

Asia-Pacific team



**Pacific Climate Change Science and Services: CSIRO  
5<sup>th</sup> International Climate Change Adaptation Platforms meeting  
October 24<sup>th</sup> – 25<sup>th</sup>, 2024**

**Dr Leanne Webb**

Science Lead

Asia-Pacific Climate Intelligence

CLIMATE SCIENCE CENTRE  
[www.csiro.au](http://www.csiro.au)



# CSIRO is Australia's national science agency



One of the world's largest multidisciplinary science and technology organisations



6,300+ dedicated people working across 51 sites in Australia and globally



State-of-the-art national research infrastructure



For 2021-2022 we delivered \$10.2 billion of benefit to the nation

# Six challenges CSIRO is working with partners to solve

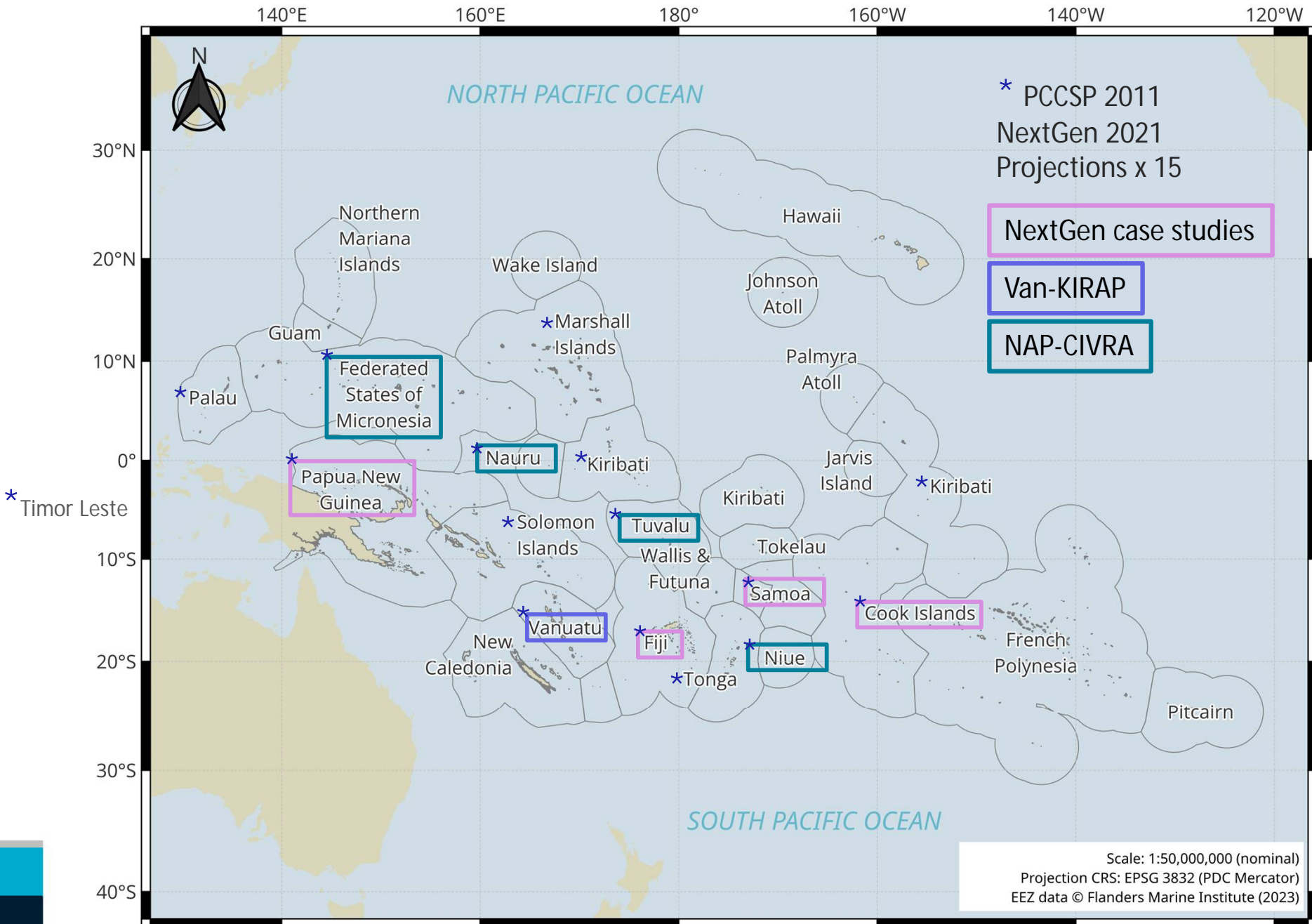
<b>Health and wellbeing</b> Enhance the health and wellbeing of all Australians.	<b>Food security and quality</b> Grow the triple bottom line value of Australia's agri-food and fibre industries.	<b>Secure Australia and region</b> Safeguard Australia and our region from threats.	<b>Resilient and valuable environments</b> Enhance the resilience and value of our natural and built environments.	<b>Sustainable energy and resources</b> Lower emissions to net zero while sustaining Australia's prosperity.	<b>Future industries</b> Create Australia's future sustainable jobs and industries.
<ul style="list-style-type: none"><li>• Support healthier lives</li><li>• Infectious diseases prevention and preparedness</li><li>• Digital transformation of healthcare</li><li>• Health technology solutions</li></ul>	<ul style="list-style-type: none"><li>• Profitable agricultural production</li><li>• Improved crops and animals</li><li>• High value foods and feeds</li><li>• Sustainable and trusted value chains</li></ul>	<ul style="list-style-type: none"><li>• Biosecurity</li><li>• Defence and national security</li><li>• Sovereign resilience</li><li>• Stable and prosperous region</li></ul>	<ul style="list-style-type: none"><li>• Resilience to climate risks</li><li>• Healthy ecosystems</li><li>• Resilient communities and built environments</li></ul>	<ul style="list-style-type: none"><li>• Electricity transition</li><li>• Industry and transport decarbonisation</li><li>• Sustainable prosperity from resources</li><li>• Value-added critical minerals</li></ul>	<ul style="list-style-type: none"><li>• Future high-tech industries</li><li>• Transition to sustainable industry</li><li>• Strengthen the innovation system</li></ul>

