



# Celebrating island biodiversity achievements in the Pacific

Case studies from the Regional GEF-PAS Integrated Island Biodiversity Project



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## Foreword

Our Pacific island region is rich and diverse in its culture, languages and traditions. Despite this diversity, Pacific peoples have something in common– we belong to the largest ocean on planet Earth, which covers more than 169 million square kilometres, we maintain a strong reliance on the conservation and sustainable use of biodiversity for sustainable development, for daily livelihoods and for preserving our cultural practices. But perhaps the most important common feature we share is that we are a region of ocean state islands.

In 2006, the Island Biodiversity Programme of Work (IBPOW) was adopted at the eighth Conference of Parties (COP) of the Convention on Biological Diversity to address the uniqueness and fragility of island biodiversity and it provides guidance on priorities for biodiversity management in small island developing states, including the application of ecosystem approaches to management.

Pacific island ecosystems and associated biodiversity make up one of the world's important biodiversity hotspots, with high numbers of endemic species that are found nowhere else in the world. Furthermore, these unique species are particularly vulnerable to extinction due to their limited range and isolation. At the same time, Pacific island biodiversity is extremely fragile and continues to be threatened by invasive species, climate change, natural and environmental disasters, population growth and urban expansion, unsustainable land use practices and land-based sources of marine pollution.

However, the outlook is not entirely discouraging.

Integrating biodiversity planning and management with national natural resource management and development planning processes is progressively occurring in our islands. Furthermore, efforts at better coordination across sectors at the national level, the use of innovative planning and management tools and approaches, improved governance at the community level, appropriate policies and legislation, education and awareness, and good baseline information on ecosystems and species are continuing with the goal of improving the management of island biodiversity across our region.

This inspiring collection of case studies tells the story of how four Pacific island countries are managing their island biodiversity in an integrated manner through the assistance of the UNEP Global Environment Facility's Pacific Alliance for Sustainability (GEF-PAS) project "Implementing the Island Biodiversity Programme of Work by integrating the conservation management of island biodiversity in the Cook Islands, Nauru, Tonga and Tuvalu" The project has created a lasting legacy for others to scale up and replicate as we continue to work together as a region to protect and sustainably use our island biodiversity to sustain environmental, economic and human well-being of our Pacific peoples well into the future.

**Mr. Kosi Latu**

**Director General, SPREP**



## Acknowledgements

We thank each of the countries (Cook Islands, Nauru, Tonga and Tuvalu), the national IIB project coordinators - Mii Matamaki, Cook Islands; Berrick Dowiyogo, Nauru; Ana Fekau, Tonga; Kitiseni Ovia, Mataio Tekinene and Faoliu Teakau of Tuvalu. We thank the focal point agencies, partner government agencies, regional partner organisations, non-governmental organisations, civil society, local communities and other stakeholders. Your keen participation and valuable contributions over the course of the project have resulted in successful outcomes for each of the four countries. We also pay tribute to the late Mii Matamaki, who worked tirelessly to champion biodiversity conservation in the Cook Islands. Thank you all once again.

## About the GEPAS IIB project

The actions described in these case studies were national activities under the multi-country project 'Implementing the Island Biodiversity Programme of Work by integrating the conservation management of island biodiversity' (GEPAS IIB project), funded by the Global Environment Facility (GEF) through its Pacific Alliance for Sustainability (PAS).

The GEPAS Integrated Island Biodiversity (IIB) project had two components:

- 1 conservation and restoration of priority species and ecosystems at risk in each of the countries' archipelagos, as identified in the Island Biodiversity Programme of Work (IBPOW); and
- 2 sustainable use of island biodiversity through improved systems and processes including resource assessment and monitoring, legislation, capacity and awareness building.

The case studies described herein are national contributions towards achieving these two project components.

The GEPAS IIB Project was funded by the Global Environment Facility, implemented through the United Nations Environment Programme, and executed by the Secretariat of the Pacific Regional Environment Programme in the Cook Islands, Nauru, Tonga, and Tuvalu.



Photo: Stuart Chapen

# COOK ISLANDS



Photo: Jerrye And Roy Klotz (Wiki Commons)

## About the Cook Islands

The Cook Islands comprise 15 small islands scattered over 1.8 million square kilometres of the South Pacific Ocean. The physical geography of the Cook Islands is one of blatant contrast between the Northern Group of islands—Palmerston, Suvarrow, Nassau, Pukapuka, Rakahanga, Manihiki and Penrhyn—which are low-lying atolls, and the Southern Group of islands—Aitutaki, Manuae, Takutea, Atiu, Mitiaro, Mauke, Mangaia and Rarotonga—which are primarily hilly volcanic islands (e.g. Rarotonga) or low volcanic islands surrounded by a raised reef platform or makatea.

Each island has its own specific set of environmental risks, with islands in the Northern Group generally characterised by low fertility, porous soil, low-lying lands susceptible to saltwater inundation, and scant terrestrial resources, and with the Southern Group having richer soils and arable land but suffering from higher population pressures, increasing tourism development, and associated environmental problems.

*Ra'ui* is the traditional way of protecting and using land and sea resources. Under *ra'ui*, traditional leaders and land owners can establish an area under conservation over a period of time. *Ra'ui* has been a practice of the Cook Islands people for many generations and is held at the helm by the chiefs and sub-chiefs of the islands.

## About the case studies

The work described here implemented the themes of *Endangered Species Management*, *Ecosystem Management*, *Invasive Species Management*, and *Biodiversity Awareness and Education* in the Cook Islands' National Biodiversity Strategy and Action Plan (NBSAP) and also contributed to Goal 1 of the Cook Islands National Environment Strategic Action Framework (NESAF): *enhance the management, protection and sustainable use of our natural resources*.

# NAURU



## About Nauru

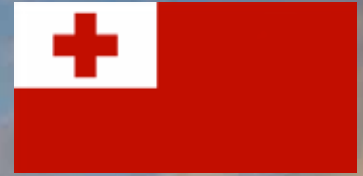
The Republic of Nauru is one of the world's smallest independent nations and is located 50 kilometres south of the equator. It is unique in that it is a single raised phosphatic limestone island with a maximum elevation of 71 metres above sea level and a total land area of 21 square kilometres, 70% of which has been mined for phosphate. Nauru has a population of 10,084 (in 2011). As a result of its remoteness and geology, Nauru's terrestrial ecosystems have relatively small numbers of species across different groups. Its marine ecosystems also have limited diversity, however, globally rare species are present, its reefs are exceptionally healthy and have among the highest percentage cover by corals on the planet.

## About the case studies

The work described here implemented theme two on Ecosystem Management and theme three on Species Management in Nauru's National Biodiversity Strategy and Action Plan (NBSAP) and also contributes to the environment sector goal in the Nauru National Sustainable Development Strategy (NSDS) which focuses on *"sustainable use and management of the environment and natural resources for present and future generations."*

Photo: U.S. Department of Energy's Atmospheric  
Radiation Measurement Program (Wild Commons)

# KINGDOM OF TONGA



## About Tonga

Vava'u is the most northern of three main island groups in the Kingdom of Tonga. This group comprises the main island of Uta Vava'u (96 square kilometres), a cluster of smaller islands to the south, and three outlying islands to the west (Late Island) and north (Fonualei and Toku Islands). The highest point on Uta Vava'u is 215 metres above sea level, whereas some of the smaller islands are very low and sand-formed. Much of the original forest has been cleared off Uta Vava'u and nearby islands, and what forest remains is largely on steep coastal slopes or inland escarpments. The three volcanic islands of Late, Fonualei, and Toku are uninhabited and largely untouched. The Vava'u group forms a beautiful mosaic of islands and reefs and is a significant marine-based tourism destination, particularly when migrating humpback whales are present.

## About the case studies

The work described here implemented the themes Forest Ecosystems, Marine Ecosystems, and Species Conservation in Tonga's National Biodiversity Strategy and Action Plan (NBSAP) and also contributes to outcome objective 7 of the Tonga Strategic Development Framework (TSDF) which focuses on "cultural awareness, environmental sustainability, disaster risk management and climate change adaptation, integrated into all planning and implementation of programmes, by establishing and adhering to appropriate procedures and consultation mechanisms".



# TUVALU



## About Tuvalu

Tuvalu is a small island state in the Central Pacific, comprising nine atolls and low islands (Nanumea, Niutao, Niulakita, Nanumaga, Nui, Vaitupu, Nukufetau, Funafuti, and Nukulaelae) with a total land area of only 26 square kilometres. The present population is estimated to be 10,782 (2012 Census). Of the total population, 57.1% resides on Funafuti, on Fongafale motu (the main settlement area), which has a land area of approximately 1.9 square kilometres with an estimated population of 6,156.

## About the case study

The case study described here corresponds to component two and implemented the cross-cutting theme on “*Capacity Building, Education, Training, Awareness and Understanding*” in Tuvalu’s National Biodiversity Strategy and Action Plan (NBSAP) and also contributes to the ‘*Environment*’ key policy objective contained in the Te Kakeega II – Tuvalu’s National Strategy for Sustainable Development.

Photo: Tuvalu (Mirims, Wiki Commons)

**CASE STUDIES:**

# **BIODIVERSITY SURVEYS**

Photo: David Broad (Mifins (Wiki Commons))

# BASELINES FOR BIODIVERSITY: UPDATING THE STATE OF KNOWLEDGE OF NAURU'S FLORA AND FAUNA

By Berrick Dowiyogo, Department of Commerce, Industry and Environment (CIE) – Government of Nauru and Vainuupo Jungblut, SPREP

## Thematic Areas:



Ecosystem conservation



Species conservation



Community awareness



Protected areas

## Background information

The Nauru rapid biodiversity assessment (BioRAP) was a biological inventory programme carried out in June 2013 to rapidly assess the biodiversity in the marine and terrestrial environments of Nauru. Options for managing threats and protecting remaining examples of native biodiversity (of national or international importance) were recommended to governing communities of the 14 districts of Nauru and the national government.

The Secretariat of the Pacific Regional Environment Programme (SPREP) engaged a team of 19 conservation specialists to work in partnership with Nauru Government staff and civil society participants, including customary resource owners. The information gathered provides a scientific basis for empowering communities, relevant government departments, and other partners to make informed conservation management and planning decisions to ensure the long-term conservation of Nauru's biodiversity and the essential ecosystem services it provides.

## Key results and outcomes

- **Ecosystems** – due to Nauru's isolation and rare geology, its terrestrial ecosystems have relatively small numbers of species across different groups. Its marine ecosystems also have limited diversity; however, the BioRAP confirmed the presence of globally rare species.
- **Plants** – 42 native plant species were recorded, most of which have critical importance ecologically and culturally. Almost no native forest remains on Nauru.
- **Insects** – New records of moths, land snails, and ants were found, adding a second endemic species (a new moth) to the already known endemic Nauru tidal rock bug (*Corallochoris nauruensis*).

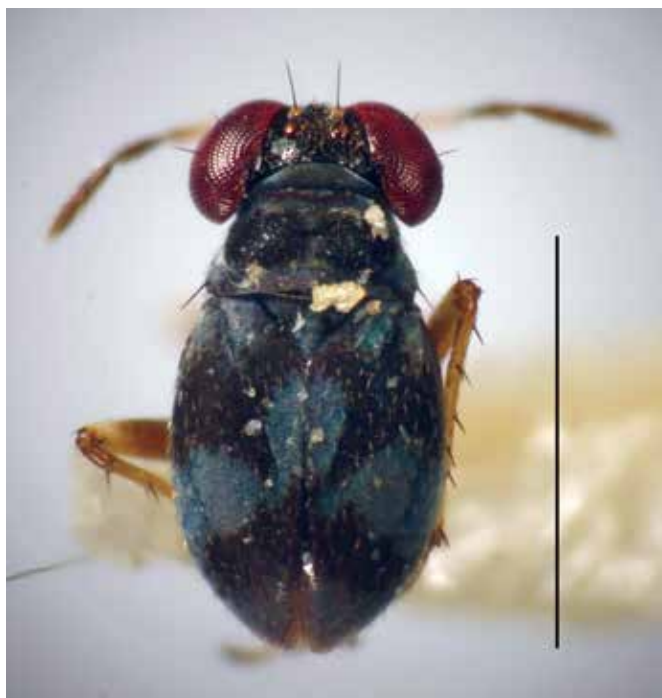


Photo: *Corallochoris nauruensis* (© American Museum of Natural History, Creative Commons)

- ◆ **Reptiles** – The reptile community appears intact despite major habitat alteration. Four species of gecko, three skinks, and a snake were recorded, including a new skink considered endemic to Nauru.
- ◆ **Birds** – A total of 36 bird species were recorded, including two new seabirds found for the first time in Nauru.
- ◆ **Reefs** – Nauru has among the highest percentage of coral cover on the planet. Nauru’s reefs are exceptionally healthy and contain globally threatened species including the humphead wrasse (*Cheilinus undulatus*), the endangered coral *Pocillopora fungiformis*, and many coral, fish, and sea turtle species.
- ◆ **Marine Invertebrates** – Two giant clams (*Tridacna maxima*), listed as internationally vulnerable, were recorded. Last recorded in the 1980s, these clams were thought to be locally extinct and thus were a significant ‘rediscovery’ during the survey.
- ◆ **Fish** – The abundance of reef fish was high relative to other nations; however, significant signs of overfishing were found, including a lack of large fish like large groupers and snappers.
- ◆ **Wetlands** – The BioRAP results also led to the development of a management plan for the Ijuw-Anabar wetlands, one of the proposed conservation areas identified through the survey.



