



# 2015

## Northern Group Senior Students SRIC CC Proposal Writing Workshop



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Teaurima  
Office of the Prime Minister  
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## ACKNOWLEDGEMENTS

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Thank you to the Aronga Mana of Puaikura, Tinomana Ariki, Kaina Mataiapo and Kaumaiti Tou Ariki for welcoming the students and opening the workshop.

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Thank you to the Prime Minister Henry Puna and Mrs Puna for attending the closing of the workshop and delivering the closing address to the students.

Most importantly, we thank the students and their teachers for their commitment and sacrificing their time to participate in the workshop.

**Thank you all so much, Ata Wai Wolo Meitaki Poria Korereka!**



## TABLE OF CONTENTS

Contents	Page Number
Introduction -----	4
Background -----	4
Methodology -----	5
Climate Change Team -----	5
Logistics-----	6
Participants -----	6 - 8
Workshop Delivery -----	9 - 10
Outcome -----	10 - 12
Observations -----	12
Feedback -----	13
Recommendations -----	13
Appendices -----	14
1. Rakahanga Rakuraku School Proposal -----	14 - 18
2. Manihiki Island School Proposal -----	19 - 23
3. Pamati Lucky School Proposal-----	24 - 27
4. Tongareva Henua School Proposal-----	28 - 31
5. Nassau Island School Proposal -----	31 - 36
6. Pukapuka Niua School Proposal-----	36 - 39
7. Questionnaire -----	40 - 41



## Introduction

The Te Maeva Nui event in July, where many of the outer island students congregate on Rarotonga, presented a great opportunity for Climate Change Cook Islands (CCCI) to host a week-long workshop.

The objective of the workshop was to give senior students the opportunity to - build their awareness of issues relating to climate change, develop their research skills, and to capture the interest of students with the various disciplines involved as potential careers for them.

In addition, it was the intention that the workshop would lead to the development of a climate change related project for their respective islands. Through this workshop, students were expected to work with the local government, elders, various groups on their respective islands, and experts from various fields to guide them through the development of a concept note that would be developed into a full proposal at a later stage.

Project can be marine related (e.g., raui, aqua-farming to address resilience and food security respectively), land-based (e.g., coastal protection, reforestation, agriculture to address sea level rise, storm surges, cyclones, and food security), or a combination of the two (e.g., land to reef holistic management for ecosystem resilience).

The workshop would also ensure that projects meet the criteria of the Climate Change Cook Island's SRIC CC program (which is to Strengthen the Resilience of our Island communities in the *Pa Enua* to Climate Change) for funding.

Considering that opportunities for Northern island students are limited due to transportation, the workshop was limited to the senior students from the Northern islands (i.e., Manihiki, Rakahanga, Penrhyn, and Pukapuka/Nassau, and Palmerston). A maximum of six students and one teacher from each school was required to participate in the workshop.

## Background

The Northern Group islands of the Cook Islands that are populated consists of the four low lying coral atolls of Manihiki, Rakahanga, Penryhn and Pukapuka, including Nassau which is a sand cay. Palmerston Island, the only low lying coral atoll in the Southern Cook

Islands was included in the workshop. The furthest of these islands from mainland Rarotonga is Penryhn of 1,365kms. With the exception of Manihiki that has fortnightly flights, all the others depend on shipping transport for supplies and passage. Although, there is air service available to Pukapuka and Penryhn, this is mainly chartered flights. Palmerston island is within close proximity to mainland Rarotonga but without an airport, hence dependent on shipping services which is very limited to these islands.

Common features of these islands include the highest point above sea level rise which is less than 5 metres.

Vegetation on all of the islands is basically the same, mostly coconut trees, pandanus, breadfruit, *tamanu*, *puka*, *ngangie*, *toa*, although Pukapuka, Nassau and Rakahanga have more taro and *puraka* swamps than the others.

People mainly depend on the ocean for their



livelihoods, such as fish and other sea foods, black pearl farming, harvesting the wild blacklip pearl oyster, craft and weaving products to sell on mainland Rarotonga.

The low lying coral atolls were targeted because of their smallness, isolation and fragile ecosystems making them more susceptible to changes particularly to the adverse impacts of climate change.

## Methodology

### Classroom presentations

This was to impart information and knowledge on climate change, including explanation on how to approach the different sections contained in the SRIC template and what type of information is required to fill in the template.

### Field visits

Field visits were designed to compliment specific areas related to climate change. To give students first hand experience about the different aspects of activities related to climate change, giving them opportunity to question, observe with hands on practice.

### Presentation from experts

Hearing from experts in different disciplines gives students opportunities to ask questions and to learn from experts experiences.

### Group work

Importantly is group work, which is meant to encourage team spirit, cohesion, leadership, responsibility and build communication skills.

### Fun activities

Incorporation of fun activities such as icebreakers, drama, singing serves to overcome shyness through playing games and having fun. Also help break communication barriers.

### Group presentations

Promoting group work as well as individual contribution to the overall outcome of the team, thus building team work and working relationships improving communication skills.

### Language

The climate change team spoke in both Maori and English and encouraged the students to speak in their mother tongue if they were uncomfortable with English.

**Climate Change Team** (left to right) Celine Dyer, Dr Teina Rongo, Ana Tiraa, Mia Teaurima, Ann-Marie Roi and William Tuivaga.



