

Integrated Island Biodiversity Technical Series

Participatory 3-Dimensional Modelling

Vaka Puaikura, Rarotonga
Cook Islands



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Our vision: A resilient Pacific environment sustaining our livelihoods and natural heritage in harmony with our cultures.

PARTICIPATORY 3-DIMENSIONAL MODELLING

VAKA PUAIKURA

June 13th to 17th 2016

Report by Teresa Mii Matamaki IIB Project Coordinator

CONTENTS

Background	2
Steps taken for the Puaikura P3DM	2
Step 1 – Scoping	2
Step 2 – Procurement of resources	3
Step 3 – Logistical arrangements	4
Step 4 – Presentation and “how to do the P3DM”	4
Step 5 – Populating the blank model and digitising the information	7
Management Plans and Community Plans	8
Future P3DM to consider	8
ANNEX 1 – Programme for the week	9
ANNEX 2 – List of materials	11
ANNEX 3 – Legend for the Puaikura P3D	15
ANNEX 4 – Contacts	15
ANNEX 5 – List of Participants	15
ANNEX 6 – Opening remarks by the Director of NES	17
ANNEX 7 – Closing remarks by the Director of NES and hand-over	18
ANNEX 8 – Expenditures	19

Background

Participatory three dimensional model (P3DM) is a community engagement tool which integrates spatial data with local “traditional knowledge”. This tool is widely used for spatial planning, climate change adaptation, disaster risk reduction and many more. P3DM is a product of geographic information system (GIS) data and it uses those facts and statistics to build the model from a series of contour lines. It also uses important sources of information to enter into GIS for participatory planning and implementation. The P3DM tool is widely used in the Pacific in Fiji, Solomon Islands, PNG, Samoa, Tonga, Nauru and now the Cook Islands.

The Cook Islands has completed its first participatory three dimensional model for the Vaka Puaikura. The exercise was carried over a 5 day period from 13 to 17 June 2016 at the Aroa Nui Hall. This exercise has been in planning mode for the last five months and the final product was handed back to the Tokerau Tinomana Ariki on the 17 June.

Steps taken for the Puaikura P3DM

- Step 1 – Scoping
- Step 2 – Procurement of resources
- Step 3 – Logistical arrangements
- Step 4 – Presentation and “how to do the P3DM”
- Step 5 – Populating the blank model and digitising the information

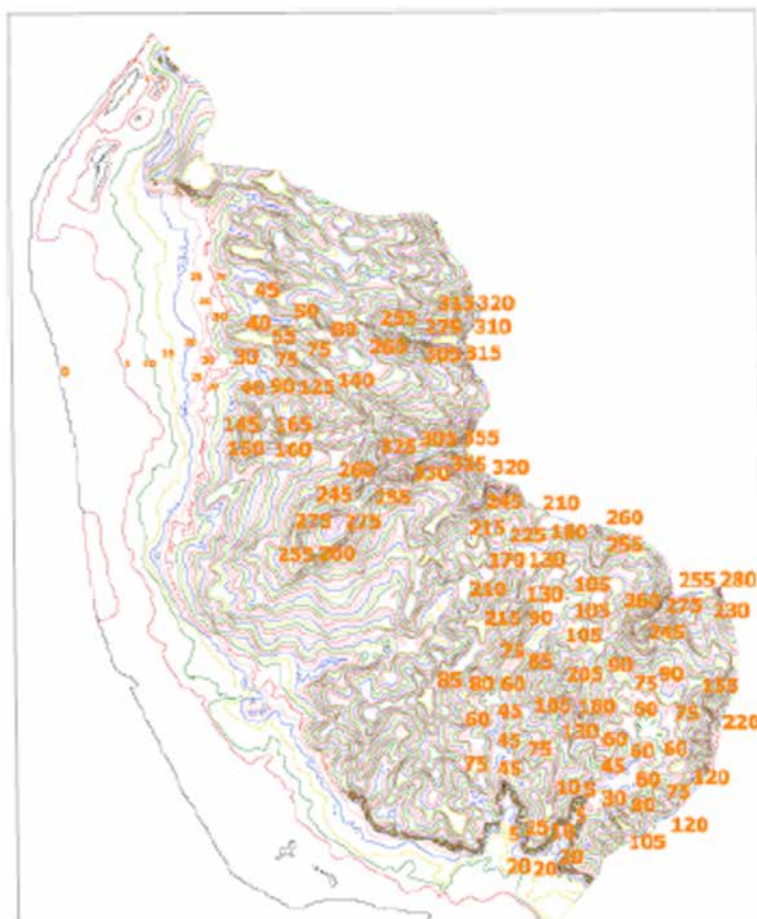
At the workshop, the Senior Education Officer documented by video the entire process of the Puaikura P3D. Participants and trainers were interviewed to talk about their experience and the process of P3D.

