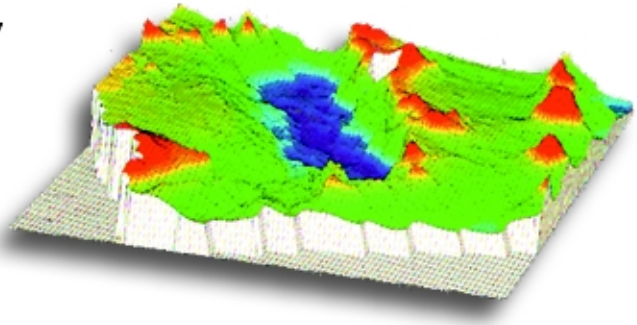
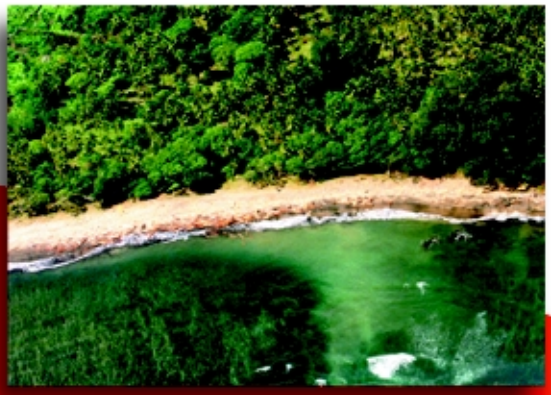
SOPAC

COUNTRY PROFILE





VANUATU

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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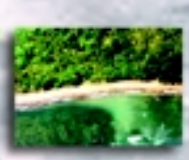
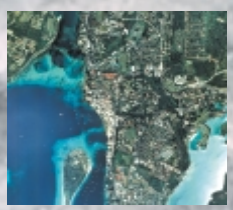


Vanuatu: Our Future

"Every person has the following fundamental duties to himself and his descendents and to others…(d) to protect Vanuatu and to safeguard the national wealth, resources and environment in the interests of the present and the future generations."

Constitution of the Republic of Vanuatu, article 7(d)

Capital:	*Port Vila*
Population:	*193 200 (1999 est.)*
Land Area:	*12 190 sq. km*
Max. Height above Sea-level:	*1 877 m (Mt Tabwemasana)*
Geography:	*Scattered archipelago of about 80 islands; volcanic in origin; largest islands are Espiritu Santo, Malakula, Maewo, Pentecost, Ambrym, Epi, Efate (main island), Erromanga, Malo, Tanna and Aneityum*
EEZ:	*710 000 sq. km*
Climate:	*Tropical; moderated by southeast trade winds*
Rainfall:	*Varies from 2 300 – 3 800 mm per annum*
Mean Temperature:	*24°C*
Economy:	*Dependent on agriculture, fisheries and tourism; exports include copra, cocoa, beef, coffee, fish and timber*
GDP per Capita:	*US$ 1 231 (1998 est.)*
Currency:	*Vatu*
Energy Sources:	*Biomass, solar, hydro, wind, geothermal*
Freshwater Sources:	*Groundwater, rainwater, surface water*
Natural Hazards:	*Cyclone, storm surge, coastal flooding, river flooding, drought, earthquake, landslide, tsunami and volcanic eruption*
Mineral Potential:	*On-land – gold, silver, manganese; Offshore – polymetallic sulphides (gold, silver, copper, lead and zinc), hydrocarbons*
Languages:	*Bislama, French and English are the official languages; plus about 105 different indigenous languages spoken throughout the country*
Government:	*Republic and member of the Commonwealth*
SOPAC Membership:	*Full member since 1980*
Country Representative:	*Director-General*
	Department of Lands, Geology,
	Mines and Water Resources
	Private Mail Bag 00. Port Vila
	Tel: (678) 22 423
	Fax: (678) 25 165



Vanuatu

Vanuatu is an archipelago consisting of about 80 scattered islands, some volcanically active, in an Exclusive Economic Zone (EEZ) of 710 000 sq km. The total land area is 12 190 sq km with Espiritu Santo being the largest island. The main island Efate is home to the capital and is the centre of government.