### Logistics

All logistics arrangements were organised by the Climate Change Team under the leadership of Dr Teina Rongo.

## Participants

### Manihiki Island.



Students are; Rosalina Tuatoru, Danielle Nimeti, Rima Tuakana and Tapaeru Tarau with teachers; Ms Anna Rauru and Mr Peter College not pictured here. Insert is the island of Manihiki.

### Nassau Island



Students from Nassau Island School are, Penese Poila, Yikitia Tiluano, Papa Komile, Hunter Tuaine, Tapolo Tuaine with teacher Mr Poila Poila. Insert is the island of Nassau.



## Palmerston Island



Students from Palmerston Island Lucky School are; Joseph Marsters, Tuakanamoe Marsters, Andrew Marsters, Ned Marsters, Mehau Ngarima Marsters, Julia Marsters, Sareanna Marsters with teacher Mr Marconi Marsters. Insert is the island of Palmerston.

## Penryhn Island



Students from Penryhn Island School are; Mum William, Anau Ivirangi, Naurea Kaihui Taka, Matoha Niukore, Akamoeau Temakopi, Tekura Ben with teacher Mr Poti Maeve, including the Penryhn SRIC Focal Point in the back row Mr Thomas Taime. Insert is the island of Penrhyn.



## Pukapuka Island



Students from Pukapuka Island Niua School are; Elitama Akima, Ngapuna Tinokura, Yemaka Yeutu, John Angaino, Ataeta Mukomuko with teachers; Mr James Katoa and Mr Jani Zape. Insert is the island of Pukapuka.

## Rakahanga Island



Students from Rakahanga Island Rakuraku School are; Napa Banaba, Tarani Banaba, Tokoteru Tarau, Haretini Tarau with teacher Mr Bazza Ross. Insert is the island of Rakahanga



## Workshop Delivery

*Aronga Mana* (Traditional leaders) of Puaikura welcomed the students to their *paepae* (Jurisdiction) with a *turou* (traditional welcome) by Kaina Mataiapo as the Kaumaiti Tou Ariki and Tinomana Ariki led the students to the workshop venue.

In his opening address the Kaumaiti challenged the students to listen and learn from the experts but to also question relevancy of information to their specific situations and particular islands. He also reminded the students of the important role traditional and local knowledge play today as we strive to adapt to the adverse impacts of climate change which is not our making.



*Kaumaiti Travel Tou Ariki giving the opening address at the opening of the workshop 27 July 2015 (Photo by Celine Dyer)*

Program included site visits to various organisations such as the composting unit based at Papaaroa, a private entity by Teava Iro. Composting was considered a more viable and sustainable method of planting which is proven by Pukapukans who has been practicing it for decades.

Since each of the Northern Group islands depend on their harbours or passage for supplies and transport, a field trip to the Avatiu harbour was warranted to introduce students to different adaptation measures carried out on Rarotonga and what is being done by government and private people. Thus reiterating that adaptation to climate change is not only government's responsibility but everyone's business.

Students were treated to a boat ride to which Dr Rongo covered a range of topics to supplement what they learned in previous lectures at the workshop. These included the influence of land-based activities on the ocean, ocean acidification, atoll and volcanic island formation, and the importance of reefs as natural barriers to the impact of cyclonic waves.

Field trips included the Meteorological Office where staff explained the process of collecting, collating and interpreting data to produce weather forecasts.

In the course of four days the students with the help of their teachers worked on their proposals. There were also fun activities to which students created and performed a drama or song about their chosen project. The Penryhn students were quick to catch on with climate change to which they performed different human activities that cause detrimental impacts on the environment. Rakahanga students without a teacher depicted the actions of humans that cause problems to fish migration and fish breeding areas.

Students from Palmerston Island presented their drama about boats throwing their anchor on the reef and causing damage to their reef and ecosystems.

Experts from different disciplines gave presentations on the Geo-Portal by Mana Etches from Emergency Management Cook Islands, Dan Rasmussen from National Environment Services presented on GIS mapping and Marino Wichman from Seabed Minerals spoke on seabed mining.

The climate change team worked with the schools to help them identify climate change related projects pertinent to their respective island as their proposal to SRIC. The SRIC programme under the Adaptation Fund funded the workshop with the understanding that successful project proposals will receive funding for implementation.



*Prime Minister Mr Henry Puna addressing the students at the close of the workshop 31 July 2015*

On the final day of the workshop the students presented their proposals to invited guests including the Prime Minister Henry Puna and his wife. In response, the Prime Minister challenged the students to be creative by utilising local knowledge and resources to address problems rather than using foreign materials which is not always the best solution to local situations. He also congratulated the students on their efforts and thanked all the relevant agencies involved in the workshop.

The schools were presented with prizes donated by Te Ipukarea Society (TIS) and SRIC CC in recognition of their contribution and participation in the workshop. A special prize for the best school participation at the workshop was awarded to Penryhn Island. Best male students award went to Napa Banaba from Rakahanga Rakuraku School and best female student award went to Tekura Ben from Penryhn Island School.



*Ana Tiraa Director of Climate Change Cook Islands with best student award recipients Napa Banaba and Tekura Ben (Photos by Celine Dyer)*



## OUTCOME

### Summary of proposals presented by the schools (Full proposals included as Appendices)

Penryhn school proposed to keep their *Pitaka* island a pristine nesting and resting place for turtles through embarking on tree planting on motus where turtles congregate to lay their eggs. Creating a safe refuge for turtles through *raui* and tree planting will add to strengthen the recovery of local ecosystems against the impacts of climate change.