Step 1 –Scoping

This is the first step of carrying out a community participatory three dimensional module (P3DM). Yvette Kerslake from UNDP was in country from the week of 4-8 April for the Ridge to Reef Project but since she was one of the main drivers for the Samoa P3DM, she was also here for the scoping exercise. The scoping also involved confirming the terms of reference to carry out the P3DM as well as a draft programme for the workshop week. One of the main activities during the scoping is the confirmation of the image that will be the basis for the P3DM. At this stage so is the selection of the area for the P3DM. The contour interval that will be used as well as the scale of the map is also confirmed during this exercise. When Kerslake was in Rarotonga, the site was already selected as Vaka Puaikura, there was then a presentation to seek support from the Kauariki Rangi for this exercise. Tokerau Tinomana Ariki and the Kauariki Rangi of Puaikura was in support of this modelling. At the presentation was also the principals for the primary schools in Puaikura – Apii Rutaki and Apii Arorangi. There were questions and answers but everyone was supportive for this activity.

Checklist

- Terms of reference
- Draft program
- GIS specialist – map of the area with 5 metre contour lines
- Area for the P3DM confirmed
- Presentation and support from community and schools
- Confirm the scale of the map



Model Scale – 1:
2,500 Contour
Interval – 5mtrs

Figure 1: contour map and confirmed scale of map

Step 2 – Procurement of resources

A list of resources to secure was sent by trainers in Samoa to check whether we have these things in Rarotonga. For the glue, paints, pins and yarn to be used for the legends of the map, these are already here in the Cook Islands and it did not need to be outsourced. The only materials not available from the local market were the cardboards and the map pins. The cardboards were sourced from Punjas in Fiji and the map pins was bought by the IAS project coordinator on one of the work trips.

Checklist

- 6mm cardboards – enough for the size of the model
- Bottles of glue
- Landscape paint colours
- Pins and yarns
- Cutters and cello tapes
- Hammer and 1-inch nails



Step 3 – Logistical arrangements

Identifying what materials were available and time frames for incoming stock was important for ensuring the project started and finished on a timely manner. This included ensuring all required material was available prior to the workshop starting. Regular communication to Punjas for the shipment of the cardboards was necessary and to work with them on the shipment of the cardboards. The initial emails from international trainers from the Technical Centre for Agricultural and Rural Cooperation ACP-EU (CTA) recommended the use of 6mm thick styrofoam sheets. Unfortunately, this was new for the Pacific as no one has used styrofoam sheets before, so the Cook Islands couldn't find a source for the styrofoam, we reverted to the traditional cardboards. Perhaps future P3D can utilise the styrofoam sheets once a supplier is identified.

Checklist

- Cardboards from Punjas in Fiji to arrive on time for the workshop including the payment before the cardboards are transported.
- Getting the table ready with acquiring the ply boards and so forth for it to match with the scale of the map.
- The booking of the Aroa Nui hall for the workshop
- Customs clearance for the cardboards and the transportation of the cardboards to the hall.
Setting up the hall for the workshop
- Draft program, talking points for the opening ceremony.
- Organising invites for the event and sending them out with the program
- Get ready "eis" for the opening ceremony
Participants sheet for the week

Step 4 – Presentation and "how to do the P3DM"

The workshop was opened by a message and prayer from the village reverend and opened by the Director for Tu'anga Taporoporo, Mr. Joseph Brier. Presentation by Paulo Amerika on how to do the P3DM and the processes for a blank model. Participants were split into 3 stations for the development of the blank model. Parallel to this the legend symbols for the different features were confirmed.



Figure 2: Custom mafe tables for the Puaikura P3DM



Figure 3: Putting together the map for tracing: L-R Joseph Brider, Paulo Amerika, Fata Malolo, Benjamin Maxwell and Olaf Rasmussen

Group: 1 -Tracing Team

1. First, fasten tracing map with card board using binder clips
2. Select one corner of map as a reference point
3. Start identifying and tracing the lowest contour with solid/plain liner
4. Use a dotted line to trace the next contour (identify the higher elevation)
5. Write contour elevation number and the arrow pointing north on the card board sheet.
6. First contour serves as a guide for cutting but the second contour serves as a reference for pasting.



