Climate Change and Fiji Coasts

A socio-environmental Report Card

PACPATH

PACific ocean PATHways

University of Maryland
Center for Environmental Science
Integration and Application Network

USP
The University of the South Pacific

IRD
Institut de Recherche pour le Développement
FRANCE

Pacific Community
Communauté du Pacifique

pccos
The Pacific Community Centre for Ocean Science

BELMONT FORUM

anr agence nationale de la recherche

NSF

DFG Deutsche Forschungsgemeinschaft

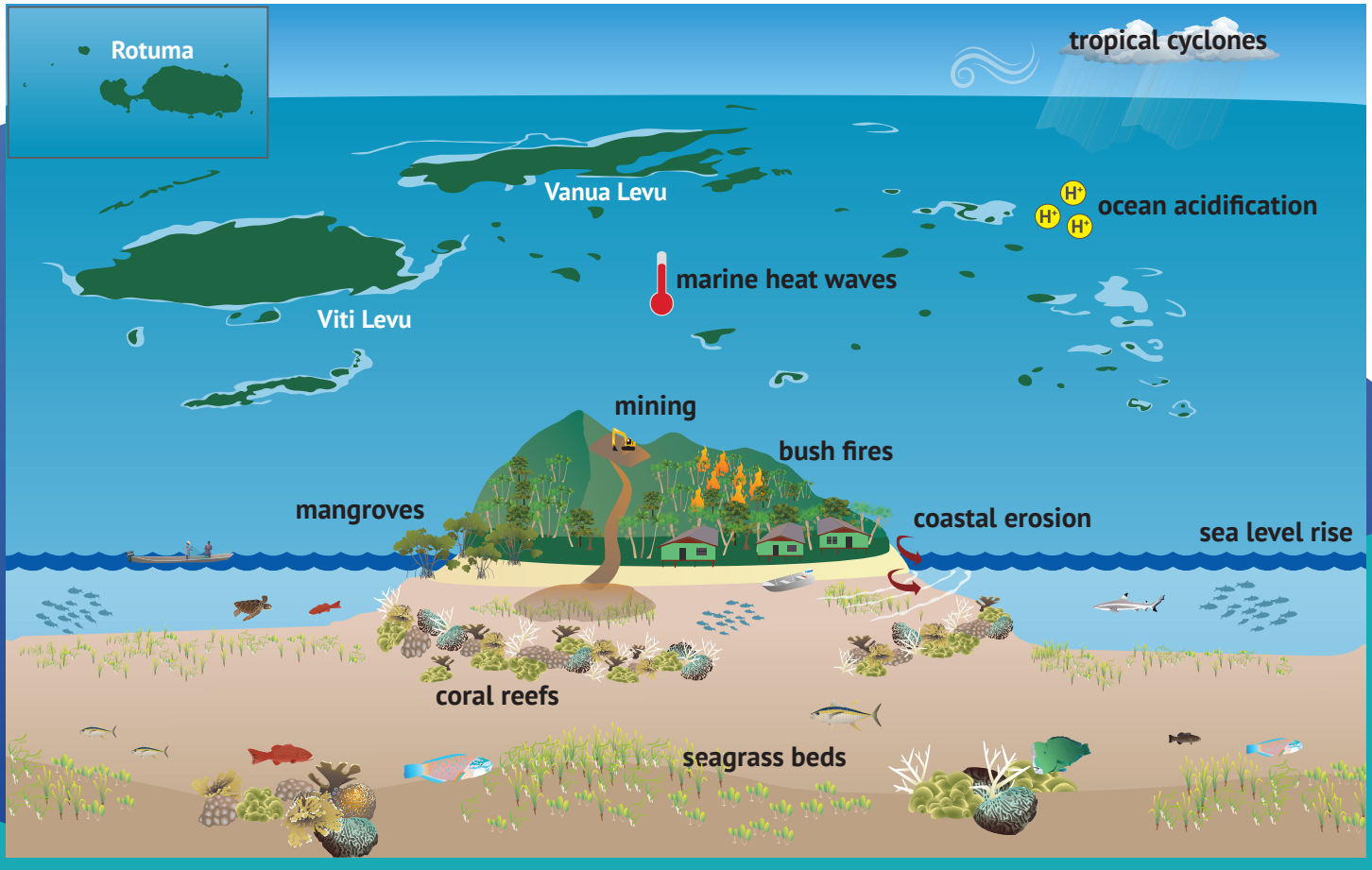
Climate change threatens Fiji's coastal communities