The population of Vanuatu in 1999[1] was estimated at 193 200 with over 80 per cent living in rural areas and 13 per cent in Port Vila, the capital.

Located in the tropical south-western Pacific Ocean, the climate of Vanuatu is tropical with variable rainfall from 2 300 mm to 3 800 mm and a mean annual temperature of 24°C. The country is prone to cyclones.

Since a predominant part of Vanuatu's population is rural, subsistence agriculture is a major part of the economy. Agriculture contributes to the export earnings of the country as well. Other mainstays of the economy include tourism and fishing.

Children of Vanuatu

There are several resource and environmental issues, common to island nations, affecting sustainable development in Vanuatu. 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, natural hazards, water quality, water availability and sanitation. Sustainable management of resources such as sand and gravel aggregate, terrestrial and offshore minerals and renewable energy are key issues in Vanuatu's quest for development.

Vanuatu has been a full member of the South Pacific Applied Geoscience Commission (SOPAC) since 1978. SOPAC is an independent, inter-governmental, 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 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.

Vanuatu is rich in several natural resources such as minerals, fisheries and forestry. Limited knowledge and technical expertise has led to either over-exploitation of some resources such as forestry or under-exploitation as in the case of fisheries.

Fisheries hold the potential to emerge as one of the biggest export earners for Vanuatu. However to utilise this resource further, more research would be required in scientific rearing of fish and into the scope for introducing advanced equipment and boats. Uncontrolled logging of forest resources has led to a depletion of watershed protection, loss of biodiversity and sedimentation of waterways.

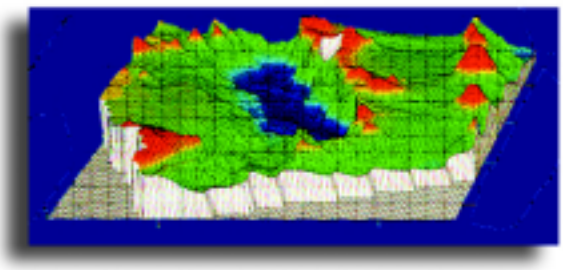
[1]SPC Demography Programme

MINERALS

Mineral resources could provide a strong boost to Vanuatu's long-term development plans. Though mineral exploration in Vanuatu began with the pioneering efforts of Douglas Mawson in 1903, it had remained very low profile until the discovery of the Lihir prospect in PNG in 1985. The discovery of gold at the Lihir prospect changed the course of mineral exploration in Vanuatu, with the government issuing over 130 licenses to various mining and exploration companies[2]. Though bigger discoveries are awaited before exploitation can commence, exploration potential also exists on Malekula and Espiritu Santo. The seventies saw the exploitation of manganese at Forari on Efate, but the mines turned uneconomic in 1978. Vanuatu also has good potential for copper and hydrocarbons, which can attract sufficient foreign investment in the future.

Offshore exploration is still at a nascent stage in Vanuatu. Exploratory surveys, however, reveal the presence of polymetallic massive sulphides (rich in copper, lead, zinc gold and silver) in the EEZ in water depths of 2500 m. There is now a need to carry out further marine scientific research and confirm and evaluate these findings. Setting up the legal and regulatory framework would also be mandatory before commercial interests can be solicited.

Exploration for mineral resources often has substantial economic, social and environmental impacts. Managing these issues while trying to ensure a sustainable future, is one of the key issues confronting Vanuatu today.



3 Dimensional offshore bathymetry map

[2]Gold Potential in the South West Pacific, East West Centre Hawaii

ENERGY

Energy is a big constraint for small island states in their pursuit of rapid development. In Vanuatu, Union Electrique d'Outre Mer (UNELCO) is responsible for the generation and supply of energy in Port Vila and Luganville. Rural areas rely on village generators. Cost of electricity in Vanuatu is high, and the feasibility of a hydro-electricity project in the country is being explored[3].

