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Resource use, development planning, and safeguarding intangible cultural heritage: lessons from Fiji Islands

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Introduction

The Fijian Government supports the involvement of local communities in the development and management of ecotourism activities. It also supports the conservation of Fiji's biodiversity, natural environment, and indigenous Fijian culture and tradition (Ministry of Planning, 2001).

The *Ecotourism and Village-based Tourism Policy and Strategy for Fiji* (2000), addresses the need for integrated village-level planning. It notes that ecotourism involves both biodiversity and cultural heritage protection. This has implications for stakeholders' involvement, including those holding customary use rights on land and marine resources, as well as government agencies and independent organisations.[1]

Regulatory, legal and cultural frameworks support native communities in taking the lead in managing and protecting these resources. But actual implementation depends on a number of factors. Available spatial data are often of poor quality, outdated or incomplete. Historic data on the occurrence, distribution and access to natural resources are orally transferred or in a manner unsuitable to detailed spatial planning, systematic monitoring and effective bottom-up communication. Some efforts have been made by government and non-governmental organisations (NGOs) to introduce participatory spatial planning and monitoring methods. But most village communities still rely on traditional gatherings and conversation to share recollections of space as the basis for analysis.

"Mapping is a fundamental way for displaying spatial human cognition and for communicating on issues related to territory"

In Fiji the use of community-based geo-spatial information technologies to support collective informed decision-making is still in its infancy. Local knowledge is scattered between individuals and rarely collated, geo-referenced or visualised using maps. Mapping is a fundamental way for displaying spatial human cognition and for communicating on issues related to territory. Lacking a tested practice for producing community-generated maps impacts on increasing community involvement in spatial decision-making. This is a critical entitlement when natural resources are distributed over vast areas.

[1] Native Fijians are the custodians of 87% of Fiji's land area and of all the coastal and marine environments up to 12 miles offshore.

Figure 1: Where Ovalau and Beqa Islands are located

Silika Tuivanuavou

Figure 2: Villagers working on an orthophoto

Photo: Giacomo Rambaldi

Scope of the case study

This paper focuses on two community mapping exercises done on Beqa and Ovalau Islands. Both encompass land and marine territories. While the methods used differed (aerial orthophoto-mapping in Beqa and Participatory 3D modelling in Ovalau), the objectives were similar – developing collaborative natural resources management and development plans based on customary values and practices and the use of modern geo-spatial technologies.

This paper compares critical steps of the two methods and the human dynamics, which emerged during the course of the processes.

Background

Beqa Island (Figure 1) has a landmass of 37 km^2 and is surrounded by a lagoon and coral reefs. It has steep slopes and a limited area suitable for agricultural production. According to the Bureau of Statistics, in 1996 the total population was 1,239 people living in eight villages.

Ovalau Island (Figure 1) is a volcanic island of 109 km^2 surrounded by lagoons and coral reefs. In 1996 its population was 8,625 people living in 27 villages. The island has pristine ecosystems, lush tropical forest cover, fertile farmland, numerous freshwater sources and rich fishing grounds.

Process

Beqa Island

In September 2004, the Ministry of Tourism, the Beqa Island Tourism Council, the University of the South Pacific (USP) and the Native Land Trust Board (NLTB) assisted the residents of the island in initiating a participatory process. This was aimed at developing a *Qoliqoli* Management Plan.[2] The two-day workshop in Rukua Village intended to produce the outline of a management plan. It relied on the use of composite orthophoto[3] and *Qoliqoli* maps *in situ* (at village level); and geographic information systems (GIS) *ex situ* (in the capital city, Suva).[4]

The event was presented as the start of a process of sustainably managing natural resources, sharing benefits, and minimising conflict arising from shared resource uses.

The preparatory phase took two months. Organising the workshop involved a series of coordinating meetings, procurement, and two on-site visits of a high-ranking government official native to the Island. Preparing the orthophoto map took a month and involved scanning, rectifying, georeferencing and making a mosaic of six aerial photos.

