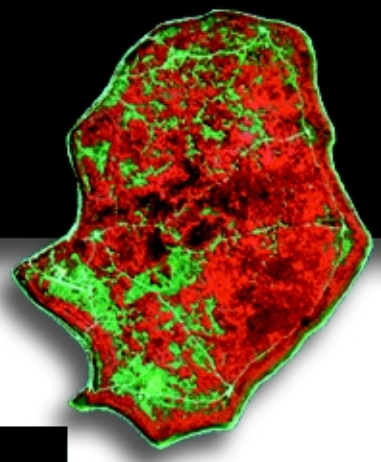
SOPAC



COUNTRY PROFILE

NIUE

SOPAC Secretariat Private Mail Bag Suva Fiji.
Tel: (679) 381 377 Fax: (679) 370 040 http: //www.sopac.org.fj/

SOPAC

Our Vision

The improved health, well being and safety of the Pacific and its peoples

The South Pacific Applied Geoscience Commission (SOPAC) is an independent, intergovernmental, regional organisation established by South Pacific nations in 1972, and dedicated to providing geotechnical services to the countries it serves. Its Secretariat is located in Suva, Fiji, and has about 40 professional and support staff.

SOPAC's work for its member countries focusses on three key areas; resource development; environmental geoscience; and national capacity development in the geosciences. To effectively deliver these services SOPAC maintains a regional data centre, provides information services, and offers technical and field services for specific project work.

THIS COUNTRY PROFILE WAS PRODUCED TO PROVIDE A SNAPSHOT OF THE CURRENT ISSUES FACED BY THE COUNTRY AND SOPAC'S ROLE IN ASSISTING COUNTRIES TO ACHIEVE SUSTAINABLE DEVELOPMENT

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NIUE COUNTRY PROFILE

NIUE: Our Future

"…In Niue, we want the best environmental planning possible, and we want it translated into action before damage is done to our delicate environment. We must act now…."

The Hon. Frank Fakaotimanava Lui
Premier of Niue. (1999)

Capital:	*Alofi*
Population:	*2 000 (1999 est.)*
Land Area:	*259 sq. km*
Max. Height above Sea-level:	*65 m*
Geography:	*Single uplifted coral island; coral reef encircles a precipitous and broken coastline*
EEZ:	*390 000 sq. km*
Climate:	*Tropical; modified by southeast trade winds*
Rainfall:	*Average of 2 177 mm per annum*
Mean Temperature:	*25°C*
Economy:	*Dependent on aid, remittances and agriculture; exports include vegetables, fruit, fish and handicrafts*
GDP per Capita:	*US$ 3 714 (1998 est.)*
Currency:	*NZ$*
Energy Sources:	*Solar, biomass and wind*
Freshwater Sources:	*Rainwater, groundwater*
Natural Hazards:	*Cyclone, storm surge, drought, earthquake, tsunami, coastal flooding and landslide*
Mineral Potential:	*On-land – unknown; Offshore - unknown*
Languages:	*Niuean and English*
Government:	*Self-governing in free association with New Zealand*
SOPAC Membership:	*Full member since 1994*
Country Representative:	*Secretary to Government*
	Premier's Department
	Office of the Secretary to Government
	PO Box 40
	Alofi
	Tel: (683) 4 200
	Fax: (683) 4 232/ 4 151
	Email: secgov.Premier@mail.gov.nu

Niue

Niue is a single uplifted coral atoll in an Exclusive Economic Zone (EEZ) of 390 000 sq km. The island, which had an estimated population of 2 000 in 1999[1], has a total land area of 259 sq km and a maximum height of 65 m above sea level.

Located at the edge of the tropical cyclone belt, in the southeast tradewinds zone, Niue experiences an average of one severe cyclone per decade. Otherwise, the atoll has a pleasant climate with two distinct seasons; the hot wet season from November to March and the cool dry season from April to November. Rainfall averages 2 200 mm per year and the mean temperature is 25°C.

International aid, especially from New Zealand, and remittances are the mainstays of the Niue economy. However, subsistence agriculture has a vital role in the economy together with minor successes in boosting exports of agricultural products.