Figure 4: Tracing out the contours

Group: 2 – Cutting Team

- Cut the card board following the solid line by using cutters



Group: 3 – Pasting Team

1. Glue the first layer on the base maps
2. Follow outline on map.
3. Continue pasting layers one by one.



Figure 5: Pasting layer by layer

Checklist

- Table completed
- 3 maps printed – one for the base map, one for tracing and one for example.
- 3 stations – tracing/cutting/gluing
- Students to help with tracing and cutting
- 2-ply toilet paper to smooth out the blank model
- White paint to paint the blank model
- Legend confirmed



Figure 6: working on the legend for the P3DM

Step 5 – Populating the blank model and digitising the information

This stage is where everyone needs to be involved for putting features on the map. Traditional knowledge is also important to be captured during this phase.



Figure 7: Populating the model starting with the roads

Management Plans and Community Plans

Community implementation – there are various plans that can be located on the map. The areas such as the Highland Paradise and some marine rahui areas can utilise this P3D for its management and communicating the boundary area and its prohibitions. The P3D is a powerful tool to help with all aspects and not limited to conservation.

Future P3DM to consider:

1. A really good satellite image with good contour lines
2. Each contour line to be a different colour
3. Community awareness about the P3DM using the Puaikura P3D video
4. The final P3D to guide community planning and implementation of those plans.
5. The 3D map should be made accessible to all
6. Given time to populate the model even after the hand-over ceremony – the digitising of the model needs to take place to collate the information onto GIS format and make available to all

ANNEX 1 – Programme for the week

PARTICIPATORY 3 DIMENSIONAL MODELLING WORKSHOP PROGRAMME FOR Vaka Puaikura, Rarotonga, Cook Islands, June 13-17, Aroa Nui Hall

Opening Ceremony – 9am start MC – Mii Matamaki

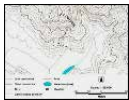











1. Message and prayer by Orometua of CICC
2. Welcome to participants and Puaikura Community
3. Address and opening of the workshop
4. Presentation by MNRE staff
5. Photo session

















Closing prayer – kai ti

















Date/Time	Activity	Responsible Personnel
DAY 1 – Monday 13th June 2016		
2.00-3.00pm	Session 1: Community Legend and Colour code development and assigning point, linear, polygon codes	Community Members and P3DM Team
	Session 2: Brief the youths 15-20 youths on their part and responsibilities for the process of the blank model making (Note: Blank model building starts Day 1 – Day 2 (2 days)	Youths and P3DM Team
3.00-3.30pm	Afternoon Tea	P3DM Participants
3.30-4.00pm	Wrap of Day 1	P3DM Participants
DAY 2 – Tuesday 14th June 2016		
9.00-11.00am	Youths and P3DM Technical Team to continue with tracing, cutting, pasting layers on the Table for the blank model	P3DM Participants
11.00-11.30am	Break for Morning Tea	
11.30-1.30 pm	Continue with the process - tracing, cutting, pasting layers on the Table for the blank model	
1.30 - 2.00pm	Break for Lunch	
2.00 - 3.00 pm	Continue with the process - tracing, cutting, pasting layers on the Table for the blank model	
3.00 - 3.30 pm	Break for Afternoon Tea	
3.30 - 4.00pm	Continue with the process - tracing, cutting, pasting layers on the Table for the blank model	
4.00pm	Wrap of Day 2	





























Date/Time	Activity	Responsible Personnel
DAY 3 – Wednesday 15th June 2016		
9.00 - 11.00 am	Community work on P3D model – start putting features onto the blank model	P3DM Participants
11.00 - 11.30am	Break for Morning Tea	
11.30 -1.30 pm	Continue with the process - putting features onto the blank model	
1.30 - 2.00pm	Break for Lunch	
2.00 - 3.00 pm	Continue with the process - putting features onto the blank model	
3.00 - 3.30 pm	Break for Afternoon Tea	
3.30 - 4.00pm	Basic land features of streams, roads etc. shown on map completed	
4.00pm	Wrap of Day 3	
DAY 4 – Thursday 16th June 2016		
9.00 - 11.00 am	Community work on P3D model – start putting features onto the blank model	P3DM Participants
11.00 - 11.30am	Break for Morning Tea	
11.30 am -1.30 pm	Continue with the process - putting features onto the blank model	
1.30 - 2.00pm	Break for Lunch	
2.00 - 3.00 pm	Continue with the process - putting features onto the blank model	
3.00 - 3.30 pm	Break for Afternoon Tea	
3.30 - 4.00pm	Basic land features of streams, roads etc shown on map completed	
4.00pm	Wrap of Day 3	
DAY 5 – Friday 17th June 2016		
9.00 - 10.30am	P3DM Official Handover & Closing Ceremony	P3DM Participants
10.30 - 11.00am	Morning Team / Photo Session	
11.00am -2.00pm	P3DM Official Handover & Closing Ceremony	
4.00pm	Participants Travel to Apia	