Photo: *Tridacna maxima* (© Juney Ward)

### Lessons learnt

- ◆ The success of the BioRAP was a result of a strong partnership between SPREP, the Government of Nauru, and Conservation International – Pacific Islands Programme.
- ◆ Partnership with local resource-owning communities which claim stewardship and ownership rights of much of the land and marine areas was also critical to the success of the BioRAP.
- ◆ The findings of the BioRAP reinforce the critical importance of the biodiversity and ecosystems of Nauru’s marine and terrestrial environment and the urgent need for follow up activities to manage and mitigate threats.
- ◆ Implementing the recommendations of the BioRAP will require commitment from all key stakeholders including external partners and donors.

## Recommendations

### Invasive species

- Develop a national invasive species strategy and action plan for Nauru, in line with the Guidelines for Invasive Species Management in the Pacific.
- Develop and implement a national border biosecurity programme to protect Nauru from the introduction of invasive plants and animals.
- Take immediate action to eradicate and/or manage the yellow crazy ant (*Anoplolepis gracilipes*).

### Species and habitat protection

- Develop and implement a range of conservation interventions, strategies, management plans, and programmes targeting rare and endangered species.
- Integrate use and protection of culturally important areas and protection of threatened species.
- Establish regular monitoring and assessment of plant, animal, and marine resources.

### Governance

- Seek legislative protection for the rare and endangered plant and animal species.
- Reduce fishing pressure and encourage best practices by establishing regulations.
- Consider signing international conventions, such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Convention on Migratory Species (CMS) and the Convention on Wetlands (Ramsar).
- Establish a community culture, as well as legislation, to manage and sustainably use the marine and terrestrial resources of Nauru.
- Ensure compliance with new regulations and laws.

### Awareness, education and traditional knowledge

- Provide training to improve knowledge of conservation issues and effective strategies to protect key resources.
- Rejuvenate and strengthen traditional environmental knowledge systems that were once an integral part of Nauruan's connection to the land and sea.
- Develop a public awareness campaign on the importance of healthy ecosystems.



## Conclusion

For the first time, Nauru has a comprehensive baseline information on the status of their biodiversity. This information has contributed immensely to the completion of their fifth national report to the Convention on Biological Diversity (CBD), the review and update of their National Biodiversity Strategy and Action Plan (NBSAP), and the setting of national biodiversity targets for their NBSAP and has raised awareness of the importance of Nauru's biodiversity.

The results of the BioRAP have also contributed substantively to the formulation of the UNDP-GEF Ridge-to-Reef (R2R) project for Nauru, which is now underway. The findings of the Nauru BioRAP have identified or reconfirmed the critical importance of the biodiversity and ecosystems of Nauru's terrestrial and marine environments and the urgent need for activities to manage and mitigate threats for their conservation.

## References

McKenna, Sheila. A., et al. (2015) Rapid Biodiversity Assessment of Republic of Nauru. Apia, Samoa: SPREP

BioRAP synthesis report: <https://www.sprep.org/attachments/Publications/BEM/biorap-nauru-synthesis.pdf>

BioRAP full report: <https://www.sprep.org/attachments/Publications/BEM/Nauru-BIORAP-2015.pdf>

## Acknowledgements

The Nauru BioRAP would not have been possible without the help and assistance of many individuals and organisations. Thank you to the resource owners and communities of Nauru for giving permission for the survey to be conducted. The BioRAP was designed, planned and implemented by the Secretariat of the Pacific Regional Environment Programme (SPREP), the Government of Nauru – Department of Commerce, Industries and Environment (DCIE), and Conservation International – Pacific Islands Programme. Important local partners included Nauru Rehabilitation Corporation (NRC), Nauru Island Association for Non-Government Organisations (NIANGO), Republic of Nauru Phosphate (RONPHOS), and the University of the South Pacific (USP).

Other partners who assisted with logistical and technical support include the New Zealand Department of Conservation, Birdlife International – Pacific Islands Programme, U.S. Geological Survey, Nauru Fisheries & Marine Resources Authority, and the Government of Samoa – Ministry of Natural Resources and Environment.



Photo: *Pocillopora fungiformis* (© Charlie Veron)

### DID YOU KNOW?

*Pocillopora fungiformis* is a genus of stony corals which are commonly called cauliflower corals and brush corals. According to the IUCN Redlist, this species is endangered and is restricted to Madagascar. However, surprisingly, it was found in Nauru during the BIORAP Survey in 2013.





**CASE STUDIES:**

# **ECOSYSTEM SURVEYS**

Photo: Carlo Iacovino/SPREP

# CATCHMENT MANAGEMENT AND RESTORATION PLAN: RAROTONGA CLOUD FOREST ECOSYSTEMS

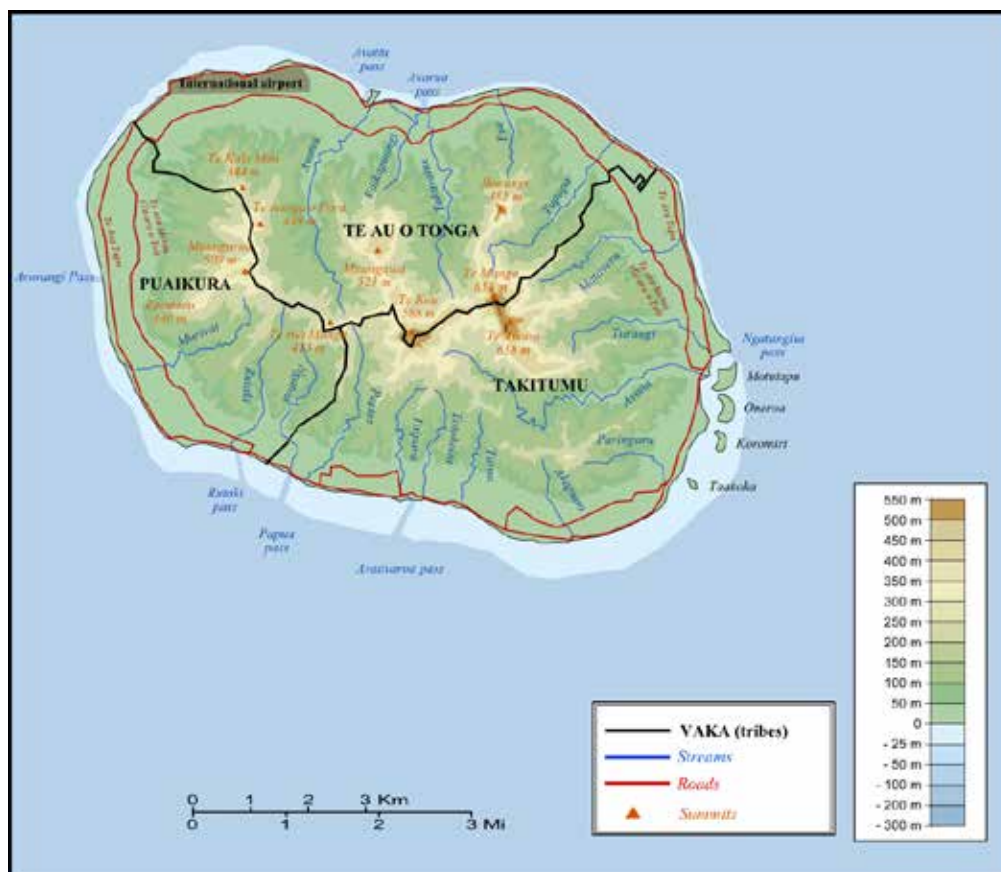
By Teresa Matamaki, Cook Islands National Environment Service

- Thematic Areas:**
-  *Species conservation*
  -  *Ecosystem management*
  -  *Community awareness*
  -  *Invasive species*

## Background

The objective of this activity was “to protect and enhance the cloud forests of Rarotonga so that their indigenous ecosystems, habitats for endemic species, and water supply functions are preserved in perpetuity.” The cloud forest field survey took place in the Rarotonga cloud forest from 6 to 22 May 2015.

The survey was conducted in the interior landscapes of Rarotonga at elevations at or above 400 metres. This area is described as the cloud forest area. The highest peak of this region is 652 metres. The study focused on the biological diversity and an updated biological inventory of these areas. Samples of flora and fauna were collected and shipped to be identified and archived at the Auckland Museum. Although cloud forest habitats cover only 1.5 km<sup>2</sup> of Rarotonga, these habitats support a disproportionately high number of the island’s endemic plant species.



Map author: Nevers (Wiki Commons)



## Key results and outcomes achieved including successes

The target habitats were those above 400 m in altitude on the Maungatea, Maungaroa, Te Kou, and Te Manga mountains. Five smaller peaks that had summits of similar altitude were not surveyed.



### Flora

One hundred and eight vascular plant species were recorded at the study sites. Eighteen endemic plant species are included on the IUCN Red List of threatened species.



### Lichens

Lichens, liverworts, and mosses were collected, and their identification is being confirmed. Initial identification work has indicated that the number of indigenous lichen species known to occur on Rarotonga will substantially increase.



### Land snails

Indigenous land snails confirmed as still present in cloud forest habitats include the endemic species *Lamprocystis globosa* and *Lamprocystis venosa*, one or more undescribed species of endemic *Lamprocystis*, and a species of *Nesopupa*. The cloud forest on Te Kou is important for land snail conservation on Rarotonga.



### Hymenoptera (ants, wasps, bees)

A total of 14 species of ants, wasps, and the honey-bee in seven families of Hymenoptera were found during the 2015 survey of the cloud forests of Rarotonga. These species are the first records of ants and wasps for the Rarotongan cloud forest and therefore represent a significant collection



### Freshwater fish

The summit basin of Te Kou is the only catchment within cloud forest habitats that has permanent flowing water. No fish were found in this stream during a kick-net survey. While spot-lighting at night, a mature tuna kavi (Pacific longfin eel; *Anguilla melastoma*) was found in the pool immediately below where the Te Kou track crosses the stream.



### Birds

Four indigenous species were seen or heard within cloud forest habitats: ioi (*Aplonis cinerascens*), Pacific pigeon (*Ducula pacifica*), white-tailed tropicbird (*Phaethon lepturus*), and Herald or Trindade petrel (*Pterodroma arminjoniana*).



### Herpetofauna

Two lizard species were seen in cloud forest habitats during the 2015 survey: Rarotonga tree skink and oceanic gecko. Inland blue-tailed skink (*Emoia impar*) were frequently seen sun-basking in the upper slope forest along the Te Manga track. This species is also likely to be present within the cloud forest.



### Threats

Key threats to the Rarotonga cloud forest habitats include climate change, invasive plant species, invasive animal species, introduced pathogens, recreational use, and other disturbances including fire, landslides, and wind-throw. Other potential threats are clearance for agriculture and housing, road construction, hydro-electricity development, and hunting.

## Key deliverables and outputs

The key deliverables/outputs of this activity were 1) a catchment management and restoration plan for the cloud forest and 2) a cloud forest survey report.

## Lessons learnt

- The report has been delayed due to the identification of the flora and fauna.
- It is important to have local support when possible for the activities and writing the report.
- The weather was a challenge but that is out of our hands, and in the end, the work was completed.