There are several resource and environmental issues, common to island nations, affecting sustainable development in Niue. These include an array of issues from climate and sea-level variability, environmental degradation and pollution to resource management. More specific challenges to sustainable development include coastal erosion, water quality, water availability and sanitation. Sustainable management of resources such as aggregate and renewable energy are other issues in Niue's quest for development.

Niue has been a full member of the South Pacific Applied Geoscience Commission (SOPAC) since 1994. SOPAC is an independent, intergovernmental, regional organisation, which provides expert technical assistance, policy advice and information on the sustainable management of these non-living resources. SOPAC also contributes to a variety of geoscientific training and educational opportunities at all levels to increase the country's capacity in science and resource management. Additional assistance is made available by SOPAC through technical support for the establishment and maintenance of database information systems and for electronic exchange of information. Expertise in hazard assessment, disaster preparedness, mitigation and management is also provided.

Resource Development and Management

For Small Island Developing States (SIDS), natural resource development and management holds the key to rapid economic development. Unwise exploitation of non-renewable resources and exploitation of renewable resources at a pace higher than the natural rate of replenishment could prove detrimental to the sustainable development plans of the country.

MINERALS

Niue has a potential for mineral occurrence beneath the limestone cover. Geochemical exploration and diamond drilling have indicated the possibility of mineralisation occurring in the basalts beneath the limestone cap.

There is also a potential for manganese nodules in Niue's waters. This, however, is yet to be tested.

[1]SPC Demography Programme

ENERGY

Niue relies on fossil fuels to generate energy, resulting in the need for greater amounts of imports and thus placing an increasing strain on the economy. Diesel generators supply most homes with electricity and individual homes operate smaller generators when the need arises.

Oil storage tanks in Niue

The use of diesel fuel in the generation of electricity in Niue is considered as one of the most expensive in the region. Therefore, the use of renewable energy resources such as wind, wave and solar radiation is essential to the continued sustainable development of the country.

WATER & SANITATION

Fresh water is a fundamental resource for small island nations. Most development plans are pivotal on the availability of fresh water. Clean water and proper sanitation enhance the health and productivity of the work force and have particular implications for the children and future generations.

Water storage tank in Niue

Rainwater and groundwater are the only sources of water on the island. There is no surface water in the uplifted coral island, but a freshwater lens about 40 to 80 metres thick occurs in the centre of the island.

Due to a limited capacity of the country to capture rainfall, approximately two thirds of Niue's rainwater is lost through run-off. Rain is an important and currently untapped source of water.

Sewerage systems in Niue are not reticulated. Septic tanks and water-sealed pit latrines are used extensively in the commercial establishments, whereas in the villages, pit and long-drop latrines are commonly used. With the geological nature of Niue, soakage from pits may be discharged into the groundwater systems as a result of inadequate sanitation infrastructure.

The disposal of solid waste is another problem that needs to be addressed. The current means, such as landfill sites, have finite application and alternatives need to be developed. As population concentrates in the capital, Alofi, and other towns, the problem of waste disposal increases.

Challenges to Sustainable Development and SOPAC's role in Niue

ENERGY

Niue is heavily reliant on the use of diesel fuel for its energy generation. However, the financial burden of supporting this system has led to the search for alternate power generation to reduce the cost of electricity. Renewable energy sources such as solar, wind and wave energy have been identified as alternatives for energy supplementation.

A feasibility study has been conducted by SOPAC for the development of alternate power-generation options using renewable sources to reduce the cost of electricity generation. The result was an evaluation of the potential of wind resources in Niue[2]. This work was greatly aided by the recent adoption of the National Energy Policy (NEP), that aims at developing economical and socially

[2]Task Profile NU 99.003

justifiable strategies for the development of alternate renewable energy resources in Niue.

SOPAC also assisted the nation in the Solar Water-pump Project[3], which demonstrates the technical and economical viability of using solar energy to pump and supply water to remote locations. Fellowship training for technical staff is an integral part of this project.

