PACC TECHNICAL REPORT 10

OCTOBER 2014

PACC

Building Resilience to Climate Change in Pacific Communities

Using Participatory Three-Dimensional Modelling (P3DM) to Facilitate Community Decision Making: A Case Study from the Vanuatu Pacific Adaptation to Climate Change (PACC) Project

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Using Participatory Three-Dimensional Modelling (P3DM) to Facilitate Community Decision Making: A Case Study from the Vanuatu Pacific Adaptation to Climate Change (PACC) Project. Apia, Samoa : SPREP, 2014.

p. cm. (PACC Technical Report No.10)

ISSN 2312-8224

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This publication is also available electronically from SPREP's website:
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ACKNOWLEDGEMENTS

This report was compiled by Ian Iercet with contributions from Dennis Alvos, Taito Nakalevu, Brian Philips, Allan Simion and Rodson Aru.

Many organisations and individuals were involved in making the workshops and the development of the Epi Island participatory three-dimensional model a reality and a very successful exercise. Key to the success were the 150 villagers from 15 villages on Epi Island where most of the adaptation interventions will be demonstrated, namely Laman Island, Laman Bay, Vaemali, Niku, Moirui, Nivenue, Nikaura, Nuvi, Lemaru, Pinki, Wenia, Walavea, Alak, Malvasi, and Rovo Bay, in the Varsu area council and the Varmali area council. Participants representing all the other remaining villages in Epi, from Yarsu area council and Vermaul area council, are also gratefully acknowledged for their input.

The following organisations and networks contributed to the success of the initiative: Climate Change Project Management Unit of the Department of Meteorology, Public Works Department, Ministry of Infrastructure and Public Utilities, Department of Agriculture and Forestry, Department of Fisheries, Department of Environment, Department of Lands Survey, Vanuatu Broadcasting and Television Corporation, SHEFA Provincial Government, Epi Island Council of Chiefs, Varsu area council, Varmali area council, Varmaul area council, Yarsu area council, Secretariat of the Pacific Regional Environment Program (SPREP), and most importantly, Epi High School teachers and students.

The photographs were taken by Allan Simeon and Rodson Aru.

The report was reviewed by a team that included Netatua Pelesikoti and Peniamina Leavai (SPREP), Ilisapeci Masivesi (Australian Department of Foreign Affairs and Trade), Gabor Vereczi and Mina Weydhal (UNDP), and Paul Maoate (Cook Islands), Simpson Abraham (Federated States of Micronesia) and Moira Faletutulu (Samoa) (PACC Project Coordinators).

EXECUTIVE SUMMARY

In Vanuatu, the Pacific Adaptation to Climate Change (PACC) project focuses on coastal zone management, and specifically the coastal roads on the island of Epi, which are being damaged by flooding and coastal erosion. The project is working with local communities to develop appropriate solutions that contribute to more resilient infrastructure.

The PACC Vanuatu project team identified participatory three-dimensional modelling (P3DM) as a valuable tool to facilitate community participation and decision making in the project. P3DM involves the building of three-dimensional (3D) relief maps by communities, combining local knowledge of geography and land use with geo-referenced data. The map then forms the basis for discussion and decision making on project interventions.

For the PACC project, the purpose of using the P3DM approach was to facilitate the development of community-owned and consensual management and adaptation plans, and also to help the communities to better understand their island ecosystems, and the relationships between terrestrial and marine ecosystems. The exercise also allowed the communities to share their social, cultural and economic experiences with the adverse effects of climate and natural disasters in the area, and their coping strategies.

Two workshops were held. The first, for the construction of 3D model of Epi Island, was held at Epi High School and involved students and teachers, with assistance from the PACC project team. The model was completed in 5 days, and the students benefited from a unique learning experience.

The second workshop used the 3D model of Epi as a community consultation tool. A public invitation was extended to all the people of Epi, and special effort was made to ensure attendance by community leaders, such as chiefs, women's leaders, youth leaders and community elders, i.e. the key decision makers in Epi. A total of 196 people attended.

The objective of the workshop was to assess vulnerabilities to climate change, identify current coping strategies, and identify adaptation options for the people of Epi. The model was also used as the basis for discussions on island ecosystems, and the importance of an integrated approach such as 'ridge to reef' in managing the island's natural resources.

Using the 3D map, the participants identified, recorded and mapped out the problems and issues that they are facing in the different areas in Epi, including climate and disaster risks, and possible adaptation measures. Participants found the 3D model easy to understand, and it was very effective for collecting and capturing local knowledge.

The workshop was very successful. The tool enhanced the community consultation, by providing a visualisation of the land and resources under discussion. This improved appreciation of the locations and inter-linkages of natural and manmade systems helps decision makers make more informed decisions on activities involving these resources and ecosystems.