ANNEX 2 – List of materials

Item Description for the construction of 3D model of the Cook Islands: Scale 1:1250 horizontal scale); 0 meters or seas level is the lowest point and the highest is 375 meters. The model measures 2.4 m X5.4 m and is made of units measuring metres.)		Unit of measure	Quantity
	Contour map of the area where model will be built	No	1
	Bathymetry map	No	1
	Single wall corrugated carton board sheets 1.2m x 2.2m. Inner and outer liner 175 g/m ² ; Thickness: 4-mm or better 3-mm. More at: http://www.iapad.org/tips/cartonboard.htm	No	0
	Base Map: Scanning, georeferencing, manipulation, attributing and plotting (Yvette/GIS Specialist to develop) Otherwise liaise with Nate or Silika for necessary inputs, like coloured ink, paper etc.) More at method process at : http://www.iapad.org/tips/base_map.htm	No. of copies	3
	Custom-made wooden base table (1.2 m x 2.2 m) (0.6 m high) (with hooks to be able to join the two tables)	No.	1
	Acrylic paint (student grade, less expensive than professional grade) colours found in natural landscapes like blue (dark and light), green (different types), brown, okra, white, yellow (800 cc per colour); dark blue (1200 cc).	400 cc bottles	20
	White Paint (Water Based).Get additional 2-3 litres for the blank model painting and whitening..	1 Litre	3
	200 cc are enough for other colours like red, orange, black, violet, purple, maroon, orange, pink, etc.	200 cc bottles	10
	All-purpose glue, gallon bottle, non toxic PVAC based adhesive. Soluble in water.	1 gallon jar	10
	All-purpose glue, 16 fl oz. bottle, non toxic PVAC based adhesive. Soluble in water.	16 fl oz bottle	20
	Plastic bucket (10 litre capacity)	No.	3
	Egg whisks	No.	2

Item Description	Unit of measure	Quantity
 Plastic container. Approximate diameter 180 mm (1 litre capacity)	Box of dozen.	20
 Attendance Certificates. Better do these by your own with a colour inkjet printer during the mapping exercise. This would a cheaper and more practical solution. Ensure you cover for Appreciation and Participation. Make sure all names from start to finish are accounted for. All Logos for MNRE/Project/Govt/Sponsors etc...	No.	150
 Foldback Clip 25mm	No.	4
 Blade Cutter	No.	20
 Tube of spare blades (pack of 10)	No.	10
 Coping saw	No.	5
 Spare blades for coping saw (wood blades) (pack of 4)	No.	15
 Carbon Paper A4 Size (Box)	No.	2
 Sticky Clue	No.	1 doz
 Pencil eraser	No.	5
 Colour Marker (black, blue, red and green) (2 each)	No.	8
 Office paper white (80 g/m2)	Sheet	1
 Office paper (200 g/m2) for cutting out labels	No.	20
 Pliers	No.	1
 Compass	No.	1
 Art line pen set	Set	1

Item Description	Unit of measure	Quantity
 <p>Cotton cable (yellow); Weight/length per ball: 50 gr =142 mt</p>	Ball/coil	2
 <p>In the event we have no Crepe papers (Below) then option of testing different types of toilet paper, as some are too thin and absorb more water or glue and takes longer for the model to dry.</p>	Rolls	50
 <p>Crepe paper (white) in the event we have none then option of testing different types of toilet paper, as some are too thin and absorbs more water or glue and takes longer to dry.</p>	Sheets	40
 <p>Dressmaker pins</p>	box of 1000	3
 <p>Hammer</p>	No.	1
 <p>Calliper (plastic)</p>	No.	1
 <p>Clear plastic jars (0.5 - 0.75 litres)</p>	No.	1
 <p>Hand knitting yarn no. 8; 18 colours (#16) (250gm)</p>	Ball/skein	20
 <p>Plasticized north arrow Download the Adobe PDF version from http://www.iapad.org/tips/georeferencing.htm</p>	No.	8
 <p>Numbers (1 to 35) Font 72 Download the Adobe PDF version from http://www.iapad.org/tips/georeferencing.htm</p>	No.	1
 <p>Letters (alphabet) Font 72 Download the Adobe PDF version from http://www.iapad.org/tips/georeferencing.htm</p>	No.	1
 <p>Plastic laminated Quick Reference guide Download the Adobe PDF version from http://www.iapad.org/tips/georeferencing.htm</p>	No.	6
 <p>Map pin with round head mod. 1204 (4 mm) (1000 pc bag). Colours: White, black, royal blue, jade green, light green, sky blue, orange, yellow, red and brown.</p>	Bag of 1000	1
 <p>Push pin mod. MP-10 (10 mm head) (1000 pc bag). Colours: White, royal blue, jade green, yellow and red.</p>	Bag of 1000	1
 <p>Push pin mod. A-150 (1000 pc bag). Colours: White, black, royal blue, jade green, yellow and red.</p>	Bag of 1000	10
 <p>Push pin mod. CL-8 (1000 pc/bag). Colours: White, royal blue, jade green and yellow. More on map and push pins at http://www.iapad.org/tips/symbols/pins.</p>	Bag of 1000	5

