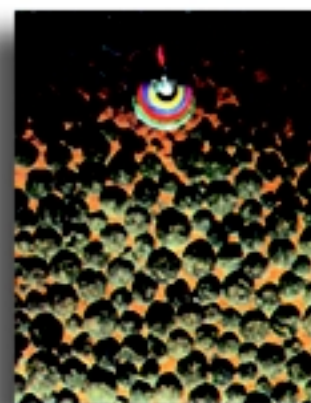


SOPAC



COUNTRY PROFILE

The background of the lower half of the page features the Union Jack flag on the left and the European Union flag (a blue field with twelve white stars in a circle) on the right.

COOKS

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



COOKS COUNTRY PROFILE



COOK ISLANDS

"...because development is moving rapidly as we approach the 21st century and we must now develop clear environmental legislation, policies and strategies to guide our developmental activities to ensure that our future development is truly sustainable."

Hon. Vaine Tairea. Minister of Environment,
Cook Islands Government. (1992)

profile

Capital:	Avarua
Population:	16 800 (1999 est.)
Land Area:	237 sq. km
Max. Height above Sea-level:	652 m (Te Manga)
Geography:	15 islands; low coral atolls in north and volcanic hilly islands in south; largest island is Rarotonga (67 sq km), followed by Mangaia (51 sq km)
EEZ:	1.8 million sq km
Climate:	Tropical; moderated by tradewinds
Rainfall:	Average of 2 040 mm per annum
Mean Temperature:	24°C
Economy:	Dependent on agriculture, tourism and offshore banking; exports include pearlshell, black pearls, banana, vegetables and clothing
GDP per Capita:	US\$ 4 947 (1998 est.)
Currency:	NZ\$
Energy Sources:	Biomass, solar, wind, wave
Freshwater Sources:	Surface water, groundwater
Natural Hazards:	Cyclone, storm surge, drought, coastal flooding, river flooding, tsunami, earthquake and landslide
Minerals Potential:	On-land – unknown; Offshore – manganese nodules
Languages:	English, Maori
Government:	Self-governing in free association with New Zealand
SOPAC Membership:	Full member since 1973
Country Representative:	Secretary
	Ministry of Foreign Affairs & Immigration
	PO Box 105
	Rarotonga
	Tel: (682) 29347
	Fax: (682) 21247
	Email: secfa@foraffairs.gov.ck



The Cook Islands

The Cook Islands comprises 15 islands with a total land area of 237 sq km and a maximum height above sea-level of 652 m. The islands are scattered over an Exclusive Economic Zone (EEZ) of 1.8 million sq km; one of the largest EEZ's in the South Pacific.

The islands are formed geographically into a Northern Group of low coral atolls and a Southern Group of volcanic, hilly islands. Rarotonga, situated in the Southern Group, is the largest island. The population of the Cook Islands was estimated at about 16 800 in 1999 with the Southern Group having twice as many people as the Northern Group.

Average rainfall in the Cook Islands is 2 040 mm per annum and the mean annual temperature is 24°C with little seasonal variation. From December to March there are possibilities of major storms occurring as the Cook Islands lie in the cyclone belt.

The Cook Islands economy receives ample external support from New Zealand. However, tourism is the top foreign exchange earner, followed by offshore banking, agriculture and black pearls.



The Cook Islands has been a full member of the South Pacific Applied Geoscience Commission (SOPAC) since 1973. SOPAC is an independent, intergovernmental, regional organisation, which provides expert technical assistance, policy advice and information on the sustainable management of these natural 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.



Digital image of the Cook Islands

There are various resource and environmental issues, common to island nations, affecting sustainable development in the Cook Islands. 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, offshore minerals and renewable energy are other issues in the Cook Island's quest for development.

MINERALS

The Cook Islands, in the central southwestern Pacific basin, has a potential source of wealth in deep-sea mineral deposits of manganese nodules within its EEZ. Although offshore exploration is still at a nascent stage in the Cook Islands, the future exploitation of these minerals has the potential to provide great economic benefits to the country. Research organisations have expressed interest in these deposits and therefore a further survey is currently being formulated to assess the scope and potential for development.