In small-island economies, alternative sources of electricity are limited, but there is a need to explore non-conventional renewable sources of energy such wave, wind, solar and geothermal energy. Hybrid power systems that use renewable sources of energy along with fossil fuels (wind/solar with diesel/coal) are currently being assessed for their viability in the Pacific countries. Efficiency in production, transmission and consumption is essential to optimize available energy sources while new avenues are being explored.

WATER

Fresh water is 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 supplies in the country are provided by the public works department, which distributes reticulated water to Vila, Santo, Isangel (Tanna), Lakatoro and Norsup (Malakula). The main sources of water are semi-artesian aquifers, catchment tanks, rivers and wells. Vanuatu is better off than many Pacific Island nations as 87% and 91% of the population have access to safe water and proper sanitation respectively. However, as the demand increases, proactive measures might be needed to increase supply and reach.

[3]Pacific Islands Yearbook, 1994

Challenges to Sustainable Development and SOPAC's role in Vanuatu

MINERALS

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

In 1983[4], SOPAC undertook an investigation into the occurrence of clays suitable for ceramics. Mineralogical and chemical testing was carried out to assess their suitability. It was concluded that the alluvial clay found in the country could be used for manufacturing bricks, pipes and tiles. Clay ideal for pottery also exists in Vanuatu. In 1985, SOPAC investigated the presence of alluvial gold and identified two areas with gold deposits.

Swath-mapping was done by SOPAC in Vanuatu under a project funded by the European Union in the late 1980s[5]. The project produced detailed bathymetric maps of the seafloor around Vanuatu.

SOPAC carried out seismic-refraction surveys[6] and evaluation of hydrocarbon source rocks[7]. To attract the interest of the oil majors, SOPAC assisted in the production of an attractive brochure on the potential of hydrocarbons in Vanuatu. Data compilation and management is crucial for planning and administration of the mineral resources. SOPAC has initiated a project to maintain and update a mineral-industry database for all the Pacific Countries including Vanuatu. An industry-level database enhances the ability of governments of Small Island Developing States (SIDS) to negotiate with powerful transnational mining companies. In 1993[8], SOPAC established a comprehensive Oil Company Database at the Secretariat to assist the member countries in their dealings with oil companies. This was a follow up to the consultancy that SOPAC offered in 1992[9], to promote the hydrocarbon exploration in the South Pacific states to the Oil Industry.

In 1994[10], SOPAC in conjunction with the Japanese Deep-Sea Minerals Programme conducted two surveys to assess the potential for polymetallic massive sulphides in the EEZ of Vanuatu. These surveys have revealed the presence of polymetallic sulphides rich in copper, lead, gold and silver. However further research is essential to define these deposits and explore commercial prospects.

Environmental pollution, adverse social impact and economic redistribution are the biggest concerns arising out of mining and mineral exploration. Pollution of air and water and deterioration of land quality are the primary damages inflicted by mining operations. The disposal of mine tailings is an arduous task for small, land-scarce islands. Mining also leads to loss of green cover and diminished aesthetic appeal of natural surroundings, and renders the land unsuitable for other applications, even long after the closure of the mine. Offshore mining could unleash a whole new host of problems ranging from the irreversible destruction of the fragile ecosystem to loss of fishing grounds.