Item Description	Unit of measure	Quantity
 Shipment of pins to destination. Recommended supplier of map and push pins: http://www.meikodo.co.jp	Consignment	1
 Masking Tape (2")	Roll	5
 Measuring Tape (3 meter long)	No.	1
 Nails (0.5")	Kg	1
 Nails (2.5")	Kg	1
 Nails (5")	Kg	1
 Packing tape (2")	Roll	3
 Transparent tape (1")	No.	3
 Painting Brush # 0	No.	10
 Painting Brush # 10	No.	20
 Painting Brush # 12	No.	20
 Painting Brush # 2	No.	20
 Painting Brush # 7	No.	20
 Painting Brush 25mm	No.	16
 Painting Brush 60 mm	No.	8
 Design Pencils # 2	No.	36
 Pencil sharpener	No.	1
 Plumb ball or plumb line	No.	1
 Scaled ruler (Rothring or similar)	No.	1
 Scissors (Type 1)	No.	3
 Scissors (Type 2) small	No.	3
 Scissors (Type 3)	No.	3
 Stapler with refill (Staple wire)	No.	1
 Transport of supplies to venue	Trip	1
 Scarpel - Surgeon's Blades	box of 50	3
 Butcher papers	roll	2
 Coloured Wall Papers - "Democracy Wall" AO Size	sheets	4
 Blu-Tac	Pkts	2

ANNEX 3 – Legend for the Puaikura P3D

English Name	Maori Name	Symbol	English Name	Maori Name	Symbol
INFRASTRUCTURE			COMMUNITY PLACES		
Main Road	Matara Maata		Community Hall	Are Note Oire	
Back Road	Ara metua		Meeting Houses	Are Uipa'anga	
Connecting Roads	Matara Tikotikoti		Cemetery	Ngai Tamumanga	
Inland Roads	Matara Ki te Maunga		Puaikura Fire Station	Toroka tamate Ai	
Bridges	Ana		Police Station	Are Akava	
Bus Stops	Ngai Tiaki Pereo		Market	Maketi	
Hiking Trails	Ara Piki Maunga		Cyclone Shelters	Punanga Akaruru	
Jetty	Uapu		Cyclone Emergency Container	Paranga-roo Tuatau Manako Kore	
Water Intakes	Fu Faipa		Tsunami Evacuation Routes	Ngaruru-Ngai Akaruru	
Landfill	Wairanga Tita		GOVERNMENT		
Quarry	Ngai Taviri Toka		Infrastructure Cook Islands		
Recycle Centre			Agriculture	Tu'anga Tanutamu	
Streams	Ara Kauvai		Rarotonga Prison	Are Auri	
EDUCATION			BUSINESSES		
Rutaki School	Apiti Rutaki		Shops (Dairy Shops)	Ona Toa	
Arorangi School	Apiti Arorangi		ATM	Matini Moni	
Apiti Arorangi	Apiti Tuatoru		Laundry	Are Pu'a Kakau	
UTILITIES			Construction Companies		
Power Substation	Are Uiraiti		Petrol Stations	Toa Penitini	
Solar Farm	Uira Natura		Bakery	Are Tumu Varaoa	
Water refill station	Ngai Akaki Vai		Pearl Shops	Ona Poe	
Water hydrants			Rental Homes	Are Kimipuapiga	
Communications			NATURAL FEATURES		
Radio Station	Are Ratio		Caves	Ana	
Emergency Siren	Oe Akamatakite Anga		Well (Man-made)	Punavai	
Bluecky Main Station	Rangi Kivakiva Iti		Natural Springs	Punavai Pupu	
E-service resellers	Rangi Kivakiva		Marine Passage	Ava	
Blue-sky Wifi hotspots	Rangi Kivakiva, Mareva Ririnui		PROTECTED AREAS		
Mobile Tower			Marine Raui	Raui Pae Tai	
Postal Depots			Highland Paradise	Maungaroo	
HEALTH			Bird Area	Ngai Note Mamu	
Rarotonga Hospital	Are Maki		Significant Native Plants & Trees	Ngai Tupuna	
Clinic	Are Paunu		VEGETATION TYPE		