The nodules in the Cook Islands are unique in that they have the highest known cobalt content of nodules found anywhere. The average cobalt content of the Cook Islands nodules is 0.44% compared to 0.23% in the Clarion-Clipperton area. Furthermore, the



Occurrence of manganese nodules on the sea floor in the Cook Islands (above) Clarion-Clipperton (below)

manganese nodule density (kg/m^2) appears to be higher in the Cook Islands than anywhere else.

Unfortunately due to the current lack of information, possible consequences of developing these nodules are unknown. Some of the possible scenarios range from sediment plume pollution and its effect on fish in the upper water column to habitat destruction of organisms living on the sea bottom.

ENERGY

The Cook Islands generates its energy predominantly from imported fossil fuels. However, in the outer islands the use of solar photovoltaic provides lighting in a significant number of villages. The use of this technology is now gaining widespread acceptance.

Natural resources such as firewood and coconut husk also still remain a major source of energy for cooking in the outer islands, and to a lesser extent on Rarotonga where the use of liquid petroleum gas (LPG) has become more common. However, the increase in population has also resulted in the over-exploitation of energy sources. Therefore efficiency in production, transmission and consumption is essential for the sustainable use of energy producing resources.

Recent resource assessments for wind and ocean energy have confirmed that opportunities exist to develop these in the future. Together with solar energy, these renewable sources of energy will assist in reducing the current reliance on fossil fuels for electricity generation.

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.

Rarotonga's water supply is obtained from the water catchments of the mountainous interior of the island, and supply is not presently a major problem. The main sources of drinking water in the other volcanic Southern Group islands are freshwater lenses and with roof catchments. Therefore, the Southern Group islands have an assured supply of good-quality drinking water. The main source of drinking water in the northern atolls is from rainwater tanks and cisterns because the groundwater resource is fragile and prone to contamination from human waste and salt intrusion.

One of the major problems of the water sector in the Cook Islands is that demand often exceeds supply. Hence, the design, construction and maintenance of adequate water storage are proactive measures needed to increase supply and reach.

Sewage disposal is also recognised as a problem in the Cooks. Most households have septic tanks, but such systems are not suitable for larger hotels and motels handling large numbers of tourists, especially on Rarotonga. With the expanding tourism industry, the need for the construction of sewerage systems and sewage treatment plants have become urgent. On the atolls, there is concern that the advocated use of pour-flush and pit toilets causes pollution of the shallow water table, leading to a high incidence of gastrointestinal disease in the population.



Rarotonga water supply system...man at work.

Challenges to Sustainable Development and SOPAC's role in the Cook's

MINERALS

SOPAC has been assisting the Cook Islands in addressing issues related to the development of mineral resources. Assistance has included field surveys, workshops, training sessions, public awareness campaigns and policy formulation.

Deep-sea mineral resources such as manganese nodules have great potential and economic significance for future prosperity of the Cook Islands. To realise the full potential of these resources requires detailed exploration and assessment within the Cook Islands EEZ.

The first CCOP/SOPAC cruise was conducted in 1972, and confirmed the presence of nodules about 90 km from Rarotonga. In 1976¹ another cruise was carried out to investigate possible deep-sea manganese nodule deposits, metalliferous sediments, and other deep-seabed resources. Significant manganese nodule deposits were discovered between Rarotonga and

Penrhyn Basin, which raised need for further surveys.

Therefore, further surveys were conducted in 1977, 1978 and 1980² and the presence of

manganese nodules, precious coral and phosphate was noted. It was also found that manganese nodules occur in sufficient abundance to have potential as an economically viable deposit. A detailed survey of the south Penrhyn Basin was run by the Geological Survey

of Japan, using the Hakurei Maru, in 1983.