## Recommendations

Below is a summary of proposed actions for restoration, management, and monitoring of the Rarotonga cloud forest ecosystems.

Issue/knowledge gap	Proposed action/s
Risk of extinction for threatened endemic flora	Establish populations of threatened endemics in cultivation.
Establishment of additional invasive species/spread of existing invasive species	Install track signage regarding footwear/clothing/equipment hygiene. Develop biosecurity protocols for track and infrastructure users. Train staff in pest mammal sign and control.
Risk of fire/inadvertent damage	Install track signage regarding fire restrictions, track standards and return times, and guidelines for minimising impacts of use.
Unknown densities/impacts of introduced mammals, particularly rodents	Undertake baseline monitoring to determine the species present and their relative abundance. Assess baseline levels of seed predation for <i>Homalanthus nutans</i> . Determine location(s) of seabird breeding colonies. Consider feasibility of pest mammal control at key sites.
Continued spread of invasive plants at key sites for threatened endemic fauna	Implement control of invasive plant species at Te Kou and Te Manga.
Long-term trends in vegetation composition and health unknown	Continue assessment of photopoints established in 2015 at three to five year intervals. Expand coverage to include Maungatea, lower altitudes on Te Kou, and control sites of invasive plant species.
Climate change leading to modification or loss of cloud forest habitats	Ensure risk posed to cloud forests by climate change acknowledged in government policy.
Low public profile of cloud forest ecosystem and species due to inaccessibility	Community education and advocacy.

The samples, photos, and information gathered provide the basis for assessing the state of biodiversity in the Rarotonga cloud forest. The information can empower communities and relevant government organisations and traditional leaders to make informed conservation management and planning decisions. The goal of assessing this biodiversity is to ensure long-term conservation of cloud forest biodiversity and its essential ecological services, such as high water quality.

The management of Rarotonga cloud forest cannot be in isolation from the surrounding lowland areas. Threats that may pose a serious risk to the mountain summits, such as invasive species and fire, may first occur or establish within adjacent lowland areas and subsequently spread to montane habitats further inland. The management will therefore be most effective if it is applied not only to cloud forest habitats but also to all of the inland forests of the island.



Photo: Wiki Commons

## References

Martin T., Ranger N., Rate, S., Brook, F., Patrick, B., MacKay J., Early J. 2015: *Catchment management and restoration plan for Rarotonga Cloud Forest Ecosystems, Cook Islands*. Wildland Consultants Contract Report No. 3567. Prepared for Cook Island National Environment Service. 91 p.

## Acknowledgements



The fieldtrip and overall report would not have been possible without the support of the following people: Amanda Wheatley, Benjamin Maxwell, Dr Tim Martin, Edwin Apera, Talie Foliga, Gerald Mc Cormack, Teresa Mii Matamaki, and the staff of NES.

### DID YOU KNOW?

The cloud forest of Rarotonga supports a disproportionately high number of endemic species. The structure and composition of the cloud forest vegetation shape the island's water supply. Thus, the cloud forests of Rarotonga, and their abundance of non-vascular species, not only play a critical role in water quality but also ensure the reliability of the water supply. (Rarotonga Cloud Forest Ecosystems: synthesis report)

# CORAL REEF ECOSYSTEMS IN THE VAVA'U ARCHIPELAGO, KINGDOM OF TONGA

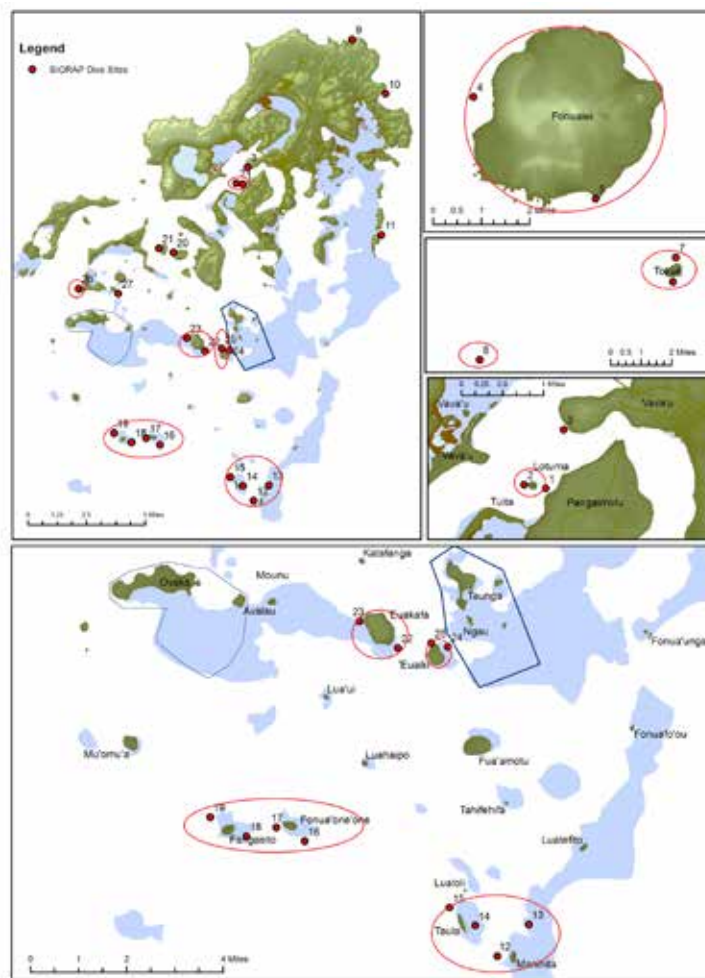
By Karen Stone, Vava'u Environmental Protection Association

Thematic Areas:  Ecosystem conservation  Species conservation

## Background

This case study summarises the assessments of marine resources that have occurred since 2014 when the Rapid Biodiversity Assessment (BioRAP) of the Vava'u archipelago was undertaken of 27 marine sites (SPREP, 2014). Marine resources are essential for subsistence and commercial fisheries, economic development through tourism, and shelter from natural and climatic events, including cyclones and sea level rise. For improved understanding of the status of coral reef ecosystems, regular monitoring is integral to provide information to both communities and resource users as well as to engage government.

In the BioRAP, monitoring included coral species, coral health and coral cover, and the diversity of reef fish, commercially targeted reef fish, and marine invertebrates including commercially harvested species such as sea cucumbers, giant clams, and lobsters. A team of national marine surveyors from the Ministry of Environment conducted further monitoring of coral reef habitats in February 2016 to identify coral health and reef fish diversity.



Map: Sites surveyed

## Key Results

- The results showed that the marine ecosystems are in varying stages of health, and the coral cover and health remained moderate to good throughout. Several important results were generated:
- In total, 222 species of hard corals were identified in the BioRAP.
- Coral bleaching, resulting from increased ocean water temperatures for extended periods of time, was evident on four sites, and further monitoring was conducted to report on potential coral mortality.
- In total, 406 reef fishes were identified during the BioRAP.
- Commercially targeted and predatory fish species including groupers, snappers, and emperor fish were in low occurrence and low abundance, showing signs of fishing pressure.
- Reef fish population composition was dominated by smaller and less important species of fish, such as damselfish and wrasses. These species can take over and damage coral reefs if there is a lack of predatory species.
- Giant clams and sea cucumbers were also reported in low numbers due to over harvesting for commercial export.
- Recent monitoring revealed no further bleaching events had occurred since 2015.
- Five conservation areas have been proposed following on from the BioRAP.



Photo: Coral reef (© D. Fenner)

## Lessons learnt

- Consistent monitoring of marine resources is essential for the future conservation and community management of marine resources.
- Improved knowledge by surveyors is important for accurate survey information.
- Community groups need to be involved through awareness programs and community managed conservation efforts under national working plans for conservation areas and marine protected areas.

## Recommendations

- Conservation programs need to incorporate coastal ecosystems, including marine habitats such as mangroves, seagrass beds, coral reefs and near-shore pelagic (deep-water) zones.
- Species conservation needs to occur to recover stocks of commercially and economically important stocks of species such as sea cucumbers, giant clams and predatory fish species.
- Community engagement and involvement in planning and performing resource management is para-mount to the success of conservation methods, including large marine managed areas and special management areas.



Photo: *Echinomorpha nishihirai* recorded during the Vavau BioRAP (© D. Fenner)

## Conclusion

The Kingdom of Tonga has made large steps toward identifying issues in its marine ecosystems through consistent monitoring and the ever-valuable implementation of the recommendations from the BioRAP. To date, five conservation areas have been presented for approval to Cabinet. Community awareness and conservation planning programs will be essential to the understanding and implementation of working plans for the conservation areas.

## References

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## Acknowledgements

The Tonga Ministry of Meteorology, Energy, Information, Disaster Management, Environment, Climate Change, and Communication (MEIDECC) was the lead agency implementing the rapid biodiversity assessment.

### DID YOU KNOW?

Coral reef ecosystems are often referred to as rainforests of the sea. These ecosystems provide us with food and protect our coastlines from storm surges and cyclones, and they are also breeding grounds for many different species of fish.

# CASE STUDIES: SPECIES SURVEYS



Photo: Karen Stone

# COOK ISLANDS: UNGA ASSESSMENT FOR THE ISLAND OF MAUKE IN 2015

By Teresa Matamaki, Elizabeth Munro, Nadia Helagi, Ian Bertram, and Reboama Samuel

**Thematic Areas:**  *Species conservation*




## Background

The coconut crab (*Birgus latro*) or unga as it is traditionally known is culturally important as a highly valued food source, which without proper management has been subject to overharvesting by the local residents on Mauke Island. Owing to the coconut crab's biology such as its unpredictable recruitment and slow growth rate, coupled with uncontrolled hunting pressures for this highly regarded food item in many island communities, coconut crab populations can be exploited faster than they can be replenished through breeding, recruitment, and growth. In an effort to combat this problem and rebuild the crab population, some landowners in Mauke have set aside their parcels of land for conservation of the coconut crab in 2012 for a period of ten years. The assessment outlined in this case study was the first assessment of the coconut crab to take place in the Cook Islands.



Photo: Laying baits (© NES, Cook Islands)

## This activity had the following objectives:

-  to collect information on population size structure and distribution on Mauke,
-  to provide an estimate of coconut crab abundance on Mauke; and
-  to train people on Mauke and representatives from Mangaia and Atiu to conduct a coconut crab survey so that they will be able to carry out further coconut crab assessments on their own in the future.



## Key outcomes

A total of 35 bait stations were distributed all over the island, including the conservation area for *B. latro*. In total, 135 crabs were recorded at 25 of the 35 bait stations. The interior region of Mauke is used by the local community for crop cultivation and raising livestock such as pigs, goats, and cows, and these agricultural activities may have an impact on coconut crab distribution. From this assessment, it was estimated that a catch per unit effort (CPUE; in this case, the number of crabs per bait) of one crab per bait corresponded to a population density of 15 crabs per acre. As a result, coconut crab populations were determined for Mauke's coastal region, *ra'ui* and non-*ra'ui* areas using the formula:

$$\text{Coconut crab population} = 15 \times \text{mean CPUE}$$

This conversion can only be used for areas of suitable habitat for coconut crab and for a maximum CPUE of 2.8 (Matamaki et al. 2016).

For the coastal region, we estimate a coconut crab population of 22,785 ( $\pm 4,830$ ), with 14% of this population occupying the *ra'ui* area. No crabs were found in the interior region during the baited trail survey, and no transects were sampled in this region; therefore, abundance in the interior region could not be determined.

## Lessons Learnt

The participants were divided into teams of up to four individuals to carry out the assessment survey. Most of the assessment team members have hunted coconut crabs for consumption, and so they have some idea of the best places to find coconut crabs. The coconut crab is a prized delicacy and is usually found at special occasion dinners, such as hair-cutting ceremonies and weddings. Through this assessment, the team learnt about the biology of the coconut crab, shared hunting experiences, and recognised the need for information on the distribution, abundance, conservation, and management of this important resource.



Photo: Measuring the thoracic length (© NES, Cook Islands)

This activity benefited from being conducted by locals with remote support from the Pacific Community. The participants who were part of the survey teams now understand the importance of conservation and have become more appreciative of this form of survey.







Gender inclusion was a factor of this survey as the interviews of coconut crab hunters included women, who also learnt about the importance of the survey and monitoring and evaluation. If a follow-up survey takes place, community support is guaranteed through their participation.