Private Doctors	Taote		Native Type	O Rakau Tupuna	
Defibrillator (Heart Starter)	Matini Puku'atu		Non-Native Type	O Rakau Porena	
Te Vaerua Rehabilitation Clinic			Swamps/Wetlands	Ngai Pai taro/Vai	
TOURISM			Reforestation	O Rakau mea tanu	
Resorts	Otera Mamaata		Fermland	Ngai tuamue	
Hotels/Motels/Lodges	Otera Rikiriki		RELIGION		
Restaurants/Cafes	Are Kaikai		Arorangi CICC	Are Pure CICC	
Car/Bike Rentals	Ona Motoka ete Paikara		Catholic	Are Pure Katorika	
RECREATION			Seventh Day Adventist	Are Pure Raitu	
Mini-Golf	Paporo Uamoa		Mormon	Are Pure Momani	
Raemaru-Park	Raemaru		Assembly of God	Are Pure AOG	
Diving Companies	Ngai Note Ona Ruku		Significant Historical Places		
HISTORICAL & SACRED SITES			Au Maru	Au Maru	
Marae	Mareae Ou		Highland Paradise	Maungaroo	
Paepae	Paepae		Tuoro(Blackrock)	Tuoro	
			Significant Historical Sites	Ngai Tupuna	

ANNEX 4 – Contacts

Cardboards - Renuka Yankaiya, Punjas FIJI: renuka@punjas.com Pacific Supplies for stationery, paints, cello tapes etc. Vonnias Warehouse for yarns, paints, cutters CICT Building for cutters and materials for table Timberland Limited for nails

ANNEX 5 – List of Participants

The model was put together by the following people:

Tinomana Tokerau Ariki	Vaka Puaikura
Rev. Tinirau Soatini	Vaka Puaikura
Tere Taio	Vaka Puaikura
Tina Tamanui (Aunty Tina)	Vaka Puaikura
Eileana Rima	Vaka Puaikura

Laliva Rima	Vaka Puaikura
Phillipa Arona (Pipa)	Vaka Puaikura
Ambrose Mana	Vaka Puaikura
Sam Napa	Vaka Puaikura
Doreen Kavana-Boggs	Vaka Puaikura
Terangi Elika	Vaka Puaikura
Maine Unuka	Vaka Puaikura
Apii Heather	Vaka Puaikura
Tinikura Mataiapo Tai Kavana Anderson	Vaka Puaikura
Puaikura Uri Mataiapo	Vaka Puaikura
Naomi Nena	Vaka Puaikura
Joseph Wichman	Arorangi School
Heath Heather	Arorangi School
Henry Mataio	Arorangi School
Jay-Dee Paruru	Arorangi School
Daphanie Samuela	Arorangi School
Jasmine Harry-Manuel	Arorangi School
Kassandra Beer	Arorangi School
Simiona Ataera	Arorangi School
Beniamina Kite	Arorangi School
Tamaau Tairi	Arorangi School
Tamatoa Tuariki	Arorangi School
Joseph Brider	NES Director, Rarotonga
Mii Matamaki	NES Officer, Rarotonga
Basilio Kaokao	NES Officer, Mauke
Elizabeth Munro	NES, Rarotonga
Moana Tetauru	NES, Rarotonga
Vavia Tangatataia	NES Manager, Rarotonga
Dan-Olaf Rasmussen	NES, Rarotonga
Ben Maxwell	NES, Rarotonga
Louisa Karika	NES Manager, Rarotonga
Jean Nicholls	NES, Rarotonga
Rimmel Poila	NES, Rarotonga
Maria Tuoro	NES, Rarotonga
Marino Wichman	Seabed Mining Authority
William Tuivaga	SRIC-CC

List of Trainees

Elleana Rima	Vaka Puaikura
Mii Matamaki	NES Officer, Rarotonga
Basilio Kaokao	NES Officer, Mauke
Elizabeth Munro	NES, Rarotonga
Moana Tetauru	NES, Rarotonga
Marino Wichman	Seabed Mining Authority

List of trainers and supporting personnel for the Puaikura P3DM

Paulo Amerika	Ministry of Natural Resources and Environment, Samoa
Fata Eti Malolo	Ministry of Natural Resources and Environment, Samoa
Siavalua Tiatia	Ministry of Natural Resources and Environment, Samoa
Ana Fekau	Department of Environment, Tonga
Easter Galuvau	SPREP, Samoa
Vainupo Juungblut	SPREP, Samoa

ANNEX 6 – Opening remarks by the Director of NES

Kia Orana Koutou Katoatoa Papa Orometua, Kia Orana

Tinomana Ariki e te Kauariki Rangī, Kia Orana Minister Turepu, Minister Heather...

