) may have a different model
  - Similar stream size (head to mouth)

16

# Acknowledgement

- **PNG UNRE:** For the generous funding and institutional support of this research
- **Dr. Heveakore Maraia (PhD):** For valuable insights
- **Colleagues (Walter Panias, Willie Takale & Cedric Junior):** For field assistance
- **Pacific Academy of Science:** For Funding my travel and granting me the opportunity to present this research

17

# The End

Any Questions/Comments?



18



Weaving Worlds: Biocultural Knowledge,  
Local Contexts, and the Future of Science in  
the Pacific

*PACIFIC ACADEMY OF SCIENCES CONGRESS  
SAMOA*

Jeffrey Noro (PhD)  
Research Fellow  
Melanesia Bio-Cultural Network (MBCN)  
University of Melbourne







## Our people at the centre of science

### Context

The Pacific is a Region of Deep Knowledge Systems

- PACIFIC = one of Earth's richest biocultural regions
- 90–95% customary land and sea; TEK embedded in:
  - *stewardship*
  - *customary governance*
  - *language & lineage*
- Conservation = *not new* — re-affirmed at ICCB 2025 (Bougainville, PNG, SI, Vanuatu, New Caledonia)
- Yet, fragmentation, loss of knowledge, climate impacts, changing economies, and weak coordination continue to threaten TEK.







## The Problem: Fragmented Knowledge, Disconnected Systems

- No regional mechanism for TEK coordination or shared standards (ethics, IP, consent)
- Communities isolated; universities disconnected from customary governance
- Policy frameworks (CBD, GBF, IPBES) require Indigenous knowledge input—yet no single platform manages this consistently
- Funding tends to be short-term, external, donor-driven

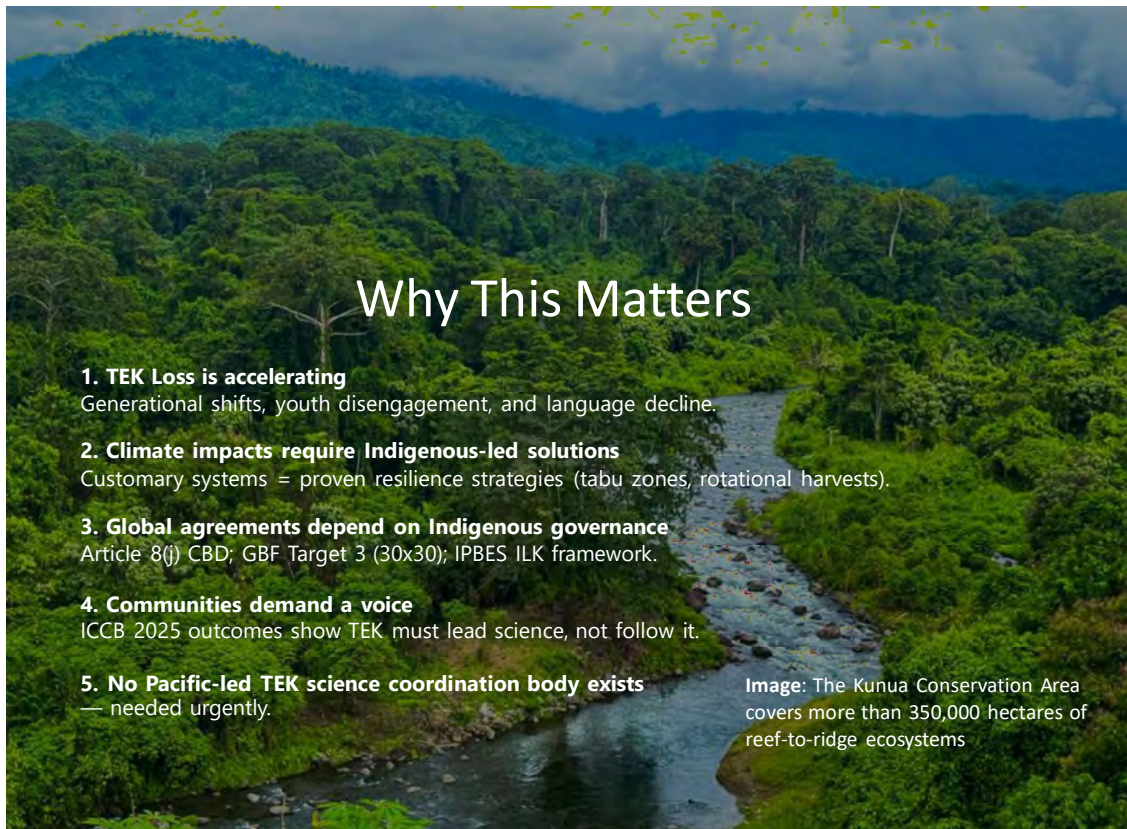
*Image: Our first "Kastom Symposium" at the University of Melbourne in 2024. We had representatives from New Caledonia, Vanuatu, Solomon Islands, Papua New Guinea, and the Autonomous Region of Bougainville*



*Image: Women in Kunua, Bougainville, recording and archiving knowledge on plants that are rare and endemic to the place.*

## The Vision: A Regional TEK platform

- Anchored by the **Melanesia Bio-Cultural Network (MBCN)**
- A regional architecture to:
  - Protect TEK
  - Support knowledge transmission
  - Provide ethical research protocols and data governance
  - Facilitate co-produced science
  - Link communities → universities → policymakers
  - Support communities in meeting CBD, UNFCCC, GBF targets
- Demonstrated demand from communities at International Congress on Conservation Biology & Kastom Symposium (2024–2025)



## Why This Matters

### 1. TEK Loss is accelerating

Generational shifts, youth disengagement, and language decline.

### 2. Climate impacts require Indigenous-led solutions

Customary systems = proven resilience strategies (tabu zones, rotational harvests).

### 3. Global agreements depend on Indigenous governance

Article 8(j) CBD; GBF Target 3 (30x30); IPBES ILK framework.

### 4. Communities demand a voice

ICCB 2025 outcomes show TEK must lead science, not follow it.

### 5. No Pacific-led TEK science coordination body exists

— needed urgently.

**Image:** The Kunua Conservation Area covers more than 350,000 hectares of reef-to-ridge ecosystems



*Image: Co-Director for the Oceania Institute, Dr. Debra addresses members from Melanesia during the 2024 "Kastom Symposium."*

What  
universities  
gain  
(Value  
Proposition)

#### For regional universities:

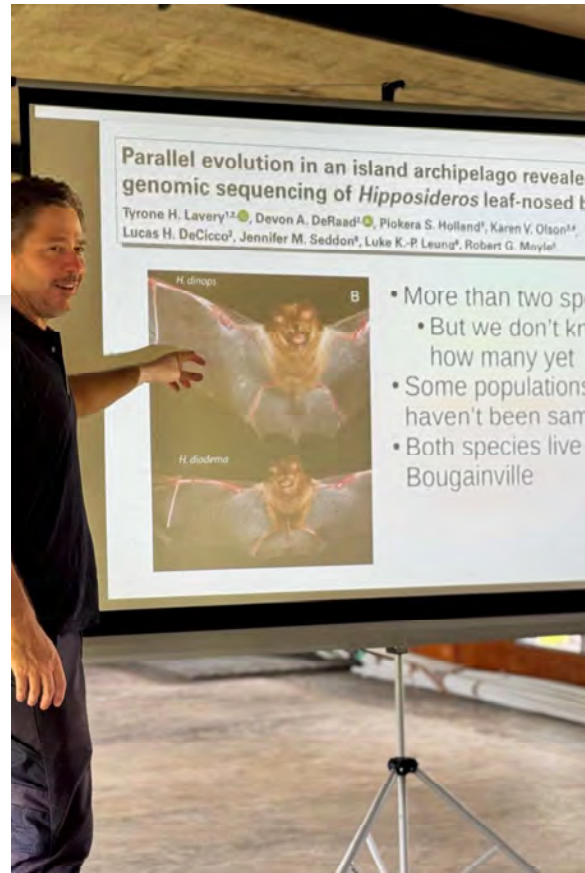
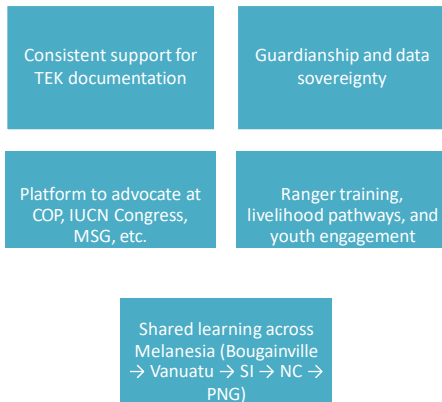
- Strengthened research portfolios
- TEK integration in curriculum
- International partnerships and visibility
- Recognised seat in global biodiversity and climate frameworks

#### For the University of Melbourne:

- Leadership in decolonising science
- Connection to regionally anchored climate & biodiversity work
- Research impact aligned with Advancing Melbourne 2030



# What Communities Gain



## The MBCN Model in Practice

Use success stories:

- **Kunua Conservation Network (Bougainville)**
- **Piku Biodiversity Network (PNG)**
- **Baru Conservation Alliance (Solomon Islands)**
- **Nanauarehed Tabu Eria (Vanuatu)**
- **Horizon Roussettes (New Caledonia)**
- **Gardiens Les Isles (New Caledonia)**

Each demonstrates why TEK coordination matters at the regional level.

Collectively, these partners are conserving up to **half a million** hectares of **biodiversity = chemical and genetic diversity**

# Connecting TEK to Science



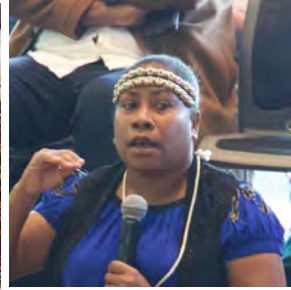
Chief Esau Kekeubata, BARU  
Adjunct Professor, JCU



Mr. Willie Missack, Vanuatu  
PhD Candidate, Wellington



Dr. Malik Oedin, PhD  
Director Gardiens Des Isles



Ms. Yolarnie Amepou, BSc.  
Director, PIKU



Dr. Junior Novera, PhD  
Chief Scientist, Kunua CN



Mrs. Dorothy Kekeubata,  
BARU, Fellow at JCU



Ms Martika Taki, Vanuatu  
Protected Areas Officer, BSc



Mr. John Lamaris, PNG  
PhD Candidate, Monash

## Proposed Implementation Pathway

**Year  
1:**

Establish TEK Coordination Unit (MBCN)

Set up 3 pilot National TK Nodes

Develop regional ethics + IP framework

**Year  
2–3:**

Expand nodes to all Melanesian countries

Launch TEK Repository

Regional ranger training

Community microgrants

**Year  
4–5:**

Integration into Pacific policy systems

Annual TEK Congress

Long-term funding secured via blended streams



## Funding Models: Hybrid, Multi-Node Funding Architecture

### 1. In-Country University Partnerships

- Solomon Islands National University (SINU)
- University of Papua New Guinea
- University of New Caledonia
- Each hosts a **National TK Node** with:
- A coordinator (co-funded by MBCN + national institutions)
- Local research partnerships
- Access to student/academic labour
- TEK documentation programs

### 2. University of Melbourne Global Engagement Streams

- Oceania Fellowships
- Joint research grants
- PhD and Master's exchange pathways (Already demonstrated by ICCB funding support)

### 3. Regional & Global Funding Mechanisms

- CBD Bio-Bridge Initiative (previous funder)
- GEF-8 (especially TEK components)
- SPREP, MSG, PIFS regional grants
- DFAT, MFAT, Fonds Pacifique
- UNESCO Local Knowledge programmes

### 4. Community-Led Enterprise + Microgrant System

- TK-based enterprises (e.g., crafts, botanicals, biocultural tourism)
- Seed grants from MBCN + partners
- % revenue reinvested in national TEK nodes

## Business System for Bio-Cultural Assets

### • Elements

- Land, Biodiversity, People, culture, traditional knowledge,
- Local Institutions, indigenous researchers, budget resources

### • Connections

- Value-adding networks, Market Access, Supply Chains, Enabling Policies, Governance
- Research and Development, Ethics, Intellectual Property Rights, Technology Transfer, Material Transfer Agreements

### • Purpose or function

- Cultural and Social cohesion, sustainable development, entrepreneurship, Nation Building
- New knowledge creation, innovation, informed society,



**Universities:** co-host national TK Nodes

**Governments:** align TEK priorities with CBD GBF targets

**Community groups:** join the regional knowledge platform

**Donors:** fund a proven, community-led model

**PAS participants:** support Pacific's unified TK voice



A Presentation by Yolarnie Amepou

Director - Piku Biodiversity Network Inc

Member of the Melanesian Bio-cultural Network (MBCN)



# Acknowledgement

I acknowledge that this presentation is made in Apia, on the ancestral lands and ocean space of the Samoan people.

I pay respect to the *aiga, matai*, and ancestors whose stewardship continues to care for this place,

I am grateful to speak and share in their living cultural space.

I acknowledge that I speak here as part of a regional network of Melanesian communities as a member of the Melanesian Biocultural Network.



## What is Bioculture?

The Living relationship between people and nature and how this relationship influences their culture (Their way of knowing, doing and being) and who they are.

The recognition that biodiversity and culture are one system



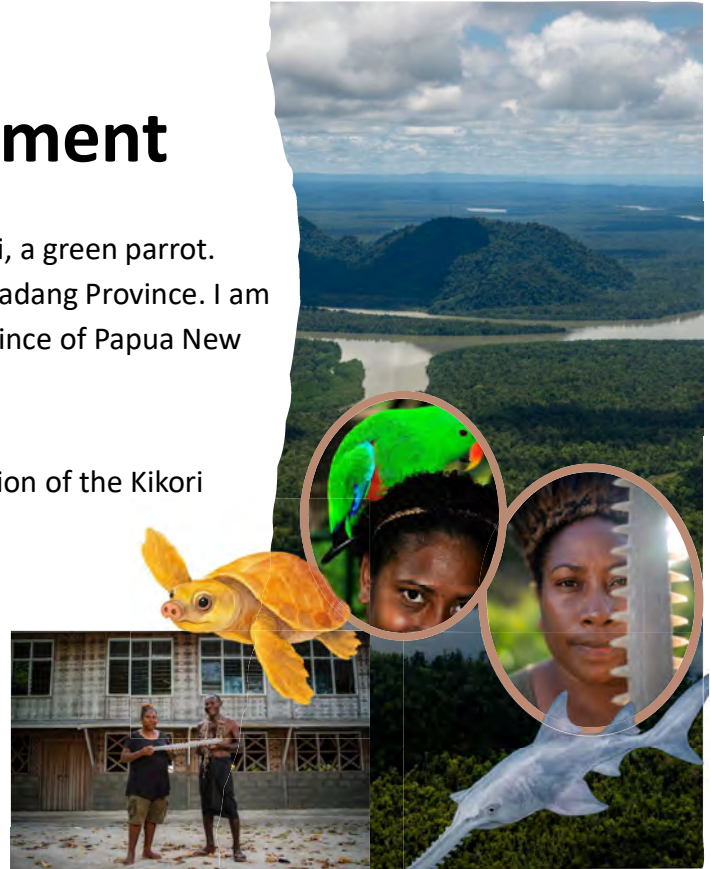




# Positionality Statement

- I am *Kiu*, the sea turtle, who flew down a river as a Matiti, a green parrot.
- I am of the Duapap clan of the tribe Sangumaar of the Madang Province. I am of the Agapu clan of the Mekeo tribe of the Central Province of Papua New Guinea.
- I am Director of the Piku Biodiversity Network, an extension of the Kikori River Community who we serve,
- Member to the MBCN

We are Working within these Customary Governance systems



## Recognition of Guardianship

- Peoples of Melanesia and the greater Pacific are guardians of people, place, and story.
- We are born into relationships with ocean, river, forest, sky, and all living systems.
- Our knowledge systems are governed by lore, shaped through ancestral memory, spiritual obligation, and responsibility across generations.
- These relationships are guided by underlying cultural principles — Relationships, Reciprocity, Responsibility, and Respect.
- Culture, place, and spirit are inseparable.



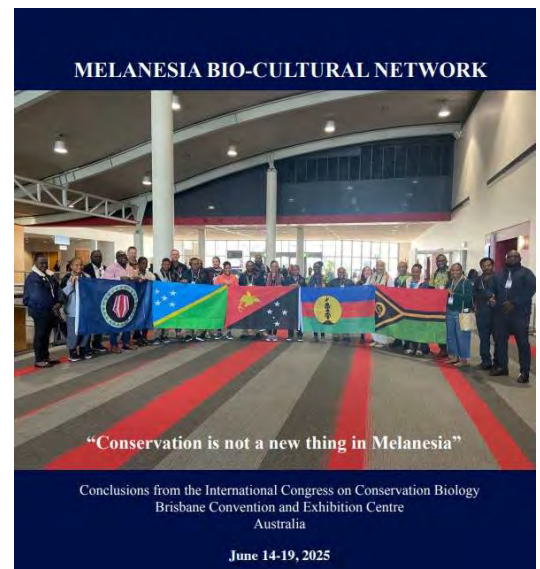


# Navigating Guardianship



## Why Do Communities Need Regional Platforms?

- To connect science with lived realities.
- To recognise and work with existing knowledge and governance systems.
- To amplify cultural voices and knowledge systems.
- To correct misrepresentations of participation within cultural systems.
- Participation that is grounded, recognised, and supports self-determination and sovereignty.



## Community-Led Conservation in Practice: Piku Biodiversity Network

## Community-Led Conservation in Practice: Piku Biodiversity Network



- **Who and Where?** The PBN is a CBO working from Kikori in PNG
- **How?** Communities define what conservation means to them
- **Why this matters?** Communities are not just participating in conservation — they are leading it.



## Strengthening Community–Science Partnerships

- Connecting communities, universities, and regional networks
- Supporting co-produced research grounded in place
- Strengthening shared capacity and leadership
- Creating opportunities for mutual learning across Melanesia
- Enabling self-determination and sovereignty in research







Thank you



# Pacific Academy of Sciences Congress

*Harnessing the Knowledge of the Pacific*

17 February 2026

Professor Sir Ashley Bloomfield

# Do people trust science?

“ There is unequivocal evidence that Earth is warming at an unprecedented rate. Human activity is the principal cause”

From the organisation tasked with getting people into space and back using...science.



Evidence - NASA Science  
science.nasa.gov

## It depends!!!

Planet Detroit

[Trump EPA set to repeal scientific basis for US climate change policy](#)

2 days ago



## NASA Unlocks Golden Age of Innovation, Exploration in Trump's First Year



Jennifer M.  
Dooren

JAN 20, 2026



RELEASE

26-011

NASA Headquarters



- <https://www.nasa.gov/news-release/nasa-unlocks-golden-age-of-innovation-exploration-in-trumps-first-year/>



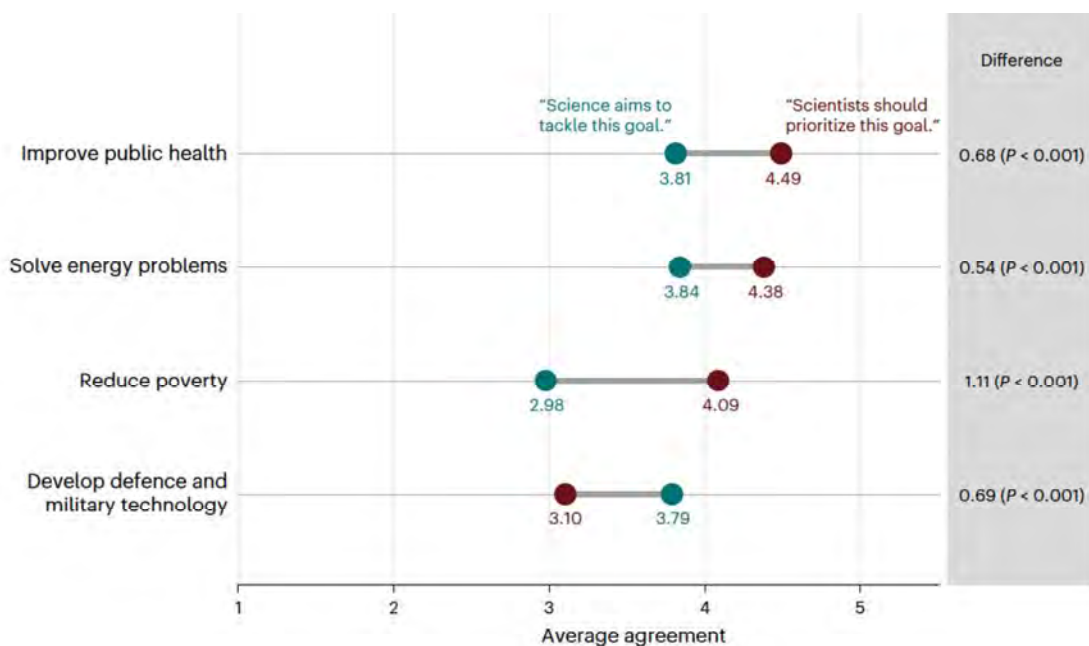
# Public Trust in Science

## Nature Human Behaviour Jan 2025

- Trust remains "moderately high" (3.62 out of 5) across 68 countries: range 3.05-4.30) and 78% rated scientists as "highly competent"
- Variations between and within countries – notably by political orientation.
- Lack of trust in scientists by even a small minority may affect considerations of scientific evidence in policymaking

<https://www.nature.com/articles/s41562-024-02090-5>

## Perceived and desired priorities for scientific research



# Who do people trust to lead innovation?

## Edelman Trust Barometer 2024

- Scientists and experts are the most trusted to lead on the innovation of new technologies e.g. AI, green energy, gene-based medicine
- Resistance to innovation is political, with a strong bias towards people on the right of the political spectrum (USA being a major outlier here)
- Listening and communication are the top ‘trust-building’ actions
  - **Communicate pluses and minuses**
  - **Hear our concerns, let us ask questions**



“[Giorgio Parisi] argues that it is not enough for scientists to communicate their results to the public. They must communicate *how* they arrived at those results—“we must...**show our work**”.”

Horton R. Offline: is there really a trust crisis in science. The Lancet 29 November, 2025

[https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(25\)02371-2/fulltext?rss=yes&\\_cf\\_chl\\_tk=JFe3YHY38SMtsUNrprx8NvGV4zdZw5ZgHhLMO5xxA08-1771033306-1.0.1.1-.4pqp87k.XHj3FrYwGru4T0.Iq8n0q6JowWdHCkSyto](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(25)02371-2/fulltext?rss=yes&_cf_chl_tk=JFe3YHY38SMtsUNrprx8NvGV4zdZw5ZgHhLMO5xxA08-1771033306-1.0.1.1-.4pqp87k.XHj3FrYwGru4T0.Iq8n0q6JowWdHCkSyto)



# Current science challenges

- Environmental Crises & Sustainability
- Funding & Resource Constraints
- Geopolitical & Structural Barriers
- Technological Ethics & AI
- Research Integrity & Quality
- Measuring and communicating impact and benefit



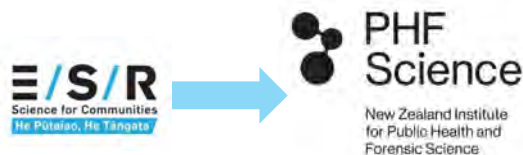
## Public Research Organisations



New Zealand Institute for Advanced Technology



# PHF Science key info



## Scope of operations

- Health security and pandemic preparedness
- Forensic Science and justice services
- Drug harm prevention and integrated health-justice interventions
- Environmental health and risk science
- Food safety and public protection
- Science for policy and public good

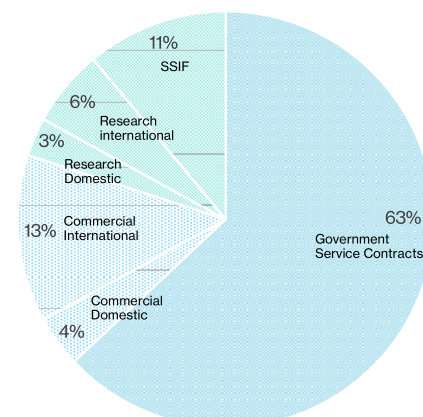
Our purpose is to enhance and protect New Zealand's public health and justice systems to support economic growth and resilience, innovation, improved health, safety and security for people and communities.

[Interim Statement of Core Purpose 2025]



• 503 FTE (June 2025)

## PHF Science FY26 Revenue by Line of Budget



# PHF Science and the Pacific

For over 20 years PHF Science has been a partner in many Pacific Island development projects. We built our approach on working **with and for** our country partners.

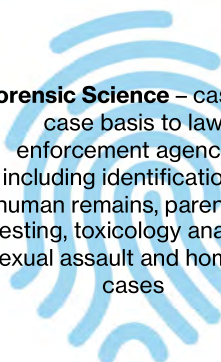
We work at all levels – national, regional, provincial, local/community and institutions (schools and health facilities in particular). Our work areas include:

**Water and environment** – WASH (water, sanitation and hygiene), water security, vector borne disease, food safety, climate change, air quality, vector-borne disease, radiation safety and protection and environmental radiation monitoring



**Health** – communicable disease, regional reference laboratory

**Forensic Science** – case-by-case basis to law enforcement agencies including identification of human remains, parentage testing, toxicology analysis, sexual assault and homicide cases



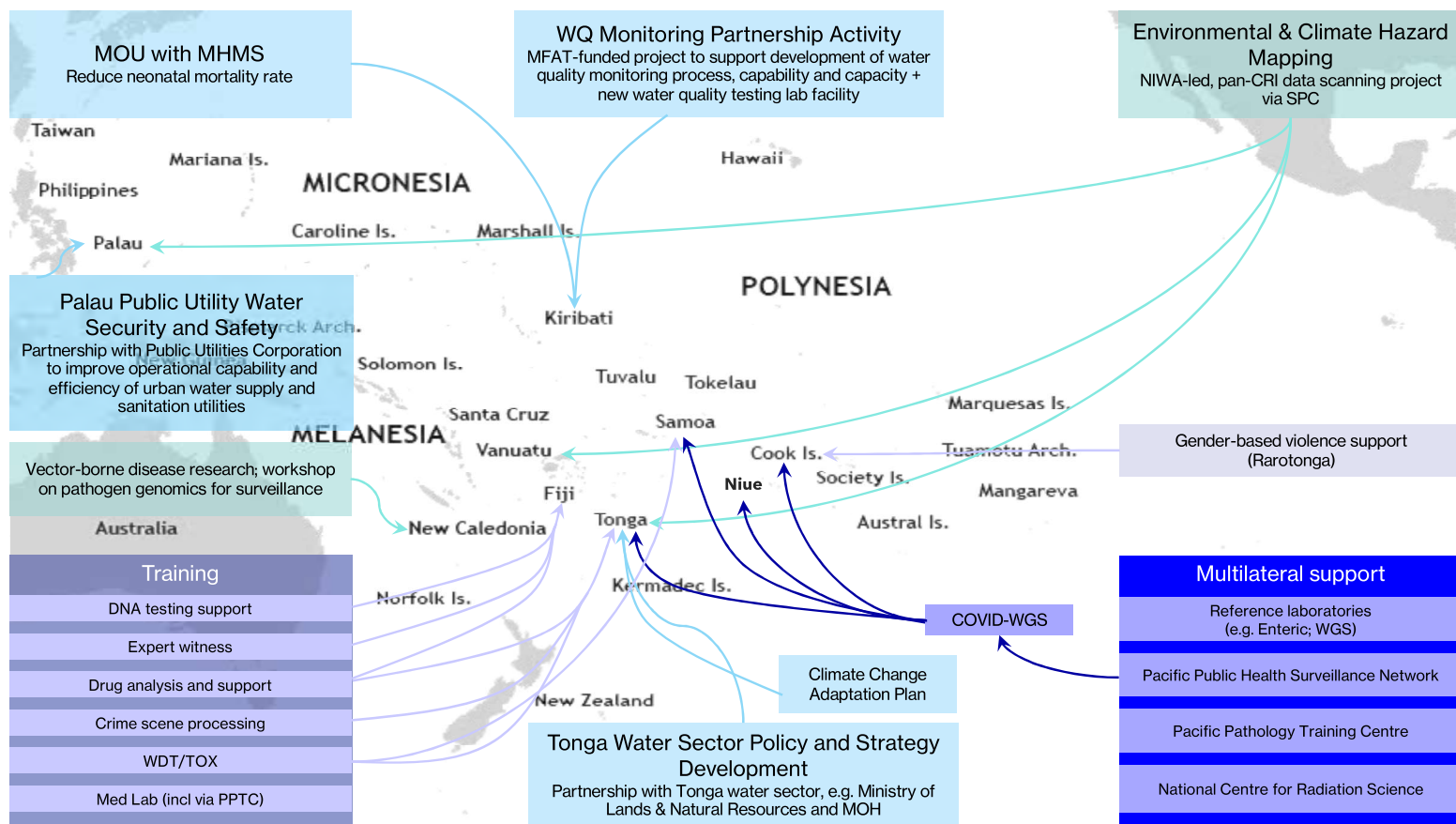
PHF Science also supports the **Pacific Public Health Surveillance Network** through participating in its governance, and supporting implementation and sustainability planning



NZ MFAT is a key partner for our work in the Pacific.







# Water and Environment

## Outcomes

- Reduced harm from water-borne illness through policy and improved monitoring and increased access to safe drinking water for communities
- Improved health outcomes and increased in-country capability through training and provision of tools and facilities

### Developing robust systems for sustainable and safe water use in Palau

*with Public Utilities Corporation and Department of Environment*

- Improving the operational capability and efficiency of urban water supply and sanitation utilities.
- Development of a water and wastewater database.
- Expansion of GIS skills and capability in-country

### South Tarawa Water Quality Monitoring Partnership and Public Utilities Board Technical Assistance Programme in Kiribati

- Development of water quality monitoring systems for freshwater and lagoon water quality, including development of National Drinking Water Standards for Kiribati and National Lagoon Water Guidelines for Kiribati.
- Build and provide training for a water quality monitoring laboratory to be situated in South Tarawa.
- Expert advice on source water quality, for the deployment of two newly commissioned desalination plants that will be providing the only drinking water supply to South Tarawa.

# Health

## Outcomes

- Improved preparedness for exotic communicable diseases, through strengthened early detection and response systems for arboviral threats like dengue across New Zealand and the Pacific.
- Improved biosecurity protocols through integration of mosquito genomics into public health frameworks.
- Enhanced regional capacity to manage climate-driven risks, supporting resilience in Pacific communities.

### Vector surveillance

- Genomic databanks developed to trace the geographic origins of exotic mosquito species in New Zealand.
- Predictive framework created to anticipate future introductions and evaluate climate-related establishment factors.
- Multidisciplinary collaboration across New Zealand, Australia, and Pacific Islands, with integration of Ngā Tikanga Māori perspectives.

### Emerging Molecular Pathogen Characterisation Technologies (EMPACT)

- A WHO initiative for enhancing genomic sequencing and surveillance of infectious diseases in the Western Pacific Region.
- PHF Science has been supporting the development of a regional roadmap for pathogen genomic sequencing surveillance and supporting communities of practice.



# Forensics

## Outcomes

- Increase the incorporation of timely and robust forensic evidence in investigations and court proceedings.
- Increase stakeholder confidence by providing quality evidence for investigations and court proceedings.

### Fiji Police Forensic Biology & DNA Service capability development

- Continued forensic drug analysis training, including complex casework.
- Remote assistance and troubleshooting for laboratory instruments.
- Development of SOPs for new methodologies.
- Providing advanced and refresher instrument training
- Continued development and refinement of quality processes including documentation

### Forensic Casework Support

- PHF Science provides forensic science services on a case by case basis to law enforcement agencies in the Pacific region.
- In the last five years this has included identification of human remains, parentage testing, toxicology analysis, sexual assault and homicide cases.

### Capability development – support and supervision for students

Our scientists provide teaching and research supervision for students from the Pacific region by linking with the Forensic Science Programme at the University of Auckland.



# Pacific Public Health Surveillance Network

We support the Pacific Public Health Surveillance Network through:



Being a PPHSN Coordinating Body member supporting governance of the network



Development and implementation planning of the PPHSN Strategic Framework 2026-2035



Supporting the next steps of the WHO-led Pacific Outbreak Manual update project (providing expert advice at the Working Group)



Supporting discussions on priority surveillance, collaboration and capacity development areas e.g. response planning for epidemics & pandemics; establishing a Regional EpiNet outbreak response team)



Contributing to building a One Health Network



Supporting sustainable laboratory capability through LabNet.



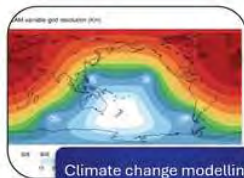
## ESNZ in the Pacific



Hydromet monitoring & forecasting



Ocean observation & modelling



Climate change modelling



Marine ecology & biosecurity



Geohazard monitoring



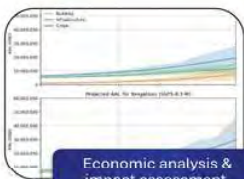
Climate resilient infrastructure & design



Risk reduction & early warning systems



Fisheries management



Economic analysis & impact assessment



Data science & high-performance computing



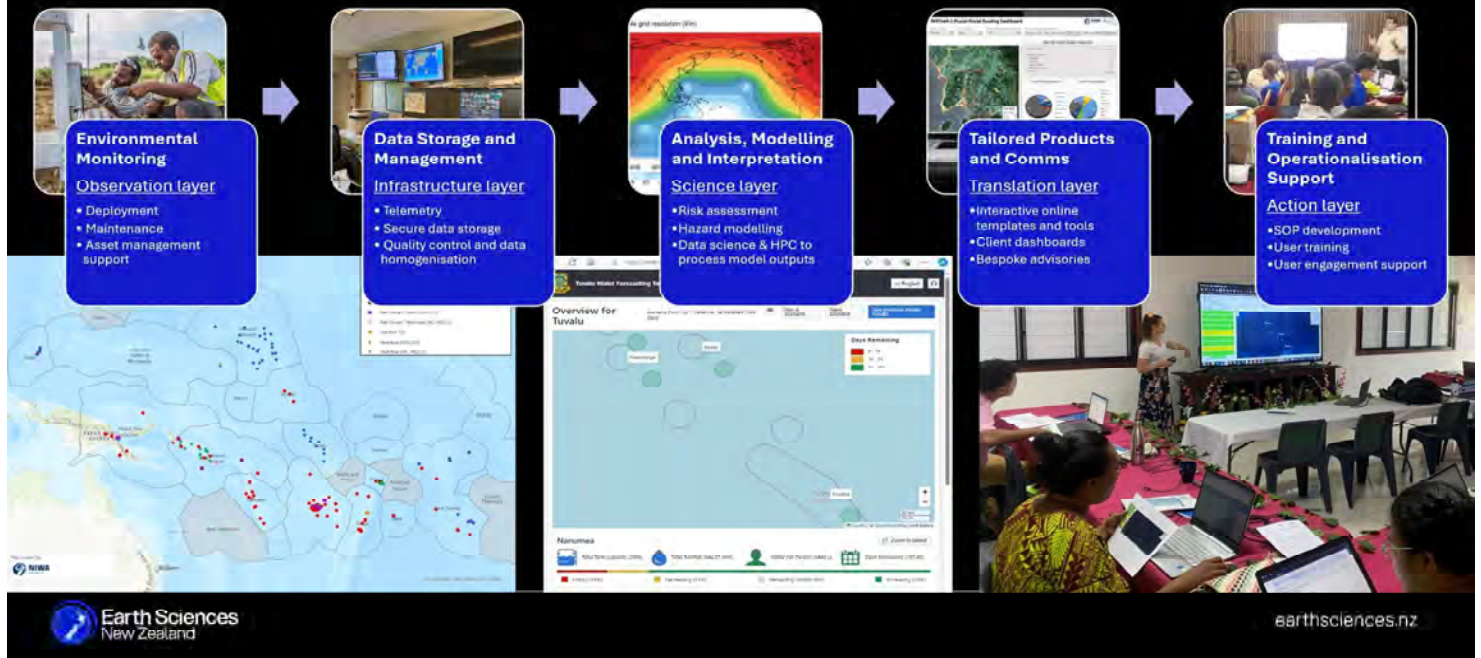
Community & stakeholder engagement



Capacity building & technical advice



## Co-developing end-to-end early warning systems



## Bioeconomy Science Institute: many years of Pacific engagement



The BSI formed in mid-2025, combining Plant & Food Research, AgResearch, Scion and Manaaki Whenua Landcare Research. These legacy Institutes have decades of Pacific collaboration:

- Collection of soil samples and mapping of soil patterns to inform land management decisions
- Biomaterials expertise focussed on microplastics challenges and sustainable aquaculture solutions
- Biological controls for invasive weeds in the Cook Islands, Tonga, Vanuatu
- Regional data tools like the Pacific Soil Portal
- Crop production challenges studied, such as vanilla production in Tonga
- Biosecurity expertise on challenges such as invasive pests like the coconut rhinoceros beetle



## Current programme 1: Climate-Smart Pacific Food Systems (2024-2028)



- Fiji, Papua New Guinea, Samoa, the Solomon Islands, Tonga
- MFAT-funded, \$16.4m
- Building the wellbeing and the resilience of communities to the impacts of climate change
- Three themes:
  - o Climate-smart food production
  - o Stewardship of water, land and waste
  - o Sustainable, resilient food value chains
- Integrating scientific innovation with community-driven solutions to build food security, reduce postharvest losses, and improve ag sustainability and climate resilience



## Current programme 2: CALM - Climate Smart Agriculture and Sustainable Land Management (2025-2028)



- MFAT-funded, \$13.8m
- Partnership with Tonga, Fiji, Vanuatu, Samoa, Niue, Cook Islands
- Each country has set their own priorities to build climate-resilient agriculture and sustainable land-use capacity
- Supporting local partners to develop agricultural practices and land-use improvements by addressing issues like soil degradation and crop protection
- In Tonga, for example, \$2.8m is being directed to improve soil management, map land use pressures and preserve culturally significant endangered plants that support livelihoods



# Focus on what is within our control

- the values that underpin the research we do
- the deep involvement of communities
- a strong ethical basis for our research, and
- blending science and indigenous knowledge so that it creates **new insights**, develops **trust** and, crucially leads to **impact** – that is, improves the wellbeing of people, communities and the planet



## Climate health and resilience in the Pacific : Applying global metrics to local realities

Li'amanaia Dr. Roannie Ng Shiu

17 February 2026

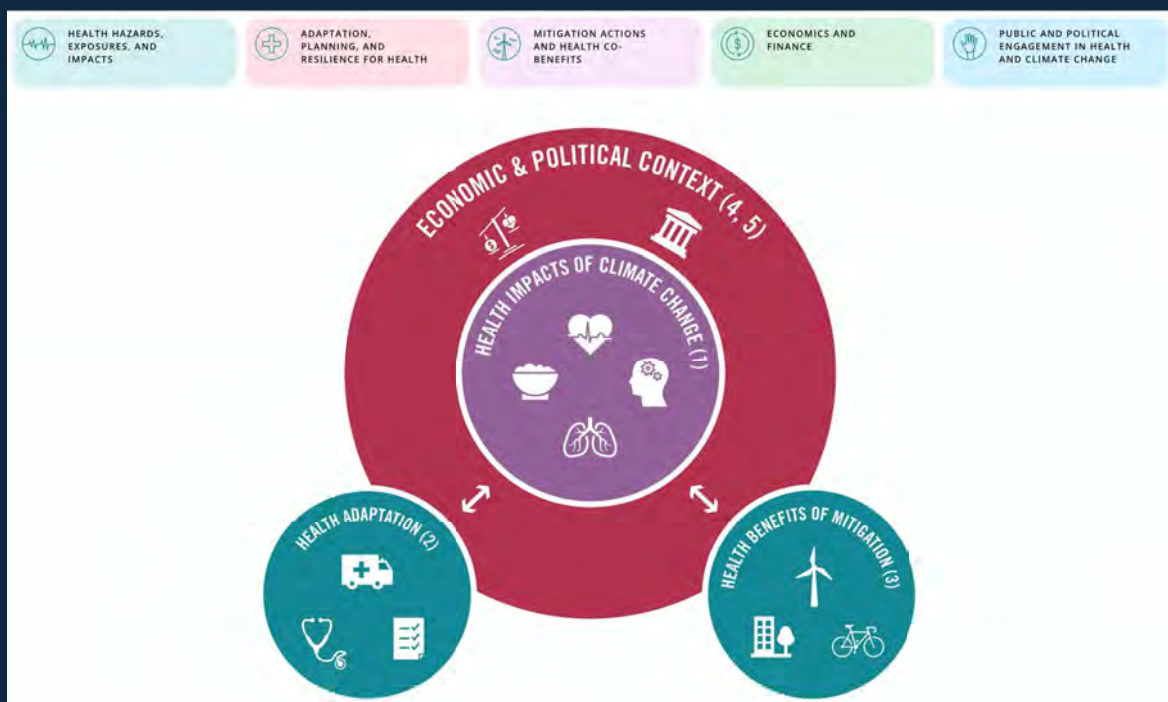
Pacific Academy of Sciences Congress



# Climate and Health in the Pacific

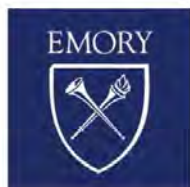
- Pacific generate the least (<0.03%) of GHG emissions, yet are the most impacted
- Increased ambient temperatures are expected to halve agricultural yields by 2050
- SLR up to 2m by 2100
- 80% of marine pollution comes from the land
- SLR, warming climates and marine pollution impact livelihoods – 60% of global tuna catch is from the Pacific, second highest source of foreign earnings
- % of the population accessing WASH lower than global average
- Climate related health problems will disproportionately impact children, poor, elderly and people with disabilities
- Impacts to community infrastructure and wellbeing.
- These impacts are far worse in rural and remote areas that already lack health, educational and other public infrastructure.

