Collaborative Spatial Information and Communication Management in the Pacific

Report on the Participatory 3D Modelling & Participatory GIS Exercise held on 4-13 April 2005 on Ovalau Island, Fiji

Compiled by Sukulu Rupeni with contributions from Giacomo Rambaldi, Silika Tuivanuavou, Amelia Makutu, Alifereti Tawake, Susana Lolohea, Etika Rupeni, Anju Mangal and Bill Aalbersberg

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ACKNOWLEDGEMENTS

This is to acknowledge all the organizations and individuals for their different roles in making this workshop and the development of the Ovalau Island Participatory 3 Dimensional Model (P3DM) a reality and a very successful one.

Key to the success rests in the hands of close to 100 villagers coming from following 27 villages on Ovalau Island: Levuka, Vagadaci, Waitovu, Vuma, Toki, Vatukalo, Nauouo, Yarovudi, Taviya, Rukuruku, Draiba, Naikorokoro, Nasinu, Tokou, Natokalau, Lovoni, Nasaumatua, Vuniivisavu, Visoto, Nacobo, Nukutocia, Naiviteitei, Nasaga, Tai, Navuloa, Viro, and Wainaloka.

The following Fijian or Fiji-based (unless otherwise specified) organisations, networks and projects organised and/or contributed to the success of the initiative: WWF, South Pacific Programme (WW-SPP); Technical Centre for Agricultural and Rural Cooperation (CTA), the Netherlands; Fiji Locally Managed Marine Areas (FLMMA) Network; Locally Managed Marine Areas (LMMA) Network (South Pacific Region); Development of Sustainable Agriculture in the Pacific (DSAP-SPC); Native Lands Trust Board (NLTB); Native Lands and Fisheries Commission; EU-SOPAC[1]-funded "Reducing Vulnerability in the Pacific Project"; Ministry of Regional Development - Fijian Affairs Board, Lomaiviti Provincial Council; Ministry of Agriculture; Ministry of Tourism; National Trust of Fiji; Ministry of Fisheries and Forest; Ministry of Lands & Mineral Resources, Department of Mineral Resources; Wet Tropics Management Authority, Australia; Secretariat for the Pacific Community (SPC); Partners for Melanesia (PNG); the Nature Conservancy (Solomon Islands); FLMMA Project - Korolevu-i-wai (Namahara FLMMA Project); Veratavou FLMMA Project; University of the South Pacific, Institute of Applied Sciences; the Delana Methodist High School, Levuka and the Levuka Public School.

Note: Copy of this document has been distributed in printed and / or electronic formats to all stakeholders involved in the exercise.

Pictures courtesy of Giacomo Rambaldi and Kenn Mondiai

[1] South Pacific Geo-science Commission

Elders' Considerations on the Workshop: …

I learnt new things about my village. I learnt names of places, names we do not use anymore, names that our elders used and I am so glad that I and future generations have learnt and will use them again.

I discovered that if we look after our environment and our "Vanua", our source of wealth, we will be able to combat poverty.

I felt this workshop has been useful for all the people of Ovalau – young and old, even our children have learnt new things. It is a big step forward for them and for all of us.

We now have a better understanding of the whole Ovalau landscape and this will be very useful for development planning and resource management.

More statements (all translated from the vernacular) are found in Appendix 10 at page 58

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List of Abbreviations

CTA	Technical Centre for Agricultural and Rural Cooperation
DSAP	Development of Sustainable Agriculture in the Pacific
FLMMA	Fiji Locally Managed Marine Areas Network
GIS	Geographic Information Systems
GPS	Global Positioning Systems
LMMA	Locally Managed Marine Area
NGOs	Non Government Organisations
NLTB	Native Lands Trust Board
P3DM	Participatory 3 Dimensional Model(ling)
PGIS	Participatory Geographic Information Systems
SOPAC	South Pacific Applied Geoscience Commission
SPC	Secretariat for the Pacific Community
WWF-SPP	WWF, South Pacific Programme

1 PROJECT BACKGROUND

Over the past ten years a solid body of knowledge and extensive experience have been gained in South East Asia in practicing Participatory GIS (PGIS) in the contexts of collaborative natural resource management and customary rights on resource tenure. In these contexts Participatory 3D modelling (P3DM) has been widely used in conjunction with Global Positioning Systems (GPS) and Geographic Information System (GIS) applications.

In Fiji Islands, native communities are the custodians of 87% of land area and of all the coastal and marine environments up to 12 miles offshore. The Government entrusts hands-on management of terrestrial and coastal resources to local communities. The latter therefore need to be sufficiently skilled and technically equipped to be in an informed position when deciding on how to manage the territory.

The regulatory, legal and cultural frameworks are supportive for native communities to take the lead in managing their resources. Nonetheless actual implementation depends on a number of contributing factors the occurrence of which is varied. Typically local knowledge is scattered and invisible or partially shared. Historic data on the occurrence of resources is transferred orally or in a manner, which is not conducive to systematic monitoring or detailed planning.

Data available at Government level is often of poor quality, outdated or incomplete. While some efforts have been made by Non Government Organisations (NGOs) and Government agencies to introduce participatory planning and monitoring methods, most village communities still rely on traditional gatherings where conversation is used as the main channel of communication.

The use of community-based geo-spatial information gathering and analysis tools to support informed decision making is still in its infancy. Local knowledge is scattered in the mind of individuals and rarely collated, geo-referenced and visualised in the form of maps. As mapping is a fundamental way for displaying spatial human cognition and for communicating on issues related to the territory, the lack of a best practice for producing community-generated maps hampers increased community involvement in decision-making, a critical entitlement when natural resources distributed over vast areas are at stake.

Ovalau Island (Figure 1 and Figure 2) and its surrounding waters are part of the Bligh waters seascape and are a known breeding ground for whales. Fiji's Vatu-i-Ra Channel, which separates the large islands of Viti Levu and Vanua Levu, contains a unique coral reef seascape, a high flow marine corridor with submerged plateaus, deep channels, protecting barrier reefs and large islands. Komodo, a globally renowned reef system, has a similar situation of strong currents funnelling through a narrow channel.

The choice of Ovalau Island as the project area has depended on on-going initiatives, a positive response from local community leaders, its unique cultural tangible[2] and intangible heritage, the presence of pristine terrestrial and coastal ecosystems, farming areas, traditional fishing grounds and resource use areas where wild plants and sea products are harvested.

Ovalau Island has been proposed as UNESCO World Heritage Site in order to protect its unique ecological and cultural heritages. While World Heritage status in itself does not ensure protection it can support raising community and Government awareness, attracting financial assistance and generating income for local

[2] Levuka the old capital of Fiji is located on the island.

communities through sustainable ecotourism activities. Thus, the use of proper community mapping practices could help in raising awareness and developing community-owned and consensual management and development plans.

On a more practical note, Ovalau Island is characterised by irregular topography[3] surrounding lagoons and reefs and is well documented in terms of topographic and bathymetric data, elevation contours and bathymetric lines being essential inputs in a 3D modelling exercise.

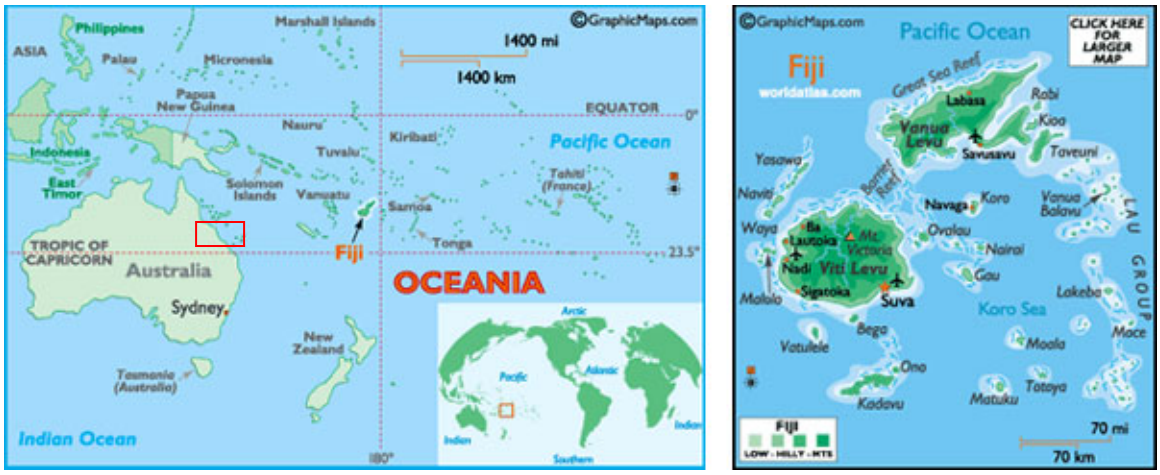

Figure 1 Fiji in relation to the world and Oceania and Ovalau in relation to the Fiji Islands

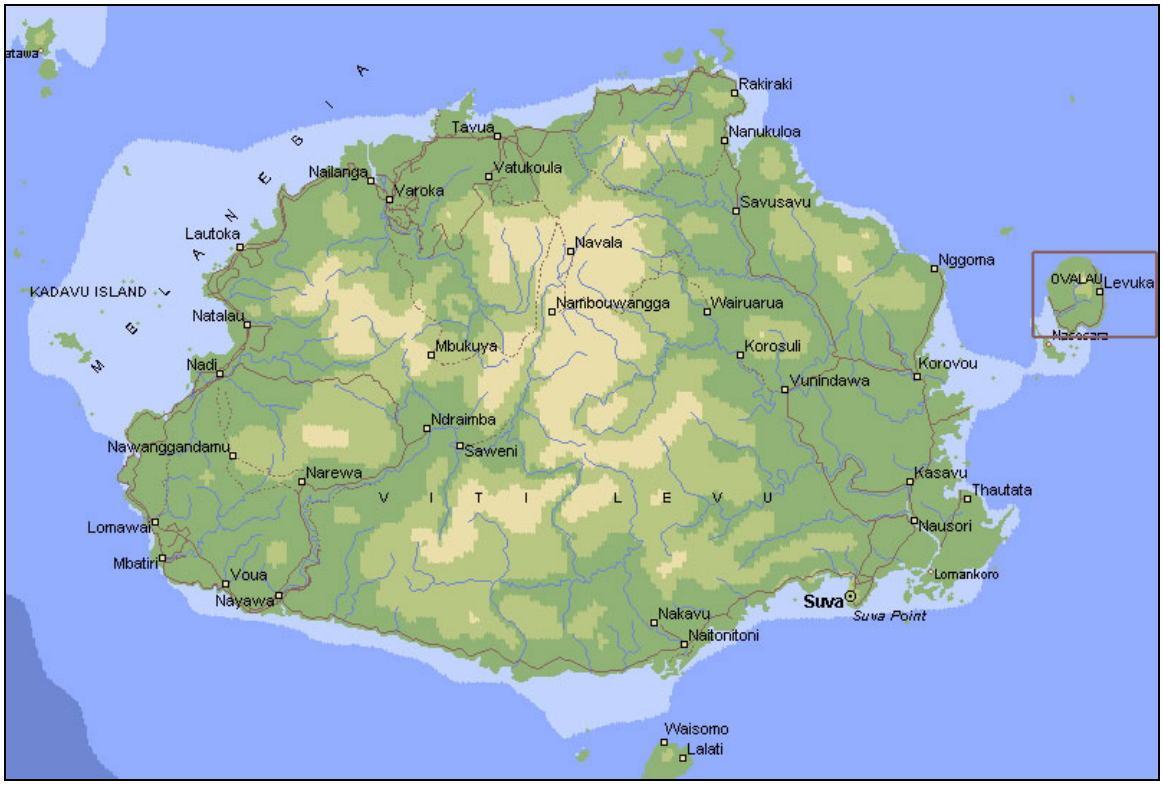

Figure 2 Ovalau in relation to the island of Viti Levu and the city of Suva

[3] Varied topography and bathymetry with substantial differences in terms of elevations (terrestrial) and depths (marine) are appropriate for participatory 3D modelling purposes.

2 INTRODUCTION AND PROJECT RATIONALE

Considering the successful experiences gained in South East Asia in practicing Participatory 3D Modelling (P3DM) integrated with GPS and GIS applications in the contexts of collaborative natural resource management and customary resource tenure, the current Project envisages introducing the practice in the region.

Interest has been expressed by various organisations and projects including the Secretariat of the Pacific Community (SPC), Native Lands Trust Board (NLTB), Ministry of Tourism, Native Lands and Fisheries Commission, EU-SOPAC[4]-funded "Reducing Vulnerability in the Pacific Project", and the EU-funded Developing Sustainable Agriculture in the Pacific (DSAP) Project. Both EU-funded projects are regional initiatives.

The Project will serve as a pilot intervention and concurrently as a training ground for practitioners in the region. Incorporating geo-accurate community-based mapping techniques in the planning process offers the opportunity to increase accuracy and relevance of local knowledge and stimulate increased sharing of knowledge among insiders and outsiders. Furthermore, the ownership of the management regimes resulting from the participatory planning process will rest with the local communities who will be responsible for their implementation. 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.

2.1 Goal

The Goal to which this project is meant to contribute is to support community based biodiversity conservation as the basis for ensuring food security and sustainable livelihoods.

2.2 Project Specific Objectives

To introduce, showcase and document improved spatial information and communication management practices in the context of community-based spatial planning and to improve community-mapping skills among selected practitioners in the South Pacific Region and share lessons learned.

In the process the Project will improve the ability of residents of Ovalau Island in developing and implementing an integrated management plan of their customary domains. The two objectives will be attained via the delivery of the following outputs:

Output 1: Ovalau Island Resource Management Plan. Spatial information management systems (3D model) in place and entrusted to a location agreed to by the communities. Data extracted, digitised and depicted in forms of thematic maps.

Output 2: Completed documentation of the process and analysis of its effectiveness versus other community mapping techniques (e.g. participatory ortho-photo mapping practised in Fiji.

Output 3: Video documentation of the entire process produced.

Output 4: Lessons learnt in the process documented and presented at an International Conference (CTA Co-seminar) which will take place in Kenya in September 2005.

Output 5: Acquired skills in practicing PGIS and P3DM and making use of the intermediate results (3D model and thematic maps) for developing collaborative management plans and monitoring programs based on full participation of the concerned stakeholders.

[4] South Pacific Geo-science Commission

The project willo be implemented through the following phases: (i) preparatory, (ii) community mapping (workshop no. 1), (iii) handing over, (iv) data extraction and manipulation; and (v) planning (workshop no. 2).

The present report concerns activities implemented over the period December 2004 – June 2005 and related to the delivery of Outputs 1, 2, 3 and 5 in the context of phases (i) to (iv).

3 PHASE I - PREPARATORY PHASE

This phase lasted three months. Activities undertaken included (i) consulting and mobilizing students and stakeholders, (ii) sourcing spatial data and preparing the base map, (iii) choosing the appropriate mapping scales (vertical and horizontal); (iv) procuring workshop materials, (v) selecting trainees and (vi) organizing the logistics.

3.1 Identification of Project Area

The island of Ovalau was selected because of the following reasons:

- A positive feedback from local community leaders and local organisations;
- its unique cultural tangible[5] and intangible heritage;
- The size of the island with its surrounding traditional fishing areas (qoliqoli);
- The presence of pristine terrestrial and coastal ecosystems combined with farming areas, traditional fishing grounds and resource use areas where wild crops and sea products are harvested;
- Relative easy accessibility from Suva (road & ferry & road or road & air & road);
- The availability of topographic data and bathymetry of terrestrial and marine components respectively.

3.2 Sourcing of Data and Preparation of the Base Map

Preparation of the base map featuring colour-coded contours (Figure 3) has been the responsibility of the GIS Unit of the Native Land Trust Board (NTLB). It took approximately one and a half months (scattered inputs) to complete the task.

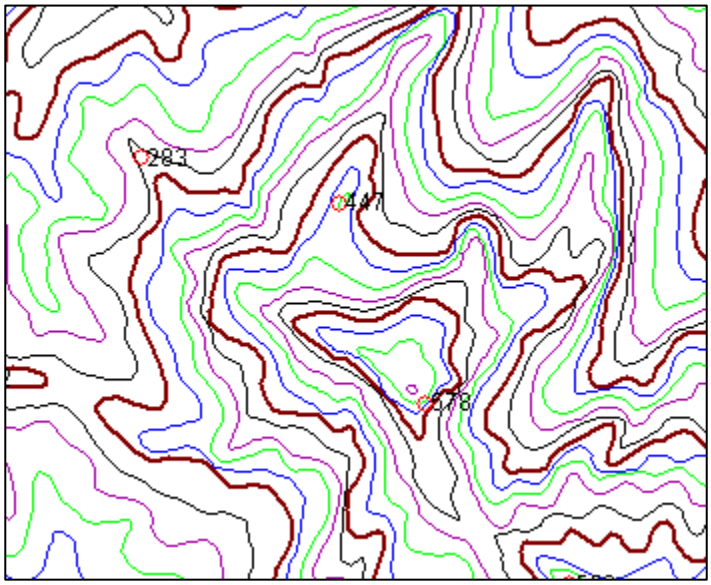

Figure 3 Section of the base map. Contour lines are colour-coded to facilitate tracing

The terrestrial contour digital data was readily available from the Lands and Surveys Department. Nevertheless this data required cleaning and conditioning. The terrestrial contour interval is 20-m starting from 0-m elevation corresponding to the mean high water mark.