It would be beneficial to conduct this same survey on other islands in the Cook Islands and compare results.

### Key deliverables and outputs

The key deliverable/output of this activity was a survey report with recommendations.

### Recommendations

-  There is a need to improve public awareness and understanding of coconut crab biology, life cycle, vulnerability, stock status and unsustainable and sustainable exploitation practices so people can understand the vulnerability of the coconut crab and can make wise decisions about its management.
-  Seasonal closures (*Ra'ui*) should be established when crabs are reproductively active to ensure coconut crabs, particularly females, are protected during the time of greatest reproductive activity. This practice will help ensure population growth and sustainable use of the population.
-  The export of coconut crab should be banned or controlled while at the same time controlling the numbers in the coconut crab population on the island of Mauke.
-  Predator control will help ensure the longevity of the coconut crab, an important food resource for the community on Mauke.
-  A monitoring programme should be established to monitor the quantity and size of crabs caught and to assess the population status over time. Monitoring should take place every 3 to 5 years.
-  Future surveys should aim to align with this study to ensure the information collected is comparable; for example, surveys should be carried out at the same time of year (pre-summer wet months) to reduce variance due to foraging and moulting behaviour. To understand temporal and spatial patterns of exploitation, catch should be monitored by collecting data throughout the year and by region (e.g. village area). The information can be collected through hunter surveys or log books.

### Conclusion

This assessment, the first of its kind in Mauke, provides a snapshot of the condition of the Mauke coconut crab stock. For Mauke (a small island), light to moderate harvest pressure on coconut crabs for local food consumption can cause stock declines. From the results of this assessment, the Mauke coconut crab warrants attention as a resource that needs conservation and management.

Follow-up population surveys similar to this current assessment should be performed every three to five years. There should be consistency in the period/season when follow-up surveys are conducted. Due to the behaviour of crabs (foraging, moulting, migration, egg release, etc.), we recommend that follow-up surveys be performed around the dark moon phase from September to late November.

## Acknowledgements

We acknowledge the support and contribution of many people and agencies. Our appreciation goes particularly to the landowners and traditional and church leaders for their support of this survey. We thank the Pacific Community for technical assistance with survey planning, implementation, data analysis and reporting. Technical assistance was provided by the GEPAS Invasive Alien Species project, implemented through the United Nations Environment Program (UNEP) and executed regionally by the Secretariat of the Pacific Regional Environment Programme (SPREP) and nationally through the Cook Islands National Environment Service.



Photo: Training Participants (© NES, Cook Islands)

## Sources:

Makamati et al. 2016. *Assessment of the coconut crab (Birgus latro) in Mauke, Cook islands*. SPC. ISBN 978-982-00-0993-6

### DID YOU KNOW?

The coconut crab is the world's largest terrestrial arthropod, growing up to one metre in length. It is the only species of the genus *Birgus* and is found widespread across the Pacific islands. It is considered a delicacy in most places, and extensive harvesting of the coconut crab for food has threatened its survival in some areas. Source: Wikipedia

# STATUS OF THE FLORA AND VEGETATION IN THE VAVA'U ARCHIPELAGO, KINGDOM OF TONGA

By Ana Loiloi Fekau, Ministry of Meteorology, Energy, Information, Disaster Management, Disaster Management, Environment, Climate Change & Communications

Thematic Areas:  Species conservation

## Background

This case study summarises the assessment of plants in the Vava'u archipelago during the BioRAP survey on the islands in February 2014. The survey of plants in Vava'u includes all plants occurring in the selected sites.

These sites were surveyed in the past and were found to have ecological importance and provide valuable ecosystem services. The native plants in Vava'u are classified by their distribution as either endemic or indigenous.

Map (right): Sites visited by botanical team

## Key Results and Outcomes

- The survey found 262 native vascular plants, including eight species endemic to Tonga, two of which are restricted to Vava'u: *Atractocarpus crosbyi* and *Casearia buelowii*.
- In total, 12 new native species were recorded for Vava'u, including one new species for Tonga, *Boerhavia albiflora*. One endemic species, *Phyllanthus amicorum*, was previously known only from 'Eua.
- Additionally, 42 new weed records were recorded for Vava'u; 18 of these are new for Tonga. In total, 22 plants have been identified as rare in Vava'u, and 14 of these were found during the present survey.
- In total, 77 native plants were identified as rare, threatened, or endangered in Tonga along with 20 Polynesian cultigens and weeds.



Photos: *Atractocarpus crosbyi* (l) and *Casearia buelowii* (r)

(©A. Whistler)

## Lessons Learnt

- Materials and equipment should be in place before conducting monitoring surveys in Vava'u.
- Communities near the protected sites should be involved in consultations, and the work should raise their awareness, as they are the future generation. What we do today will affect the future generations.



Photo: *Hippeastrum* spp. (© Tau'olunga, Wiki Commons)

## Recommendations

There are several key recommendations about the flora and vegetation of Vava'u, including areas and species that should be given some kind of protection:

- Protect rare species, notably by collecting seeds and propagating *Casearia buelowii*, which is found only on Mt. Talau. The endemic *Atractocarpus crosbyi*, *Serianthes melanisca*, and *Syzygium crosbyi* should also be propagated.
- Protect the remaining native vegetation areas in Vava'u, including Mt. Talau, Mo'ungalafa, 'Utula'aina, 'Utungake, and outer islands.
- Raise awareness of the conservation values and threats to the rare plants of Vava'u through discussions and awareness and education programmes with landowners, communities, resource owners, and tourism operators regarding the management of significant sites.
- Develop Mt. Talau as a site for education and public awareness through interpretation and nature trails.
- Formally designate and gazette Mt. Talau as a National Park.
- Develop a management plan for Mt. Talau.
- Train more Department of Environment staff to monitor the recommended sites every two years.

## Conclusion

The flora of Vava'u is very unique and much smaller than the flora for the whole of Tonga: based upon the present BioRAP field studies and previous publications, the flora of Vava'u comprises more than 260 native vascular plant species. Given the uniqueness of these rare plants, it is therefore imperative to propagate them, possibly at the 'Ene'io Botanical Garden in Vava'u.



Photo: *Entada phaseoloides* (© David Eickhoff, Wiki Commons)

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## Acknowledgements

The success of the survey of flora and vegetation of Vava'u depended upon the assistance of the world-famous botanist Dr. Art Whistler and James Atherton with assistance from local team members from the Department of Environment from Nuku'alofa and the Vava'u branch and from the Department of Forestry in Vava'u.

I thank the other staff from the Department of Environment for taking turns to join the botanical team during the BioRAP survey in February 2014.

### DID YOU KNOW?

Eight of the native Vava'u species are endemic to Tonga; two of the eight are endemic to Vava'u, and one of these, *Casearia buelowii*, is only found on Mt. Talau!

# STATUS OF REPTILES IN VAVA'U, KINGDOM OF TONGA

By Ana Loiloi Fekau, Ministry of Meteorology, Energy, Information, Disaster Management,  
Environment, Climate Change & Communications

& Adam Backlin, US Geological Survey






**Thematic Areas:**  Species conservation

## Background

The Vava'u island group within the Kingdom of Tonga is known to support 12 species of terrestrial reptiles, all of which are lizards. Eleven of these species were documented from previous expeditions and research, and one was newly documented through the Vava'u Rapid Biodiversity Assessment (BioRAP) in 2014 and represents a recent (within the last 20 years) arrival to Vava'u.

Steadman et al. (1999) compiled much of the prior information on the reptiles of Vava'u, which includes several expeditions and research projects (Gill 1990; Gill and Rinke 1990; Zug and Gill 1997). The main island of 'Uta Vava'u has the highest priority for reptile conservation in Vava'u.

## Key Results & Outcomes achieved including successes

-  A total of 417 terrestrial reptiles representing 11 lizard species were recorded during the BioRAP. Six species of skink, one iguana species and four gecko species were detected, including the first record of the invasive common house gecko (*Hemidactylus frenatus*) on Vava'u. No snakes or amphibians were detected.
-  During the BioRAP, the team collected reptile inventories on 13 islands, five of which had no previous reptile information: Kenutu, Maninita, 'Oto, Taula and 'Umuna. In total, 29 new island species records were collected for reptiles across the Vava'u Island Group.
-  No snakes or amphibians were detected during the BioRAP. One of the aims of the BioRAP was to confirm that no invasive amphibians have established recently. The most likely invasive amphibian species would be the cane toad (*Rhinella marina*).
-  The globally threatened Lau banded iguana (*Brachylophus fasciatus*) was seen and collected in the surrounding forest of the village of Leimatu'a Vava'u. It was recently introduced to this location from elsewhere. Communities were aware of the iguanas and had seen them at some point in their lifetime.
-  Two translocations of the Lau banded iguana took place in Vava'u during the BioRAP. The first was an iguana that was captured in the village of Leimatu'a that had been collected from the forest. The second was an iguana captured on Pangaimotu, near a vanilla farm. This iguana was released on Mafana Island. One of the two captured iguanas died shortly after translocation. There is concern about the source of the iguanas and the size of their population.

## Lessons learnt

- Not enough environment staff members are trained in surveying reptiles, and this makes the outlook for follow up surveys uncertain or unclear.
- There is little awareness and there have been few awareness programmes with local communities about the global status of the Lau banded iguana. Education programmes for the local community will increase their understanding of the importance of the role of the iguana in the ecosystem and its value for protection.
- Formulate specific actions and goals in the Tonga NBSAP related to the conservation of the Lau banded Iguana.



Photo: Lau banded Iguana (© Adam Backlin)

## Recommendations

To ensure the survival and resilience of the reptiles of Vava'u into the future, the following is recommended:

- Train more staff members from the Department of Environment to assist with the survey work on reptiles in Vava'u prior to any further surveys;
- Create more awareness within local communities on the global status and importance of the Lau banded iguana to the environment of Vava'u;
- Formulate a Conservation Action Plan for the survival and safety of iguanas in the Vava'u archipelago;
- Create management areas to protect large intact sections of forest and to link forest patches;
- Carry out inventories of invasive species across the islands of Vava'u to provide baseline data to initiate conservation actions working toward invasive species control, removal and biosecurity protocol development; and
- Conduct a comprehensive survey across the Vava'u Island group to understand the current distribution and abundance of the Lau banded iguana.



## Conclusion

The reptile survey was part of the Biological Rapid Assessment Survey (BioRAP) of the Vava'u Archipelago in Tonga. The up-to-date information collected on reptiles and their threats is crucial for ongoing conservation planning and management.



Photo: *Emoia tongana* and *E. cyanura impar* (© Adam Backlin)

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## Acknowledgements

The reptile survey was successfully completed during the 2014 BioRAP due to great contributions from the US Geological Survey (USGS) and the staff of the Tonga Department of Environment.

### DID YOU KNOW?

The Lau banded iguana is native only to the islands in the Lau Group of eastern Fiji, and it was introduced to Tonga. It is listed as endangered, and its population is declining according to the IUCN Redlist. Only a single individual of the Lau banded iguana was found in Vava'u during the BioRAP Survey, which raises the need to put in place conservation measures to protect it. (Vava'u BioRAP, 2014)

# PROTECTING TONGA'S ENDANGERED MEGAPODE SPECIES, KINGDOM OF TONGA

By Ana Loloilo Fekau, Ministry of Meteorology, Energy, Information, Disaster Management,  
Environment, Climate Change & Communications

& Dr. David Butler, R&D Environmental Ltd., Nelson, New Zealand

**Thematic Areas:**  Species conservation

## Background

This case study assesses the conservation of the endangered bird known as the Polynesian megapode (*Megapodius pritchardii*) or Malau. The bird is endemic to Tonga and was only found on Niuafu'ou island until a second population was established relatively recently on Fonualei Island in the Vava'u Group (Butler, 2014). Niuafu'ou is approximately 8 kilometres wide. Three surveys have been carried out on the island recently, in 2010, 2012, and 2014. The 2010 and 2012 surveys produced significantly different findings due to differences in interpreting what were an active nesting ground and an active burrow. Following the third survey, a consistent picture has emerged.