Port Vila aerial photograph

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 affects. 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 land has often led to social disharmony. The loss of land or fishing grounds deprives many of their traditional lifestyles and the resultant unemployment catalyses alcoholism, violence

[4]SOPAC Technical Report 33
[5]SOPAC Technical Reports 108 & 138
[6]SOPAC Technical Reports 7 &12
[7]SOPAC Miscellaneous Reports 141
[8]SOPAC Miscellaneous Report 146
[9]SOPAC Miscellaneous Report 141
[10]SOPAC Technical Report 21

and crime in the affected societies. SOPAC recognises the impact of these externalities on Vanuatu's goal of sustainable development and has attempted to assist the country in addressing them while framing policies. Several seminars have been organised in the country to advise landowners and senior government officials on the issues involved in mineral exploration and mining. SOPAC has assisted in the production of promotional and information pamphlets on mineral development in local languages to spread awareness among villagers.

Social cost-benefit analysis and social and environmental impact assessments are advocated for all mining projects in Vanuatu. Mineral policy formulation is rapidly emerging as one of the core activities of SOPAC and this expertise could be used in future to develop sustainable terrestrial and offshore mineral policies, quarrying regulations and compensation policies. In February 1999, SOPAC coordinated an Offshore Mineral Policy Workshop at Madang in Papua New Guinea to evolve the systems and guidelines for preparing Offshore Mineral Policies in the South Pacific. The Pacific Exploration Technology Seminar that SOPAC had organized at Nadi in 1998 addressed several technological issues relating to onshore and offshore mining.

ESMG students 2000

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 has been undertaken for 21 years.

All these activities are expected to go a long way in helping Vanuatu reap the economic benefits involved in the development of mineral resources.

ENERGY

Vanuatu is confronted with the urgent need to introduce supply- and demand-side management programmes to attain efficiency in the power sector. To economise on the existing supply of power, UNELCO has to promote consumer awareness. Besides running educational programmes, there is a need to encourage the use of energy-saving devices, viz. timers, fluorescent lamps and regular maintenance of heavy-duty appliances like air conditioners and industrial equipment.

SOPAC's response has been targeted more at reducing supply-side constraints. In 1987[11], SOPAC collected data for the wave-measurement programme and combined this with satellite altimetric data and island wind measurements to build up a picture of the climatology of ocean waves in Vanuatu. Besides providing information useful for harbour design and wave forecasting, wave data were used to study the feasibility of generating electricity from tidal waves. A series of studies on the wave-energy programme followed in the early 1990s. The outcome of SOPAC's research was published in a brochure called "Ocean Wave Energy in the South Pacific" that provides extensive information on the results, status of wave energy internationally and avante-garde technology in the field. The brochure also proved to be a promotional pamphlet for the potential that the South Pacific has in this area. Several training workshops have been organised by SOPAC on wave measurement and wave climatology. Workshops and training programmes have also been held to strengthen energy-sector human resource capacity and evaluate options for non-conventional sources of energy[12].

WATER & SANITATION

SOPAC has been assisting Vanuatu with the water and sanitation issues since 1983 through field surveys, assessments and capacity building through training programmes and workshops. Vanuatu has a limited supply

[11]SOPAC Technical Reports 156 & 187
[12]Task Profiles RT 99.015 & 99.053

of surface water and hence there is a need to conserve groundwater as the main source of fresh water for the population.

Surveys were conducted in 1990[13] to monitor water quality and pollution levels in coastal waters. These surveys also assessed the impact of causeways and the bridge between Emten and Ekasuvat lagoons and obtained the baseline data required for a hydraulic exchange to improve water quality. In 1999[14], further work was carried out to promote good water-management and conservation practices among water suppliers and consumers. SOPAC also provided a fellowship for a technical staff member to draft a Water Action Plan for Vanuatu[15].

Sanitation and garbage disposal create a major predicament for small land-scarce islands with fragile ecosystems. Waste disposal and sanitation in urban areas is an increasing concern in Vanuatu. Pollution of Port Vila's harbour and surrounding lagoons by septic effluents and run- off from garbage dumps is severe. In the two major urban areas - Port Vila and Luganville - improper disposal of human waste and household wastes and the associated risk of contamination of drinking water have a serious health implication[16].