The bathymetry map of the subject area was only available in print format. This required its conversion into digital format.

[5] Levuka the old capital of Fiji is located on the island.

This process involved scanning of the hardcopy using an A0 scanner, geo-referencing the digital image and digitizing the bathymetry. Intervals of 20 metres depth contours were generated starting from 10-m below mean sea level.

3.3 Choosing the Mapping Scales (vertical and horizontal)

The area selected for the mapping exercise includes the terrestrial portion of Ovalau Island, its lagoons and surrounding coral reefs and measures 22 km by 24 km. The scales are the following: 1:10,000 horizontal and 1:6,666 vertical. The larger vertical scale has been chosen taking into consideration the need to enhance the perception of slope and to meet the carton board thickness (3-mm) available on the local market. In view of its 1:10,000 scale, the model measures 240-cm x 220-cm and has been constructed using two base tables measuring each one 220-cm in length, 120-cm in width and 60-cm in height. Making two tables instead of one, has ensured easier access to the working space. The two tables and were joined every evening and on completion of the exercise.

Figure 4 Movable top of one base table

3.4 Procurement of workshop inputs and their on-site delivery

The success of any Participatory 3D Modelling exercise heavily depends on the availability of all necessary inputs at the location where the event will take place. With the assistance of the DSAP Project, the organisers procured all items which were identified during the preparatory phase. The inputs were delivered on site by van and ferry before the start of the activities. The wooden base tables (two units) and carton boards were ordered according to the specifications resulting from scaling the subject area to the desired 1:10,000 scale.

Figure 5 Display of supplies prepared for the 3D modelling exercise

The base table was custom made with a movable top (Figure 4) with dimension exactly matching those of the base map. The materials were ordered according to specifications listed in the handbook "*Participatory 3-Dimensional Modelling: Guiding Principles and*

Applications" and in consultation with CTA. An updated supply list id available on the Internet at http://www.iapad.org/supplies/items.htm

3.5 Consulting and Mobilising Students and Stakeholders

Representatives from 27 villages including traditional leaders, elders, fisherfolk and farmers, men and women, and youths attended the mapping exercise and contributed to the collation of knowledge which formed the basis for depicting current resource distribution and use on the 3D model. In order to properly mobilise the villagers a representative from the Organising Committee, a staff from the Lomaiviti Provincial Council[6] and WWF visited all villages where they met with the village headperson and other community members. In each village the team introduced the planned workshops (mapping and planning), the importance of village involvement, the criteria for selecting village representatives and the benefits which would derive from their participation. Part of the protocol for village visits included the presentation of a *sevusevu* in the form of a bundle of *yaqona*[7]. Before departing a second bundle was donated to thank the community for its participation. Local authorities in Levuka were also informed of the forthcoming 3D modelling exercise.

In addition the team visited the Delana Methodist High School and the Levuka Public School in Levuka Town both playing a role in the construction of the relief model of the island. The team introduced the workshop and explained the students and teachers their role in mapmaking. An educational video on P3DM practice was shown to assist students and teachers in visualising their forthcoming tasks.

3.6 Preparation of the draft legend

Contrary to the plans, no draft legend[8] was discussed during the preparatory field visit. Instead the items listed by participants in a preceding community mapping exercise on Beqa Island (September 2003) were used as a starting point for discussion among participants on Ovalau Island.

3.7 Selection of Trainees

The LMMA network partners in the Pacific Region, and local stakeholders (NGOs, Government agencies and projects) were requested to nominate trainees. The selection criteria included having experience in cartography/GIS, community work and natural resource management. Eighteen trainees (Appendix 3) from various institutions in Fiji Islands, PNG and Solomon Islands were selected. One additional lady trainee from Australia joined the group on a self-financed basis.

3.8 Workshop Logistics

The organizing committee liaised with the National Trust and the Lomaiviti Provincial Council Office regarding logistic arrangements. The WWF representative (who was also the chief organizer) and a representative from the organizing community spent three weeks prior to the workshop in organizing logistics. The mapping workshop was held at the Carell Hall in Levuka town. The hall houses the town library and the local museum. Daily transport was arranged for participants (students and villagers). The villagers were accommodated at the Vagadaci Village. Trainees, facilitators and trainers lodged at the Royal Hotel. Catering was provided by the Navoka Church Women's' group.

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[6] Ovalau Island is part of Lomaiviti province.

[7] Dried roots of *Piper methysticum,* a ceremonial plant.

[8] Prioritising and getting a consensus among mapmakers on which items are relevant and what should be featured on a map, is the first step in a participatory process aimed at addressing community-based issues related to the territory and its resources.

Table 1 Ovalau Mapping Exercise Summary Fact Sheet

Organizing Institutions	**Locally-Managed Marine Area (LMMA) Network**: www.lmmanetwork.org **WWF South Pacific Programme**: www.wwfpacific.org.fj **Technical Centre for Agricultural & Rural Cooperation (CTA)**: www.cta.int **Native Lands Trust Board (NLTB)**: www.nltb.com.fj
Funding Partners	**Technical Centre for Agricultural & Rural Cooperation (CTA)**: www.cta.int and **Development of Sustainable Agriculture in the Pacific Project**: www.spc.int/dsap
Venue	Levuka, Ovalau Island, Fiji.
Dates	April 3 -14, 2005 (inclusive travel and other training related activities)
Duration of the actual P3DM exercise:	9 working days
Duration of preparatory work:	3.5 months (scattered inputs)
Participants	
Villagers (details in Appendix 5)	96
Trainees from various institutions/projects/NGOs (details in Appendix 3) acting also as facilitators	18
Students and teachers (Delana Methodist High School and the Levuka Public School) (Appendix 4)	30
Resource persons Appendix 2	2
The model	
Horizontal scale:	1 : 10,000
Vertical scale:	1 : 6,666
Elevation contour interval:	20 m
Bathymetry (interval)	20 m
Highest elevation on the model	614 m a.s.l.
Maximum sea depth on the model	- 90 m
Final size of the model (two units 1.2 m x 2.2m)	2.4 m x 2.2 m
Area covered (on the ground)	52,800 ha (528 sq. km)
Geographical coverage of the exercise	
Province:	Lomaiviti
Districts:	Tikina Levuka, Tikina Lovoni, Tikina Bureta and Tikina Nasinu
Villages:	Levuka, Vagadaci, Waitovu, Vuma, Toki, Vatukalo, Nauouo, Yarovudi, Taviya, Rukuruku, Draiba, Naikorokoro, Nasinu, Tokou, Natokalau, Lovoni, Nasaumatua, Vuniivisavu, Visoto, Nacobo, Nukutocia, Naiviteitei, Nasaga, Tai, Navuloa, Viro, and Wainaloka

4 OUTREACH

4.1 Participants and Trainees

A number of institutions, projects and NGOs attended the training. Contact details are found in Appendix 3, Appendix 4 and Appendix 5. The following is a summary of those who were actively involved in the workshop:

- **Village representatives**
  - Representatives from the following 27 villages: Levuka, Vagadaci, Waitovu, Vuma, Toki, Vatukalo, Nauouo, Yarovudi, Taviya, Rukuruku, Draiba, Naikorokoro, Nasinu, Tokou, Natokalau, Lovoni, Nasaumatua, Vuniivisavu, Visoto, Nacobo, Nukutocia, Naiviteitei, Nasaga, Tai, Navuloa, Viro, and Wainaloka.
- **National Government Agencies:**
  - Ministry of Regional Development - Fijian Affairs Board, Lomaiviti Provincial Council, Fiji Islands
  - Native Land Trust Board, Fiji Islands
  - Ministry of Agriculture, Fiji Islands
  - Ministry of Tourism, Fiji Islands
  - National Trust, Fiji Islands
  - Ministry of Fisheries & Forest, Fiji Islands
  - Ministry of Lands & Mineral Resources - Department of Mineral Resources, Fiji Islands
  - Wet Tropics Management Authority, Australia
- **Regional Agencies:**
  - Secretariat for the Pacific Community
- **Non Government Organizations (NGOs) National and Regional**
  - Fiji Locally Managed Marine Areas (FLMMA) Network
  - Locally Managed Marine Areas (LMMA) Network (South Pacific Region)
  - WWF, South Pacific Programme, (Fiji)
  - Partners for Melanesia (PNG)
  - The Nature Conservancy (Solomon Islands)
- **Regional Projects**
  - EU-SPC - funded “Development of Sustainable Agriculture in the Pacific”
  - EU-SOPAC -funded “Reducing Vulnerability in the Pacific Project”
- **National Projects**
  - FLMMA Project- Korolevu-i-wai (Namahara FLMMA Project),
  - FLMMA Project - Veratavou FLMMA Project.
- **Educational Establishments**
  - University of the South Pacific – Institute of Applied Sciences
  - Delana Methodist High School, Levuka
  - Levuka Public School, Levuka
- **Logistical Support**
  - Navoka Church Women’s’ group

4.2 Resource Persons

Resource persons were provided by CTA, NLTB and WWF-SPP as shown in the Table below. Their contact details are found in Appendix 2.

Table 2 Trainers, Resource Persons and Lead Facilitators

Resource person	Topics
▪ Mr. Giacomo Rambaldi, Programme Coordinator, Technical Center for Agricultural and Rural Cooperation, Wageningen, Netherlands	Participatory GIS, Participatory 3 Dimensional Modelling (P3DM), Facilitation Techniques
▪ Ms. Silika Tuivanuavou, Spatial Information Coordinator, Native Land Trust Board (NLTB), Suva, Fiji	GIS applications including extraction of the information from the 3-D model and on-screen digitizing
▪ Mr. Etika Rupeni, Fiji Country Programme Manager, WWF, Suva, Fiji	Project rationale, cultural settings, workshop dynamics

It is worthwhile noting that all trainees acted as co-facilitators and went through all roles necessary for learning good facilitation practice.

5 PHASE II - COMMUNITY MAPPING PHASE (WORKSHOP NO. 1)

The preparatory phase was followed by the community mapping phase. All activities under this phase were carried out at the Carell Hall, in Levuka over a period of 11 calendar days and involved the following key activities:

(i) Introducing and orienting trainees on facilitation techniques and participatory 3D modelling;

(ii) Refreshing[9] students, trainees and villagers on the scope the project and work schedule;

(iii) assembling the blank model;

(iv) drafting and fine-tuning the map legend;

(v) transposing cognitive maps;

(vi) transferring data from and to the 3D model;

(vii) extracting data using digital photography;

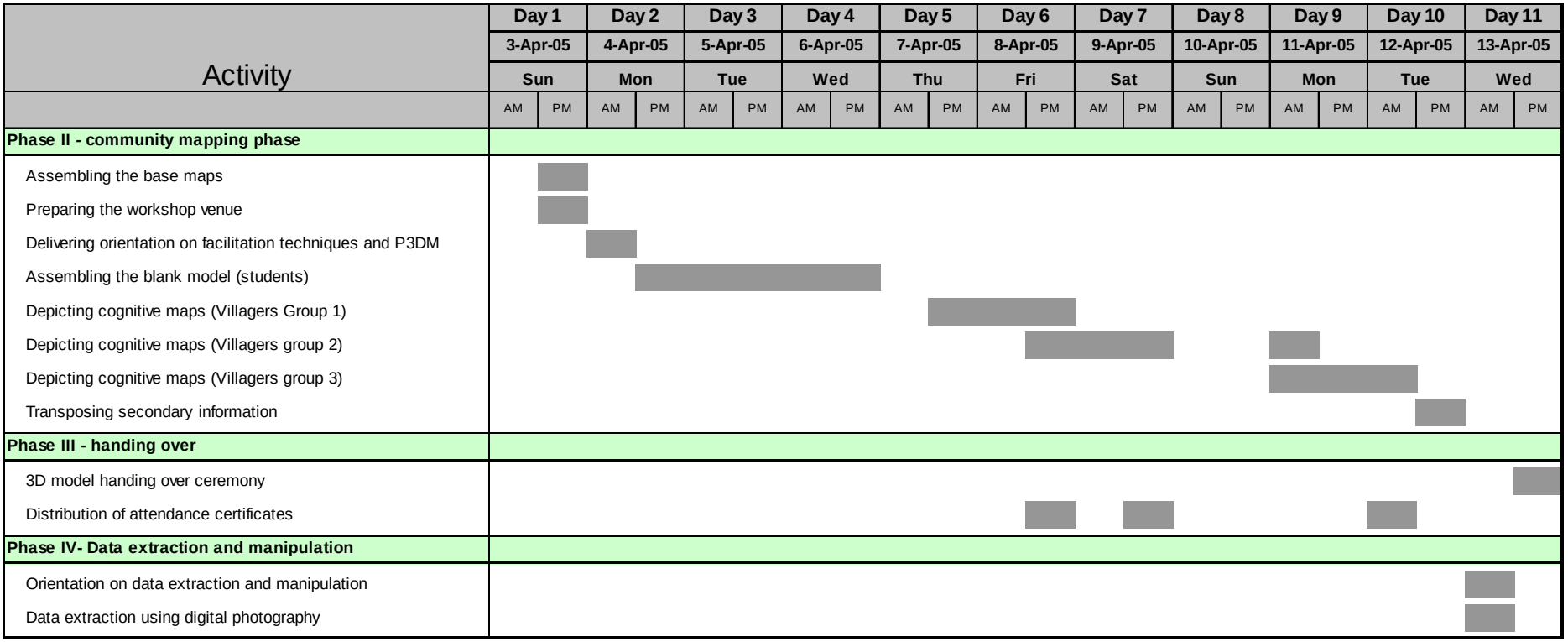
(viii) orienting trainees on data extraction and manipulation.

The activities enfolded as per workshop programme (Appendix 1) and according to the implementation schedule shown in Figure 6.

This section of this report summarised the daily activities.

[9] Trainees and participating organisations received a detailed description of the projects a couple of weeks ahead of the actual workshop.

Figure 6 Actual Implementation schedule of Phases II - IV



5.1 Day 1 – Monday 4 April 2005

5.1.1 Introductory Presentations

Mr. Rupeni, WWF Fiji Country Programme Coordinator, introduced the project background, goal, objectives and phases. The project rationale was also presented and how trainees would be enabled to use acquired skills in their work. He further described the workshop process, planned activities and the expected roles of the trainees during the various phases of the mapmaking process.

5.1.2 Exercises to Assess the Frame of Mind and Expectations of Trainees

Mr. Rambaldi facilitated three exercises using "metacards" (Figure 7). The following instructions were given: "*Please use the meta cards and the marker pens to summarise in a few words your expectations from this workshop. Please use one meta card per statement*!" "*Starting on day 4, villagers will map the physical, biological and cultural environments of Ovalau Island using what they store in memory. We will ask them to do it for terrestrial, coastal and marine areas*". "*What are your expectation in terms of resulting quality and accuracy of data*?" "*How do you see your role in the mapping process*?" *Please use one meta card per statement*!"

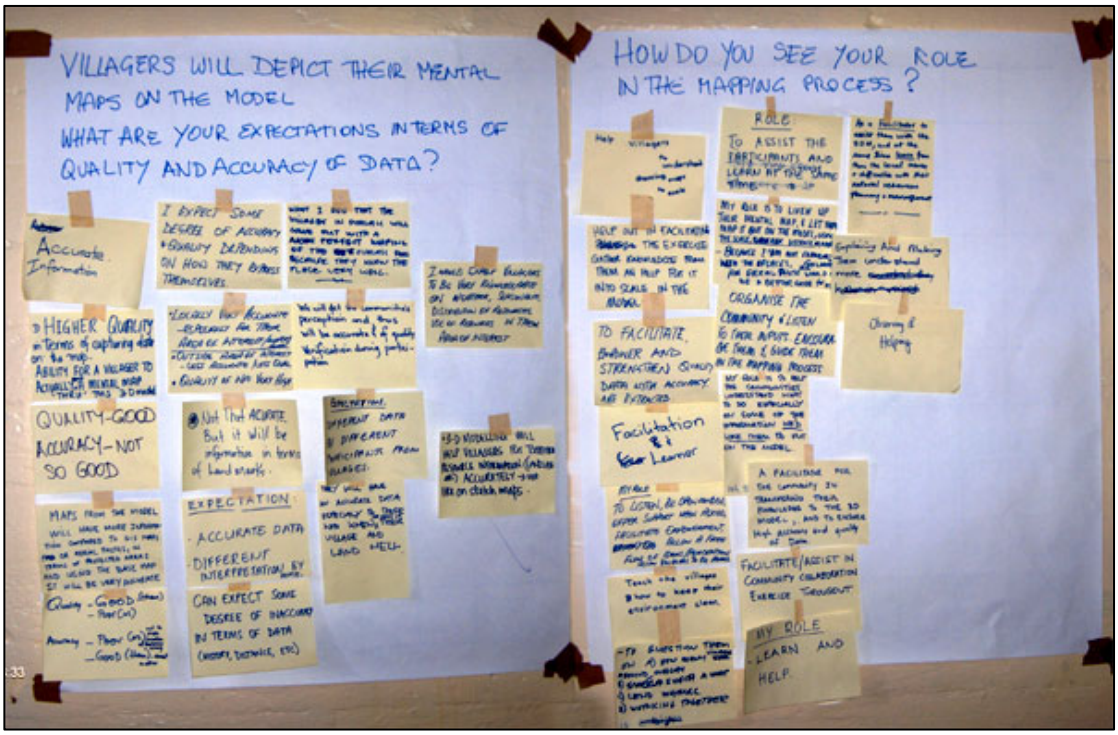


Figure 7 Individual statements fixed on large sheets of paper with masking tape

The objectives of the exercises were to gauge the following (i) trainees' expectations (ii) trainees' perception of the value of community knowledge in terms of quality and accuracy, and (iii) perceived roles of trainees in the forthcoming mapping process.