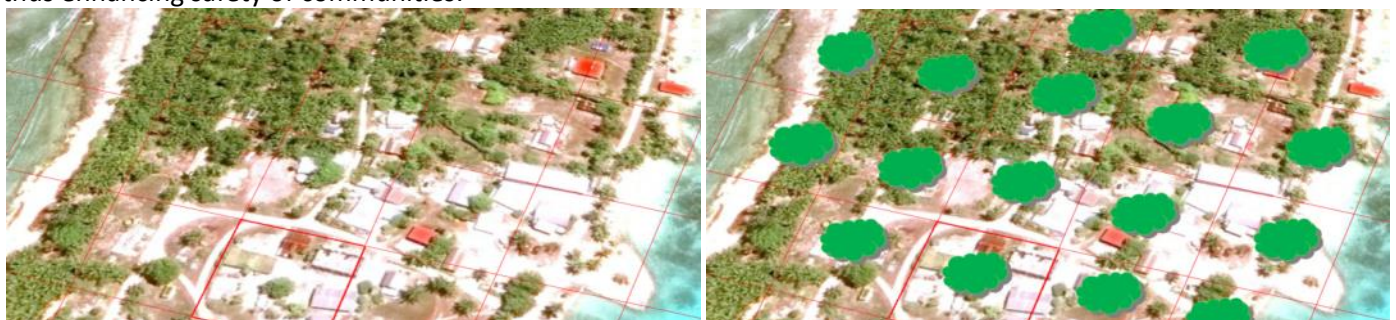
Rakuraku school of Rakahanga proposed to improve the drainage of their fish pond. In the early 2000s the Island Council constructed a causeway across the Kuta cove which is not only limiting the drainage of the Tai puhatu watershed, but also restricting the movement of fish in and out of the cove. Naturally, the cove is a nursery ground for a variety of reef fish juveniles that mass migrate to this cove to feed and develop. In particular, *Ava* (*Chanos chanos*), the most common fish species that migrate in large numbers into this cove are perhaps the most affected. With the causeway in place, the taro swamps adjoining the cove are susceptible to saltwater inundation during high seas. The proposed project will address food security, habitat, and biodiversity maintenance.



Causeway constructed across the Kuta cove of Rakahanga. This causeway is limiting the drainage of this Kuta watershed during flood events from both rain and high seas.

Nassau school chose to address food security by the construction of a drainage system in the taro swamp to prevent flooding during heavy rainfalls that damage the taro crops. They also want to fence the planting area to keep animals away from damaging crops. Protecting planting areas of communities is assuring food security in the face of climate change whilst also ensuring sustainable livelihoods of communities.

Cyclone *Matini* that devastated their island particularly the village of Tauhunu, prompted the two Manihiki school to embark on tree planting proposal. They wanted to plant *tamanu* (*Calophyllum inophyllum*) following the example of Palmerston island situated in the hurricane path and yet unscathed. *Tamanu* tree was chosen because of its root system that goes deep into the ground to hold the soil. Considering that cyclonic waves can easily wash over the entire motu of Tauhunu, an effective plant plan is to also plant trees throughout the island using a grid system (see below). Previous planting schemes has focused along the coast, however, when these coastal barriers are breached as we've seen with cyclone Martin, residential areas inland become vulnerable. *Tamanu* is also a big tree when fully grown and will certainly act as an effective defence barrier to wind and waves. With the expectation of more intense cyclones due to climate change, the project will strengthen the resilience of the island system against intense events thus enhancing safety of communities.



Tauhunu will be the location for the Manihiki school, which was the most effected motu on Manihiki during cyclone Martin in 1997. A grid size of 50 by 50 meters was proposed to guide the planting scheme. The idea is to plant at least one *Tamanu* tree in each grid.

Lucky school of Palmerston proposed to install permanent mooring buoys on the fore reef. Anchoring by boats on the reef pose significant threat to coral reefs, and it is the intention of this proposal to provide several mooring buoys to prevent vessels tossing their anchor.

Niua school of Pukapuka opted to ensure food security as a means to strengthening the resilience of their island communities to climate change. Due to sea level rise and heavy rains flooding has become a challenge growing taro for the people of Pukapuka. Hence, their proposal is to improve the drainage of the taro plantations from salt water inundation during high seas and flooding from heavy downpours. In addition, they also proposed to erect a fence to protect their plantation from the destruction of wandering pigs.

### **Observations**

- Flexibility of the Climate Change team by conversing both in Maori and English was a key factor that bridged the communication gap making students comfortable to speak up.
- Students were more comfortable speaking in their Maori dialects and the Pukapukan language for Pukapuka and Nassau students.
- Teachers were a valuable resource seemingly they knew the strengths and weaknesses of each of their students and guided them accordingly.
- Delivery of the workshop in a professional setting and a nice venue was a moral boost to students and teachers making them feel special and appreciated for the work they were doing.
- Fun activities created incentives for the students to get involved in team work and class participation.
- Field trips gave students opportunity to witness on site operations and to see and feel actual end products in addition to the fun of sightseeing.