SOPAC will continue to assist Vanuatu with its water and sanitation issues. Some of the areas identified for technical assistance are:

- legislation of policies to protect water sources;
- assistance to monitor water quality;
- baseline studies to address water and sanitation issues; and
- enhancement of infrastructure and institutional capacity within relevant departments.

Several workshops have been organised by SOPAC to evolve strategies on water-resource management and development. A regional consultation workshop on water-resource management in the Pacific regions was held in 1996[17]. Some of the constraints specific to Vanuatu that were identified are non-availability of data, inappropriate and under-utilised equipment and lack of technical expertise. In the same year SOPAC organised a workshop at the Secretariat on Technologies for Maximising and Augmenting Freshwater Resources in Small Islands[18]. 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 Vanuatu. In 1997[19], SOPAC organised a workshop to review the photovoltaic pumping technology and determine the causes for its failure in the South Pacific. The workshop also looked at ways for making the technology more affordable to villages and households.

On the field training

In addition to these, SOPAC has been running an Earth Sciences programme for technicians 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 at the University of the South Pacific. Member countries like Vanuatu use this as an avenue to strengthen the capacity within the water and sanitation departments.

HAZARDS & DISASTERS

Vanuatu is very prone to natural disasters given its location in the seismically active Pacific 'Ring of Fire'. Vanuatu also falls in a tropical cyclone belt with the average of one cyclone passing through its waters every year. Cyclones have had disastrous effects on Vanuatu, with large amounts of national development funds having to be diverted for disaster mitigation. For instance, Cyclones Uma (1987) and Prema (1993) wrecked commercial crops such as coconut, cocoa and coffee, with some islands losing more than 50% of their standing crops.

[13]SOPAC Technical Report 117
[14]Task Profile VU 99.001
[15]Task Profile VU 97.015
[16]3rd Development Plan (1992-1996)
[17]SOPAC Miscellaneous Report 229
[18]SOPAC Miscellaneous Report 223
[19]SOPAC Miscellaneous Report 251

Every cyclone is followed by a slump in the economy as agriculture, trade and tourism decline. Global climatic changes hold the threat of increasing the frequency and severity of storms as well as droughts.

The islands also lie along the New Hebrides Trench, a line of high tectonic activity on the eastern edge of the Indo-Australian Plate, making them extremely susceptible to volcanic eruptions and earthquakes. Given the high opportunity cost that disaster mitigation expenditure has, hazard assessment and disaster mitigation are of crucial importance to high-risk countries like Vanuatu.

Active volcanoe

In the event of a natural disaster, poor construction and building standards could aggravate the human catastrophe and infrastructural damage. SOPAC is encouraging the implementation of a National Building Code to reduce the hazard posed by faulty construction. SOPAC has undertaken studies in its Pacific Cities project to determine geotechnical parameters and ground response in the event of an earthquake. The project also covered the microzonation of Port Vila to allow the design of infrastructure with resilience to earthquakes and an assessment of the vulnerability of Port Vila to tsunamis and storm surges[20]. Geological, geotechnical and MapInfo database training has been provided for the technical personnel in Vanuatu[21]. Port Vila is also covered under the Pacific Cities project that aims to develop a comprehensive multi-hazard risk- management geographic information system (GIS) database. The database will be used for the mathematical modelling of vulnerability in cities[22]. Under this project, zonation of all hazards, their distribution frequency and likely impact on the city are being assessed. The database is vast in its coverage and even information on all buildings in high-disaster-risk areas is included to prepare for the response of the structures to a wide range of hazards like cyclone, earthquake and sea-level rise. Training of technical personnel in risk analysis, disaster mitigation and civil protection measures is also being undertaken as part of the project.

The Disaster Management Unit (DMU) of SOPAC has been supporting Vanuatu in dealing with the increased volcanic threat in Ambae and focus on critical issues such as the timely evacuation of communities under greatest threat. The possibility of evacuating the entire population has been considered with the immediate emphasis being on the relocation of people within a 10-km radius of the volcano. SOPAC could support Vanuatu to draw up policies and muster political support and international assistance in the event of a full evacuation becoming inevitable.