The results of these exercises were taken into consideration by the trainers during the flow of the workshop. Details are found in Appendix 7 at page 47.

5.1.3 Orientation of Trainees

Mr. Rambaldi delivered two PowerPoint presentations on "Participatory Spatial Information Management and Communication" and "Participatory 3D Modelling/Participatory GIS". During a Question & Answer session, Mr. Rambaldi

explained the relationship between the selected scales (horizontal and vertical), the contour intervals and the procurement of the material.

Ms. Silika Tuivanuavou, GIS Specialist from NLTB, delivered a PowerPoint presentation illustrating in detail all steps in sourcing and enhancing spatial data in a GIS environment and in the preparation of the base maps (see Appendix 12).

5.1.4 Orientation of Students

Thirty Students from the Delana Methodist High School and the Levuka Public School arrived in the afternoon. They were welcomed by Mr. Rupeni who introduced the scope of the project and described the tasks ahead. Mr Rambaldi ran a 20 min video on P3DM and provided a technical introduction on how to manufacture of the blank model (Figure 8). After the introduction and a Question and Answer session, the students were divided into thee working groups. Trainees were assigned to different groups to supervise the students in the implementation of their tasks.

Figure 8 Students are briefed on model making

The groups consisted of students:

(i) Tracing the contours on 3-mm thick carton board;

(ii) Cutting out the single contour layers;

(iii) Gluing and pasting the layers one on the top of the other, and ensuring that placement would occur correctly. The same group was responsible for consolidating the different layers using crepe paper.

5.1.5 Assembling the Blank Model

After the orientation, students, teachers and trainees assembled two large carbon papers (see Figure 9) having dimensions corresponding exactly to the tables, the base maps and the corrugated carton board sheets.

Figure 9 A group of students assembling the carbon paper

Once completed these mega carbon papers were stitched on the bottom of to the base maps and used for tracing single contours on carton board sheets.

Figure 12 A group of students tracing the contours onto the cardboard sheets

Figure 12 Trainees and students cutting single contour layers

Figure 12 Participants pasting progressive contour layers on the top of each other

5.1.6 Meeting the *Tui* Levuka

On April 4, the workshop facilitation team, trainees and a representative from the Lomaiviti Provincial Council paid a courtesy visit to *Tui Levuka*, a high Chief of Ovalau Island. The team members presented their *sevusevu* to the Chief seeking of his favour and blessing on the workshop. He accepted the *sevusevu* welcomed the initiative and emphasized the importance of timeliness especially in working with communities.

The meeting covered the following:

(i) Project background, goals, objectives, and project phases;

(ii) Briefing on P3DM workshop;

(iii) Follow up visit or workshop in June 2005 on resource management planning; and

(iv) An invitation to the handing over ceremony and the closure of the workshop.

5.2 Day 2 –Tuesday April 5

Students, teachers and trainees kept on working on the construction of the model.

5.3 Day 3 – Wednesday April 6

Construction of the model continued on day 3. A group of students and trainees started working on the map legend.

5.3.1 Drafting of the Map Key (Legend)

It is the task of the facilitators to prepare a draft list of legend items ahead of the actual mental mapping process. Such a list should be the result of preliminary consultations held with local stakeholders, with the objective of identifying features of the landscape which are relevant to those who will take part in mapmaking. As the mapping process unfolds, facilitators solicit the thorough revision of the proposed legend items, their unambiguous definition and their association with clearly identifiable and culturally acceptable symbols in order to distinctively depict and describe physical, biological, socio-cultural and virtual features of the territory and to facilitate their objective interpretation.

Figure 13 Facilitator compiling a draft list of legends items

An initial listing of legend items was made based on the result of a preceding community mapping exercise done in September 2004 on Beqa Island, Fiji. The listed items, their textual definition and description were thoroughly discussed among students, teachers, Fijian facilitators and some by-passers. Legend items were grouped in the following categories: points, lines and polygons (areas).

5.3.2 Learning from Each Other

Large sheets of paper were fixed on the walls of the meeting hall and participants were invited (on day 3 and later-on on day 11) to summarise using metacards what "they noticed, discovered, felt, learned", and were asked to make suggestions on

how to improve the process. The results of these exercises were duly recorded and are found in Appendix 8 and Appendix 9 at page 50 and 53 respectively.

5.3.3 Establishing an Enabling Environment for Eliciting Local Knowledge

Considering the presence of foreigners and Fijian outsiders, the facilitation team and the trainees met with a representative from the Lomaiviti Provincial Council to discuss on how best to interact with the village informants. Emphasis was placed on observing traditional protocols, being respectful of local culture and diversity, maintaining a "learning attitude" and refraining from "teaching and/or preaching" and "correcting".

Instead trainees and facilitators agreed on maximising their effort in speeding up the transfer of "intellectual ownership" of the exercise to the participating communities, and on acting as a catalyst in enhancing the analytical capacities of the informants.

There was general consensus on the fact that the key of success would rest in establishing an enabling environment where the elders, custodians of popular knowledge, would feel comfortable in sharing it openly.

The following strategy was developed:

(i) Villagers would join the workshop in three groups at different dates (please refer to the implementation schedule on page 15). The welcoming strategy would ensure a rapid transfer of intellectual ownership of the exercise to the community. This would occur as follows: The first introduction would be done by the Provincial Council representative. He would benefit from his existing rapport and trust with the communities. Hereafter a village representative from Group 1 would introduce Group 2 to the purpose and mechanics of the exercise; and a villager from Group 2 would do the same for Group 3.

(ii) Technical matters would be introduced by Mr. Rambaldi and translated by one of the trainees (with technical knowledge) into the local language;

(iii) The trainees would assist villagers in their tasks, and would pay particular attention to ensuring that coding means be applied consistently and scaling be adhered to as much as possible;

(iv) Trainees were reminded that villagers would be in the forefront in determining what is relevant to them. Nonetheless facilitation should ensure that the

distribution, use and access to terrestrial, coastal and marine resources be thoroughly discussed and visualised.

(v) Trainees would be individually assigned as co-facilitators to specific villages and would relate to the main facilitators in terms of overall coordination.

(vi) A representative from the FLMMA network would take advantage of the gathering of so many influential and knowledgeable villagers to convene awareness raising meetings in the evenings.

5.3.4 Completion of the Blank Model

The blank relief model was completed in the evening of 6 April 2005.

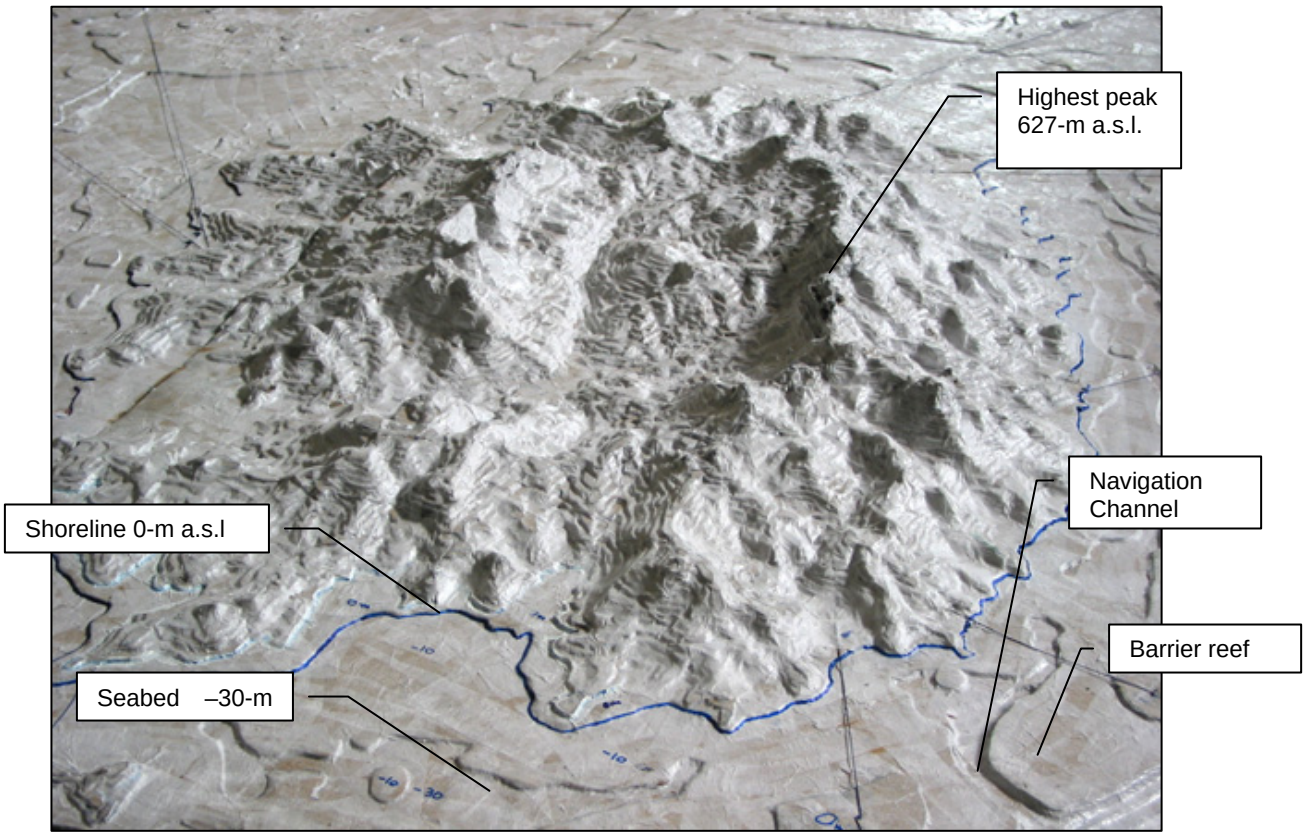


Figure 14 Completed blank 1:10,000 horizontal and 1:6,666 vertical scale model

The construction of the model lasted for two days and a half and benefited from a total contribution of approximately 150 working days delivered on a voluntary basis by 30 students, 3 teachers, all trainees and facilitators.

The construction of the model required the accurate tracing, cutting and pasting of 36 layers of 3 mm thick carton board. Each layer was accurately positioned on the top of the lower one in order to ensure precision in terms of geo-referencing. The entire model was covered with cut-outs of crepe paper to ensure its strength and solidity. The shoreline (zero elevation level) was traced with a blue marker to assist villagers in discerning terrestrial from marine environments and in locating themselves vis-à-vis the scaled model.

This participatory relief model is the first in its kind in the Pacific Region where both terrestrial and marine areas (i.e. sea bed) are physically reproduced in 3 dimensions. The highest elevation being 627 m above seal level and the lowest, 90m below sea level.

5.3.5 Award of Certificates of Attendance to Students and Teachers

Participating students and teachers expressed how proud and fortunate they were to be a part of a historical event- the creation of the first ever Participatory 3D Model in the South Pacific.

School teachers highlighted the overwhelming positive feedback obtained from parents thus promising a brighter working relationship between parents and the schools.

Figure 15 Students from the Delana Methodist High School and from the Levuka Public School posing in front of the "growing" 3D model

Once the construction of the relief model was completed the facilitators solicited reactions from the participants on "lessons learned" or other observations in the conduct of the exercise. Participating students and trainees recalled a number of difficulties encountered and how they addressed them (see Appendix 6)

Students were individually given Certificates of Participation to certify their involvement in constructing the first ever 3D model with seabed.

5.4 Day 4 –Thursday April 7

5.4.1 Preparation for the Transposing Phase

On April 7 in the morning the trainees prepared a display of all coding means including coloured map and push pins, yarn and paint. All codes were neatly labelled, arranged and displayed close to the draft legends.

Mr. Rambaldi facilitated a recap of the entire process and discussed with the participants the various phases of the construction of the two models soliciting observations and lessons learned. Comments on what trainees noticed, discovered, felt and learned, and on what they would suggest are documented in Appendix 8 on page 50.

In a follow-up focus group discussion the trainees expressed their view about the villagers' ability to locate features on the models. There was a general consensus that with the help of the 3D model, village informants would be able to provide a high

degree of accurate and quality information based on their knowledge of villages, land marks, land use and resource distribution. Accuracy and completeness of data would be higher within the individual domains of interest. It was deemed that informants would be less accurate and poorer in terms of quality when dealing with information outside their area of interest. The trainees anticipated that the villagers would input data according to their own individual interpretations.

Given the above-mentioned reasons, the model would contain more information than GIS maps or aerial photography. A trainee expressed her concern in terms of potential inaccuracy in terms of data such as history and distance. Others stated that what may be considered as accurate and quality information by the villagers may be considered poor by the trainees.

Following this group discussion, Mr. Rambaldi recalled facilitation techniques during the community mapping exercise. He advised trainees to be prepared to step down from the teaching pulpit and to become careful listeners, and to accept the existence of variety of perspectives for every single item. To support his statement Mr. Rambaldi flashed some slides showing contradictory images including an inverted map of Viti levu, the main Island in Fiji and other optical tricks.

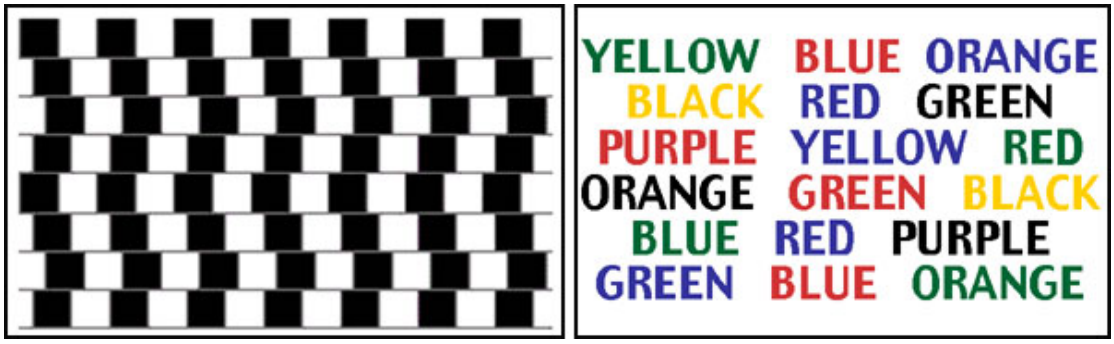


Figure 16 Optical tricks used to raise awareness on the lack of "absolute truth" and on the existence of different perspectives (cultural diversity)

This statement further confirmed the trainees' general perceived roles during the community mapping exercise, which were to assist villagers in visualising their knowledge on the model, to learn about their issues and more generally about the island of Ovalau. It was agreed that trainees would facilitate the mapping process and would assist informants in being consistent in using codes and possibly accurate in terms of scaling[10], in locating features which are relevant to them, contain if possible dominant participants and prevent these from mapping features outside their respective areas, avoid raising contentious issues like "boundaries" and allow villagers to physically access the model, by stepping back in order to avoid any village informant is left idle.

5.4.2 Villagers at work

On 7 April 2005 the first group of villagers (community participants/key informants) reported to the venue at 3 PM. Some participants carried their village sketch maps, eager to get to work. Mr. Sunia Waqainabete, the Fiji Locally Managed Marine Areas (FLMMA) Coordinator, welcomed the community participants and presented an overview of the project background, goals, objectives and the purpose. He also described the students' role in the construction of the model. Most of the informants had children who participated and were very proud to be part of this historic event. This was followed by Mr. Rambaldi's orientation on the forthcoming activities and on the process of transposing cognitive maps on the relief models by the use of colour-coded yarn, paint and pins.

[10] Facilitators and informants were provided with Quick Reference Guides

5.4.3 Development and fine-tuning of the Map Key (the Map Legend)

Maps are media in cartographic or digital formats. Communication occurs mainly by way of symbols which need to be interpreted via the map legend and its graphic vocabulary. Lacking universal standards each map has its own visual language. This language has to be "common property" in order for communication of any kind to take place.

Figure 17 Villagers of Group 2 consulting the legend

Mindful of this, participants were invited to review the draft legend and to suggest changes or integrations. By the end of the exercise the initial legend had expanded substantially to include a series of features, defined by the villagers themselves.