In relation to climate change science, CSIRO's expertise includes climate science, atmospheric chemistry, hydrology, ocean chemistry, marine science, sustainability science, social science, economics, risk assessment, knowledge brokering, capacity building and development of bespoke products and services.

# CSIRO Asia-Pacific team

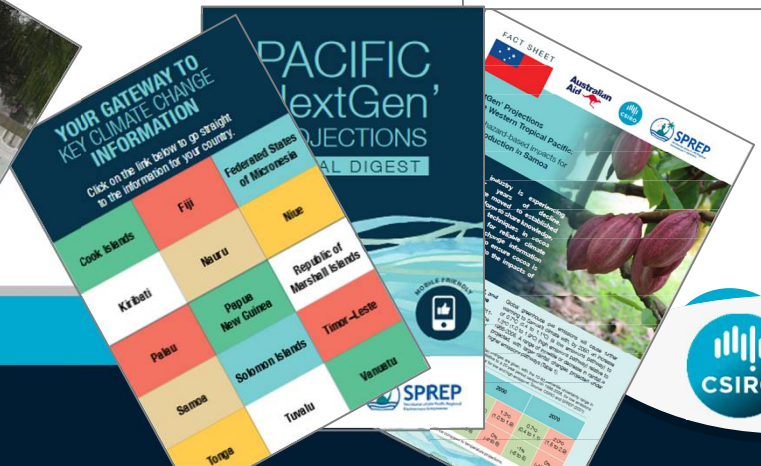
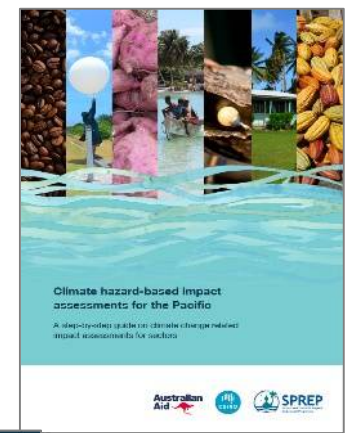
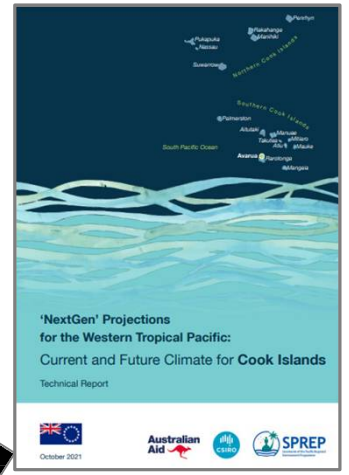
- Since 2009, CSIRO's Asia-Pacific Team has translated historical and projected climate data into products and services focusing on the Pacific region.
- These products and services have evolved whereby the team is currently informing national adaptation plans and country's decision making, through development of climate risk assessments and other further developed materials.
- Our evolution from 2009 to 2024 and beyond:
  - *Pacific Climate Change Science Program (PCCSP 2009-2011)*
  - *Pacific-Australia Climate Change Science Adaptation Planning (PACCSAP 2012-2015).*
  - *Australia Pacific Climate Partnership / NextGen (APCP 2018-2021)*
  - *Climate Information Services for Resilient Development in Vanuatu (VanKIRAP 2019-2024)*
  - *Climate Impacts, Vulnerability and Risk Assessment (CIVRA 2023-2025) for Tuvalu, Nauru, FSM and Niue.*
- Our team's emphasis is on innovation, quality-assurance, capacity-building, trusted relationships and effective partnerships.

# Countries studied by CSIRO A-P team



# Next Gen Climate Projections (2018-2021)

- Updated partner PIC country reports X 15
- Sectoral case studies
  - Coffee (PNG)
  - Cocoa (PNG & Samoa)
  - Black Pearls (Cook Islands)
  - Root Crops (Fiji)
- New guidance materials
- Other regional assessments:
  - Extreme sea/Total water level
  - Tropical cyclones
  - Macro-economic analysis
- Tailored comms
  - Fact sheets
  - Slide decks (COP26 UNCC)



# Van-KIRAP (2019-2024)



**The Vanuatu Klamet Infomesen blong Redy, Adapt mo Protekt (Van-KIRAP) project is developing and delivering climate data, information, decision support tools and associated knowledge products in the form of climate information services to raise climate awareness and guide decision-making for a range of key stakeholders in Vanuatu.**

The climate information services are relevant across multiple time scales including current and future climate, and relate to five priority sectors: infrastructure, water, agriculture, fisheries, and tourism.