## Lancet Countdown: Indicator Framework





# Authors and Collaborators



THE LONDON SCHOOL  
OF ECONOMICS AND  
POLITICAL SCIENCE

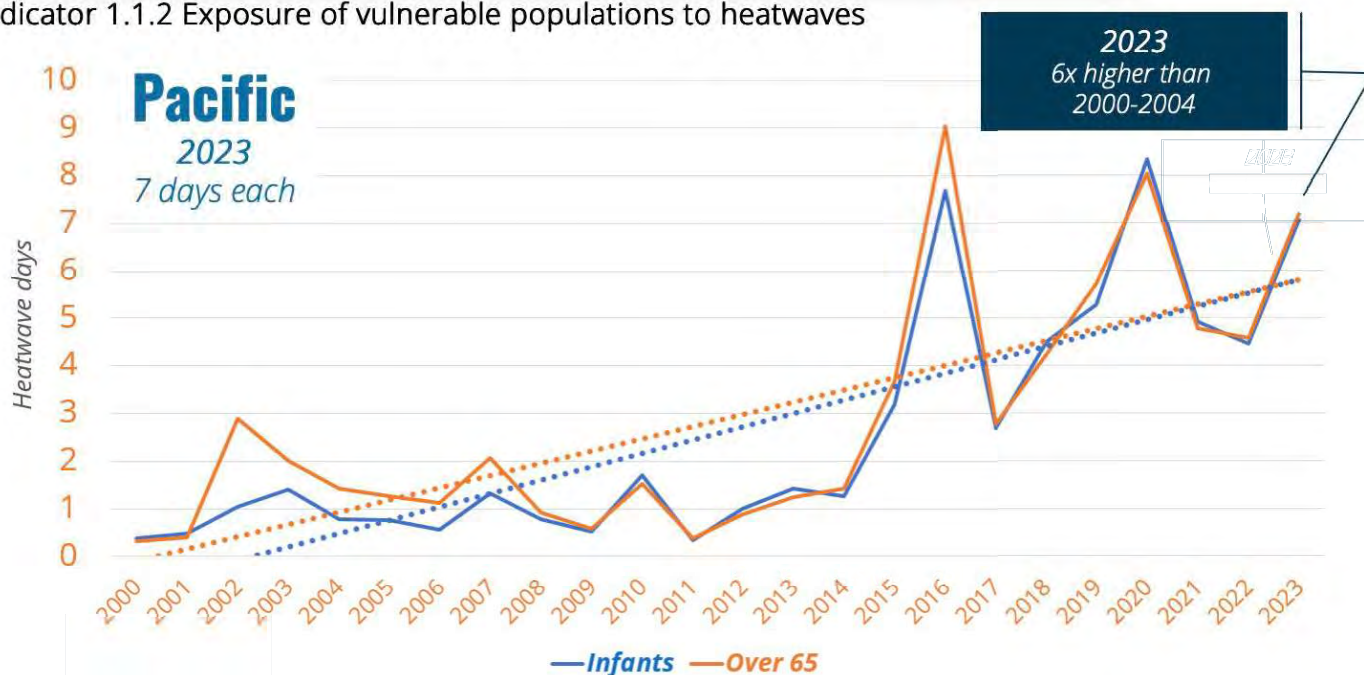


THE LANCET



## Record breaking heat exposure

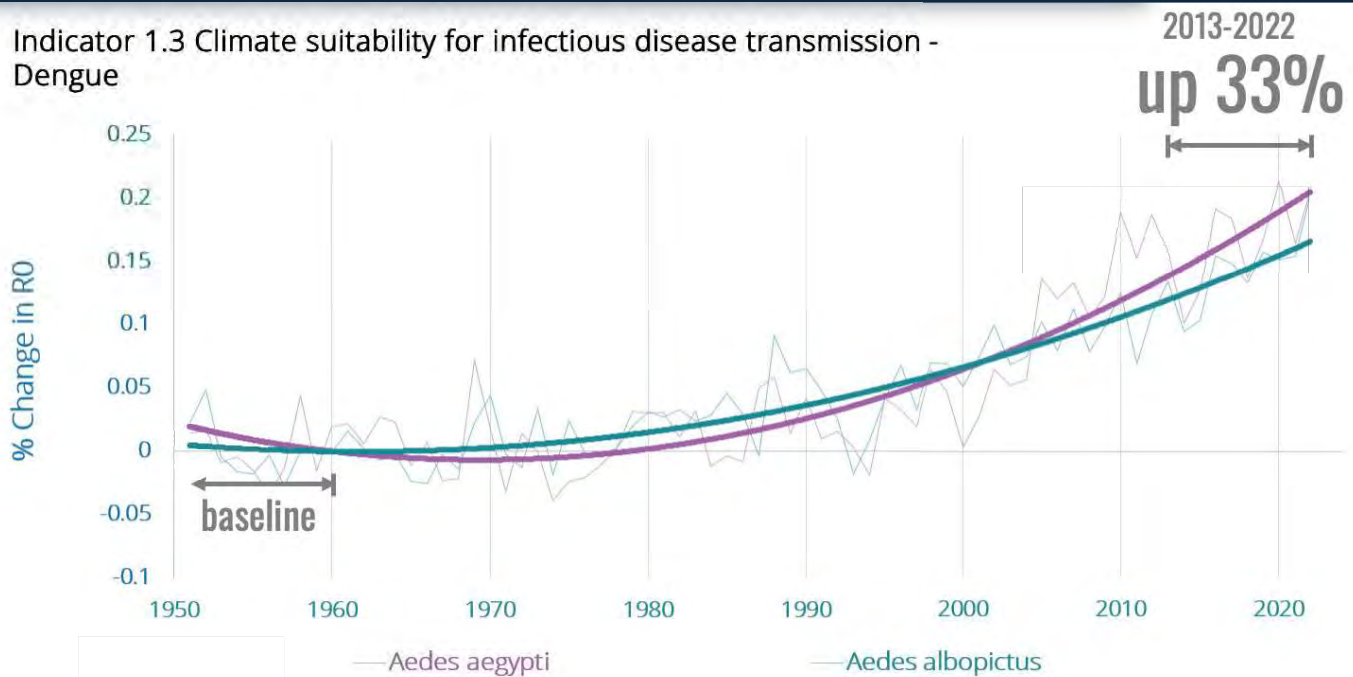
Indicator 1.1.2 Exposure of vulnerable populations to heatwaves





# Climate more conducive to VBD

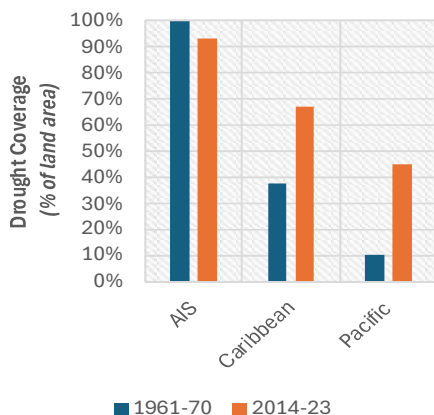
Indicator 1.3 Climate suitability for infectious disease transmission - Dengue



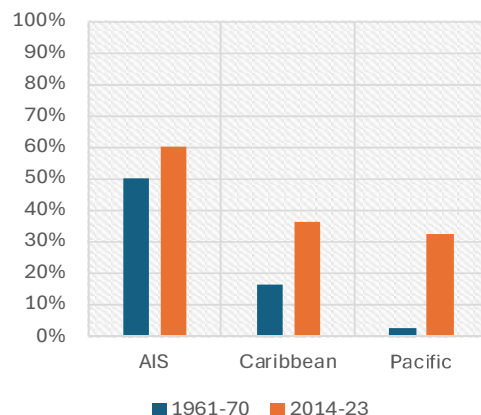
# Extreme droughts over longer durations

Indicator 1.2 Drought

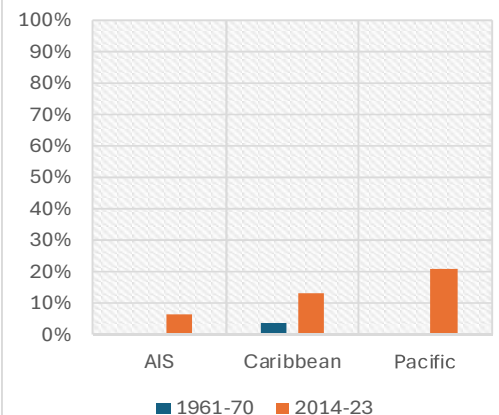
1 month of extreme drought



3 months of extreme drought



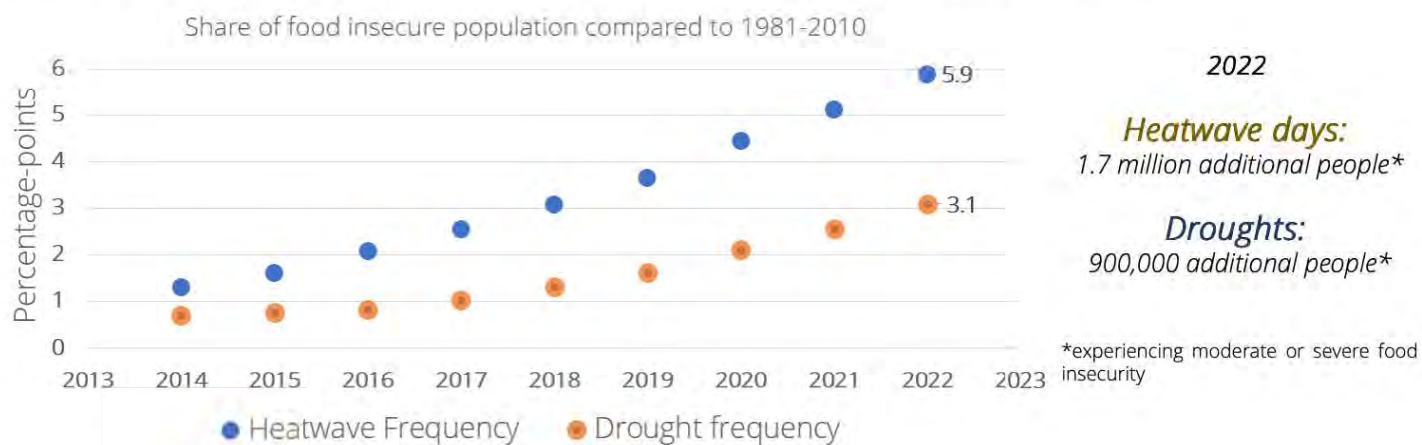
6 months of extreme drought



# Food (in)security

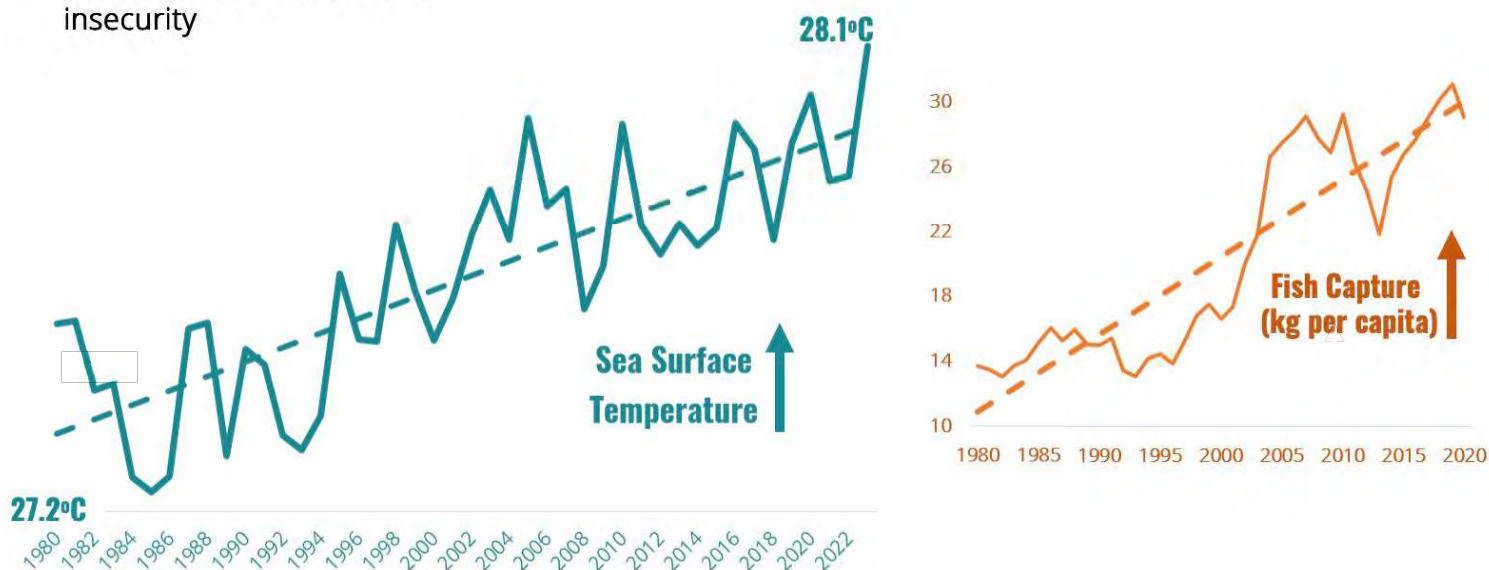
## Indicator 1.4.1 Food insecurity

The higher frequency of heatwave days and drought months in 2022 compared to 1981–2010, was associated with 2.6 million additional people experiencing moderate or severe food insecurity

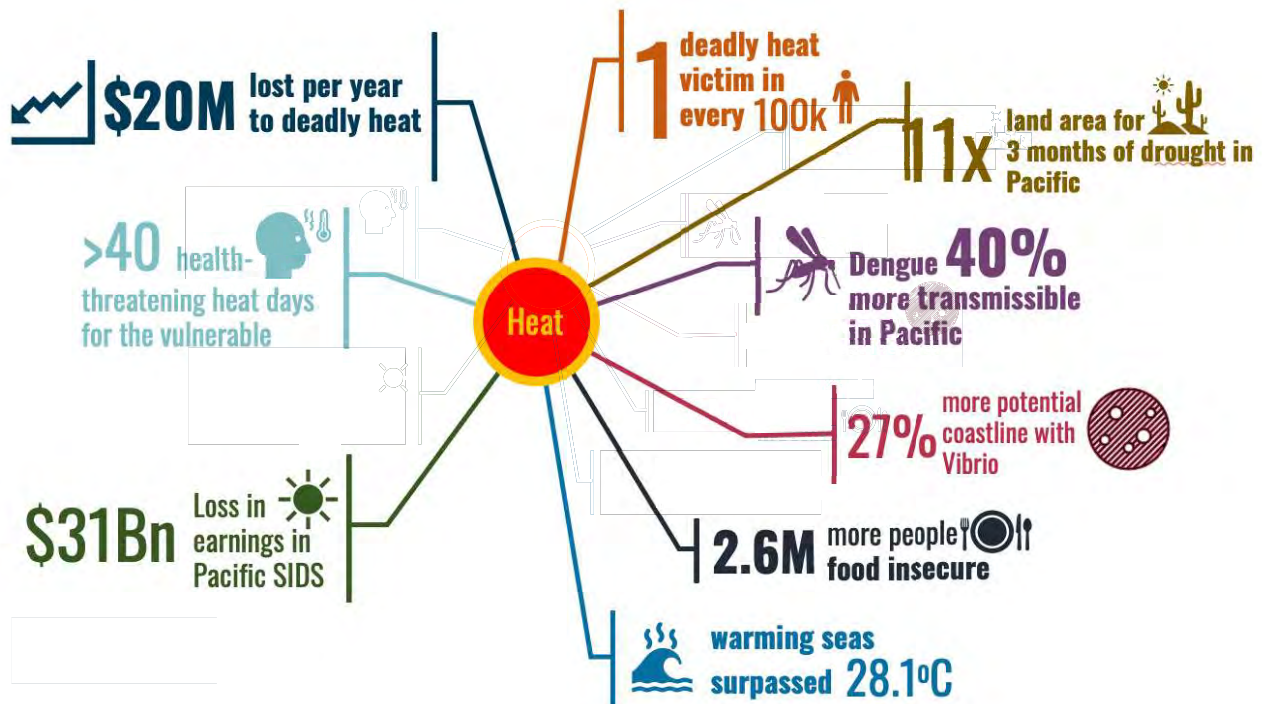


# Marine ecosystem services are at stake

## Indicator 1.4.2 Marine food insecurity



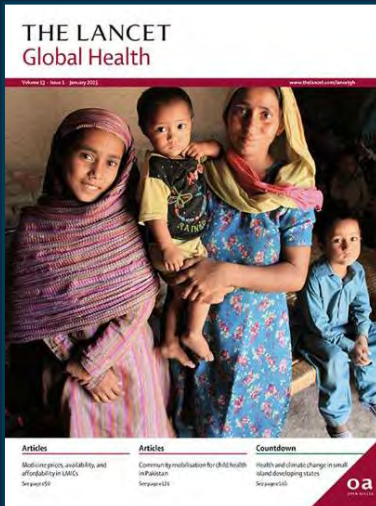
# Summary of temperature related outcomes



## Data gaps and needs

- Data coverage is less than 70% for some indicators
- Indicator development required
  - WASH
- Non-communicable diseases and climate change
- Indicators are developed for continental geographical contexts
  - Issues around scalability for SIDS contexts
  - Appropriate proxies for SIDS
- Supplement indicator data with stories of resilience

# What next?



The 2024 Small Island Developing States Report of the Lancet Countdown on Health and Climate Change

2025 out soon



Looking for a part-time research assistant for

Working Group 1 on Heat Impacts for next three years

Contact me:

[r.ngshiu@auckland.ac.nz](mailto:r.ngshiu@auckland.ac.nz)



## Chronic Adaptations: An approach to understand the dynamics of climate change and non- communicable conditions

Professor Narelle Warren, based on work with Dr Elissa Waters,  
drawing on work with Dr Elissa Waters and Dr Eliorah Malifa

[Narelle.Warren@monash.edu](mailto:Narelle.Warren@monash.edu)

Human Geography, Anthropology and Development Studies

School of Social Sciences

Monash University





**Table 1: Countries that have a 30% or higher risk of premature death from non-communicable diseases**

| Country                     | Percentage risk of premature death from target NCDs (2021) | Percentage of deaths from NCDs (2021) | Total number of NCD deaths (2021) |
|-----------------------------|------------------------------------------------------------|---------------------------------------|-----------------------------------|
| Kiribati                    | 44                                                         | 66                                    | 840                               |
| Solomon Islands             | 41                                                         | 68                                    | 4,000                             |
| Micronesia Federated States | 41                                                         | 78                                    | 71                                |
| Fiji                        | 38                                                         | 67                                    | 6,300                             |
| Vanuatu                     | 37                                                         | 72                                    | 1,600                             |
| Lesotho                     | 34                                                         | 36                                    | 11,400                            |
| Afghanistan                 | 33                                                         | 34                                    | 116,700                           |
| Eswatini                    | 32                                                         | 35                                    | 5,500                             |
| Haiti                       | 32                                                         | 55                                    | 56,000                            |
| Philippines                 | 32                                                         | 68                                    | 622,200                           |
| Samoa                       | 32                                                         | 83                                    | 1,200                             |
| Central African Republic    | 31                                                         | 23                                    | 13,900                            |
| Zimbabwe                    | 31                                                         | 38                                    | 58,000                            |

This data is for the following NCDs:

- Cardiovascular disease
- Cancers
- Chronic respiratory disease
- Diabetes

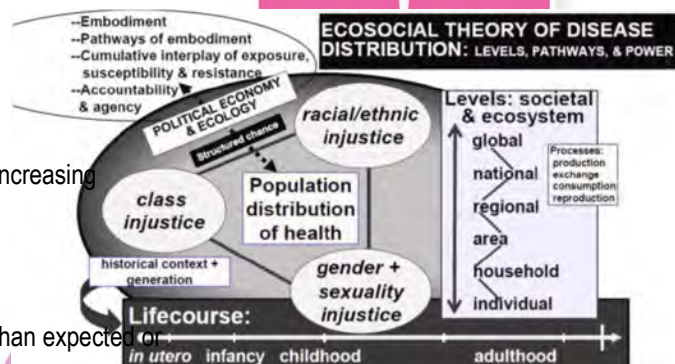
Premature death means dying between 30 and 70 of any of these diseases

Source: Anderson, 2025, *Development Policy Blog*

## Patterns of chronic illness in the Pacific

NCDs: A huge challenge for individuals, families and health systems in SIDS

- Cardiovascular disease - leading cause of death
- Stroke
  - **Hypertension** (20% adults; 40% aged 45-64)
  - Vast majority (94%) do not have it under control - this number is increasing
- Diabetes
  - 31% women, 26.9% men
- Chronic kidney disease (not always due to diabetes)
  - Age-standardized rates and DALYs are much higher in Oceania than expected or compared to other countries
  - Prevalence of 13.5% in Fiji, 21.5% 1-year mortality (Chandra et al., 2025)
- Obesity
  - 58.4% women, 43.8% men



Sources: WHO, 2026; Global Nutrition Report, 2026:

<https://globalnutritionreport.org/resources/nutrition-profiles/oceania/polynesia/samoa/>

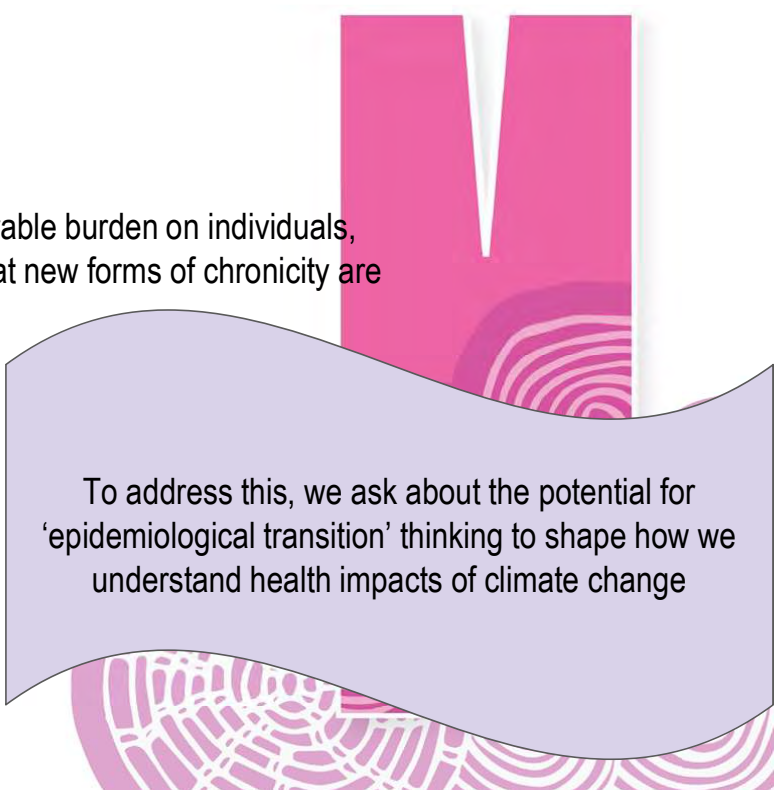
## Our research asks:

In contexts where NCDs are already placing considerable burden on individuals, households, communities, and public institutions, what new forms of chronicity are intensified or generated by climate change?

How do climate hazards -

- Extreme heat
- Salinisation
- Food system stress
- Water contamination
- Displacement

Reshape the health landscape in the Pacific?



To address this, we ask about the potential for 'epidemiological transition' thinking to shape how we understand health impacts of climate change

## Insights from MOFCREC project, Indonesia

Explored factors shaping climate resilience in Eastern Indonesia

- 3 groups: older people, women, people with disabilities

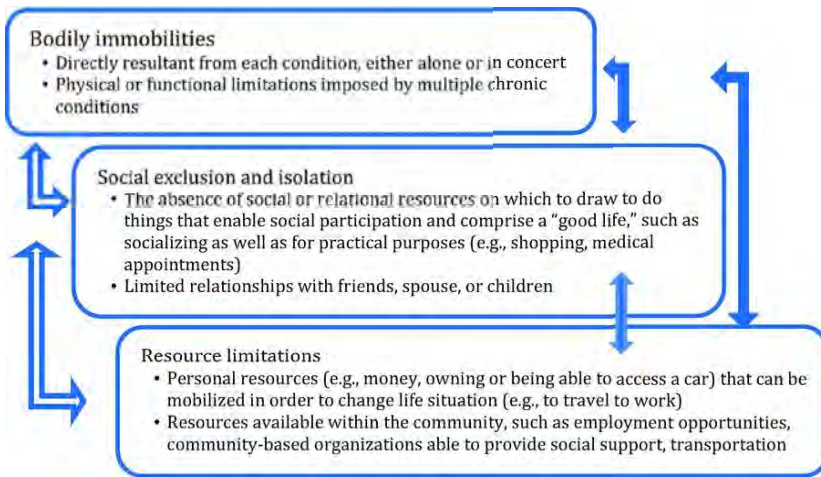
Findings:

- Intersectional vulnerabilities shape what agency people have in climate change responses
  - And what new risks/vulnerabilities are created by climate shifts
  - Our three groups were largely omitted from decision-making and policy fora
  - Climate impacts create new vulnerabilities
- People employed a range of strategies to enhance resilience
  - Economic: Livelihood diversification - borrowing money
  - Social: Reliance on faith and spiritual practices; Grassroots advocacy
  - Leveraging tradition: Utilizing traditional knowledge and practices
  - New innovations: Development of drip irrigation systems

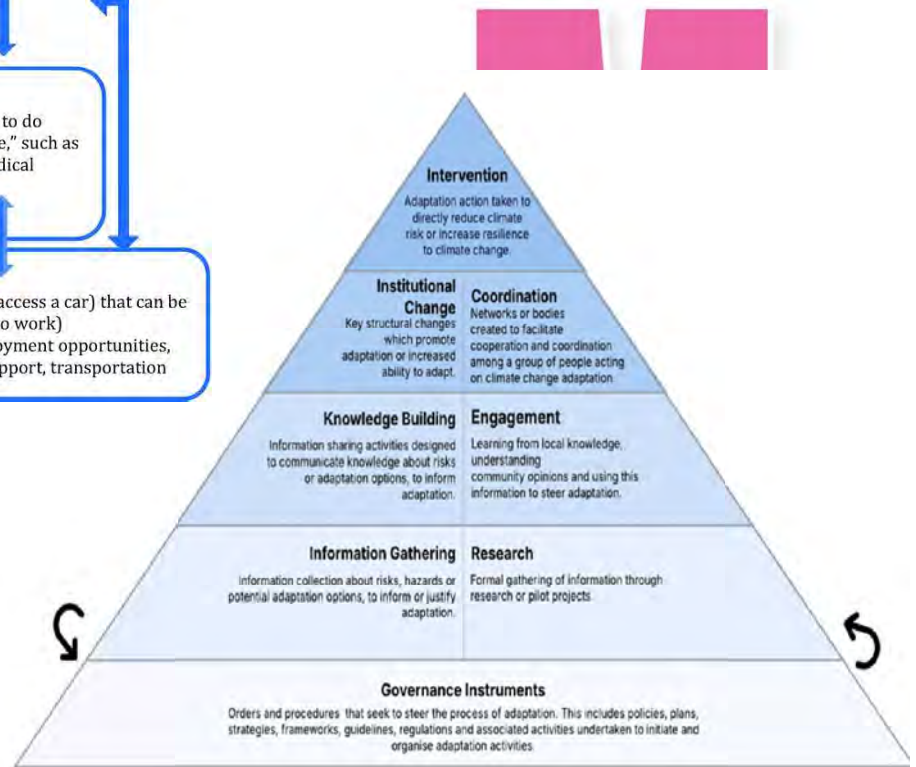
Also raises new research opportunities - can lead to more/different questions:

- Local-state level gaps (in understanding, delivery, etc)
- How climate change impacts people with particular needs (chronicity as including disability)
- Resilience as a concept focused on individuals or community, rather than on structures of power and influence

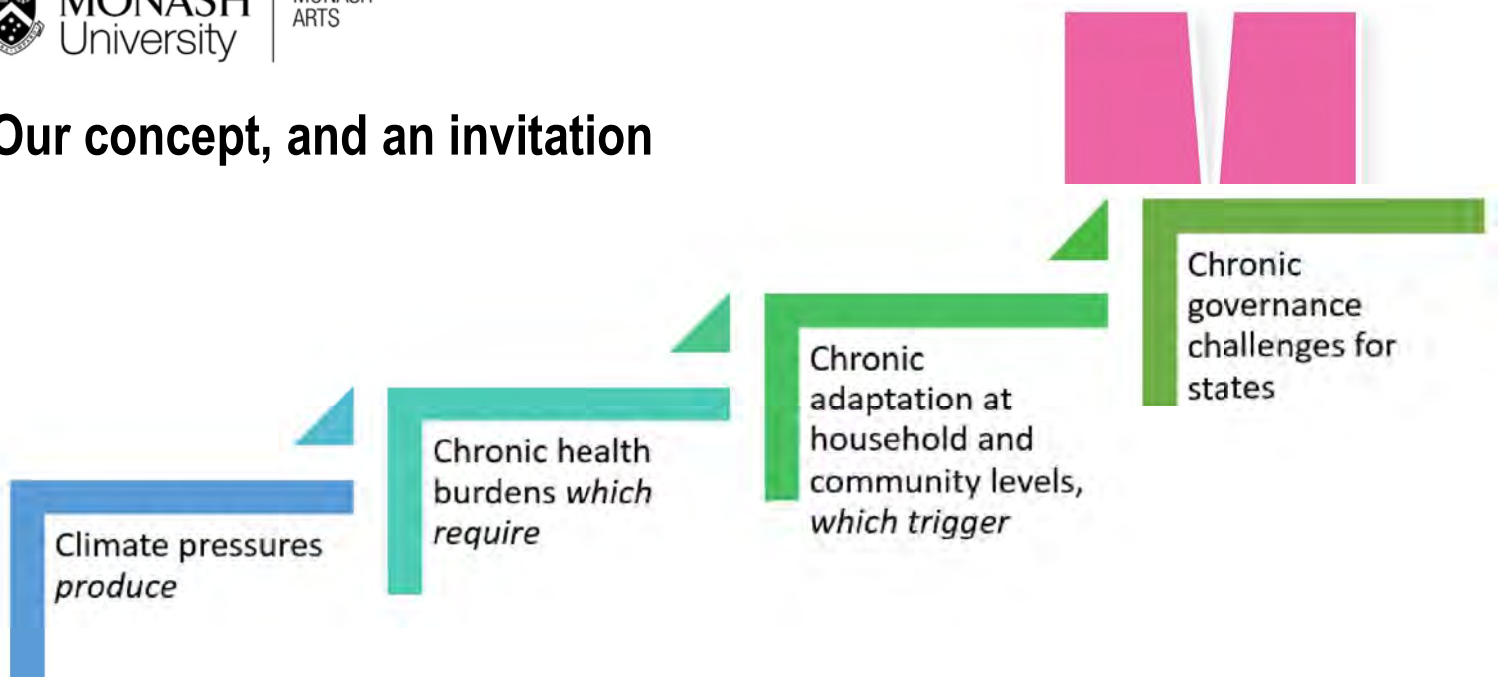
Source: [MoFCREC Research Project - Monash University, Indonesia](#)



Sources: Manderson & Warren, 2016; Brullo, Barnett, Waters & Boulter, 2025



## Our concept, and an invitation





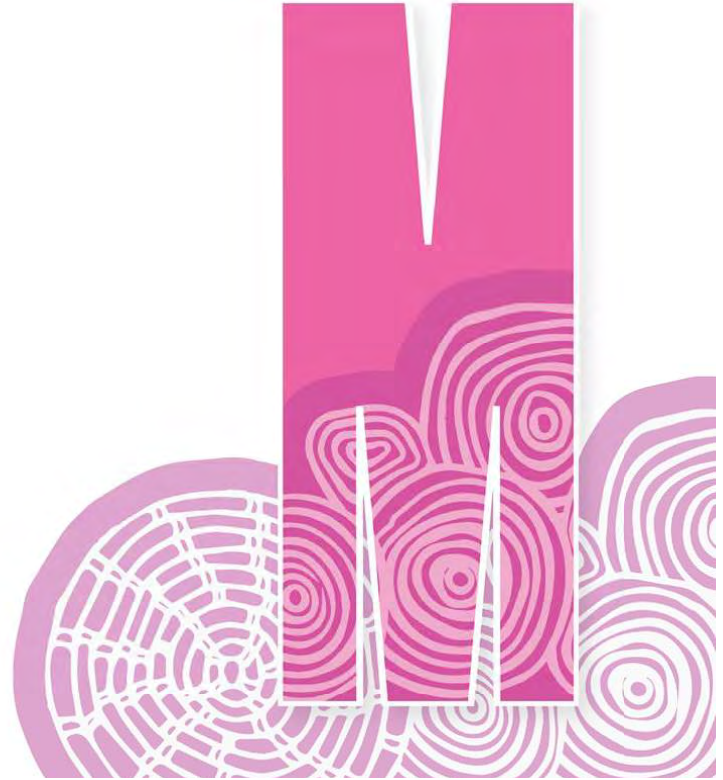
# Thank you!

If you are interested in talking more with us or being partners in this research, please contact:

[Narelle.Warren@monash.edu](mailto:Narelle.Warren@monash.edu) or WA +61438440599

[Elissa.Waters@monash.edu](mailto:Elissa.Waters@monash.edu)

[Eliorah.Malifa@monash.edu](mailto:Eliorah.Malifa@monash.edu)



## Knowledge

**Intertwining ageing care, climate crisis,  
community**

---

Pacific Academy of Sciences Congress – Apia, Sam  
6–18 Feb 2026

Carlos  
CRIA | M  
Postdoc



# CLIMAGECARE project:

“Ageing Care and the Climate Crisis in Villages on the Spain–Portugal Border”

Study in border villages between Spain and Portugal — La Raya.

- Depopulation.
- Living borders.
- Forest fires and heat waves.
- Vulnerable population (older people).
- Social networks (local bonds).

Main objective:

To explore how older people in rural areas live and make sense of everyday care during climate-crisis events, in relation to communal actors and the non-human environment.

Key topics: Social Care — Ageing — Climate Crisis

Ethnographic approach

Cases studies

Participant observations

In-depth interviews



## Constellations (meshworks) of care

- Care as a relational weave bringing together people, places, life-rhythms, institutions, and the material presence of climate; not a resource list, but a way of being together that keeps adjusting.
- What this lens does: it helps name links and timings (who calls whom, when to go out, where shade is found) without reducing care to “services”.

Short scenes:

The neighbour who notices a shutter still down; the daughter who shifts routines with the heat; the smell of smoke that reshapes the afternoon; the bar that quietly sets who drops by next.



# Ecosyndemics, care constellations, rural ageing

- Ecosyndemics are moments when environmental shifts, social inequalities, and limited public responses intersect and amplify one another, shaping health, wellbeing and everyday life—especially where disadvantage is greater.
- Always an ecological + social reading → not linear causality.

How it knots with care constellations:

Climate reorders the weave of care (timings, routes, calls), and that weave modulates how climate is felt and navigated in bodies and in the community.

Key idea:

Rural ageing and the climate crisis are not separate problems but coupled processes whose effects intensify each other—the ecosyndemic logic in a nutshell.



## Older people's everyday knowledge

- Historical communal care, environmental management, and self-care practices.
- A dynamic knowledge system interacting with health vulnerabilities and ecological stressors.

Guiding idea: not a museum piece, but living ways of finding one's bearings.

Caring and self-care as learned ways that hold daily life together.

→ Are care experiences themselves a form of local knowledge?



# Interdependencies: climate, care, and the state

- Fragility of ageing care services in depopulates rural territories: the weight falls back on families and neighbours.
- Growing reliance on informal and community-based care.
- Heatwaves and fires saturate public responses; policies don't always fit local realities
- Interrogating “resilience”: it often individualises responsibility and aligns with more neoliberal logics; I prefer to speak of shared responsibility and social (climate) justice.



## Towards a framework for debate. To open, not to close

- Ecosyndemics to articulate climate-health-care-institution entanglements. Look at the crossings: climate, health, care, and institutions together.
- Constellations (meshworks) of care to map human and no-human relations. Name the weave: ties, timings, places, bodies, and common understandings that keep adjusting.
- Local knowledge community-orientated care. Listen to older people's everyday knowledge.
- Beyond “resiliences”: towards social and climate justice.



# Thank you!

email:

[carlos.chirinosmedina@monash.edu](mailto:carlos.chirinosmedina@monash.edu)



Waipapa  
Taumata Rau  
University  
of Auckland

## Finding Rhythm: Mental Health for Pacific Young People

17 February 2026

Nicola Ludin

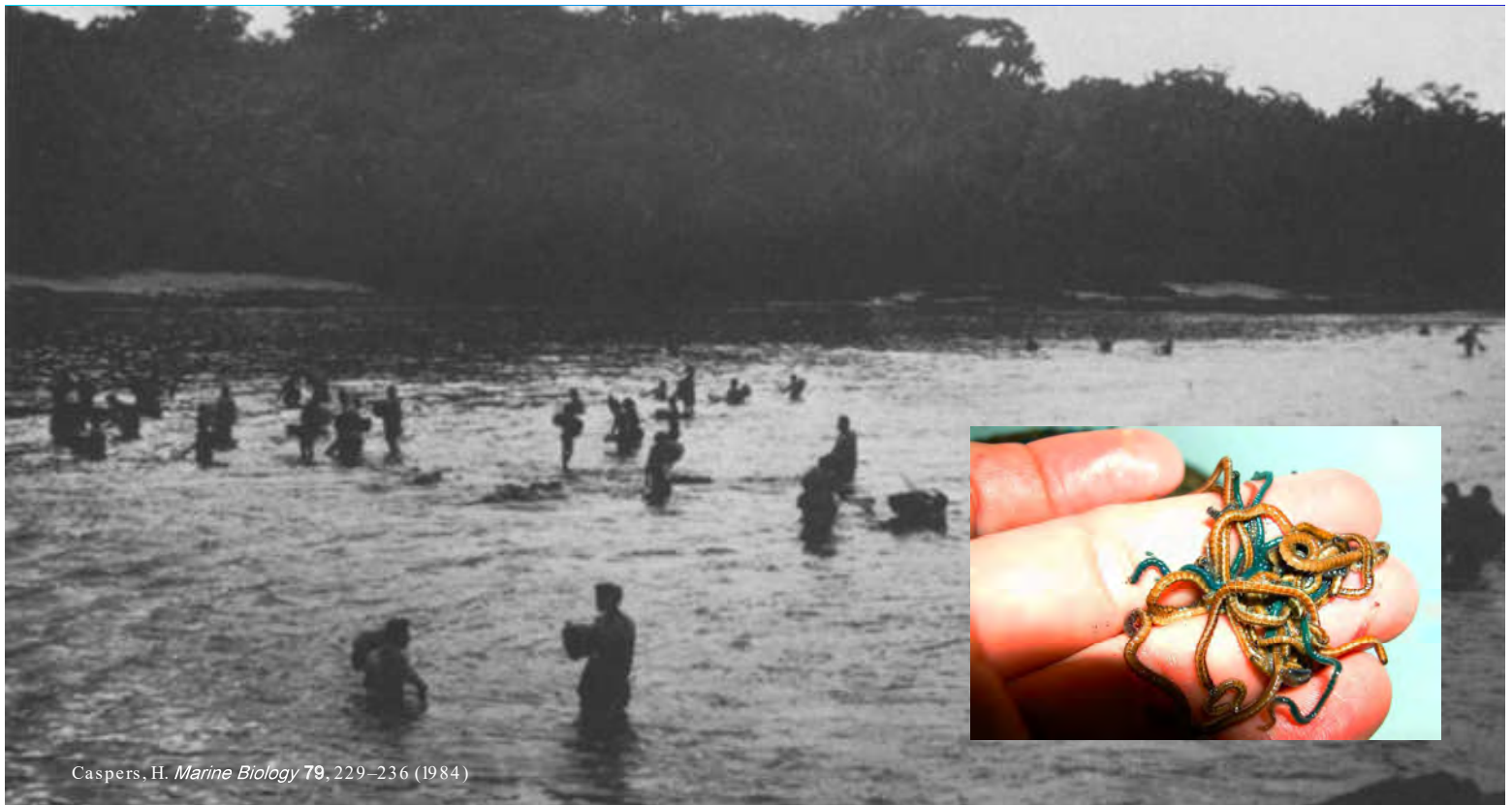


# Rhythms are ubiquitous



*"To every thing there is a season,  
and a time to every purpose under  
the heaven."*

Ecclesiastes 3:1



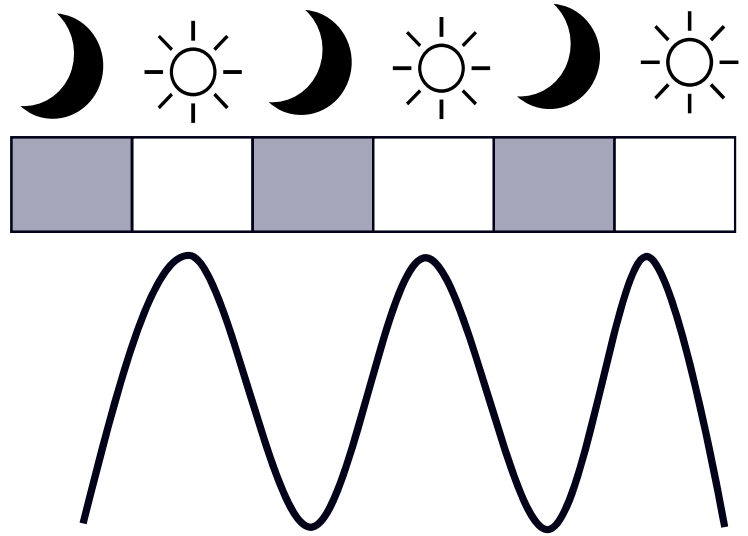
Caspers, H. *Marine Biology* **79**, 229–236 (1984)

# Circadian Rhythms



Circadian comes from circa (meaning “around”) and diem (meaning “day”).