Figure 18 Map Legend for point and line data

By the end of the exercise the initial legend had expanded substantially to include features, defined by the villagers themselves. The complete model displays a total of 79 different items including 35 different land uses and covers; 34 different point data and 10 different types of linear data as shown on the following Table:

Table 3 Features identified by the Informants and used as map key (legend)

Polygons (paints)		
Vanua Ni Vasua - Clam harvesting Area	*Na Vanua Ni Maroroi (Tabu)* - Traditional Taboo Area	*Vutia* – Seagrass area
Ota – Wild Spinach harvesting area	*Yagona* Plantation - Kava	*Veidogo* - Mangroves
Cakau Bula/Mate – Partly Damaged area	*Na Vei Paini* – Pine Plantation	*Vanua Qolivi Kina Na Sasalu* – Sea cucumber harvesting area
Yagona and Dalo – Kava and Taro	*Baravi Nuku* - Sandy Beach	*Siwa* – Handling Fishing Area
Qumu and Buabua – Dwarf dryland forest made out of two species	*Vanua Ni Vakasucu* – Breeding/Spawning Places	*Cakau Bulabula* – Healthy Coral Reef
Vanua Bulu – Reclaimed Land	*Wai* – Water body	*Lairo* – Crab Harvesting Area
Veigasau Co – Shrubs	*Baravi/Vanua Veivatuvatu* – Rocky shore/area	*Lumulumu* – Slash and burn
Teitei and Vuata – Garden and mixed fruit	*Wainimate Vakaviti* (e.g. Kura) – Harvesting area for herbs	*Veitalasiga* – Harvested (secondary) Forest
Teitei Plantation – Cassava (uto), Yam, Egg plant, Sweet potatoe, pineapple	*Veibitubitu* - Bamboo	Lumi Lulua Totoyava – Seaweed Plantation
Veikuta	*Voivoi* – Pandanus	*Dalo* – Taro Plantation
Veiniu – Coconut Plantation	*Veikauloa* – Dark (virgin) Forest	*Lomaloma* – Lagoon
Vanua Ni Vakasasa – Hunting area		*Vuata* - Mixed Fruit Trees
Point (pins)		
Yaca Ni Veivanua – Names of places	Vanua Ni Volivolitaki - Market	Vanua Ni Cakacaka – Industrial Plant
Vuniwai Vakaviti – Traditional Healer	Kelekele Ni Waqa – Boat Docking Sites	Vale Ni Cina - Lighthouse
Vale Ni Bula/Vale Ni Wai - Hospitals	Vale Vakoro (Vale Ni Sogo) – Meeting Place	Mata Ni Wai – River Source/Names N/Place)
Vale Ni Lotu – Religious Establishment	Sautabu – Traditional Burial Ground	Bulubulu – Graveyard
Siteseni Ni Ovisa – Police Station	Tikotiko Ni Saravanua – Tourism Accommodation	Vanua e Voca kina na waqa - Shipwreck
Vale Ni Veivesu – Prison	Vanua Ni Qito (Rara) - Sports Field	Toba – Harbour
Vanua Ni Vasucu Vonu – Turtle Nesting Places	Qaravatu - Caves Susu Manumanu – Livestock Farm	Vanua Era Dau Taileitaka Na Saravanua – Place of tourist interests
Koronivuli - Schools	Koro Makawa – Heritage Sites	Vanua Ni Nunu – Diving Spots
Nai Benubenu – Dumping Sites	Bikeni - Beacon	Muslim Temple
Mita Ni Radio – Transmitter station	Savu - Waterfalls	Tage Ni Wai – Water Reservoir
Dam	Tataga – Women's Fishing point	Dua Na Vuvale – One household
	Tini Na Vuvale – Ten Households	
Lines (yarn)		
Dreke Ni Wai - Permanent Rivers/Streams	Qalimaca – Seasonal Creeks	Sala Ni Tamata – Walking Trails
Kawakawa - Bridge	Gaunisala Ni Matanitu – Main Road	Sala Qereqere – Feeder Road
Paipo Ni Wai Duka – Sewerage (Pipelines)	Wa Ni Livaliva – Electric Lines	Paipo - Pipelines
	Curucuru Ni Waqa – Boating Channels	

Consistency in the use of colour-coded pins, yarns and paints emerged as a clear necessity for properly displaying local knowledge on the model.

5.4.4 Transposing Mental Maps

Upon familiarising themselves with the landscape of model (Figure 19), villagers started working with enthusiasm. They were asked to outline river courses and name mountain peaks

Figure 19 Villagers of Group 1 locating themselves vis-à-vis the scale model

With great surprise of the facilitators the model started filling with labels and names. “It appears that every single stone has a name” was the comment of Mr. Rambaldi. This was of no surprise for Fijians who knew that knowledge is traditionally orally transmitted. This led to the need for a name for everything. The names of fishes, trees, land are significant aspects of the indigenous Fijians’ traditional identity. They are interlinked and inseparable

Considering the richness in names and the difficulty in depicting other features like land use and cover in the presence of too many labels, Mr. Rambaldi suggested to postpone the “naming phase” once other features would have been depicted on the model. This sequence was later on adopted also for Group 2 and 3.Colour coded yarns were used to outline land cover and use. Once these were located the areas were painted with appropriate colours. Informants were later assisted in locating point features like households, social infrastructure and others (Table 3), and linear features such as roads and trails. This was followed by labelling of features.

To confirm the validity of using a 3D model versus a planimetric map or aerial photography, villagers complained about missing landmarks such as peaks (Figure 20), small islets, landfills and dumping sites, or erroneous depths of navigation

Figure 20 Informants spotted a missing peak on the blank 3D model and added it. Note that the landmark is missing on the official topography of the island.

channels. After cross-verification among participants missing features were added and other small modifications were done to meet the villagers’ comments.

Figure 21 Informants depicting their knowledge

The facilitators assisted the informants in processing and displaying their knowledge (mental maps) in an organized and consistent manner[11] (Figure 20).

Students kept on visiting the venue to follow up the work of the elders (Figure 22). An interesting relation developed among the different generations and the youth got increasingly interested in what was in many instances new to them: traditional knowledge.

During the mapping process, the two tables were kept separate to allow more villagers to work at the same time. In the evening and at lunch time the two tables were usually joined to allow participants to have a comprehensive bird's eye view of the island and its surrounding coastal areas. In addition when the two units were connected, participants could check if the information displayed on the single units matched at the meeting edge.

Figure 22 A student observing an elderly women working on the model

The process had to be fine-tuned and facilitators met to discuss the problems encountered in facilitating the activities with Group 1.

There was general consensus on the fact that due to the insufficiently planned schedule of arrivals, too many informants came from adjacent villages. This led to all of them wanting to work on the same portion of the model at the same time. This resulted in overcrowding, making it impossible for all participants to work. In the spirit of good team work trainees/facilitators got some of the groups to discuss and list features present in their community, to prepare labels, codes, lines and points. A lesson learnt about the overcrowding was that during community selection and groupings,

[11] Displayed data have to be properly coded in order for later users to be able to decode, interpret and understand them by the use of the map key (legend).

consideration has to be given to properly schedule arrivals of participants to ensure that only a few adjacent villages are present at the same time.

The second problem observed was that excited participants tended to neglect proper scaling, an issue anticipated by the trainer. The role of facilitators in ensuring scaling was considered as essential by all trainees.

5.4.5 FLMMA Awareness

On the evening of day four, there was a FLMMA awareness meeting involving villagers of the first group. This meeting was conducted by the FLMMA Coordinator and two FLMMA community representatives who were trainees / facilitators at the workshop. The main purpose of the meeting was to introduce FLMMA. Some of the issues discussed were the role of FLMMA and how it could assist communities in managing their resources sustainably for the benefit of future generations; and the June workshop which would build on the first one and essentially deal with community-based resource management planning. FLMMA meetings were also held for the second and third group of informants.

Figure 23 FLMMA Awareness raising

5.5 DAY FIVE – Friday April 8

Group 1 (Figure 24) continued with the transposing process and completed it in the afternoon. Thereafter villagers were asked to write on metacards a short statement on what they had learned, felt, discovered or noticed during their one-day and a half contribution. The results of the exercise were read out to all those present and translated into English (see Appendix 10 on page 58). On completion of this exercise, all villagers received their attendance certificates. After lunch the second group of villagers arrived and was introduced to the forthcoming exercise by a representative from Group One. The presenter proudly introduced newcomers to their tasks and illustrated the achievements so far. He silently took ownership of the work, the venue and the model and praised exercise as a blessing from God and a 'spiritual' opportunity for the people of Ovalau to work together in unity to manage their natural

Figure 24 Group 1 posing in front of the model

resources for the health and wealth of Ovalau current and future generations. The same occurred for Group 3 (Figure 29). His sentiments were echoed by a representative from the Provincial Council who urged Group 2 to accomplish their task with dedication by April 9.

The two groups viewed a slide show of the work carried out by the students and by Group 1 and worked together to validate the information displayed on the model before Group 1 finally left.

5.6 DAY SIX – Saturday April 9

The trainees continued the facilitation of the exercise jointly with the resource persons. The second group of informants completed their exercise on the evening of Saturday 9 April 2005. Participants were given the opportunity to provide their feedback on their experience via metacards. Results were displayed on a large sheet of paper fixed on the all and read out in vernacular and English. The results are found in Appendix 10 on page 58. All villagers were awarded individual Certificates of Attendance.

Figure 25 Group 2 posing behind the model

Mr. Rambaldi acknowledged the villagers' efforts and emphasised that the model is their common property to use for their resource management planning and development. He said he was impressed by their knowledge and added that the model was a "living model" which needed regular updating. A village elder thanked the organizers, trainers and facilitators for the workshop and said it was an educational and enjoyable experience and invited workshop facilitators and trainees to visit his village. Formalities ended with a group photo session and villagers singing of the Ovalau Island anthem. A group of participants was invited to return on Monday to handover their work to Group 3.

5.7 DAY SEVEN – Monday April 11

Group 3 comprising 27 participants arrived and was introduced to the project by a representative from Group 2 (Figure 29). In doing so the newcomers were reminded that the exercise would benefit them and their future generations, therefore full commitment was required from their part.

Figure 26 Lovoni Elders familiarising with the model

Upon completion of the handover, the informants were invited to locate mountain peaks, islets, water courses, roads, trails, social infrastructures and other features. Facilitators assisted participants to delineate with the use of colour-coded yarns, vegetation types, land use and other aspects they considered important to their environment.

5.8 DAY EIGHT – Tuesday April 12

The last group of informants continued transposing their spatial knowledge. Once the entire model was completed (Figure 27), informants were asked to express their opinions on the workshop. The results are found in Appendix 10 on page 58. This activity was followed by the presentation of individual certificates and picture taking (Figure 29).

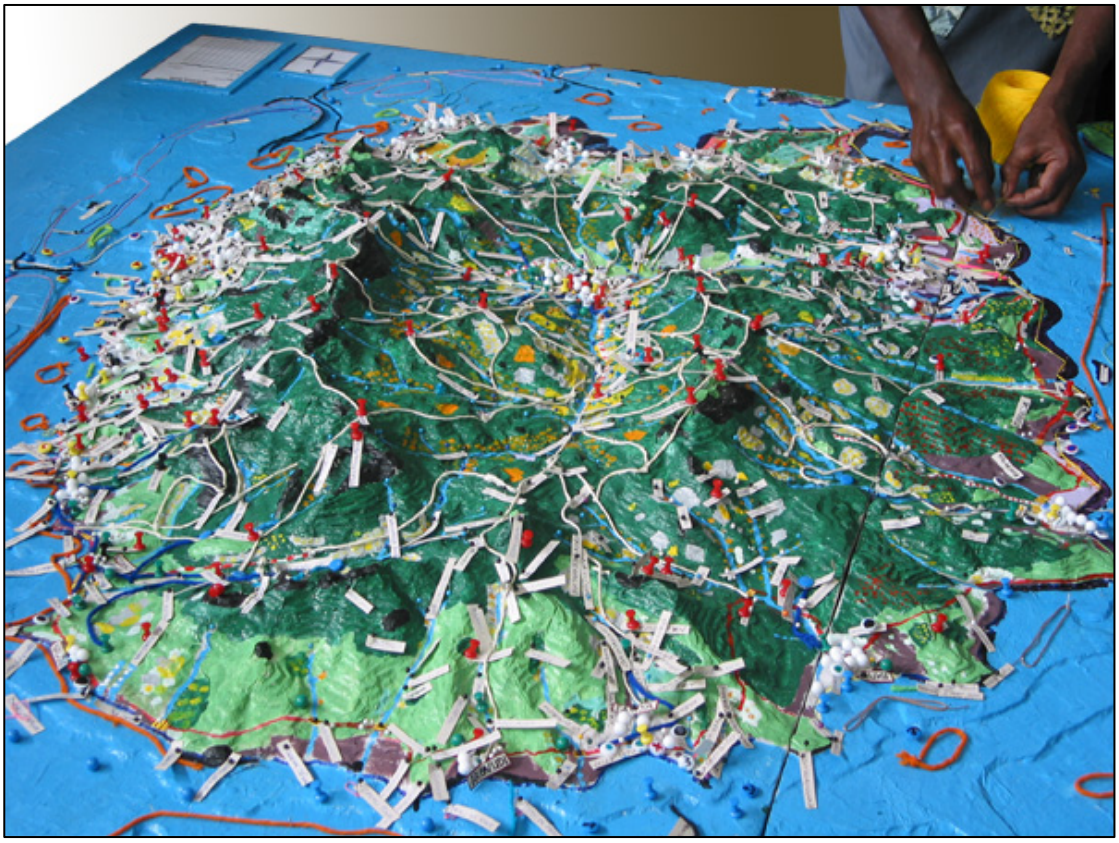


Figure 27 Image of the completed 1:10,000-scale model red pins symbolise locations of cultural heritage significance. A total of

Figure 29 Villager from Group 2 introducing the exercise to villagers from Group 3

Figure 29 Villagers from Group 3 posing behind the completed 3D model

5.8.1 Transferring Data from/to the 3D Model

On 13 April 2005, Mr. Rambaldi oriented the trainees on how to transfer data between model and base map and vice versa. This process involved the placement of a scaled grid (Figure 30) at a 10-cm intervals. This corresponds to a 1-km on the ground for models at 1:10,000-scale.

Figure 30 a 1km grid is woven on the top of the model

The main purpose of the activity was to train participants in transferring data with simple tools like rulers and tape meters and making use of simple coordinates offered by the reference grid and letters and numbers placed on the X and Y axes (Figure 31) of the model.

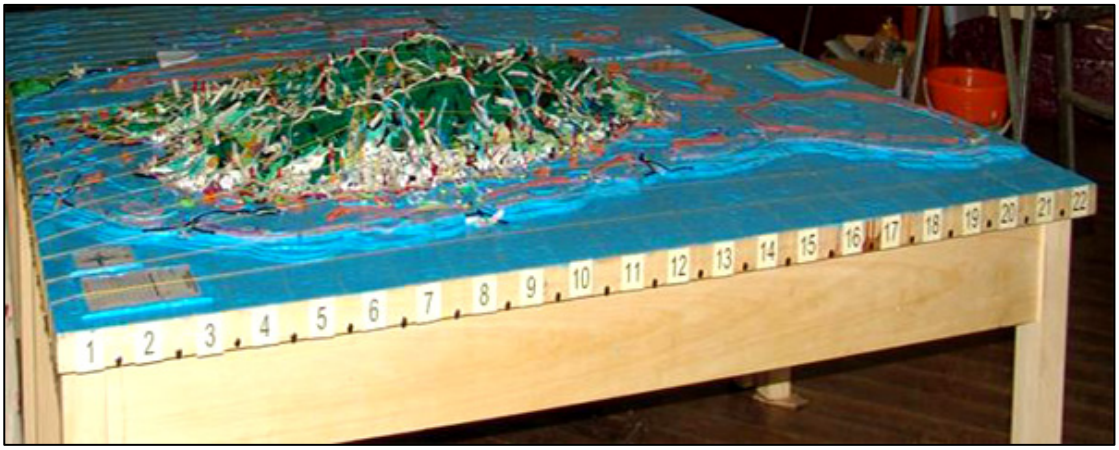


Figure 31 Model with grid and identification labels on the two axes

5.9 DAY NINE – Wednesday 13 April 2005

5.9.1 Data Extraction Using Digital Photography

The technique used to extract data from the model and export them to a GIS environment involved the following steps:

(i) Capturing the image of the model using a digital camera.

(ii) Geo-referencing of the images using MapInfo software

(iii) Digitising various layers of data in MapInfo

5.9.2 Capturing Data Using Digital Camera

The models are tipped vertically as shown in Figure 33 and pictures are taken at four metre and six metre distances. Other pictures were also taken at varying ranges. Two cameras were used for the exercise. Eight and four MP cameras were used to shoot pictured from 6 and 4 meter distances respectively. Due to late reporting of the trainees in the morning and the handing over ceremony, the exercise was done in a hurry and quality suffered from this.