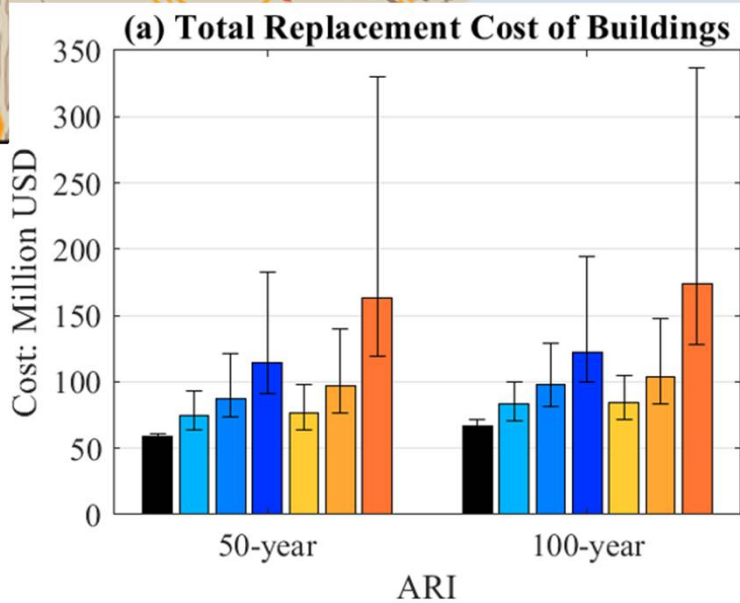
The products, specifically relevant over multi-decadal (climate change) timescales, are presented in multiple formats, including hard copy and digital, and are accessible via a new cloud-based portal hosted by the Vanuatu Meteorology and Geo-hazards Department (VMGD).

# Van-KIRAP (2019-2024)

Van-KIRAP products	Total
Infobytes for sectors (infrastructure, water, agriculture, fisheries and tourism)	15
Factsheets and explainers for specific climate variables	6
Summaries on current and future climate variability and change for Vanuatu North, Central and South	3
Factsheets describing methods	5
Factsheets describing technology	2
Videos	7