Our physiology and behaviour is governed by a 24 h biological clock



# Sleep

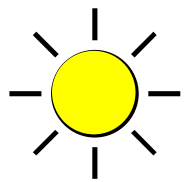


- Memory consolidation
- Neural and cellular repair
- Hormone regulation
- Toxin and metabolic waste clearance
- **Emotional regulation**

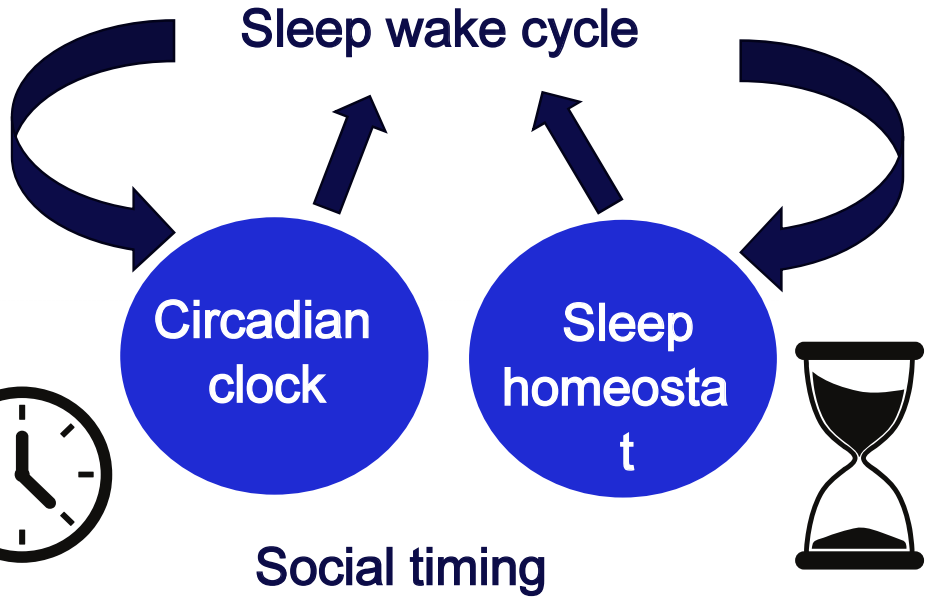




## Sleep and the circadian clock

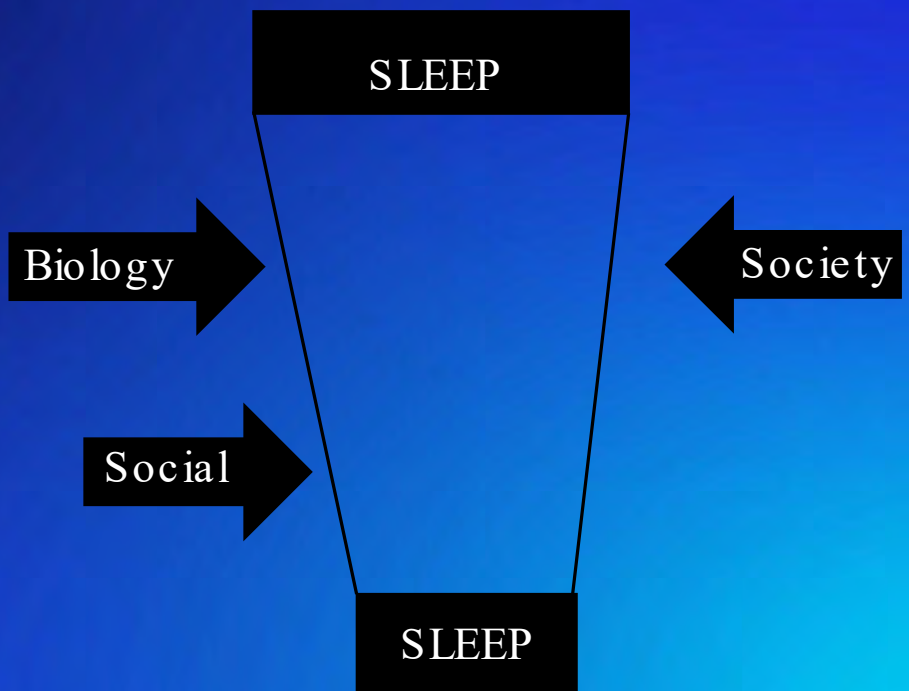


Morning light



Waipapa Taumata Rau, University of Auckland

## Influences on young people's sleep



Waipapa Taumata Rau, University of Auckland

# Sleep and mental health



Meyer, N., et al., 2024. Proc Natl Acad Sci U S A, 121(9), e221475612

Waipapa Taumata Rau, University of Auckland

## Global

1 in 7 adolescents (10 –19)  
experience mental health  
conditions

Most undetected and  
untreated



Waipapa Taumata Rau, University of Auckland

28 August, 2026



# Youth depression in Pacific young people



Young people's (NZ) depression  
increased from 13% in 2012 to 22%  
in 2019

Pacific young people increased  
from 13% to 24%



## Data gap

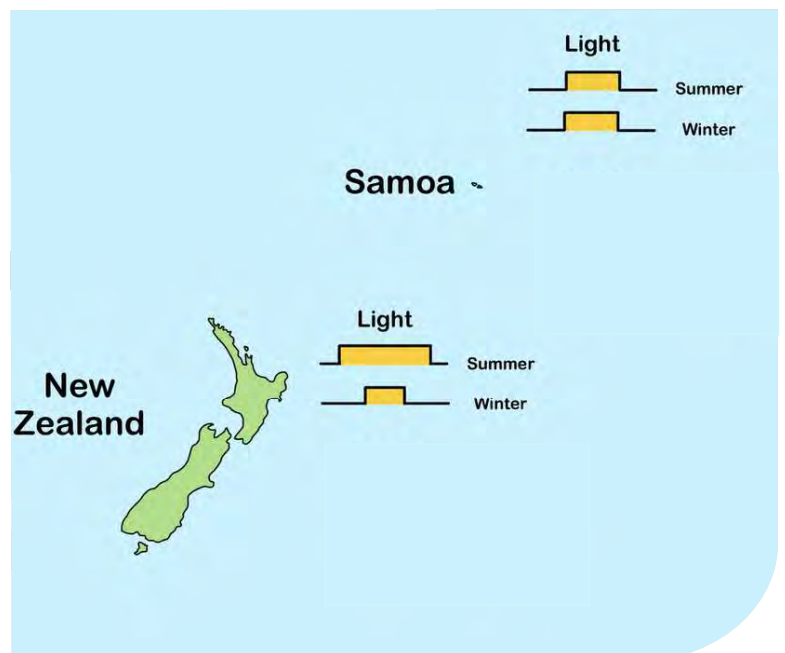
Data to drive  
decisions



# Innovating in the Pacific for better youth mental health



## Latitude and environment



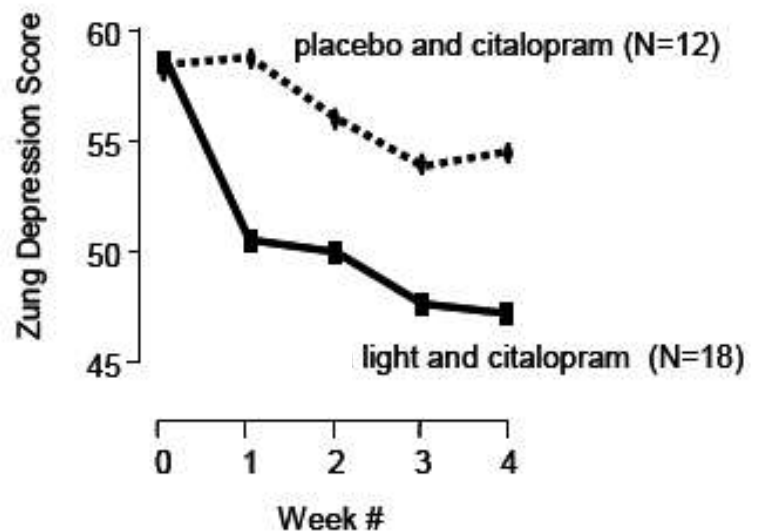
## Morning light



Waipapa Taumata Rau, University of Auckland

28 August 2026

## Morning light and antidepressants



Wirz-Justice and Terman Handbook of Clinical Neurology (2007)

Waipapa Taumata Rau, University of Auckland



# Co design and collaboration

## Survey

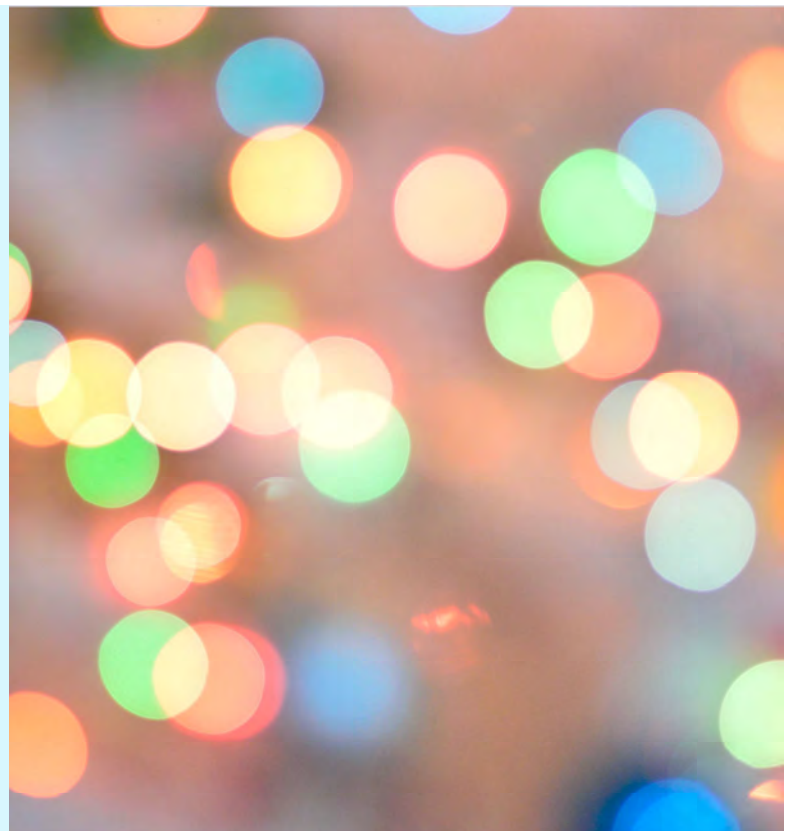


## Early intervention and treatment



### Morning light and CBT

- Barriers and Facilitators
- Needs and preferences







Dr Roannie Ng Shiu



Dr Nicola Ludin



Dr Epaggelia Efu



Prof Sarah Hetrick



Prof Russell Foster



A/Prof Mat Pawley



A/Prof Guy Warman

Waipapa Taumata Rau, University of Auckland

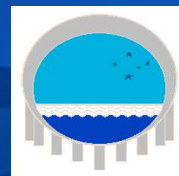
28 August, 2026



Waipapa  
Taumata Rau  
University  
of Auckland



Pacific Academy  
of Sciences



CHRONOBIOLOGY  
RESEARCH GROUP



TE PUNA TIKETIKE  
RESEARCH AND INNOVATION OFFICE

Nāia te rourou, nāku te rourou. Ka ora o te iwi  
With your contribution and mine, our people are vibrant

17 February 2026

Dr Nicola Ludin

Waipapa Taumata Rau, University of Auckland

# Trends in Cardiovascular Disease in NZ and across the Pacific region



**manawataki  
fatu fatu**

**Corina Grey**

**Pacific Academy of Sciences Congress**

**17 February 2026**

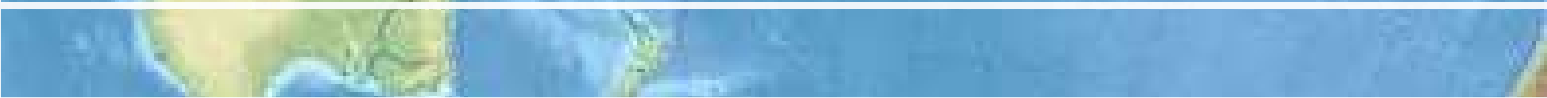
## What this presentation will cover

- 01** Trends in the Pacific region
- 02** Trends in Aotearoa NZ
- 03** Manawataki Fatu Fatu:  
building Māori and Pacific  
research capacity in NZ

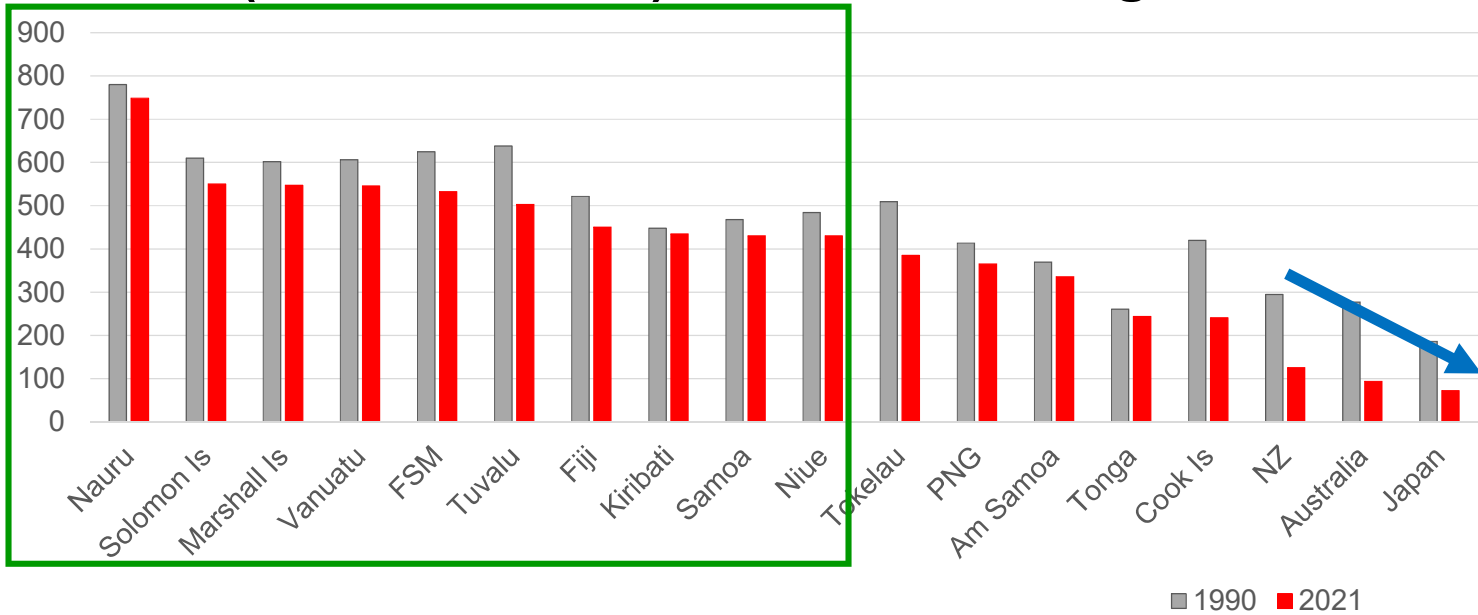




## CVD trends in the Pacific

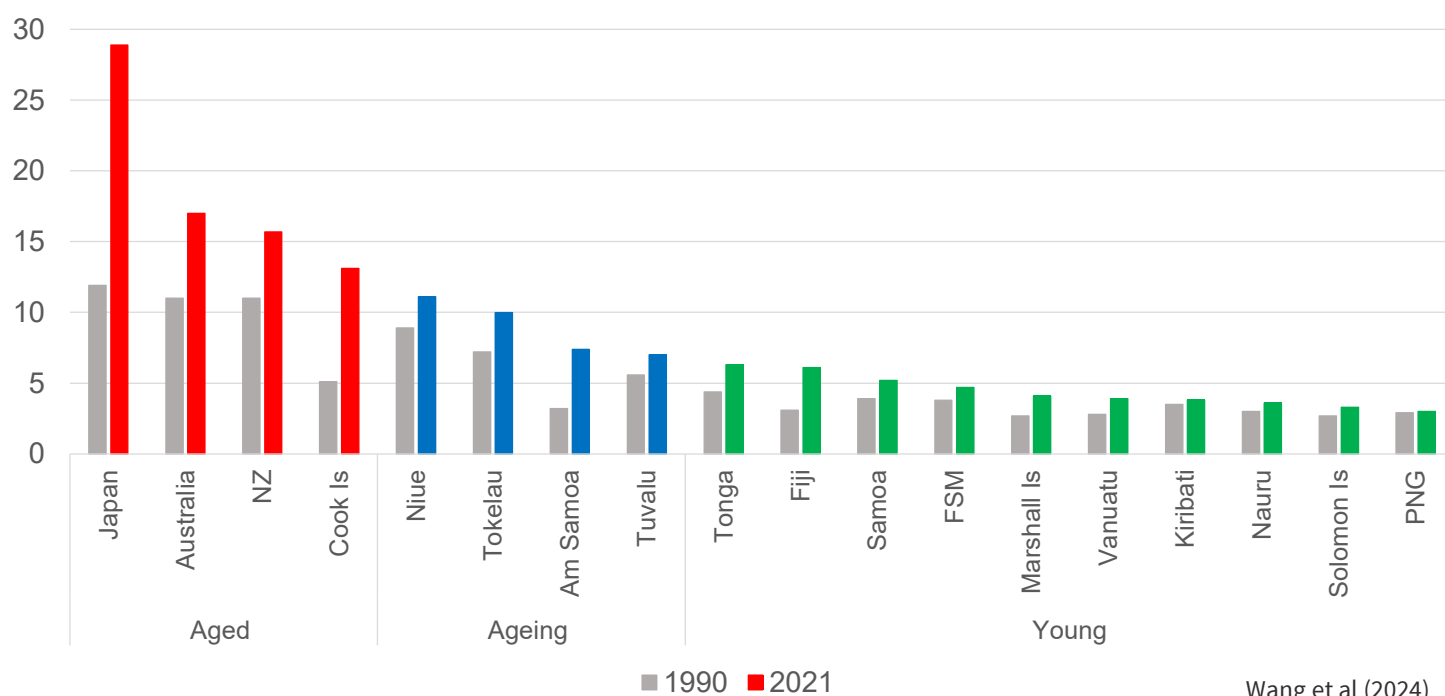


### Age-standardised CVD death rates per 100,000 (1990 and 2021) in the Pacific region

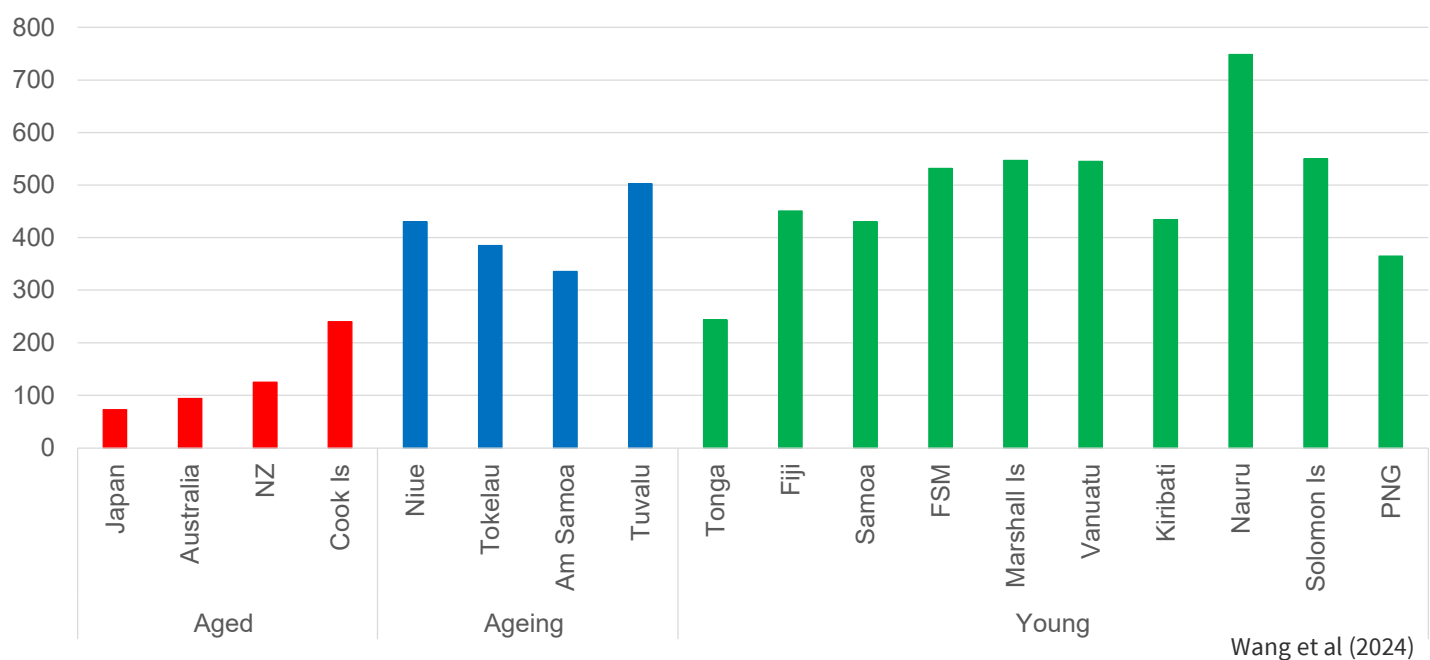


Wang et al (2024). Burden of cardiovascular disease among the Western Pacific region and its association with human resources for health, 1990–2021: a systematic analysis of the Global Burden of Disease Study 2021. Lancet Western Pacific. [Volume 51](#)101195.

## % of population aged 65+

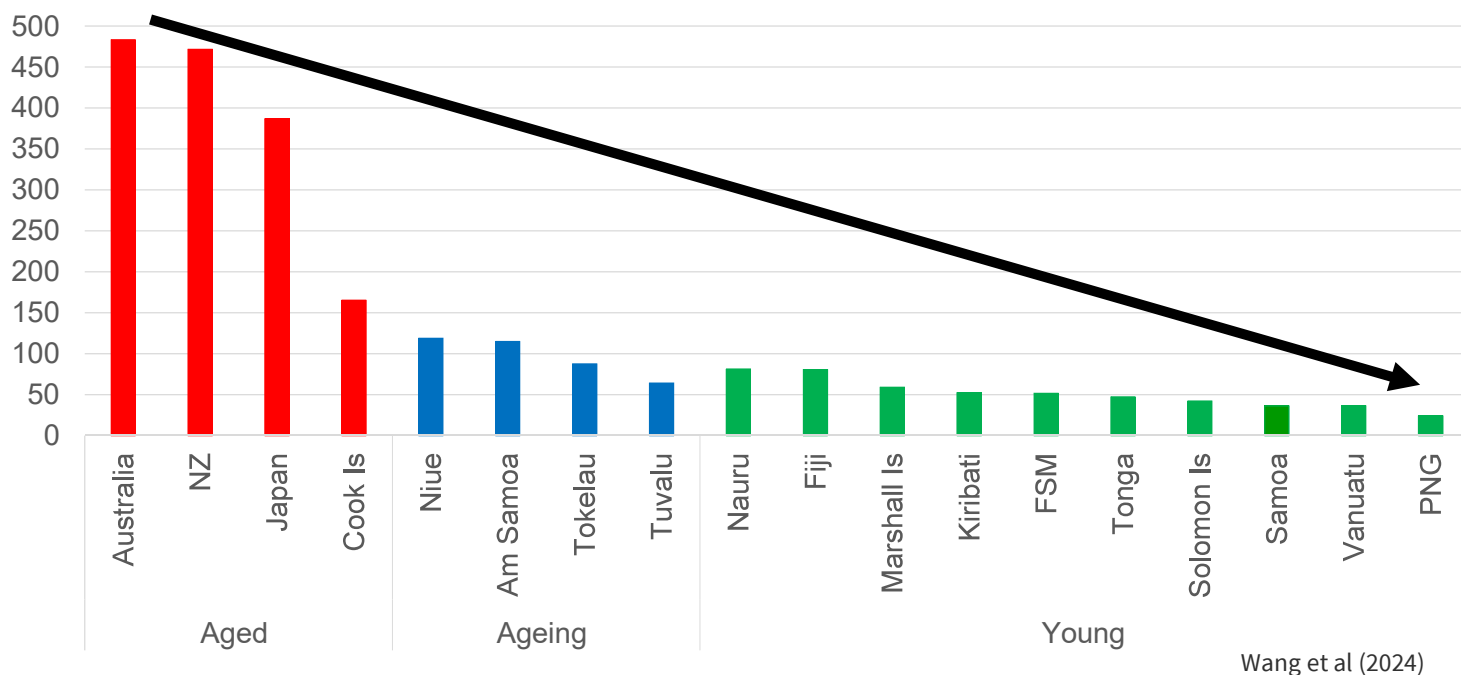


## Age-standardised CVD death rate per 100,000, 2021

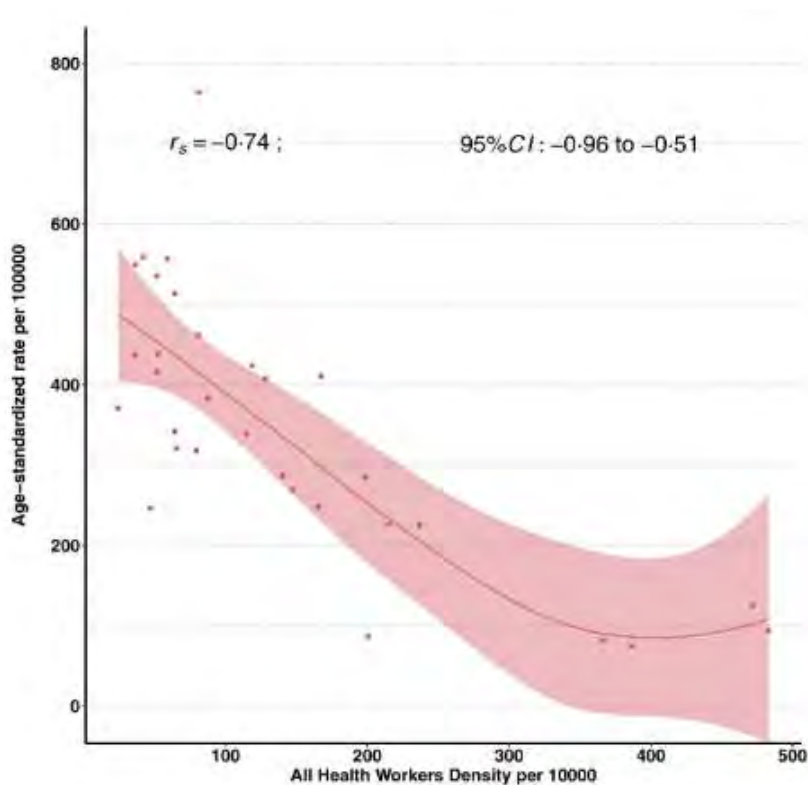


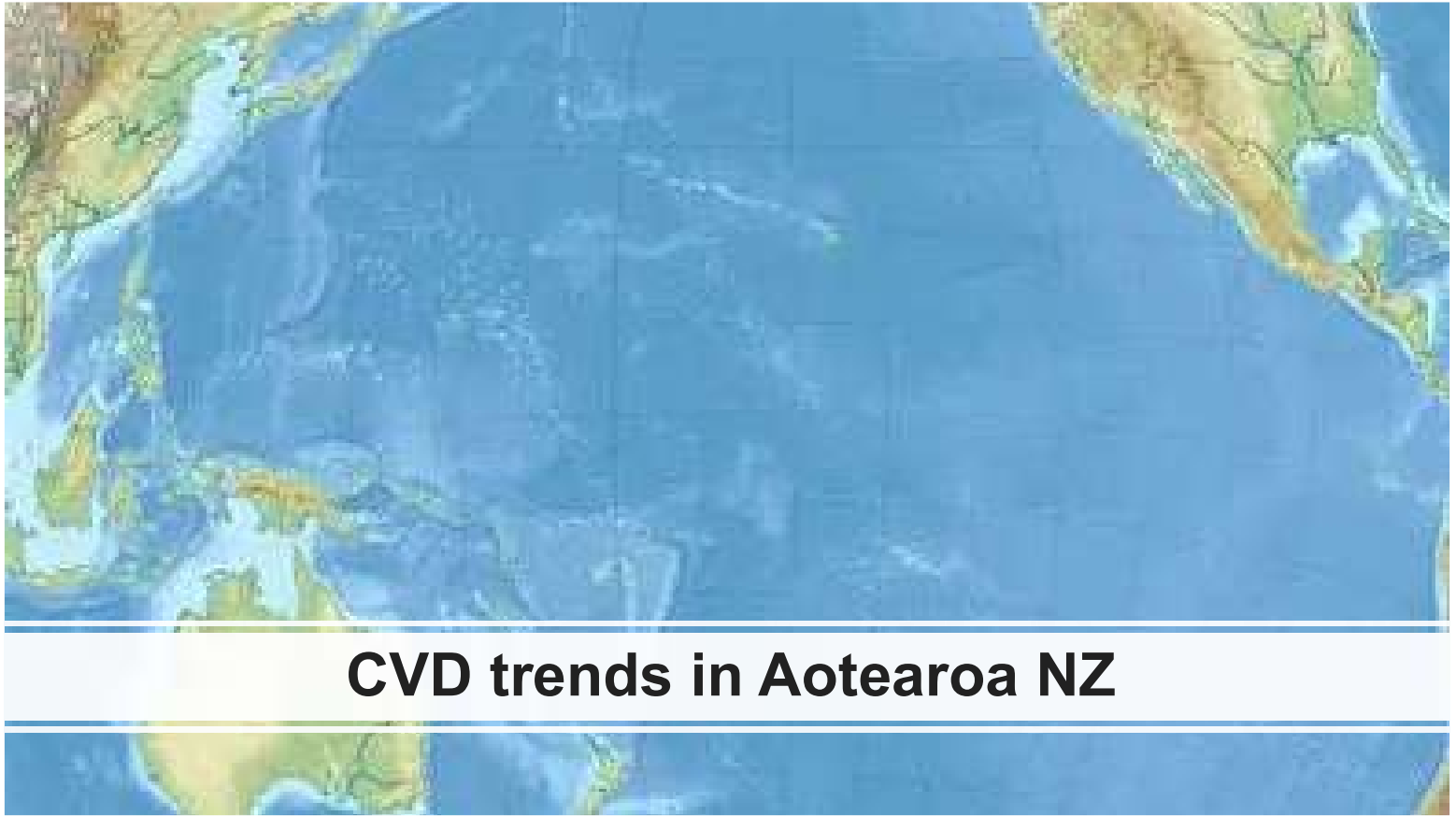


## Density of human resources for health (per 10,000), 2019

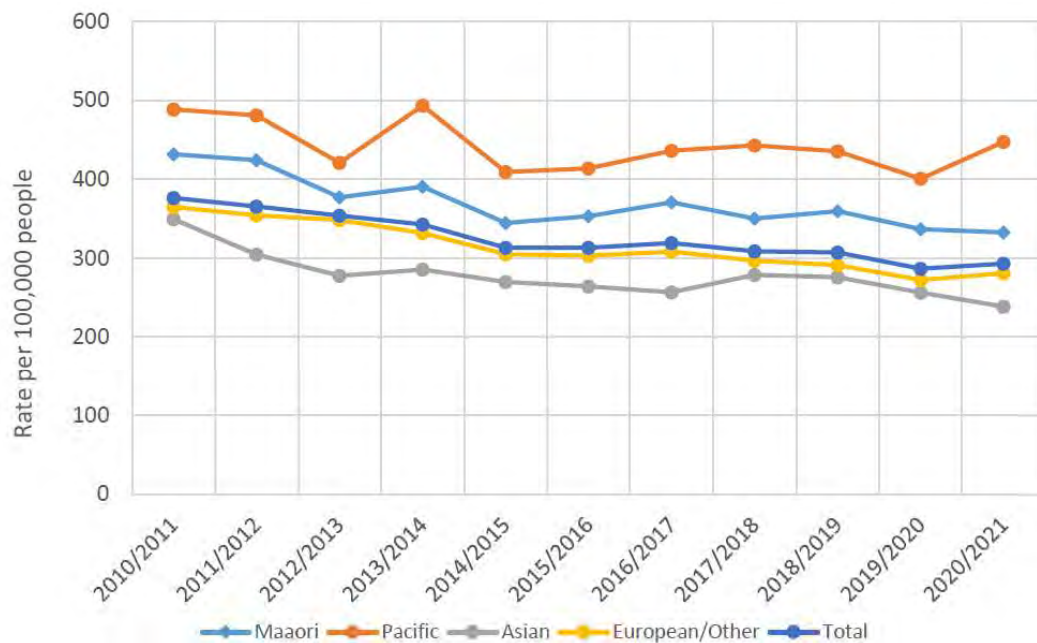


## Association of CVD death rates with HRH density



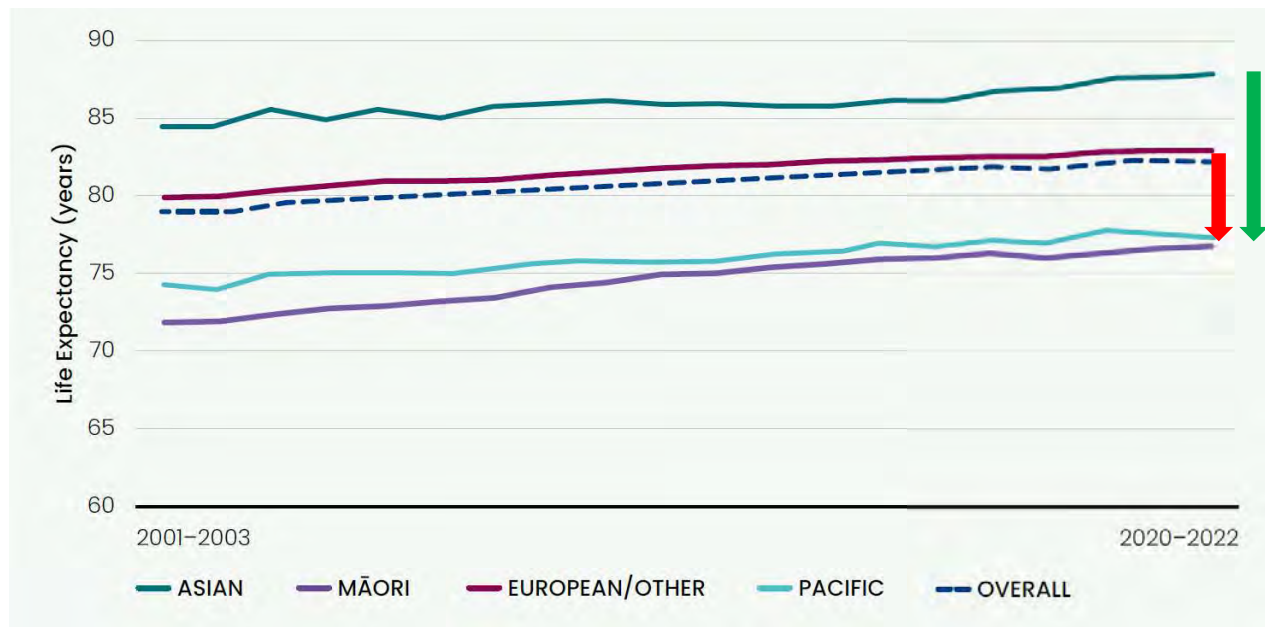


## Trends in first hospitalisations for IHD in NZ, 2010-2021



[Cardiovascular Disease and other Cardiovascular Related Diseases hospitalisations in New Zealand with a Northern Region focus, 2010/11 to 2020/21 – Health New Zealand | Te Whatu Ora](#)

# Trends in Life Expectancy in NZ, 2001-2022



[Life Expectancy in Aotearoa: An Analysis of Socioeconomic, Geographic, Sex and Ethnic Variation from 2001 to 2022 – Health New Zealand | Te Whatu Ora](#)

## What can we do?



---

Build knowledge

---

---

Address determinants

---

---

Build infrastructure

---

---

Implement healthy public policies

---

---

Partner with communities

---



# Manawataki Fatu Fatu: Creating opportunities to thrive



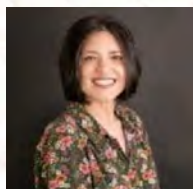
Prof Matire Harwood



Dr Corina Grey



Prof Shanthi Ameratunga



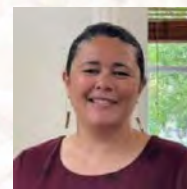
A/Prof Vanessa Selak



Dr Karen Brewer



Dr Tua Tauetia-Su'a



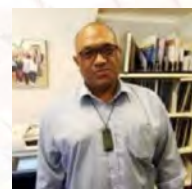
Dr Sandra Hanchard



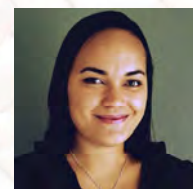
Dr Janine Paynter



A/Prof Bridget Dicker



A/Prof Sione Vaka



Dr Jamie-Lee Rahiri



Dr Rochelle Ellison-Lupena



Dr Julie Winter-Smith



Dr Ainsleigh Laumatia



Dr Annaliese Wheeler



Taria Tane



Jess Lagaluga-Hutchings



Sarah Penney



Aroha Brett



Alyssa Houma



Haydn Drake

## Navigating the long journey of heart failure—experiences of Māori and Pacific peoples

Sandra Hanchard, Karen M Brewer, Tua Tauetia-Su'a, Sione Vaka, Shanthi Ameratunga, Taria Tane, Rochelle Newport, Vanessa Selak, Matire Harwood, Corina Grey

Review

## Ethnic differences of the care pathway following an out-of-hospital cardiac event: A systematic review

Rochelle Newport <sup>a,\*</sup>, Corina Grey <sup>a,f</sup>, Bridget Dicker <sup>b,c</sup>, Shanthi Ameratunga <sup>d</sup>,  
Matire Harwood <sup>d</sup>



The Royal New Zealand  
College of General Practitioners  
Te Whare Tohu Rata o Aotearoa

> *N Z Med J.* 2025 Nov 21;138(1626):12-25. doi: 10.26635/6965.7086.