Figure 33 The model is tipped perpendicularly to the floor facing the camera

Figure 33 High resolution Images are taken from selected distances of 4 and 6 meters respectively

6 PHASE III - CLOSING CEREMONY AND HANDING OVER

On April 13, the closing ceremony took place at the Carell Hall. The Chief Guest was the *Tui* Levuka. The event was attended by the heads of Government Departments in Levuka, Traditional Chiefs of the various villages of Ovalau Island, trainer and, trainees, representatives from the village participants, students, teachers and members from the Levuka community.

The closing ceremony enfolded along customary practices and included traditional Fijian ceremonies and religious blessings.

The actual handing over was made by a villager to *Tui* Levuka, the Chief Guest. In doing so, the community participant highlighted that the model was the fruit of labour of the people of Ovalau, it belonged to them and their future generations to use for resources management planning and development.

Figure 34 Handing over of the model to the Tui Levuka

In accepting the model, the *Tui* Levuka expressed his appreciation and urged his people to use it to discuss issues related to their territory.

He ensured the organisers, participants and the community members that they would have free access to it. He added that it was the responsibility of the Ovalau residents to keep it updated.

He added that the Lomaiviti Provincial Council would be the custodian of the Model and that it would be housed with the National Trust on a temporary basis. After his speech, the *Tui* Levuka, accompanied by Mr. Rambaldi, unveiled the model.

This ceremony was followed by a recap of the exercise by Mr. Rupeni and speeches delivered by representatives from school, villages and trainees. One school teacher stated that his schools would manufacture a similar, although smaller model of the school environment taking stock of the experience gained at the workshop and the leftover materials donated to him by the organisers.

The community representative shared the apprehension of some villagers that in depicting data on the model they could infringe on nearby village domains. He expressed his appreciation for the Participatory 3D Modelling method, which – according to the participating villagers - clearly revealed the existence of a wealth of traditional knowledge and strong ties existing among residents on Ovalau Island. He stated that in going through the exercise participants felt in many ways closer to each other. The ceremony was concluded with the presentation of certificates of attendance to the trainees by *Tui* Levuka and to the villagers by Mr. Aleki Sisifa, Director of the Land Resources Division at SPC and Mr. Etika Rupeni.

7 GROUP DYNAMICS

Careful attention was paid to the group dynamics during the exercise. The trainees, coming from different institutions, generally worked well as a team. The diverse educational background of the group (including GIS technicians, social scientists, community organisers, natural resource management (NRM) specialists and staff from the National Trust) contributed to the success of the exercise. In fact it is good practice that any P3DM exercise is facilitated by a multidisciplinary group including at least 3 disciplines: cartography/GIS, community work and NRM.

In preparing trainees for the arrival of key informants, the "Do's and Don'ts" of "facilitation" were discussed, enhancing the importance of "broadening the perspective" or "enhancing analytical skills" of key informants, rather than "correcting their mistakes". Trainees were assigned villages to facilitate their mapping on the model.

The synergy between informants, trainees and facilitators was evident from the day the first the Group of villagers arrived and similarly for the two groups which followed. Facilitators were keen to practice facilitations skills, learn about the processes of transposing cognitive maps and more about Ovalau Island itself.

Informants were fascinated by the birds-eye view of the entire Ovalau landscape, inducing them to freely share information through lively discussions and depicting their spatial knowledge onto the relief model (Figure 35).

Figure 35 Villagers fully dedicated to their tasks

It is worthwhile noting that an interesting collaboration pattern developed amongst the elderly and the younger generations: The youth were tasked with manual assignments (painting, writing labels, fixing yarns) while the elders were standing by advising on names, distribution of natural resources and harvesting grounds and places of historic and cultural significance. In several occasions the Elders started narrating stories and legends, generally associated with natural phenomena, features of the landscape, natural resources and people. The younger generations, the trainees and the trainers listen to these with great fascination.

Red pushpins were used to symbolise places of cultural significance. A total of 79 red pushpins currently feature on the model, and each one of these pins has an unwritten story behind it. The idea of getting the students to gather and write down all these stories was flagged with the School Headmasters. If done, it would offer the residents of Ovalau Island a unique chance to document both in terms of content and distribution of the islands intangible cultural heritage. It is worth noting that the Fiji Museum has recorded [only] approximately 30 pre-historic sites[12] on the Island of Ovalau.

[12] Source: *A case Study on Levuka* presented at The Culture Heritage Management and Tourism: a UNESCO conference/workshop for the enhancement of stakeholder cooperation in tourism development and heritage preservation in Asia and the Pacific, Bhaktapur, Nepal, 8-16 April 2000. http://www.unescobkk.org/index.php?id=2176

8 MULTIMEDIA PROCESS DOCUMENTATION

The entire P3DM process (Phases I to V) was recorded on video for the purpose of preparing a multimedia orientation kit on P3DM and Participatory GIS practice in the Pacific. WWF hired a media consultant (In Focus Arts, Suva) to produce a 20/25-minute video documenting the mapping exercise (ten days) in Ovalau and the forthcoming planning workshop (three days).

All activities occurred from 4 to 13 April 2005 were filmed. Additional shooting took place in Suva to document the processes of on-screen digitizing and map plotting. The video will be used for educational purposes.

9 MEDIA COVERAGE OF THE EVENT

A news item on the P3DM exercise was aired on the Fiji One news TV programme on 7 April 20057, featuring students working on the blank model and Mr. Rambaldi describing the forthcoming mapping exercise involving village Elders.

The FLMMA Media Liaison Officer, Ms. Amelia Makutu, spent 4 days at the workshop venue. She interviewed participants, Mr, Rambaldi and the FLMMA coordinator. Her work resulted in an article published in the Daily Post Newspaper and a second article published in the Kaila! Newspaper.

An agreement was entered with the DSAP-SPC project. WWF would supply the Media Unit of the South Pacific Commission with some footage of the exercise to produce two media clip on the exercise to be aired in the region via Pacific TV. The cost of these productions would be shouldered by DSAP and SPC entirely.

10 COURSE EVALUATION

At the end of the exercise the trainees were asked to evaluate the course and make their recommendations for improving the P3DM method. Their feedback is found in Appendix 9 and Appendix 13 at pages 53 and 68 respectively.

11 LESSONS LEARNT

The following are some of the main lessons learnt in terms of mapmaking:

- The scheduling of informants participation to a 3D modelling exercise should take into consideration their geographical provenience to avoid overcrowding around specific edged of the model. The objective being that all participants have a space where to work on the model and at the same time be able to cross-fertilise and cross-check each others;
- One important task of the facilitators is to assist the informants in appropriately scaling data depicted on the model in order to possibly avoid excessive exaggeration. The use of the Quick Reference Guide should be promoted;
- The dimensions of base table, base map, corrugated carton board sheets and carbon paper need to be exactly the same;
- On the base map more elevation labels are entered along contour lines to facilitate the tracing of the contours;
- More care taken whilst cutting contour lines such as joining islets by drawing a bridge to larger areas.
- Ensure that no cut-outs of cardboard are discarded until all contour levels are pasted on the model;
- To ensure that weights used to gently compress contour layers are not too heavy to avoid collapse of corrugated carton board sheets. This would lead to errors in terms of elevation.

- Informants need to be well informed on the need to consistently refer to the legend items and associated symbols and colours before transposing their knowledge on the model;
- The use a quality high resolution camera is of paramount importance in the data extraction process;
- Pictures are taken at a standard distance from the model ensuring consistency of the images;
- When placing the tables for photography ensure they are perpendicular. The reason for this is to have better quality images with the least distortion
- When planning for this type of workshop in Fiji, ensure that additional days are allocated to the GIS specialist to extract information from the model. Added time would compensate the large amount of textual information put on labels.
- Facilitators should be prepared to document stories and legends shared by Elders.

12 POST WORKSHOP ACTIVITIES

12.1 Geo-referencing of the Images

This process took a while to complete because it involved stitching two images together. Initially, the two images were geo-referenced one at a time. However, they did not match on the upper portions of the tables.

To correct this, another method was tied using the Erdas software to separately geo-reference the two portions of the model using rubber sheeting. This was unsuccessful because there were inadequate controls on the areas where the two tables joined together resulting in skewing of the images and the true colours of the model did not turn out right adding to the problem of identifying the correct features with the correct legend.

Finally the two pictures were merged before geo-referencing. It was the selected option of geo-referencing multiple pictures of pieces of the models. After geo-referencing of the models, the different features were digitised.

12.2 Digital Data Capture

Data capture started with the on-screen digitisation of the hydrology features. Land cover features were next with large polygons first (forest cover) then to the smaller polygons. Other features like improvements or terrestrial infrastructures were captured followed by all coastal and marine features. It was important that larger polygons were captured first because there were smaller ones of different use or cover within those big polygons posing a threat of clipping. It is important to note that additional visits had to be made to see the model itself to verify and digitise boundaries of features that could not be discerned on the digital image because of the large number of labels. These were hiding boundaries in many places.

12.3 Thematic Map Creation

Thematic maps were produced after capturing all information from the model.

These maps are now ready for printing and use by communities (in addition to the 3D model) for the next workshop where participants are going to develop a resource use and management plan.

12.4 Post-workshop Networking and set-up of a DGroup

A dedicated closed electronic DGroup by the name "*Collaborative Spatial Information Management and Communication in the Pacific*" has been established by CTA 10 days after the completion of the workshop to offer a discussion platform for those who participated in the event as trainees and /or facilitators. As of the writing of this report the group includes 22 members.

12.5 On-line Workshop Evaluation

The workshop assessment has been conducted 2 months after the completion of the Ovalau mapping workshop using both the DGroup as vehicle for communication and www.surveymonkey.com as surveying instrument. The final results were shared among participants and other stakeholders on 7 July 2005. Results are found on line at http://www.surveymonkey.com/Report.asp?U=94640384009

Figure 36 A great team (facilitators, trainees and resource persons)

13 CONCLUSION

The workshop was a success. These sentiments were echoed by the Ovalau community and by local and foreign trainees as evidenced in their individual evaluations. All have benefited from the exercise and realised the potential of Participatory 3-D modelling / spatial information management and communication as an effective method to address environmental and social concerns as well as to reinforce bottom up development and collective decision-making.

Trainees and other participants unanimously expressed recommendations for implementing similar exercises throughout the South Pacific Region to assist communities and Governments in resource management and development planning.

Appendix 1 Summary of Activities

Date	Activities
Saturday April 2 2005	▪ Arrival of Participants from places outside Suva. Gathering at Peninsula Hotel, Suva, Fiji
Sunday April 3 2005	▪ 10:00 reporting of all participants at the Office of WWF and travel to Levuka on Ovalau Island by road and air.
Monday April 4, 2005 (AM)	▪ Registration of Participants and distribution of training kits. ▪ Opening remarks Project by Etika Rupeni, Fiji Programme Manager, WWF, FLMMA ▪ Round of presentations - introductions ▪ Introduction to the Project by Etika Rupeni, Fiji Programme Manager, WWF, FLMMA ▪ Exercises on expectations and awareness raising facilitated by Giacomo Rambaldi, CTA ▪ Collaborative Spatial Information Management and Communication, presentation by Giacomo Rambaldi, CTA ▪ Orientation on Participatory 3D Modelling (technical and organizational aspects), presentation by Giacomo Rambaldi, CTA ▪ How to source data and prepare the base map, presentation by Silika Tuivanuavou, GIS Specialist, Native Lands Trust Board ▪ Orientation on schedule, trainees' roles and attitudes
Monday April 4, 2005 (PM)	▪ Arrival of 29 students from the Delana Methodist High School and Levuka Public School ▪ Welcome address by Etika Rupeni, Fiji Programme Manager, WWF, ▪ Screening of P3DM video for students ▪ P3DM Exercise – Orientation of Participants (students) and Trainees - Construction of the blank model
Tuesday April 5 2005	▪ P3DM Exercise - Construction of the blank model
Wednesday, April 6 2005	▪ P3DM Exercise - Construction of the blank model ▪ Legend Preparation ▪ Blank model completed ▪ Students' Certification ▪ Group Management Meeting (Trainees prepared for key informants' arrival)
Thursday, April 7 2005 (AM)	▪ P3DM Exercise - Construction of the blank model ▪ Training feedback exercise with trainees ▪ Preparation of material for Legend
Thursday, April 7 2005 (PM)	▪ P3DM Exercise - Transposing mental maps ▪ Arrival of key informants - villagers (Group 1) ▪ Introduction and Orientation presentations for Participants (key informants) ▪ Informants identify features as map key (legend) ▪ FLMMA awareness meeting
Friday, April 8 2005 (AM)	▪ P3DM Exercise - Transposing mental maps.
Friday, April 8 2005 (PM)	▪ Informants' workshop evaluation ▪ Presentation of Attendance Certificates to key informants (1st group) ▪ Arrival of key informants - villagers (Group 2) ▪ Introduction and Orientation presentations for Participants (key informants)
Saturday, April 9	▪ P3DM Exercise - Transposing mental maps.

Date	Activities
2005	▪ Informants' workshop evaluation ▪ Presentation of Attendance Certificates to key informants (2nd group)
Sunday, April 10 2005	▪ Rest day
Monday, April 11 2005	▪ P3DM Exercise - Transposing mental maps ▪ Arrival of key informants – villagers (Group 3) ▪ Introduction and Orientation presentations for Participants (key informants)
Tuesday, April 12 2005 (AM)	▪ P3DM Exercise - Transposing mental maps. ▪ Informants' workshop evaluation ▪ Presentation of Attendance Certificates to key informants (3rd group);
Tuesday, April 12 2005 (PM)	▪ Started placing of reference grid. Oriented trainees on the matter ▪ Trainees' Assessment of the Training
Wednesday, April 13 2005 (AM)	▪ Extracting Data by the Use of Digital Photography ▪ Orientation of Trainees - Extracting Information
Wednesday, April 13 2005 (PM)	▪ Afternoon: Closing ceremony and presentation of Training Certificates to the trainees ▪ Evening: Public Closing Ceremony
Thursday, April 14 2005	▪ Travel to Suva and departure of international participants

Appendix 2 Contact Details of the Resource Persons

Mr. Giacomo Rambaldi
Programme Coordinator
Technical Center for Agricultural and Rural Cooperation (CTA) ACP-EU
Wageningen, The Netherlands
Email: rambaldi@cta.int
Internet: www.cta.int

Mrs. Silika Tuivanuavou
Spatial Information Coordinator
Native Land Trust Board (NLTB)
P.O Box 116
Suva, Fiji
Fiji Islands
Email:stuivanuavou@nltb.com.fj

Appendix 3 Contact Details of the Lists of Trainees

Mr. Etika Rupeni,
Fiji Programme Manager,
WWF Fiji Country Programme
Private Mail Bag
Suva, Fiji
Email: erupeni@wwfpacific.org.fj
Internet: www.wwfpacific.org.fj

Mr. Kenn Mondiai
Executive Director
Partners With Melanesians Inc.
PO Box 1910, Port Moresby 121 NCD,
Papua New Guinea
Email: kmondiai@pwmpng.org.pg
Internet: www.pwmpng.org.pg

Ms. M'lis Flynn
Wet Tropics Management Authority
PO Box 2050 Cairns
QLD, Australia
Email: mlis.flynn@epa.qld.gov.au
Email: mlis_flynn@yahoo.com.au

Ms. Catherine Siota
Solomon Islands locally Managed Marine Area Network (SILMMA)
Representative
The Nature Conservancy
Conservation Officer
P.O. Box 759,
Honiara, Solomon Islands
Email: csiota.tnc@solomon.com.sb

Mr. Ratu Pio Radikedike
FLMMA-Community Representative
Email: veratavou@yahoo.com

Ms. Susana Lolohea
WWF South Pacific Programme
Administrative Assistant
Suva, Fiji
Private Mail Bag
Email: slolohea@wwfpacific.org.fj

Mr. Kiniviliame Ravonoloa
FLMMA_Community Rep
PO Box 35
Korolevu
Fiji Island

Mr. Ramon Fereti
Research Assistant
University of the South Pacific,
Institute of Applied Sciences
Email: ramon_ralifo@yahoo.com

Mr. Sunia Waqainabete
Research Officer
Ministry of Fisheries and Forest
P.O Box 3165,
Lami, Fiji Islands
Email: swaqainabete@fisheries.gov.fj

Ms. Elizabeth Niumataiwalu
Senior Ranger
National Trust of Fiji
Box 124, Levuka
Fiji
Email: ntflevuka@connect.com.fj

Mrs. Vilimaina Civavonovono
Ministry of Agriculture
Department of Land Resources Planning and Development
Senior Technical Assistant (GIS)
P. O Box 5442
Raiwaga, Fiji Islands
Email: vcivavonovono@govnet.gov.fj

Mr. Isoa Koroiwaqa
Institute of Applied Sciences
University of the South Pacific
PO Box 1168
Suva, Fiji
Ph: 9323 648
Email: soxkoroi@yahoo.com