Members of Parliament, Smiley Heather and James Beer, Kia Orana

Our invited guests from Samoa and Tonga, Kia Orana and welcome to Cook Islands and to Vaka Puaikura.

Our SPREP staff, Easter and Vai, Kia Orana and it is a pleasure to have you both here to help and assist us and the community Vaka Puaikura

Representatives of government ministries and agencies, Kia Orana And to the people of Vaka Puaikura, Kia Orana koutou katoatoa.

I am happy to be here today to give this opening address to you all because, finally after some months of planning and with great anticipation from Vaka Puaikura, we gather in this Aro'a Nui Hall, in the "Shadow of Raemaru", to work together on this community participatory three dimensional mapping exercise.

The other name for this village is Arorangi which means to "look to the sky", a fitting place to host this workshop as we work together to develop a model to view Arorangi from the sky in all directions.

Arorangi has an abundance of history and folklore arising from when Tinomana fled here in perhaps the 1400's and founded this village, we have stories of Raemaru and the shadow it cast all the way to Aitutaki, Ati and the Momoke, Orooro-a-Moa, Vai-a- Kura and Vai Toko.

Arorangi has important people and places, such as Tinomana and the chiefly lineage, Papehia and the importance of Christianity, the Taura Oire, Raemaru and Maungaroa, Arorangi School having just commemorated 100 years of service to its people and Highland Paradise and the ancient Marae and homes at that site. All of which have a place in this exercise.

Today and for the rest of this week, we hope to work together to develop a 3D model of this village, a model representing a snapshot in time, a tool for decision making. They say a picture speaks 1000 words, so I ask, how many words would a 3D model speak, I would suspect many more.

Community participatory three dimensional mapping or P3DM is an exercise that combines **community mapping** with **open discussions** on land-use and land-use planning scenarios.

It is a combination of geographic accuracy with local, individual spatial knowledge and 'mind-maps' of our districts and familiar settings.

During a P3DM exercise, all participants contribute to make a physical, hands-on wood- and paper model, to scale, of their village or community. I hope that through this exercise, everyone will contribute to placing features and places onto the model. This includes identifying and placing on the map our marae, our favourite fishing area, our schools and the churches to name a few.

The success of this exercise relies on all participants playing their part, elders sharing traditional and historic knowledge, fishermen sharing where good fishing places are or where the fish spawn or gardeners sharing where plantations are or old or important plants or trees are. Everyone will have knowledge to share and map, places where important past events occurred, of boundaries, of key areas and times for certain activities, and these can be discussed, and learned, by all participants including our school children.

At this juncture I would like to take this opportunity to welcome and introduce the trainers for this week from Samoa Ministry of Natural Resources and Environment staff – Mr. Paulo Amerika, Mr. Fata Eti Malolo and Ms Siavalua Tiatia. We also welcome and introduce the staff of the Secretariat of the Pacific Environment Program (SPREP), Ms. Easter Galuvao and Mr. Vainuupo Jungblut and from Tonga, Ms Ana Fekau.

These are our technical specialists, here to help out during the week and we look forward to learning

from and sharing with the team.

Vaka Puaikura is the first vaka to have this P3DM and through the organizing and support of National Environment Service and its supporting partners including the Integrated Island Biodiversity project, the Invasive Alien Species project, the SRIC- Climate Change project, the Government of Samoa, SPREP, the Technical Centre for Agricultural and Rural Cooperation (CTA), the Global Environment Facility and United Nations Environment Programme (UNEP).

To conclude I would like to thank you for your attention and I wish you all a great week with the P3DM and your hard work will be revealed on Friday for all to see.