## Key Results & Outcomes achieved including successes

- The Malau population on Niuafu'ou has stabilised around a low level since 2010. Nine nesting grounds remain active, a number that appears stable since the 1990s, although there has been a decline in the number of active burrows over that period.
- The key threat to the Malau population has been identified as the harvesting of eggs by collectors. Historically, all nesting sites have been exploited, with more than 50% of all eggs that were found in each nest taken (Goth & Vogel 1995). There has also been predation of egg-laying females and chicks by introduced feral cats (Elliot 1994, Goth & Vogel 1995).
- Egg collecting seems to be in decline as a tradition, so the survival of the Malau population seems fairly assured. However, measures are needed to try to build up the numbers to previous healthier levels and to understand more about current threats to the species. These measures are identified in a Recovery Plan prepared for the species by the Department of Environment (2014).
- A population established in 1993 on the uninhabited island of Fonualei is free of the main threats found on Niuafu'ou. A 2013 survey found that the population had increased since a previous check ten years earlier and had spread to new areas. The population was estimated at 600 to 1,000 birds, probably more than found on Niuafu'ou where the last detailed estimate was 188 to 235 pairs in the 1990s (Goth & Vogel 1995). The same 2013 survey re-confirmed that an earlier attempt to establish another population on Late Island had failed.



Photo: Niuafu'ou (© International Space Station, Wiki Commons)

## Lessons learnt

- Developing standardised procedures for surveying Malau is challenging, and further trials are needed on how to use playback of calls consistently.
- Major research using new remote sensing techniques is needed to provide estimates of population size and trend and to refine monitoring procedures.
- Invasive species are a key future threat on small remote islands.



Photo: Tongan Megapode (Malau) (© David Butler)

## Recommendations

- Encourage and assist Niufo'ou islanders to establish a Malau committee to establish a sustainable egg-harvesting regime that enables the preservation of local culture and the future survival of the Malau.
- Carry out a detailed research study on the Malau using modern technologies (radio transmitters, remote cameras, etc.) aimed at establishing an accurate assessment of population size and developing a monitoring protocol so that future trends can be assessed.
- Establish a monitoring programme to periodically assess the Malau population on Niufo'ou.
- Promote Niufo'ou as the island for visitors to see Malau and to learn the traditions of egg collecting and care of the birds. Fonualei Island, where a second population of Malau has been established, is not suitable for visitors.
- Develop educational materials so that schoolchildren learn of the Malau and its importance as an endemic species that used to survive only on Niufo'ou.

## Conclusion

The Malau is not under immediate threat of extinction. The small population on Niuafou'ou remains vulnerable to egg collecting, and if this key threat to the birds is reduced, the population should increase within the interior of the crater where other threats are largely absent. The population on Fonualei appears secure unless the island faces a disaster such as a volcanic eruption, severe cyclone, or the arrival of new invasive species.

## Acknowledgements

The contributions of all who assisted with the survey are sincerely appreciated and gratefully acknowledged. Furthermore, I would like to express my deep appreciation and indebtedness particularly to the officers from the Department of Environment (MEIDECC) for taking their time to assist the international consultant in conducting the survey on the outer islands.

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Illustration: *Megapodius pritchardii*  
(© Joseph Wolf, Zoological Society of London, Wiki Commons)

### DID YOU KNOW?

The Tonga megapode, or the Malau as it is known locally, is also known as the Polynesian megapode but is endemic to Tonga, meaning it is found only in Tonga. It is mostly found on Niuafou'ou Island and has significant cultural importance. According to the IUCN Redlist, the Tonga megapode is endangered, and one of main threats to the decline in population is due to overharvesting of the eggs for food.



Photo: Teariki Rongo







Photo: Mike Koka, Wikimedia Commons

**CASE STUDIES:**  
**TRADITIONAL  
MEDICINE**

# BIODIVERSITY AND TRADITIONAL HEALING: CONSERVING THE RARE VAIRAKAU MAORI (TRADITIONAL MEDICINE) PLANTS OF THE COOK ISLANDS

By Teariki Rongo, Cook Islands National Environment Service

**Thematic Areas:**  Species conservation  Capacity building  
 Community awareness  Invasive species

## Background

The sustainable use of the native and important naturalised plants and animals of the Cook Islands, especially those that are hard to find/rare and used for *vairakau*, is a very important issue. This importance is clearly reflected in the past and present activities of the National Environment Services (NES) and that of the Cook Islands Natural Heritage Project (CINHP), and sustainable use has become even more desirable in view of the changes to the environment as a result of climate change and the strive to create opportunities for outer island populations to remain on their islands.

The National Biodiversity Strategic Action Plan (NBSAP), a document of goals and listed activities, was an initial stepping-stone toward implementation of conservation and preservation actions to manage and conserve Cook Islands biodiversity.



Photo: *Mirabilis jalapa* (© frustratedgardener.com)

## Key results and outcomes achieved, including successes

As part of this effort, the project practitioners:

- Identified and consulted with practitioners of *Vairakau Maori* regarding plants used;
- Identified, surveyed, and recorded populations of at risk, hard to find, or rare *vairakau* plants;
- Articulated a system of long-term monitoring and management of at risk, hard to find, or rare *vairakau* plants;
- Identified threats to the *vairakau* plants and proposed recommendations to address the threats identified; and
- Carried out education and awareness activities related to the importance and value of *Vairakau Maori* plants.

## Key findings:

- Of the species of *Vairakau Maori* plants listed by the Cook Islands Biodiversity Database as rare, **74%** are found **only** on the Southern Group islands of Aitutaki, Mitiaro, Atiu, Mauke, and Mangaia. **26%** of the plants found in the Southern Group islands were also found in the Northern Group islands.
- Of the species of *Vairakau Maori* plants listed by practitioners as rare, **65%** are found **only** on the Southern Group islands of Aitutaki, Mitiaro, Atiu, Mauke, and Mangaia. **35%** of the plants named in the Southern Group islands were also found in the Northern Group islands.
- Forty-seven per cent** of *Vairakau Maori* plants listed by the database and practitioners are found on volcanic soil only, and **27%** grow in soil with a higher proportion of coastal soil.
- 27%** of *Vairakau Maori* plants identified by the database as rare are **Polynesian Introduced**, and of those identified by practitioners as rare, **37%** are Polynesian Introduced.

## Lessons learnt



Photo: *Syzygium malaccensis*  
(© drfarrahcancercenter.com)

- There is a need to regularly update information on plants listed as rare. Species surveys have tended to be ad hoc or only for particular species that are of interest to researchers. Changes have been noted by the local practitioners in terms of finding it harder to find certain plants, but this is anecdotal, and there is no formal population survey to confirm this or determine if populations of rare plants are improving or diminishing.
- It is important that this information is collected on-island and on a consistent basis, either by the appropriate Government agencies or through the Organisation of *Taunga Vairakau Maori* on each island of the *Pa Enua*. This would give the database and the Government agency a more complete information package on plants and their locations.
- Surveys must be conducted on each island. There are similarities between geologically similar islands, but there are also some significant differences, e.g. some have lakes, some have invasive species problems, and not all the *Vairakau Maori* plants are found on all of these islands. We must also consider the people who manage and use biodiversity on each island: there are significant differences with *ta'unga* and resource owners on each.
- All information sent to the NES should be stored in a database and used to update the Biodiversity Database when required.
- There is a need to replant plants and trees that are rare.

## Recommendations

The Action Plan and the activities on How to Monitor the Plan provided in the Programme developed to protect and conserve rare Vairakau plants should be supported and funded by donors and Government.

The project should continue for the islands of Aitutaki, Pukapuka, Rakahanga, and Manihiki.



Photo: *Leucas decemdentata* (© Nuroa Keisotyo )

## Conclusion

The Cook Islands biodiversity database has a list of species that are identified as rare or hard to find. However, this information can only be verified by survey and fieldwork. Traditional practitioners know which plants are rare and hard to find because they use those plants often. More support is needed to confirm these plants in the rest of the Cook Islands.

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## Acknowledgements

A big thank you is given to the taunga vairakau of Rarotonga, Enea Manu, Akatokamanava, Nukuroa, and Auau. The great support of Gerald McCormack, the Ministry of Health, and the Cook Islands National Environment Service is also acknowledged.

### DID YOU KNOW?

The basic tool of a *Taunga Vairakau Maori* is the *reru* or pounder and the *kumete* or wooden medicine bowl, usually made of tamanu (Polynesian mahogany) or miro (Pacific Rosewood). It is estimated there are least 62 Taunga Vairakau Maori in the Cook Islands; 89% are women, and 76% are between ages 16 and 59.

(Source: *Vairakau Maori Technical Report*)



**CASE STUDIES:**

# **PARTICIPATORY PLANNING TOOLS FOR BIODIVERSITY**

Photo: Carlo Iacovino/SPREP

# THE FIRST PARTICIPATORY THREE-DIMENSIONAL MODELING TRAINING IN THE KINGDOM OF TONGA: VAVA'U CASE STUDY

By Ana Loiloi Fekau, Ministry of Meteorology, Energy, Information, Disaster Management, Environment, Climate Change & Communications

## Thematic Areas:



*Ecosystem conservation*



*Species conservation*



*Resource mapping*



*Protected areas*



*Community awareness*

## Background

The Kingdom of Tonga's first training in Participatory Three-Dimensional Modeling (P3DM) took place in Vava'u in November 2015. Local community members, school children and government officers attended the training. P3DM is a process that is used to generate a series of physical outputs, the information from which may be stored in a database for use in a Geographic Information System (GIS). P3DM was used in Vava'u as a community-based mapping tool, which integrates local spatial knowledge with data on elevation of the land and depth of the sea to produce a stand-alone, scaled, and geo-referenced relief model of the island group.

Following the completion of the GEFPAS IIB Project rapid biodiversity assessment survey (BioRAP) of the terrestrial and marine ecosystems of the Vava'u archipelago in February 2014, a P3DM process was introduced to engage communities and key stakeholder on key recommendations that came out of the BioRAP.



Photo: Completed model and participants (© Paulo Amerika)

Participants from six districts on Vava'u including key relevant stakeholders were trained in the P3DM approach and process. These participants created the first P3D model of the Vava'u archipelago.

The P3D modeling was completed in a total of four consecutive days and involved the following key activities: consultations with communities and school principals on P3DM practices and processes; construction of the P3D model by school children and community members; composing the legend for the model; tracing, cutting, and pasting (done in teams) and extracting the data via digital photography. The model was digitised during the month of June 2016.

## Key Results & Outcomes achieved including successes

- The definition of legend components by community members identified the community values placed upon the marine space.
- The process of building the P3D model facilitated the transfer of traditional and local knowledge, wisdom, and values from the older participants to the younger ones.
- The entire P3DM process empowered community members to take ownership and leadership in sustainably managing their environment and natural resources.

## Lessons learnt

- It is important to conduct a follow up activity to update the model as new information becomes available.
- The P3D model should be used to assist with the formulation of management plans for conservation sites.
- Communities need to participate fully on all days of training to ensure that all information on the model is complete and correct.
- The number of days for the training should be extended for more than four days to allow sufficient time to create the model.
- Representatives from communities and schools and all stakeholder groups generally work in a voluntary capacity. It is important to minimise the amount of time that participants are requested to stay away from their homes and obligations. Usually, participants inputting data onto a 3D model need one and a half days to complete their work. The project should cover the costs of transport, lodging, and catering.
- Reducing the number of participants working at any one time on the model would allow everyone to physically access the model. An overcrowded venue, with more than approximately 20 people, causes distraction and loss of motivation.
- Community members need more training after the handover on specific parts of the data extraction and digitization process.
- P3DM should be seen as a means to enhance community-based awareness and local analytical skills.
- P3DM aims to create full participation by community members as part of a broader intervention for sustainable resource use and management.
- The outcomes of the P3DM exercise included many non-tangible elements, like increased awareness and knowledge about physical and cultural aspects of the island groups which were mapped, enhanced community identity and social cohesiveness.
- Based on the success in Vava'u, P3DM modeling is best done with one community before replicating modelling workshops in other parts of the country.

## Recommendations

- P3D modelling should be used more often because it assists community members in building on the existing model to communicate, advocate, and plan more effectively.
- P3D models are bulky. Data extracted from the P3D model should be used to produce thematic maps which could then be used by representatives of the community as media in negotiation processes.
- Extending the training over several days but with less time on each day would address the issue of people being away from their family and traditional obligations.
- P3DM can be used to assist development of management plans for the seven approved conservation areas.
- Approximately 15 or fewer participants should work on the model per day to maximise access of all participants to the model.