# Economic impact

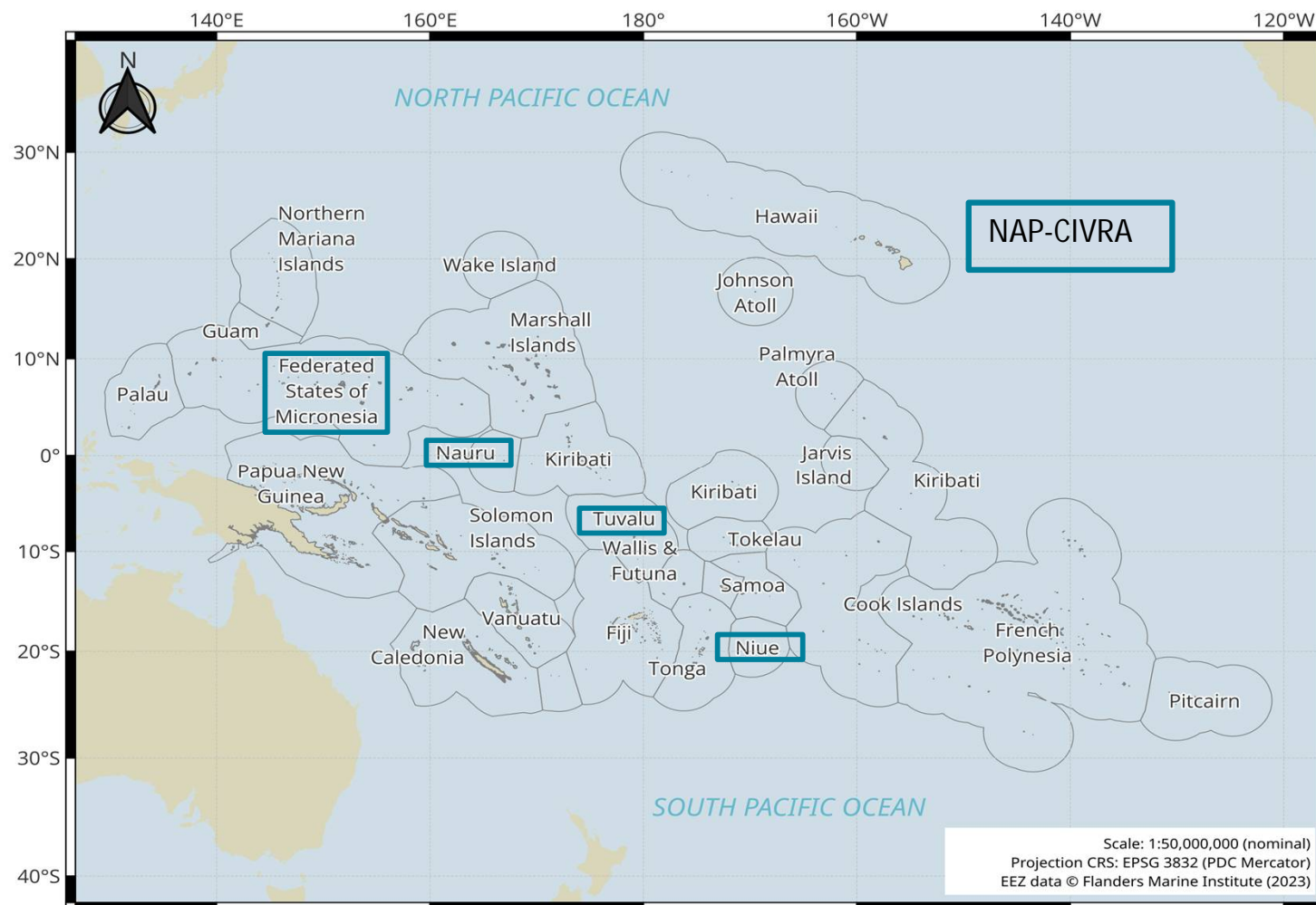


- Impacts of extreme sea-level driven coastal inundation under rising sea levels for Port Vila and Luganville
- Assessed roads and buildings for future exposure and replacement cost

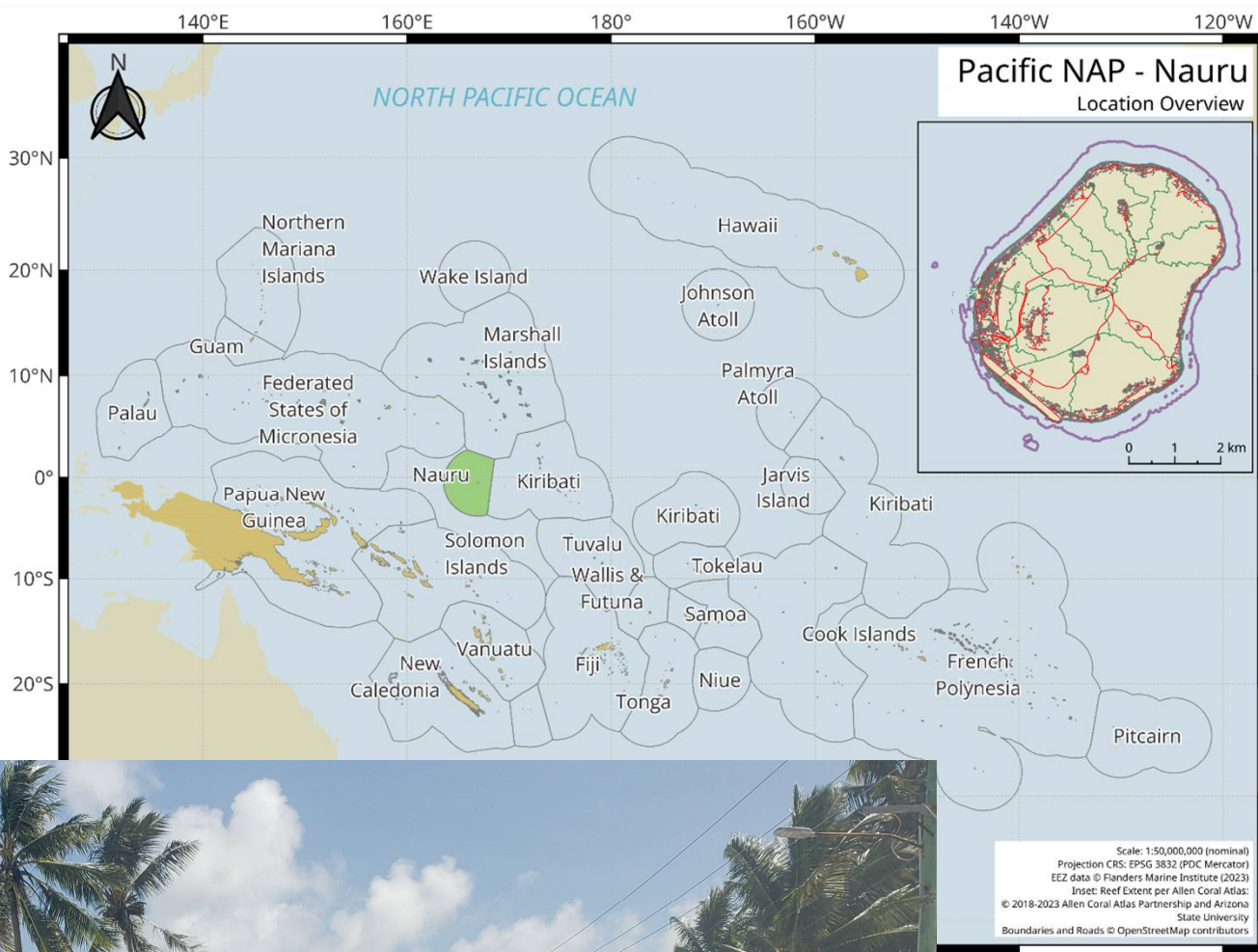


# CIVRA countries

- Tuvalu
- Nauru
- Federated States of Micronesia
  - Yap
  - Chuuk
  - Pohnpei
  - Kosrae
- Niue