Mr. Livai Siga
Lomaiviti Provincial Officer
P.O. Box 52
Levuka, Fiji Islands

Ms. Mere Namudu
Marine Protected Area Officer
WWF Fiji Country Programme
Suva, Fiji Islands
Email: mnamudu@wwfpacific.org.fj

Ms. Nanise Odrovakavula
Tourism Officer - Planning and Research Section
Ministry of Tourism
Box 1260
Suva,
Fiji Islands
Email: nodrovakavula@govnet.gov.fj,

Ms. Metuisela Tabaki
Senior Ranger
National Trust of Fiji
Box 124, Levuka
Fiji Islands

Ms. Anju Mangal
Information/Publication Assistant
Animal Health And Production Services
Secretariat of the Pacific Community (SPC)
Suva, Fiji Islands
Email: anjum@spc.int

Ms. Lydia Bower
National Trust of Fiji
Box 124, Levuka
Fiji

Mrs. Sukulu Rupeni
Institute of Applied Sciences
University of the South Pacific
PO Box 1168
Suva, Fiji Islands
Email: srupeni@yahoo.com

Ms. Vilisi Tokalauvere
Resource Information Officer/ Fiji Country Intern
SOPAC/EU Project "Reducing Vulnerabilty in the Pacific ACP States
SOPAC Secretariat, Private Mail Bag, Mead Road, Nabua, Suva
Fiji Islands
Email: vtokalauvere@mrd.gov.fj

Mr. Aleki Sisifa
Director
Land Resources Division
Secretariat of the Pacific Community (SPC)
Suva, Fiji Islands
Email: alekis@spc.int

Mr. Stephen Hazelman
Extensionist
Plant Protection Services
Secretariat of the Pacific Community (SPC)
Suva, Fiji Islands
Email: stephenh@spc.int

Appendix 4 List of the Student Participants

Levuka Public School	Delana Methodist High School
Students (16-17 years old):	**Students (15-17 years old):**
Mr. Tevita Rokotola	Ms. Setita Wati
Mr. Tikiko Bainivalu	Ms. Matila Tili
Mr. Etuate Volavola	Ms. Niumaia Adilele
Ms. Rosie Uluiviti	Ms. Fulori Vakaliwaliwa
Ms. Ofa Cavalevu	Ms. Losana Vadei
Ms. Priscilla Sauvavi	Ms. Georgina Varea
Ms. Jopana Qacia	Ms. Losalini Talewale
Ms. Mereoni Vakacabeqoli	Mr. Akuila Koroi
Ms. Unaisi Cagicake	Mr. Apisai Daveta
Ms. Seruwaia Tinanivalu	Mr. Joeli Vuli
Ms. Elenoa Daveta	Mr. Josese Balenaqio
Mr. Peceli Vadei	Mr. Veveni Vuiwakaya
Mr. Soviata Roko	Mr. Solomone Seniyaro
Mr. Niumaia Maravu	Mr. Aseri Ura
Ms. Litea Wati	
Teachers:	**Teachers:**
Mr. Joji Katoni (Principal)	Mr. Master Timasi Waqa (Principal)
Ms. Suliana Sandys (Vice Principal)	Mr Saimoni Buinimasi
Mr. Golden Varea	Rev. Solomone Vakaliwaliwa (Chaplain)
Mr. Akuila Vute	

Appendix 5 List of Key Informants

Participants – Villagers Group 1

Participant	Village	Participant	Village
1. Isikeli Joji	Visoto	2. Sivinia Vakarewa	Natokalau
3. Emosi Cagilevu	Visoto	4. Inia Tabuasuka	Natokalau
5. Joeli Vuki	Visoto	6. Timoci Tikomailepanoni	Natokalau
7. Kaiava Koroi	Visoto	8. Mesake Draniyatu	Natokalau
9. Ilaisa Vonolele	Nacobo	10. Teresia Matata	Draiba Koro
11. Nacanieli Taqa	Nacobo	12. Nemani Leone Tora	Draiba Koro
13. Josua Lutudromu	Nacobo	14. Di Kula Sowani	Draiba Koro
15. Vilitati Baba	Nukutocia	16. Peni Toga	Naikorokoro
17. Aisake Bukavesi	Nukutocia		
18. France Lote	Nukutocia	19. Anare Visawaqa	Nasinu
20. Onisimo Kuru	Nukutocia		
21. Ido Kivi	Tokou	22. Joe Temo	Wainaloka
23. Beranadeta Kinikinilau	Tokou	24. Jone Daudau	Wainaloka

Participants – Villagers Group 2

Participant	Village	Participant	Village
25. Apisai Bulivorovoro	Waitovu	26. Isoa Ratu	Toki
27. Joseva Ramusu	Waitovu	28. Sakiusa Naivalu	Toki
29. Sakiusa Bulivorovoro	Waitovu	30. Mere Koroi	Toki
31. Panapasa Tamani	Vagadaci	32. Samuela Raganitoga	Rukuruku
33. Nemani Tamani	Vagadaci	34. Ateca Korolala	Rukuruku
35. Isoa Saqacala	Vagadaci	36. Semi Kalisinu	Rukuruku
37. Deve Saqacala	Vagadaci	38. Inoke Rasiga	Rukuruku
		39.	
40. Kaiava Davui	Vatukalo	41. Taitusi Bakani	Yarovudi
42. Samuela Tawake	Vatukalo	43. Taitusi Ratu	Yarovudi
44. Joseva Sira	Vatukalo	45. Marica Macanalagi	Yarovudi
46. Maraia Wasawasa	Levuka	47. Usaia Delai	Vuma
48. Marica Vakacabeqoli	Levuka	49. Metuisela Tukutuku	Vuma
50. Sevania Cikamatana	Taviya	51. Jona Nayacatini	Nuouo
52. Epeli Tamani	Taviya		
53. Asaeli Tamani	Taviya		
54. Maciu Tamani	Taviya		
55. Viliame Nabati	Taviya		

Participants – Villagers Group 3

Participant	Village	Participant	Village
56. Adriu Cirikiwai	Lovoni	57. Marika Ratumaibure	Lovoni
58. Ananaisa Naucukidi	Lovoni	59. Iowane Boro	Lovoni
60. Jone Niuafo	Lovoni	61. Volau Sainikinadi	Lovoni
62. Kavai Damu	Lovoni	63. Ovatia Qatianavanua	Lovoni
64. Nemani Driu	Lovoni	65. Teveci Dau	Lovoni
66. Epi Bole	Lovoni	67. Jope Bainikea	Lovoni
68. Malakai Masilino 1	Navuloa	69. Temesa Waicala	Nasaga
70. Malakai Masilino 2	Navuloa	71. Jone Aukerea	Nasaga
72. Laitia Sebualala	Navuloa	73. Isikeli Bure	Nasaga
74. Paula Ravutia	Navuloa	75. Lisi Gadai	Nasaga
76. Samu Seru	Naiviteitei	77. Jokatama Bole	Viro
78. Ravaele Davila	Naiviteitei	79. Kolinio Mata	Viro
80. Lagani Celua	Naiviteitei	81. Ledua Seruvatu	Viro
		82. Meli Suka	Viro

Appendix 6 Constraints identified by the trainees and by the students during the manufacture of the blank model

Working Group "The Tracers"

- Little islands were not traced- missed out.
- Solution offered was to draw bridges linking small islands to bigger pieces to avoid losing little pieces

Working Group "The Cutters"

- Smaller but essential pieces were either left out or mistakenly discarded. Due mainly to lack of experience in reading scales and recognizing contours
- Solution offered was to not discard any piece and to keep all leftovers.
- Bridges were cut to join little pieces to bigger pieces to avoid anything missing
- It was decided that red dotted lines are marked to make it easy for the next top layer to know where they should be placed

Working Group "The Gluers"

- They experienced what the tracers and cutters faced regarding missing pieces.
- Found the importance of numbering, proper tracing and cutting helps make their work a lot easier.

Appendix 7 Day 1 - Trainees' Frame of Mind at the Beginning of the Workshop

Expectations expressed by trainees at the beginning of the workshop (metacard exercise, Monday – April 4, 2005)

- Knowledge & confidence to conduct a P3DM activity in my local communities
- Learn how to involve the community in building a 3D Model using their mental maps
- To have more skills, practice on 3D model understanding
- Expert trainer in P3DM
- Better process for communities and facilitators to base resource maps on
- Understand and able to implement/construct a P3DM to introduce back to organization
- Process and skills of 3DM to be gained. Also to share experiences with participants
- Network with other ministries/organizations to assist in GIS and related projects
- How to use this knowledge gained to support/enhance community disaster risk management
- Team work from all participants
- To gain history about Ovalau
- To understand more about resource mapping and how the models will interest communities
- Constructing 3D maps for resources (skills)
- Gain knowledge and information on the hidden history of Ovalau
- Skills to empower local communities better
- Very useful information gathering
- Making models from maps
- Gain more knowledge on GIS
- To understand & practice 3D Modelling – mapping skills
- Community's interest to continue with management plans
- Knowledge so I can encourage my Government department to work more collaboratively with indigenous stakeholders
- Expertise in 3D modelling
- Make more friends
- Use maps for Management Plan for Levuka
- Learn more about GIS and Spatial Information
- Learn about 3D modelling

How Do You See Your Role In The Mapping Process?
(metacard exercise, Monday – April 4, 2005)

- Help villagers to understand drawing maps to scale
- Help out in facilitating the exercise, gather knowledge from them and help put it into scale in the model
- To facilitate, empower and strengthen informants provide quality data with accuracy are extracted
- Facilitation and learner
- To listen, be open-minded, offer support when asked, facilitate empowerment, allow a free flow of ideas/perceptions and allow villagers to be heard
- Teach the villages how to keep their environment clean
- To question them on (a) how many village are found on Ovalau Island, (b) land marks (c) working together
- To assist the participants and learn at the same time
- My role is to liven up their mental map, & let them map it out on the model using the scale, ask distance marked because I'm not familiar with the places. Enlarge an aerial photo would be a better guide for now
- Organise the community & listen to their inputs. Encourage them & guide them in the mapping process
- To help the communities understand what to do especially on some of the information we'd like them to put on the model
- A facilitator for the community in transferring their knowledge to the 3D model, and to ensure high accuracy and quality of data
- Facilitate/assist in community collaboration exercise throughout
- Learn and help
- As a facilitator to assist them with the 3DM and at the same time learn from them the local issues and difficulties with their natural resources planning and management
- Explaining and making them understand more
- Observing and helping

Villagers will depict their mental maps on the model. What are your expectations in terms of quality and accuracy of data? (metacard exercise, Monday – April 4, 2005)

- Accurate information
- Higher quality in terms of capturing data on the map. Ability for a villager to actually map a mental map 'thru' this 3D model
- Quality: good; accuracy: not so good
- Maps from the model will have more information compared to GIS maps or aerial photos, in terms of protected areas and using the base map. It will be very accurate
- Quality – Good (them), Poor (us)
- Accuracy – Poor (us); Good (them)
- I expect some degree of accuracy & quality depending on how they express themselves
- Locally very accurate, especially for their area of interest/work
  Outside area of interest – less accurate/less quality
  Quality of information very high
- Not that accurate, but it will be informative in terms of land marks
- Accurate data but different interpretations by some
- Can expect some degree of inaccuracy in terms of data (history, distance, etc)
- What I see that the villages in Ovalau will come out with a perfect mapping of the Ovalau because they know the place very well
- We will get the communities perception and thus will be accurate and of quality. Verification during participation
- Different data by different participants from villages
- They will have an accurate data especially to those who know the status of their village and land well
- I would expect villagers to be very knowledgeable on weather, seasonality, distribution of resources, use of resources in their area of interest
- 3D modelling will help villagers put together resource information (land use etc) accurately – not like on sketch maps

Appendix 8 Day 4 – Trainees' Mid-term Feedback - Thursday April 7 2005

I Noticed …

- Local students have a good knowledge of community resources
- Students have much information of the place and just needs to be encouraged to share this openly
- Most local knowledge are not documented
- The eagerness of every participants willingness to finish the model
- Tracing the maps on to the cardboard was an important exercise
- After gluing 3 layers of contours, we paste the growing model with crepe paper along the edges
- This 3D model will benefit stakeholders to overcome language barriers…
- Good Government policy, political commitment is important for adoption of 3DM into Government process
- The preparation of this workshop is very important at all areas…procurement stage, decision on scale, community consent, accommodation, availability of trainers and media.
- The eagerness and excitement of the informants in incorporating of their information into the model

I Discovered …

- How important some resources around us are so useful
- More about the terrestrial and marine ecosystem of Ovalau
- Good pre-planning is an important component of 3DM
- Something new for me to the field I know or experience
- Building a physical 3D Model requires not just one organization but a mixture of GIS specialist, community workers from various organizations working together as a TEAM
- It's good working with the help of 2 - 4 people to have a 3D Model
- Value of team work in creating a P3DM
- Workshop materials tend to grow legs when you least expect it
- How important and useful such a model is, to the community at large.

- We used small stones for the Mountain peaks and cardboard for the contours
- It is a good tool to be used in the FLMMA Management Plan Workshop with communities
- Rippling effects of P3DM, fosters unity, new beginnings, opening for good governance (all sectors of society)
- The unique/rich historical & cultural significance of Levuka/Ovalau
- Levuka has many ghosts
- The importance of team work especially, in ensuring that there is accuracy in the tracing of the correct contours, cutting the same and gluing those together accurately so that at the completion of the model, there is no discrepancy in the construction

I felt …

- This will assist most GIS specialists to produce a tool that will be easily interpreted by the community
- My attendance/participation is worthy
- Happy to discover something new in life
- Excited yet nervous at conducting P3D in my community
- To produce such a model, there has to be a lot of team work involved
- I'm confident that we will finish the model in time with the communities
- Nervous at first but, as the model was building up, it was so amazing.
- I should have been here from day 2 as "it was the most crucial part of the exercise"
- Confident after going through the process
- Excited as the model was growing
- Privileged to be a part of this and thrilled to use skills acquired to empower communities, promote good governance and sustainable development through building more P3DMs
- Excited about this project from the beginning and more so when seeing the excitement of the informants from the beginning to the end when the project was completed. We have done something really unique and very useful indeed for resource management.

I Learned …

- That good scaling selection produces close to real 30m
- For this type of tool to be used, a network of people will be responsible for it
- The skills of 3D Modelling
- How the 3D model is made
- We use simple materials for the model
- That participation from everyone makes life easier when building the model
- That facilitation requires confidence and competence
- This exercise has taught me more about terrestrial terrains of Ovalau. Geography students (especially physical geography) will have no problem with the identification of various spatial features with such a model
- Many things during the making of the empty model

- Why base maps need to match the exact grid lines…smooth contour tracing, how to paste, cutting a bit
- Creating a 3D blank model and most of all that it was done through team work and communication
- We draw bridges to connect contours to make cutting easier
- The why's and how's of creating a 3D model. Awesome
- The essentials of organizing such a workshop
- Many things and see how the island of Ovalau looks like as it is on the map.
- How this type of exercise can bring so many people together in harmony and at the same time leave an imprint on their minds of how important it is to map their resources, be more aware and learn more about their surroundings and be able to pass the knowledge down to their future generations.

I suggest …

- When tracing contour lines we should use different coloured pens to make work easier
- A much bigger scale 1:4000
- Training team leaders for each school group – would develop leadership skills
- Proper supervision should be maintained at all times – informants
- Revisit to Ovalau by the group after the Management Plan is in place
- The scale be increased to have a bigger model
- Some prior advice on dress codes (i.e. right & appropriate clothes for community)
- I take this workshop as the standard as it has been excellent on all aspects, thank you
- Facilitators also be given a chance to visit areas mapped/modelled
- All Pacific Government Institutions, NGO's to lobby for P3DM as part of the Government process
- That this kind of workshop be done in all the islands in Fiji
- Better coordination of the trainees by having de-briefings after a day's work to review the day's activities and plan for the next day.