This assessment, done during an expert workshop in Suva in February 2023, aims to highlight the impacts of climate change on the coastal communities of Fiji. On a global scale, the planet's changing climate has increased ocean temperature and caused sea level rise. These changes impact coastal communities, threatening their livelihoods. Changing weather patterns and coastal erosion threaten many villages with coastal flooding and saltwater intrusion. Individual livelihoods and national food security are threatened by decreasing fish populations. Although climate impacts are felt across Fiji, this is only one facet of a changing environment.

photo courtesy of IRD

Threats beyond climate and the environment

Fiji's rich and beautiful natural resources are threatened by overexploitation: pollution, environmental degradation (*e.g.,* urbanisation, deforestation), and resource exploitation (*e.g.*, overfishing). Coral reefs, for example, face severe risks from combined pollution and marine heat waves. Additionally, there is often a disconnect between scientific expertise and management policy and decision-making. This disconnect can cause resource overexploitation and unsustainable development, which impacts local communities. Different types of pollution—industrial, sediment, litter and invasive species—affect both land and sea from the mountains to the reefs. Polluted ecosystems can deplete fisheries and water quality for villages. A growing population and shifting demographics have changed the demands on natural resources, with a general focus on short-term benefits over long-term planning.



The Vanua: a strong connection between people and place

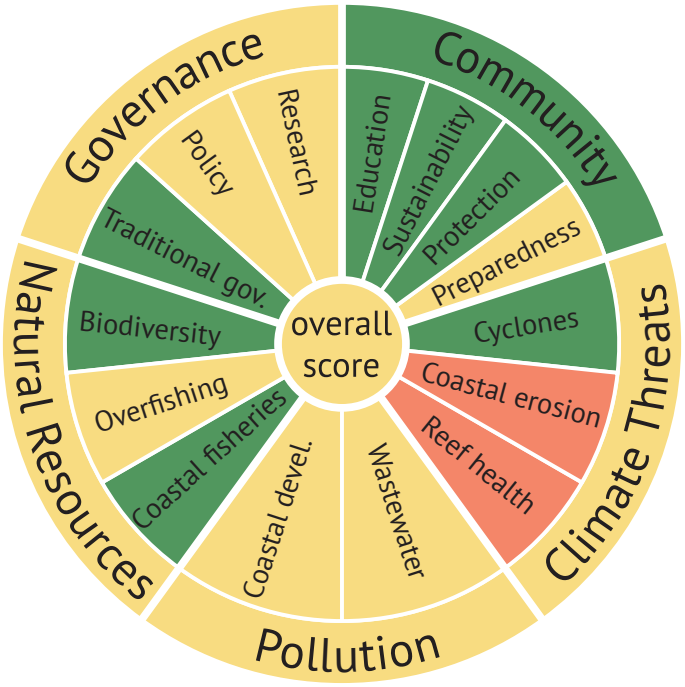
Strength of community and connection with the environment is central to the traditional way of life in Fiji. The concept of Vanua is more than the literal translation of "land." It reflects the cultural, social, and ancestral ties to the land and other members of the community. The kinship of family extends to other communities and responsible stewardship of terrestrial and marine resources. Community structure and social roles are highly respected within and between communities, many of which have been implementing the same agriculture and fishing practices for generations. Because of the Vanua, communities in Fiji are deeply connected to the places they inhabit and place a high value on using traditional knowledge to manage their natural resources. There is a desire and need among these communities to better integrate traditional knowledge into science-based research and informed resource management.

photo by Heath Kelsey

The PACPATH project seeks to identify sustainability pathways towards resilient coastlines

Coastal communities must have the capacity to withstand or to recover quickly from threats. The principle of sustainability should guide management planning so that communities may persist into the future without depleting natural resources. A transdisciplinary approach that includes all facets of society —government agencies, universities, nonprofit groups, and local leadership— is necessary to understand the full scope of the issues and develop relevant and effective solutions. The Pacific Ocean Sustainability Pathways (PACPATH) project aims to do this by involving diverse stakeholders in collaborative workshops. These workshops aim to co-develop a comprehensive list of relevant issues; adequately assess the extent of the issues; and practical, relevant solutions. collaboration between scientists, government officials, resource managers, and aims to codevelop strategies with strong local relevance. The first in Nouméa, New Caledonia, in October 2022; the second workshop 2023.