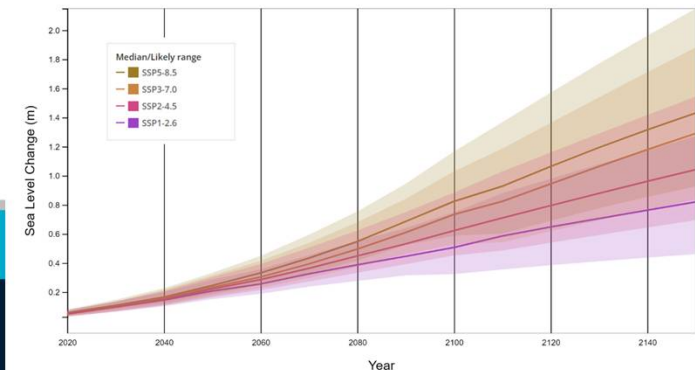
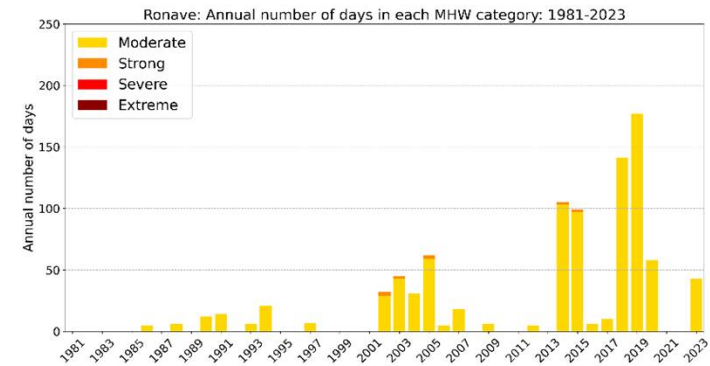
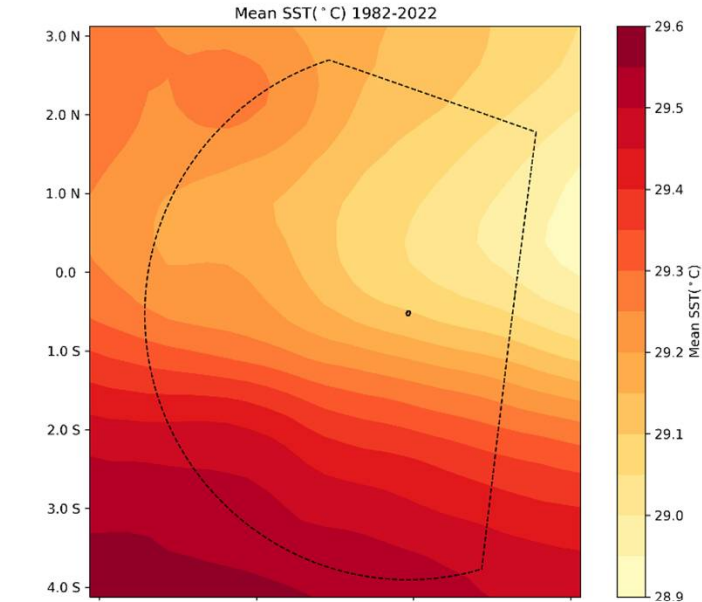


# CIVRA: Nauru



# Climate variables assessed : Nauru CIVRA

- **Observed climate**
  - **Recent trends**
  - **Projections (CMIP6)**
    - 2030, 2050 (decision horizons)
    - **SSP1-2.6, SSP5-8.5**
1. Average and extreme temperature
  2. Average and extreme rainfall
  3. Drought
  4. Wind
  5. Sea level rise
  6. Coastal inundation (tides/ waves)
  7. Average sea surface temperature (SST)
  8. Extreme SST: marine heatwaves and degree heating weeks
  9. Ocean acidification



# Sectors assessed for Nauru CIVRA

1. Water resources
2. Health and wellbeing
3. Agriculture
4. Fisheries and marine resources
5. Disaster management and emergency response
6. Infrastructure and coastal protection  
(includes telecommunications, energy, transport, and waste management)
7. Biodiversity and environment
8. Land and land rehabilitation
9. Community and culture



# Data management

- Data, methods and information used in climate change risk assessments are used to inform adaptation decisions
- Need for:
  - Data transparency
  - Data provenance
  - Data licencing
  - Data ownership
  - Data standards
  - Methods transparency / avoid 'Black box' science
  - Standard Operating Procedures?? Rules?

[nature](#) > [nature climate change](#) > [perspectives](#) > [article](#)

Perspective | Published: 08 February 2021

## **Business risk and the emergence of climate analytics**

[Tanya Fiedler](#), [Andy J. Pitman](#) , [Kate Mackenzie](#), [Nick Wood](#), [Christian Jakob](#) & [Sarah E. Perkins-Kirkpatrick](#)

[Nature Climate Change](#) 11, 87–94 (2021) | [Cite this article](#)

13k Accesses | 689 Altmetric | [Metrics](#)

### **Abstract**

Emerging awareness of climate-related financial risk has prompted efforts to integrate knowledge of climate change risks into financial decision-making and disclosures.