The workshop and the 3D model also facilitated sharing of information on natural resources among the different island communities. A lack of shared knowledge and understanding on natural resources is often a limitation in planning for sustainable resources use, and this tool can therefore help overcome this problem.

The approach promotes ownership of the resulting decisions and actions. The management regimes resulting from the participatory planning process are owned by the local communities on Epi Island and the Vanuatu PACC Project team, who are jointly responsible for their implementation.

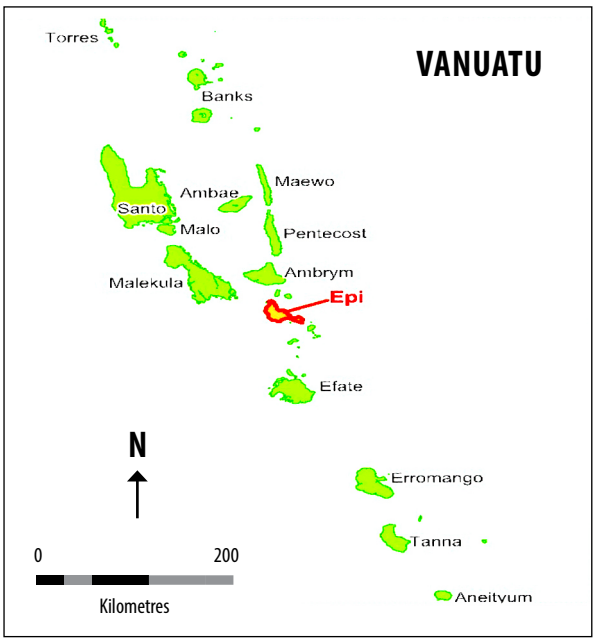


Figure 1. Map of Vanuatu.