SOPAC continues to help the government of Vanuatu in carrying out surveys to assess storm hazard and estimate risk to the population and property. All these contribute towards SOPAC's vision of strengthening Vanuatu's capability to assess natural and man-made hazards and improve post-disaster rehabilitation.

COASTAL MANAGEMENT

Vanuatu has very distinctive coastal areas comprising features such as fringing reefs, lagoons, and natural beaches. There have been rapid changes in the coastal geography associated with increasing reclamation and coastal construction as a part of burgeoning urbanisation. To protect reclaimed land from the onslaught of the sea, various protection systems such as the concrete wall, groynes, and riprap revetments have been constructed haphazardly. However, the success of these protection structures has been minimal, owing to a limited understanding of the wave and current pattern around the islands and the misconception that coasts are inherently and eternally stable. Poor construction and development practices, indiscriminate reclamation and aggregate mining on beaches and reef areas cause coastal instability and beach erosion. In addition, coastal pollution leads to death of reef biota and loss of biodiversity, and affects reef fisheries.

[20]Task Profile VU 98.016
[21]Task Profile VU 99.025
[22]Task Profile VU 99.015

Erosion causing road loss in Vanuatu

SOPAC's partnership with Vanuatu began in 1981[23] when a resource and environment management strategy was formulated to stimulate the development process. Training in basic research skills was provided to the technicians to assess mineral resources. A baseline coastal study was executed in 1983[24] to develop appropriate coastal-management and development strategies. The study investigated the geological changes in the coastline in a historical perspective to determine the causes of the changes and develop plans that accommodated such changes in the future. Bathymetric studies of Teouma Bay in 1987[25] collected baseline data for the evaluation of the inlet as a fuel depot and the suitability for building a harbour.

In 1990[26], baseline data of Mele Bay were also collected to estimate coastal erosion and coastline retreat. A coastal-mapping workshop complemented this effort and trained the local personnel in coastal morphology and geology. In 1991[27], the impacts of sand mining on coastal and beach processes were assessed. Geophysical mapping of the near-shore zone was carried to assess the factors contributing to serious coastal erosion. Bathymetric and sediment studies were carried out in Port Havannah in the same year[28]. Data was also gathered to develop a physical environment database with the intention of creating a tourism coastal-management plan.

Recently, SOPAC has advised the government on the setting up of a coastal water-quality programme to assess the pollution hazard in bathing beaches and adjacent areas of Port Vila. Based on recent requests from Vanuatu Division of Geology, Mining and Water, SOPAC will also develop project guidelines for on-land quarry management and also for further assessment of coastal erosion and shoreline development in Mele Bay. New task profiles will be developed for these activities.

[23]SOPAC Technical Report 15
[24]SOPAC Technical Report 29
[25]SOPAC Technical Report 81
[26]SOPAC Technical Report 116
[27]SOPAC Technical Report 149[23]SOPAC Technical Report 15
[28]SOPAC Technical Report 122

To help Vanuatu protect and manage its coastal zone better, SOPAC has recommended the following strategies.

- implementation of appropriate policies to regulate beach sand mining;
- more scientific approach to fill and reclamation;
- technical assessments to properly develop, contract and maintain shoreline protection structures and facilities;
- identification of alternative sources of sand aggregates; and
- development of legislation regarding quarrying as an alternative to sand mining.

Given the critical importance of sustainable development in the Vanuatu, 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 because of poor economies of scale and difficulties in monitoring. Low human capital endowment further complicates the situation. These factors have constrained Vanuatu in its pursuit of rapid growth.

SOPAC has been helping Vanuatu to improve its management systems and train personnel in Information Technology. SOPAC has provided several training attachments at the Secretariat to impart skills to government employees from Vanuatu. SOPAC continues to assist Vanuatu in developing GIS[29], Intranet and Internet

[29]Task Profile VU 98.005

services[30] and upgrading information systems.