## Te ara o Manawataki Fatu Fatu-Kaupapa Māori and Pacific qualitative co-design hui to explore cardiovascular disease care for Māori and Pacific peoples in Aotearoa New Zealand

Jamie-Lee Rahiri <sup>1</sup>, Jason Tuhoe <sup>2</sup>, Sandra Hanchard <sup>3</sup>, Alyssa Houma <sup>3</sup>, Noah Appleby <sup>3</sup>,  
Karen Brewer <sup>3</sup>, Tua Tauetia-Su'a <sup>3</sup>, Taria Tane <sup>3</sup>, Shanthi Ameratunga <sup>4</sup>, Vanessa Selak <sup>5</sup>,  
Bridget Dicker <sup>6</sup>, Corina Grey <sup>3</sup>, Matire Harwood <sup>3</sup>

## Māori and Pacific families' experiences and perspectives of cardiovascular care; A qualitative study

Karen Marie Brewer, <sup>1,\*</sup> Tua Tauetia-Su'a, <sup>1</sup> Sandra Hanchard, <sup>1</sup> Sione Vaka, <sup>2</sup> Shanthi Ameratunga, <sup>2,4</sup> Taria Tane, <sup>1</sup>  
Rochelle Newport, <sup>3</sup> Vanessa Selak, <sup>4</sup> Corina Grey, <sup>3</sup> Matire Harwood <sup>3</sup>



## Rural Māori experiences of accessing heart health care: a Kaupapa Māori qualitative analysis

Taria Tane <sup>A,\*</sup>, Vanessa Selak <sup>B</sup>, Kyle Eggleton <sup>C</sup> and Matire Harwood <sup>D</sup>





**Fa'afetai lava, Ngā mihi nui**



## Diabetes Outcomes Sa

---

**Dr. Nicola Hawley, Y**  
Yale Obesity, Lifestyl  
(OLaGA)

---



# Obesity, Lifestyle & Genetic Adaptations Research Group



## 1990-1995

Longitudinal study of adiposity and cardiovascular disease risk  
n=1,020 participants from American Samoa and Samoa

## 2002-2003

Extended family-based genetic linkage analysis of cardiometabolic traits  
n=1,083 adults, n=409 children from American Samoa and Samoa

## 2010

**Genome Wide Association Study**  
n = 3,504 participants from Samoa

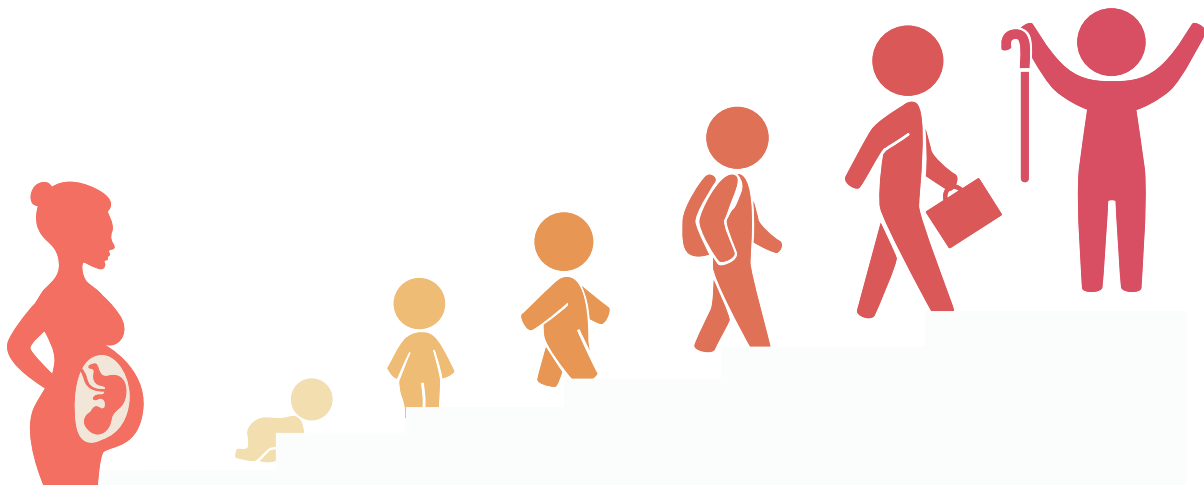
## 2017-2019

Follow up study of  
n = 519 GWAS participants

## ONGOING WORK

**Genetic & non-Genetic Studies**  
Cardiometabolic risk  
Maternal and Child Health  
Mental Health  
Health Systems  
Strengthening

Hawley et al. 2015; Minster et al. 2016





## Intrauterine environment impacts health

'Teachable' moment

Interaction with healthcare system

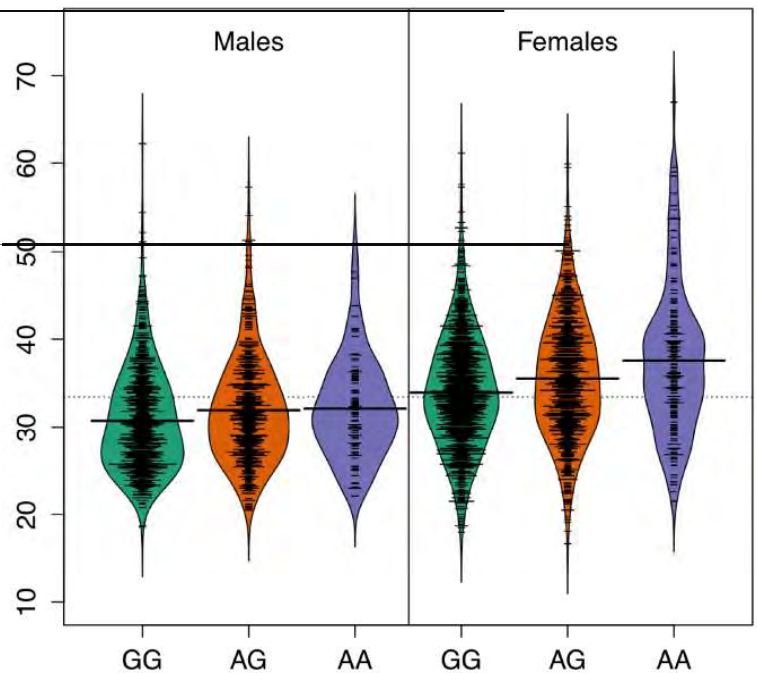


### rs373863828 (p.ArgGln) *CREBRF*

- Discovery Sample:  $\pm 1.36 \text{ kg/m}^2$  per copy
- Explains 1.93% of variation in BMI

#### COMPARISON WITH FTO:

- 0.25-0.41  $\text{kg/m}^2$  per copy
- 0.10-0.34% of variation in BMI
- ~45% of Samoans have at least one copy of the variant

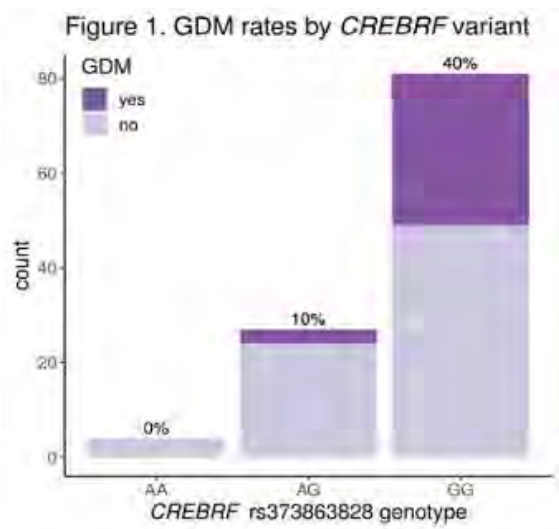


rs373863828 (p.ArgGln) CREBRF

| Genotype       | Obesity       | Diabetes |
|----------------|---------------|----------|
| GG             | 52.1%         | 19.7%    |
| GA             | 58.0%         | 14.2%    |
| AA             | 65.2%         | 9.5%     |
| Each Copy of A | Relative Risk |          |
|                | 12.6% ↑       | 26.9% ↓  |

Minster, Hawley et al., 2016; Hawley et al., 2023; Krishnan et al., 2023

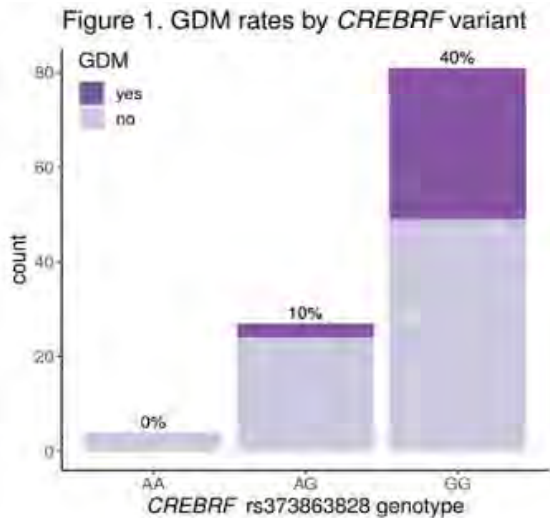
rs373863828 (p.ArgGln) CREBRF



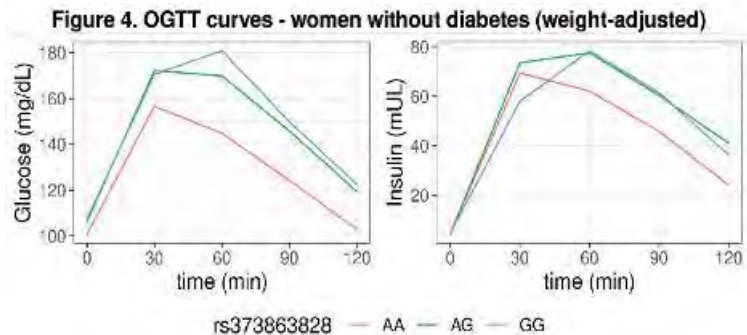
Minster, Hawley et al., 2016; Hawley et al., 2023; Krishnan et al., 2023



## rs373863828 (p.ArgGln) *CREBRF*



1. Can we replicate this in a larger, more generalizable sample?
2. Is there also an impact on transition to postpartum diabetes?
3. What is the mechanism?



Minster, Hawley et al., 2016; Hawley et al., 2023; Krishnan et al., 2023



## GROW

$n = 350$  women

- $\geq 18$  years of age
- Samoan (four Samoan/PI grandparents)
- $< 14$ w based on ultrasound
- Singleton pregnancy
- Completion of prenatal care enrollment
- Planned residence in American Samoa until 18m postpartum

### Exclusion Criteria:

- Pre-existing Type 1 or Type 2 Diabetes
- Conditions that would interfere with glucose homeostasis or other key study variables

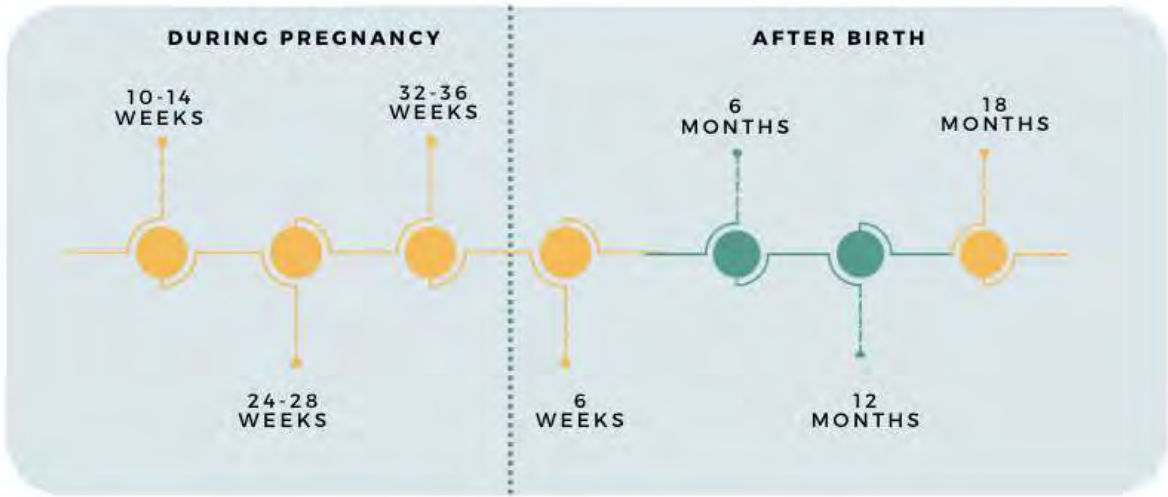
Note: We will include those with pre-diabetes



# GROW

n = 350 women

- fs-OGTT, HbA1c, CGM (10-14w, 24-28w, 32-36w, 6w, 18m)
- Anthropometry & body composition, blood pressure
- Questionnaires



# GROW

n = 350 women

- fs-OGTT, HbA1c, CGM (10-14w, 24-28w, 32-36w, 6w, 18m)
- Anthropometry & body composition, blood pressure
- Questionnaires



# GROW - Clinical & Public Health Questions

$n = 350$  women

- How common is GDM?
- Are there patterns of early glycemic control that are associated with GDM diagnosis?
- Are there behavioral factors associated with development of GDM or postpartum T2DM?
- What support do women with GDM need?

| Assessment                  | Data Collected                                                                                                                             | Measure                                       | Time Point     |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|----------------|
| Demographic characteristics | Age, education, household income                                                                                                           |                                               | 10-14w         |
| Health History              | Prior diagnoses, medication use, family history of diabetes                                                                                | Investigator-developed                        | 10-14w*        |
| Tobacco and Alcohol         | Use of tobacco products, vaping, alcohol consumption; 30d recall                                                                           |                                               | All            |
| Dietary Intake              | Intake of fruits and vegetables, sugar-sweetened beverages, desserts, salty snacks, fast food, water; 30d recall                           | Brief dietary screener                        | All            |
| Physical Activity**         | Time spent in 32 activities: household/caregiving, occupational, sports/exercise, transportation, and inactivity; current trimester recall | Pregnancy Physical Activity Questionnaire     | All pregnancy  |
|                             | Time spent in moderate and vigorous leisure, work, and transportation activities; 7d recall                                                | International Physical Activity Questionnaire | All postpartum |
| Sleep                       | Global sleep quality score and component scores (subjective sleep quality, sleep duration, etc.); 30d recall                               | Pittsburgh Sleep Quality Index                | All            |
| Psychosocial Health         | Depression, anxiety, social support                                                                                                        | PHQ-9, GAD-7, MSPSS                           | All            |
| Infant Feeding              | Mode of infant feeding (breastfeeding, formula, mixed-feeding)                                                                             | Investigator-developed                        | All postpartum |
| Usual Routines              | Illnesses during CGM, changes to usual routine (diet & physical activity)                                                                  | Investigator-developed                        | All CGM        |

d: day; w: week; CGM: continuous glucose monitoring. \*Diagnoses and medication use throughout pregnancy will be extracted from medical records (Section C.5.f); \*\*Min/week of light, moderate and vigorous activity will be used in analyses

## GROW+

$n = 320$  infants

- Genotyping
- Anthropometry (weight, length, skinfolds)
- Body composition (DXA)
- Metabolic markers: glucose, insulin, proinsulin, c-peptide, leptin, adiponectin, IGF1, IGF2
- CGM - 12m
- Questionnaires (feeding)



---

## Summary

- Pregnancy is a uniquely important moment to both understand how NCD risk is established and to intervene
  - Understanding unique genetic contributors to risk may open doors to intervention or help guide limited resources
  - Our work will examine risk for gestational diabetes (GDM) and impacts of GDM on child health and growth in the first 18 months of life
- 



@YALEOLAGA



YSPH.YALE.EDU/OLAGA  
WWW.OLAGA.ORG



NICOLA.HAWLEY@YALE.EDU



# REVCAP: Regional Enhanced Vaccine Capacity in the Asia - Pacific

Global Vaccine Data Network  
Centre For Health Analytics, MCRI  
Fiji National University, Fiji  
Ministry of Health, Fiji  
Ministry of Health, Samoa  
Immunisation Advisory Centre, NZ  
Vaccine Uptake Group, MCRI



A collaboration for vaccine safety, confidence and effectiveness



## Background

.....

Immunisation is a global success

But safety scares (real or spurious)  
do occur

Infodemic - misinformation



# Background

---

Immunisation is a global success

But safety scares (real or spurious)  
do occur

Infodemic - misinformation



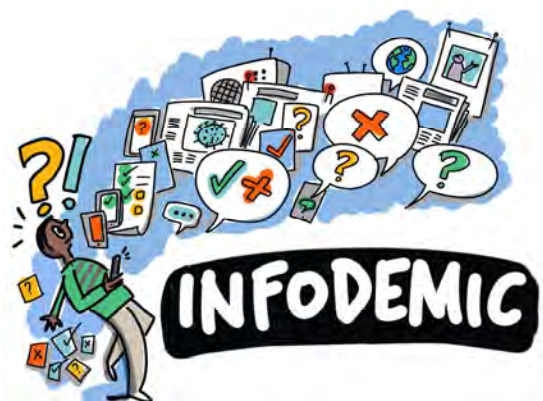
# Background

---

Immunisation is a global success

But safety scares (real or spurious)  
do occur

Infodemic - misinformation



Challenges to vaccine confidence and vaccine acceptance

# GVDN

Investigator led real-world data collaboration in vaccine effectiveness and safety supporting vaccine confidence and uptake

Supporting vaccine confidence and acceptance

Steve Black MD, Jim Buttery MD  
Co-Directors



## Global Vaccine Data Network



## The power of a global vaccine data network

Health data from diverse populations around the world.

Comparison of different vaccines and schedules.

Increased statistical power.



# Global reach & collaboration

---



6 continents



35 countries



37 sites



>600 million

VAC4EU

ALIVE

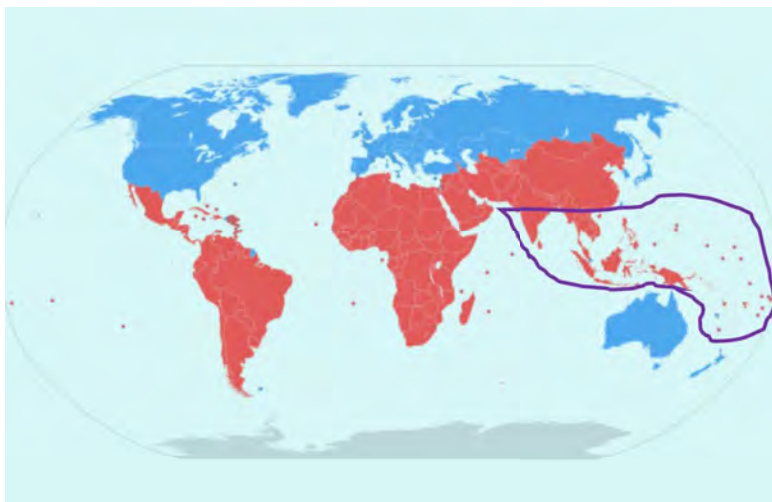
BRAVE

GVDN® | An investigator-led coordinated programme of vaccine safety and effectiveness activities



# Vaccine safety assessment inequity

---



Most of the world lives in LMIC

Most vaccine safety infrastructure is centralised in high income countries

Considered "acceptable" when most new vaccines are used in HIC for a long time prior to use in LMIC

But this is no longer true

GVDN® | An investigator-led coordinated programme of vaccine safety and effectiveness activities





# GVDN collaboration principles

---

Committed to regional partnerships

Understand national and regional priorities

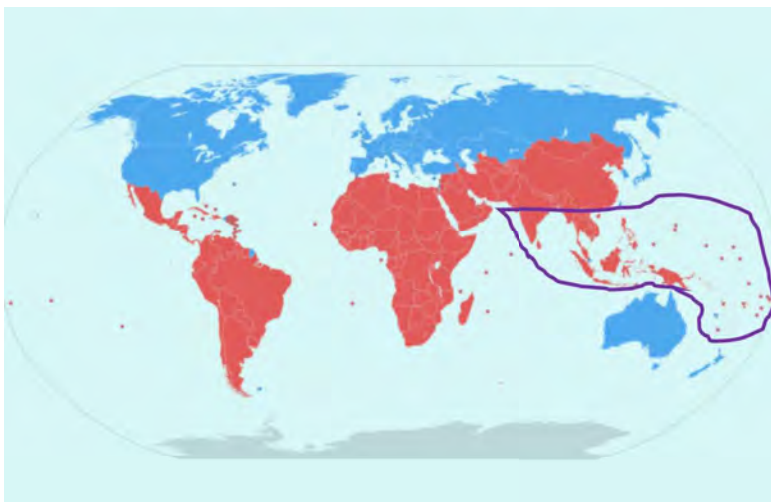
Build communication

Identify capacity building opportunities

Avoid duplication

## Vaccine safety assessment inequity

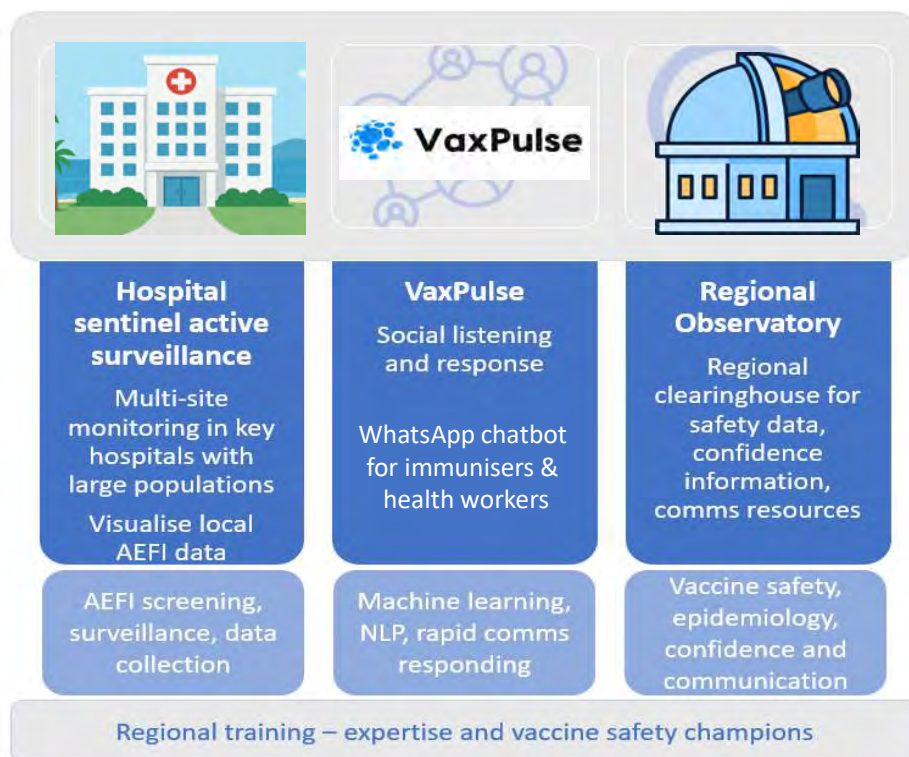
---



### GVDN Post-COVID reflections

- Asia-Pacific under-represented
- Local concerns underinformed
- High vulnerability to misinformation
- Escalating vaccine hesitancy in the region

- Improve opportunities for collaboration & inclusion in global vaccine safety activities
- **REVCAP**: Regional Enhanced Vaccine Capacity in the AsiaPacific



GVDN® | An investigator-led coordinated programme of vaccine safety and effectiveness activities



REVCAP will build Asia-Pacific regional capacity to identify and effectively respond to vaccine safety challenges and enhance immunisation confidence.

**VaxPulse**

Social listening and response

Combat misinformation and infodemic

Support local immunisation leaders

**VaxPulse**

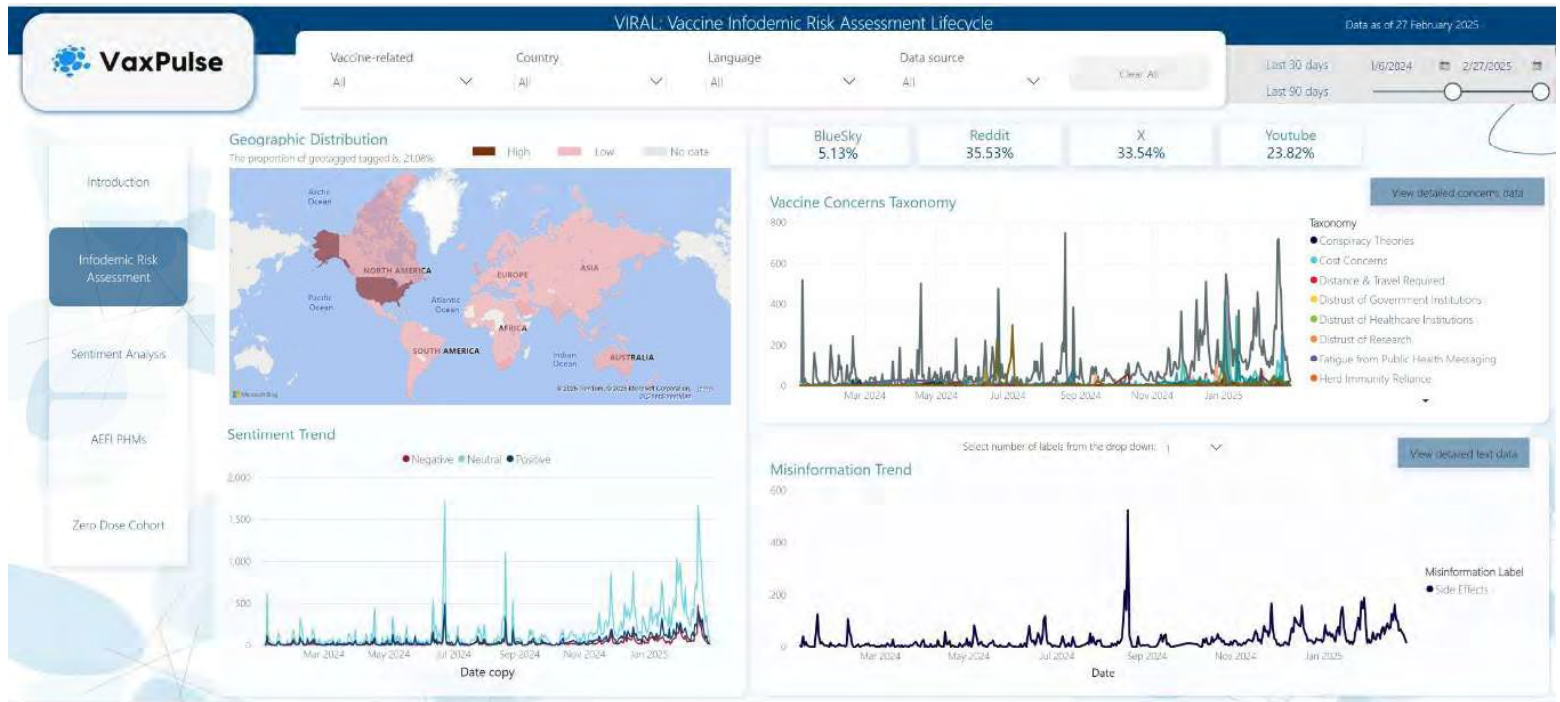
Machine learning, NLP, rapid comms responding

- Next steps**
- Co-design VaxPulse dashboard
  - Workshop dashboard outputs
  - Support enablers for strategy & decision-making



- Nov 2025 → In-country visit
- Socialise REVCAP model
  - Collaboration agreements
  - Confirm priorities





**WhatsApp** **VaxPulse** V

Yes. Vaccines are safe for most people; side effects are usually mild and brief. Talk to your clinician. 2:11 pm

Does HPV vaccine cause abortion? 2:12 pm ✓

No. HPV vaccine doesn't cause abortion. It's not recommended during pregnancy; vaccination can be done before/after pregnancy. 2:12 pm

Does HPV vaccine increase promiscuity? 2:13 pm ✓

No. HPV vaccine does not affect sexual behavior; it prevents HPV-related cancers and is safe. 2:13 pm

Is the Typbar Typhoid vaccine safe? 2:30 pm ✓

Yes, Typbar Typhoid vaccine is safe and effective; side effects are mild, like injection-site pain or fever. 2:30 pm

11/11/2025

What are side effects of the AstraZeneca vaccine? 5:46 pm ✓

Common: sore arm, fatigue, headache, muscle pains, fever. Rare: blood clots with low platelets (VITT). Seek care if severe. 5:47 pm

18/11/2025

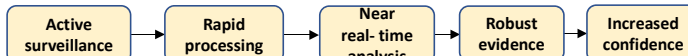
GVDN® | An investigator + Type a message

**Global Vaccine Data Network**

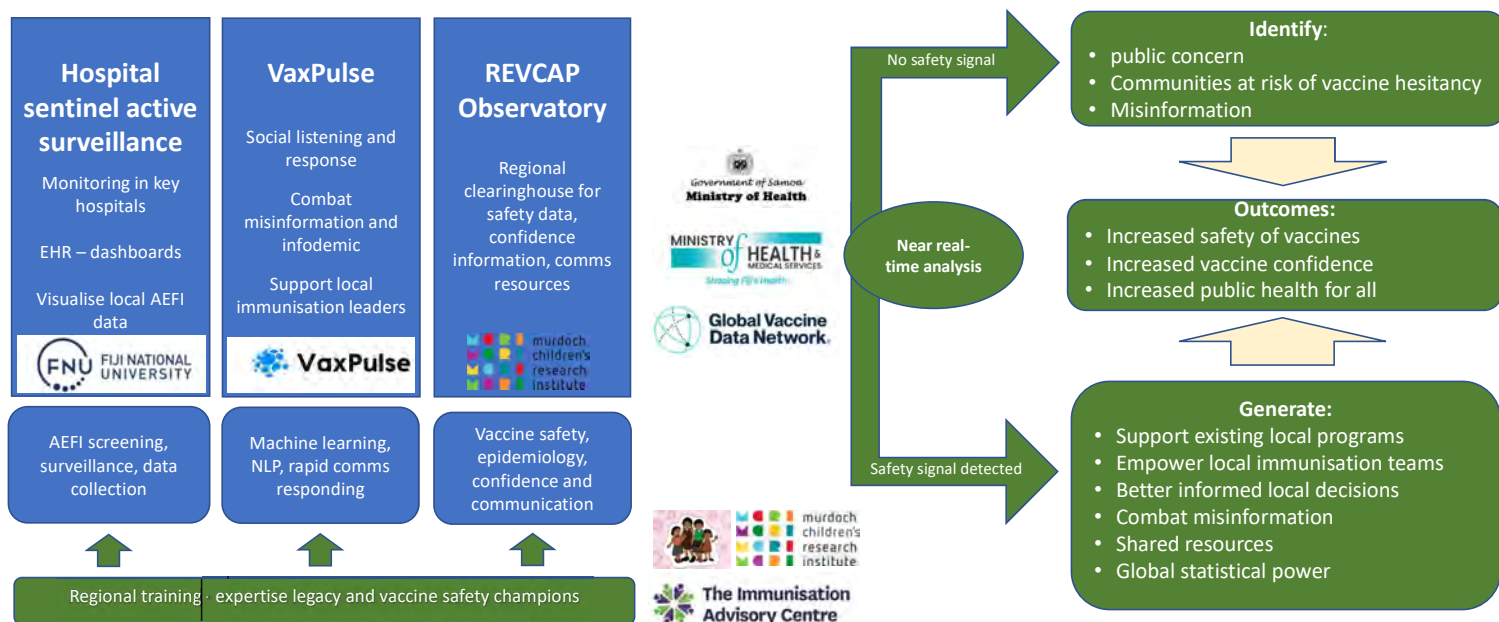
## What's the problem with vaccine hesitancy?

Amplifies emerging disease | Allows for disease resurgence | Undermines community health

## GVDN REVCAP Solution process



## Regional Enhanced Vaccine Capacity in the Asia-Pacific (REVCAP): A project for vaccine safety, confidence and effectiveness



REVCAP will build Asia-Pacific regional capacity to identify and effectively respond to vaccine safety challenges and enhance immunisation confidence.



Strengthened capacity



Informed local leaders



Regional Observatory



Regional training - expertise legacy and vaccine safety champions

A collaboration for vaccine safety, confidence and effectiveness





# REVCAP partners



[jim.buttery@mcri.edu.au](mailto:jim.buttery@mcri.edu.au)



Acknowledgements:



GVDN® | An investigator-led coordinated programme of vaccine safety and effectiveness activities



## AMR genomic surveillance in Fiji. Lessons for Pacific health security



**Pacific Academy of Sciences  
Samoa - 2026**

*Sakiusa Baleivanualala*

*[saki.baleivanualala@otago.ac.nz](mailto:saki.baleivanualala@otago.ac.nz) / [sakiusa.B@fnu.ac.fj](mailto:sakiusa.B@fnu.ac.fj)*

*Dept of Microbiology & Immunology, University of Otago*

*Dept of Pathology and Medical Lab Science, CMNHS, Fiji National University*

# Global burden of bacterial antimicrobial resistance in 2019: a systematic analysis

Antimicrobial Resistance Collaborators\*

## Summary

**Background** Antimicrobial resistance (AMR) poses a major threat to human health around the world. Previous publications have estimated the effect of AMR on incidence, deaths, hospital length of stay, and health-care costs for specific pathogen–drug combinations in select locations. To our knowledge, this study presents the most comprehensive estimates of AMR burden to date.



*Lancet* 2022; 399: 629–55  
Published Online  
January 20, 2022  
[https://doi.org/10.1016/S0140-6736\(21\)02724-0](https://doi.org/10.1016/S0140-6736(21)02724-0)

Estimated **4·95 million** (3·62–6·57) **deaths associated with bacterial AMR in 2019**

Includes **1·27 million** (95% UI 0·911–1·71) **deaths attributable to bacterial AMR**



*Lancet* 2022; 399: 629–55

## Drivers and Solutions for AMR in PICTs

### Drivers of AMR in PICTs

#### General

- High infection rates
- Rational and irrational prescribing

#### Surveillance and Diagnostics

- Lack of susceptibility testing
- Poor access to diagnostics

#### Education

- Low community knowledge of AMR

#### Transmission

- Overcrowding and limited infrastructure
- Increasing travel and medical tourism

#### Animal Health

- Shortage of veterinarians
- Antimicrobial use for prophylaxis/growth promotion



### Solutions to Address AMR in PICTs

#### General

- Local antimicrobial guidelines
- Reliable global funding support

#### Surveillance & Diagnostics

- Increase diagnostic availability
- Strengthen laboratory systems
- Routine AMR surveillance reporting

#### Education

- Antibiotic awareness campaigns
- AMR in healthcare curricula

#### Transmission

- Vaccination, sanitation and hygiene

#### Animal Health

- Regulate antimicrobial use in agriculture

Underpinned by PICTs National Action Plans

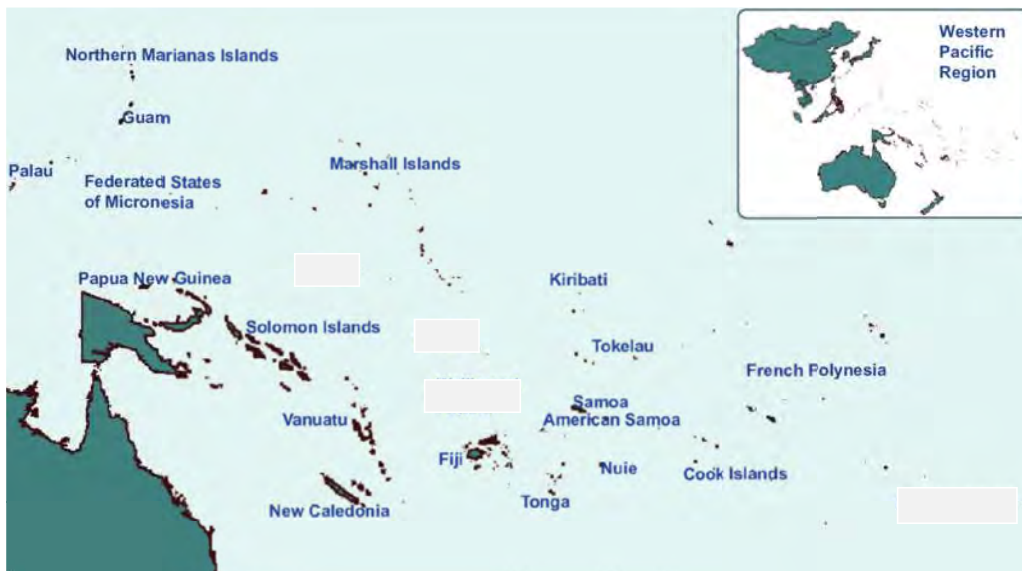
Antimicrobial resistance in the Pacific Island countries and territories

Michael J. Lottus,<sup>1,11</sup> Andrew J. Stewardson,<sup>1</sup> Ravi Naidu,<sup>2</sup> Ben Goghlan,<sup>3</sup> Adam W. Jernrey,<sup>4,5</sup> Jorita Kepas,<sup>6</sup> Evelyn Lavi,<sup>6</sup> Alex B. Munamua,<sup>7</sup> Trisha N. Peet,<sup>1</sup> Vinita Sahai,<sup>2</sup> Rosemary Tekeoa,<sup>8</sup> Lilla Tudoraru,<sup>2</sup> Julie Zlotnik,<sup>9</sup> Allen C. Cheng,<sup>1,10</sup> Eric Rafai,<sup>11</sup> and Anton Y. Polog<sup>1,12</sup>





# AMR burden in the Pacific

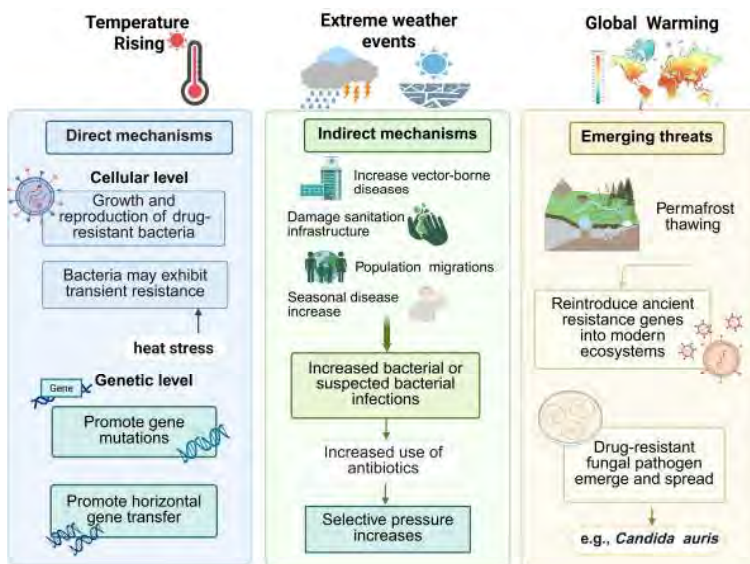


- 32,000 projected deaths in Pacific (2020 - 2030)
- \$500 million economic cost by 2030



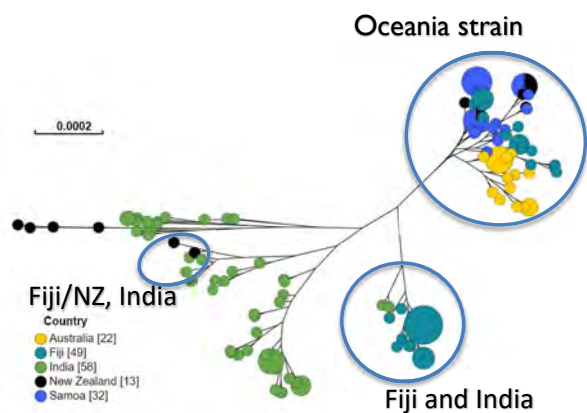
Health and economic impacts of antimicrobial resistance in the Western Pacific Region, 2020-2030

## Climate change is fuelling the AMR Crisis



Climate change and antimicrobial resistance in the Western Pacific: a mixed-methods systematic analysis

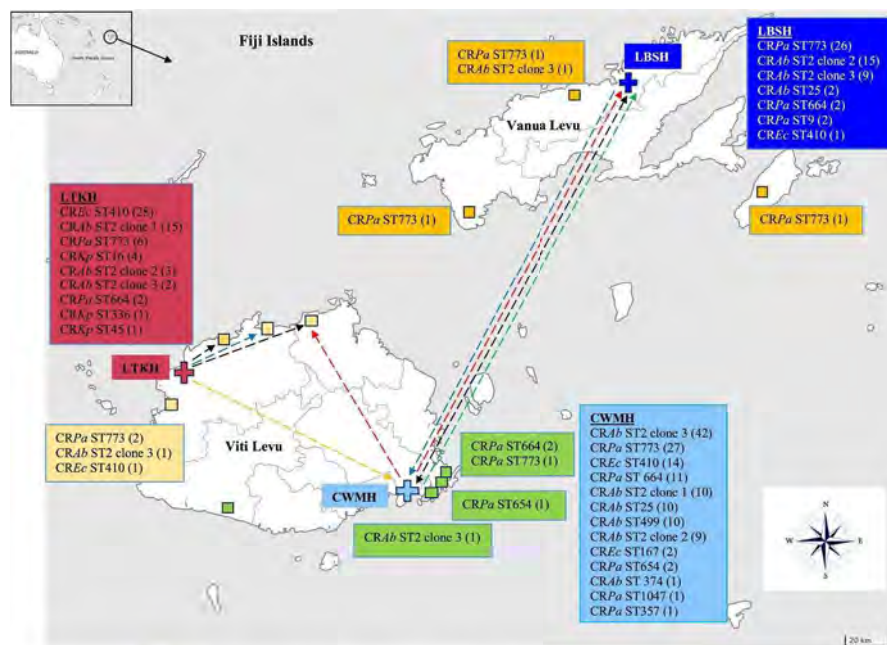
<https://www.emjreviews.com/microbiology-infectious-diseases/news/climate-change-is-fuelling-the-amr-crisis/>



## Multicountry Study of CRAb ST2



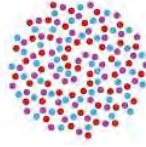
Baleivanualala et.al, Lancet Regional Health Western Pacific, 2023