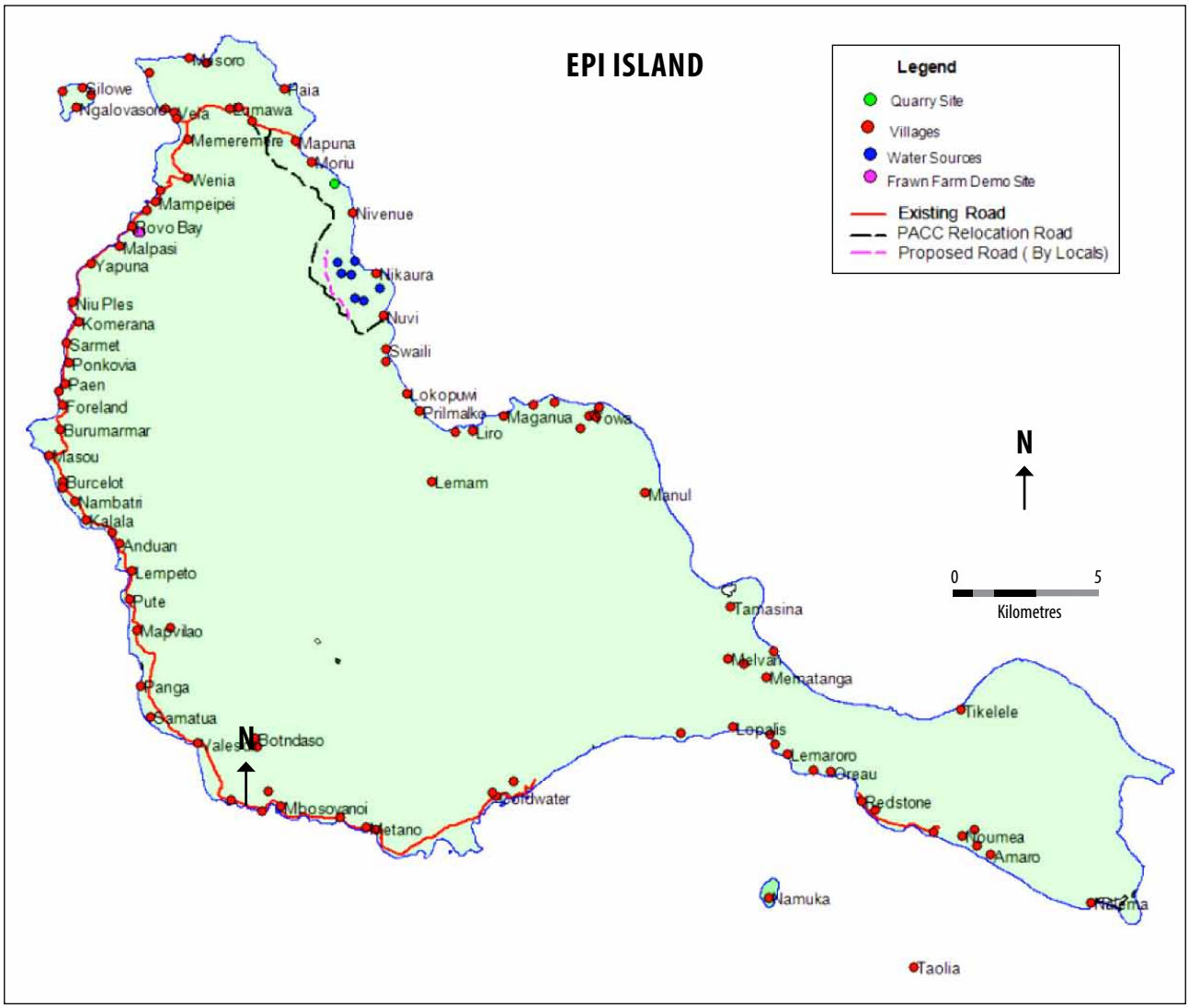


Figure 2. Map of Epi Island.

1. INTRODUCTION

The Pacific Adaptation to Climate Change (PACC) programme is the largest climate change adaptation initiative in the Pacific region, with projects in 14 countries and territories. PACC has three main areas of activity: practical demonstrations of adaptation measures; driving the mainstreaming of climate risks into national development planning and activities; and sharing knowledge in order to build adaptive capacity. The goal of the programme is to reduce vulnerability and to increase adaptive capacity to the adverse effects of climate change in three key climate-sensitive development sectors: coastal zone management, food security and food production, and water resources management. The programme began in 2009 and is scheduled to end in December 2014.

In Vanuatu, the PACC project focuses on coastal zone management, and specifically, the coastal roads on the island of Epi (Figures 1 and 2). Flooding and coastal erosion on the island have been causing increasing damage to the roads. The project is working with local communities to develop appropriate solutions that contribute to more resilient infrastructure.

The PACC project team identified participatory three-dimensional modelling (P3DM) as a valuable tool to facilitate community participation and decision making in the project. P3DM involves the building of three-dimensional (3D) relief maps by communities, combining local knowledge of geography and land use with geo-referenced data. The map then forms the basis for discussion and decision making on project interventions.

In Vanuatu, communities are the custodians of about 80% of the land and of the coastal and marine environments up to 12 miles offshore. The Government entrusts hands-on management of terrestrial and coastal resources to the local communities. It is therefore important that communities have the necessary skills and knowledge to help them with informed decision making on managing these resources, and especially now, in the face of climate change.

The regulatory, legal and cultural frameworks are supportive for communities to take the lead in sustainable management of their resources; however actual implementation can be challenging. Typically, local knowledge is scattered, and only partially shared among villages. Historic information on resources – where they are found, for example – is usually transferred orally which is not conducive to systematic monitoring or detailed planning.

In addition, data available at government level is often of poor quality, outdated, incomplete or in a format that cannot be understood by the community leaders.

While some efforts have been made by non-government organisations (NGOs) and government agencies to introduce more systematic resource management approaches, such as participatory planning and monitoring methods, most village communities still rely on traditional approaches involving village gatherings and oral sharing of information.

Community-based geo-spatial information gathering and analysis tools to support informed decision making are not widely used in the Pacific. There have however been successful experiences in Fiji and Solomon Islands in the use of P3DM in the contexts of collaborative natural resource management and customary resource tenure.

For Epi, it was envisaged that P3DM could be used to help develop community-owned and consensual management and adaptation plans. P3DM can also help the communities to better understand their island ecology and the relationships between terrestrial and marine ecosystems, by allowing them to visualise the different features such as watersheds. This may help the communities of Epi to review the way they interact with their island ecosystems and change their actions and behaviours accordingly.

2. OVERVIEW OF THE P3DM EXERCISE

2.1. Purpose

For the PACC project, the purpose of using the P3DM approach was to facilitate community participation in assessing vulnerabilities to climate change, and identifying adaptation options, for the people of Epi. Through an improved appreciation of the locations and inter-linkages of natural and manmade systems, P3DM helps decision makers make more informed decisions on use of these resources and ecosystems.

The approach also promotes ownership of the resulting decisions and actions. The management regimes resulting from the participatory planning process are owned by the local communities on Epi Island and the Vanuatu PACC project team, who are jointly responsible for their implementation.

The P3DM exercise also served as a pilot intervention and as training for the project team in the use of a new tool. Incorporating geo-accurate community-based mapping techniques in the planning process offers the opportunity to increase accuracy and relevance of local knowledge and stimulate sharing of knowledge. The more complete, accurate, visible and relevant (to the users) the collated information on resource distribution and use, the more effective the decision-making process will be.

2.2. Activities

It was decided that, in order to be time and resource efficient, an initial workshop would be held for model/map construction at Epi High School. This was followed by a second workshop, attended by community members from across the island, where the model was used for climate change community consultation.