I would like to now declare the Vaka Puaikura community P3DM...OPEN Kia Orana e Kia Manuia

ANNEX 7 – Closing remarks by the Director of NES and hand-over

Kia Orana Koutou Katoatoa Papa Orometua, Kia Orana
Tinomana Ariki e te Kauariki Rangi, Kia Orana Minister Turepu, Minister Heather...
Members of Parliament, Smiley Heather and James Beer, Kia Orana Kia Orana to our invited guests from Samoa and Tonga.
Our SPREP staff, Easter and Vai, Kia Orana
Representatives of government ministries and agencies, Kia Orana And to the people of Vaka Puaikura, Kia Orana koutou katoatoa.

We have come to the end of our journey to map Vaka Puaikura and provide a tool, an aid and a legacy for this Vaka.

We have toiled together in the shadow of Raemaru to create a view of Arorangi from the sky.

Brothers and Sisters, Elders and youth, people across generations, and across Polynesia with our Samoan and Tongan kin, sharing, learning and building together.

The experience has brought forth a wealth of knowledge, a surge of creativity and bond of community.

Hours were long and tiring but time was well spent, energy was low but enthusiasm and commitment stood tall.

I said on Monday that a picture speaks 1000 words, today I can say that a 3D model speaks 10,000. The model has been built by all of us here in this Aroa Nui Hall, for all to use, learn from and enjoy. The success, and I believe this is a success, relied on all participants working together, sharing their knowledge and experiences and this, I feel, was done – a testament to what can be done when all work together.

This was no simple task, no small feat, nor a random action. It is the result of committed community setting a goal and striving to achieve it. Well done to all involved.

At this juncture I would like to take this opportunity to thank everyone that was involved. I would like to sincerely thank Tokerau Tinomana Ariki for her steadfast commitment to this exercise and for the support of the Kauariki Rangi. I would like to thank Arorangi School for their support and army of eager students who drew, traced and cut, hammered, glued and painted.

I would like to recognise and appreciate the commitment and support shown by the Vaatuatua of Tinomana – Tere Taio, Uri Mataiapo Maine Unuka, Kavakura Mataiapo Apii Heather, Tiikura Mataiapo Tai Kavana Anderson Aunty Tina Tamanui, Doreen Kavana-Boggs, Philippa Moeroa, Elleana Rima, Uri

Mataiapo Maine Unuka, Kavakura Mataiapo Apii Heather and Ambrose Mana. Please let's give them all a hand!

I would also like to recognise of brothers and sisters from across Polynesia, Paulo, Fata and Sia from the Government of Samoa, Ana from the Government of Tonga and Easter and Vai from SPREP. We very much appreciate the knowledge, wisdom and skills that you have imparted on this community and nation and we look forward to passing these skills onto others. Please convey our deepest appreciation to your governments, communities and families.

I would also like to acknowledge to commitment of the staff at the National Environment Service, Mii, Liz, Louisa, Maria, Matt, Moana, Olaf, Ben, Jean and Basilio from Mauke.

I would also like to recognise our supporting partners including the Integrated Island Biodiversity project, the Invasive Alien Species project, the SRIC-Climate Change project, the Government of Samoa, SPREP, the Technical Centre for Agricultural and Rural Cooperation (CTA), the Global Environment Facility and United Nations Environment Programme (UNEP).

The idea for this exercise was borne out of the SRIC-Climate Change project and in partnership with the Tu'anga Taporoporo, we have delivered.

And finally, it gives me great pleasure to officially hand over the Vaka Puaikura Participatory 3D Map to Tokerau Tinomana Ariki and Vaka Puaikura

Kia Orana e Kia Manuia

ANNEX 8 – Expenditures

Expenditures		
Pacific Supplies	Stationery and supplies	\$ 1,412.42
Vonnias	Resources for P3D	\$ 344.80
CITC Building	P3D Resources	\$ 965.90
Punjas Fiji	Pay Punjas for cardboards	\$ 1,169.37
Punjas Fiji	Pay for freight	\$ 3,172.89
MFEM - Customs	Customs and VAT	\$ 667.34
Puaikura Community Centre	Hire of Aroa Nui Hall	\$ 1,000.00
Polynesia Rentals	Rental	\$ 873.00
Rarotonga Freight Services	Freight and clearance of cardboards	\$ 246.65
CITC Food	Coffee/Tea/Milo etc	\$ 490.50
Timberland	Nails	\$ 33.50
Various	Catering for the week	\$ 10,500.00
Vaima Water	Water and igloos for the week	\$ 84.80
CIPS - Printing	Map	\$ 1,190.08
	Certificates	\$ 95.45
Katherine Ruatoe	11 Ei for opening	\$ 110.00
Triad Petrol	Petrol for rental	\$ 95.45
Friendlymart	Batteries for label maker	\$ 20.40

TOTAL: \$ 22,472.55