### **Feedback**

A feedback session using questionnaires was conducted at the end of the workshop and received the following responses (*Questions in the Appendix*)

- Out of twenty six respondents, ninety eight per cent found the information presented in the workshop was useful and eighty five per cent said they would definitely use the information when they return to their respective islands by sharing it with their fellow students left behind.
- There was hundred per cent approval of the field trips, students and teachers found information from the site visits very useful which elevated their understanding in those areas. Some indicated they would use the composting information to improve their home gardens on their respective islands.
- Overall, hundred per cent of participants indicated their understanding of climate change has increased as a result of the workshop.
- Hundred per cent of participants liked and enjoyed the whole workshop. Some particularly liked the opportunity to learn about the other islands, meeting new people, eating new food, whilst others appreciated the opportunity to learn to develop real proposals. Others commented they really liked the variety of activities, the nice venue, the presentations, field visits and the fun activities. Overall, everyone loved and enjoyed the workshop.
- There wasn't any dissatisfaction response about the workshop.
- Of the question on areas to improve the workshop, some participants pointed out their personal weaknesses was a hindrance to their participation in the workshop and they needed to improve on speaking out and overcoming shyness. Some pointed out that the special presenters should be bilingual and should be mindful of using technical language as some students may not have the same level of understanding in English.
- On the last question on further comments about the workshop, hundred per cent of participants really enjoyed the workshop, some wanted it to be replicated in the schools, whilst others wanted it to continue



but more importantly, that the proposals developed from the workshop are carried forward and implemented.

### **Recommendations**

- It was recommended from all those involved in the workshop to extend the same opportunity to the Southern Group Schools.
- All those who attended received such a rich experience and recommended for the continuation of the program perhaps every two years.

### **APPENDICES**

# RAKAHANGA RAKURAKU SCHOOL PROPOSAL

## *Rakahanga*

- Sister island of Manihiki
- Lies in the central-southern Pacific Ocean
- The unspoilt atoll is 1,240 km from the main island of Rarotonga in the southern group



## Challenges

- Depopulation
- Imported goods are limited due to infrequent shipping schedule
- Ocean food resources are declining
- Up-to-date information about Rakahanga limited because it is rarely visited by researchers





# Proposed project

- To improve the drainage of the Kuta watershed and the adjoining cove



## Existing situation

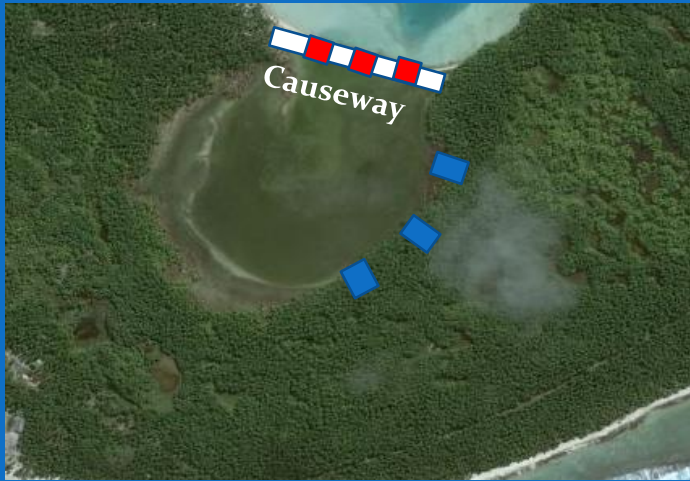
- Because the cove is a drainage basin for the Kuta watershed, detritus and associated nutrients the cove is an ideal habitat for a variety of juvenile reef fishes to feed and develop.
- The following are some of the fish species and other fauna found in the cove:

- Barracuda
- Tilapia
- Mosquito Larvae
- Milk fish
- Eels
- Black tail snapper
- Turtles
- Crabs
- Wahoo



## Existing situation...cont

In the early 2000s a causeway was constructed across the cove. Today, there are 3 drainage pipes (in blue) installed to help drain the Kuta watershed and 3 outlets along the causeway (in red) to allow some flow in and out of the cove.



## Existing situation...cont

Over the years these drainage systems has collapsed, limiting the drainage of the watershed and adjoining cove. As a result, taro swamps are vulnerable to stagnant conditions and fish movement into the cove for feeding and breeding are effected



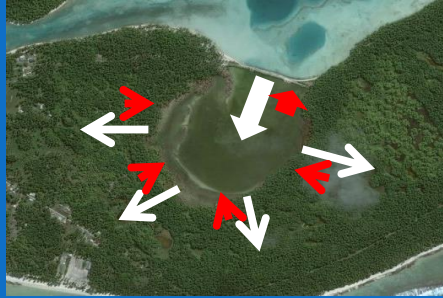
## Concerns

- Poor drainage during high seas and heavy rain events
- saltwater remain in the taro swamp for prolonged period , creating poor conditions for taro planting.
- Poor drainage during heavy rain events create a stagnant condition that favour mosquito (insert) breeding
- The cause way is obstructing fish migration in and out of the cove

Flow during heavy rain events



High seas



## Solution : Install large culverts to improve drainage





# Who will be involved

- Island administration and council
- SRIC CC
- Infrastructure Cook Islands
- Ministry of Marine Resources
- Ministry of Health
- Rakuraku school