Workshop 1, the construction of the 3D model of Epi Island, was held at the Epi High School Library and involved Year 11 Geography and Year 12 Arts classes.

Workshop 2, the community consultation using the 3D model of Epi island, was held at the community market house at Lamen Bay. Participants came from all four area councils of Epi Island (Figure 3). Participants identified climate change issues in their respective villages and communities, discussed coping mechanisms, and identified adaptation options to tackle the issues.

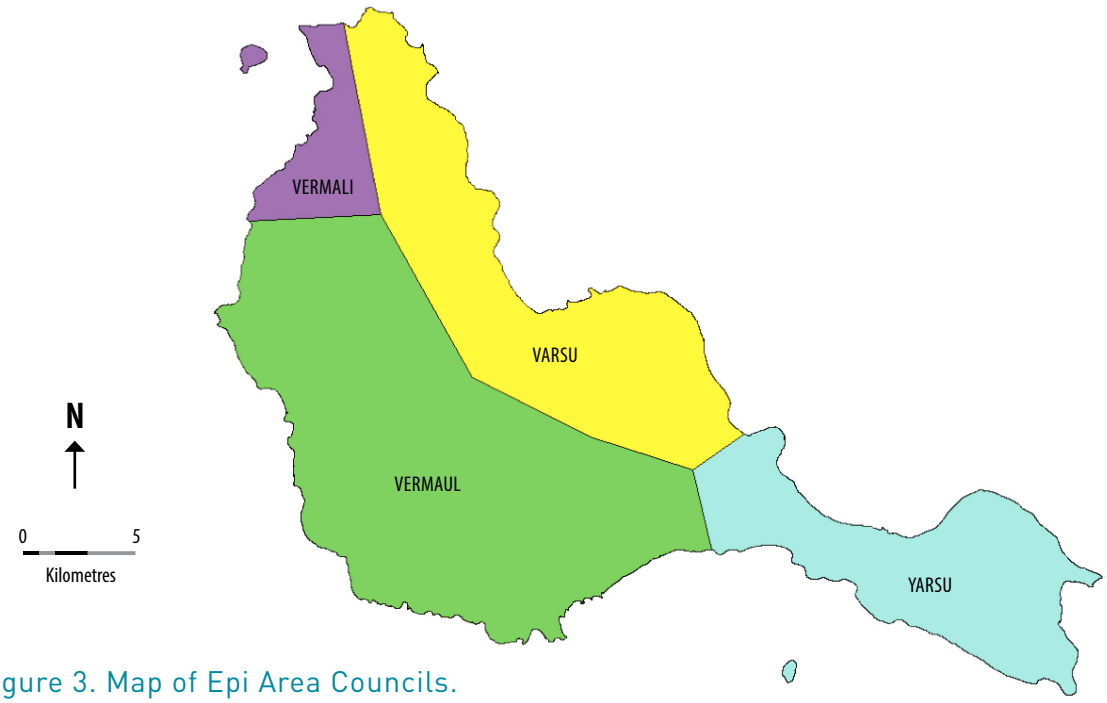


Figure 3. Map of Epi Area Councils.

3. PREPARATORY ACTIVITIES

This phase took three months. Activities included: consulting and mobilising students and stakeholders; sourcing spatial data and preparing the base map; choosing the appropriate mapping scales (vertical and horizontal); procuring workshop materials; selecting trainees; and organising the logistics.

3.1. Sourcing of data and preparation of the base map

The base map was prepared by the Vanuatu Department of Land and Surveys. It took approximately three weeks to complete the task. The digital contour data were available, but required 'cleaning' to make them useable. The terrestrial contour interval was 20 m starting from 0 m elevation corresponding to the mean high water mark. Contours were colour-coded, to help with later tasks.

3.2. Choosing the mapping scales

The island of Epi, including the land, lakes and surrounding coral reefs, measures 18 km by 20 km. The scales chosen were 1:20,000 horizontal and 1:6,666 vertical. The scales chosen allowed the model to be a manageable size so that it could be moved, but also ensured it was big enough to facilitate group working around it. A larger vertical scale was chosen taking into consideration the need to enhance the perception of slope and to accommodate the board thickness (3 mm).

3.3. Procurement of workshop materials

The success of the exercise depended on effective planning and procurement of materials. The cardboards were purchased in Australia through a Vanuatu-based company called Earthquip Ltd, while the rest of the materials were purchased locally at stationery and hardware shops. All materials were shipped to Epi Island one month before the first workshop commenced.

3.4. Logistics

Consultations and arrangements were made with the appropriate authorities before engaging the students of Epi High School to build the model.

For Workshop 2, logistics included arranging transport (land and sea), accommodation, and meals for the participants, who attended from the four area councils of Epi. Arrangements were also made with the following government departments for professionals to attend and share their expertise in their respective fields in regards to climate change adaptation: Environment, Forestry, Fisheries, Agriculture, Lands Survey, Climate Change and Public Works.