A computing unit for GIS and remote-sensing (RS) work was provided by SOPAC to Vanuatu in 1993 through funding under Lome III. Technical assistance, hardware and support continue to be an integral part of SOPAC's workplan for Vanuatu.

Coast of Vanuatu

SOPAC installed a Vanuatu Mineral Resource Database/ GIS system for the Department of Mines. This system still receives on-going support from SOPAC.

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

In future, the focus will be on:

- Development of appropriate, economic and scalable technologies.
- Increasing the number of IT professionals in the local population.
- Improving Internet access.
- Further development of Geographical Information System and Remote Sensing techniques.

Future directions in Vanuatu

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

SOPAC will further its partnership with Vanuatu in developing onshore and offshore resources of minerals and hydrocarbons. Policy formulation will be a key area that SOPAC will develop as one of its core professional activities. Development of appropriate legislations to manage coastal erosion and regulate sand and aggregate 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 Vanuatu in creating a national capacity in geo-science. SOPAC will continue its work to reduce Vanuatu's vulnerability to natural disasters and improve preparedness.

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 Vanuatu to achieve this.

By performing its functions as the specialised scientific organization 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 Vanuatu. This can be accessed through the library database, PIMRIS or the Internet. SOPAC holds at its Secretariat:

- Maps of the country
- Project reports
- Educational/Awareness pamphlets
- Videos
- Geological samples
- General reference material on Vanuatu

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

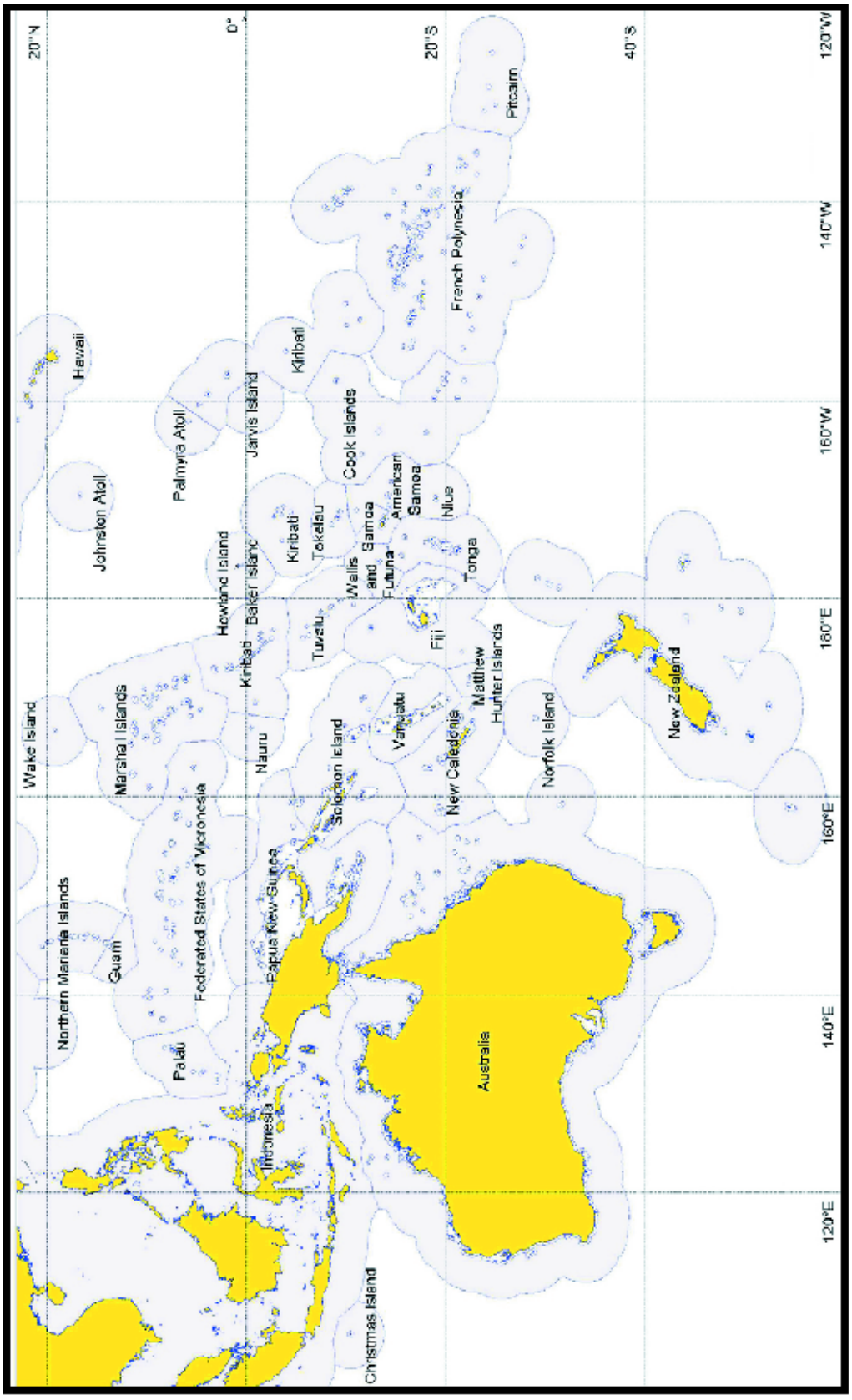
For more information please contact:
The Librarian
South Pacific Applied Geoscience Commission
Private Mail Bag, GPO
Suva, Fiji Islands