## Time Frame

- Quarter 4, 2015 to Quarter 2, 2016



# MANIHIKI ISLAND SCHOOLS PROPOSAL

## TREE PLANTING: a climate change adaptation proposal

**Manihiki Schools, 2015**



Manihiki island : taken from <http://www.cookislands.org.uk/manihiki.html>

## BACKGROUND

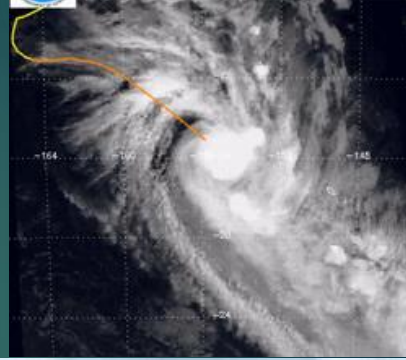
- ❖ Original name of Manihiki - HUMPHREY ISLAND named by Captain Patrickson. Now known as the Island of Black Pearls.
- ❖ It is a triangular atoll of 1,160 kilometres.
- ❖ Land Area: 4 square kilometres
- ❖ 43 islets (motu)
- ❖ Manihiki sits on top of an underwater mountain rising above 4000m above the ocean floor.
- ❖ 10km wide lagoon
- ❖ Population – about 233
- ❖ Food reserve for Rakahanga

# EXISTING SITUATION

## Cyclone Martin (1997)

- ▶ Cyclone Martin in 1997 (Category 3: 185 km/hr)
- ▶ Badly destroyed almost the entire landscape of the island of Manihiki
- ▶ Destroying plantation and vegetation in general on the island
- ▶ There were 19 lives lost during Martin
- ▶ Frequency of cyclones was estimated at 1 per 100 years
- ▶ With the influence of climate change, a cyclone like Martin is predicted to occur every 45 years

Cyclone Martin



# PROPOSED PROJECT

We, the senior students of Manihiki, is proposing that the issue of protecting the island and its inhabitants from the impacts of extreme cyclone events is of high importance and must be addressed now rather than later. We propose that tree planting is the most appropriate and cost effective climate change adaptation measure to implement on Manihiki.

**LOCATION:** *Tauhunu* village. This village was the most devastated by cyclone Martin.

**AIM:** To plant *Tamanu* (*Calophyllum inophyllum*) throughout *Tauhunu* for the purpose of minimizing the impact of cyclones on the island and its inhabitants.



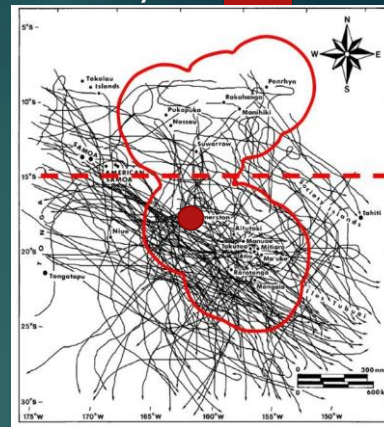
*Tamanu* (Pacific Mahogany; *Calophyllum inophyllum*)



# Why *tamanu*?

- *Tamanu* is indigenous to Manihiki.
- Seedlings are abundant on the island
- Cost is minimal to implement such project
- *Tamanu* trees are effective barriers against cyclonic winds, storm surges, and can reduce erosion.
- In the north, *tamanu* has been a life line during high seas; people often use this tree to tie themselves on to avoid being swept away by waves.
- Although Pamati lies in the cyclone path for this region (red dot), its large *tamanu* forest is confirmation of the effectiveness of these trees for the purpose intended for this proposal.

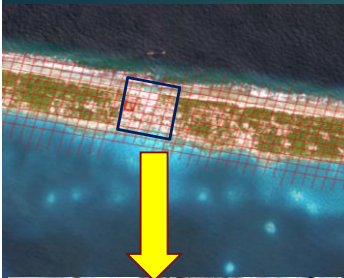
## Cyclone tracks



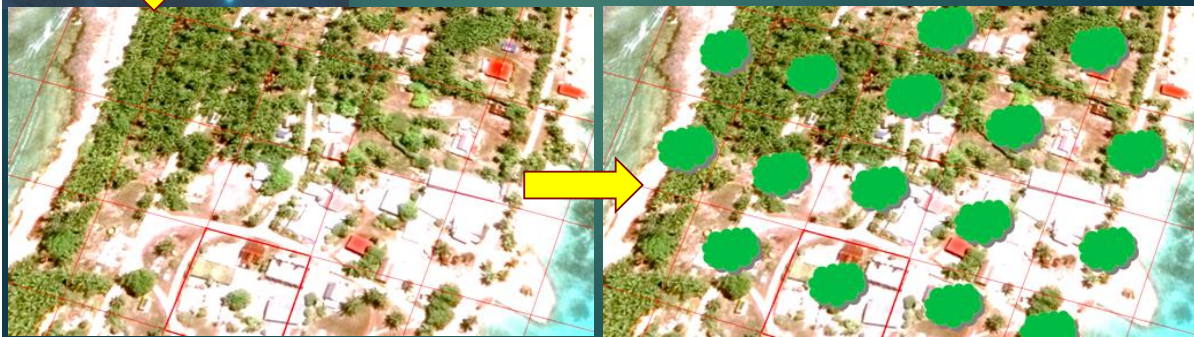
Tracks of 104 cyclones in the Cook Islands from 1820–2006 (de Scally, 2008). Red dot indicates Pamati.