4. WORKSHOP 1 – MODEL CONSTRUCTION

The first workshop took place at the Epi High School library. The Year 11 Geography class and Year 12 Arts class were chosen to participate in the mapping and model construction. Thirty students participated, along with their teachers. The school handyman was engaged fulltime, and the school librarian also voluntarily participated in this interesting learning exercise as the model took shape. The library windows were always crowded by other classes during breaks and after school, as everyone was interested to follow the construction development.

4.1. Consulting and mobilising participants

The PACC project team introduced the workshop. They explained to the students and teachers their roles in the exercise. An educational video on P3DM was shown to assist participants in understanding the process and their forthcoming tasks.

Mr Taito Nakalevu, PACC Programme Manager, introduced the project background, goal, objectives and phases. He emphasised the importance of the model construction and how it will contribute to development and planning for Epi Island. He described the workshop, planned activities and the expected roles of the participants during the process.

Mr Rodson Aru explained to the students about the different types of maps, explaining the different components, and the symbols and their meanings. He briefed on the grids, i.e. longitude and latitude, the north orientation of the map, the scale, and finally took some time to ensure that the students understood the contours of the map as these are the basis of building the three-dimensional map (Figure 4).

Mr Ian Iercet, Assistant PACC Vanuatu Project Coordinator, introduced the scope of the exercise and described the tasks ahead. He provided a technical introduction to building the model of Epi, and the different steps in executing the construction of a model using P3DM.

Figure 4. Student orientation.

4.2. Constructing the model base and preparing the base map

A base for the model was made by joining two plywood sheets together. This allowed for the model to be easily transported or moved around for accessibility and public viewing.

Then the base map was placed on top of the model base, and the latitude and longitude were marked onto the model base.

The facilitators and students then prepared the base map for tracing. A large carbon paper was created to the same size of the base map by combining many A4 size pieces of carbon papers. The carbon paper was then taped to the bottom of the reference base map (topographic), with the marking side facing out (Figure 5).

Figure 5. The carbon paper is taped onto the plywood base, ready for tracing the contour lines.

4.3. Constructing the model

After the introduction and a question and answer session, the students were divided into three working groups, each with a supervisor. The groups were assigned to three main construction stages of the model building process:

- Tracing the contours on the 3 mm thick cardboard;
- Cutting out the single contour layers;
- Gluing the contour layers to build the model.

Map construction then proceeded with the following steps:

1. Corrugated cardboard sheets were prepared, the exact same size as the reference base map. On each sheet of cardboard, a single contour was traced using the base map with carbon paper underneath as a reference (Figure 6). Sheets were labelled with the contour elevation and a north-pointing arrow, for correct orientation.
2. Contours were cut from the cardboard sheets (Figure 7).

3. Contour sheets were superimposed on one another in the correct order and the precise orientation, and then glued together (Figure 8).
4. Once dry and secure, the model was covered with thin paper which was secured using acrylic white or translucent glue (Figure 9). This helped to smooth out the contour layers and create terrain continuity.
5. The model was then painted by the students, adding features such as roads, rivers, streams, airstrips, public buildings and telecommunication towers by painting or using pins with tags (Figure 10).

The model was completed in 5 days (Figure 11).

This was a unique learning opportunity for the students, who broadened their knowledge in map reading, scaling, terrain information and model construction. It was agreed that, after the second workshop, the model would be kept in the school library and used as a teaching aid in the future.

The model can also be used as a basis for community adaptation planning, and by government departments to aid assessments and awareness raising on different issues affecting the island.

Figure 6. Tracing the contours.

Figure 7. Cutting the contours.

Figure 8. The model taking shape.

Figure 9. Covering the model with paper.

Figure 10. Painting the model.

Figure 11. The finished model.

5. WORKSHOP 2 – COMMUNITY CONSULTATION

The second workshop used the 3D model of Epi as a community consultation tool. The objective of the workshop was to assess vulnerabilities to climate change, identify current coping strategies, and identify adaptation options for the people of Epi. The model was also used as the basis for discussions on island ecosystems, and the importance of a 'ridge to reef' approach in managing the island's natural resources.

5.1. Participants and venue

The Vanuatu PACC team extended a public invitation to all the people of Epi to attend the workshop. Special effort was made to ensure attendance by community leaders, such as chiefs, women's leaders, youth leaders and community elders, i.e. the key decision makers in Epi.

A total of 196 people attended: 27 men and three women from the Varsu area council; 54 men and 44 women from Varmali area council; two men and two women from the Yarsu area council; 10 men and seven women from the Vermaul area council; and 43 students and four teachers from Epi High School.