Assessment of future climate risk requires knowledge of how the climate will change on time and spatial scales that vary between business entities. **The rules by which climate science can be used appropriately to inform assessments of how climate change will impact financial risk have not yet been developed.** In this Perspective, we summarize the demands by the business and finance community for reliable climate information, and the potential and limitations of such information in the context of what climate models can and cannot currently provide.





# A-P team: Next steps, gaps, limitations, other issues

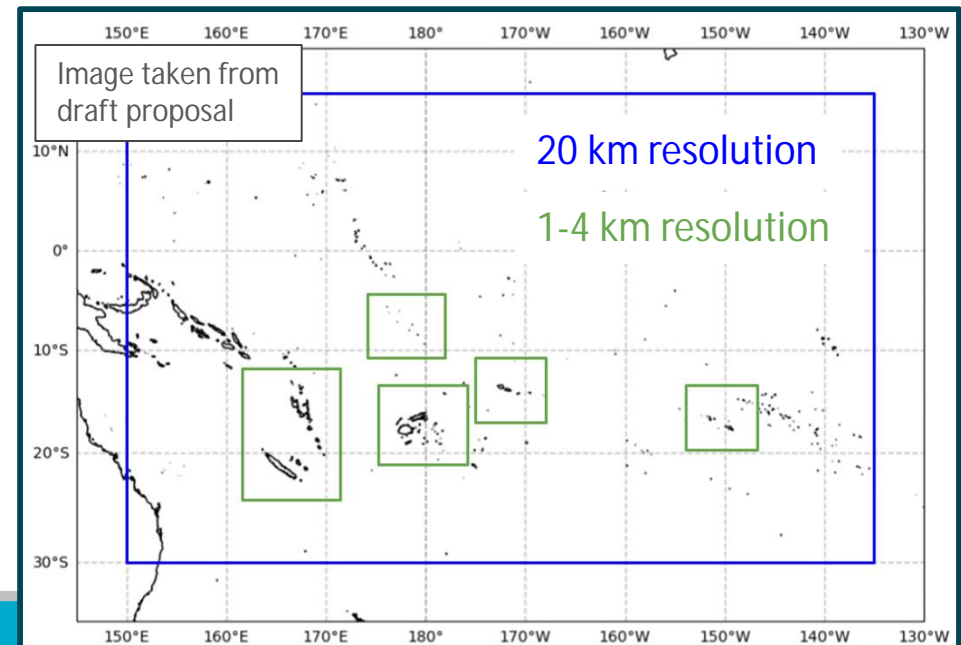
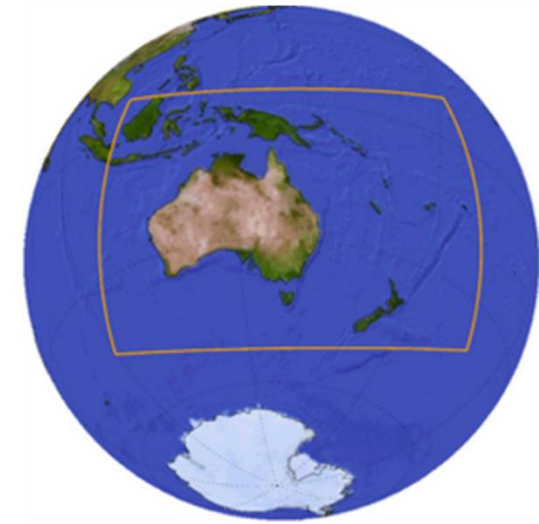
- IPCC Pacific write shops
- Capacity development e.g. Produce e-learning modules for climate projections interpretation (PIETR panel)
- CMIP7 and CORDEX
- Understand ENSO in a changing climate: New index 'Relative ENSO'
- Keeping up to date with development of the Pacific Climate Change Research Roadmap
- Weather Ready Pacific also happening alongside.
- Ongoing monitoring and analysis of historical climate data is being actively encouraged: ocean monitoring, LiDAR.
- Tipping points relevant to the Pacific e.g. Antarctic ice sheet collapse and associated sea level rise.

# CORDEX-Pacific FPS

- The Pacific region contains many small island states with some facing an existential threat from climate change
- Most of these islands are near the edge or outside existing standard CORDEX domains
- Several previous and on-going downscaling efforts in the region can be leveraged
- Multiple downscaling groups can/will contribute to the effort (e.g. UNSW, Météo-France, NIWA, IBM, UPF, CSIRO)
- Local/regional organisations support the effort (e.g. Pacific Climate Change Centre)
- CORDEX is currently reviewing the proposal. Official “Flagship Pilot Study” status is expected before the end of the year.