Photos: The model building process (©SPREP)

## Conclusion

The P3D model empowered the local communities of Vava'u to share their knowledge of their resources and surroundings. This knowledge, which is represented physically on the P3D model, is vital to the overall sustainable management of the resources of the islands, including the establishment of new conservation areas on Vava'u.

## References

UNISDR (2014). UNISDR Scientific, Technical and Advisory Group Case Studies, Participatory 3-Dimensional Mapping to foster multi-stakeholder collaboration in Disaster Risk Reduction. UNISDR Scientific and Technical Advisory group, the United Nations office for Disaster Risk Reduction.



Photo: Working on the legend for the P3D model (©SPREP)

## Acknowledgement

The first P3D model of the Vava'u Island Group would not have been successfully completed if not for the assistance of local communities from six districts in the Vava'u Island Group. The technical assistance of the IIB project executing agency (SPREP) and the Ministry of Natural Resources and Environment (MNRE) - Government of Samoa is acknowledged. The P3DM training was a success due to extraordinary contributions of Town officers, District officers, students from Primary, Secondary and Tertiary schools in Vava'u, Government and non-government organisations from the main island of Tongatapu, and staff from the office of the Governor of Vava'u. The training was facilitated through a partnership between the Tonga Department of Environment (MEIDECC), MNRE, and SPREP with the assistance of the Technical Centre for Agricultural and Rural Cooperation (CTA ACP-EU).

### DID YOU KNOW?

The P3D model is located at Mailefhi hall in Neiafu, Vava'u and is accessible and available for public viewing. It is an effective tool to guide development planning and resource management.

# PRACTICAL PLANNING FOR RESOURCE MANAGEMENT - NAURU'S FIRST PARTICIPATORY THREE-DIMENSIONAL MODEL

By Berrick Dowiyogo, Department of Commerce, Industry and Environment (CIE) – Government of Nauru and Vainuupo Jungblut, SPREP

## Thematic Areas:



*Ecosystem conservation*



*Species conservation*



*Resource mapping*



*Protected areas*



*Community awareness*

## Background

Participatory Three-Dimensional Modelling (P3DM) is a planning process that combines aerial/satellite imagery, elevation data, and local traditional knowledge to generate a series of physical outputs, the information from which may be stored in a database for use in a Geographic Information System (GIS).

The first Participatory Three-Dimensional Model for Nauru was constructed during a national training in April 2016. The training brought together key stakeholders including local communities from the 14 districts of Nauru, government officials, school children, and non-governmental organisations to learn about P3DM, its application, and benefits and to construct a 3D model of their island through a participatory process.

The P3D model will assist greatly with the establishment and management of conservation areas identified through the Nauru Rapid Biodiversity Assessment (BIORAP, 2013) and can also be applied to planning across the different sectors in Nauru.

## Key results and outcomes

- The Nauru P3D model was successfully completed with hands-on participation from all stakeholders involved, and with high-level recognition and support.
- From the process of constructing the P3D model, students and community members gained an appreciation of the spatial interlinkages within the natural environment of their country, including areas of high biodiversity value, areas of cultural/spiritual significance, infrastructure and utilities, and heavily disturbed areas.
- The training was well documented through capture of still and video footage, including interviews with community members, students and government representatives to gauge their views on the training.
- A high-resolution image of the model was captured by the P3DM team for digitisation and storage in a Geographic Information System (GIS) programme for future modification.
- Effective replication of P3DM skills from other IIB participating countries and cross-island sharing of expertise was facilitated through participation of the Tonga IIB coordinator and technical assistance provided by the Ministry of Natural Resources and Environment (MNRE) – Government of Samoa.

## Lessons Learnt

- Always be prepared and have contingency plans. In remote areas, it is important to have experienced staff and flexible approaches. The P3DM team faced many unforeseen logistical challenges during the training but formulated backup plans on the spot to address these.
- Wider membership or incentives are needed for better engagement in national P3DM planning. A P3DM technical team was identified among various key government agencies to assist with planning and logistics of the training, but only three of the seven identified members joined the training.
- P3DM trainers that engage in the scoping exercise should also take part in the actual training to help avoid issues with follow up finalising the needed maps for the model.
- The general public and school children should have access to the completed model for educational purposes.



Photo: His Excellency, President of Nauru, Hon. Baron Waqa MP perusing the P3D model (©SPREP)

## Recommendations

- The Department of Commerce, Industry and Environment (DCIE) should continually promote the use of the model for 'whole of island' integrated planning.
- Further input for district-specific features (buildings, noteworthy natural features, cultural/spiritual sites, etc.) on the P3D model should be provided by each of the 14 districts.
- The permanent location of the P3D model should be suitable for protecting the model from damage but also making it accessible to the public and to school children.

## Conclusion

The P3D model will assist with planning for the management of conservation areas on Nauru, particularly those priority areas recommended by the 2013 Nauru rapid biodiversity assessment. Further, the P3D model will facilitate the preparation of management plans for new conservation sites and broader biodiversity conservation initiatives, including the UNDP Nauru ridge to reef (R2R) project, and can be used to inform sectoral planning, including for climate change adaptation and disaster risk reduction.

## References

McKenna, Sheila. A., et al. 2015. Rapid Biodiversity Assessment of Republic of Nauru. Apia, Samoa: SPREP



Photo: Building up the P3D model (©SPREP)

## Acknowledgements

Sincere thanks are given to the Government of Nauru, through the Department of Commerce (DCIE), for their interest in extending P3DM to their country. Sincere appreciation is conveyed to the Samoan Ministry of Natural Resources and Environment (MNRE), the main trainers and resource people who worked tirelessly to make sure the P3D model was completed on-time. The Tonga IIB Project Coordinator shared her valuable P3DM experience and skills with Nauru stakeholders. The Secretariat of the Pacific Regional Environment Programme facilitated arrangements for the P3DM training. The Technical Centre for Agricultural and Rural Cooperation (CTA ACP-EU) provided assistance for the training.

**DID YOU KNOW?** The first P3D model was constructed for all of Nauru with active input and participation of local and national stakeholders and was unveiled by the President. The final P3D model will be used as a living tool to assist with the planning and management of the island's environment.







**CASE STUDIES:**

# **UNDERSTANDING ISLAND BIODIVERSITY**

Photo: Carlo Iacovino/SPREP

# PROFESSIONAL DEVELOPMENT FOR TEACHERS ON BIODIVERSITY CONSERVATION — THE COOK ISLANDS EXPERIENCE

By Teresa Matamaki, Cook Islands National Environment Service

- Thematic Areas:**
-  *Species conservation*
  -  *Capacity building*
  -  *Community awareness*
  -  *Invasive species*

## Background information

Integrating biodiversity into the school curriculum is a priority identified in the Cook Islands National Biodiversity Strategic Action Plan (NBSAP). Therefore, Live and Learn Environmental Education (LLEE) was engaged by the National Environment Services (NES) partnered with the Ministry of Education (MOE) to plan and conduct a training of trainers with teachers from the primary and secondary schools.

LLEE conducted consultation training in 2013 and 2015 with the teachers from the primary and secondary schools to develop positive attitude and values on biodiversity conservation, to share participatory approaches for promoting biodiversity conservation, to identify sustainable actions relevant and measurable at the school level, and to provide opportunities to establish networks among teachers.

Building on the previous training delivered in 2013, the programme for 2015 took a participant-focused approach to share lessons learnt and to explore strategies identified in the Biodiversity Conservation Teacher's Guide developed by LLEE Education and distributed to school by MOE.



Photo: Training Participants (© LLEE Fiji)

## Key results and outcomes achieved including successes

The training:

- Demonstrated the significance of biodiversity conservation and its relevance to the Cook Islands 'way of life';
- Enlightened and enforced the trainers' scope on the different tools applicable to engage student interest in and commitment to biodiversity conservation, as identified in the Biodiversity Conservation Guide;
- Enabled the trainers to develop lesson/unit plans for biodiversity awareness within the school curriculum;
- Served as a space for the trainers to identify strategies and develop an annual workplan for implementation in their school;
- Facilitated an atmosphere where trainers felt comfortable to share their experiences and challenges faced in integrating biodiversity conservation awareness in their schools and the community and to identify supportive roles for NES and MOE in supporting the activities developed within the workplan developed by the trainers;
- Identified champions and key agents for implementation of the workplan to advocate for biodiversity conservation; and
- Enabled the trainers to develop a networking strategy for sharing of experiences with activities in schools that advocate and encourage biodiversity education.



### Lessons learnt

- It was noted through informal discussions that school activities planned are carried out without coordination and often fail because of a lack of consultation with the district community.
- The teachers were not familiar with the LLEE handbook Discovering Biodiversity Education Guide despite MOE distributing a copy to all schools that were represented at the training two years prior (2013).
- The MOE has a strong partnership with NES, which could be explored for the benefit of its curricular programmes.
- The professional development training by LLEE empowered teachers as change agents and biodiversity champions, building on the existing strengths and understanding of the teachers.

Photo: Training Participants (© LLEE Fiji)

## Recommendations

The following are important recommendations to be considered based on the training outcomes and for future similar training:

- District-based schools should be encouraged and supported to involve the communities in school activities.
- MOE can play a strategic supporting role in preparing schools to develop a criteria checklist for any action plan identified to ensure that all relevant stakeholders are informed and involved for a strong partnership to implement the identified actions.
- Monitoring of school resources and materials will encourage the use of available materials. The MOE should explore the resources available from NES to support school strategy plans, such as the identified NES website on the tabled flora and fauna species found within the Cook Islands.
- Rotation of facilitation of similar programmes by school clusters is encouraged to develop, facilitate, and lead similar trainings in the future to continue the cycle of innovative learning.

## Conclusion

This training workshop coordinated by NES and MOE provided an excellent opportunity for increasing teacher awareness of existing resource materials that can be incorporated into the existing curriculum or used to develop creative approaches to engage student interest in understanding the importance and relevance of biodiversity conservation. The general feedback noted that the three-day training was a good refresher course and for some allowed a better understanding of the concept of biodiversity and the relevance of biodiversity conservation awareness and action in schools. In addition, the participant-oriented approach allowed for open sharing and communication on various successful actions that have been carried out in various schools. This approach also allowed for open discussion of past challenges in implementing strategies in schools and of the supportive roles the MOE and NES can provide for school management engagement.

## References

1. Live and Learn Environmental Education 2013, Technical report for biodiversity conservation teachers training in Rarotonga. 23 p.
2. Live and Learn Environmental Education 2015, Report on Teachers Professional Development Training 8th – 10th April, Rarotonga, Cook Islands. 23 p.

## Acknowledgements

A sincere thank you to Live and Learn Environmental Education in partnership with National Environment Service and the Ministry of Education for the successful completion of the training for the teachers.

### DID YOU KNOW?

Discovering and valuing biodiversity as well as understanding the linkages between culture, biodiversity, and people's ability to take action are some of the fundamental building blocks for integrating biodiversity conservation into the school curriculum. The challenge for environmental education in the Cook Islands is instilling in today's generation the necessary respect for the environment and a readiness to protect its natural biodiversity, in order to hand down to future generations the resources necessary to respond to their needs. (Source: [NES website](#))

# TEACHING AND LEARNING BIODIVERSITY IN SCHOOLS: THE TUVALU EXPERIENCE

By Faoliu Teakau, Tuvalu Department of Environment

## Thematic Areas:



*Education and awareness*



*Communication*



*Capacity building*

## Background

Tuvalu signed the Convention on Biological Diversity in 1992 and ratified it in 2002. In 2010, Tuvalu approved its own National Biodiversity Strategic Action Plan (NBSAP) following the submission of a national report to the UN Convention on Biological Diversity in 2009, which had noted that the threats to the environment in Tuvalu developed from deleterious human actions and negative attitudes that resulted in littering, over-fishing and -hunting, and climate change. With the increasing effects of climate change, there is growing recognition of the need for education to understand the significance of the existing biodiversity in our environment and the importance of implementing innovative and proactive actions for the conservation of biodiversity.

Live & Learn Environmental Education was engaged through the Tuvalu IIB project in June 2016 to deliver a training workshop with teachers and stakeholders to explore linkages on biodiversity in the existing school curriculum and to raise awareness of the meaningful engagement of child advocates in biodiversity conservation. Resource materials developed by Live & Learn were used as a basis for the training course; they also drew on creative application of lesson plans trialled successfully in schools across the region to raise awareness of how biodiversity can be integrated into school activities.