The venue for the workshop was Lamen Bay market house. The venue can accommodate about 200 people inside and has a large open area with big trees that provide shade and can accommodate another 100 persons. The building was prepared by the market house committee. A public address system was set in place and electricity was connected to power the equipment.

5.2. Setting the scene

The people of Epi welcomed the Vanuatu PACC team, and the Chiefs of Epi agreed to allow the team to conduct climate change business on the island. The Church Elder in Lamen Bay offered an opening prayer, and other formalities were completed.

Prior to workshop activities, the Vital Roads video was screened, which gave background to the PACC project in Vanuatu. A second video that captured the 2012 community consultation workshop was also screened. That workshop aimed to raise awareness on climate change and identify the climate change problems and issues faced by the people of Epi, and clarify how the PACC project can address some of these problems. The screenings were followed by a short question and answer session.

5.3. Introducing the ridge to reef approach

Mr Reedly Tari from the Environment Department, Mr Philemon Ala from the Forestry Department and Mr Andrew William from the Fisheries Department explained to the participants the natural relationships between the terrestrial ecosystem and the marine ecosystem. The presentations emphasised the direct link between these ecosystems inside a particular watershed boundary, and the 3D model of Epi helped the participants to visualise and understand this complex issue.

The Fisheries officer gave an example by explaining the life cycle of freshwater prawns. They live upstream inland, but when they are ready to spawn, they have to make their way down to the sea. After spawning the larvae remain in the sea for 21 days and then make their way back to the estuaries and up the streams or rivers.

The Environment and the Forestry officers explained how improper land use can upset the whole ecology of the island. Uncontrolled farming methods and illegal cutting down of trees and clearing vegetation on steep slopes can lead to soil erosion and landslides along the ridges. Soil is washed down and transported through the waterways, causing excessive sedimentation which damages or destroys coastal ecosystems such as coral reefs.

The important lesson imparted to the resource owners and managers was that sustainable resource management has to be holistic, that is, following a ridge to reef approach. If we want to protect our marine resources, we have to also consider how we use our land in that particular watershed boundary.

5.4. The community consultation

The participants split into four groups, by residence in the four area councils of Epi. Each group included men and women, and the facilitator stressed the importance of ensuring equal participation by both gender groups.

The objective of the first exercise was for the groups to identify the climate change problems and issues they are facing (Figure 12). They were asked to write these down on butcher paper and note the locations, bearing in mind that this record would be used later to populate the 3D model. The problem areas were limited to villages and areas used for subsistence and commercial activities.

The groups were then asked to identify some of their current coping strategies to address the problems and issues they are facing. However, this raised some difficulties. Because climate change happens over a long period of time, coping strategies have also evolved over time, and people often do not realise that a change in behaviour has occurred and is a coping strategy.

After this exercise, the PACC team revisited this issue in order to identify all of the coping strategies adopted by the communities.

The facilitator then asked the groups to present their findings, and this was followed by a question and answer session. This allowed aligning of understanding between the PACC team and communities, and ensured that the entire group is moving forward together.

The four area council groups then placed their problems and issues, and their coping strategies onto the 3D model using pins with tags and following the legend created earlier (Figure 13).

Figure 12. The community consultation.

Figure 13. Map detail, with problems and issues added by the participants.

5.5. Results

Through the workshop, and using the 3D map, the participants identified, recorded and mapped out the climate change problems and issues that they are facing in the different areas in Epi. The results are presented in table form in Annex 1.

The workshop participants identified, recorded and mapped out adaptation interventions that address the climate change problems and issues that they are facing in the different areas in Epi. Due to time constraints the workshop was forced to pick up data by area council instead of village by village case.

During the workshop, it was agreed to establish the Epi Island Climate Change Committee. The committee was appointed by the High Chiefs of Epi Island, and will act as liaison between the communities and the PACC project team.

6. BEST PRACTICES AND LESSONS LEARNED

The use of P3DM was very effective for collecting and capturing local knowledge. At the same time it provided an excellent opportunity to verify the local information collected, through discussion with other community members present.

The tool enhanced the community consultation, by providing a visualisation of the land and resources under discussion. Members of the community who were not trained to interpret 2D maps and found these difficult, found the 3D model easy to understand. This improved understanding of geography, locations of natural resources, and linked ecosystems helps decision makers make more informed decisions on activities involving these resources and ecosystems.

The workshop and the 3D model also facilitated sharing of information on natural resources among the different island communities. A lack of shared knowledge and understanding is often a limitation in planning for sustainable resources use, and this tool can therefore help overcome this problem.

Having the students build the model proved successful. It was cost- and time-effective, and also provided a valuable learning experience for the students.

While the scale 1:20,000 and the contour interval of 20 m used for the model of Epi was workable, the PACC team felt that it would have been better to build the model to a scale of 1:10,000, to accommodate contour intervals of 10 m. This would result in a larger model, and features and land use could be more easily shown.