Transmission of AMR pathogens across health facilities in Fiji, 2020 - 2021

Baleivanualala et.al, Lancet Regional Health Western Pacific, 2024





MAURICE WILKINS CENTRE  
FOR MOLECULAR BIODISCOVERY



aspen  
medical



James Ussher  
UO/Awanui



Saki Baleivanualala  
UO/FNU



Donald Wilson  
FNU



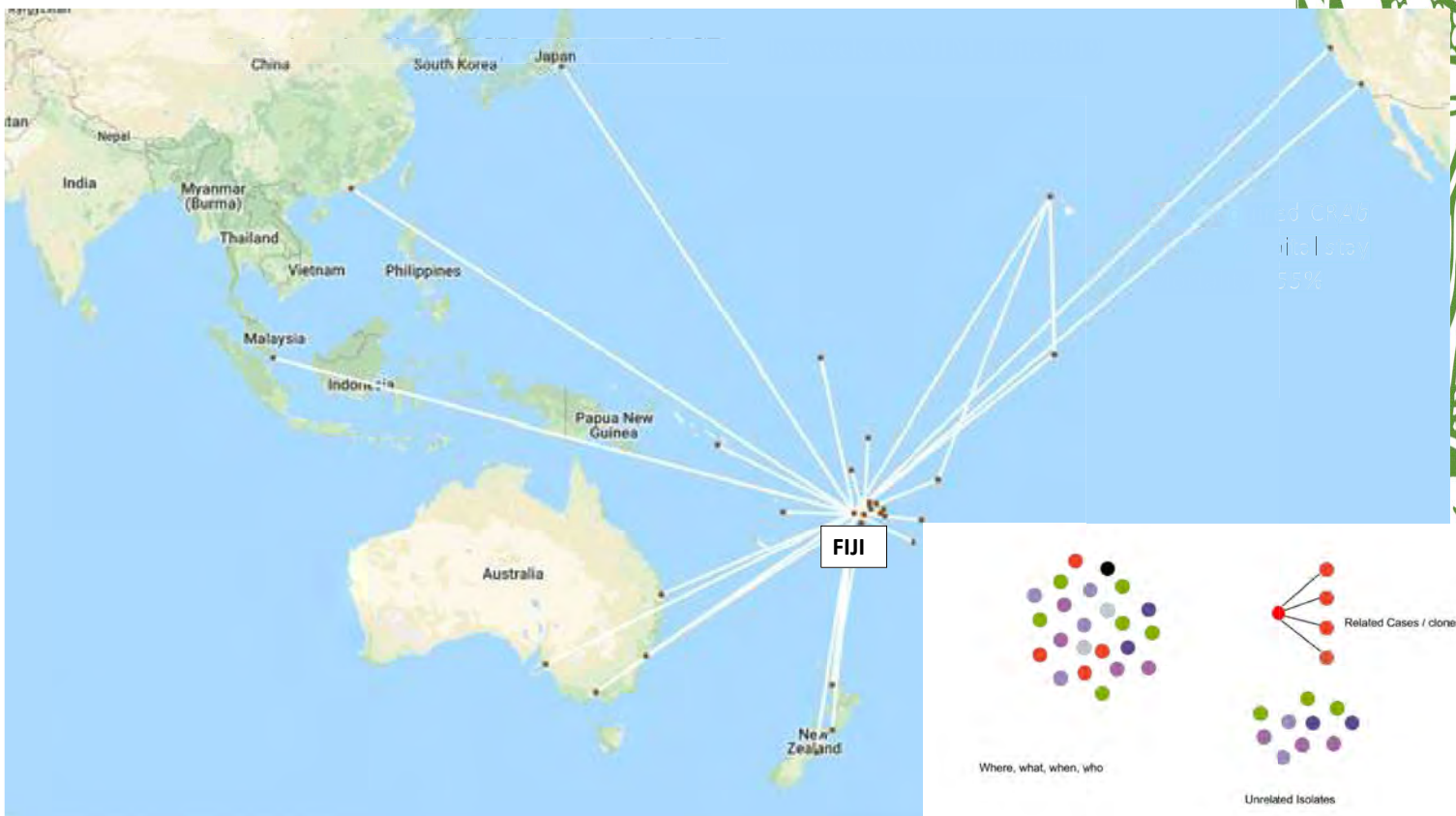
Adriu Sepeti  
FNU



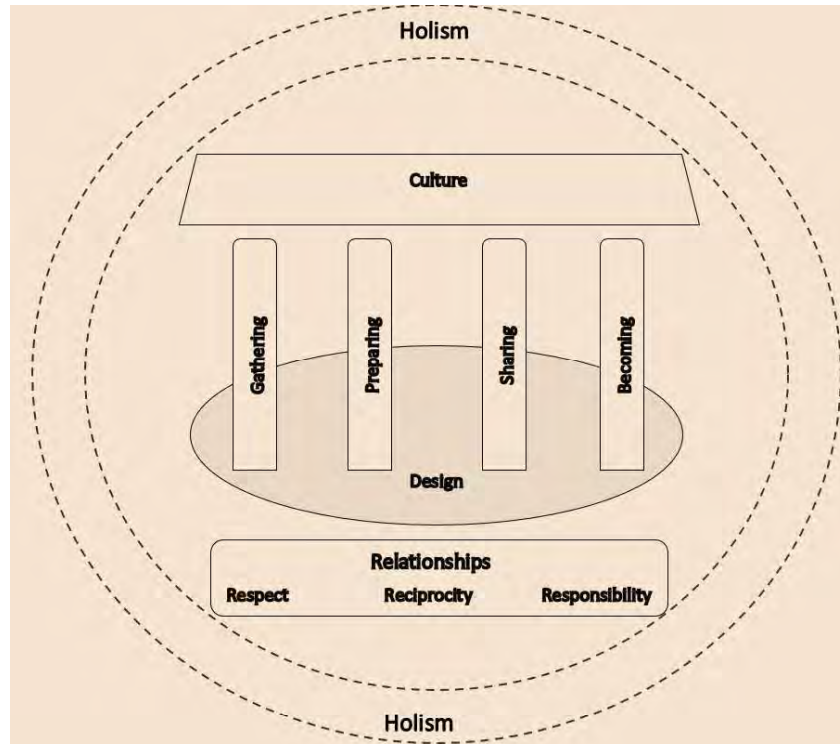
Swastika Devi  
FNU



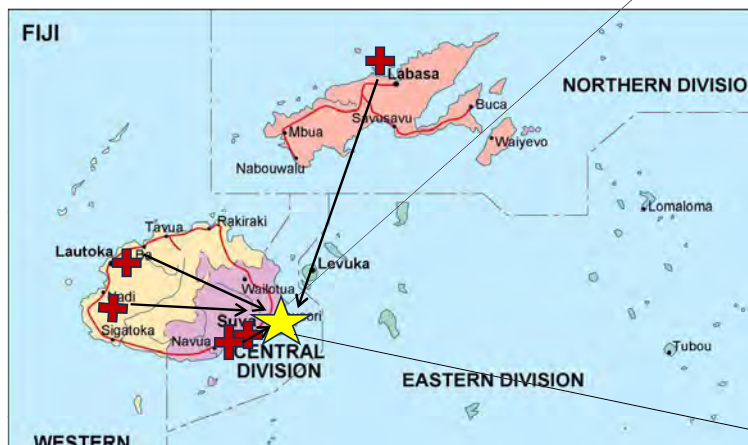
Sajnel Prasad  
MOH Fiji



# The Framework



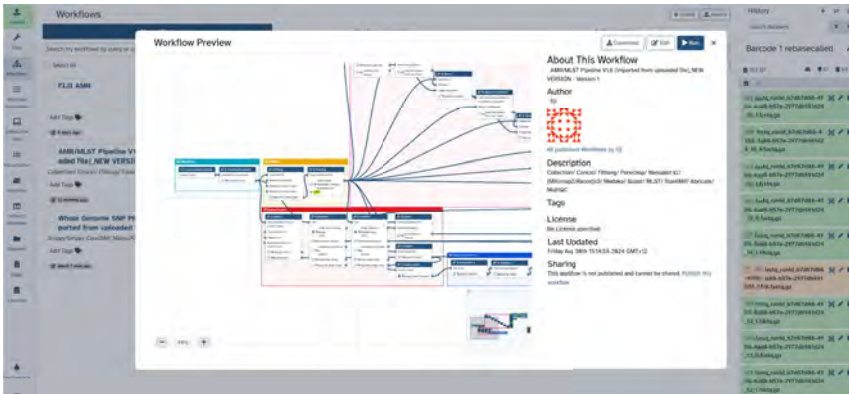
## Establishing AMR genomic surveillance





# Infrastructure requirement

| Wet Lab                | Dry Lab                                                                                              | Logistics & Reporting                         |
|------------------------|------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| Phenotypic & Molecular | Computing capacity/ Server<br>Bioinformatics training<br>- Need user-friendly bioinformatic pipeline | Sustainable supplies.<br>Reporting mechanisms |

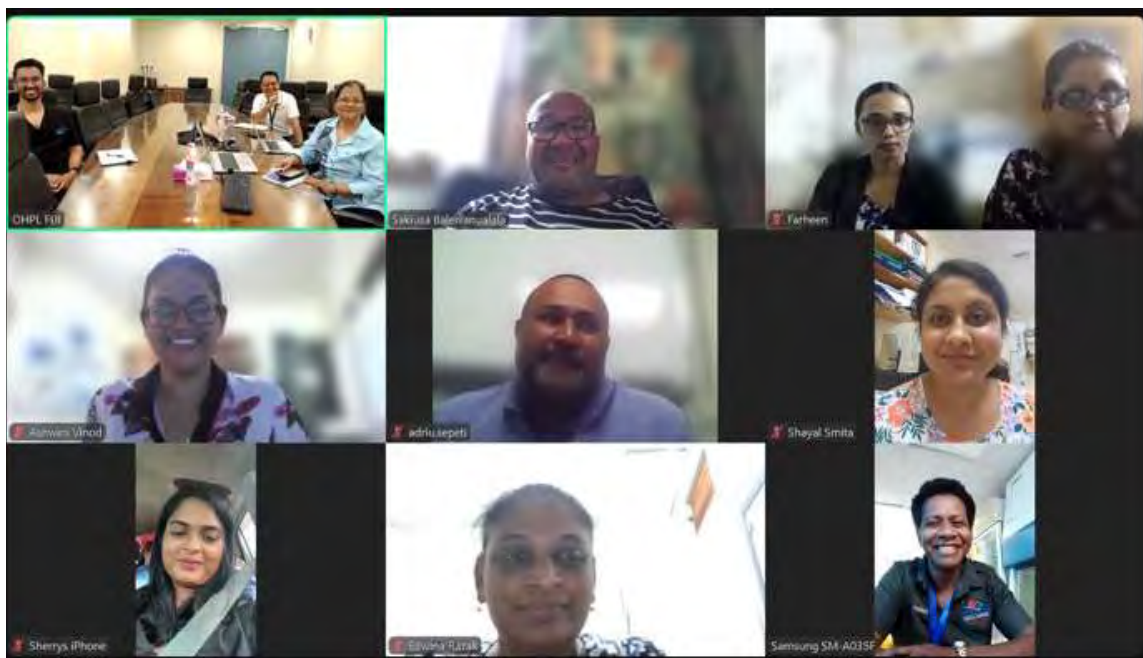


# Awareness and relationship building

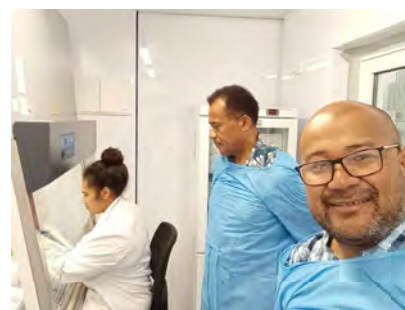




# Fiji's Microbiology Network



## Tuakana-Tacina





# AMR team and partners



## Result

### Multi Locus Sequencing Type

Multilocus sequence typing (MLST) is an unambiguous procedure for characterising isolates of bacterial species using the sequences of internal fragments of (usually) seven house-keeping genes.

Copy table

Configure columns

Scatter plot

Violin plot

Export as CSV...

Showing 1/1 rows and 9/9 columns.

Summarize table

| Isolate ID | Scheme          | Sequence type | Locus 1 | Locus 2 | Locus 3  | Locus 4 | Locus 5 | Locus 6  | Locus 7 |
|------------|-----------------|---------------|---------|---------|----------|---------|---------|----------|---------|
| Barcode 01 | ecoli_achtman_4 | 410           | adk(6)  | fumC(4) | gyrB(12) | icd(1)  | mdh(20) | purA(18) | recA(7) |

### Chromosomal Antimicrobial Resistance Genes

MOB-Recon was used to isolate Chromosomal sequences. These sequence were then analysed by AMRFinderPlus. This software identifies antimicrobial resistance genes in bacterial protein and/or assembled nucleotide sequences as well as known resistance-associated open reading frame and point mutation presence/absence. It does not infer phenotypic resistance. Many of the resistance genes detected are not currently in the AMR database or antimicrobial surveillance.

Copy table

Configure columns

Scatter plot

Violin plot

Export as CSV...

Showing 3/3 rows and 4/4 columns.

| Gene symbol          | % Coverage of reference sequence | % Identity to reference sequence | Class       |
|----------------------|----------------------------------|----------------------------------|-------------|
| bla <sub>CMY-2</sub> | 100.0                            | 100.0                            | BETA-LACTAM |
| bla <sub>NDM-7</sub> | 100.0                            | 100.0                            | BETA-LACTAM |
| ble                  | 100.0                            | 100.0                            | BLEOMYCIN   |





# LESSONS FOR PACIFIC HEALTH SECURITY

- AMR is already a serious Pacific threat.
- Genomics reveals hidden transmission.
- Local capacity is possible with strategic investment.
- Collaboration is essential.
- Surveillance is a pillar of health security.
- Building AMR genomic surveillance in Fiji is not only a scientific achievement.

It is an investment in Pacific sovereignty, preparedness, and resilience.”

## Vinaka





# Whose Future Gets Modelled?

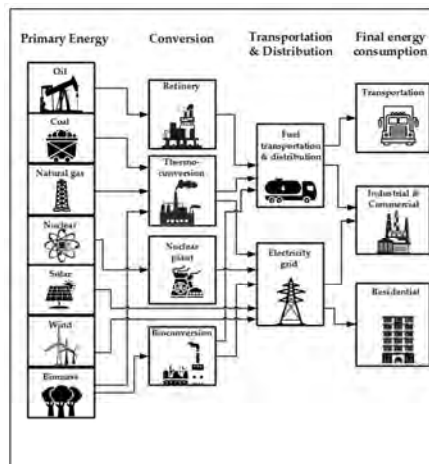
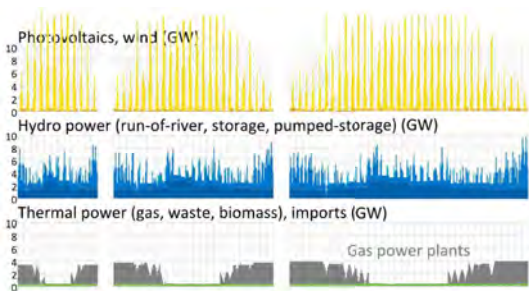
## From Targets to Pathways with Pacific-Led Energy Systems Modelling

Associate Professor Martin Atkins  
School of Engineering  
University of Waikato



**TE KURA MATA-AO**  
**SCHOOL OF ENGINEERING**

## Energy Systems Modelling



# Why is this Important?

- Models can shape decisions that have real impact
- Climate change and energy transition has real impacts
  - Energy Trilemma



3

## Fa'afaletui - Tamasese et al (1997)



**View from  
the canoe**



**View from  
the treetops**



**View from  
the mountain**

Tamasese K, Peteru C, Waldegrave C. 1997. Ole Taeao Afua: a qualitative investigation in Samoan perspectives on mental health and culturally appropriate services. Report for the Health Research Council of New Zealand. Wellington: The Family Centre.

4





**Thank you for listening.**

**For more information, visit  
our website or email  
[martin.atkins@waikato.ac.nz](mailto:martin.atkins@waikato.ac.nz)**

**Follow us on  
LinkedIn @ Ahuora**



**[www.ahuora.co.nz](http://www.ahuora.co.nz)**



# Renewable Energy Adaptation and Potential Challenges for Pacific Island Countries

***Amit Prakash***

*The University of Fiji*

***Pacific Academy of Sciences Congress: Harnessing the Knowledge of the Pacific***

*Taumeasina Island Resort, Samoa*

*16<sup>th</sup> – 18<sup>th</sup> February 2026*

1

## Content of Presentation

- Introduction
- Literature Review
- Renewable Energy Balances in Pacific Island Countries
- Renewable Energy Projects in Pacific Island Countries
- Potential Challenges in Pacific Island Countries
- Conclusion and Implications
- References

2

## 1. Introduction

- Sustainable Development Goals:



- Adaptation of renewable energy generation will have two-fold effect of climate mitigation and reducing fuel import bill.
- Pacific Island Countries are broadly categorized into three distinct cultural and geographical subregions, Melanesian, Micronesia and Polynesia.

3

## 1. Introduction

- Installed renewable energy capacity for PIC region increased from 640 megawatts (MW) in 2014 to 830 megawatts (MW) in 2022 that represents approximately 30% growth in eight years (IRENA, 2023).
- Renewable hydropower accounted for the largest share of global total followed by solar and wind energy in 2022. At the end of 2024, the global renewable generation capacity was dominated by solar with renewable hydropower and wind energy.
- Solar PV is an integral part of global energy transition due to scalability, modularity and rapid declining costs (Rezaee and Silva, 2025).

4

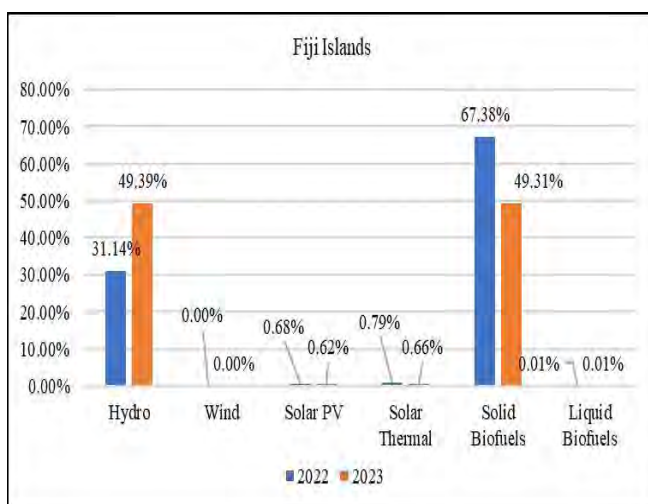
## 2. Literature Review

- Pacific Island Countries (PICs) face numerous energy access challenges that hinders achieving the Sustainable Development Goals (Jena and Chaturvedi, 2025).
- Rezaee and Silva (2025) acknowledged that solar PV is an integral part of global energy transition due to scalability, modularity and rapid declining costs.
- Uncertainties in the Pacific economies together with lack of fiscal space and low savings and per capita income hampers the country's ability to mobilize domestic capital (Lal and Kumar, 2022) .
- Narayan and Narayan (2024), Donor funding and clean energy of Pacific Island Countries.

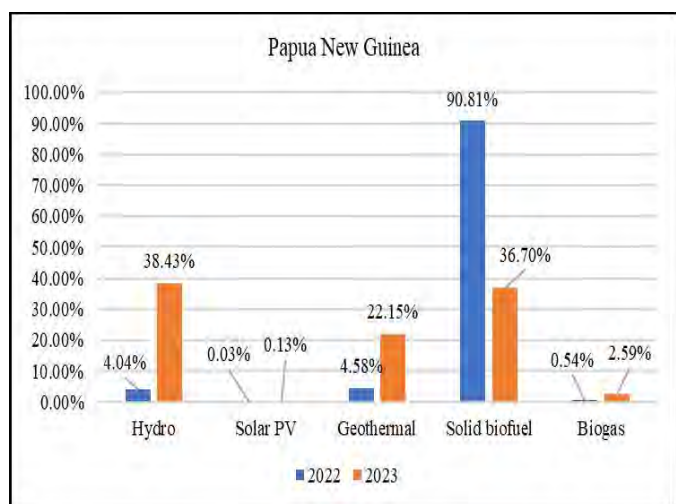
5

## 3. Renewable Energy Balances in Selected Pacific Island Countries

Panel A



Panel B



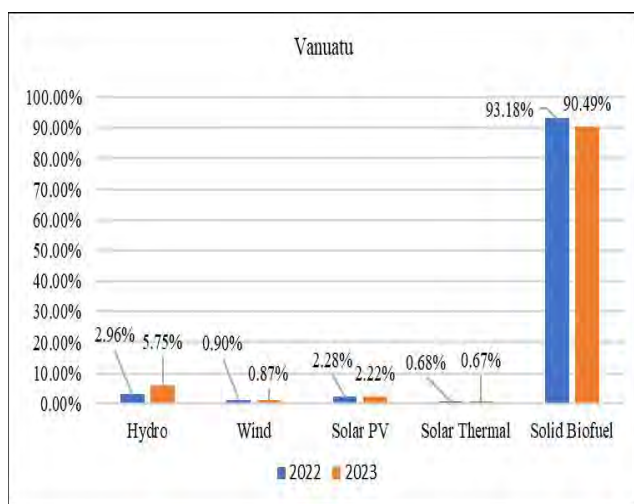
Source: IRENA (2026)

6

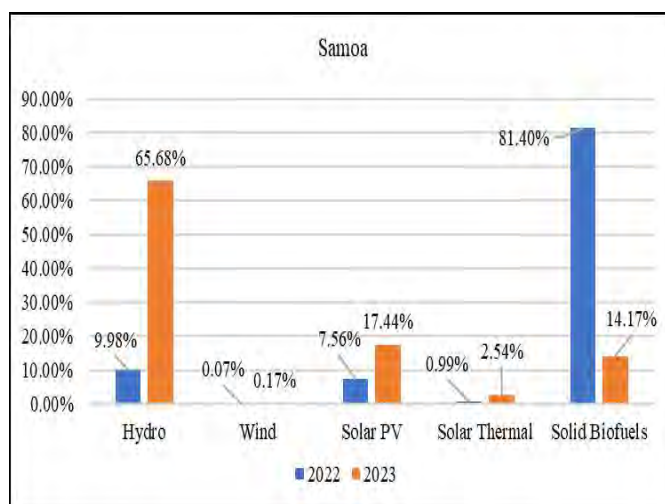


### 3. Renewable Energy Balances in Selected Pacific Island Countries

Panel C



Panel D

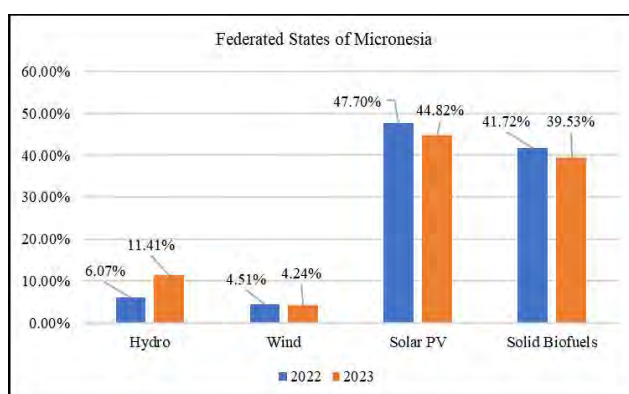


Source: IRENA (2026)

7

### 3. Renewable Energy Balances in Selected Pacific Island Countries

Panel E



Source: IRENA (2026)

8

#### 4. Renewable Energy Projects in the Selected Pacific Island Countries 2021 – 2023

|                                           | <i>Number of Projects<br/>(2021 – 2023)</i> | <i>Grants/Concessional Loan</i> | <i>Amount (2022 Constant USD<br/>million)</i> |
|-------------------------------------------|---------------------------------------------|---------------------------------|-----------------------------------------------|
| <i>Fiji</i>                               | 10                                          | Standard Grants                 | \$8,574,316.04                                |
| <i>Kiribati</i>                           | 4                                           | Standard Grants                 | \$315,665.25                                  |
| <i>Marshall Island</i>                    | 8                                           | Standard Grants                 | \$5,991,514.97                                |
| <i>Federated States of<br/>Micronesia</i> | 8                                           | Standard Grants                 | \$5,951,316.08                                |
| <i>Nauru</i>                              | 1                                           | Standard Grants                 | \$47,784.31                                   |
| <i>Palau</i>                              | 7                                           | Standard Grants                 | \$42,103,656.26                               |
| <i>Papua New Guinea</i>                   | 16                                          | Standard Grants                 | \$28,421,638.68                               |
| <i>Samoa</i>                              | 5                                           | Standard Grants                 | \$1,230,646.85                                |
| <i>Solomon Islands</i>                    | 8                                           | Standard Grants                 | \$4,322,692.45                                |
| <i>Tonga</i>                              | 9                                           | Standard Grants                 | \$5,557,300.14                                |
| <i>Tuvalu</i>                             | 3                                           | Standard Grants                 | \$4,926,423.05                                |
| <i>Vanuatu</i>                            | 14                                          | Standard Grants                 | \$36,905,485.93                               |

Source: IRENA and OCED(2025) Private Investment Database

9

#### 5. Potential Challenges in Pacific Island Countries

- Pacific Island Countries have twin energy security concerns.
- Low savings and per capita income hampers the country's ability to mobilize domestic capital (Lack of Infrastructure).
- Financial Management of Renewables.
- Geographical Isolation and Grid Infrastructure Limitations.

## 6. Conclusion and Policy Implications

- Potentially explore on solar dominance (smart Grids); possibly Microgrids and extension to Grid...but the impediment is costing.
- Adaptation of Environment Friendly Technology and Gadgets.
- Empowering local communities for climate mitigation.
- Policy and Regulation.

11

## 7. References

- Jean, L. and Chaturvedi, A. 2025. Renewable Energy Financing in the Pacific Island Countries. *Energy for Sustainable Development*. Available at: <https://doi.org/10.1016/j.esd.2024.101642>.
- International Renewable Energy Agency. 2023. *Renewable Capacity Highlights March 2023*. Available at: [https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2023/Mar/IRENA\\_RE\\_Capacity\\_Highlights\\_2023.pdf](https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2023/Mar/IRENA_RE_Capacity_Highlights_2023.pdf)
- International Renewable Energy Agency. 2025. *Renewable Capacity Highlights March 2025*. Available at: [https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2025/Mar/IRENA\\_DAT\\_RE\\_Capacity\\_Highlights\\_2025.pdf](https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2025/Mar/IRENA_DAT_RE_Capacity_Highlights_2025.pdf)
- Lal, R. and Kumar, S. 2022. Energy security assessment of small Pacific Island Countries – Sustaining the call for renewable energy proliferation. *Energy Strategy Reviews*. Available at: <https://doi.org/10.1016/j.esr.2022.100866>
- Rezaee, E. and Silva, S. 2025. Solar Energy in 2025: Global Deployment, Cost Trends, and the Role of Energy Storage in Enabling a Resilient Smart Energy Infrastructure. *Authorea*. August 29, 2025. Available at: <https://doi.org/10.22541/au.175647950.09188768/v1>
- Mulugetta, Y., Hagan, E. and Kammen, D. 2019. Energy access for sustainable development. *Environmental Research Letters*. Available at: <https://doi.org/10.1088/1748-9326/aaf449>
- Energy Fiji Limited. 2026. *Hydro Energy Plants*. Available at: <https://efl.com.fj/about-us/renewable-projects/hydro-electricity-projects/>
- Global Green Growth Institute. 2026. *Fiji Achieves Major Milestone with the Commissioning of Mua Solar Farm on Taveuni Island*. Available at: <https://gggi.org/fiji-achieves-major-milestone-with-the-commissioning-of-mua-solar-farm-on-taveuni-island/>
- Business Advantage International, 2026. *Hydro project aims to bring stability to Port Moresby's grid*. Available at: <https://www.businessadvantagepng.com/hydro-project-aims-to-bring-stability-to-port-moresbys-grid/>
- Lowy Institute, 2025. *PNG's fuel crisis to further calls for exchange-rate reform*. Available at: <https://www.lowyinstitute.org/publications/png-s-fuel-crisis-further-calls-exchange-rate-reform#:~:text=Puma%20Energy%20has%20cited%20a%20shortage%20of,type%20would%20probably%20lead%20to%20social%20protest.>
- Asian Development Bank. 2025. *Expanding Hydropower in Samoa*. Available at: <https://www.adb.org/multimedia/partnership-report2024/story-archives/expanding-hydropower-in-samoa/#:~:text=%E2%80%9CThe%20hydropower%20plants%20the%20project,2013%20to%2053%25%20in%202020.>
- International Renewable Energy Agency, 2025. *Renewable Energy Balance Overview*. Available at: <https://www.irena.org/Data/View-data-by-topic/Renewable-Energy-Balances/Overview-Tables>
- Narayan, S., & Narayan, P. K. 2024. Clean energy for the Pacific Island countries: does donor funding promote this transition? *Energy Economics*. Available at: <https://doi.org/10.1016/j.eneco.2024.107567>

12



*Thank You*

13



**Pacific Academy  
of Sciences**

**Pacific Academy of Sciences  
Inaugural Congress 2026**

**Taumeasina Island Resort  
Feb 16<sup>th</sup> – 18<sup>th</sup>, 2026**

***“Advancing renewable energy for  
sustainable growth and energy  
security in Papua New Guinea”***



**International  
Science Council**  
Regional Focal Point for  
Asia and the Pacific



**Australian  
Academy of  
Science**



**SASAKAWA  
PEACE  
FOUNDATION**

# OUTLINE

- Brief introduction
- Summary
- PNG energy profile
- Power sector overview
- Policy landscape
- Major barriers
- RE cost competitiveness
- Recommended frameworks
- Way forward
- Benefits
- Conclusion

# BRIEF INTRODUCTION

Francis Sakato



## 01 Demographics

10.8 million people | 1.6 million households  
22 provinces | 89 districts

## 02 Languages

Official: English : Unofficial: Pidgin  
Local languages: 800+

## 03 Government

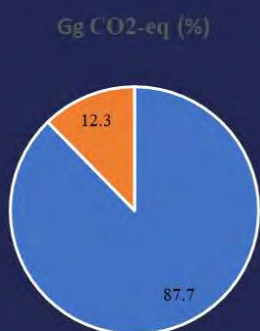
Constitutional monarchy with  
parliamentary democracy

## SUMMARY

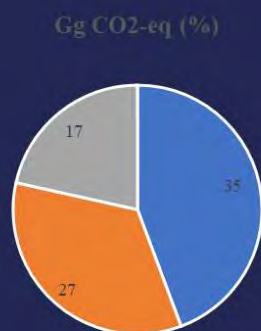
- PNG depends on imported fossil fuels, with the energy sector emitting 87.7% of GHGs.
- Abundant renewable energy (RE) resources exists but deployment lags due to policy, regulatory, economic, and political barriers.
- This study conducts a gap analysis of frameworks like PNG National Energy Policy, calls for an umbrella RE policy, and proposes mechanisms like feed-in-tariffs (FiTs), net-metering, auctions, tax rebates, soft loans, and priority grid access to enhance energy security, access and climate mitigation.

## PNG ENERGY PROFILE

- Fossil fuel dominate (oil 44-58%, 87.7% GHGs)
- RE potential: hydro, solar, geothermal, Biomass
- Low access: <30% RE now vs. 100% Vision 2050



Energy Forest and Others

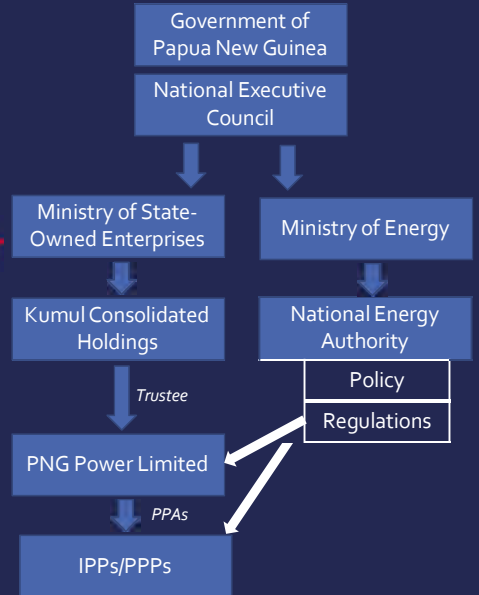


Energy industries Fugitive emissions of natural gas Transport



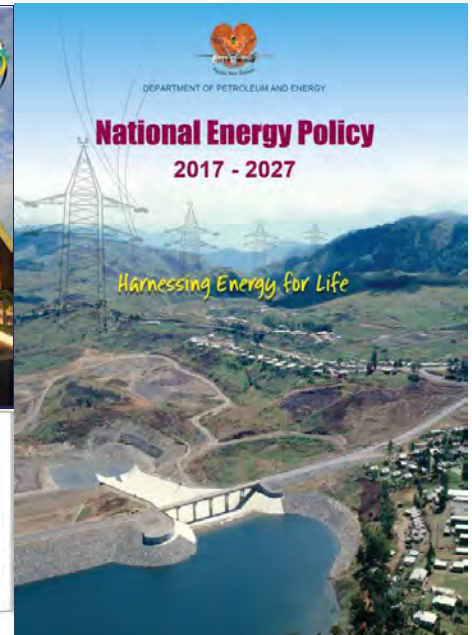
# POWER SECTOR OVERVIEW

- PPL: Vertically integrated, buys 36% from IPPs
- NEA regulates; uniform tariff cross-subsidizes
- Shift to single-buyer model (Electricity Industry Policy 2009 – implementation in 2014)



# POLICY LANDSCAPE

- Targets:
  - 100% power generation from renewable energy (PNG Vision 2050)
  - 70% electrification by 2030 (PNG Development Strategic Plan 2010–2030)
- PNG National Energy Policy (2017–2027): Low-cost energy goal
- Gaps: No umbrella RE policy; stalled FiT pilots



# MAJOR BARRIERS

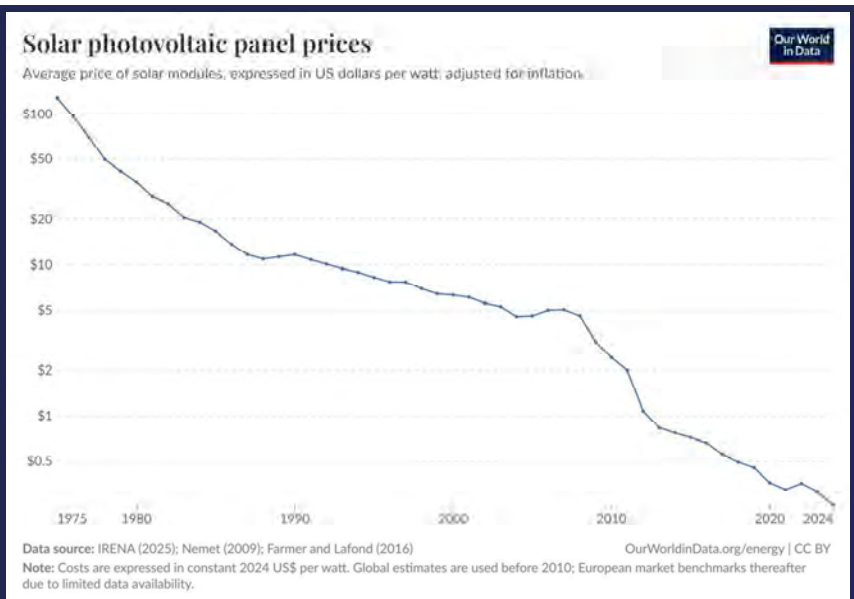


| Barrier type | Examples                 | Impact                |
|--------------|--------------------------|-----------------------|
| Policy       | No specific RE framework | Slow IPP deployment   |
| Economic     | High capex, no finance   | Despite low LCOE      |
| Market       | PPL monopoly             | Limits competition    |
| Political    | Low priority             | Unmet ambitious goals |

- Policy/Regulatory Gaps – no dedicated RE framework; overlapping policies lack clear guidelines for IPPs outside PPL areas.
- Economic/Financing – high capital costs, limited bank expertise, no subsidies despite lower LCOE for RE vs diesel.
- Institutional/Market – PPL monopoly (retail right within 10km), stalled reforms, low political priority.
- Technical/Social – Grid Code lacks VRE integration, landowner issues, skills shortages.

# RE COST COMPETITIVENESS

- Solar PV costs fell 85% (2010 – 2020)
- Competitive: Hydro, geothermal, wind (good sites)
- Need policies for wholesale/retail parity



Source: <https://ourworldindata.org/grapher/solar-pv-prices>

## RECOMMENDED FRAMEWORKS

- Pricing: FiTs, auctions, net-metering, net-billing
- Incentives: Tax reductions, rebates, soft (concessional) loans, PPAs
- Regulatory: Streamline grid access, VRE standards

## WAY FORWARD

- Strengthen NEA capacity bottom-up
- Subsidies + market liberalization
- RE quotas for PPL
- Capacity building for institutions and banks

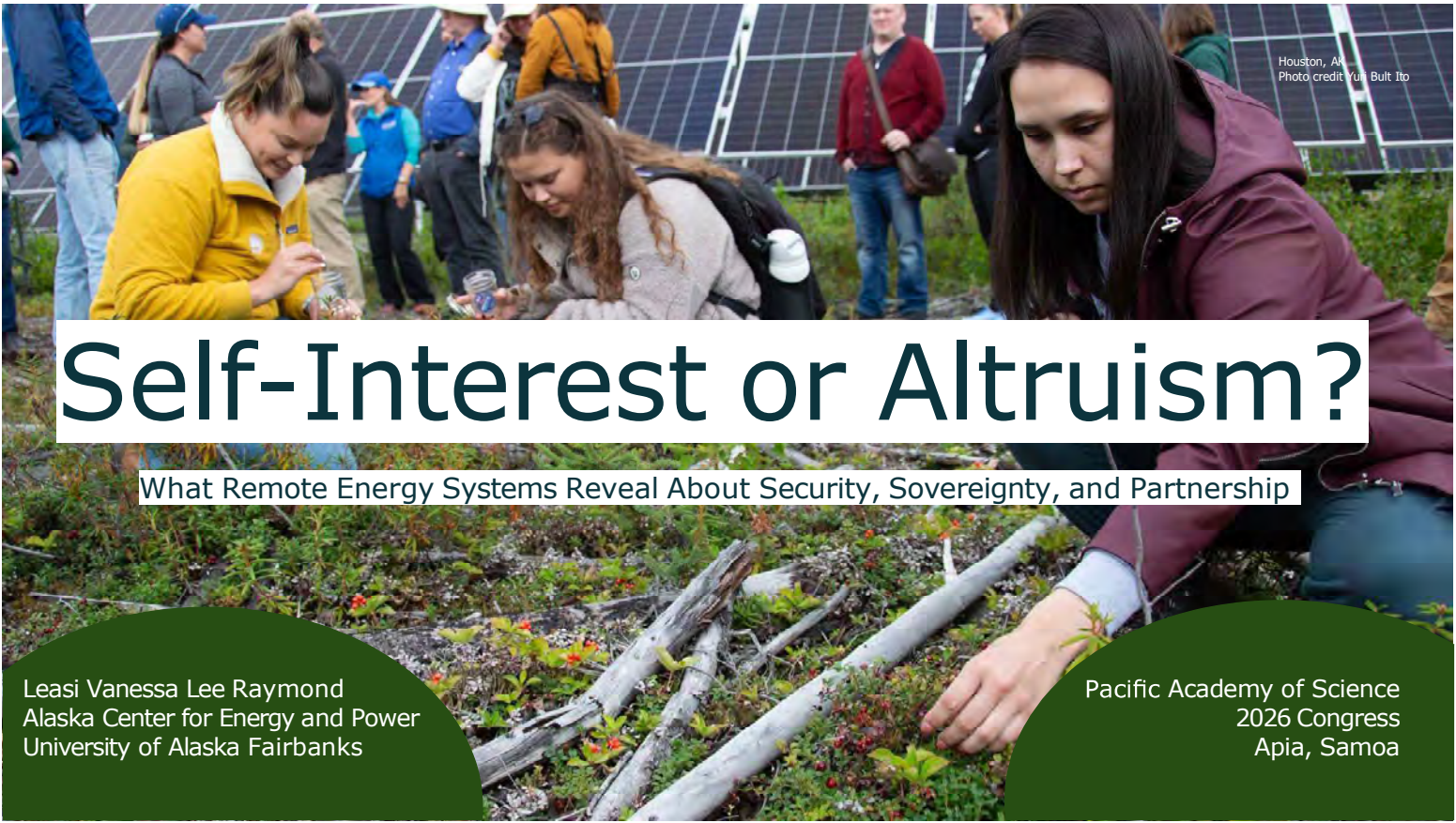
## BENEFITS

- Energy security, jobs, FX savings
- GHG reduction, rural access
- Aligns with NDC, SDG7

## CONCLUSION

- Comprehensive RE policy essential
- GOPNG/NEA: Remove barriers, enable investments
- Call to Action: Implement now for sustainable future





Houston, AK  
Photo credit Yuni Bult Ito

# Self-Interest or Altruism?

What Remote Energy Systems Reveal About Security, Sovereignty, and Partnership

Leasi Vanessa Lee Raymond  
Alaska Center for Energy and Power  
University of Alaska Fairbanks

Pacific Academy of Science  
2026 Congress  
Apia, Samoa

This project is part of the Alaska Regional Collaboration for Technology Innovation and Commercialization (ARCTIC) Program - Innovation Network, an initiative supported by the Office of Naval Research (ONR) Awards #N00014-22-1-2049 and N00014-24-1-2675





Galena, AK  
Photo credit Drone

## Positionality

- Samoan of mixed heritage
- Born & raised mostly in the diaspora
- Settler & Arctic resident since 2013
- Matai
- Socio-technologist
- Political scientist
- Data nerd
- co-chair
- Research leader
- PhD student
- Returned Peace Corps

# How does our work span two regions?

the Arctic

&

the Pacific

Kotzebue, AK  
Photo credit Jeff Fisher





What do our regions share?

Kotzebue, AK  
Photo credit Michelle Wilber



How do we collaborate?

Cordova, AK  
Photo credit Jeff Fisher



# Remote energy systems are expensive

Kotzebue, AK  
Photo credit Amanda Byrd



GAS \$8.049  
DIESEL \$8.599

Galena, AK  
Photo credit Tim Kalke







## What Drives that Cost

- Fuel costs (diesel)
- Isolation drives need for backup power
- Limited bulk purchasing power
- Shipping costs
- Reliance on costly off-island and “Outside” expertise for maintenance and operations

Granite Mountain, AK  
Photo credit Peter Illig



## Alaskan & Pacific Energy Realities

- Exposure to extreme weather
- Shipping / barging goods long distances
- Limited workforce training opportunities
- Costly infrastructure investments
- Cultural & family priorities for workforce

Shungnak, AK  
Photo credit Amanda Byrd



Atka, AK  
Photo credit George Roe

# When energy systems fail, who pays?

Alaskan and Pacific energy insecurity is strategic vulnerability

- Fuel shocks
- Supply chain disruptions
- Typhoons, hurricanes, flooding, erosion
- External influence

Cordova, AK  
Photo credit Amanda Byrd

# The complications with energy transitions

## Pros

- Renewables help reduce imported fuels and increase resiliency
- Renewable energy aligns with cultural values of regeneration & local resources
- Refresh and renew energy decision-making and governance

## Cons

- More complex to operate and maintain
- New workforce skills are required
- Diesel systems still needed for redundancy
- Emerging technologies are not proven



## What do we need for resilient, cost effective energy?

- Where do we test systems?
- Who trains operators?
- Who shows up after storms?
- Where are lessons shared?