## Methodology

### Tauhunu



- A 50 x 50 m grid size will determine the spatial distribution of the trees. With this grid size, over 200 trees will be needed to cover the entire *motu*. Note: a proper analysis may be required to determine the appropriate grid size for the planting scheme.
- At least one *tamanu* tree will be planted within each grid
- A GPS will be used during the planting stage to ensure that each tree is within the confinement of the grid.



ENVIRONMENT DAY – tree planting initiative to be built into the curriculum in response to the impacts of climate change



WHO WILL BE RESPONSIBLE FOR THE REPLANTING PROJECT?



#### FORMULATION OF PROJECT CONCEPTS & MANDATES

- Senior students of Manihiki
- Manihiki Island Administration & Island Council

#### STAKEHOLDERS FOR IMPLEMENTATION

- Ministry of Marine Resources (MMR)
- National Environment Service (NES)
- Climate Change Cook Islands (OPM)
- Manihiki Island Administration & Island Council
- Community

#### FINANCING OF PROJECT

- Climate Change Cook Islands (SRIC CC)



## DATA COLLECTION:

Students of Manihiki will be responsible for collecting the data regarding the types/number of plants required for the project, land areas to be planted with the professional support of the Environment Department.

The data will be submitted to the CICC project engineers and those with the technical expertise for the designing and the implementation of the project

### Time frame

Quarter 4, 2015 to Quarter 2, 2016



## MEITAKI KOREREKA!





## Mooring buoy

A coral reef protection  
proposal

Palmerston, 2015



## Background

Palmerston is a true atoll with a total land area of approximately 2.6 km<sup>2</sup>. There are around 62 people living in Palmerston. The Cook Islands target is to achieve 100 % renewable by 2020, and Palmerston has recently switched to solar power after decades using a diesel generator. The island has no airport and shipping services are infrequent. The economy is based on fishing and to some extent tourism, particularly from visiting vessels. At the most, around 200 touring vessels would visit the island.

## Concerns

- There are limited mooring buoys available to visiting vessels
- Often vessels not tied to the mooring buoy would drop their anchor, which damages our corals and its inhabitants
- Those that drop their anchor are at risk of ending up on the reef (see bottom picture)



Anchor dropped on a coral colony. Anchors has been shown to cause considerable damage on coral reef worldwide.



Top: sail boats tied to mooring buoys on Palmerston. Bottom: sail boat that dropped anchor ended on the reef flat of Palmerston.

## Proposed project

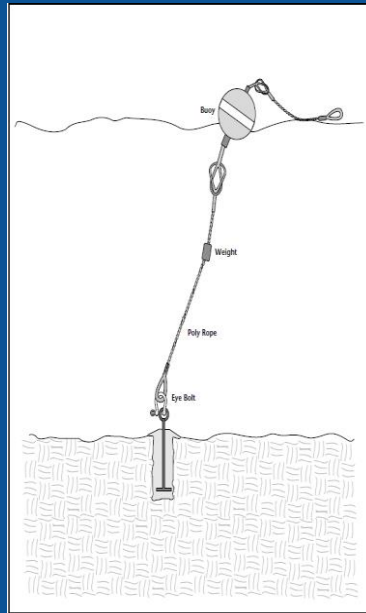
- We the senior students of Palmerston school with support from our Island Administration and Council have decided that reef health is of high importance to us considering the goods and services that it provides to our community, therefore its protection is a priority.

**Aim:** To deploy more mooring buoy on Palmerston, to avoid visiting vessels dropping anchor.



## Proposed mooring design:

Mooring system will be similar to the two cartoon pictures below. The appropriate design will be determined by an engineer.



## Who will be involved?

- Island council
- Palmerston Island administration
- MMR
- Students

### Financial support

Climate Change Cook Islands (SRIC CC)

### Time Frame

- Implementation 8 months

### Evaluation

- 3<sup>rd</sup> Quarter 2016



# REEF PROTECTERS



# TONGAREVA HENUA SCHOOL PROPOSAL

Te Pitaka: te korona o to matou matakeinanga

Reforestation of *motu* Mangarongaro

Penrhyn

Climate Change Workshop, 2015



## Background

- Penrhyn is the most north-eastern atoll in the Cook Islands
- Largest lagoon ~ 233 km<sup>2</sup>, Te Pitaka circumference ~ 77 km
- Land area in the Cook Islands will fit into the Penrhyn lagoon
- Two villages: Omoka & Te Tautua
- People live a subsistence lifestyle
- Cash needed to pay bills (power, phone, order cargo)
- Main industry is **weaving** (rito hats & fans, hara mats)
- Main food: rice, coconuts & fish
- Power now solar '*Uira Natura*' (NZAID)

## Background cont...

### Fauna & Flora status

- Lagoon is pristine & still has most taxonomic groups intact
- It is suggested that Penrhyn is the largest and most important nesting ground for sea turtles in the Cook Islands
- Penrhyn still has a healthy population of seabirds
- Reef resources are relatively healthy, but the size of pelagic species are seeing a decline, likely due to heavy fishing pressure by foreign fishing vessels
- Land crabs – hermit and *tupa* still healthy, but *kaveu* becoming rare
- Native trees still present, but invasive species are threatening some areas



Penrhyn has the largest nesting grounds for sea turtles in the Cook Islands

## Proposed project

Turtles need to live and nest in a relaxing and lush environment. We the students of Penrhyn school are proposing to replant indigenous trees on Mangarongaro, which is the main turtle nesting *motu* of Penrhyn. Like many atolls in the Cook Islands, Penrhyn is also vulnerable to the impacts of sea level rise and accompanied coastal erosion. Thus, it is also the intention of this project to reduce the impacts of high seas and sea level rise. This project will provide a case for our Island Council to replicated this project in the Pitaka (whole of Penryhn island)

**Aim:** To replant indigenous trees on *motu* Mangarongaro

### Project Site – *Motu* Mangarongaro



*Motu* Mangarongaro has the largest and therefore the most Important nesting ground for turtles in the Cook Islands



## Existing situation

Trees in some areas are badly damaged on *motu* Mangarongaro due to fire. Attempts to clear & replanted trees have been carried out in the past. The school have planted 62 coconut trees on the *motu*. Fifteen *tamanu* trees (*Calophyllum inophyllum*) were planted by the school, but didn't survive.