SOPAC has recommended that Niue implement the following measures for the sustainable development of the energy sector:

- development of clear electrification policies and guidelines;
- popularisation of low-emission technologies and native energy sources;
- provision of reliable energy sources on the least cost strategy; and
- maintenance of human resource base in the energy sector.

WATER & SANITATION

SOPAC's role in Niue regarding water and sanitation issues began in 1995, when the Water Resources unit was first attached to the organisation and issues affecting the country's freshwater supply were identified.

Bore-hole water pump

In 1999[4], SOPAC carried out studies to identify current wastewater disposal and treatment techniques, ongoing sanitation initiatives, and stakeholders in the sanitation sector; and sites for future pilot projects. The vast majority of homes in Niue have toilets connected to septic tanks. However, infiltration of wastewater into the groundwater lens has yet to occur, as the water supply wells are located in the interior of the island, while most of the population is concentrated along the coast. A recent initiative of the Public Works Department to pre-caste septic tanks is also underway.

Through efficient demand management and conservation of water supplies, pressure on freshwater resources has been reduced, thus making more water available for other development or for future use. A recent survey of the water distribution system for leaks led to a 50% reduction in water usage. Most leaks were discovered not along the distribution mains, but within households - leaky taps and toilets. This reduction in water usage resulted in huge savings in electricity for from the groundwater pumps for the Public Works Department.

SOPAC continues to work in Niue to reduce water wastage through good demand and conservation practices by both water suppliers and water users[5]. This project will help to:

- Enhance reliability of existing water-supply systems.
- Reduce water usage and water losses.
- Enhance future access to supplies.

Recent work by SOPAC staff aims at creating a Geographical Information System (GIS) database of the water distribution system in Niue.

CLIMATE & SEA-LEVEL VARIABILITY

Global climate variability may be responsible for increasingly more-frequent and more-severe cyclones, interspersed with scorching droughts. The impact of this variable climate has been harsh on ecosystems and

[3]Task Profile NU 99.002
[4]SOPAC Preliminary Report 10
[5]Task Profile NU 99.001

coastal, terrestrial and marine biodiversity. Economically, the impact has translated into decreased agricultural yield, death of livestock and decrease and loss of marine biodiversity. This has caused loss of revenue, which can have detrimental effects on the social and economic system of SIDS and developing economies. As the majority of the people dependent on these sources of income are poor, the poverty implication of variable climate is high.

On-the-field training

The Intergovernmental Panel on Climate Change (IPCC) predicts that there will be a 10-30-cm rise in sea-level by the year 2030 and 30-100 cm by the end of the next century. This prediction has serious implications for sustainable development in Niue. Any increase in sea-level as a consequence of global warming will have significant impacts to the island. The island will experience accelerated coastal erosion and inundation of coastal settlements.

In addition, damage to infrastructure by coastal inundation, wave run-up and tidal surges could be immense. The social and economic impact of this on developing economy is severe, and can lead to persistent poverty.

Although SOPAC has not provided the Niue any assistance to date with the issue of climate and sea-level variability, the increasing importance of this issue and its implications to the survival and livelihood of the country will certainly require future assistance from SOPAC. Experience and expertise in coastal management, environmental vulnerability assessment, mitigation and adaptation strategy development are all part of SOPAC's capabilities and technical resources that it is able to provide countries to help address this issue.

COASTAL MANAGEMENT

Niue is a one-island country and is surrounded by a fringing reef. Therefore any degradation of coastal resources will mean a threat to the whole country.

Coastal erosion problems are associated with the removal of sand by machinery from many beaches at rates that are far in excess of the natural replenishment rates. Unmanaged sand-mining leads to coastal instability resulting in reef degradation and impingement on fisheries. Chronic coastal erosion can also lead to the loss of coastal lands and infrastructure.

In Niue, mining of coral reefs is also occurring, and immediate action to regulate this activity needs to be taken if long-term growth prospects are to be protected. SOPAC has proposed to undertake digitising of existing coastal data sets into MapInfo for planning and management of coastal and beach resources and the island[6].