## Domains

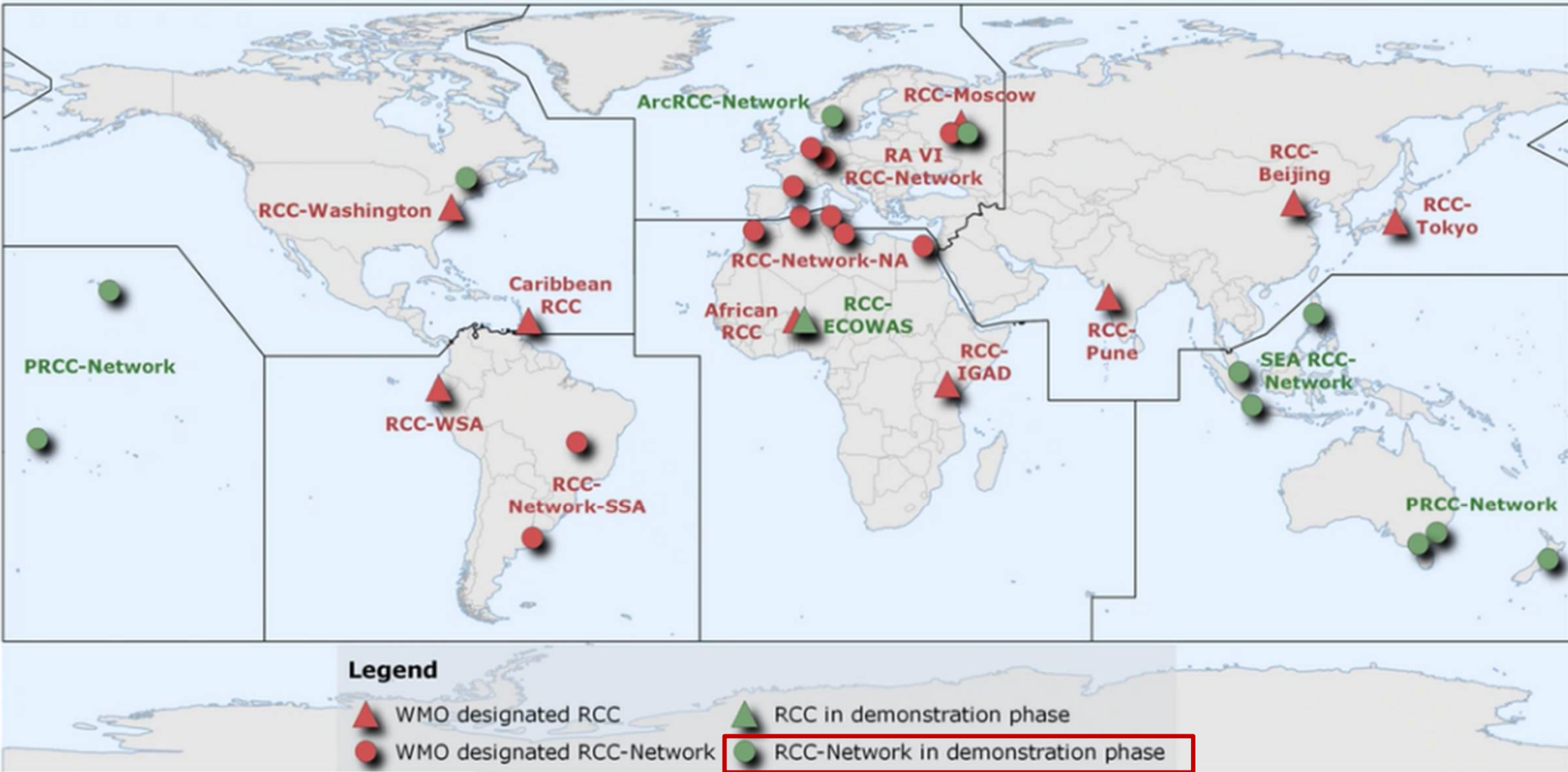
- Region 1: South America
- Region 2: Central America
- Region 3: North America
- Region 4: Europe (EURO)
- Region 5: Africa
- Region 6: South Asia
- Region 7: East Asia
- Region 8: Central Asia
- Region 9: Australasia**
- Region 10: Antarctica
- Region 11: Arctic
- Region 12: Mediterranean (MED)
- Region 13: Middle East North Africa (MENA)
- Region 14: South-East Asia (SEA)



# CSIRO Asia-Pacific team

- We participate in the Pacific Meteorological Council (PMC) on the following panels:
  - Pacific Island Climate Services (PICS) (LW)
  - Pacific Island Climate Outlook Forum (PICOF) (LW)
  - Pacific Islands Education, Training and Research (PIETR) (LW)
  - Pacific Islands Marine and Ocean Services (PIMOS) (RH)
- We co-lead (along with NOAA) the climate change node of the Pacific Islands Regional Climate Centre (PI-RCC). (LW)
- These organisations inform the Council of Regional Organisations of the Pacific (CROP) agencies, i.e. SPREP, SPC, USP and PIFS (Pacific Islands Forum Secretariate), delivery partners and consultancies.
- The Pacific Islands Climate Outlook Forum (PICOF 15) 14-15 October, in Nuku'alofa, Tonga. (LW)