Neither altruism nor self-interest

Reliable and cost-effective energy systems

+

Community resilience

+

Regional stability

=

increased peace & security







## A shared learning opportunity

- Similar energy grid architectures
- Similar climate risk
- Indigenous sovereignty
- Culturally & Geopolitically strategic



## Call to Partner

Seeking to invest in

- Workforce development
- Relationship-building
- Applied research & field testing
- Energy innovation & Infrastructure

Partners who

- Believe in shared learning
- Want to train, retain, and return local workforce
- Respect sovereignty & self determination



# References

- 1 - [Eia.org](https://www.eia.gov/states/HI/analysis) Hawaii <https://www.eia.gov/states/HI/analysis>
- 2 - [Energy.gov](https://www.energy.gov/gdo/american-samoa) American Samoa. <https://www.energy.gov/gdo/american-samoa>?
- 3 - [Eia.org](https://www.eia.gov/states/GQ/analysis) Guam <https://www.eia.gov/states/GQ/analysis>
- 4 - [NREL.org](https://research-hub.nrel.gov/en/publications/energy-transition-initiative-island-energy-snapshot-commonwealth-/) Commonwealth of Northern Mariana Islands <https://research-hub.nrel.gov/en/publications/energy-transition-initiative-island-energy-snapshot-commonwealth-/>
- 5 - [Energy.gov](https://www.energy.gov/cmei/articles/energy-transitions-initiative-energy-snapshot-republic-marshall-islands) Snapshot of Republic of Marshall Islands <https://www.energy.gov/cmei/articles/energy-transitions-initiative-energy-snapshot-republic-marshall-islands>
- 6 - Energy Power Corporation - Electricity Rates <https://www.epc.ws/electricity-rates/>





# Strengthening Pacific Research and Development

## A baseline assessment of investment and capacity in Pacific states

Kaita Sem, Roi Burnett, Li'amanaia Roannie Ng Shiu, Tina Newport, Natalie Solomona, Lisi Iosefa, Grace Shaw & Lanea Tuiasosopo

## 1. Purpose

To provide a baseline assessment of Research and Development (R&D) investment and human capacity in ten Pacific Small Island Developing States (PSIDS): **Cook Islands, Fiji, Kiribati, Nauru, Niue, Papua New Guinea, Samoa, Solomon Islands, Tonga and Vanuatu.**



Target  
**9.5**

Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending

Indicators ▲

**9.5.1**

Research and development expenditure as a proportion of GDP

**9.5.2**

Researchers (in full-time equivalent) per million inhabitants



## 2. Methodology

- Pacific R&D survey adapted from the Frascati Survey
- Secondary data from government reports, & regional databases

## 3. Key Findings

- Key policy priorities: Climate resilience, agriculture, marine resource & health
- R&D mostly funded by donors and overseas aid
- National R&D investment is minimal (<1% of national budgets) or data unavailable

### 3. Snapshot of Public sector R&D Activity In Fiji

**Table 1: National R&D policies and instrument**

| Policy/Instrument                                                   | Year        |
|---------------------------------------------------------------------|-------------|
| Fiji National Development Plan 2025-2029 and Vision 2050            | 2025-2029   |
| Energy Policy (NEP) 2023-2030 – “Our Energy, Our Future”            | 2023-2030   |
| National Climate Change Policy (NCCP) 2018-2030                     | 2018 - 2030 |
| Green Growth Framework for Fiji                                     | 2014        |
| Quality Standards for Fiji Higher Education Quality Standard        | 2023        |
| Higher Education Commission (HEC) Strategic Research Plan 2022–2026 | 2022-2026   |

**Table 2: Public Sector R&D Initiatives**

| Initiative                | Year | Lead Ministry                                                         |
|---------------------------|------|-----------------------------------------------------------------------|
| Fiji Innovation Hub       | 2025 | Reserve Bank of Fiji                                                  |
| National Research Council | 2025 | Cabinet                                                               |
| R&D Tax Incentives        | 2025 | Fiji Customs and Revenue                                              |
| RISE Initiative           | 2020 | Ministry of Trade, Co-Operatives, Micro, Small and Medium Enterprises |

Pacific Academy of Sciences  
www.pacificsci.org

### 3. Key Findings Continued

- Human resources and capacity require significant investment for strengthening
- Research output data is a challenge
- Few countries have dedicated national R&D policies
- PNG an outlier in terms of R&D scale and scope (the only country that met the UN threshold to be measured under SDG9.5.2 (Researchers (in full-time equivalent) per million inhabitants))

## 4. Summary

Findings demonstrate significant variations in R&D sector maturity

Findings highlight a need to develop and strengthen national R&D and STI policies across the region

This baseline report serves as a resource to support subsequent reports for future monitoring & advocacy tools

## 5. Recommendations for future surveys

- Ensure sufficient time is given to allow for national approvals and public administration challenges
- Funding to be provided directly to country focal points
- Leverage the post-2030 global agenda to develop appropriate indicators



# PACIFIC ISLANDS UNIVERSITIES REGIONAL NETWORK – PIURN

*Advancing regional collaboration and sustainable  
development in Pacific Higher Education*

Inaugural Congress – Pacific Academy of Sciences – February 17<sup>th</sup>, 2026

Founded in 2013 under the name Pacific Islands Universities Research Network, PIURN brings together **16 Member Universities** of Pacific Islands Countries and Territories (PICTs).

In 2023, the consortium renamed the network, wishing to broaden the scope of its action and to strengthen its impact at the regional level.

## **PIURN Vision**

To **collectively empower** the Pacific Universities to **become key contributors** to finding solutions for challenges facing the region

## **PIURN Mission**

To empower the new generation of Pacific leaders, researchers and professionals to better serve the needs and aspirations of the Pacific communities, in accordance with the education, research and technology pillar of the 2050 Strategy for the Blue Pacific Continent.

## 16 Member Universities



Co-Chaired by:



15 Pacific Islands Countries and territories



## Objectives

Generate knowledge through research and on priority challenges in the Pacific region, aligned with the SDG's

Share physical and intellectual resources in a manner, to facilitate quality research

Develop shared research training initiatives

Collectively work with regional and international organizations

Strengthen research content in the curriculum and in teaching

Protect and apply local and indigenous knowledge systems

Provide research policy advice at the regional and national levels

Use the knowledge generated through research for the well-being of the Pacific Island communities.

# Research Impacts



PIURN is labelled by the United Nations as a SDG Action :  
**#SDGAction 39993**

All PIURN Projects are aligned with the United Nations' Sustainable Development Goals (SDGs) and the 2050 Strategy for the Blue Pacific Continent.

PIURN collaborative scientific projects are multidisciplinary and contribute to explore concrete solutions to the Pacific Challenges. PIURN Projects have to bring together at least 2 universities from the network.

Since 2017, **40 PIURN collaborative projects** have been funded by :

- University of New Caledonia
- The University of the South Pacific
- Divine Word University
- Papua New Guinea University of Technology
- National University of Vanuatu

For a total of **936,000.00 AUD** (with co-funding from external partners)

## PIURN Projects – Impact Assessment 2017 – 2024

- **27 Research** collaborative projects
- **12 PIURN** Member Universities Involved
- **12 external partners** participating to the projects
- Following 5 PIURN seed - funding projects, additional funding of **4,257,000 AUD / 2,534,000 euros** in **national or regional** research grants was secured.
- **20 publications**
- **15 communications** in regional or international conferences and workshops
- **50+ students involved** in the research work of the PIURN projects
- **11 full-time internships** with Master thesis
- A contribution to the development of a regional initiative coordinated by SPC (Pacific Data Hub)
- Major global visibility given to the PIURN network through the project on **migrations and climate change** and especially the projection of the 52' documentary called **'Nations of Water'** in New Zealand, Cook Islands, France, the United States, Canada and Spain (with a Spanish translation)



## PIURN Collaborative Projects

### Gender equality

- Managing Gender Based violence in PNG, Samoa and Fiji
- DEIC committee and influence : Pacific Universities case studies

### Food Security

- Threats to Food Security in Solomon Islands, PNG, Fiji
- Family Agriculture, alimentation and health in the Pacific

### Biodiversity

- Advancing nickel hyperaccumulator plants discovery (PNG, New Caledonia, Australia)
- Studying essential oils, as renewable chemical resource

### Pollution

- Organic and metallic pollutants in Pacific coral reefs (Fiji, Vanuatu, New Caledonia)
- Air Pollution in Pacific Island cities (Fiji and New Caledonia)

### Traditional Knowledge

- Knowledge, Indigenous Practices and Resilience (Fiji, Vanuatu, New Caledonia)
- Tok Story for and by the Pacific Youth

### Sustainable Tourism

- Community engagement in Fiji Tourism Industry
- Sustainable tourism and community well - being across four Pacific Island territories (New Caledonia, Vanuatu )

### Climate Change

- Shoreline monitoring (Vanuatu, New Caledonia)
- Climate induced migrations in the Pacific
- Threats of sea - level rise to Pacific Islanders

### Health

- Assistive Communication Systems (Samoa, Fiji)
- Deploy affordable and accurate technological solution treating PTSD

## Platform for regional research grants

### TUPU Pacific Research Grants

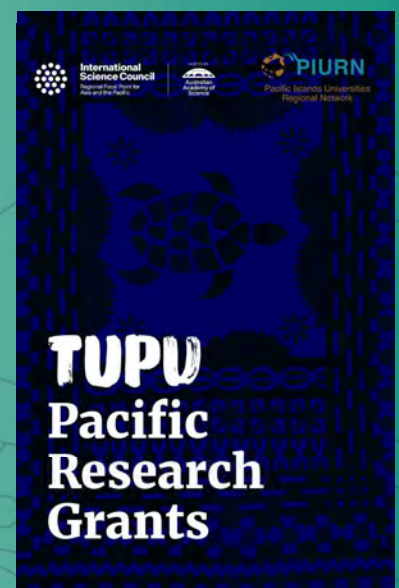
Collaborative initiative, funded through the **International Science Council Regional Focal Point Asia Pacific** and implemented by **PIURN**.

To be eligible, consortia to be composed of :

- 1PIURNUniversity
- 1Pacific islands university or institutions
- 1Australia university
- External partners welcome

Goal : to ignite fresh ideas and strengthen research connections between Pacific regional universities and their Australian counterparts - **BUDGET: 220,000 \$AUD**

**Results to be announced very soon**



## Platform for regional research grants

*Barriers to Women Leadership in Pacific Universities , with an emphasis on Science, Technology, Engineering and Mathematics (STEM) Project,* funded by Pacific Women Lead (PWL) at SPC - Budget: 450 000 AUD

Led by The University of the South Pacific (USP)

Partnership with FNU, NUS, SINU, PIURN

Collaborators : Science in Australia Gender Equity (SAGE) Ltd are partnering in the project.

### Goal:

1. Identify/prioritize remediation pathways for women in STEM
2. To document perceived barriers and challenges to the career advancement of female STEM staff
3. To analyse whether female STEM University staff in Fiji, Samoa, Solomon Islands share common or cultural-specific barriers to career advancement
4. Implement interventions at an institutional level via recommendations for policy changes, action plans and training requirements



PACIFIC  
WOMEN  
LEAD



FIJI NATIONAL  
UNIVERSITY



## Platform for regional research grants

### FALAH - Family Farming, Lifestyle and Health project

Multidisciplinary project, led by University of New Caledonia aligned with the SGD's, explored the impact of climate change on food security and practice of the Pacific population's health, in Fiji, New Caledonia, Solomon Islands and Vanuatu

3 themes :

- **Agriculture** : Family Farming for Food Security
- **Food**: Lifestyle and Health for Society
- **Knowledge** : Exchange, mobilities for sustainable education

Partners: USP, SINU, NUV, Australian Universities (UoW, UNSW, Usyd), European Institutions (Toulouse University)

Budget: **1.3 million euros (2.1 millions AUD)** from the European Commission Horizon 2020 Marie Curie program

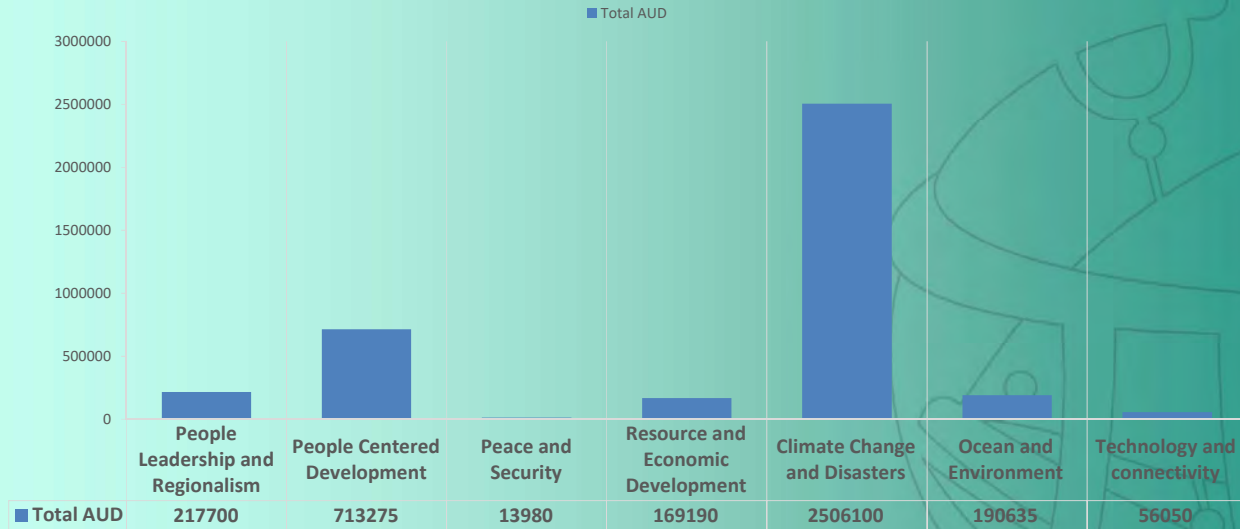


European Commission | Horizon 2020 Marie Curie Actions



# Platform for regional research grants

PIURN Research Projects Funding Aligned with the 2050 Strategy for the Blue  
Pacific Continent Thematic Areas (2017 – 2025)



## PIURN as a catalyst for regional academic initiatives

The first **PIURN Summer Institute** took place from **November 24th to November 28th, 2025** at **Centre for Sustainable Futures at the University of the South Pacific (USP)**, Suva, Fiji. The general and multidisciplinary theme was “Climate Change in the Pacific”

15 PhD Students  
15 Academics  
11 PIURN Member Universities

### Key outcomes :

- Strengthening **research networks** and collaboration
- Sharing strategies for resilience and **community engagement**
- Addressing **challenges** for **early career researchers**
- Emphasis on **Pacific - centered research** and methodologies
- **Field trip** in Buretu Village, Tailevu, to witness first-hand adaptation methods

## PIURN Summer Institute



2026 PIURN Summer Institute at  
University of New Caledonia



## PIURN as a catalyst for regional academic initiatives



**Erasmus+**

**Regional Academic Mobility**



USP and UNC are embarking on a significant transpacific academic initiative, facilitated by Erasmus+ funding and the French Embassy in Fiji.

- 8 USP students** will participate in research internships at UNC, the Institut Pasteur and the French Research Institute for Development (IRD) – February - May 2026
  - 2 UNC PhD Students** will be welcomed at USP – March - June 2026
  - 5 USP Staff** will teach at UNC,
- providing an exchange of **good practices** between researchers and **knowledge transfer**

This programme is implemented with the support of the Pacific Islands Universities Regional Network (PIURN) Secretariat.



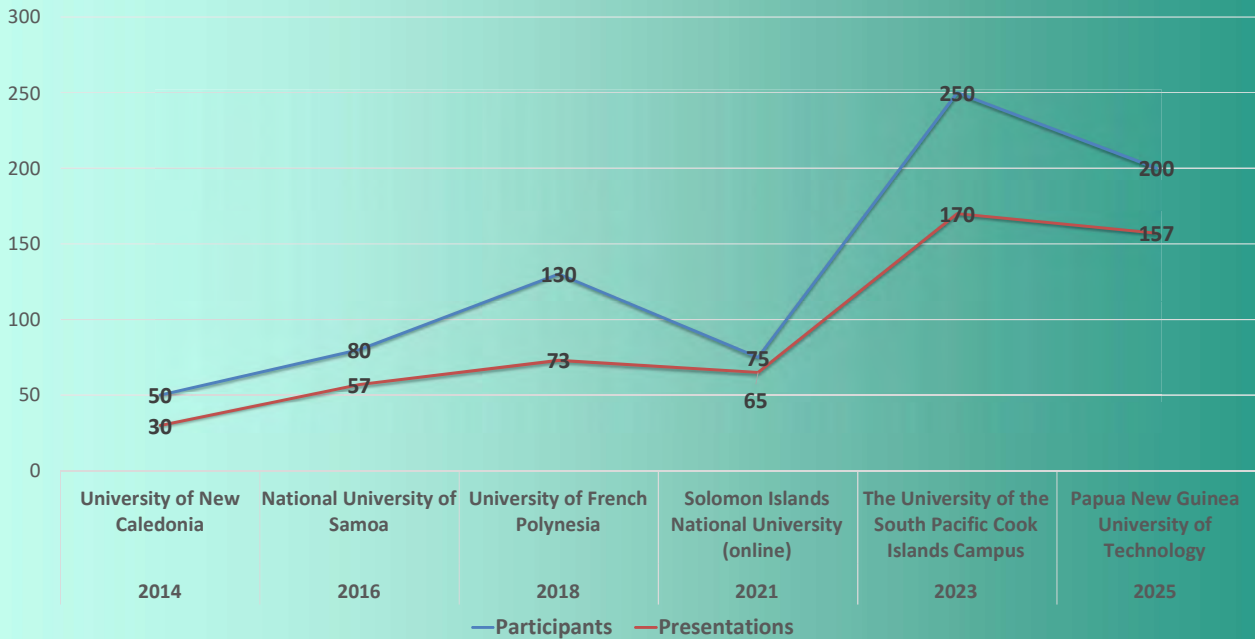
## PIURN Conferences

The network hosts a Conference every two years. These conferences highlight the work of the Pacific researchers, showcase the PIURN projects and allow the establishment of new collaborations.

- In **2014**, the University of New Caledonia organized the **1st PIURN Conference**, the theme was “**Belonging VS Property : Oceanians’ New Relationships with their Land and their Environment**”
- In **2016**, the National University of Samoa introduced the theme of “**Addressing the Challenges of Sustainability in the Pacific Islands**” for the **2nd Conference**.
- In **2018**, the University of French Polynesia hosted the **3rd PIURN Conference**, on the theme of “**Traditional knowledge, academic knowledge and current universities’ research dynamics in the Pacific region**”.
- In **November 2021**, the first virtual Conference was hosted by Solomon Islands National University, and explored the theme of “**Shaping our Tomorrow Today : Research, Innovation and Practice in the Pacific**”
- **July 2023** marked the **5th Conference** of the network, organized by USP Cook Islands Campus, with the theme “**Exploring this Sea of Islands**”
- The **6th PIURN Conference** was held **1-3 July 2025** at the Papua New Guinea University of Technology. The theme was “**Harnessing technologies for the safe and sustainable development of the Pacific**”



## PIURN Conferences - Key Figures



## PAS – PIURN complementarity model

**PAS lane (academy - level):** convene, endorse, elevate, broker across sectors, set standards/ethics, translate evidence to policy, and build visibility and credibility.

**PIURN lane (university - linked delivery):** operational coordination, collaboration pipelines, practical tools (templates/mechanisms), implementation support across universities.

**Guiding principle:** PAS builds on what is missing; otherwise PAS adopts, endorses, and partners.

To be discussed



### Get In Touch



[WWW.PIURN.ORG](http://WWW.PIURN.ORG)



RESEARCH OFFICE, LAUCALA CAMPUS, USP,  
SUVA, FIJI

### Mathilde Souchon PIURN Coordinator



+679 900 1360



[MATHILDE.SOUCHON@USP.AC.FJ](mailto:MATHILDE.SOUCHON@USP.AC.FJ)

### Tristan Fejoz PIURN Project Officer



+679 836 3882



[TRISTAN.FEJOZ@USP.AC.FJ](mailto:TRISTAN.FEJOZ@USP.AC.FJ)

# GENER-AI-TIONS TO GENERATIONS

LAYLA THOMAS, LUCY KEUNG, ANIVA LAWRENCE, ALLAMANDA FA'ATOESE



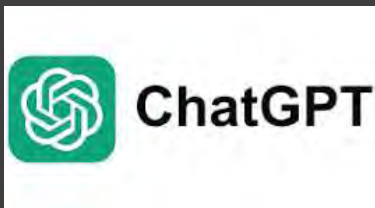
# AIM

To develop culturally grounded, Pacific-centred AI generated health education resources that support both:

1. Medical undergraduate and postgraduate learning
2. Pacific patient and community health education

# PROMPTS

1. One-page AI-generated infographics summarising key Pacific health data from existing publications.
2. Short AI-generated video exploring climate change and its impact on Pacific peoples' cardiovascular health.
3. AI-generated video montage of historical racist events affecting Pacific peoples in Aotearoa.
4. AI-generated data visualisations demonstrating how racism contributes to increased cardiovascular disease risk.
5. AI-curated resource list of annual Pacific community events by geographical catchment areas.
6. AI-generated summaries of published Pacific Models of Care.
7. AI-generated fictional clinical case (Pacific CVD and diabetes) demonstrating application of the Fonofale model in practice.
8. AI-generated learning resource on the use of Soalaupule in rheumatic fever and heart disease care.
9. AI-generated educational resource illustrating how current CVD risk calculators underestimate risk for some high-risk ethnic groups, including the role of mental health.
10. "Through the ages" AI-generated video showing changes in Pacific nutritional practices over time.





## Te Vaka Atafaga



## So'alaupule for Strong Hearts

### WHAT IS RHEUMATIC FEVER?

Rheumatic fever is an illness that can damage your heart if it returns more than once. It often starts from untreated sore throats or skin infections.

### WHY IS MONTHLY BICILIN IMPORTANT?

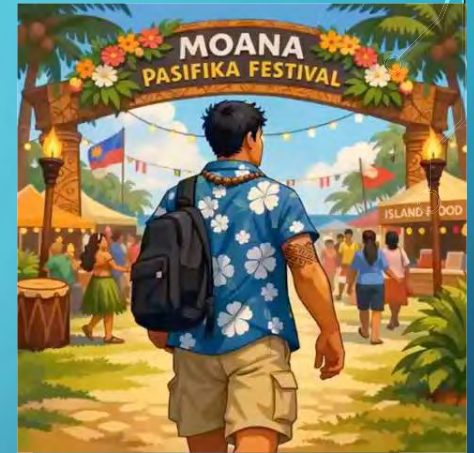
Families make health decisions together. Health is everyone's responsibility. Monthly Bicilin helps prevent repeat infections and protects the heart. This protects the whole aiga.

### WHEN INJECTIONS HURT

Yes, the injection can hurt. The pain is short. Heart damage can last a lifetime. Your family stands with you every month.

### TAKE ACTION

Do not face this alone. Your aiga, nurses, and community are ready to support you. Get your Bicilin on time. Protect your heart.



## PACIFIC COMMUNITY & HEALTH EVENTS

For Medical Students  
University of Auckland

Learn beyond the clinic • Engage respectfully • Build cultural safety

### WHAT'S THIS?

A short guide to Pacific community and health events that happen each year in Auckland and may be useful for medical students. These events are organised by Pacific communities, health organisations, and education providers.

### WHY SHOULD I CARE?

- Work with Pacific patients during placements
- Build examples for cultural safety or population health
- Get real-world content beyond lectures
- Support reflections on portfolio - various times
- Build ideas for longer placements and year

### EVENTS THAT HAPPEN EVERY YEAR

- Pacifica Festival - March
- ABE Festival - March
- Whaea Pacifica Festival - May/June (New Zealand)
- Pacific Language Week - May to November
- Pacific Health & Wellbeing events - various times

Check dates and longer placements and year

### WHERE ARE THESE EVENTS HELD?

- Auckland University
- Auckland University
- Auckland University
- Auckland University
- Auckland University

### WANT MORE DETAILS?

- Scan QR code
- Email: [email address]
- Phone: [phone number]
- Facebook: [facebook link]
- Instagram: [instagram link]
- Twitter: [twitter link]
- LinkedIn: [linkedin link]
- YouTube: [youtube link]
- Website: [website link]
- Newsletter: [newsletter link]
- Reflection prompts for medical students

Updated each year

This resource supports medical student learning and respectful engagement with Pacific and community and health issues

## MALAMALAMAINA I LE TOTO MAUVALUGA O LE ASIASIGA A PELE I LE FOMAI



Translated by Vasa Mulipola

## A Snapshot of New Zealand's Pacific Peoples (2023)

This infographic summarises key demographic data from the Te Kaitiaki Health Chart Book 2023. It provides a foundational understanding of the Pacific population in New Zealand to help inform the design and delivery of health services.

### A Growing & Youthful Population

**442,632**  
Pacific Peoples in New Zealand

Making up 9.8% of the total population in 2023.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

### A Distinctly Youthful Population

Median Age: 24.9 years

Compared to 38.1 years for New Zealanders

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

### Cultural & Social Identity

43.3% identify with more than one ethnicity

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2041.

Projected to be 11.2% of the population by 2041.

The Pacific population is projected to grow to 588,000 by 2



## WHERE TO FROM HERE...

- A good option for developing nations that cannot afford design costs
  - Develop health promotion with limited resources (good option for low funded protocols)
- Explore its ability to translate accurately
- Personalise the learning experience
- How will the AI generated health resources be utilised
- Help in overcoming barriers to access to health

Fa'afetai Lava

Malo 'aupito

Mahalo

Fakaaue

Tenkyu

Tanggung tumas

Ko rabwa

Fakafetai

Vinaka

Tankyu

Salamat

ありがとう

# PACIFIC DATA SOVEREIGNTY & AI



PACIFIC DATA  
SOVEREIGNTY  
Preserving Pacific Data

## PACIFIC DATA SOVEREIGNTY NETWORK

The PDSN group aims to establish a unified voice, collective guardianship, advocacy of data, and information about Pacific peoples living in New Zealand.

Essentially, nothing is about Pacific peoples without Pacific peoples.

PDS Trust established 2025

### Pacific Data Sovereignty Expert Advisory Group



IVAN TAVA  
CHAIRMAN



PROFESSOR EL-  
SHADAN  
TAUTOLO  
EXPERT ADVISOR



DR. POLLY  
ATATOA CARR  
EXPERT ADVISOR



DR. SAM  
MANUELA  
EXPERT ADVISOR



VAOTUI SEULUPE  
DR. FALANIKO  
TOMINIKO  
EXPERT ADVISOR



DR. GERARD  
SONDER  
EXPERT ADVISOR



MALAE TOGIA DR.  
JACINTA FALILI-  
FIDOW  
EXPERT ADVISOR



DR. DEBBIE RYAN  
EXPERT ADVISOR



LOATA TIAPAPA  
SECRETARY

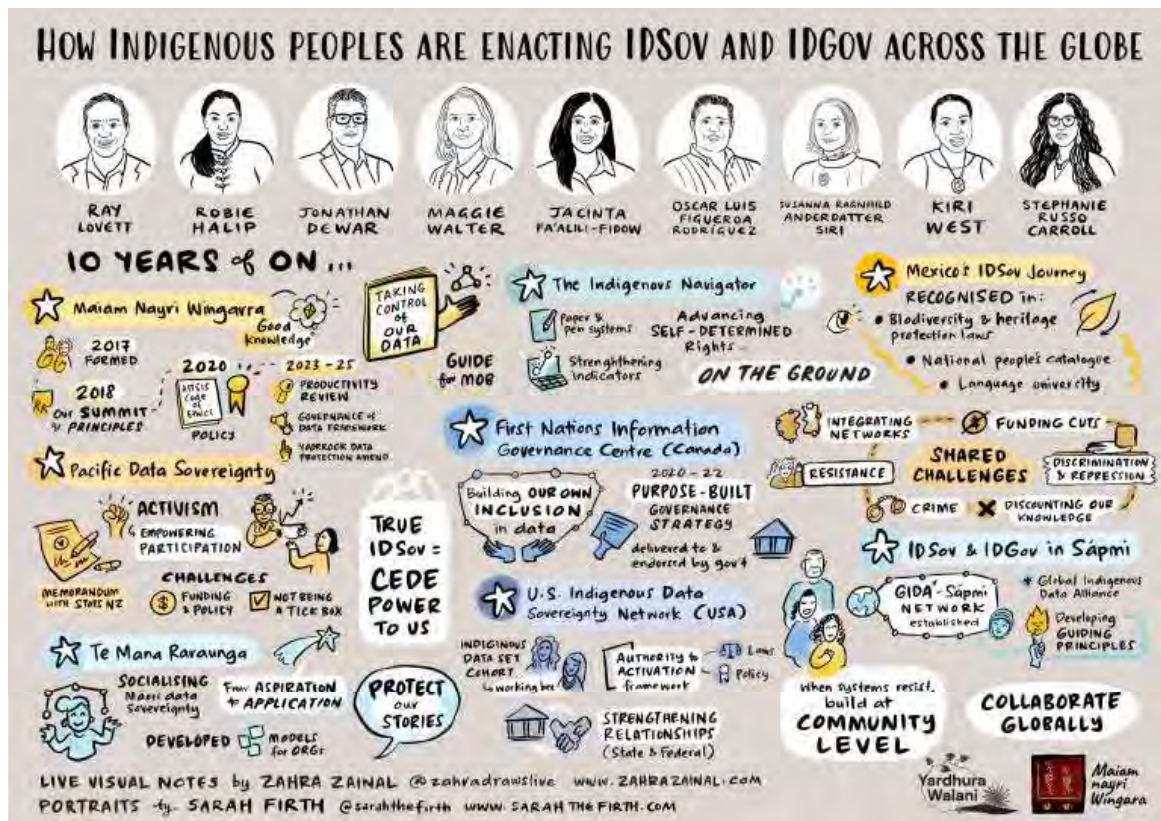
We must create data environments that supports and benefits our people.  
Data sovereignty is our cultural imperative

Ivan Tava, Chairperson, Pacific Data Sovereignty Committee



# APPLICATIONS: PACIFIC DATA SOVEREIGNTY IN PRACTICE

- Census/IDI/ Administrative data
- Research
- Innovations & AI
- Pacific knowledge systems
- Community data sources e.g., churches, ethnic-specific community groups





## PACIFIC DATA SOVEREIGNTY

“Data sovereignty is not just about ownership of the collection, storage, retrieval, accessibility, application and dissemination of individual groups and cultural information. **It is about taking charge of our destiny.** It allows for an understanding of who we are, where we came from, and where we aspire to go.”

**Professor ‘Ana Taufe’ulungaki,  
PDS Seminar 2019  
(10 May 1946 – 18 November 2024)**



## AI RISKS & BENEFITS

### BENEFITS

- Speed, efficiency, accessibility and communication of data
- Streamline tasks and processes, reduce administrative workloads and boost productivity
- Supports decision-making

**“Māori & Pasifika are at a crossroads with AI – we maintain the status quo or decolonise and empower. There are no rules against cultural appropriation/ misappropriation. It is not illegal, but it is immoral.**

*Dr Kataraina Taiuru, Founder, Te Kete AI*

### RISKS

- Perpetuates patterns of misrepresentation and systemic inequities
- Misuse of traditional knowledge and indigenous data by corporations – loss of authenticity and exploitation
- Lack of policy and regulation – inability of policy to keep up with the rapid rise and evolution of the AI landscape
- Digital divide vs AI divide

## CREATE OUR OWN AI SOLUTIONS

Increase investment in Pacific and community-led innovations. Build own data storage systems (digital & cloud sovereignty) and tools/resources.

Building partnerships between tech and community stakeholders to co-create culturally responsive AI solutions.



This is an opportunity to uplift our communities – If we are not ready and comfortable with that, we will be left behind  
*Nu'uall'i Eteroa Lafaele, Co-founder & Director, Fibre Fale*



## EMBED CULTURAL AUTHENTICITY & PROTECT TRADITIONAL KNOWLEDGE & DATA

Include Pacific peoples during the design phase and throughout AI development.

Safeguard cultural heritage and Pacific AI – Ancestral Intelligence. Avoid digitising sacred knowledge where relevant.



In the digital world, data is like land. If we do not have control, governance, and ongoing guardianship of our data as Indigenous people, we will be landless in the digital world, too.

*Peter Lucas Jones, CEO of Te Hiku Media*



## INVEST IN EDUCATION AND CAPABILITY-BUILDING

Embed AI education in schools, workplaces and community settings

Increase investment in STEAM (Science, Technology, Engineering, Arts & Mathematics).

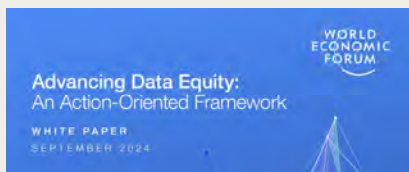
**“Organisations are seeing opportunity – it’s changing the way we work. AI won’t replace you – but someone that uses AI will”**

*Amy Dove, Deloitte partner*



## PACIFIC-LED POLICIES & ETHICAL FRAMEWORKS

Establish AI policies grounded in Pacific values that ensures protection and positive outcomes for Pacific peoples



**What's important is that we are in control of the technology that we build. We are in control of the infrastructure that runs it. We determine how the technology should be used, and who should use it. That is the key part of this digital sovereignty.**

*Keoni Mahelona, Chief Technology Officer at Te Hiku Media.*







## Digital sovereignty drives nations away from US tech platforms

**STRATEGIC SHIFT.** France to replace Zoom, Microsoft Teams with its own Visio across government departments

**By Benjamin H.**

Governments across major economies are accelerating a shift away from US software firms, replacing video conferencing and virtual services, among others, as critical national infrastructure and rising security, data sovereignty and geopolitical risks.

On Tuesday, France said it will replace American platforms like Zoom and Microsoft Teams with its domestic video-conferencing tool Visio across all government departments to start, citing security concerns and a broader strategy to reduce reliance on foreign software vendors.



**SECURITY RISKS.** This is an illustration of a person using a laptop.

France's move, announced by the prime minister, comes as the country seeks to reduce its reliance on US tech giants, citing the need for digital sovereignty and reduced reliance on US tech giants.

Germany's Scholz said his government is also looking to reduce its reliance on US software firms, including by developing cloud services under Dutch control, and Germany, which is promoting European health solutions that ensure security, performance and full data sovereignty under European standards.

**MOVING AWAY** Germany's Scholz said his government is also looking to reduce its reliance on US software firms, including by developing cloud services under Dutch control, and Germany, which is promoting European health solutions that ensure security, performance and full data sovereignty under European standards.

and also reportedly consider AI models alongside traditional computer programs, events, indigenous platforms differ from migrating with foreign vendors, allowing governments to define and regulate their move from American. Countries over the security architecture control cryptographic key is-protocols, ensure national cyber audit and integrate with national identity and security frameworks.

**EXPERT MARKET** As a strategic technology report market emerges, nations work to build indigenous platforms will supply steadily positioned countries seeking alternatives to US tech dominance.

This wave is already evident, with countries like Brazil, Indonesia, South Korea and the U.K. developing sovereign communication infrastructure. This will only accelerate because data sovereignty is shifting from a policy aspiration to a technical government requirement.

## Māori and Iwi investments in NZ data centres

In the past month, we saw for the first time, a major iwi, Ngāi Tahu, announce their investment into one of New Zealand's many geographically located data centres, while also a Trans-Tasman indigenous regional edge datacentre provider [Gambiarra Kaha](#) announced that they have expanded operations to New Zealand with a sole Māori Director.

Both announcements are a part of many recent announcements by Cloud Host Providers in New Zealand offering New Zealand and Māori sovereignty solutions. But it does highlight the crucial question "to what extent is this Māori Data Sovereignty?" and is it good for all Māori and iwi?

This article will do a deep dive analysis into the many Aotearoa New Zealand providers and self hosting solutions to ascertain to what level is Māori Data Sovereignty being offered. 5 Māori Data Sovereignty hosting options are identified that are available for Māori Data Sovereignty.

This article also discusses Māori and iwi economic developments with Cloud Hosting providers and questions if fully sovereign cloud hosting is realistic, or if partnerships are more viable.

## The Commission moves forward on cloud sovereignty with a EUR 180 million tender

**NEWS ARTICLE**

10 October 2022 — Directorate-General for Digital Services — 1 min read

Launched as a competition under the [Cloud W Dynamic Purchasing System](#) (Cloud W DPS), the tender will allow EU institutions, bodies, offices and agencies to procure sovereign Cloud services over 6 years. The tender establishes a benchmark for how sovereignty is applied in practice to cloud services.

Up to four providers, registered in the Cloud W DPS, will be awarded a contract under a new [Cloud Sovereignty Framework](#). This framework measures sovereignty across eight concrete objectives. These objectives include strategic, legal, operational, and environmental considerations, as well as supply chain transparency, technological openness, security, and compliance to EU laws. By setting minimum assurance levels for each, the Commission creates a level playing field where cloud providers active on the EU market can demonstrate their sovereignty strengths. It drives the entire sector towards compliance with European standards and values.

As the Commission continues to prioritise digital sovereignty, this tender marks a significant step towards creating a more resilient digital environment. The Cloud Sovereignty Framework is envisioned as a reference point for cloud providers and a catalyst for the growth of the EU cloud market, especially in the public sector.

The tender is expected to be awarded between December 2022 and February 2023.

## ACKNOWLEDGEMENTS

- Te Titoki Mataora and Moana Connect for their sponsorship of the PDS & AI report
- AI experts and networks who contributed to the PDS & AI workshop and webinar
- Pacific stakeholders who contributed to the PDS & AI report
- Moana Connect
- Pacific Data Sovereignty Committee
- Pacific Data Sovereignty Trust





## ICT and Technology

### Indigenizing Cybersecurity Frameworks for Enhanced Resilience for Pacific Island Countries



#### Imtiyaz Hussein

School of Information Technology, Engineering,  
Mathematics and Physics  
The University of the South Pacific  
Email: [imtiyaz.hussein@usp.ac.fj](mailto:imtiyaz.hussein@usp.ac.fj)



Pacific Academy of  
Sciences Inaugural  
Congress 2026

16-18 Feb 2026  
Apia, Samoa

## THE PACIFIC PARADOX

Standard "Western" frameworks often fail in the Pacific due to a mismatch in cultural values and resources.

### The Digital Surge:

Based on the most recent ITU Global Cybersecurity Index (GCI) 2024, Pacific Island countries have shown significant improvements, however, still low.

- Fiji, Samoa, Tonga – Tier 4 (score of 20-55)

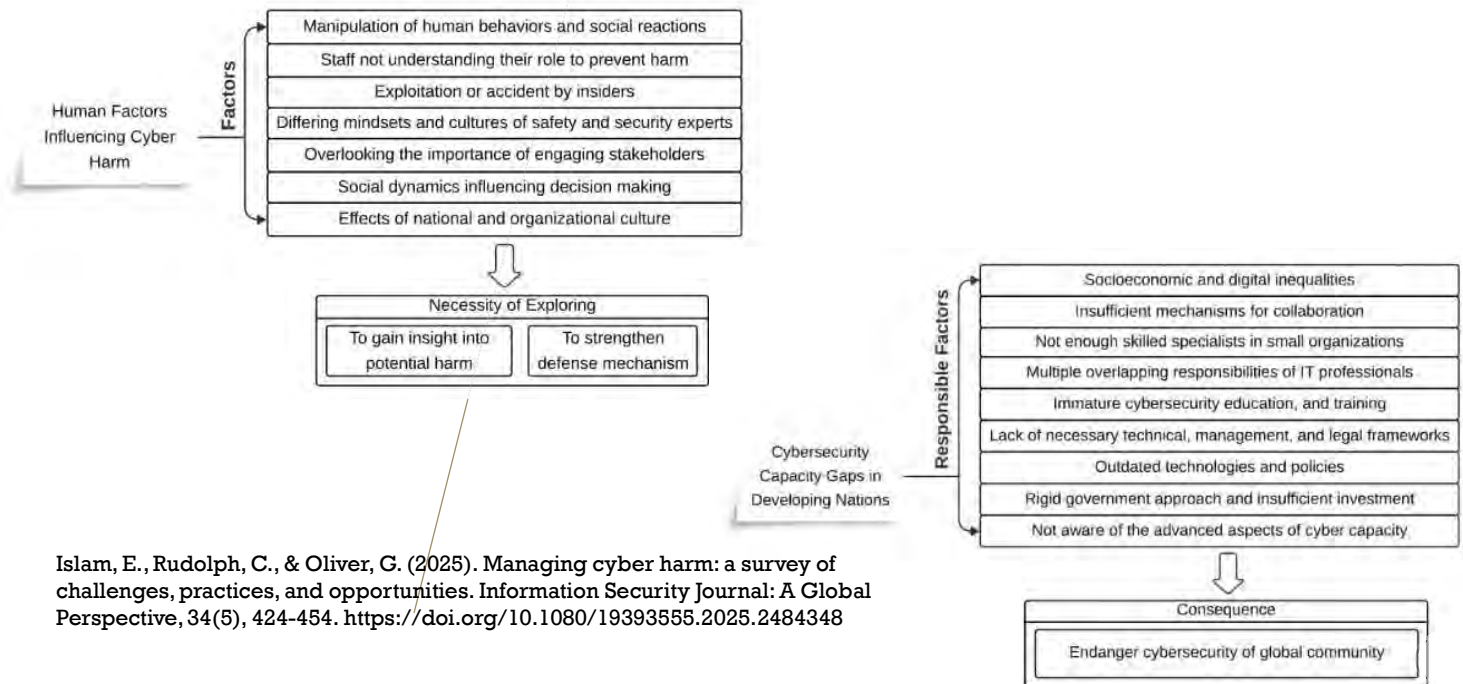
### Compared to

- Australia – Tier 1 (score of 95-100)
- New Zealand – Tier 3 (score of 55-85)



# THE CONCEPT OF MANAGING CYBER HARM

RESEARCH BY MONASH UNIVERSITY



Islam, E., Rudolph, C., & Oliver, G. (2025). Managing cyber harm: a survey of challenges, practices, and opportunities. *Information Security Journal: A Global Perspective*, 34(5), 424-454. <https://doi.org/10.1080/19393555.2025.2484348>

## THE INDIGENIZE MINDSET BUILDING RESILIENCE

CONCEPT 1 – Kaitiakitanga (Data Stewardship)

CONCEPT 2 – Wantok & Matai (Decentralized Response)

CONCEPT 3 – Talanoa (Relationship-Based Intelligence)





# KAITIAKITANGA (DATA STEWARDSHIP)

## FROM "SECURITY" TO "KAITIAKITANGA"

**Kaitiakitanga** : Guardianship over data collection, storage, and ethics to ensure PIC interests are protected.

**Traditional Cybersecurity**: Focuses on Ownership and Control (CIA Triad)

**Kaitiakitanga Model**: Focuses on Stewardship and Relationship.

- Protecting the "digital taonga" (treasures/data) - ensuring data remains safe and useful for future generations.
- Collective Welfare: Shifting focus from individual user protection to the safety of the Whānau (community/network).