7. FURTHER READING

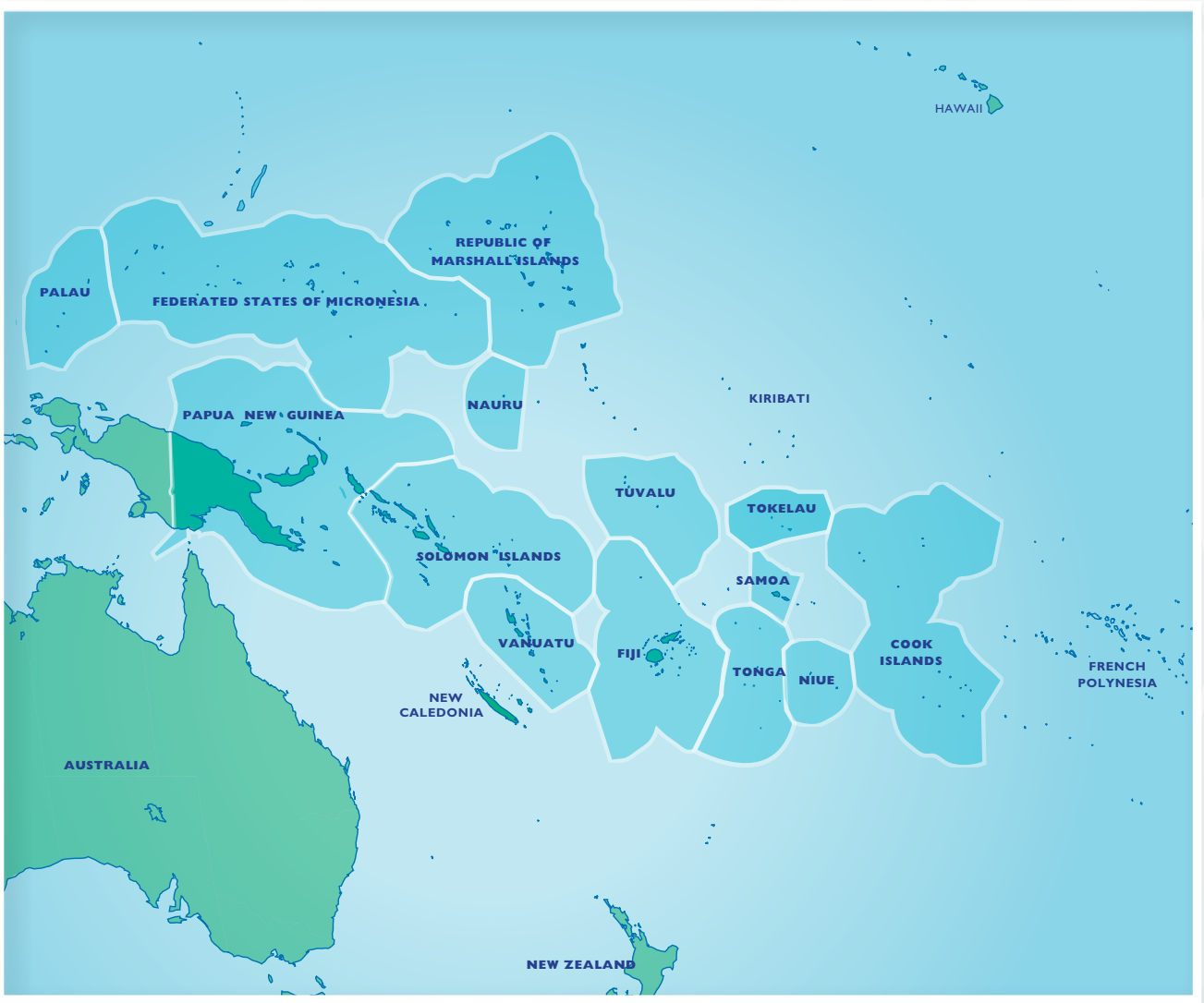
Rambaldi, G. (2010) Participatory 3-D Modelling: Guiding Principles and Applications. CTA, Netherlands, Download at http://www.iapad.org/publications/ppgis/p3dm_english_web.pdf

Integrated Approaches to Participatory Development: www.iapad.org – Information, case studies and publications on P3DM.