In 1997[7], SOPAC undertook a surveying exercise to address the engineering and erosion concerns relating to coastal development in Niue. To assist the Government of Niue address the aggregate issue, SOPAC developed a mineral policy in 1998[8] outlining requirements of exploration, mining and quarrying. The concerns of the environment and fiscal issues are included in the policy.

1999[9] saw the development of a MapInfo database by SOPAC and production of a coastal geomorphology map of the island. SOPAC continues to assist Niue in digitising the existing maps and converting them into GIS-format data[10]. This database will assist in the identification of chronic and acute erosion, planning shorefront development and managing coastal resources around the island.

Coastal area

Several recommendations have been made by SOPAC to tackle the coastal degradation and erosion problem in Niue:

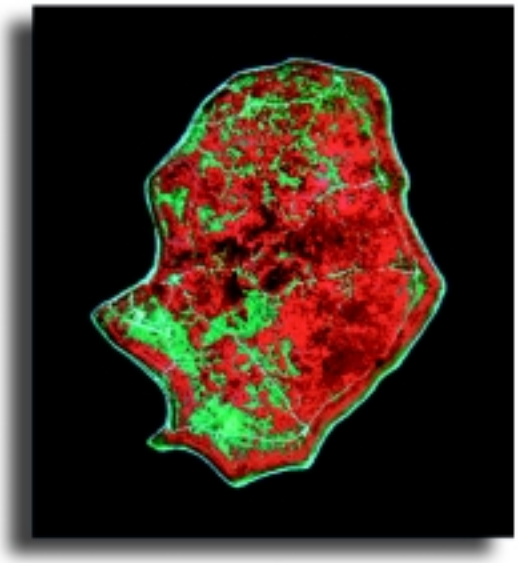
[6]Task Profile NU 99.004
[7]SOPAC Technical Report 233
[8]SOPAC Technical Report 276
[9]Task Profile NU 97.002
[10]Task Profile NU 99.004

- assist in the development and implementation of appropriate environmental policies and legislation;
- use of appropriate technology for shoreline protection; and
- identification of alternative aggregate resources using remote sensing and field surveys.

Given the critical importance of sustainable development to Niue, SOPAC will continue to play an important role in coastal preservation and the development of sound policies to ensure better management of coastal resources.

STEPS INTO THE FUTURE: INFORMATION TECHNOLOGY & COMMUNICATION

For effective resource management and planning, the storage and processing of timely and accurate scientific data is critical. Island nations face the fundamental crisis of geographic isolation and high cost of communication. Given the small size of these nations, technology providers are reluctant to supply cutting-edge technology because of poor economies of scale and difficulties in monitoring. Low human capital endowment further complicates the situation. This problem is a constraint in Niue's pursuit of rapid growth.



Spot image of Niue

SOPAC has assisted Niue in addressing its need for improved management systems for information and data; and the training of personnel in information technology. This includes several projects such as:

IT training for SOPAC member country personnel

- Assistance to Niue Police Department in obtaining resources to operate a weather satellite system[11].
- Support for GIS and remote sensing (RS) capacity development[12].
- Assistance in compiling a data set to support Law of the Sea issues[13].
- Production and organisation of coastal data and information[14].
- Assistance in the development of Intranet and Internet in Niue[15].
- GIS training for Government personnel[16].

SOPAC in conjunction with the Environmental Planning Unit, Department of Justice, and Land and Survey Department of Niue has also conducted a workshop[17], which introduced and demonstrated the tools for GIS and Remote Sensing. This will assist in mapping and monitoring for the benefit of Island Systems Management.

As a regional data centre, SOPAC has been compiling geographic data on Niue.

[11]Task Profile NU 99.021
[12]Task Profile NU 98.006
[13]Task Profile NU 98.005
[14]Task Profile NU 98.007
[15]Task Profile NU 98.008
[16]Task Profile NU 98.011
[17]SOPAC Miscellaneous Report 317

Future Directions in Niue

In future, SOPAC will continue its partnership with Niue, to overcome the hurdles in the path of sustainable development. SOPAC will use its key 'ownership advantage' - the expertise in applied sciences - to help Niue manage and develop its non-living resources sustainably.