### REFERENCE

**Māori data sovereignty and privacy. Tikanga in Technology discussion paper**

Kukutai, T., Cassim, S., Clark, V., Jones, N., Mika, J., Morar, R., Muru-Lanning, M., Pouwhare, R., Teague, V., Tuffery Huria, L., Watts, D. & Sterling, R. (2023). Māori data sovereignty and privacy. Tikanga in Technology discussion paper. Hamilton: Te Ngira Institute for Population Research.

**The Māori Data Privacy Framework: How useful is it for hapū?**

Clark, V., Kukutai, T., Teague, V., Kani, H., & Pēpi Tarapa-Dewes, E. (2025). The Māori Data Privacy Framework: How useful is it for hapū? Te Ngira Institute for Population Research. 10.15663/j21.36102



# WANTOK & MATAI (DECENTRALIZED RESPONSE)

## SHIFTING FROM "FORTRESS DEFENSE" TO "COMMUNITY STEWARDSHIP".

### Wantok & Matai

**Wantok (Melanesian context): Literally "One Talk."**

- Refers to a system of mutual kinship and shared responsibility.
- In a network, this represents trust-based peer-to-peer relationships.

**Matai (Samoan context): The "Chief" or head of the family.**

In cybersecurity, the Matai is not a "dictator" but a coordinator who facilitates collective protection and resource sharing.

### REFERENCE

**Land and social security in Samoa**

Schoeffel, P., Meleisea, M., & Arthur, T. (n.d.). Land and social security in Samoa. National University of Samoa.

**UoA Cybersecurity Foundary**



# TALANOA (RELATIONSHIP-BASED INTELLIGENCE)

**Talanoa** - A traditional Pacific word (used in Fiji, Samoa, Tonga, etc.) describing a process of inclusive, participatory, and transparent dialogue.

Removing barriers to create a “safe space” for sharing authentic knowledge without the constraints of rigid, Western hierarchy.

Talanoa is a grounded approach and practice because the conversations and experiences are shaped by the context and the people involved.

## REFERENCE

### The Scope of Talanoa Research Methodology: The place of research methods that are not rooted in Pasifika traditions

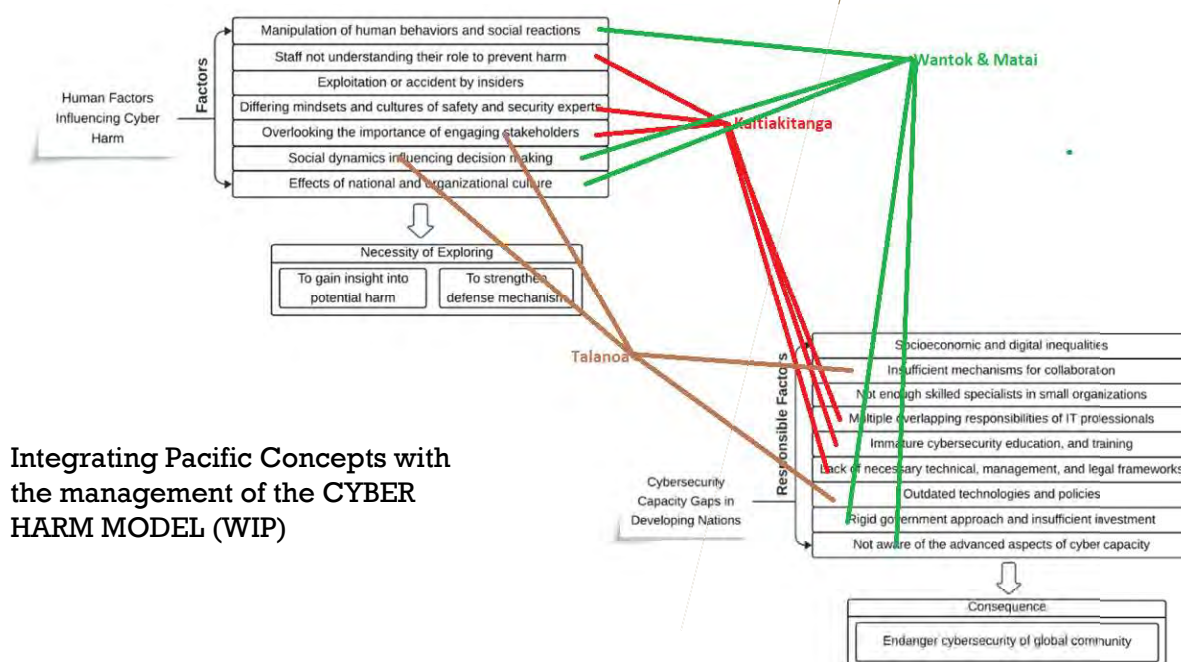
Gremillion, H., Hallie, J., & Tominiko, F. (2021). The Scope of Talanoa Research Methodology: The place of research methods that are not rooted in Pasifika traditions. In E. Papoutsaki and M. Shannon (Eds.), Unitec Research Symposium Proceedings 2020 (pp. 39–53). Auckland, New Zealand: ePress, Unitec New Zealand

### Getting to the heart of the story: Using talanoa to explore Pacific mental health

Vaka, S, Brannelly, T, Huntington, A, (2016) Getting to the heart of the story: Using talanoa to explore Pacific mental health, Issues in Mental Health Nursing, 37(8), 537–544

7

## NOW INTEGRATING INDIGENOUS VALUES & CYBERSECURITY BUILDING A HUMAN FIREWALL



8

## PRACTICAL IMPLICATIONS MAPPING KAITIAKITANGA TO ISO 27001

### The Intersection:

While Frameworks like ISO 27001 & NIST provides the "How" (processes and controls), Kaitiakitanga provides the "Why" (purpose and ethical responsibility).

### Core Philosophy:

Moving from "owning" data to "guarding" data.

| ISO 27001 Requirement         | Kaitiakitanga Application                                    | Stewardship Outcome                                                                     |
|-------------------------------|--------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| Context of the Org (Clause 4) | Understanding the origin and lineage of the data we hold.    | Clearer data classification and asset ownership.                                        |
| Leadership (Clause 5)         | Leadership through service and protection of the collective. | Management is accountable for the "safety" of the digital village, not just compliance. |



## CONCLUSION INTEGRATING INDIGENOUS KNOWLEDGE

Integrating Indigenous Knowledge (IK) into cybersecurity and computer science requires a shift from viewing technology as an individualistic, efficiency-driven tool to a **holistic, relational, and community-focused system**.

Key strategies involve prioritizing **Indigenous data sovereignty (kaitiakitanga)**, utilizing **collaborative research methodologies**, and **embedding ethical protocols** like relational accountability (**Talanoa, wantok & matai**).

Reference:

INTEGRATING INDIGENOUS KNOWLEDGE SYSTEMS INTO MODERN CYBER LAWS IN INDIA: ENHANCING DATA SOVEREIGNTY, AI ETHICS, BLOCKCHAIN GOVERNANCE & DIGITAL PRIVACY

Chaudhari, P. G. (2025). Integrating Indigenous Knowledge Systems into Modern Cyber Laws in India: Enhancing Data Sovereignty, AI Ethics, Blockchain Governance & Digital Privacy. *Vidyabharati International Interdisciplinary Research Journal (Special Issue: IKS-BTM 2025)*, 277-280.







Pacific Academy of  
Sciences Inaugural  
Congress 2026

11-12 September  
2026

## ICT and Technology

### Adoption and Impact of digital technologies in the Pacific Islands

PRESENTED BY: **Dr. Ravneil Nand**

Lecturer in CS & IS

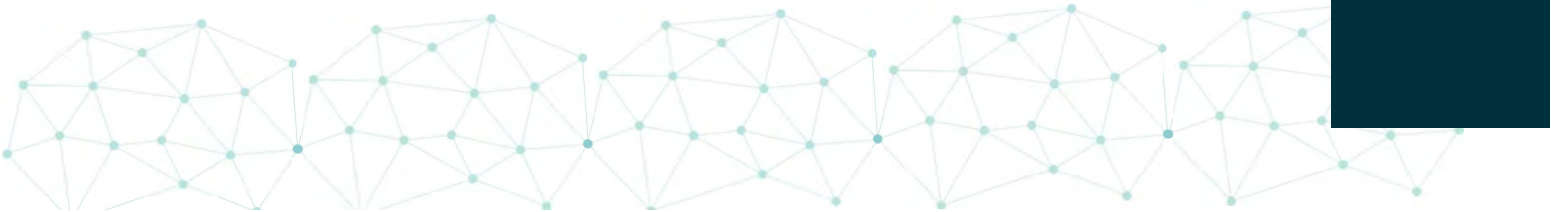
School of Information Technology, Engineering, Mathematics  
and Physics

The University of the South Pacific

Email: [ravneil.nand@usp.ac.fj](mailto:ravneil.nand@usp.ac.fj)

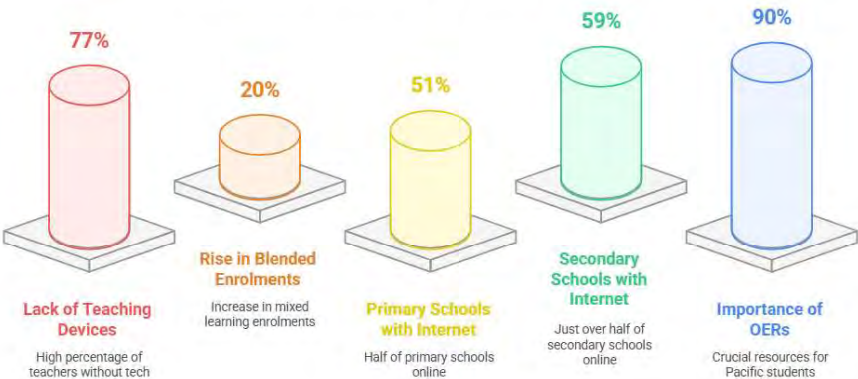
# TABLE OF CONTENTS

|    |                    |    |                      |
|----|--------------------|----|----------------------|
| 01 | BACKGROUND         | 04 | DATA                 |
| 02 | INTRODUCTION       | 05 | DIGITAL TECHNOLOGIES |
| 03 | AIM AND OBJECTIVES | 06 | IMPACT               |



## GEM Report 2024

Educational Technology and Access in the Pacific



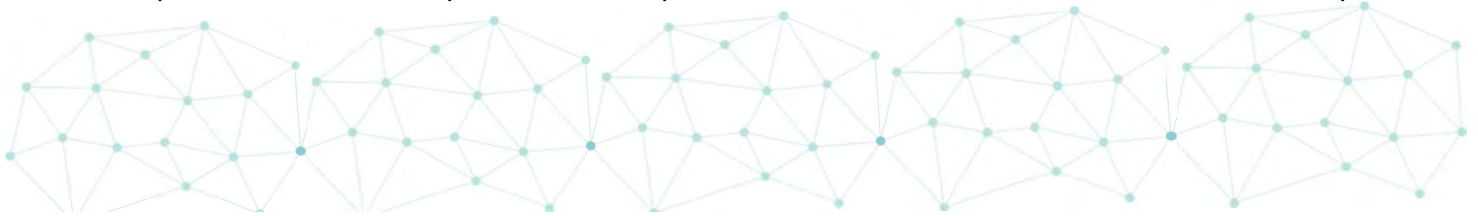
(Ref: Global Education Monitoring Report 2024/5 | Technology in Education)

## INTRODUCTION

In this age of digital technology, almost every aspect of our lives demands some degree of digital proficiency. It is an essential skill for education and employment, as it empowers students and employees to think critically, communicate effectively, and demonstrate creativity in a digital environment (Chan, 2024; Danao et al., 2025; Morgan et al., 2022; Reddy et al., 2022).

However, rural communities in pacific face challenges of accessing digital tools and resources. Limited access to digital resources reduces students' ability to learn effectively and diminishes future opportunities (Danao et al., 2025; Kormos & Wisdom, 2021). While some have access to them, but impact is still unknown.

Adoption of these tools is paramount as it promotes inclusiveness and fosters resilient development.



## AIM AND OBJECTIVES

### **Aim:**

To investigate the adoption and impact of digital technologies in the Pacific, with a focus of Information Systems for inclusive and resilient development.

### **Objectives:**

1. To understand how digital technologies are being adopted in Pacific communities and organizations.
2. To identify the main challenges people face when using digital technologies in the Pacific.
3. To explore how digital technologies can improve daily life and support development in the Pacific.





## Data: How to acquire it?

The study will use a qualitative research approach to explore how digital technologies are being used in the Pacific and the challenges people face. **Data** will be collected through semi-structured interviews with community members, educators, small business owners, and government or ICT officers, supported by short surveys to capture basic patterns of digital use. Other concepts at ground level needs to suit the Pacific.

The Indigenize mindset:

CONCEPT 1 – Kaitiakitanga (Data Stewardship)

CONCEPT 2 – Wantok & Matai (Decentralized Response)

CONCEPT 3 – Talanoa (Relationship-Based Intelligence)



## Digital Technologies



**Smart devices**



**Social media or AI**



**Laptops**



**Mobile money**

Is everyone using these technologies and how proficient are they?  
Does Adoption require frameworks?  
Are people ready for the change?



## Impact

What could be some of the impact of digital technologies in the Pacific.

➤ **Increase connectivity**

➤ **Reforms**

➤ **Economy growth**

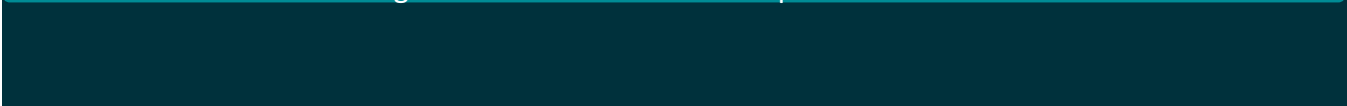
➤ **Challenges and Risk**

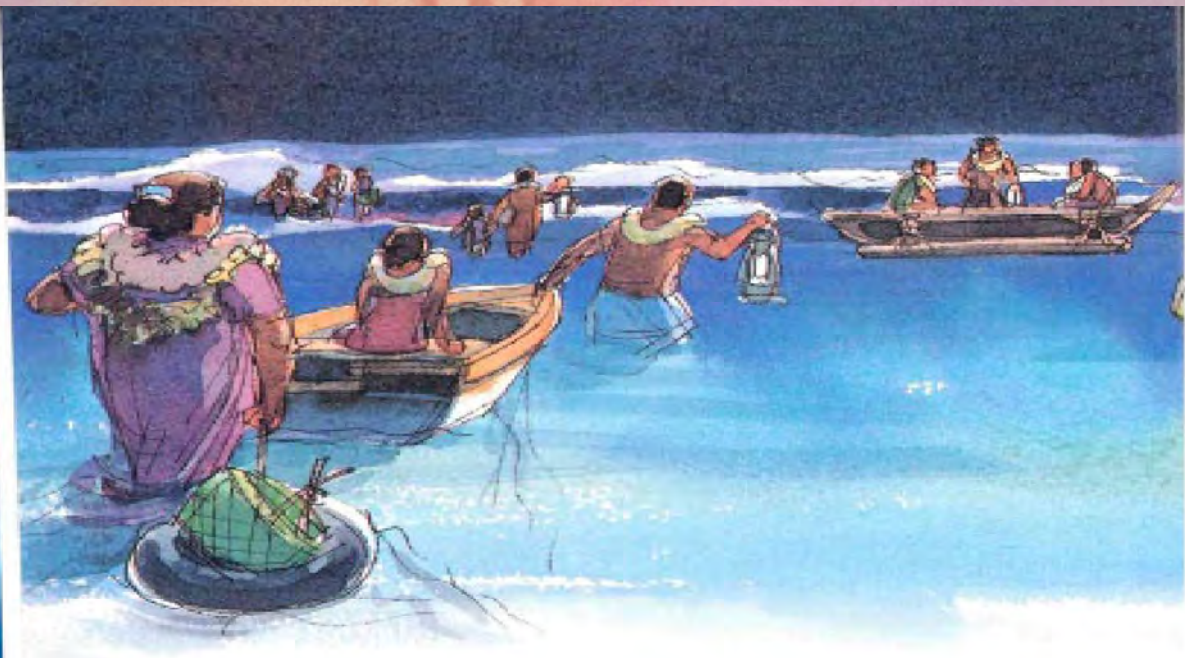
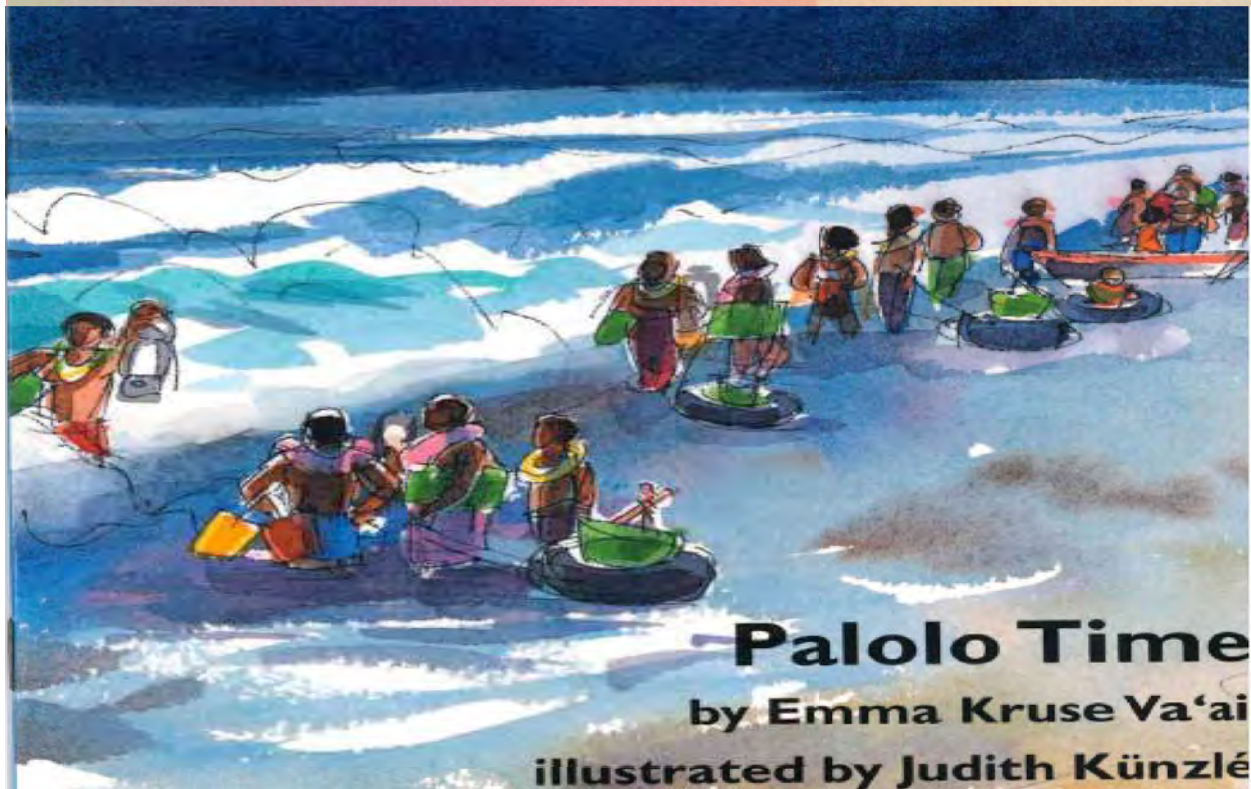


The research starts with Tonga as the pilot country !!!

# THANK YOU

Looking forward for feedbacks to improve the research!



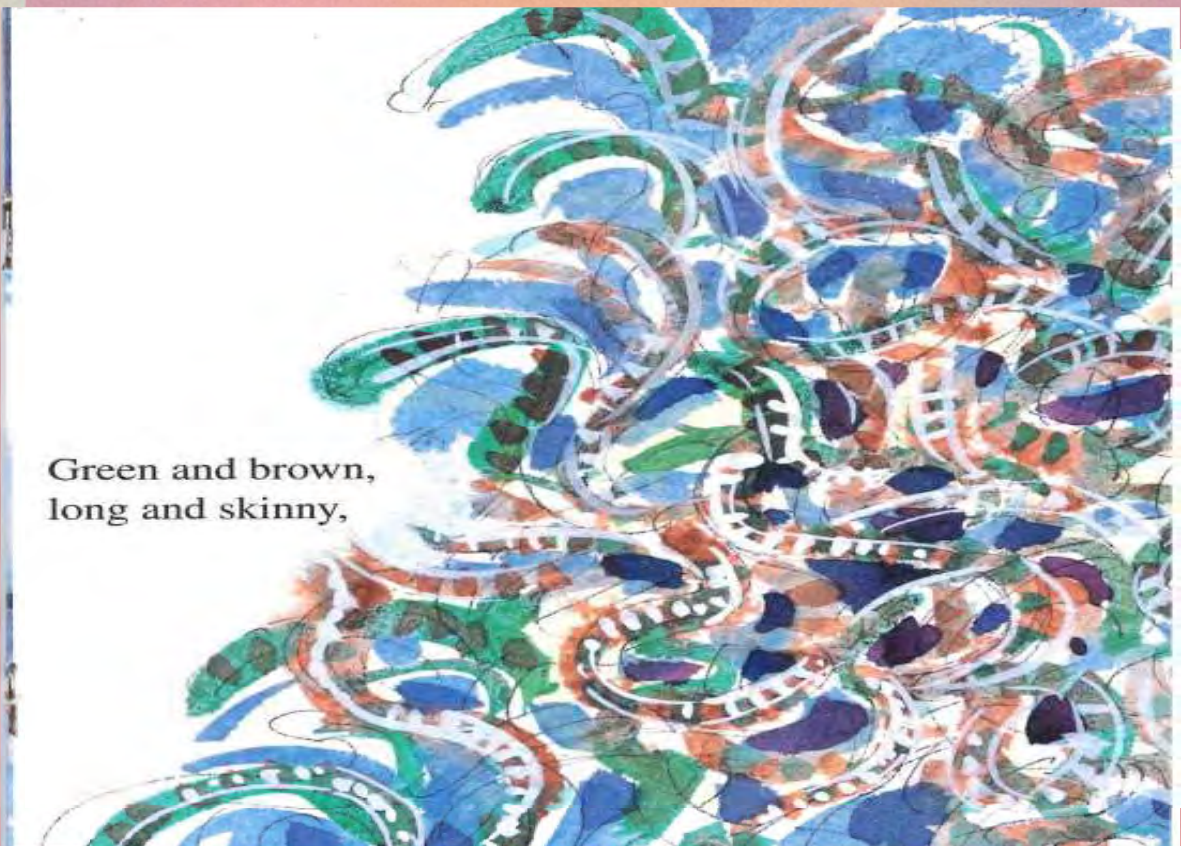


Palolo time is at night time.  
Palolo time is at high tide.



A painting of a night sea. The sky is dark blue with a small, white crescent moon in the upper right. The sea is depicted with various shades of blue and white, showing waves crashing and foam. The overall style is expressive and somewhat abstract.

As the moon glides quickly by,  
they swim in with the tide.

A painting of a dense, swirling mass of green, brown, and blue. The colors are mixed together in a chaotic, almost abstract way, with some areas appearing more solid and others more like splatters or drips. The overall effect is one of intense energy and movement.

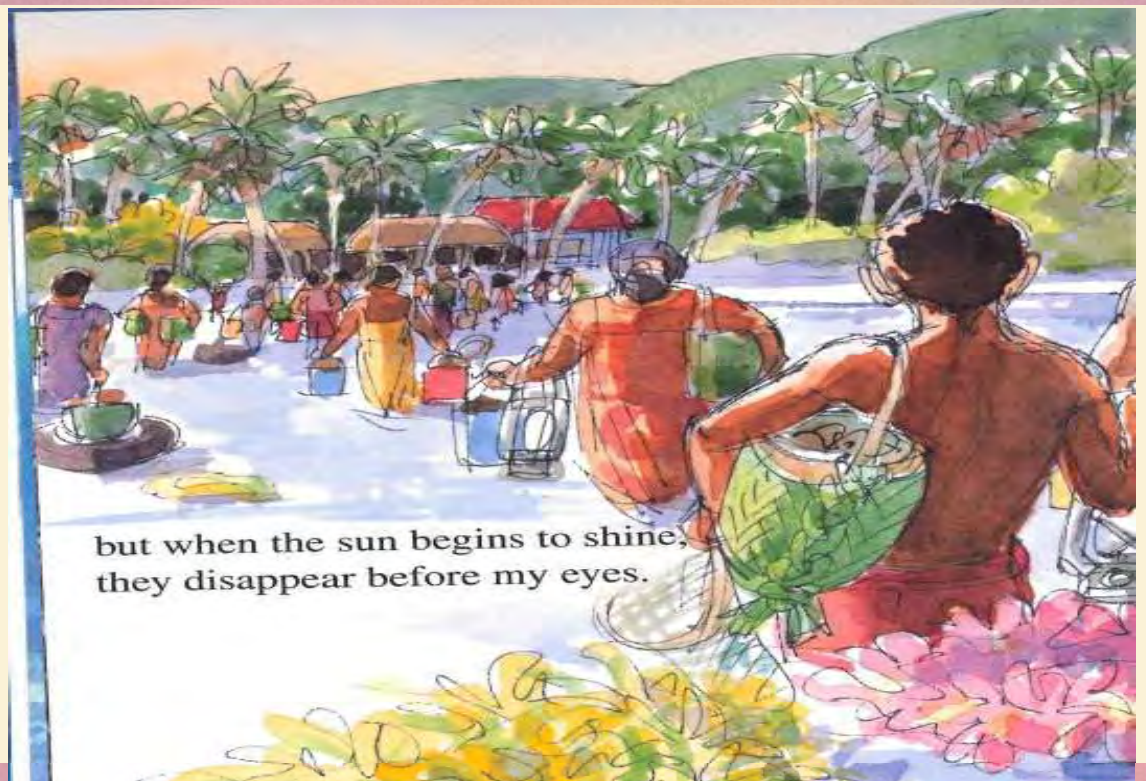
Green and brown,  
long and skinny,





I have to hurry  
before they're gone.

I scoop and sweep ...



but when the sun begins to shine,  
they disappear before my eyes.





Sā iai se togātogo 'i le mātou nu'u.  
'Ou te fiafia lava 'e savalivali 'i vā 'o togo,  
ma fa'apisipisi o'u vae  
'i totonu 'o le taufusi.  
'Ā goto o'u vae 'i totonu 'o le pala ...





... 'ou te la'a mai 'i fafo 'ua fai o'u tōtini uli!



'Ae 'e lē fiafia 'uma tagata 'i le pala,  
Fai mai a'u uō 'o le togātogo 'o se nofoaga pogisā  
toe pāū.  
'E sili atu ai se matāfaga 'e tā'a'alo ai,  
po 'o se 'auvai 'e tā'e'ele ai.





Sā manatu isi tagata 'o le pala  
 'o se nofoaga 'e lē aogā.  
 Sā mana'o le pule 'o le faletalimālō,  
 'e fau ai se vai 'a'au loloto.  
 'A 'o le fa'atau'oloa, 'ua fa'aaogā le togātogo  
 'e lafo 'i ai le otaota.



'O Tinā Matua, sā pei lava 'o a'u.  
 Sā fiafia fo'i 'i le togātogo.  
 'O lana mau,  
 " 'O le togātogo 'e tāua tele!  
 'O se nofoaga ofoofogia.  
 'E te lē iloa atu i'a 'olo'o feoa'i  
 'i totonu 'o le pala,  
 'ae 'olo'o iai 'i lalō.  
 'Olo'o fa'afailele ai le tele  
 'o i'a ma figota  
 — 'i tausaga 'uma."





'E iai le vaitaimi 'o le tausaga  
'e a'e ai le 'anae.  
'O le 'anae, 'o se i'a fa'apitoa  
'i lō mātou nu'u.  
'Ua fa'aigoaina tagata 'o le mātou nu'u  
'o le toto 'o le 'anae.



Sā māسانی 'ona fa'apea mai tagata mātutua,  
“ 'Ia va'ai fa'alelei togātogo.  
'O le pala 'olo'o tautu'ufua ma ola ai i'a.  
'A lēai togātogo 'ole'ā fa'aitiitia fo'i i'a  
ma figota 'o le sami.”

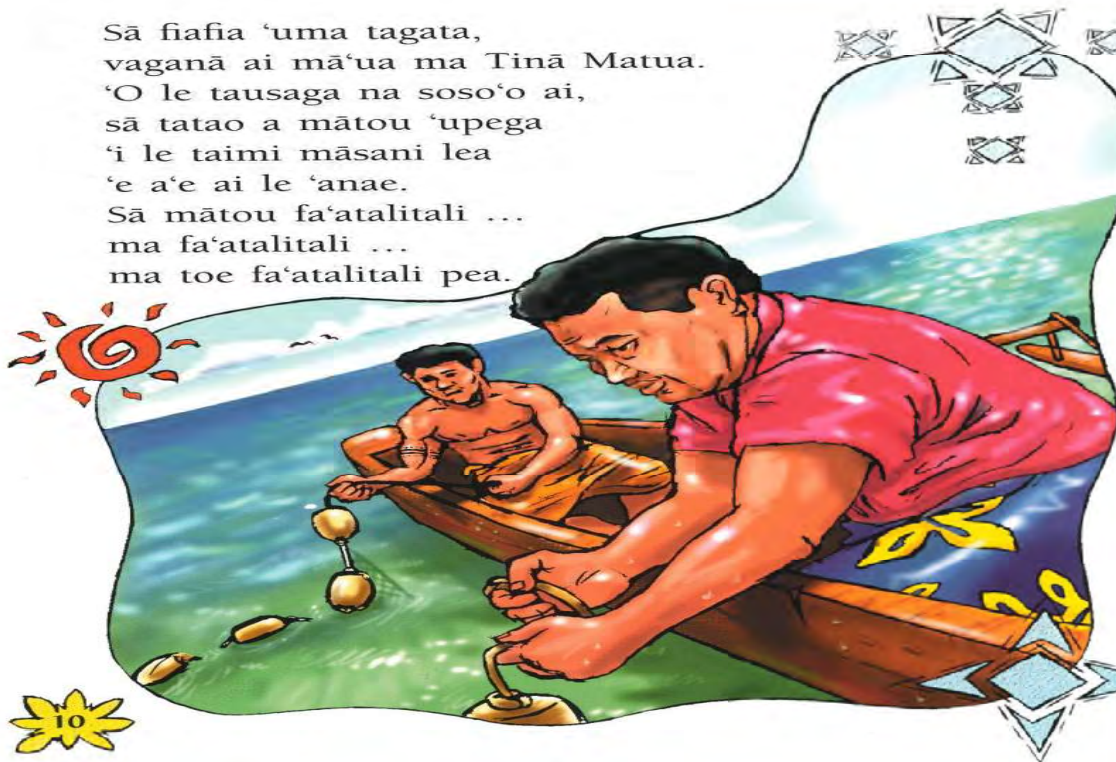




'Ae peita'i, 'ua lē fa'alogo lava tagata.  
 Na ō mai masini sua palapala,  
 ma tanu le togātogo.  
 'Ua fa'aopoopo le isi faletalimālō fou,  
 ma sā fau ai loa ma se vai 'a'au.



Sā fiafia 'uma tagata,  
 vaganā ai mā'ua ma Tinā Matua.  
 'O le tausaga na soso'o ai,  
 sā tatao a mātou 'upegā  
 'i le taimi māsani lea  
 'e a'e ai le 'anae.  
 Sā mātou fa'atalitali ...  
 ma fa'atalitali ...  
 ma toe fa'atalitali pea.





'Ae 'e le'i mau la mātou 'upegā.  
 'Ua lē tofū le mātou 'āiga.  
 Sā fa'anoanoa lava Tinā Matua.  
 " 'E lē ola a'e ni i'a  
 'i totonu 'o se vai 'a'au.  
 'E mana'omia 'e lātou le pala.  
 Talofa e! 'Ole'ā tātou  
 fa'atau i'a mai le māketi."



'O le Aso To'ona'i na soso'o ai,  
 sā pu'e le mā pasi ma Tinā Matua  
 ma te ō ai 'i le māketi.  
 'A 'o mā pasi ane 'i le faletalimālō fou,  
 sā 'ou va'aia se tamāloa faipisinisi  
 'o oso 'i totonu 'o se tama'i ta'avale.  
 Sā tau la'u va'ai 'i ona tōtini uli ...  
 ma 'ua 'ou toe manatua ai loa  
 nai o'u tōtini uli mai le pala!



# Strengthening Indigenous Pacific knowledge in mathematics education and community

Kamuela Yong

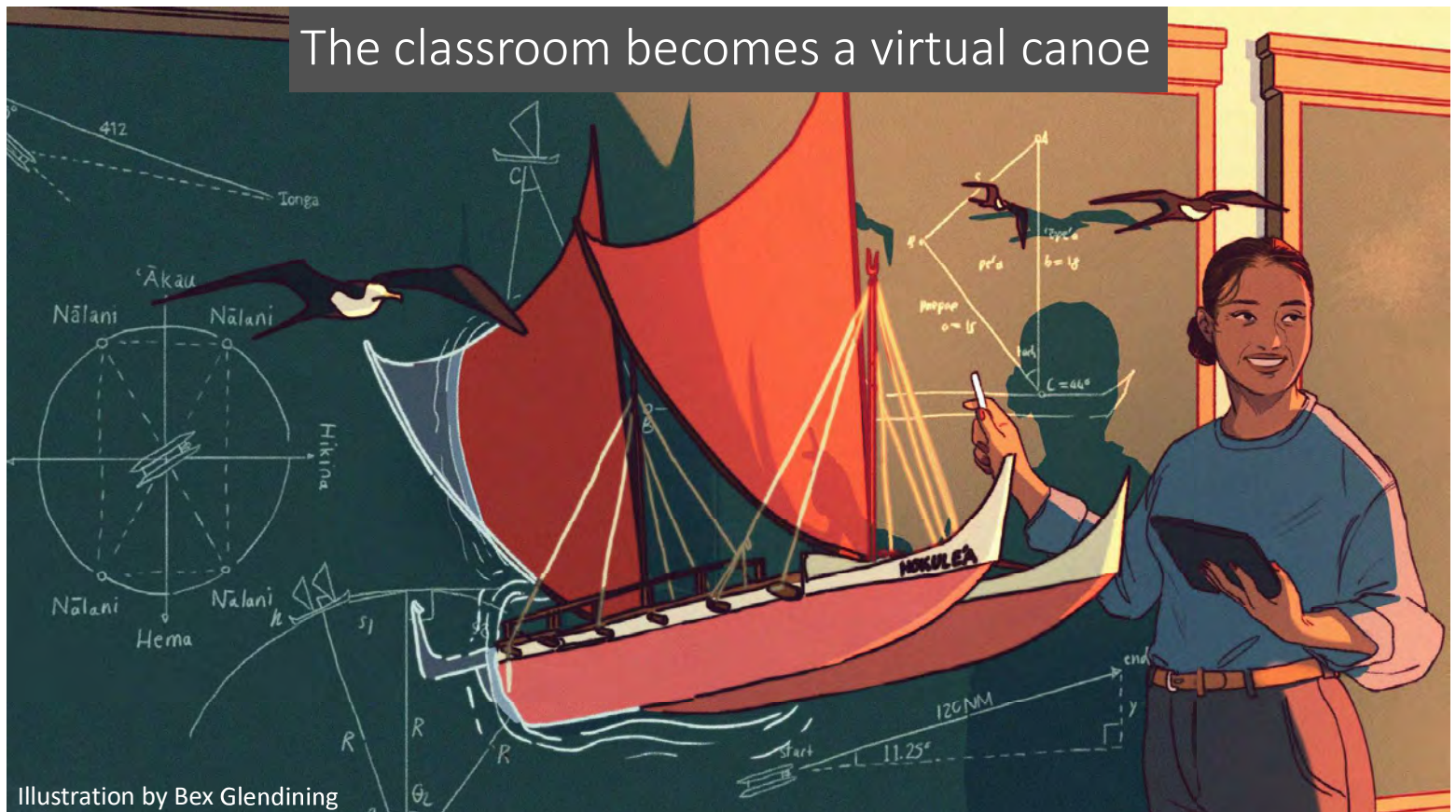
University of Hawaii – West O‘ahu

kamuela.yong@hawaii.edu



Website: kamuelayong.com

The classroom becomes a virtual canoe





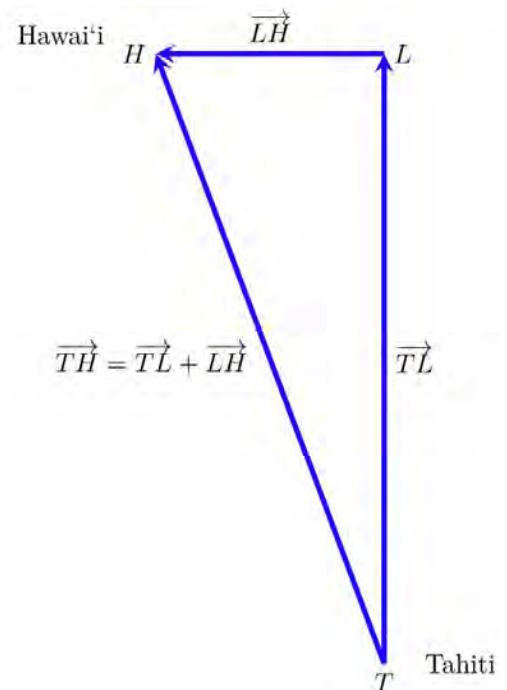
# Vector Addition

If we stand in Tahiti and face Hawai'i, we would be looking in the house Haka Ho'olua or north by west (NbW). When the Hōkūle'a sails from Tahiti back home to Hawai'i, she doesn't head directly towards Hawai'i in the house Haka Ho'olua. Instead, Hōkūle'a initially sails north. Once the navigator determines that Hōkūle'a has reached the latitude of Hawai'i, approximately N, the wa'a then changes course to head westward towards home. This navigation technique is known as latitude sailing, where knowing the latitude is crucial. The navigator can determine the latitude by measuring the altitude of Hōkūpa'a (North Star), observing the altitude of stars as they reach their highest point in the sky, or watching for pairs of stars that rise or set together.

## Vector Addition

We can represent the location of Tahiti as  $T$ , the location with the same latitude as Hawai'i and directly north of Tahiti as  $L$ , and the location of Hawai'i as  $H$ . Then, Hōkūle'a's northward path can be represented by the vector  $\vec{TL}$ , and its westward path by the vector  $\vec{LH}$ . The total displacement is equivalent to sailing directly from Tahiti to Hawai'i, represented by  $\vec{TH}$ . We refer to the vector  $\vec{TH}$  as the **sum** of the vectors  $\vec{TL}$  and  $\vec{LH}$ , written as

$$\vec{TL} + \vec{LH} = \vec{TH}$$



To find the **sum** of vectors  $\mathbf{u}$  and  $\mathbf{v}$ , we place the initial point of the second vector at the terminal point of the first vector. The vector formed from the initial point of the first vector to the terminal point of the second vector is the the sum of the two vectors,  $\mathbf{u} + \mathbf{v}$ . See Figure 8.4. Since vectors can be translated, any two vectors can be added. Notice that adding the vector  $\mathbf{v}$  to  $\mathbf{u}$  results in the same vector obtained by adding  $\mathbf{u}$  to  $\mathbf{v}$ . Thus  $\mathbf{u} + \mathbf{v} = \mathbf{v} + \mathbf{u}$ .