In 1985, 1986³, 1987⁴, and 1990 SOPAC partnered the Japan Deep-sea Minerals Programme to confirm the presence of manganese nodules in the EEZ of the country. Since further extension of research is required to assess the potential, SOPAC in collaboration with Japan signed another three-year research contract in February 2000. The survey in the Cook Islands in May 2000 is expected to define the distribution of manganese on the seafloor and to obtain necessary data to enable an evaluation of environmental conditions of the area. A detailed scope of work is yet to be finalised and will be discussed with SOPAC and Cook Islands prior to the survey.

To evolve a comprehensive framework for preparing Offshore Mineral Policies in the South Pacific, SOPAC coordinated an Offshore Mineral Policy Workshop in February 1999 in Madang, Papua New Guinea.

Also in 1999⁵, a brochure written by Stewart Kingan on manganese nodules of the Cook Islands was published by SOPAC. This brochure is aimed to promote and create awareness about manganese nodules that occur in the EEZ of the Cook Islands.

Adverse social impact and economic redistribution are the biggest concerns arising out of mineral exploration. Offshore mining could unleash a whole new host of problems ranging from the irreversible destruction of the fragile ecosystem to loss of fishing grounds.

Mineral resource development often leaves indelible scars on the fabric of traditional societies through the resultant change in lifestyle, perceptions and values that it inevitably produces. While displacement and compensation for externalities form a complex range of issues on their own, the assignment of pecuniary or economic value to communally owned properties like



Manganese nodules are found in high densities in the south Penrhyn Basin



Japanese R/V Hakurei-Maruno.2

¹SOPAC Cruise Report 4

²SOPAC Cruise Report 41

³SOPAC Technical Report 99

⁴SOPAC Technical Report 100

⁵SOPAC Miscellaneous Report 295

fishing grounds has often led to social disharmony. The loss of fishing grounds deprives many of their traditional lifestyles, and the resultant unemployment catalyses alcoholism, violence and crime in the affected societies. SOPAC understands the impact of these externalities on the Cook Island's goal of sustainable development and has attempted to address them through formulation of appropriate policies. Social cost-benefit analysis and social and environmental impact assessments are advocated for all mining projects in the Cook Islands.

Capacity development in the member states is one of the top priorities of SOPAC. Training in the field for technical personnel 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 courses in the Earth Science and Marine Geology Certificate Programme, which has been undertaken for 21 years.

ENERGY

The Cook Islands is mainly reliant on imported fossil fuels for its energy generation along with renewable energy sources such as solar energy, which contribute to a small proportion of the total energy used.

SOPAC has undertaken training workshops to strengthen the country's capacity to plan and manage the energy sector efficiently. To reduce the level of fuel imports, SOPAC has assisted the Cook Islands in the identification of renewable energy sources and development of appropriate energy supply policies.

In 1987⁶, SOPAC installed a wave-rider buoy off Rarotonga to collect wave data to consider the potential for harnessing this energy. In 1989⁷ a workshop on sea and swell data was held in the Cook Islands.

⁶SOPAC Technical Report 80

⁷SOPAC Miscellaneous Report 92

Presently, SOPAC is assisting the Cook Islands Government in the development of a national energy sector policy⁸. The absence of a comprehensive national energy sector policy was identified as a



Energy training for SOPAC member country personnel

major constraint to the proper planning and management of the Pacific Islands national energy sectors by the World Bank in its 1992 Pacific Regional Energy Assessment reports. National energy-sector policies ensure that activities in the energy sector are consistently carried out under the same set of policies and guidelines.

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

- development of clear electrification policies and guidelines;
- identification of alternative renewable energy sources;
- maintenance and modification of energy databases; and
- strengthening of human resource base in the energy sector.

WATER & SANITATION

SOPAC has attempted to assist the Cook Islands with the water and sanitation issues through field surveys, assessments and capacity building through training programmes and workshops.

In 1992⁹ a circulation study was undertaken in Avarua, Rarotonga, to determine the ocean current regime off

⁸Task Profile CK 99.005

⁹SOPAC Technical Report 143

Avarua and Motutoa to design and plan for a proposed sewer outfall.

Owing to the increasing demands being placed on water supplies for tourism, agriculture, industry and domestic use, a review of Rarotonga's existing water and waste-disposal systems and issues was carried out by SOPAC in 1997¹⁰. The assessment of ground and surface water resources and the water supply of Rarotonga was also undertaken by SOPAC in the same year¹¹.