ANNEX 1. PROBLEMS, CAUSES AND SOLUTIONS IDENTIFIED BY THE GROUPS

Area council (group)	Problems and causes	Solutions
VERMALI	Pollution	Planting new trees along sea coast Bury empty plastics Providing awareness
	Cutting down of trees	Replanting trees Reduce the cutting of trees
	Hillside settlements	Build underground wells or tank Proper drainage planning
	Greenhouse effect	Move inland Build water tanks and underground wells
	Damage reef and over fishing	Tapu long reef Create more conservation areas Limitation of consumption e.g., fish and trochus
	Flooding	Proper drainage Relocation of village
	Increase of pest	Forestry department needs to come down and see for themselves
	Difficulties with telecommunication network (TVL and DIGICEL)	Communicate need to identify an area for this companies to build towers
	Global warming (sea level rise and coastal erosion)	Planting of mangroves Stop deforestation along coastal areas Build sea wall Move to higher grounds
	Heavy rainfall (flooding, soil erosion damage to reefs)	Proper drainage system Road maintenance services Build good strong bridge Reforestation Farming of sea cucumbers
	Over grazing of animals and clearing of large areas for cultivation (soil erosion)	Proper agriculture management Fencing
	Over fishing	Conservation Farming of sea shells e.g., green shells Farming of fish Farming of coral
	Soil erosion – lo water source I mekem se I blokem water reserve pipes I mekem se water I no rongudikam long skul	Airport bae I mas stapnomo lo Laman bay be baeoli mas finem one new side Planem mangroves lo coastal area

Area council (group)	Problems and causes	Solutions
VERMAUL	Flooding	Make gardens in flat lands
	Landslide (poor agriculture practice, e.g. cultivation on sloping areas)	Reafforestation
	Heavy rain causing floods Sea level rise/coastal erosion	Proper drainage system Relocation
	Decrease in marine resources (over harvesting, flooding, population increase)	Planting mangroves Coastal reafforestation Building sea wall
	Reduction of food crops	Control harvesting-number, size and season Conservation areas Control population growth Respect Reseedings marine resources Aquaculture Food crops variety adaptation
	Increase of pest	Hunting Destroy mosquito breeding sites
	Poor road condition (heavy rain, lack of maintenance)	Proper drainage system Tar sealed roads Regular maintenance
	Poor runway (heavy rain)	Proper drainage system Tar sealed roads
VARSU	Poor road condition Landslide Big valleys/heavy rain Sea level rise	Plant more trees (special grass), no work closap/side long hills Bridge – drainage (small wan) Relocate new road site, build sea walls
	Dead coral reef Soft mud Man-over harvest Cyclone – earthquake	Divertem water I go long wan area blong yumi save usum blong wan fish farm Putum ol strainer blong sevem graon mo water I no go long saltwater I mas gat ol conservation areas
	Poor water condition Heavy rain Land slide Rain water –pollution Hand pump – salty water	No work closap lo water source Protectem ol water source Awareness Identify new sites and relocate hand pumps
	Poor crops/market Snail Wild pig High temperature Land slide Volcano	Planem more trees Awareness long ol different types of crops we I save adapt or survive lo hot weather Introducim wan different type of snail or wan posen we I save kilimol damaging snails
	Sea level rise	Planem moa grass mo ol trees long ol coastal areas More awareness long olpipolblong no cuttemol trees long ol coastal areas mo no karemtumas sand mo coral long same area nomo Buildim sea wall Relocate to new areas
YARSU	Sea level rise (coastal erosion)	Plant trees, e.g. mangrove Protect any trees around coast Implement laws to ensure people cut down on the consumption of coral and sand
	Marine life (rain water from creek down to sea causes dead reef, land slide)	Providing technical help in growing reefs Implement laws in community concern to protect the coastal sites



PACC – building adaptation capacity in 14 Pacific island countries and territories

PACIFIC ADAPTATION TO CLIMATE CHANGE (PACC) PROGRAMME

The PACC programme is the largest climate change adaptation initiative in the Pacific region, with activities in 14 countries and territories. PACC is building a coordinated and integrated approach to the climate change challenge through three main areas of activity: practical demonstrations of adaptation measures, driving the mainstreaming of climate risks into national development planning and activities, and sharing knowledge in order to build adaptive capacity. The goal of the programme is to reduce vulnerability and to increase adaptive capacity to the adverse effects of climate change in three key climate-sensitive development sectors: coastal zone management, food security and food production, and water resources management. PACC began in 2009 and is scheduled to end in December 2014.

The PACC programme is funded by the Global Environment Facility (GEF)'s Special Climate Change Fund (SCCF) and the Australian Government with support from the United Nations Institute for Training and Research (UNITAR) Climate Change Capacity Development (C3D+). The Secretariat of the Pacific Regional Environment Programme (SPREP) is the implementing agency, with technical and implementing support from the United Nations Development Programme (UNDP).

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PACC TECHNICAL REPORTS

The PACC Technical Report series is a collection of the technical knowledge generated by the various PACC activities at both national and regional level. The reports are aimed at climate change adaptation practitioners in the Pacific region and beyond, with the intention of sharing experiences and lessons learned from the diverse components of the PACC programme. The technical knowledge is also feeding into and informing policy processes within the region.

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ISSN 2312-8224