Top: aerial photo of *motu* Mangarongaro (red box is an area on the ocean side destroyed by fire; bottom)

## Project activities

- Conduct a public consultation of the project to gain the support of community
- Build a simple nursery using local material
- Grow seedlings of indigenous trees in nursery
- Provide a plan for planting scheme (i.e., priority area, timing, and species)
- Clear fallen trees not only to plant new ones, but also to ensure that turtles can easily access nesting areas
- Remove the *parapara* (parasitic weeds) to encourage growth of planted trees and other important trees
- Use GPS to map and monitor the trees over time
- Evaluate the project after 8 months

## Who will be involved?

- Technical Support: Dr Michael White & Honu Kuki Airani (Scientific Research Group)
- Community Support: Hakono Haranga ~ our Community Environmental Society
- Island Government Support: Tongareva Local Government Omoka School Parents and Community
- SRIC CC - Climate Change Cook Islands (OPM)

## Timeframe

- The project should be completed in 8 months from Quarter 4, 2015

## Budget

### Motu Observatory Station

Timber, roofing iron to catch water, water tank, to construct a basic observation hut on the *motu* during school field trips

\$25,000

### Nursery & Planting equipments

Shade cloth for nursery & grow-out containers for seedling

Three chain saw, three spade, four shovel, four machete, and three wheelbarrow

\$16,000

### Monitoring equipments

Recording equipment and materials (camera, GPS, etc...)

\$4,000

## NASSAU ISLAND SCHOOL PROPOSAL

### NASSAU SCHOOL SRIC CC PROJECT PROPOSAL



Rarotongan Spa & Beach Resort,  
Arorangi

Rarotonga

27 – 31 July 2015

# Background

## History

- Historically Nassau was a reserve for Pukapuka island in terms of taro and puraka
- Discovered in 1835 by Captain John Samson on the whaler 'Nassau' to which the island is named after
- Always been occupied by Pukapukans
- Leased by a Samoan Shipping and Trading Company to produce copra from 1916 – 1926
- Labourers recruited from Kiribati, Tuvalu, Samoa, and Tokelau
- 1945 was bought by the Cook Islands Admin for 2,000 pounds, subsequently bought back by the chiefs of Pukapuka for the same amount in 1951
- 1954 the first group of copra workers chosen by the chiefs of Pukapuka arrive on Nassau to work on a one year rotating cycle. They are replaced by a new group at the end of the year

## Geographical

- Nassau is a sand cay of 121 hectares with a reef circumference of 6kms
- Distance from Rarotonga is 1324kms and nearest island Pukapuka 89kms away
- Temperature average 28 – 32 throughout the year

## Vegetation

- Puka, ngangie, puapua, wala, niu, nonu, taeyinu, wetau, wau
- Taro and puraka, banana, breadfruit, pawpaw main crop and staple diet with fish, birds, turtles and other seafood



## Current Situation

- Permanent settlement, stronger concrete and timber households, School, Telecom office, Admin , passage access
- Managed by Pukapuka, however, has own Island Council and Admin officer
- Powered by solar
- Income from fishing, government employment (Beautification project) crafts
- 22 households and 78 residents
- Constant problem with animals destroying taro crops
- Heavy downpours causes flooding in taro plantations

From Temporary to Permanent Structures



# Project Description

## Food Security

1. To design and construct drainage for taro plantation
2. To fence taro plantations from animal damage.

## Problem

- Unpredictable rainy seasons therefore disrupting planting patterns
- Heavy rains causes flooding of taro swamps
- No drainage to allow the overflow to drain out

## Problem...cont

- Animals eat the crops and dig the gardens destroying the cultivated area
- Residents effort to plant and time spent in manual labour is wasted - such as collecting of leaves for composting, which is tediously and labour intensive



Nassau Women working in taro swamp applying mulching from leaves previously collected from around the island. Maturity of taro crops takes 7 months to a year and the puraka 3 years and constant care of these crops are a must

## Who will be involved

- ▣ Nassau School
- ▣ Planters
- ▣ Community
- ▣ Island Council
- ▣ Ministry of Agriculture
- ▣ Climate Change Cook Islands (SRIC CC)

## Project activities

- Consult with the community and relevant stakeholders on this project
- Have an engineer design the appropriate plan for the drainage system
- Mobilize necessary agencies, equipment, tools required for project implementation
- Develop a budget for the project implementation

### Timeframe

- Pending on boat schedule to Nassau



## Project outcome

- Project will increase or boost the chances of a sure harvest
- It will help save much energy and time put into the planting and upkeep of the Taro and Puraka crops.
- It will assure steady providence of food therefore ensuring sustainable livelihood for the community
- It will build the resilience of the community to climate change by ensuring food security.