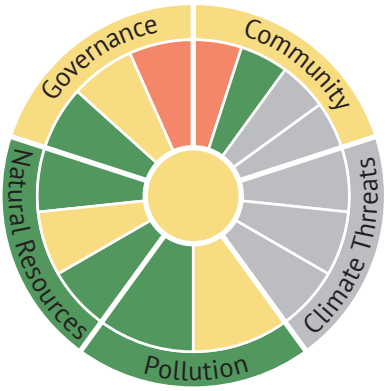
Across Fiji, communities and ecosystems are resp

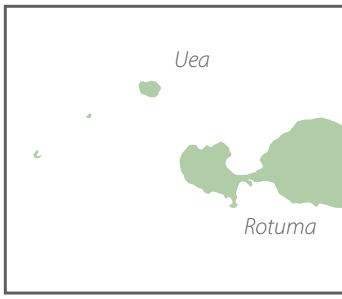


This map presents a set of threats to values, monitoring parameters, and indicators as perceived by the assembled stakeholders during the Suva workshop. Stakeholders were divided into small groups to discuss conditions across the entirety of Fiji. Two categories were discussed: values of people from the Fiji Islands, and threats to those values. Long lists of threats and values were narrowed down into quantifiable indicators, which are illustrated on this double page. Indicators are subdivided into categories. Each indicator was given an approximate score: "good" (green), "moderate" (yellow), "bad" (red), or "not addressed" (grey) as perceived by the workshop participants. Category scores are an average of indicator scores within that category. Stakeholders also discussed if and how to subdivide the country to capture regional variation, as shown by the dotted lines. This map reflects the results of that exercise and each assessment region has a "pie" diagram that reflects the average assessment of resource conditions in that region, as defined by stakeholders.

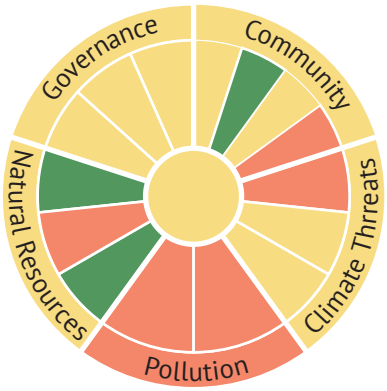
The overall score wheel above describes the averages of each indicator across all regions, averaged by category and then into an overall score. Based on this comprehensive mapping and indicators exercise, conditions in Fiji are moderate (central circle).

Rotuma

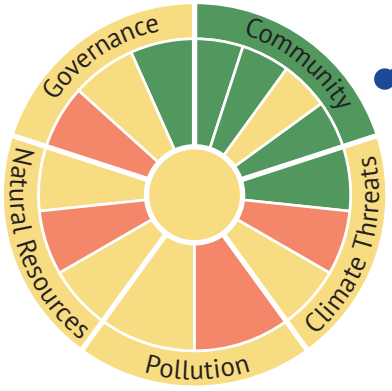




West Viti Levu and Islands



Viti Levu Southeast



onding to changes in environment and governance

Human and ecosystem values and threats can be assessed

Governance

Traditional governance is valued in Fiji. Local knowledge and traditions are key to the management of coastal lands and resources. Suggested indicators include the degree to which local knowledge of seasonal weather indicators, fishing practices, and traditional governance are incorporated into management and planning activities. **Governance and policy** can impact how effectively communities prepare for and respond to coastal changes. Political changes and government transitions create inconsistency. Decisions made from the top of the governmental system may not adequately account for traditional knowledge sources nor scientific data. **Research and innovation** can inform planning. Scientific research, combined with traditional knowledge, is vital to understanding the status of Fiji's natural resources, and preparing communities for the future.

Community

Education keeps the public well-informed about environmental concerns and their solutions. For example, public education about littering can reduce certain types of pollution in rivers. **Sustainability and resilience** are principles that prepare communities for coastal changes. Planning should ensure that communities will persist into the future, and that necessary resources will persist with them. **Protection** from coastal change considers both human and natural systems. Restoration of degraded ecosystems increases coastal resilience. Communities that have been damaged by flooding can be rebuilt to better withstand future events. **Preparedness** for coastal changes includes emergency response as well as community building and planning.

Pollution

Nutrients, sediments, wastes, invasive species and chemical contaminants from the land add stress to marine and coastal ecosystems. **Pollution** can increase biodiversity loss, reducing food security for coastal communities and making ecosystems less resilient to other stresses. Suggested pollution indicators include water quality measurements for contaminants and monitoring of waste from mining activities and bushfires. **Coastal development** practices have a direct effect on coastal erosion and water pollution. Understanding these threats is vital for sustainable management and planning. The proposed indicators aim to assess and monitor planning and development activities.