Water sampling in the field

The lack of sound and accurate information regarding water supplied to the user and the amount of water used is impeding efficient management of the water-supply system in the Cook Islands. Follow-up projects on Rarotonga's groundwater assessment were carried out in 1998¹².

Throughout this project:

- training activities were conducted;
- a regional water and sanitation database was developed; and
- specific technical support was provided, as required, to the Water Works Department and Government of the Cook Islands.

Furthermore, in 1995¹³ a demand management and conservation project was implemented in the Cook Islands. The primary goal of the project was to reduce wastage of fresh water through good demand management and conservation practices by water suppliers and water users in the Cook Islands.

Several workshops have also been organised by SOPAC to evolve strategies on water resource management and development. A workshop on Technologies for Maximising and Augmenting Freshwater Resources in

Small Islands was held at the Secretariat in 1996¹⁴. This workshop contributed towards a Source Book of Alternative Technologies for Freshwater Augmentation in Small Island Developing States to be published by SOPAC in a user-friendly format for application by water sector managers and planners in developing countries like the Cook Islands.

Recent work in the Cook Islands (1999) involved training of Rarotonga's Water Works staff in hydraulics, and the development of a hydraulic model of one of Rarotonga's water-supply zones. SOPAC continues to carry out water and sanitation projects in the country. At present a water network modelling study aimed at training technical staff is being conducted¹⁵. Rarotonga is also currently looking at extensive upgrades to their water distribution system, including a wastewater treatment plant, funded by ADB.

During the 1999 World Water Day, SOPAC organised an Essay and Poster Competition for schools. The theme 'Everybody Lives Downstream' helped raise public awareness on the flow-on effects of water pollution and mismanagement. The day also highlighted the need in island nations to manage freshwater resources wisely, and a public forum was organised as well.

In addition to these, SOPAC has been running an Earth Science and Marine Geology Certificate Programme for technicians from the Cook Islands and the region since 1979. Since 1995, when the Water and Sanitation Programme was first attached to SOPAC, a module relating to water issues has been added to the certificate course, which is run by SOPAC at the University of the South Pacific



ESMG students

¹⁰Task Profile CK 97.004

¹¹SOPAC Technical Report 248

¹²SOPAC Technical Report 259

¹³Task Profile CK 99.001

¹⁴SOPAC Miscellaneous Report 251

¹⁵Task Profile CK 99.002

CLIMATE & SEA-LEVEL VARIABILITY

Global climate variability has triggered more-frequent and more-severe cyclones, interspersed with scorching droughts. The impact of this variable climate has been harsh on ecosystems and coastal, terrestrial and marine bio-diversity. 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 people economically dependent on these sources of income are poor, the poverty implications of variable climate are high.

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 century. This prediction has serious implications for sustainable development in the Cook Islands. Any increase in sea-level as a consequence of global warming will have significant effects on the low-lying northern atolls of the Cook Islands. Atolls and small islands will experience accelerated coastal erosion, loss of land and saltwater intrusion, which will cause even greater scarcity of already limited freshwater resources.

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 a developing economy is tremendous, and can lead to persistent poverty.

Although SOPAC has not provided the Cook Islands 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

Coastal-zone degradation and erosion is a major concern in the Cook Islands. In all the islands of the Cooks, that is the northern atoll islands and southern volcanic group, coastal erosion is attributed mainly to natural causes and is exacerbated by anthropogenic factors.

Beach sand and gravel mining, construction of sea walls, groynes and revetments, development of infrastructure on the foreshore, pollution of lagoon systems and poor land management practices on land adjacent to the coastal zone all take their toll on fragile ecosystems.

Of these factors, the removal of coral and beach aggregate has caused the most serious erosion



Extensive beach erosion

problem. Owing to the increase in development of modern infrastructure, such as resorts for the tourism industry, large quantities of aggregate are taken from beaches, thus contributing to erosion. Even though mining of sand from beaches is banned legally, inadequate implementation of the laws results in the regulation being largely ignored.