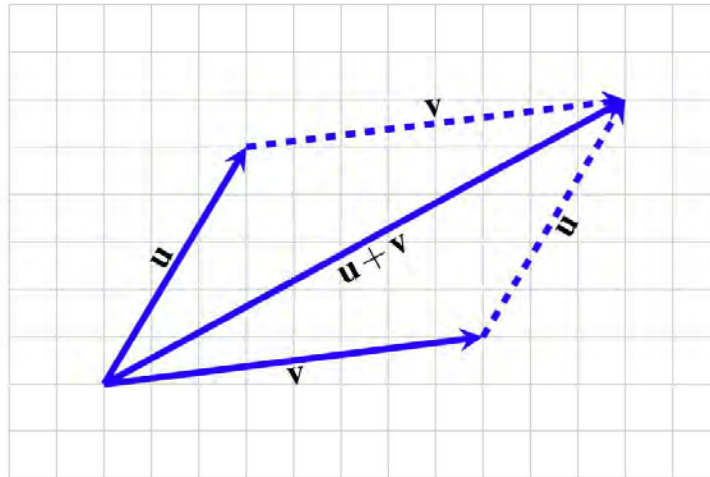


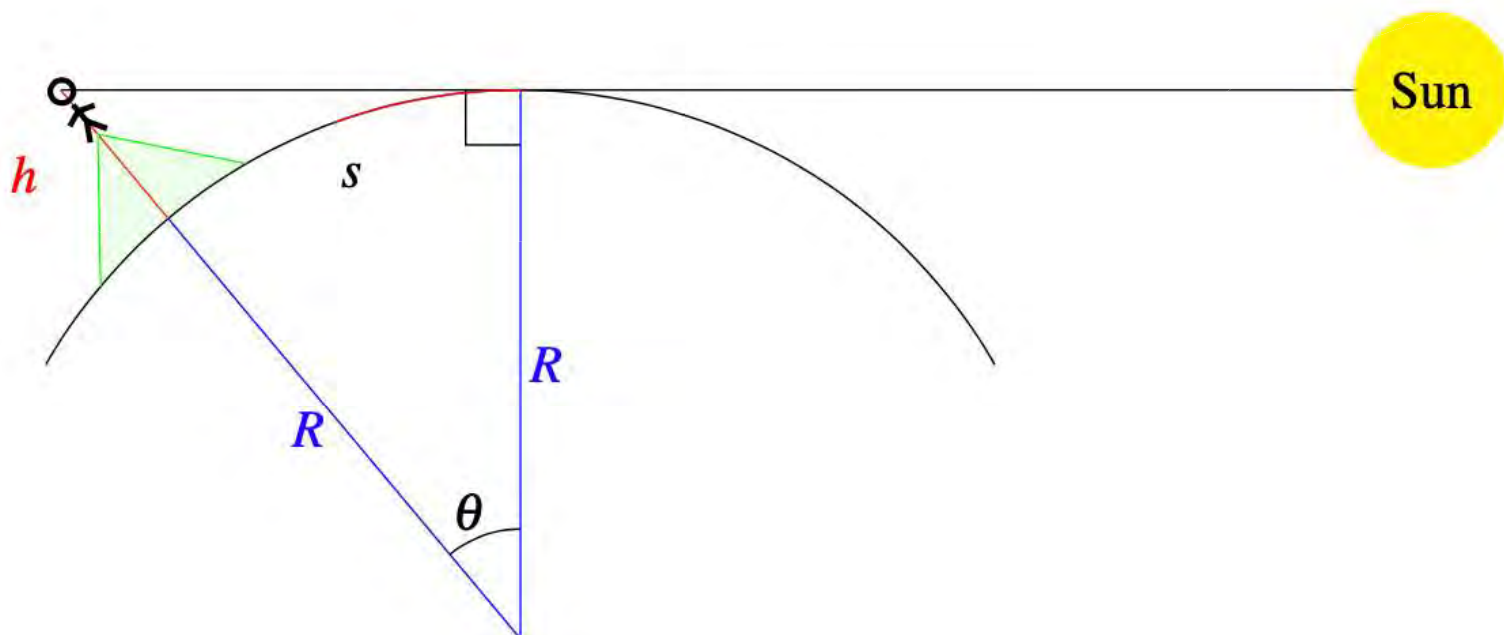
Figure 8.4:  $\mathbf{u} + \mathbf{v} = \mathbf{v} + \mathbf{u}$

## Inverse Trigonometry

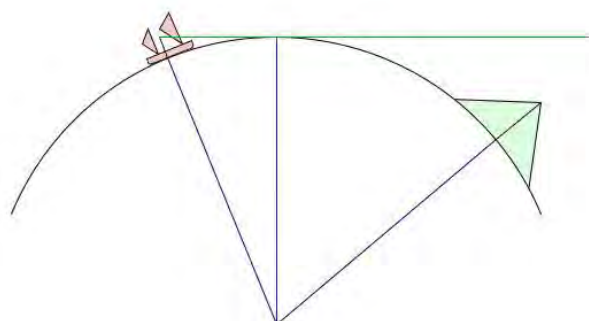
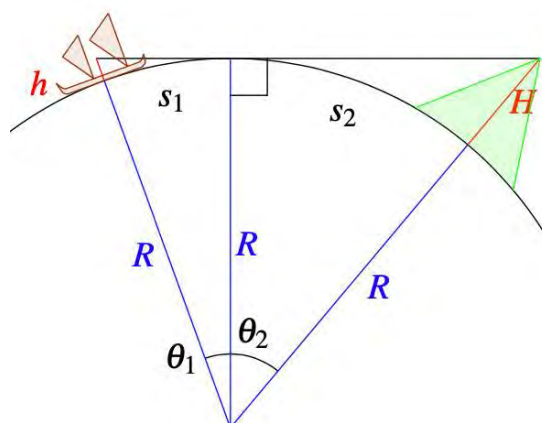
Western Textbook Example

**Being the First to See the Rising Sun** Cadillac Mountain, elevation 1530 feet, is located in Acadia National Park, Maine, and is the highest peak on the east coast of the United States. It is said that a person standing on the summit will be the first person in the United States to see the rays of the rising Sun. How much sooner would a person atop Cadillac Mountain see the first rays than a person standing below, at sea level?

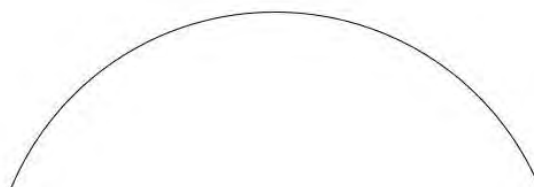
**[Hint:** Consult the figure. When the person at  $D$  sees the first rays of the Sun, the person at  $P$  does not. The person at  $P$  sees the first rays of the Sun only after Earth has rotated so that  $P$  is at location  $Q$ . Compute the length of the arc subtended by the central angle  $\theta$ . Then use the fact that at the latitude of Cadillac Mountain, in 24 hours a length of  $2\pi(2710) \approx 17027.4$  miles is subtended.] **3.35 min**



Finding Land



Side View



Looking Forward



## Inverse Trigonometry: Finding Tahiti

As Hōkūle‘a is sailing towards Tahiti, the navigator uses a process called **dead reckoning** to determine their position based on the latitude, measured by the stars, and other factors such as the estimated distance traveled, speed, and direction. Once the navigator has determined they are in the vicinity of land, her attention is now focused on looking for signs of land. One method navigators will use is to look for **land-based seabirds** such as the manu-o-kū (fairy tern) and the noio (noddy tern), which go out to sea in the morning to fish and return to land at night. The navigator will also look for other signs such as **drifting land vegetation**; **clouds** that form over islands; the **loom of the island** when white sand and still lagoons reflect the sun or moon upwards; and distinctive patterns of **swells bending (refracting)** around and/or reflecting off islands.

When does the navigator first see land?



Problems...

- Atolls

# Finding Land Rapa Nui



As Hōkūleʻa is sailing towards Rapa Nui, the navigator uses a process called dead reckoning to determine their position based on the latitude, measured by the stars, and other factors such as the estimated distance traveled, speed, and direction. Once the navigator has determined they are in the vicinity of land, her attention is now focused on looking for signs of land. One method navigators will use is to look for land-based seabirds such as the manu-o-kū (fairy tern) and the noio (noddy tern), which go out to sea in the morning to fish and return to land at night. However, Rapa Nui's seabird population has been reduced so she will look for other signs such as drifting land vegetation; clouds that form over islands; the loom of the island when white sand and still lagoons reflect the sun or moon upwards; and distinctive patterns of swells bending (refracting) around and/or reflecting off islands. Land will be spotted when the navigator first sees Maunga Terevaka, the tallest point in Rapa Nui, which stands at 1,665 ft.

1. On the deck of Hōkūleʻa, a navigator stands at 9 ft above sea level. If she looks out to the sea, how far is she from horizon? Assume the radius of the earth at Rapa Nui is 3,960.449 miles.
2. How far is Hōkūleʻa from Maunga Terevaka when it first becomes visible over the horizon to someone standing 9ft above sea level?

1. Learn from the communities
2. Seek permission



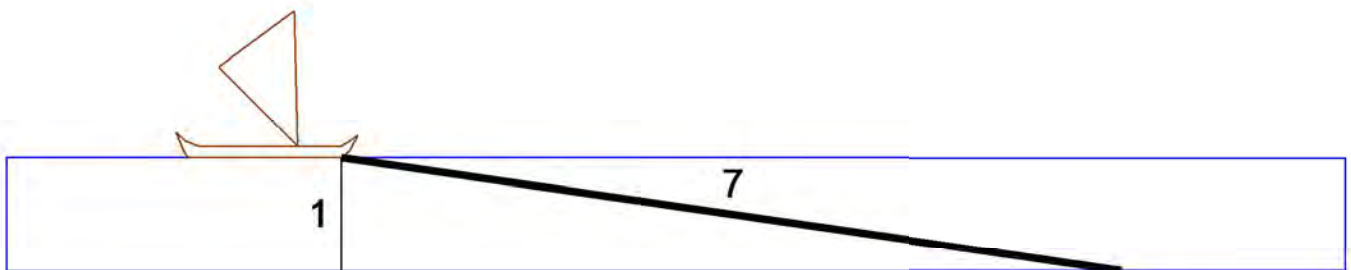
Kānehūnāmoku Voyaging Academy

# Anchoring



# Anchoring

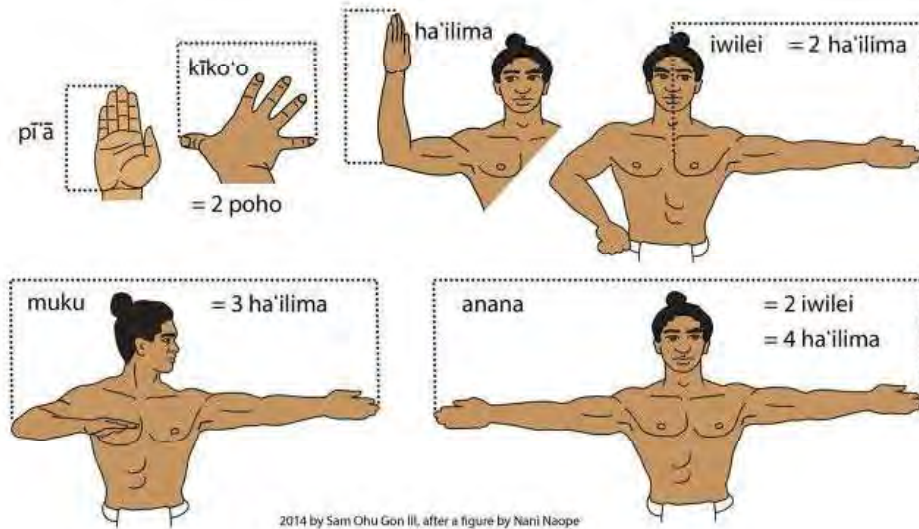
- For every 1 foot of depth, 7 feet of anchor line
- How much anchor line for 2 feet of depth?
- 3 feet?
- Mathematically: Ratio
- Nautically: Scope





# Hawaiian Units of Measurement

## Nā Anakahi Hawai'i (Hawaiian Units of Measurement)

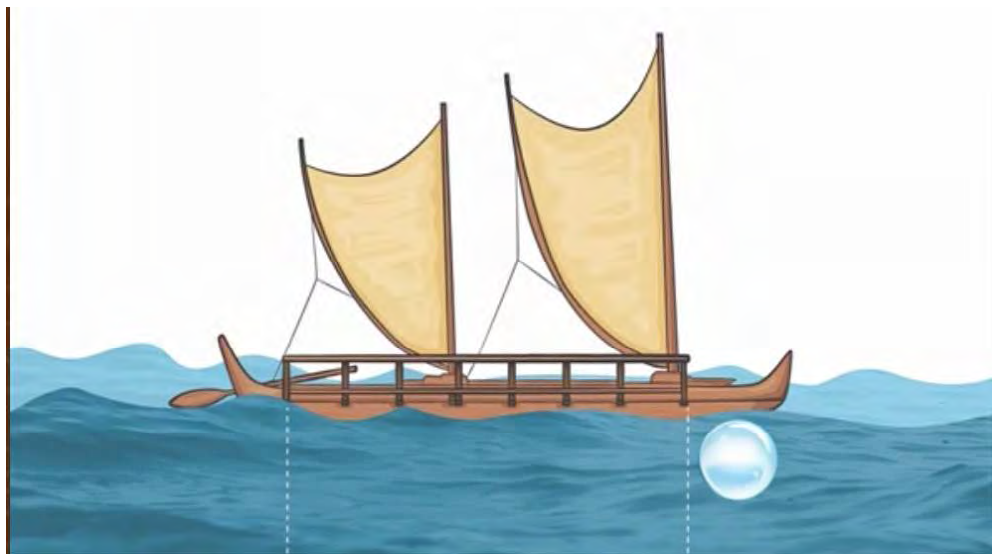


## Estimating Speed

- $\text{Speed} = \frac{\text{Distance}}{\text{Time}}$
- Sailing:  $\text{knot} = \frac{\text{nautical mile}}{\text{hour}}$
- In reality:  $\text{Speed} = \frac{\text{meters}}{\text{second}}$

### Unit Conversions

- 1 nautical mile = 1852 m
- 1 hour = 60 minutes
- 1 minute = 60 seconds

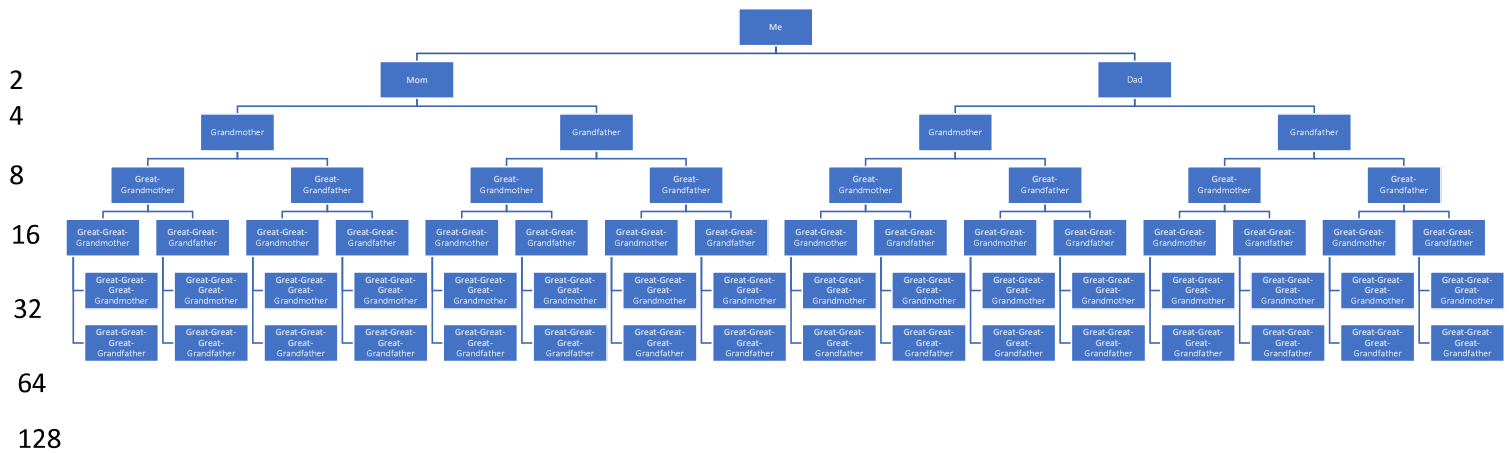


<https://www.ksbe.edu/holomoana>

# Estimating our speed



## Exponential Function - Genealogy



# Future of Mathematics

- Themes/Curriculum can be shared across the Pacific
- Each place has their own rich culture

Pacific Mathematicians  
IndigenousMathematicians.org





Mahalo

Fa'afetai Tele Lava

Email: [kamuela.yong@hawaii.edu](mailto:kamuela.yong@hawaii.edu)

Website: [kamuelayong.com](http://kamuelayong.com)



Free Trigonometry Textbook

[kamuelayong.com/trigonometry](http://kamuelayong.com/trigonometry)



[IndigenousMathematicians.org](http://IndigenousMathematicians.org)



# RECOGNISING STRENGTHS AND RESOURCES: MAPPING THE FUNDS OF KNOWLEDGE AND INDIGENOUS KNOWLEDGE SYSTEMS OF PACIFIC YOUTH AND CHILDREN RELATED TO MATHEMATICS EDUCATION

Professor Jodie Hunter,  
Massey University  
[j.hunter1@massey.ac.nz](mailto:j.hunter1@massey.ac.nz)

# Background

- Under-representation of diverse groups of people (including indigenous and migrant communities) in mathematics.
- We see this in achievement results in schooling and under-representation in tertiary education and employment.
- Developing equitable education systems in relation to mathematics and science is a goal in many countries

# Background

- Growing body of research (Hunter & Hunter, 2018; McAllister et al., 2022) relates under-representation to a failure to serve.
- Privileging specific ways of knowing and being creates difficulty in students and teachers recognising strengths and resources.
- Theoretical framing of Indigenous Knowledge Systems and Funds of Knowledge

# Research focus

To present a case study of voices from diverse communities, in this case, Pacific youth and children in Niue and Rarotonga to highlight what we can learn about mathematical strengths and resources when we listen to and build on the experiences of those from marginalised communities.

# Research design

- Tivaevae research design
- 27 students aged between 5 years and 14 years old participated.
- Visual data through photo-voice and story-telling interviews.
- Inductive and deductive data analysis to examine mathematical aspects and connections to context.



# Growing and cultivating food



Growing beans and plants



Spear fishing from the reef



Caring for livestock



## Cultivating taro





# Growing and cultivating food

C: I was husking a coconut, I thought it was like, knowing how much you supposed to take off.

R: Can you tell me a little bit about the process for husking, like, what do you do when you're husking them?

C: You have to push it down on the core, see the things? And then, you like, just try and get it at a spot where you don't hit the shell as you go. And then you have to take off, you have stuff and you need to know how big of a piece you're gonna take off, yep, like, push down on one side, then the other side leverage, (Okay), and then it comes off, and then you do it to the other piece, and you so on until you've gone around the coconut.

R: What do you use the coconut for? Once you've husked it?

C: You use it for food. You use it for making moina tai, which is like, like a dipping oil things, or, like, drinking by yourself.

R: Do you do anything with the husk?

C: Yeah, you turn it into a rope.

## Food preparation



Nane, my Niuean porridge...you have to get the right consistency. If you didn't put enough pia, the consistency it would be too liquid but if you put too much in, it would be too thick. So you'd have to get the right amount of pia to it, and then coconut water and then coconut flesh, it has to be a balance, not really a balance, it has to be more pia than coconut flesh but then a balance of coconut water to pia.

# Cultural activities



# Cultural events



You have to see how many taros you have to give out to other people. You put the taros in bundles and put them in rows for the number of people. Then we had to look at the money, see who has the most money for paying back... he had the most money so he gets like the most feed.



# What can we learn from these stories?

Pacific people along with other indigenous and those of First Nations have long been positioned in a deficit framing in relation to mathematics. This research platform offers a way to speak back and share the stories of mathematics that are frequently overlooked or ignored.

Curriculum resource material and text-book schemes potentially perpetuate stereotypes about who “does” mathematics and where mathematics is “found”.

Need for localised and place-based forms of curriculum innovation.

## Widening a view of mathematics as part of Pacific culture

When we first started taking photos and that's when I kind of was like “It's [maths] is actually like everywhere”. [Parent]

When you think about maths, it's our culture, it's our tradition and those treasures that they're teaching, that is maths. [Parent]



When the problems are about us you can see that maths is real and it's useful.....not just something random you do at school.

I thought it was going to be a bit hard because everything just seemed normal but once you think, have a mind-set of looking for maths it's actually more, it's more common than you think



Thanks to ACDS for  
funding and support

# The Affordances of a Competency-Based Approach to Assessment

Professor Elizabeth Angstmann  
School of Physics, UNSW  
Australia

*This presentation reflects the collective efforts of the Competency Assessment and Grading Working Party, co-chaired with A. Prof. Helen Gibbon, and supported by many dedicated colleagues at UNSW.*

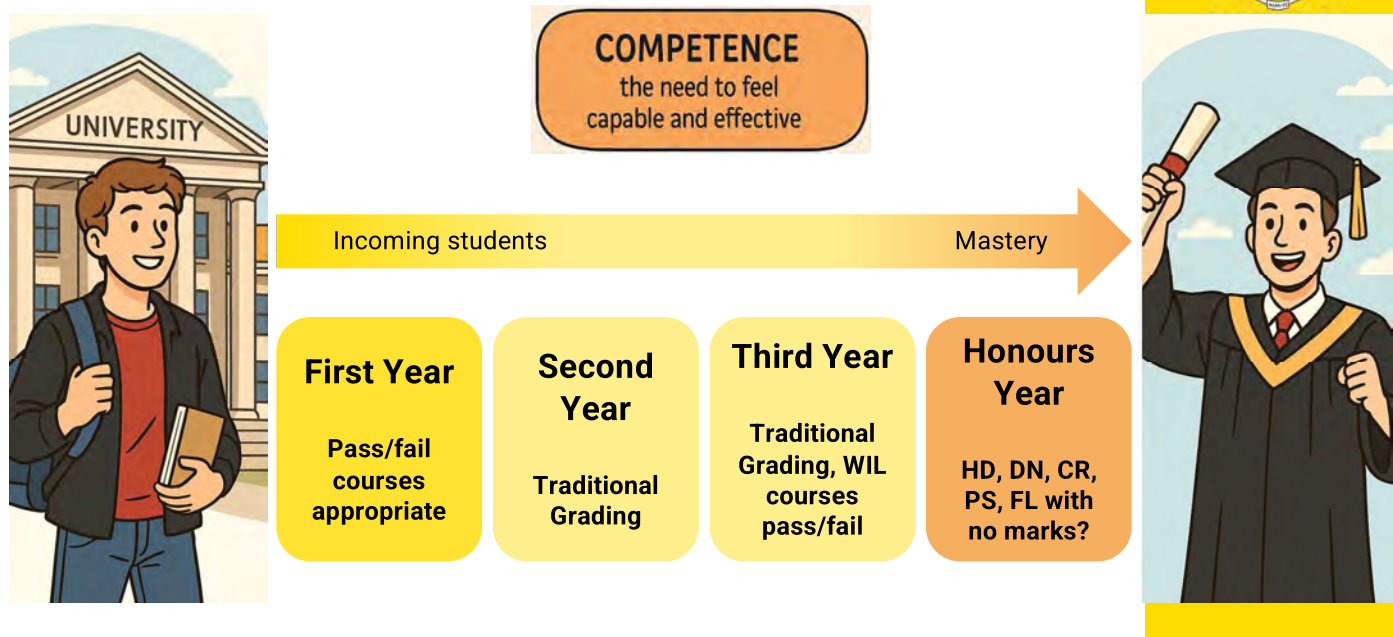


## Design Principles for Competency-Based Courses

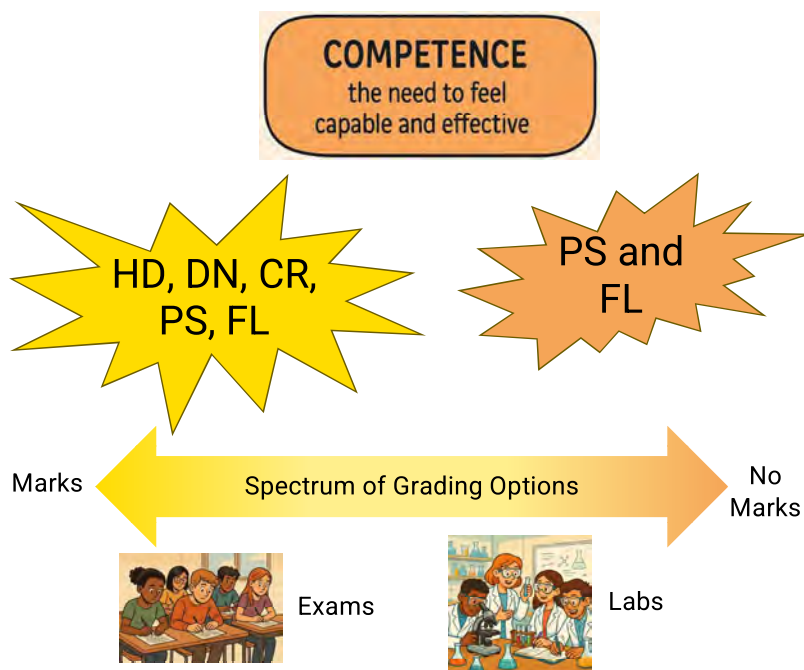
- **Clear outcomes** – Define what students must know and do
- **Proficiency standards** – Set clear criteria for “competent”
- **Multiple attempts** – Allow retries and feedback loops
- **Aligned pedagogy** – Match tasks to course level and Bloom’s taxonomy
- **Skill-focused activities** – Build core knowledge and capabilities
- **Competency to pass** – Mastery required in all key areas



# Context Dependent



## Different types of Competency Grading



**Keller Plan/Personalised System of Instruction**  
1960s

Popular in engineering:  
Self-Pacing  
Mastery Learning  
Unit-Based Structure  
Formative Assessment with Multiple Attempts  
Immediate Feedback  
Instructor as Facilitator

**Ungrading**  
Why Grading Students Undermines Learning (and What to Do Instead)  
edited by Susan D. Blum, 2020

Alternative grading or "Ungrading" is currently gaining popularity, as outlined in this book edited by Susan Blum, 2020

**Reform Challenges in School Education**  
Geoff Masters  
2023, ACER

"Assessments to monitor long-term progress will require transformed approaches to communicating Learning...Percentages and letter grades will be inadequate for this purpose"



# Advantages of Competency Grading

- **Academic Benefits:** Raised standards, higher quality participation, encourage creative risk-taking.
- **Student Wellbeing:** Reduced anxiety, growth mindset.
- **Instructor Benefits:** Reduced workload.



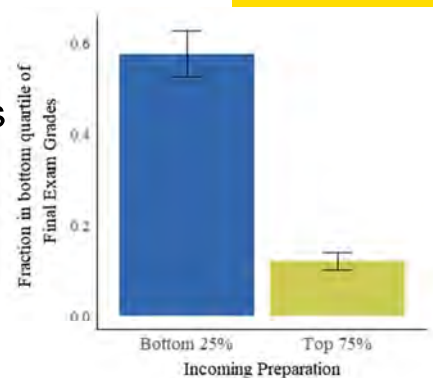
References provided in the blog linked from the QR code:

## Competency for Access

- Prior achievement predicts success
- Access for under-represented groups
- Supporting under prepared students
- Not adversely affecting well-prepared students

From The Universities Accord

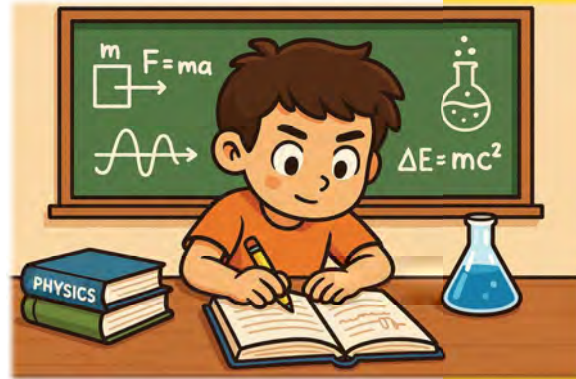
**Equity:** Every Australian should have the opportunity to experience the life transforming benefits of tertiary education. This is vital for Australia's future. Only by expanding access to tertiary education to currently under-represented groups – including people from low SES backgrounds, First Nations, people with disability and regional, rural and remote students – can the nation meet its projected skills needs. Access to tertiary education must include high quality teaching and learning targeted to students with lower educational attainment, alongside access to income support where necessary, affordable student housing and the ability to find reasonable work and placement opportunities.



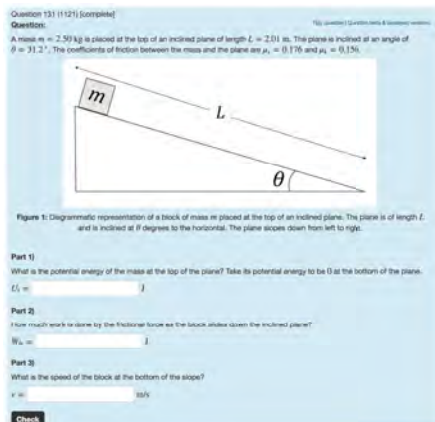
Salehi, S., Burkholder, E., Lepage, G. P., Pollock, S., & Wieman, C. (2019). Demographic gaps or preparation gaps?: The large impact of incoming preparation on performance of students in introductory physics. *Physical Review Physics Education Research*, 15(2), 020114.  
Confirmed with larger sample, 2025: <https://doi.org/10.1119/5.0255768>

# Physics 1A

- Students solve problems by translating them into equations
- Two hurdle tests, up to three attempts each
- Questions drawn from a large STACK bank, released progressively
- Lab component also a hurdle



## Tests



Formative weekly quizzes from the same bank.

Tests invigilated in the first-year physics lab.

Incorrect answer. Note: Your answers should be correct to 3 significant figures.

**Feedback for Part 1)**  
Calculate the potential energy using  $U = mgh$ . You will need to use trigonometry to find  $h$ ,  $h = L \sin(\theta)$ .  
Marks for this submission: 0.00/0.33. This submission attracted a penalty of 0.11.

**Feedback for Part 2)**  
The work done is given by  $W = \vec{F}_f \cdot \Delta \vec{x}$ . In this case the frictional force is in the opposite direction (up the inclined plane) to the displacement (down the inclined plane) so the work done will be negative. The frictional force can be calculated by using  
$$F_f = \mu_k N$$
$$= \mu_k mg \cos(\theta)$$
  
so  $W = -\mu_k mg \cos(\theta)L$ .  
Marks for this submission: 0.00/0.33. This submission attracted a penalty of 0.11.

**Feedback for Part 3)**  
The block loses the work done overcoming friction as it moves down the slope so:  
$$U_i + K_i + W_{fr} = U_f + K_f$$
  
Initially  $v = 0$  so  $K_i = 0$ . The final potential energy  $U_f$  is also 0 so:  
$$K_f = \frac{1}{2}mv^2 = U_i + W_{fr}$$
$$\Rightarrow \frac{1}{2}mv^2 = mgL \sin(\theta) - \mu_k mg \cos(\theta)L$$

Marks for this submission: 0.00/0.33. This submission attracted a penalty of 0.11.



# Student Support

Important to send message that if students fail the first time it is not the end of the world. The help we had available in term 1 2023 was:

- **Peer Support**
  - PASS tutorials
  - Discord for student Q&A
- **Instructor Support**
  - Moodle forums
  - Online drop-in sessions
  - Problem-solving workshops
  - Post-lecture Q&A
- **Course Design**
  - Online lectures as quizzes
  - Frequent communication from the convener



# Psychology: Work Placement

|                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Description of Client Presenting Issue(s)</b>      | <ul style="list-style-type: none"> <li>Includes sufficient information around: <ul style="list-style-type: none"> <li>Relevant cognitive, behavioural, emotional, physiological and relational aspects</li> <li>Triggers and precipitating factors</li> <li>Onset &amp; trajectory</li> <li>Level of distress &amp; impact on daily functioning</li> <li>Suicidality and self-harm (if relevant)</li> </ul> </li> </ul> |
| <b>Description of Client Background</b>               | <ul style="list-style-type: none"> <li>Includes sufficient information around: <ul style="list-style-type: none"> <li>Referral source &amp; reason(s) for referral</li> <li>Client demographics</li> <li>Developmental history</li> <li>Psychosocial and educational background</li> <li>Relevant medical, psychiatric history</li> <li>Relevant environmental factors</li> <li>Genogram</li> </ul> </li> </ul>         |
| <b>Justification for Assessment Tools Used</b>        | <ul style="list-style-type: none"> <li>Appropriately justifies selection and use of assessment tools</li> <li>Includes key psychometric properties of assessment tools</li> </ul>                                                                                                                                                                                                                                       |
| <b>Description of Results for Assessment Measures</b> | <ul style="list-style-type: none"> <li>Accurately reports and interprets results of assessment measures</li> <li>Integrates results with broader assessment information</li> </ul>                                                                                                                                                                                                                                      |
| <b>Diagnosis and Differential Diagnoses</b>           | <ul style="list-style-type: none"> <li>Accurately applies diagnosis based on international taxonomies of classifications of psychological disorders</li> <li>Appropriately considers relevant differential diagnoses</li> </ul>                                                                                                                                                                                         |
| <b>Formulation of Presenting Issue(s)</b>             |                                                                                                                                                                                                                                                                                                                                                                                                                         |



## MPsych(Clin) Professional and Ethical Practice Therapy Case Report Assessment Marking Grid

Trainee ID:  
Course: PEP3/4/6  
Type of Therapy Case: Adult / Child  
Assessor Name:  
Date of Assessment:  
Overall Grade: Pass with Distinction / Pass / Revise & Resubmit / Fail

|                                                                                                                                                                                                                                                                                                                                         | Not Applicable | Absent or Unsatisfactory | Incomplete | Developing Well | Excellent Progress | Assessor Comments |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------------------------|------------|-----------------|--------------------|-------------------|
| <b>Treatment Context</b>                                                                                                                                                                                                                                                                                                                |                |                          |            |                 |                    |                   |
| <ul style="list-style-type: none"> <li>Includes relevant contextual information around client case including: <ul style="list-style-type: none"> <li>Placement site</li> <li>Name of case supervisor(s)</li> <li>Number of sessions to date</li> <li>Client status at time of writing (e.g. discharged, ongoing)</li> </ul> </li> </ul> |                |                          |            |                 |                    |                   |
| <b>De-identification of Client</b>                                                                                                                                                                                                                                                                                                      |                |                          |            |                 |                    |                   |
| <ul style="list-style-type: none"> <li>Appropriate de-identification of client information</li> </ul>                                                                                                                                                                                                                                   |                |                          |            |                 |                    |                   |



Thanks to A. Prof. Chien Gooi,  
School of Psychology





# Introducing Law and Justice

- First term, first year of Law School, core course
- Approx. 400 students
- Three hurdle assessment items:
  - Class Participation
  - Midterm written assignment
  - Final invigilated exam
- Very positive student feedback from Term 1 2025
  - Reduced competitiveness
  - Focus on learning rather than worrying about marks
- Improved standards at the lower end
- Increased teacher workload

Thanks to A. Prof. Helen Gibbon, Law and Justice



## At UNSW

- University-wide working party on competency grading as part of SX project, make recommendation about wider roll-out by the end of the year
- Trials across diverse courses
- Focus on student wellbeing, instructor experience, and transition support



# Term 1 survey

- 13 ungraded courses surveyed
- Physics and Law included
- Responses collected before and after course
- Questions focused on stress, learning, peer relationships, and preferences
- Used Likert scale + open responses

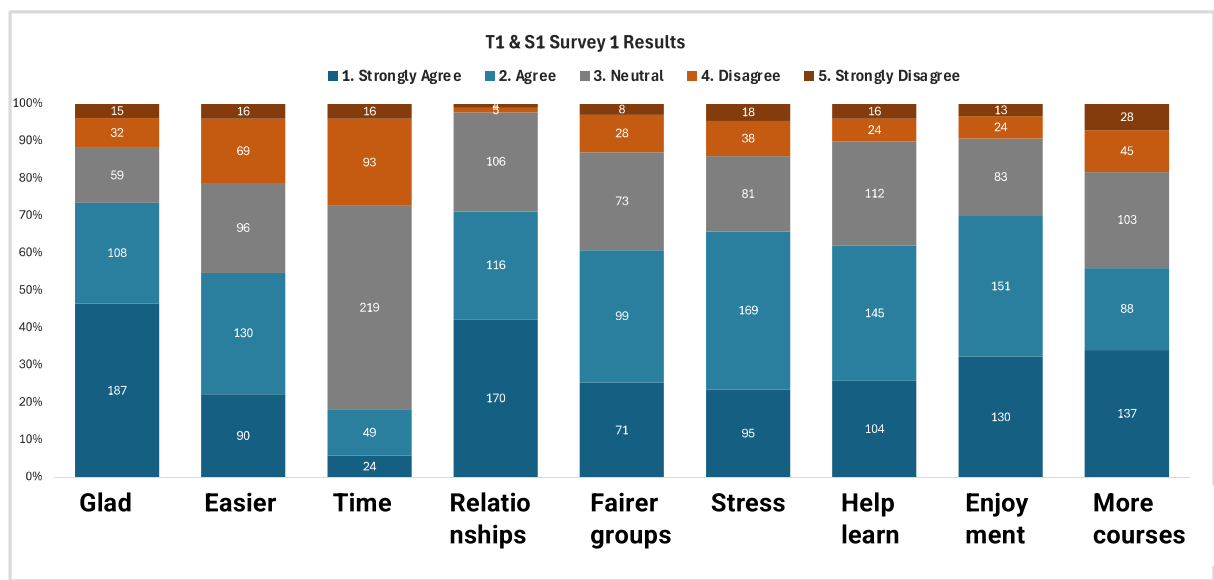


## The questions

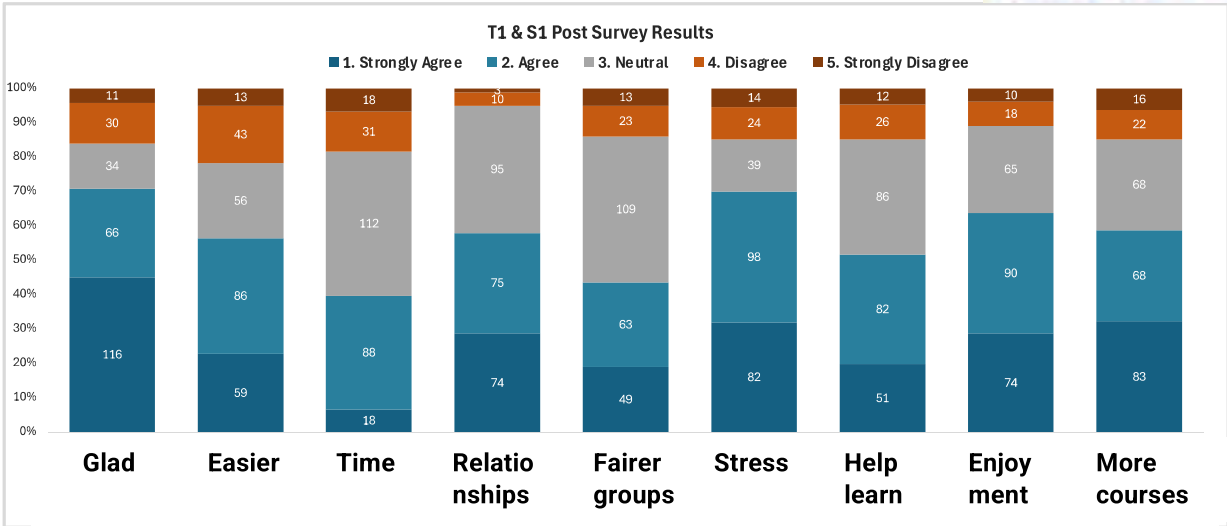
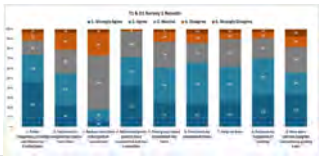
- I am glad that this course used the SY | FL grading model rather than numerical marks and standard grades. – **Glad**
- I felt that this course was easier than my other courses as I will not get a final numerical mark. – **Easier**
- Did the SY | FL grading model used in this course affect the amount of time you spent on assessment? – **Time**
- What impact did the use of the SY | FL grading model have on your relationship with your peers in this course: options from “Much more cooperative and less competitive” to “Much more competitive and less cooperative” – **Relationships**
- The SY | FL grading model used in this course made the group-based assessment feel fairer. – **Fairer groups**
- What impact did the use of the SY | FL grading model have on your assessment stress? – **Stress**
- The SY | FL grading model used in this course helped me learn. – **Help learn**
- The SY | FL grading model used in this course increased my enjoyment of learning. – **Enjoyment**
- I would like more of my courses at UNSW to use the SY | FL grading model. – **more courses**



Survey 1 Overall Results (out of 401 responses)



Post Survey Overall Results (Out of 257 responses)





# Student voice

Because this course had no impact on WAM, I could stop worrying about marks and focus on content. I definitely had more fun learning in this course than others.

**It makes me feel safe in general as a first year student that was trying to adapt to the new environment in university.**

The use of SYJFL helps to reduce stress for the course and actually enjoy the course and to be completely transparent it helped more in learning and retaining content learnt.

The use of SYJFL grading allowed me to stress less about the grade I would receive at the end, instead allowing me to engage deeper with the content and actually build meaningful understanding and intuition instead of memorising for an exam.

The grading model was effective in forming close friends and having an enjoyable time during the course.

Knowing that if I failed one assessment even if I did very well on the other assessments, I would fail overall, made me very stressed.



# Thanks for listening!

This is based on work of numerous teams of people. In particular the Competency Assessment and Grading working party.



Thanks to ACDS for funding and support



# Proceedings of the Inaugural Pacific Academy of Sciences Congress 2026

Harnessing the Knowledge of the Pacific



**International  
Science Council**  
Regional Focal Point for  
Asia and the Pacific



HOSTED BY  
**Australian  
Academy of  
Science**