SOPAC will further its partnership with Niue and the development of appropriate legislations to manage coastal degradation and regulate sand and coral mining will be a priority in the near future.

Sustainable development, conservation and management will be the guiding principles in the water and energy sectors. Policy development will be an activity in both these areas as well. Training programmes, workshops and seminars will be organised regularly to assist Niue in creating a national capacity in geoscience. Capacity development in the member states is one of the top priorities of SOPAC. Training in the field for technical personnel from the member countries is an ongoing process with the aim of enhancing in-country capacity to undertake assessment studies and field surveys. This training is carried out through workshops and seminars and through the courses in the Earth Science and Marine Geology Certificate Programme, which is conducted by SOPAC at the University of the South Pacific since 1979.

Island systems management will be a future area of focus given its ability to improve database management and decision-making processes. SOPAC intends to support the development of information technology and communication infrastructure in Niue to achieve this.

By performing its functions as the specialised scientific organisation that it is, SOPAC has been addressing some of the fundamental factors that have impeded the development process.

Reference Materials

SOPAC provides access to a variety of information relating to Niue. This can be accessed through the library database, PIMRIS or the Internet.

Some of these reference materials relevant to Niue are:

- Maps of Niue (bathymetric etc.)
- Project Reports
- Aerial Photographs
- General reference material on Niue

Please refer to the Niue Bibliography for full reference and material listing.