The approach taken during the training was to enhance participants' knowledge of biodiversity values and connections and provide platforms for discussion to identify the relevance and significance of biodiversity to the community's well-being and 'way of life'. For example, a field trip was organised by the Department of Environment to a nursery managed by the Tuvalu Ministry of Agriculture to provide an 'outside the classroom' experience and approach to learning and appreciating the living things in our community, demonstrating the potential for outdoor activities with students. This created an enabling environment for teachers to also identify entry points for biodiversity into the existing school curriculum, develop lesson plans to engage student interest and identify various strategies to engage meaningful participation of their schools in biodiversity conservation.



## Key results and outcomes

The training:

- Increased the awareness of the significance of biodiversity conservation and relevancy to the Tuvaluan islanders' 'way of life';
- Enlightened the trainers about different tools applicable to engage student interest and commitment for biodiversity conservation, as identified in the Biodiversity Conservation Guide;
- Developed lesson/unit plans for biodiversity awareness within the school curriculum;
- Identified strategies and developed a school action plan for implementation in the various schools;
- Facilitated an atmosphere where trainers felt comfortable to share their experiences and challenges faced in integrating biodiversity conservation awareness in schools and the community and to identify roles for the Department of Environment and Ministry of Education to support the activities developed within the new workplan;
- Identified champions and key agents for implementation of the workplan to advocate biodiversity conservation; and
- Developed a networking strategy for sharing experiences in activities in schools that advocate and encourage biodiversity.



Tuvalu teachers during the training. Photo: © LLEE Fiji

## Lessons Learnt

- The participant-oriented approach of the training succeeded in facilitating creative and forward thinking.
- Teacher involvement in action plan design is key to integrating biodiversity awareness into school curricula.
- The platforms facilitated open discussions regarding the challenges to implement these actions and the role of government and NGO stakeholders in supporting the successive implementation of the identified activities.

## Recommendations

The following are important issues that are recommended for consideration by the relevant authorities in Tuvalu based on the training outcomes:

- Strengthen partnership with the Ministry of Education (MOE) to address some of the challenges highlighted by the teachers. This is an important course of action to ensure that reflections and action plans designed by the teachers are acknowledged and that further developments from the training can be absorbed into the Ministry's curriculum planning and design of school terms and activities;
- Develop and encourage more school-oriented environmental programmes, facilitated by relevant ministries in partnership with MOE and with other environmental agencies present in Tuvalu and the region;
- Distribute relevant resources developed by Ministry of Environment, Ministry of Agriculture, MOE, and environmental NGOs to schools and students to build their interest in environmental issues and actions they can implement;
- Support existing environment committees in schools to add more environmentally focused programmes in schools, as well monitor and provide assistance to schools to carry out their biodiversity action plans;
- Encourage student representatives to participate with teachers in similar trainings;
- Provide platforms where teachers and students learn together to improve their understanding of biodiversity;
- Encourage further Teachers Professional Development courses on child-centred learning and child rights and responsibilities;
- Extend the training to schools on the outer islands of Tuvalu; and
- Develop a joint workplan for the Tuvalu Department of Environment and MOE to work together to follow up on these recommendations and next steps for the progressive integration of biodiversity into the national curriculum.



Participants presenting the findings of their group work. Photo: © LLEE Fiji

## Conclusion

The highly vulnerable nature of the biodiversity on Tuvalu, linked with its island type and the predicament that the nation faces because of climate change impacts, gives more reason for the involvement of schools in biodiversity conservation efforts. This training was the first of its kind for teachers of Tuvalu. The teachers' workshop provided the opportunity to strengthen networks among the Departments of Environment, Agriculture, and Education and teachers on future biodiversity conservation advocacy activities. Additionally, the training provided an excellent opportunity for raising awareness of educational resource materials that can be incorporated into the existing curriculum and of the potential to develop creative approaches for engaging student interest in understanding the importance and relevance of biodiversity conservation to life in their islands.

## References

Government of Tuvalu. Tuvalu National Biodiversity Strategy and Action Plan 2012-2016. Funafuti.

Government of Tuvalu. Tuvalu National Report to the third Conference of Small Island Developing States (SIDS), Apia Samoa June 2014.

## Acknowledgement

A big thank you is given to the Secretariat of the Pacific Regional Environment Programme (SPREP) and the IIB project for making the training a reality. To Live and Learn Environmental Education Ltd, thank you for your expert delivery of the training; to the teachers of both primary and secondary schools who participated, thank you for your great enthusiasm and active participation which has made this training a resounding success—you are the champions to move the next steps of this initiative forward; To the other ministries and stakeholders that participated, thank you for your time and interest in this initiative.



Training participants. Photo: © LLEE Fiji

## DID YOU KNOW?

The marine environment of Tuvalu consists of six major ecosystem types: oceanic, outer reef, lagoonal, back reef, lagoon floor, and patch reefs, plus natural channels between the ocean and lagoon (Tuvalu NBSAP 2009). The Funafuti Conservation Area, which is sometimes called the 'Kogatapu Conservation Area' or 'Funafuti Marine Conservation Area, is administered by the Funafuti Falekaupule and was established with support from the South Pacific Biodiversity Conservation Programme executed by SPREP.



**CASE STUDIES:**

# **COMMUNICATING KEY MESSAGES ON BIODIVERSITY**

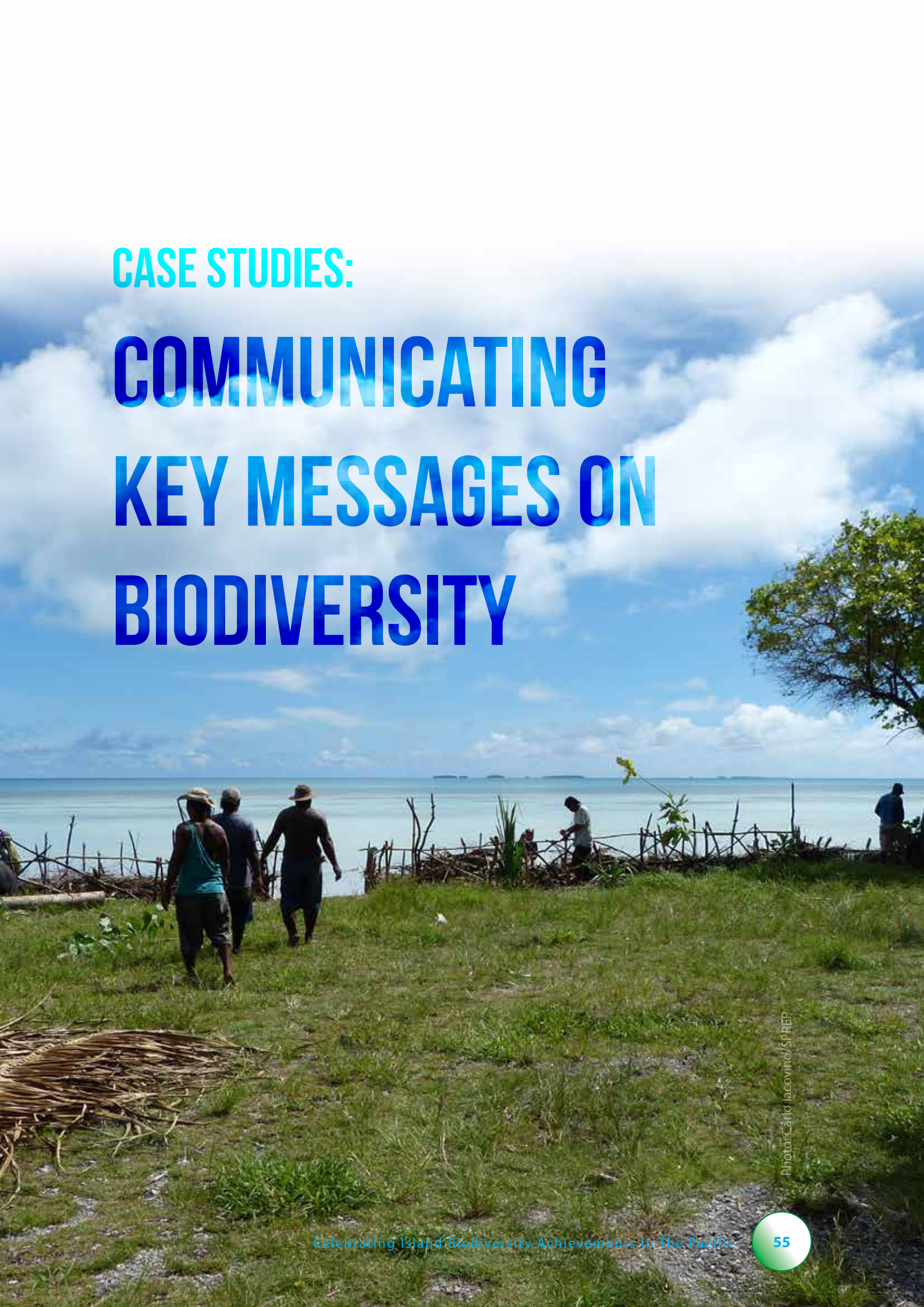






Photo: Carlo Iacovino/SPREP

# OUR BIODIVERSITY, OUR ISLANDS, OUR FUTURE

By Teresa Matamaki, Cook Islands National Environment Service

**Thematic Areas:**  *Species conservation*  *Capacity building*  
 *Community awareness*  *Invasive species*

## Background





The Cook Islands National Environment Service, in collaboration with the Integrated Island Biodiversity (IIB) Project and the Invasive Alien Species (IAS) Project, launched the theme for our 2014 campaign: E Tango Maori te Ao Ora Natura: Our Islands, Our Biodiversity, Our Future. The theme encompasses the link between biodiversity and the past and present state of each of our islands within the Cook Islands. It also recognises the importance of biodiversity to our future. 'Our Islands, Our Biodiversity, Our Future' was aimed at promoting the different aspects of Cook Islands biodiversity to our people. This effort included highlighting threats, such as invasive species, and promoting the unique features of our species and ecosystems.



Photo: (© Cook Islands NES)

## Key results and outcomes achieved including successes

'Our Islands, Our Biodiversity, Our Future' saw a large number of events take place to promote our Cook Islands biodiversity.

-  The media was an avenue for a number of awareness-raising activities with newspaper advertorials, newspaper advertisements including a "Did you know?" weekly column, as well as both radio and television ads.
-  The Campaign involved community events on Rarotonga, such as 'cross island trek' walks with schools as well as walks through gardens to the Takitumu Conservation Area; the replanting of native trees along the coast of the Punanga Nui Market; speech competitions; an inter-ministry biodiversity challenge; and a photo exhibition as well as a quiz night.
-  Avarua Primary School participated in the Live and Learn Teacher training held in 2013, which led to many biodiversity activities including Biodiversity Modules for teachers, culminating in the classes creating biodiversity displays as well as holding a Biodiversity Parade for the school. Both events were significantly covered by our Division officers as well as the media.
-  Avarua Primary School has continued using the remaining modules of the Live and Learn Resource material in the 2014 school year. As part of the NES 2014 campaign, further presentations were made to Avarua Primary School teachers on specific biodiversity modules that will be used this year, including on threats to biodiversity.

## Lessons learnt

- Engage school children because they will be able to share the message with their parents or the adults at home.
- Link activities to national programmes to increase the likelihood of accessing both financial and technical support for activities, making them more sustainable.
- Link your theme to international or regional campaigns to have resources available for promotions and awareness.
- Working with other government ministries using tools like the inter-ministry challenge helps to create a fun learning environment while implementing your campaign.
- It is important for the programme to develop useful resources that will be sustainable after the campaign has come to an end.
- Media costs are high, and it is best to budget realistically for these or seek partnerships to help cover costs.



Photo: Akaiami, Cook Islands (© Robert Young, Wiki Commons)

## Key outputs

The main deliverables and outputs of this campaign were outlined in a report describing the following activities:

- newspaper advertorials
- newspaper advertisements
- 'cross island trek' walks with schools
- Takitumu Conservation Area trek
- speech competitions
- inter-ministry biodiversity challenge
- photo exhibition
- quiz night
- "Did you know?" weekly newspaper column
- biodiversity-related radio and television advertisements
- replanting of native trees along the coast
- Live and Learn Teacher training

## Recommendations

- It is important to have a communications strategy that will guide the awareness campaign.
- Keep working with the schools to involve them in the campaigns that influence their education and surroundings.
- Cover as many different modes of media as necessary, including social media.