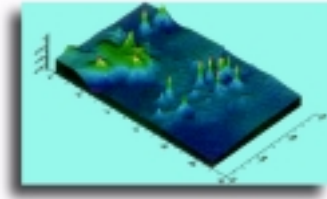
The problems relating to the continued exploitation of beach sand in the Cook Islands demand immediate address. This requires the assessment of alternative aggregate resources and the development of a management strategy to minimise coastal erosion.

SOPAC has been assisting the Cook Islands in addressing the coastal erosion issue through coastal-zone field surveys, coastal mapping workshops and public awareness workshops. Some of the key projects undertaken in the Cook Islands include:

- Assessment study of the stability of beaches in Rarotonga in 1983¹⁶. Sand mining on beaches was identified as the major factor in the destruction of Rarotonga's beaches.

¹⁶Cruise Report 102

- Coastal mapping workshop in Rarotonga in 1986¹⁷, which included coastal mapping exercises and measurements for assessing coastal erosion and accretion.
- Field surveys conducted in 1990¹⁸ to determine sediment movement patterns during severe storms and cyclones along the Avarua-Avatiu coastline for management and planning.
- A 1992¹⁹ study by SOPAC of the physical and oceanographic processes in Muri Lagoon and Ngatanglia Harbour to investigate their effects on the circulation and flushing, sedimentation, shoreline erosion and water quality in the area.
- Follow-up field studies conducted in 1993²⁰ to address development issues such as aggregate dredging, environmental considerations such as pollution and living resource issues such as fisheries.
- Beach profiles established on Aitutaki in 1995²¹ to enable future monitoring of changes related to natural events such as cyclones or artificial changes such as channel enlargement.
- In 1997²², baseline mapping and analysis of coastal morphology and stability carried out in Manihiki Lagoon. The exercise identified the extent of coastal erosion problems and helped to determine the capacity and management needs in the rapidly expanding black-pearl aquaculture by providing better understanding of lagoon circulation and ecology.
- In 1998, a coastal mapping workshop carried out for Rarotonga and Aitutaki.



Three-dimensional submarine topography of the Cook Island's EEZ. Water depths are in meters.

Field studies have also been carried out in Rarotonga and Aitutaki to assess erosion and beach dynamics²³.

¹⁷SOPAC Training Report 12
¹⁸SOPAC Preliminary Report 39
¹⁹SOPAC Technical Report 142
²⁰SOPAC Technical Report 181
²¹SOPAC Technical Report 226
²²SOPAC Technical Report 246
²³SOPAC Technical Report 285 & 292

The studies provided data to assist in planning of foreshore protection and development. Rarotonga is the primary tourist destination and administrative centre in the Cook Islands and has a long history of coastal erosion problems. There is a need for improved port facilities in Aitutaki to improve efficiency and reduce the risk associated with landing of cargo from ships lying off the reef. Baseline studies of coastal stability, sediment dispersal processes and lagoon circulation are required before the harbour improvement design is finalised.

Several recommendations have been made by SOPAC to tackle coastal erosion and manage aggregates:

- implementation of appropriate environmental policies and legislation;
- use of advanced technology for shoreline protection;
- management and maintenance of coastal structures;
- better monitored reclamation and shorefront development; and
- identification of alternative coastal resources using remote sensing and ground surveys.

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

STEPS INTO THE FUTURE: INFORMATION TECHNOLOGY & COMMUNICATION

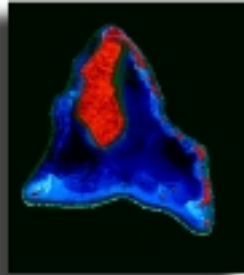
For effective resource management and planning, the storage and processing of timely and accurate scientific data is critical. Island nations face the fundamental crisis of geographic isolation and high cost of communication between the various islands. Given the small size of these nations, technology providers are reluctant to supply cutting-edge technology owing to poor economies of scale and difficulties in monitoring.