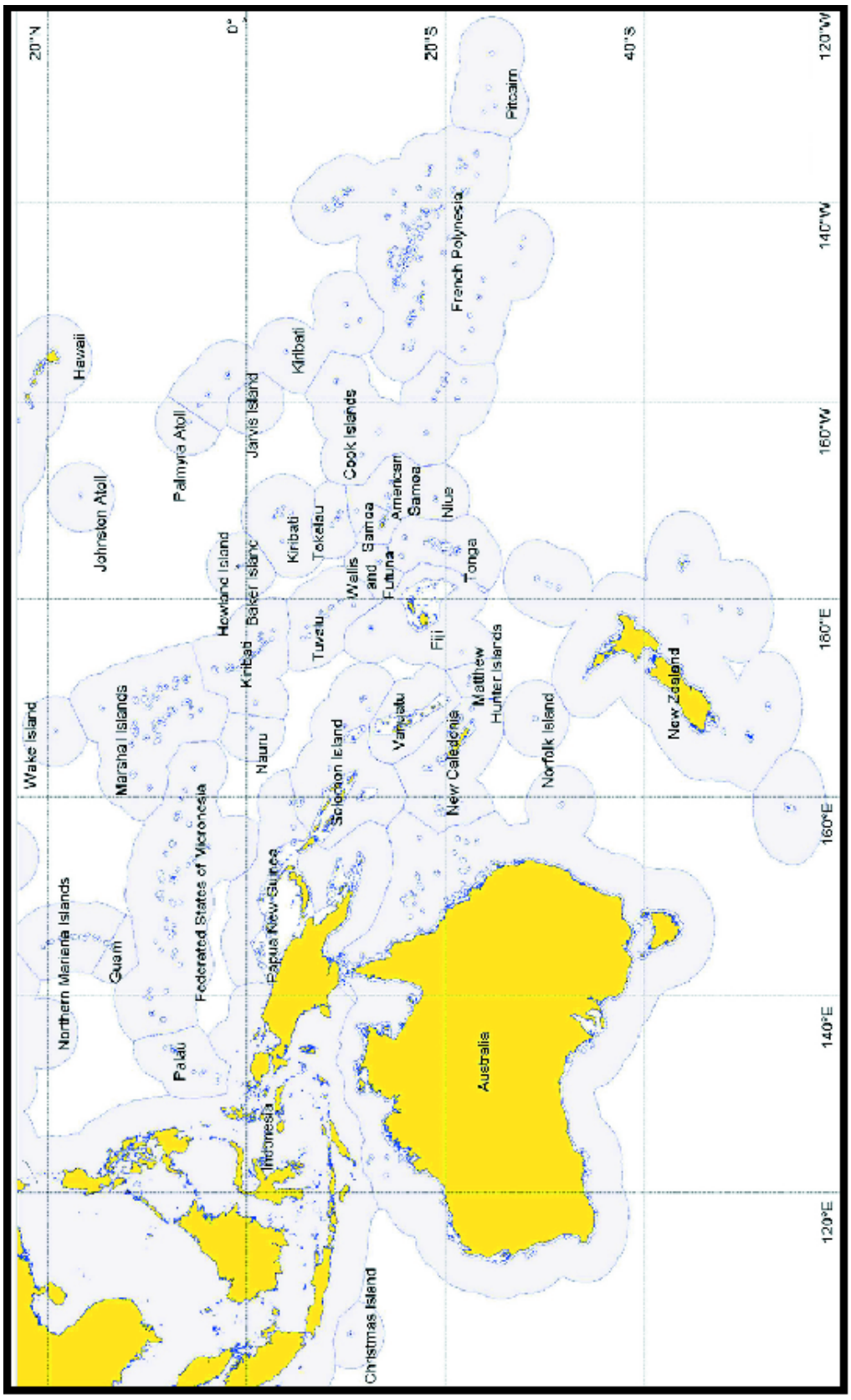
Coastal karst structure in Niue

For more information please contact:
The Librarian
South Pacific Applied Geoscience Commission
Private Mail Bag, GPO
Suva, Fiji Islands

Phone : (679) 381377, Fax : (679) 370040
Email : postmaster@sopac.org.fj
Website : www.sopac.org.fj

Issues and SOPAC's Responses for Further Development

ISSUES	CONSTRAINTS	RESPONSES FOR FURTHER DEVELOPMENT
Water & Sanitation	· Lack of management for water supply system · Contamination of groundwater by human waste seepage due to inadequate sanitation infrastructure · Lack of public knowledge on water and sanitation issues	· Development of resource policy and legislation · Advising on the improvement of infrastructure within the water and sanitation sector · Undertaking pilot projects, research and feasibility studies, and training · Increasing public awareness on sustainable water management, proper sanitation and waste disposal practices
Coastal Management	· Inappropriate coastal development · Unsustainable aggregate mining · Poor awareness of the environmental impacts of coastal degradation	· Implementation of appropriate policies and legislation · Identifying renewable alternative sources of aggregates · Educating the local people about coastal degradation and management through workshops and field training
Energy	· Heavy reliance on imported fossil fuels putting an increasing strain on the economy · Inadequate public awareness on renewable energy sources and management	· Identifying viable renewable energy sources · Development of appropriate energy policies · Enhancing the skills required by local staff for management and operation of the energy sector through workshops and appropriate training
Minerals	· Inadequate scientific research to define full potential of resources	· Development of policy and advice on the development and management of terrestrial and offshore minerals · Encourage further research
Information Technology & Communication	· Limited availability and poor access to accurate, timely and sound scientific information · Lack of relevant regional and local data · Lack of skilled personnel to manage the IT sector · High costs	· Development of relevant and effective IT systems · Training of local staff in information technology and GIS and RS · Assisting in the development of Intranet and Internet in Niue · Coordination, compilation and creation of standardised geographic data sets
Human Resource Development	· Weak human resource base · Limited financial and institutional resources · Limited expertise	· Conducting workshops and technical training programmes to improve national capacity in the geosciences · Running the Earth Science and Marine Geology course to improve the human resource base · Fellowship attachments



South Pacific Region Maritime Limits

SOPAC Member Countries: Australia, Cook Islands, Federated States of Micronesia, Fiji Islands, Guam, Kiribati, Marshall Islands, Nauru, New Zealand, Niue, Papua New Guinea, Samoa, Solomon Islands, Kingdom of Tonga, Tuvalu, and Vanuatu. French Polynesia and New Caledonia are Associate Members.