## Monitoring the project

- Nassau School will take photos of commencement of project to completion
- Nassau School will report of any discrepancies or deviations of the project from original proposal
- Nassau School will make recommendations for future improvement to the project in consultation with relevant authorities
- Nassau School will report to SRIC on any problems encountered in the lifetime of the project and the success of the project

**ATA WAI WOLO**

# PUKAPUKA NIUA SCHOOL PROPOSAL

**Pukapuka Island**



**Background**



- Pukapuka island is also known as Te Ulu o te Watu
- Coral atoll of three motus (islets) with a submerged reef of eight kilometres west of the island where it received the name 'Danger Island'. The current population is about 360 that fluctuates throughout the year
- Total land area is 425Ha with a reef circumference of 41kms
- Distance from Rarotonga 1,324kms with the nearest island Nassau with a distance of 89kms
- Flight is irregular usually on a chartered basis and shipping is also irregular
- Highest point above sea level rise is less than 5 metres
- Vegetation mostly coconut trees, puka, pandanus, tamanu, ngangie, puapua, wetau, taeyinu, nonu
- Large taro swamps which is the main staple food along with puraka, breadfruit, bananas, pawpaw
- Main source of protein is fish, marine invertebrates, and birds
- The island recently converted to solar powered renewable energy pictured here.

## Current Situation



- Large swampland no longer suitable for planting taro due to salt water intrusion. This is adding more problems to a fragile wetland eco-system



- Heavy rains causes flooding thus drowning and destroying taro crops
- No proper drainage to let water out of the taro plantations
- King tides are more common reaching the planting areas and killing off taro crops and puraka



## Project Description

### Food Security

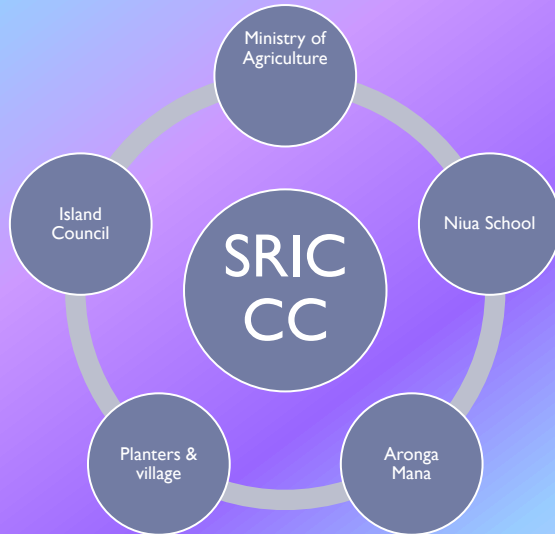
- ▶ To design and construct drainage for taro plantation to drain out excessive water during floods
- ▶ Whilst at the same time blocking off saltwater inundation from storm surges and especially king tides which are occurring more frequently in recent years

### Problem

- ▶ Unpredictable rainy seasons is disrupting planting seasons
- ▶ King tides are more common, reaching planting areas
- ▶ Sustainable livelihoods of people are threatened from frequent occurrence of these natural events
- ▶ Loss of crops is wasted time and energy considering taro takes 7 months to 1 year to mature and puraka 3 years
- ▶ Loss of precious land to salt water intrusion means less land for planting



## Stakeholders



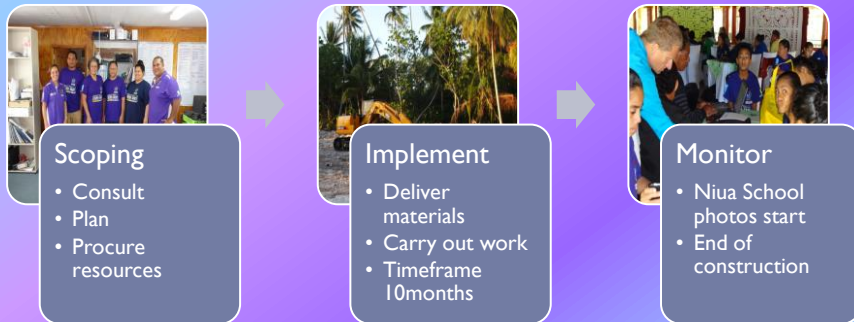
## Project Outcome

- ▶ **Project will assure a good harvest boosting people moral to continue planting that their time and efforts in planting is not wasted**
- ▶ **It will provide a steady harvest thus enabling sustainable livelihoods for the communities**
- ▶ **Increase resilience to climate change through the assurance of food security**
- ▶ **Enable planters to plan their planting activities**



Newly planted taro patch on Pukapuka. Photo by Celine Dyer

## Project Activities



## QUESTIONNAIRE

### Northern Group Senior Students Workshop Feedback

Was the information that was presented in the workshop useful? If yes, would you use this information in the future?

If no, what kind of information will be more useful for your purpose?

Were the site visits useful to you? If yes, which ones did you find useful and interesting. Would you use this information in future and for what purpose?

Has your understanding on climate change improved as a result of this workshop?

**What did you like about the workshop?**

**What did you not like about the workshop.**

**What areas do you think could be improved?**

**Have you got any other comments to make about the workshop?**

**ATA WAI WOLO MEITAKI PORIA KOREREKA THANK YOU!**