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

[30]Task Profile VU 98.007

Issues and SOPAC's Responses for Further Development

ISSUES	CONSTRAINTS	RESPONSES FOR FURTHER DEVELOPMENT
Water & Sanitation	· Demand often exceeds supply rates · Water wastage through poor demand and conservation practices · Lack of baseline data	· Development and implementation of resource policy and legislation · Conducting research and feasibility studies to address water and sanitation issues · Increasing public awareness on sustainable water management through training and workshops
Coastal Management	· Poor land management · Unmanaged aggregate mining · Inappropriate coastal development and protection works	· Educating locals about coastal degradation and management through workshops and technical training · Locating an economically viable, alternative source of aggregate · Dialogue with the government and private sector on sustainable development
Minerals	· Additional work required to define the full potential of terrestrial and deep-sea minerals · Inadequate promotion of the mineral sector · Unregulated quarrying	· Develop minerals and policy regime · Assessing the potential of polymetallic massive sulphides in Vanuatu's EEZ · Encourage further research · Assist in strengthening human resource capacity towards sustainable management and development of mineral resources · Develop a promotional pamphlet for the mineral sector · Assist in amending the Quarrying Act
Energy	· High cost of electricity · Limited alternative sources of energy · Use of imported fossil fuels places increasing strain on the economy	· Identify and develop viable renewable energy sources · Identification of feasible alternative sources of energy · Development of energy policies and legislation · Enhance local staff skills in energy sector through workshops and technical training
Hazards & Disasters	· Prone to natural disasters such as cyclones, volcanic eruptions, earthquakes, climate change and ENSO events · Communities lack awareness of the impacts of natural hazards, and measures to mitigate the impacts	· Natural hazards impact assessment of historic and future disaster events impacting Vanuatu · Conduct training workshops on disaster management and response for disaster managers and the wider community · Raise awareness of hazards and assist with preparedness and mitigation actions of vulnerable communities
Information Technology & Communication	· Limited availability and poor access to information · Lack of skilled personnel in IT sector · Lack of relevant regional and local data · High costs	· Assisting in development of Internet and Intranet services · Conducting training of local staff in information technology and GIS/RS · Regional coordiination and selection of effective IT systems · Development of improved software and GIS utilities · 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.