# WMO Regional Climate Centres and Networks



Total of 16 RCC's and RCC-Networks



# PI-RCC Network

## Mandatory functions

- Long-Range Forecasting
- Climate monitoring
- Data services
- Training

## Highly recommended functions

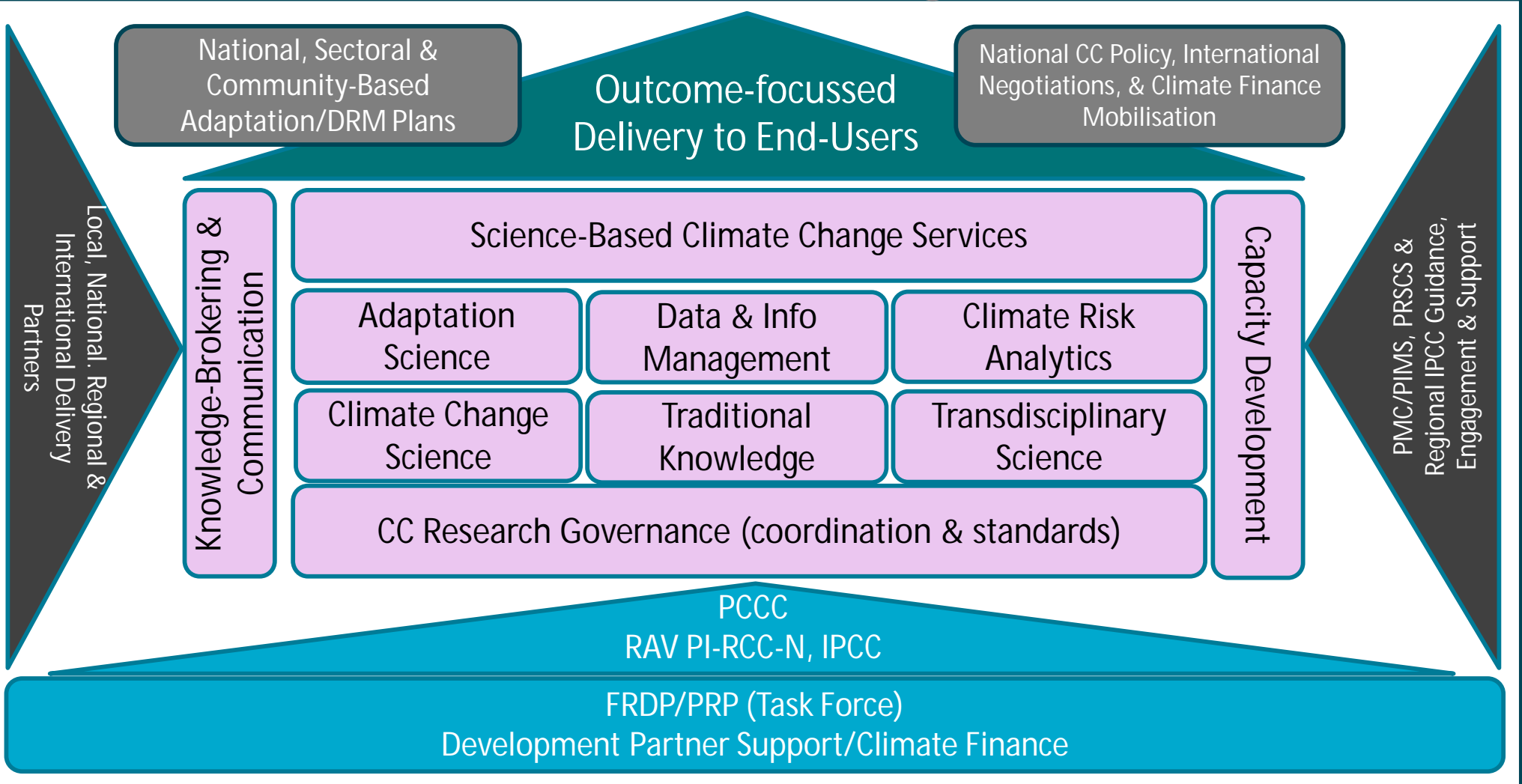
- Climate prediction and projection
- Non-operational data services
- Coordination
- Training and capacity building
- Research and development

Node Title	Lead Agency/Co-Lead	Consortium members
Node on Long-Range Forecasting	NIWA & BOM	Meteo-France, NOAA, University of Hawaii, APCC, SPREP & SPC
Node on Climate Monitoring	NOAA & University of Hawaii	BOM, SPC, SPREP & NIWA
Node on Climate Change	CSIRO & NOAA	USGS, BOM and SPREP
Node on Operational Data Services	BOM	NOAA, University of Hawaii, SPC & NIWA
Training Function	SPREP & SPC	NOAA, University of PNG, BOM, NIWA, SPC & CSIRO

# CSIRO and SPREP

- The CSIRO team's commitment to deliver benefit to Pacific Island partners is recognised through a preferred supplier status with SPREP for climate products and services in the Pacific (SPREP MoU).
- CSIRO has collaborated with SPREP in the development of the **Pacific Islands Climate Change Research Roadmap**, (PICCRR) led by the SPREP-hosted Pacific Climate Change Centre (PCCC).
- The Roadmap will facilitate prioritisation, management, coordination and delivery of climate change science and services in the Pacific over the next 5 years.
- A consultant has just been appointed to review and advise the roadmap's development.
- The PICCRR is likely to be endorsed by the Pacific Meteorological Council (PMC) (out of session) in March 2026.

# SPREP: Pacific Climate Change Centre



Beyond physical science...through case studies... adaptation/ risk etc  
Increased and enhanced collaboration: e.g. NIWA, NIES, NOAA, IRD, CORDEX...

# Thank you

Leanne Webb | [leanne.webb@csiro.au](mailto:leanne.webb@csiro.au)

Science lead | Asia-Pacific Climate Intelligence

Australia's National Science Agency



**SPREP**  
Secretariat of the Pacific Regional  
Environment Programme