Low human capital endowment further complicates the situation. These problems are a constraint in the Cook Islands' pursuit of economic growth.

SOPAC has been assisting the Cook Islands to improve its management systems and train personnel in Information Technology. SOPAC also helped the Ministry of Marine Resources, in 1995²⁴, to upgrade their information system. An upgraded Information System will enable accurate analysis of data on living and non-living resources. Similar support was given by SOPAC to the Cooks in 1998²⁵.

In 1998²⁶, an in-country Geographical Information System (GIS) workshop was conducted by SOPAC in the Cook Islands to train technical staff from government ministries.

As a regional data centre, SOPAC has also been compiling geographic data on the Cook Islands.



Spot image of Aitutaki

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 the Cook Islands in creating a national capacity in the applied sciences.

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 the Cook Islands 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.

Future Directions in the Cook Islands

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

SOPAC will further its partnership with the Cook Islands in developing offshore resources, namely manganese nodules. Policy formulation will be one of the key areas that SOPAC will focus on as one of its core professional activities. Development of appropriate legislation to manage coastal erosion and regulate aggregate mining will be a priority in the near future. A detailed SWATH mapping and remote sensing exercise will be conducted by SOPAC to identify potential alternative aggregate resources.

²⁴SOPAC Miscellaneous Report 197

²⁵Task Profile CK 97.007

²⁶SOPAC Miscellaneous Report 293

Reference Materials

SOPAC provides access to a variety of information relating to the Cook Islands. This can be accessed through the library database, PIMRIS or the Internet. SOPAC also holds at its Secretariat:

- Maps of the Cook Islands
- Project Reports
- Educational/Awareness pamphlets
- Videos
- Deep-sea mineral database
- Geological samples
- General reference material on the Cook islands

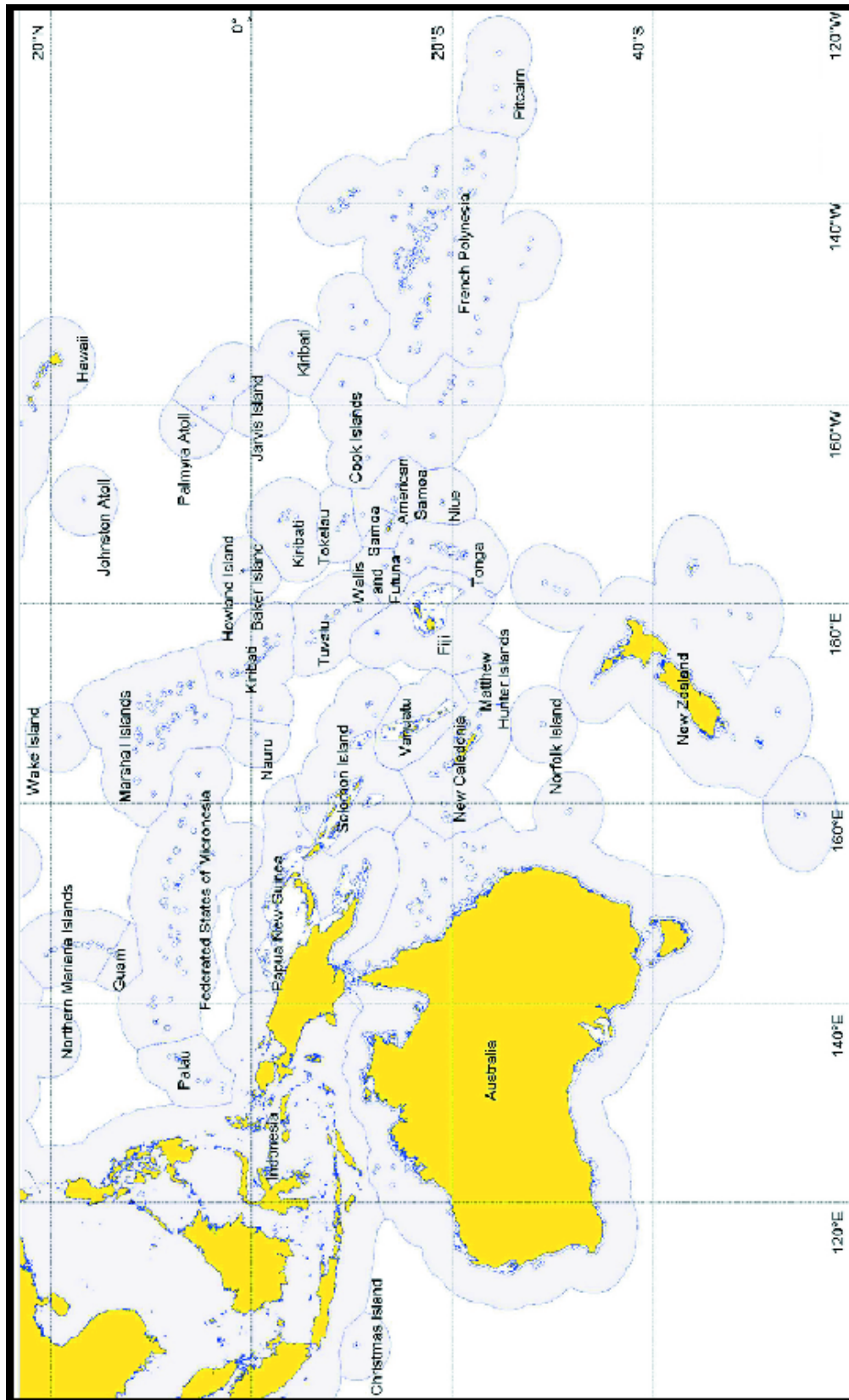
Please refer to the Cook Islands' Bibliography for SOPAC's full reference and material listing.