Appendix 9 Day 11 – Trainees' Final Feedback - Wednesday April 13 2005

I Learned …

- I learned that the P3DM is a very effective tool for any development as it promotes govt/ngo community partnership
- I learned that contours be properly traced, cut and labeled with the contours level
- I learned that choosing a team to facilitate a P3DM exercise is a critical factor in completing model successfully (including the work before exercise, the planned implementation after P3DM exercise)
- I learnt that P3DM is an effective tool for development. All stakeholders have a fair idea of what is needed (background information) before any development takes place
- I learned many things from the 3D model
    - Assembling the base maps
    - Tracing and cutting of contour lines
    - Paintings
    - The use of grid on the 3D model with a scale
- I learnt
    - The steps and ways in creating a 3d blank model
    - How to identify the different legends
    - What precious things different villages have
    - How important my island is
    - God's creation is so amazing
- I learnt that the base map is most important in the whole process. You get it right in the first step the rest follows through
- I learnt that choosing a team to facilitate a P3DM exercise is a critical factor in completing model successfully [including the work before excises and the planned implementation after]
- I have the learnt the process, skills and formulation of 3D community mapping

I felt …

- There is a need to redesign some parts of the process to be able to cut back on time and cost, two weeks is a bit long
- Grateful and privileged to be part of this inaugural exercise

- That this exercise/training has been extremely beneficial for me personally and hope I can share this knowledge, experience and skills with communities at home and abroad
- That more information in terms of explanation is needed when presenting to villages, schools and trainees
- Good about the whole workshop from day one till now. Felt served/trained/prepared
- Feel good about all these below:
    - coordination by Susana
    - awareness before the workshop [Tu Pio, Su & Eliki]
    - facilitation by Mr. Rambaldi, Silika & Etika, Trevor & Vanessa & happy team, local fellow trainees Elizabeth, Lydia, Tabaki and Roko
    - fellow trainers, wonderful, dynamic professionals and very friendly accommodation, food, program, transport
- Happy to see a 3D model like this an see the hills after travelling around Ovalau and listening to the sounds of the songs
- Good being part of the workshop as it becomes a stepping stone into my GIS career and enhance the interest in community-based projects

I discovered …

- Many heritage areas found here in Ovalau and how the island looks compared to a map
- Many new places, tales, etc of this beautiful island which I would not have learnt elsewhere
- That by using yarn we demarcate areas and thus make less planning errors
- Accuracy of base maps is vital for the final output of 3DModel
- 3D Mapping is the most realistic type of map. Prior reading of materials and literature review will help participants and trainees
- The team must include a key facilitator, a key logistics person, a technical GIS, IT, camera person, key persons with community development skills, experience and rapport, key persons with local knowledge and connections
- It is a good tool to used in FLAMMA management plan workshop with communities
- P3DM is an extremely technical process requiring extensive organizational and facilitation skills – the more work put into “getting all aspects right” means a better outcome for traditional owners
- That being part of this workshop offsets the monotony in our individual workplaces. It is good to be part of a diverse group of people from various technical background working towards a common course
- A very important community GIS tool that contains vast and accurate knowledge by the community that not Government map can ever produce

I noticed …

- The legend is the key to interpreting the model so make it perfect
- Unity amongst team members facilitators and trainees which is vital. This team worked well, listened, respected and preferred each other. No one

was more important; all rose together and gave their best when needed. Keep this team together

- Communities overwhelming willingness to share information and pride and enthusiasm to participate
- The tireless efforts of certain team members who braved cold nights drinking kava to raise awareness on FLAMMA, this project and building lasting relationships which will benefit the project and Ovalau community in its sustainability
- If the contour lines were to have a 50m difference between the areas of village sites and peaks would show out clearly
- That teamwork is important and the model building progressed well with community support and collaboration
- That teamwork makes work easier and simpler. Collaborative work makes exercises as this worthwhile and most of all people get to have a lot of incite from it
- Traditional owners of Ovalau were very knowledgeable on cultural heritage of the island – indicating that Fijian culture is still very strong and vibrant
- That the interest level was gathering momentum from Day 1 as students and elders kept coming back and people were beginning to see clearly the importance of the model

I would like to suggest …

- We keep this team for the next few P3DM workshops including one or two community members [or school kids – informants] from the beginning to end of the exercise to help demystify any parts of exercise that all community members aren't directly involved in would help keep process open and transparent
- Naming of places can be typed and printed right away from computer during mapping from the community so that consistency of labels on the model is ensured
- That very clear agreements are made with community about use of storage and access to GIS data derived from model – Very important
- Use 1:5000 scale since in Fiji all terrain have names and its significant to Fijian identity
- That three community school leavers/youth were brought in as trainers
- This team of facilitators work together on future P3DM exercises proposed in future, catering be rotated or shared among community groups

Trainees Views - Wednesday April 2005

Q: "List the three most important aspects of the P3DM exercise you would emphasize to trainees, if you were a trainer".

Trainee A

- ensure participants (community members) understand scale and scaling issues
- ensure contours and cut-outs are checked thoroughly (by having a checking system)
- ensure that organisers put together a well rounded facilitation team where each person has clear role(s)

Trainee B

- Creation of Blank model : After pasting not to put too much heavy load, because it tends to put more pressure on the elevation of the model (thickness of cardboard is only 3mm) that thickness is what we want to maintain; its what's going to show out.
- Scale: More emphasis for example a little exercise on painting on a blank piece of paper would be better, that is just to make them aware that in a 4 sq cm, some important features that are missed out could have been plotted, but just because of poor planning, there is not enough space or just mere exaggerated boundaries. Some may have never used painting brush, but a preliminary exercise as such, similar to the use of yarn before going to painting would be a great help. Reminder, these are going to be mapped using the computer, and the computer is very area wise sensitive. Some waterways are just too wide for a creek.
- Labels on the 3D models: The models are too congested with names. It's going to be pretty hard in mapping which is another phase of this P3DM exercise. To ease the situation such as this, a suggestion would be to have a printer by the model, where one could type in whatever list of names wanted by the villagers to be placed on the model. This is to emphasise consistencies in the size of font and clear capture of land cover over the model. Very important.

Trainee C

- Tracing and Cutting is very important - so be accurate with these
- Preparation is very important - the logistics involved their materials etc - these should be ready.
- Organise a clear legend - one that is easily understood and read.

Trainee D

- Preparatory Phase: This includes the awareness to villages, students, etc. Everyone to have a common understanding on the project and what is expected from all parties involved. Don't make 'informants' feel threatened on sharing their local knowledge [depicting mental maps], etc but promote the feeling of ownership for the project among them. Assembling of materials and personnel, workshop logistics, etc. Trainees to be fully briefed/aware of village protocols, etc
- Project Implementation: Trainees knowledge of the project is important that we're able to 'speak the same language' while conversing with

participants, answering questions/queries, public awareness, etc.

- Keep focus on tasks to achieve within the timeframe
- Teamwork and the Right Attitude is important in achieving project goals – friendly/encouraging attitude towards 'informants' to get maximum input/participation from them
- Data Extraction and Manipulation and Follow-up process

Trainee E

- Preparatory Phase: (i) Base map's accuracy; (ii) Selection of informants; (iii) Precision and accuracy of procurement of materials/supplies
- Project Implementation: (i) Selection of trainees and their ability to work as a team as this does affect overall; (ii) workshop output; (iii) Precision and accuracy in each of the steps from base tables, tracing base maps to carton board, cutting, gluing, mapping features using various coding means
- Know how's of facilitation and being open/broad minded allowing for other perspectives
- Documentation
- Participants (trainees and informants) full understanding of the purpose of the P3DM model

Appendix 10 Villagers' Feedback on their Participation in the P3DM Workshop

Listed below are the translated comments made in writing (metacard exercise) by participating villagers at the end of their actual work on the 3D model. Please note that representatives from 27 villages joined the workshop in 3 groups, one following the other (with some overlap) as detailed in the implementation schedule Figure 6 on page 15. The majority of villagers were adults with a very high representation of Elders. Women were poorly represented.

Villagers Group 1: 8 April 2005 – Villagers' Statements (Metacard exercise)

- I have learnt the names of rivers and mountain ranges.
- I discovered that if we look after our environment and our *vanua*, our source of wealth, we will be able to combat poverty.
- I felt this workshop has been useful for all the people of Ovalau – young and old, even our children have learnt new things. It is a big step forward for them and for all of us.
- I am learning new things about my village and surrounding areas and also the coastal area.
- After so many years, I now have a better understanding and knowledge about Ovalau. Thank you, thank you very much.
- This exercise is a good model for future development.
- I have learnt so much about conservation.
- God has created many wonderful things and he has created me to look after them.
- A learning experience that has broadened my horizon.
- We have been able to come as a group and learn new things about Ovalau.
- This is the first time I have learnt anything about the formation of an island. I have also discovered the concept of conservation from the beaches and coastline to the mountains. We are the first ever participants of such a workshop. Good luck to the district of Nasinu and its future endeavours.
- I learnt my island properly.
- I leant about conservation.
- I have acquired knowledge about mountains, gullies, plains and coastal areas
- I learnt about the formation of the *vanua.*
- I would like to say here 'thanks very much' for a well-deserved workshop that will benefit the generation of Ovalau (today and tomorrow) 'Can we have another one?' God bless all.

Villagers Group 2: 9 April 2005 – Villagers' Statements (Metacard exercise)

- I learnt about (living things that surround us).
- I discovered many 'ancient' things about Ovalau.
- The indigenous people have been enlightened! The exchange of knowledge happened in this building. The benefits of this exchange will benefit future generations and all ethnic groups.
- I discovered new things about Ovalau.
- God created so many great things on this island, and I have been blessed.
- What I discovered here will assist me in conserving my environment.
- I have learnt many things about the connections between all living things from the mountains to the coastline.
- Over the past two days, I have learnt about names of places on Ovalau, I never knew before.
- I have acquired new information about 'old village sites' on Ovalau.
- I have learnt many new things about Ovalau.
- We should be sharing information about Ovalau, it is of great use to future generations.
- I have learnt names of streams, rivers, mountains. Through the model I have seen Ovalau from a new and broader perspective.
- I learnt about the *vanua* and my fishing grounds. I learnt names of streams, mountains and reefs in my fishing grounds. I also saw the boundaries of each village.
- I learnt new things about my village. I learnt names of places, names we do not use anymore, names that our elders used and I am so glad that I and future generations have learnt and will use them again.
- It is important that we learn about old village sites, name of rivers and streams, reefs, fishing grounds and mountains. It is pointless to learn about other places when we do not know about our own island.
- I am so pleased about the workshop. I learnt names of many places including old village sites, mountains and rivers. I am glad to know all these new information. I am 58 years old and I have learnt new things
- I have learnt new things.
- I discovered so much at this workshop.
- I now know what Ovalau really looks like.

Note by the documenter: additional statement (not included) are repeats of the above.

Villagers Group 3: 12 April 2005 – Villagers' Statements (Metacard exercise)

- I have enjoyed and learnt a lot of new things about Ovalau, Moturiki and Naigani. Especially regarding their natural resources on land and in the sea.
- I have learnt about God's creation in my village and on Ovalau. I have come to see the streams, mountains and the coastal areas.
- I have come to learn a lot about Ovalau but especially Lovoni. I now know the real names of the streams, mountains and coastlines and notice the clear land and village boundaries.
- I notice that a lot of land is not used but lying idle and we need to do something about it.
- I would suggest that it would have been better if your group could have made a trip to Lovoni, which is in the interior of the island of Ovalau, which has lots of historical sites in Fiji. It is always been said that if you make a trip to Ovalau, and did not pay a visit to Lovoni, you still have never seen Ovalau.
- I discovered the beauty of Ovalau Island and its natural resources. It is our responsibility to conserve our environment especially the marine areas
- I have come to appreciate Gods creation of Ovalau Island and the beautiful things he placed in it. It is so amazing. Also, saw how our forefathers divided the land amongst themselves.
- This project is not good due to the following reasons; a) It was useless to me: (i) pay me nothing, (ii) waste my time, (iii) only benefited the caterers; (iv) It is a snare e.g. information identifying dam, electricity, fishing ground; (v) undresses our vanua, vi) Tourists pay nothing in exchange for this information.
- During the two days I spent here, I learnt new things about Ovalau Island e.g. the mountains and the names of small streams.
- I now have a bird's eye view of the whole of Ovalau Island.
- This has been highly educational for me as I learnt about the real names of
- Certain features in my own piece of land. I am so thankful for this project that can learn about building a 3D Model.
- I learnt about every village and how they are all connected to Lovoni.
- I noticed that a lot of land is lying idle and not utilized. So from this project I realized that I should make good use of the land by planting food gardens and making good use of my time.
- I now have a clear idea of the size of the island, and can see areas that are used and those that are unused. I also realize we have a lot of streams and coral reefs.
- The colours used on the model are so beautiful. This is very educational and beneficial to all the inhabitants of Ovalau Island.
- I discovered that this exercise has clarified a lot of things to the youth of Ovalau.
- I learnt that there are a lot of sacred things in Ovalau.
- This exercise has inspired me to learn more about my Island.
- I learnt that we have protected our island's natural resources well and people still have knowledge of the names of our areas.
- I noticed that there are a lot of lands that are not used for planting.
- I now have a better understanding of the whole of Ovalau landscape and will be very useful for development planning and resource management.

Appendix 11 3D Model Summary Sheet

Participatory 3D Model Data Input Form	Description
Title of Model	Participatory 3-D Model of Ovalau Island and surrounding waters
Project/Programme framework	Collaborative Spatial Information Management and Communication in the Pacific
Country	Fiji
Province(s)	Lomaiviti
Districts	Tikina Levuka, Tikina Lovoni, Tikina Bureta and Tikina Nasinu
Primary Objectives of the Exercise	To support local communities in developing resource management and development plans and preserving local cultural heritage.
Secondary Objectives of the Exercise	To introduce, showcase and document improved spatial information and communication management practices in the context of community-based spatial planning and to improve community mapping skills among selected practitioners in the South Pacific Region and share lessons learned.
Method	Participatory 3-D Modelling and GIS.
Date	2005
Results	Participants to the exercise have realized the extent of indigenous spatial knowledge of community members. The 3-D model resulting from the collation of mental maps of 96 key informants displays the following: 35 different land use and covers; 28 different point form information; 19 different types of linear data. High-resolution images were taken ready for on-screen digitizing. WWF will further support the residents of Ovalau Island in the pursuit of their desire to better manage their resources.
Stakeholders and key informants	Men and women from the following villages: Levuka, Vagadaci, Waitovu, Vuma, Toki, Vatukalo, Nauouo, Yarovudi, Taviya, Rukuruku, Draiba, Naikorokoro, Nasinu, Tokou, Natokalau, Lovoni, Nasaumatua, Vuniivisavu, Visoto, Nacobo, Nukutocia, Naiviteitei, Nasaga, Tai, Navuloa, Viro, and Wainaloka
Local Organization (contact person, address, e-mail and URL)	Lomaiviti Provincial Council, Fijian Affairs Board, Ministry of Regional Development - Fiji Islands
National Organization (contact person, address, e-mail and URL)	Fiji Locally Managed Marine Areas Network (FLMMA) and WWF South Pacific Programme

Participatory 3D Model Data Input Form	Description
External Organization (contact person, address, e-mail and URL)	Technical Center for Agricultural and Rural Cooperation (CTA) ACP-EU), Wageningen, The Netherlands. Contact person: Giacomo Rambaldi Email: rambaldi@cta.int
Funding Agency (name and URL)	Technical Center for Agricultural and Rural Cooperation (CTA) ACP-EU), Wageningen, The Netherlands http://www.cta.int
Horizontal Scale of 3-D model (1:X,000)	1:10,000
Vertical Scale of 3-D model (1:X,000)	1:6,666
Size of model (m x m)	2.4 m x 2.2 m
Area covered by the model (km2)	528
Corner coordinates of the 3-D model	
North West corner (Latitude)	-17° 33” 26’
North West corner (Longitude)	178° 38” 42’
North East Corner (Latitude)	-17° 33” 26’
North East Corner (Longitude)	178° 52” 16’
South West Corner (Longitude)	178° 38” 41’
South West Corner (Latitude)	-17° 45” 22’
South East Corner (Longitude)	178° 52” 16’
South East Corner (Latitude)	-17° 45” 22’

Appendix 12 PowerPoint presentation: Base Map Preparation

BASE MAP PREPARATION

OVALAU PARTICIPATORY 3D MODELLING WORKSHOP

Silika Tuivanuavou
Native Land Trust Board
April 4, 2005

OVERVIEW

- Choosing the Scale
- Types of Data
- Data Sources
- Data Preparation
- Challenges
- Output
- Questions

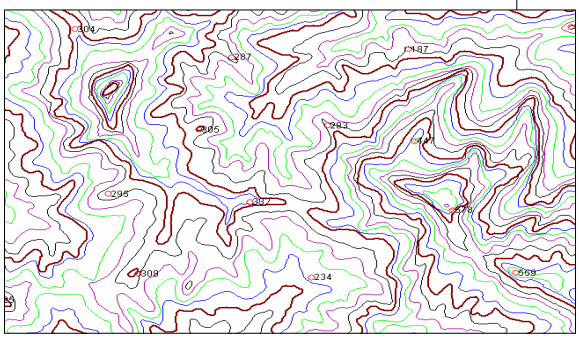
CHOOSING THE SCALE

- Area covered – terrestrial & quoliquoli boundaries
- Scale determined – 1:10,000

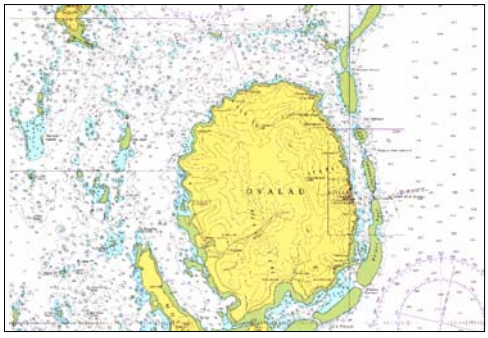
TYPES OF RAW DATA

- Digital topographic data
- Ovalau Chart – Hard copy map
- Qoliqoli Boundary Data (Customary Fishing Rights Boundary) - Digital
- Topographic Map Backdrop - Digital