Natural Threats

Tropical cyclones of strong intensity may increase in frequency as the climate changes. However, preparation for flooding, storm surges, and erosion is vital. **Coastal erosion** is a serious problem in Fiji. People living in coastal areas are moving to higher ground, losing their cultural resources. Suggested indicators for coastal erosion include the extent of land vulnerable to cyclones and tsunamis, the number of people relocated, and the number of trees and mangroves planted for coastal protection. **Reef health** reflects reef stress. Coral reefs, seagrass beds, and mangroves provide critical habitat that supports coastal fisheries and provides protection from waves, erosion, and flooding. Proposed indicators include changes in the extent and density of coral reef, seagrass and mangrove cover.

Natural Resources

Fisheries provide subsistence and income for small villages and traditional communities throughout Fiji. Tropical fisheries are threatened by changing temperatures and ocean acidity as well as **Overfishing** pressure. The proposed indicators are related to the assessment and monitoring of development and planning activities. **Biodiversity** provides a variety of food options for local communities, supports tourism-related economic opportunities, and is a sign of a healthy and resilient ecosystem. Indicators of biodiversity include the presence of key fish and coral species, as well as jobs and economic opportunities related to tourism. Indirect measures of biodiversity could include community well-being and indigenous knowledge of resources.

Priorities for coastal sustainability

The following research priorites were identified during the workshop and follow-up writing retreat. The transdisciplinary approach, which involves stakeholders from the government to villagers, is vital to developing realistic solutions that increase coastal resilience.

Protecting the environment at the community level requires conservation, waste management, adaptation and resilience-building measures that align with the concept of Vanua. For example, mangrove restoration provides multiple conservation benefits: protection against coastal erosion, sea level rise and storms surges; and mitigation of excess atmospheric carbon dioxide (carbon sequestration).

photo by Mathilde Landemard

Coastal erosion and sea level rise: vulnerability and adaptation

- Understand coastal erosion and submersion, their history, causes and impacts, from natural climate cycles to climate change, and local human-induced pressures
- Evaluate local impacts on community welfare and how governance practices have aggravated erosion
- Identify traditional and local knowledge and practices for shoreline erosion mitigation, and develop a communication and capacity-building strategy to limit the threat

Marine habitats: food security and reef health

- Evaluate and monitor local ocean ecosystem health through measurements, local consultations and community involvement
- Design a National Monitoring System with standardised methods and sharing policy and collaboration
- Elaborate strategy for reef health, sustainability and resilience through awareness, engagement, restoration and protection activities and marriage between traditional and local knowledge and science

Governance: process-based decision making for positive change

- Map governance structure and policies related to coastal change and identify alignment and contradictions
- Integrate and analyze knowledge types: scientific, local and traditional
- Empower local communities
- Establish communication process with the scientific communities
- Propose process-based, transparent decision making that involves local communities, youth, women and scientists

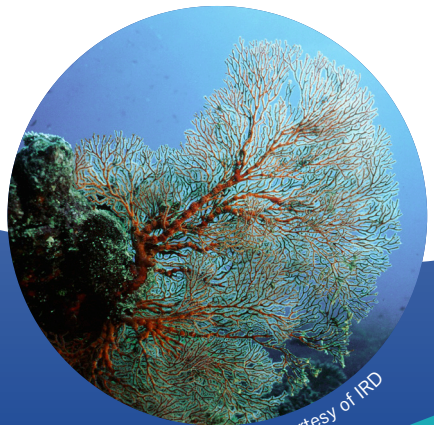


photo courtesy of IRD

photo by Heath Kelsey

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What is this report card for?

During this workshop, participants worked together to create this shared vision of coastal and ocean sustainability and identify effective actions to fight the impacts of climate change on the ocean and coastal livelihoods.


photo by Mathilde Landemard

The resulting socio-environmental map is based on the results of collective reflection on values and threats, indicators and their status. The interior map summarises joint expert assessment, combining the wealth of different types of knowledge. It is intended to support the future actions and requests in the field of monitoring, research and adaptation.


photo by Mathilde Landemard

This document can be used as a support to project designs and proposals to demonstrate the state of indicators (urgency of the situation, need for action, etc.) and pathways as identified by stakeholders.

The content reflects indicators according to the real thoughts of local stakeholders, as it was co-produced by a wide range of viewpoints from research, communities, NGOs and government agencies.


photo by Mathilde Landemard

Nevertheless, it remains a qualitative assessment made at a given moment by a necessarily limited number of participants and the selection of indicators deemed most important, but not exhaustive.

Acknowledgments and gratitude

The University of the South Pacific in Suva hosted the workshop. The organising team is grateful to the stakeholders who devoted time and provided relevant input. The team is also grateful to Vatani Village and Silana Village, who hosted the workshop participants and shared their views, as well as the to the Tailevu Province for its hospitality.

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