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	<ul style="list-style-type: none"> Groundwater resource fragile and prone to contamination by human waste and saltwater intrusion Demand is greater than water supply Inadequate water catchment and storage facilities Water wastage through poor demand and conservation practices and excessive system leakage Pollution of shallow water table through use of pit toilets Insufficient sanitation facilities for large populations Lack of public knowledge on safe sanitation practices 	<ul style="list-style-type: none"> Development and implementation of resource policy and legislation Conducting research and feasibility studies to address water and sanitation issues Advising on the improvement of infrastructure within the water and sanitation sector Increasing public awareness on sustainable water management through training and workshops Carrying out workshops and training programmes to educate people on safe sanitation and waste disposal practices
Coastal Management	<ul style="list-style-type: none"> Poor land management due to land tenure situation Unmanaged sand mining and dredging Inappropriate coastal development and protection works Inadequate public knowledge on coastal-zone management 	<ul style="list-style-type: none"> Assisting in improving participation by landowners in land-use planning process Locating an economically viable, alternative source of aggregate Dialogue with the government and private sector on coastal development and management Educating people about coastal degradation and management through workshops and field training
Minerals	<ul style="list-style-type: none"> Inadequate scientific research to define full potential of resources High risks and costs associated with acquisition of data Absence of a legislature framework for offshore mineral development 	<ul style="list-style-type: none"> Assessing the potential of cobalt-rich manganese crusts in Cook's EEZ Development of resource policy and advice on the development and management of offshore minerals Encourage further research
Energy	<ul style="list-style-type: none"> Importing fossil fuels to generate electricity places increasing strain on the economy Inadequate public awareness on renewable energy sources and management 	<ul style="list-style-type: none"> Identifying viable renewable energy sources Enhancing skills required by locals for management and operation of the energy sector through workshops and appropriate training Development of energy policies and legislation
Information Technology & Communication	<ul style="list-style-type: none"> Limited availability and poor access to information Lack of skilled man-power to manage the IT section Lack of relevant regional and local data High cost 	<ul style="list-style-type: none"> Upgrading of information systems Providing training to locals in information technology Compiling and organising databases Assisting in development of Internet access in the Cooks Coordination, compilation and creation of standardised geographic data sets
Human Resource Development	<ul style="list-style-type: none"> Weak human resource base Limited financial and institutional resources Limited expertise 	<ul style="list-style-type: none"> 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.