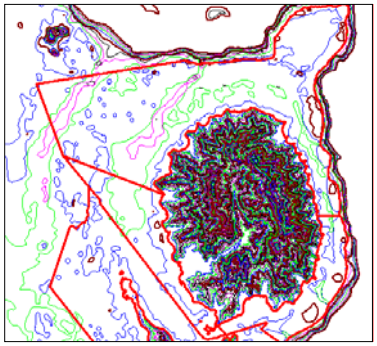
DIGITAL TERRAIN DATA



OVALAU MARINE CHART



QOLIQOLI BOUNDARIES



TOPOGRAPHIC MAP BACKDROP

DATA SOURCES

- Digital topographic – Lands & Surveys Department
- Ovalau Chart – Hydrographic Survey
- Digital Qoliqoli – Native Lands & Fisheries Commission
- Topographic map backdrop - SOPAC

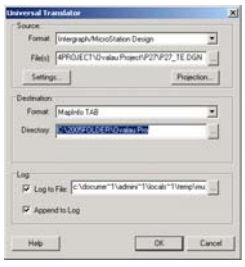
DATA PREPARATION

- Data translation from DGN format to MapInfo of Terrain data
- Contour cleaning
- Creation of tables
- Spot Heights verification
- Scanning of marine chart – georeferencing with topo backdrop
- Overlay of Qoliqoli data with other data above

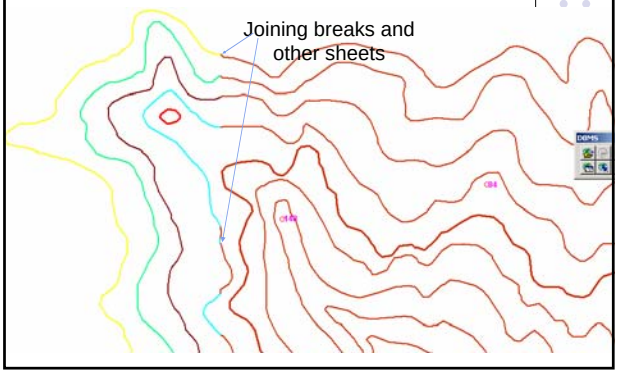
DATA TRANSLATION

DGN Format – Design File to MapInfo

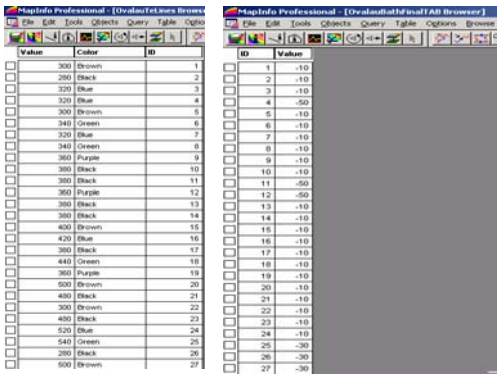
Projection importance



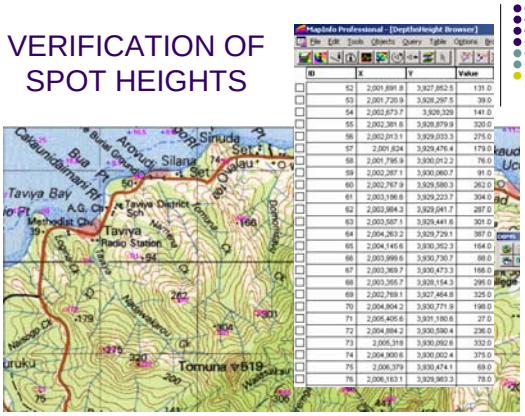
CONTOURS CLEANING



TABLES OF DATA



VERIFICATION OF SPOT HEIGHTS

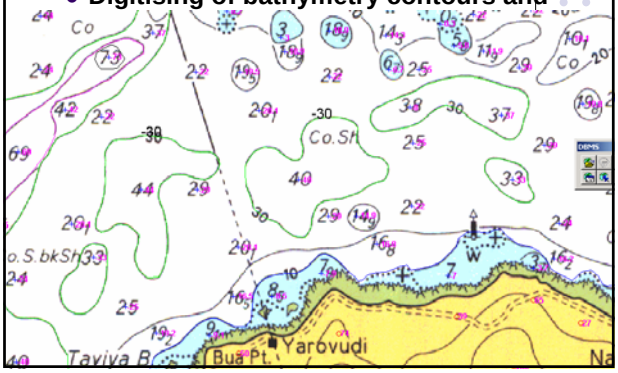


SCANNING OF MARINE CHARTS

- MRD scanner
- Geo-referencing – conversion of lat and long to Fiji Map Grid
- Overlay with topo backdrop for verification

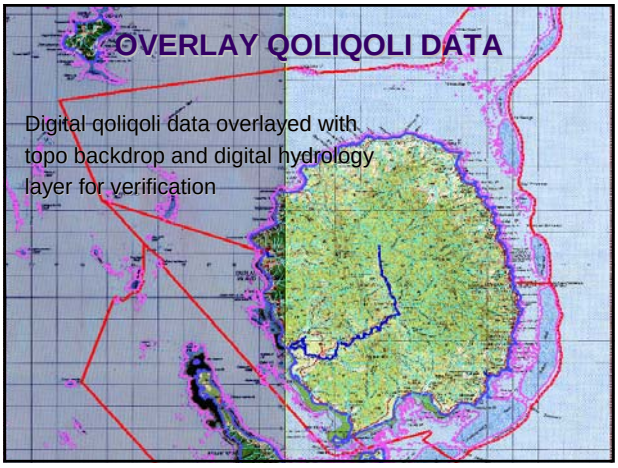
ON SCREEN DIGITISING

- **Digitising of bathymetry contours and**



OVERLAY QOLIQOLI DATA

Digital qoliqoli data overlayed with topo backdrop and digital hydrology layer for verification



CHALLENGES

- Unavailability of digital bathymetry data
- Scanned data does not agree well with topo backdrop
- Incompleteness of bathymetry
- contours

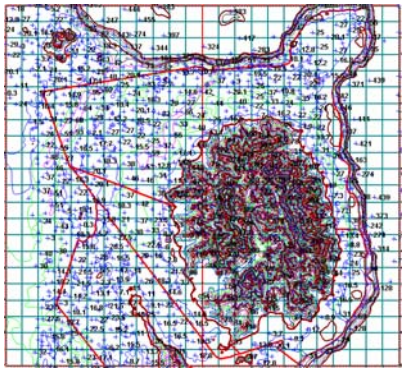
Grid Creation

10cm Map Grid Created – 1km on the ground

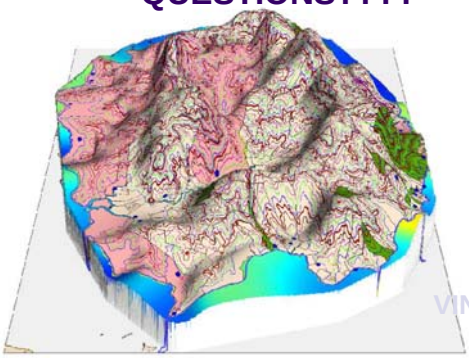
Start from top left corner coordinates

OUTPUTS

Map sheets – 9 for joining



QUESTIONS????



Appendix 13 Results of the on-line Workshop Assessment

Results Summary

Export... View Detail >>

Filter Results

To analyze a subset of your data,
you can create one or more filters.

Add Filter...

Total: 13

Visible: 13

2. Your Background Information

1. What best describes the kind of organization you represent?

		Response Percent	Response Total
Non-Governmental Organization / Civil Society		**38.5%**	**5**
International Organization		15.4%	2
Government Organization		23.1%	3
International Financial Institution		0%	0
Private Sector		7.7%	1
Educational/Think Tank/Research		15.4%	2
Other (please specify)		0%	0
	Total Respondents		**13**
	(skipped this question)		**0**

2. What is the basis of your interest in community mapping?

		Response Percent	Response Total
Member of a local community interested in acquiring skills in community mapping.		7.7%	1
Employed by a national government agency with programs for community based planning.		23.1%	3
Employed by an international NGO with programs for community based natural resource management.		**30.8%**	**4**

Employed by a private company that provides services for community mapping.		7.7%	1
Affiliated with an academic or research program focused on issues related to the territory.		7.7%	1
Private citizen interested in spatial/ territorial issues and traditional resource users' rights.		7.7%	1
Interested in the preservation and safeguard of intangible cultural heritage.		0%	0
Interested in supporting my people in asserting their traditional rights on resource tenure, control and access.		7.7%	1
View Other (please specify)		7.7%	1
		Total Respondents	**13**
		(skipped this question)	**0**

3. How would you describe your previos experience in community mapping?

		Response Percent	Response Total
I am new to the practice.		**30.8%**	**4**
I have assisted to some exercises as an observer.		7.7%	1
I have read about community mapping but never practiced it.		15.4%	2
I have participated to several exercises as key informant.		0%	0
I have facilitated several exercises.		0%	0
I have a solid experience in the practice.		7.7%	1
I have experience in mapping (cartography / GIS), but not in community mapping.		23.1%	3
View Other (please specify)		15.4%	2
		Total Respondents	**13**
		(skipped this question)	**0**

3. About the Training in Levuka

4. Please comment the following:

	I agree strongly with this statement	I agree with this statement	I disagree with the statement	I disagree completely with the statement	No comment	Response Total
Overall, I am satisfied with the workshop.	**67% (8)**	25% (3)	8% (1)	0% (0)	0% (0)	**12**
My initial expectations were met.	**58% (7)**	42% (5)	0% (0)	0% (0)	0% (0)	**12**
I acquired new knowledge useful for carrying out my job more effectively.	42% (5)	**50% (6)**	0% (0)	0% (0)	8% (1)	**12**
I acquired new contacts which will be useful for exchanging information and acquire new knowledge.	**67% (8)**	33% (4)	0% (0)	0% (0)	0% (0)	**12**
The outcome of the workshop has met the set objectives.	**50% (6)**	**50% (6)**	0% (0)	0% (0)	0% (0)	**12**
I have somehow changed my mind in terms of "who's knowledge counts".	**50% (6)**	42% (5)	0% (0)	0% (0)	8% (1)	**12**
					Total Respondents	**12**
					(skipped this question)	**1**

5. Please comment the workshop dynamics:

	I agree strongly with this statement	I agree with this statement	I disagree with the statement	I disagree completely with the statement	No comment	Response Total
The interaction between participants, facilitator and resource person were rewarding.	**83% (10)**	17% (2)	0% (0)	0% (0)	0% (0)	**12**
The interaction between trainees and informants were rewarding.	**67% (8)**	33% (4)	0% (0)	0% (0)	0% (0)	**12**
Presentation methods were appropriate.	**67% (8)**	33% (4)	0% (0)	0% (0)	0% (0)	**12**
Presentations were clear.	**83% (10)**	17% (2)	0% (0)	0% (0)	0% (0)	**12**
The pace during the workshop was adequate .	**58% (7)**	42% (5)	0% (0)	0% (0)	0% (0)	**12**
Duration was adequate.	**50% (6)**	25% (3)	25% (3)	0% (0)	0% (0)	**12**
Intensity was satisfactory.	**42% (5)**	**42% (5)**	17% (2)	0% (0)	0% (0)	**12**
					Total Respondents	**12**
					(skipped this question)	**1**

6. If you found the interaction rewarding, what made them so?	
View **Total Respondents**	**11**
(skipped this question)	**2**

7. Which aspects of the programme, if any, were insufficiently treated?	
View **Total Respondents**	**10**
(skipped this question)	**3**

8. Please comment the logistics of the workshop:

	I agree strongly with this statement	I agree with this statement	I disagree with the statement	I disagree completely with the statement	No comment	Response Total
Background information was timely and sufficient.	42% (5)	**50% (6)**	8% (1)	0% (0)	0% (0)	**12**
The organisation of your trip was satisfactory.	25% (3)	**75% (9)**	0% (0)	0% (0)	0% (0)	**12**
Accommodation was satisfactory.	42% (5)	**58% (7)**	0% (0)	0% (0)	0% (0)	**12**
In general, the working conditions were acceptable.	25% (3)	**50% (6)**	17% (2)	8% (1)	0% (0)	**12**
Workshop facilities were adequate (equipment, materials).	**50% (6)**	**50% (6)**	0% (0)	0% (0)	0% (0)	**12**
Catering conditions were satisfactory.	**58% (7)**	42% (5)	0% (0)	0% (0)	0% (0)	**12**
					Total Respondents	**12**
					(skipped this question)	**1**

4. Future Directions

9. If you were to put your acquired skills into practice how important would these facilities be to you?

	Very Important	Important	Somewhat Important	Not Important	Response Total
On-line database on community mapping / PGIS featuring case studies	**75% (9)**	25% (3)	0% (0)	0% (0)	**12**
On-line contact database (PGIS experts and reference centers)	42% (5)	**50% (6)**	0% (0)	8% (1)	**12**
Community mapping training resource database	**67% (8)**	33% (4)	0% (0)	0% (0)	**12**
Community mapping / PGIS newsletter	**58% (7)**	33% (4)	8% (1)	0% (0)	**12**
Regional network of community mappers	**50% (6)**	42% (5)	8% (1)	0% (0)	**12**
Electronic discussion forum	**42% (5)**	**42% (5)**	17% (2)	0% (0)	**12**
				Total Respondents	**12**
				(skipped this question)	**1**

10. In which field do you see yourself putting your acquired skills into pratice?

	Very Important	Important	Somewhat Important	Not Important	Response Total
Supporting collaborative planning and management of terrestial, coastal and marine natural resources.	**58% (7)**	42% (5)	0% (0)	0% (0)	**12**
Asserting ancestral land and resource rights and entitlements.	**42% (5)**	**42% (5)**	8% (1)	8% (1)	**12**
Conducting collaborative research.	25% (3)	**67% (8)**	8% (1)	0% (0)	**12**
Managing and ameliorating conflicts amongst and between local community groups, and between communities and higher-level authorities or economic forces.	**42% (5)**	**42% (5)**	17% (2)	0% (0)	**12**
Supporting cultural heritage preservation and identity building among indigenous peoples and rural communities.	**58% (7)**	33% (4)	8% (1)	0% (0)	**12**
				Total Respondents	**12**
				(skipped this question)	**1**

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If you found the interaction rewarding, what made them so?	
1.	People who knew their surroundings and the intangible features that went with it.
2.	Local knowledge with expert trainers knowldege and also supported by the individual participants skills was very helpful and was really rewarding
3.	- experiencing together (with other trainees) this new tool. Discovering new things and sharing with each other often about how we could improve on current community mapping and how empowering it would be for our local vulnerable districts to have similar models...especially in the context of hazards/vulnerability reduction. - Giacomo is an excellent trainer, facilitator/resource person..we felt served, and he provided for us the environment for the workshop to be a success. Silika is awesome and a invaluable resource person.Interaction with community informants were great due to my own curiosity to see their response to the exercise, thanks for assigning trainees to informants or villages. To feel their excitement and hear their stories, and to see first hand the impact of the excises is yes so rewarding.
4.	Trainees were all looking forward to learn what this P3Dmodel workshop all about. Ample time was given to the parts of the programme
5.	The information that was communicated.
6.	Easy access/exchange of ideas on community mapping and how this could contribute to general sustainable development in all areas of society
7.	Trainees participation and informants participation. Everyone worked as a group to accomplish the community mapping exercise
8.	Interactions were rewarding on a number of levels. With participants it was fantastic to hear their knowledge and then see it dispolayed on the model. With the other trainees it great to work with professionals such as Giacomo and the Fijian, Soloman Islander and Papua New Guinean trainees to see different ways of approaching things and discuss issues pertinant to P3Dm in their own communities.
9.	The exchanging of information between the trainees and the informants.Informants well-informed trainees using traditional knowledge, thus in a way educating trainees on the overall Ovalau Island.

10.	Interactions were rewarding because they were done in such a manner that enabled participants, trainees and informants to feel that their knowledge and participation were very important and appreciated.
11.	Good facilitation. We felt playing a constructive role. We were given space where to learn and share at the same time. It has been fascinating to observe and listen to the villagers when these were working on the model, explaining us their customs and legends, talking about their farmland, fishing grounds and harvesting areas.

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Which aspects of the programme, if any, were insufficiently treated?	
1.	Camera work. The last bit. I was interested in that but unfortunately time caught up.
2.	All was good except that, we needed more time so that it will be relaxing rather then being really intensive training
3.	None that I can think of
4.	If only the trainees were given the liberty to arrange for their own accomodations, as we were accustomed to any workshop. The overfeed was too much. An alternative for such group feeding was that, to arrange for certain days only.
5.	Putting of maps together,the very first part of the training done on sunday,some of us were late to attend.But however everything afterwards was excellent.
6.	No comments
7.	I don't beleive any were.
8.	None
9.	The photography session at the end of the workshop, I feel was not given much time and importance judging by the outcome of the photographs.
10.	The last session on extracting data from the model. We were a bit late in the morning and had limited time to implement the task because of the following traditional handing over ceremony.