## Conclusion

This awareness campaign successfully promoted the conservation of the rare and unique biodiversity of the Cook Islands by introducing students to natural areas and conservation. The frequency and understanding of discussion about biodiversity increased as a result of this campaign.

## References

NES Annual report 2013-14 and IFD 6 month report July-Dec 2014



Photo: Photographic exhibition (© Cook Islands NES)

## Acknowledgements

Special thanks are given to the Education and Awareness Division of the Cook Islands National Environment Service and to the school students and teachers who actively participated in the campaign activities. A big thank you is conveyed to the Secretariat of the Pacific Regional Environment Programme (SPREP), the GEPAS IIB project, and GEPAS Invasive Alien Species (IAS) project for making this successful campaign a reality.

### DID YOU KNOW?

Community participation helps people to take ownership of actions to help protect our Islands' biodiversity and increases community pride in their natural surroundings and its interlinkages with our traditional custom (Source: NES website)

Photos: Awareness campaign posters

(© Cook Islands NES)

# BIRD SPECIES

**Ei! Kua kite ainei koe...**

The Cook Islands has two native Kingfishers, the **Mangia** found only on Mangaia and the **Nyktora** found on both Atiu and Mautia.

**Kakerori** is only found on Rarotonga and Atiu.

**THE KOPEKA (ATIU SWIFLET)** is endemic to Atiu. It lives in caves and feeds on small flying insects.

...ko Rarotonga e Atiu ua te nga anua e kitea ia ana te manu **KURUPA**

**THE KURUPA'O (ORLE LORAKEE)** IS FOUND ON ATI'U AND FEEDS ON FLOWERS AND SOFT FRUITS.

# TREES

**Ei! Kua kite ainei koe...**

**MATO** (COOK ISLANDS HOMALIUM) is endemic to the Cook Islands and can only be found on Rarotonga and Mangaia.

**TAMANU** The Tamenu is a valuable source to the northern group islands. In Nukunono, cutting of the tree is discouraged to allow it to grow and age.

**INIAO (MITIARO FAN PALM)** The Iniao (Mitiaro Fan Palm) is a seriously endangered tree. Only 500 trees exist on the planet and can only be found on Mitiaro.

# MEDICINAL PLANTS

**Ei! Kua kite ainei koe...**

**THE PŪAIKAO (LEUCAS)** IS A MEDICINAL PLANT AND IS USED WIDELY BY TRADITIONAL HEALERS.

**MILE-A-MINUTE WEED** is an invasive weed that has medicinal use.

**THE KŌKI'I (CLOVER SORREL)** is a creeping herb and has medicinal properties.



REGIONAL CASE STUDIES:

# IMPROVING TECHNICAL CAPACITY FOR BIODIVERSITY CONSERVATION

Photo: Carlo Iacovino, SPREP

# CAPACITY BUILDING AND TECHNICAL COOPERATION ON BIODIVERSITY CONSERVATION IN THE ISLANDS OF THE PACIFIC

## Thematic Areas:



South-south cooperation



Partnerships



Education and awareness



Knowledge sharing

## Background

During the implementation of the GEFPAS IIB project, in-country and regional capacity building initiatives not only provided skill development for new and innovative approaches to biodiversity conservation planning but also facilitated south-south cooperation and knowledge sharing across the four countries under the project.

The approach to capacity building through the project was very much hands on, which facilitated greater learning of themes and concepts conveyed. Capacity building initiatives also brought different stakeholders and communities together in an informal setting where they freely participated and shared ideas, challenges and lessons with great enthusiasm and worked closely together in the spirit of cooperation to jointly develop outputs that they can proudly call their own. Furthermore, over the course of the project, IIB project country coordinators gained skills and experience that would assist them in the long-term as conservation professionals.

## KEY RESULTS AND OUTCOMES

### Participatory three-dimensional modelling (P3DM)

Training on the process and practical aspects of P3DM was rolled out in three project countries (Cook Islands, Nauru, and Tonga). The three-dimensional models developed by each country greatly assisted them with the process of identification, establishment and management of conservation sites, species conservation and marine resource management. Unlike traditional conservation planning methods which use flat maps, the 3-D models enable stakeholders to better visualise their land and seascapes and therefore better identify and verify any adverse change to habitats and species that has occurred, is occurring, or is likely to occur in the future. The in-country trainings were unlike others in that the principle trainers/resource people were Pacific islanders themselves, from the Government of Samoa who imparted their knowledge with IIB project coordinators and partners in Tonga, Nauru, and the Cook Islands.

The trainers conveyed knowledge from their own experience of the P3DM processes to those who participated, which created a meaningful dialogue over the course of the training. The process enabled full participation of communities, youth, NGOs, private sector and government representatives, it facilitated close collaboration, ownership of the process and demonstrated the value of working together towards a common goal.

Overall, it provided a level platform for the free exchange of ideas and experiences between these different interest groups including a network of trainers to continue and sustain P3DM activities in their own countries. Refer to figure below for the key merits of the P3DM process.



## Training on Open Standards for the Practice of Conservation

A six-day training, held in March 2016, focused on the Open Standards for the Practice of Conservation, a five-step conservation planning process that combines principles and best practices in adaptive management and results-based management from conservation and other fields, and is designed to be applicable at any geographic, temporal, or programmatic scale.

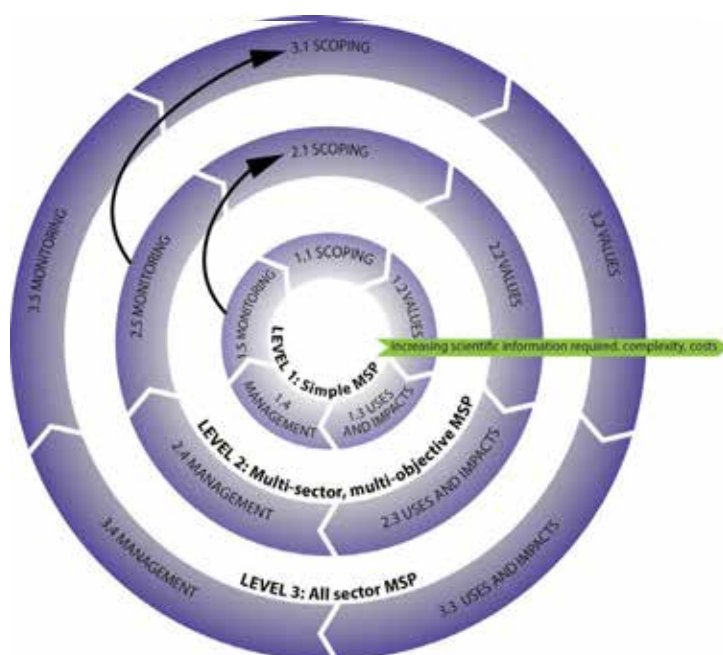
The training provided participants with practical knowledge of the Miradi software, cutting-edge software for adaptive management for planning of conservation projects from start to finish. Participants were able to 'plug in' information from real life conservation projects to get a taste of the software's functionality. The skills acquired will enhance the planning and delivery of better outcomes for the conservation of Pacific island biodiversity in the Cook Islands, Nauru, Tonga and Tuvalu.



## Nauru Marine Spatial Planning

A training workshop on Marine Spatial Planning (MSP) was completed for Nauru in February 2016. The training workshop introduced the concept of MSP and its benefits as a planning tool to the Nauru stakeholders. Over the four days of the workshop, in-depth discussions took place to identify priorities of the different stakeholders (government, communities, and NGOs) related to marine resources management and where these opportunities conflict.

The values and uses of different in-shore marine areas around Nauru were identified and discussed in detail along with the different pressures placed on these areas by different activities. Participants were also prompted to start thinking more closely about appropriate management options for these different areas.



Overall, the training signified the beginning of a comprehensive MSP process for Nauru. The training was also designed to promote cross-learning and exchange with other Pacific island countries. To achieve this, participants from the Cook Islands, Tonga and Tuvalu were invited to contribute their country experiences to the process (see figure) and learn from the experience of Nauru stakeholders. Meaningful discussions and interactions followed during the training workshop, much of which the invited participants felt produced knowledge and lessons they could integrate to improve related initiatives in their own respective countries.



### Cooperation through the Rapid Biodiversity Assessments (BIORAPs)

The Nauru Rapid Biodiversity Assessment, completed in 2013, improved the state of knowledge of Nauru's marine and terrestrial ecosystems. Furthermore, the assessment identified or re-confirmed the critical importance of the biodiversity and ecosystems of Nauru's terrestrial and marine environments and the urgent need for follow-up activities to manage and mitigate threats for their conservation.

Apart from this, the BIORAP also facilitated south-south cooperation between Nauru and Samoa, where field experts from the Samoan ministry of environment (MNRE) took part, worked alongside local government staff, customary resource owners and civil society and contributed expertise and experience from their own BIORAP completed one year earlier in 2012. The cooperation resulting from the BIORAP was a win-win situation for cross-learning and expertise sharing between these two countries.



Photo: Fialelei Enoka (Samoa MNRE, blue shirt sitting) participating in the Nauru BioRAP (© Edwards)

### Rarotonga cloud forest Study

The Rarotonga cloud forest study was completed in 2015. The study updated the knowledge of the biological diversity of the interior landscapes of the island of Rarotonga (Cook Islands) in areas 400 metres or greater above sea level. Otherwise known as cloud forest. The study also facilitated cross-country learning, expertise and experience sharing between the Cook Islands and Samoa, where a flora expert from the Samoa Ministry of Environment (MNRE) participated in the cloud forest study and contributed his expertise and experience. This cross-country learning and sharing contributed to the successful completion of cloud forest study.



Photo: : Talie Foliga (Samoa MNRE) participating in the Rarotonga cloud forest survey (© SPREP)

### Lessons learnt

There was great benefit in following the ‘training of trainers’ approach to capacity building throughout the project, as was used for the P3DM trainings. The approach empowered Pacific islanders as trainers and facilitated faster uptake and understanding of the key principles of the P3DM process through, for example, the simplified explanations of technical terms and related practical tasks.

In general, the sharing of experiences and practical knowledge between and across project countries was a meaningful result of the project’s capacity building effort and was commended by the project countries themselves.

### Recommendations

- Assess opportunities for up-scaling and replicating the training on P3DM for biodiversity conservation planning in other Pacific island countries.
- Continue to promote south-south cooperation and knowledge sharing on island biodiversity conservation in the region, including creating and maintaining an electronic mailing list to facilitate follow up discussions, continue knowledge sharing and identify opportunities for further south-south cooperation.
- Continue to promote training of national practitioners on new innovative tools and approaches for the conservation and management of island biodiversity, such as the Open Standards and Miradi software as well as pedagogy to prepare them to teach these skills to others as done in the P3DM work.
- Continue promoting cross-participation of Pacific islanders in the development of specific tools for better conservation planning. Officers from the Cook Islands, Tonga and Tuvalu who participated in the Nauru Marine Spatial Planning training workshop came away with enhanced knowledge and understanding on the importance of marine spatial planning as a tool for sustainable resource management and how they could apply this tool to marine resource planning processes within their own countries.

## Conclusion

Capacity building is applied at different levels and is essential to the long-term success of the conservation of island biodiversity in the Pacific island region. The GEPAS IIB project was able to facilitate an innovative and sustainable model of capacity building, whereby practitioners from Samoa were able to share their knowledge and transfer practical skills to practitioners in Tonga, Nauru and the Cook Islands.

This was a good way of promoting knowledge sharing and expertise among Pacific peoples and a true example of south-south cooperation in action. Furthermore, the countries benefited from practical training on innovative tools and approaches for planning biodiversity conservation interventions—through the trainings on open standards and marine spatial planning. Equipping Pacific peoples through such approaches with the skills to plan for and manage their island biodiversity in the long term and to communicate this management to others is a key outcome of the project and a lesson of best practice for scaling up across the region.



Photo: Cooks P3DM participants (© Cook Islands NES)

### DID YOU KNOW?

South-south cooperation is a term used to describe the exchange of resources, technology, and knowledge between developing countries. Key aspects of South-South Cooperation are supporting self-reliance through innovation and technology while strengthening local and regional partners in development.

(<https://intpolicydigest.org/2016/05/23/the-need-for-south-south-cooperation/>)

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Photo: Stuart Chape