The workshop involved 62 villagers. They depicted the distribution, use of, and access to land and coastal resources, including taboo and heritage sites. They used a 1986 1:50,000 marine map outlining customary fishing rights and a 1:11,900 scale composition of 20-year old geometrically rectified aerial images.

Participants worked in seven discussion groups, formed according to existing *Qoliqoli*. The groups located and annotated different features on the respective portions of the map and aerial image (Figure 2).

The participants were enthusiastic about the process. But there was an incomplete briefing on the fact that the aerial photos were 20 years old and a lack of adequate supplies. Facilitators failed to provide transparencies to depict differ-

[2] *Qoliqoli* is the vernacular of 'traditional fishing grounds'. The *Qoliqoli* are made out of many *Mataqali* (land and water owning units).
[3] Geometrically rectified aerial photographs placed in a map coordinate system.
[4] According to the plans, the GIS facility would have received and processed data resulting from the village exercise, produced thematic maps and returned these to the community for further use in the planning process.

Box 1: Participatory 3D modelling

Participatory 3D modelling (P3DM) is a communicative facilitation method. It supports collaborative processes related mainly to resource use and tenure. It aims to facilitate grassroots participation in spatial problem analysis and decision-making.

P3DM integrates people's knowledge and spatial information (contour lines) to produce stand-alone scale relief models. These have proved to be user-friendly. They are relatively accurate data storage and analysis devices and at the same time excellent communication media.

The difference between an ordinary contour map and a 3D relief model is the vertical dimension. This provides important cues to stimulate memory and facilitates the establishment of spatial associations (Rambaldi *et al*., 2002).

ent information layers. Instead data were depicted directly onto the photos using black pencils, but since the images were printed in grey-tones the pencil marks were difficult to read. Those working on the black and white marine maps found it easier, as the pencil was clearly visible.

The exercise resulted in seven separate sets of annotated orthophoto and *Qoliqoli* maps. No comparison between the outputs occurred at the workshop. So the actual planning was deferred until after the seven sets had been compiled in a GIS.

The villagers could easily relate to aerial photographs, but experienced some difficulties in respect to scaling. They would tend to oversize items depending on how important they were to them (e.g. their own farms).

To brief villagers about follow-up ex-situ activities, facilitators transferred some data from one annotated photo to a GIS and showed them the resulting output. They explained that they would complete the data extraction and consolidation processes back in their offices and then return to discuss the results. At the time of writing, the data was digitised and a total of 60 legend items were identified.

But those involved in data extraction said the process was difficult. It involved three people: the first person looked at the orthophoto map. The second person identified corresponding features from the legend. The third person was responsible for on-screen digitising, matching individual features sketched on the maps with landmarks identified on the digital geo-referenced orthophoto map. They had to try to accurately reproduce both the size and location of these features. Features that were found to be overlapping on different annotated orthophoto- and/or *qoliqoli* maps were selectively digitised. Discrepancies were noted down, ready to be raised at the follow-up workshop. This was where the verification of all captured data would have been done.

Figure 3: Elders working on the model

Photo: Giacomo Rambaldi

But due to lack of funding, the Department of Tourism did not return to the island. No validation of the maps took place and no management plan was produced.

Ovalau Island

In January 2005 a similar process involving a number of agencies began on Ovalau Island.[5] The exercise started with a three-month intense design phase, followed by a four-month period during which the organisers conducted networking and coordination activities and procured materials, including topographic and bathymetric data.[6] They prepared base maps, mobilised stakeholders during a series of 27 village consultations, organised the logistics, and outlined community entry and exit strategies, including the discussion of appropriate attitudes and behaviours, respect of rituals, and possible follow-up actions which could eventually address new emerging realities.

The actual P3DM exercise took place in Levuka in April 2005. The event lasted for 11 days. During the first three days, twenty-nine students and six teachers from local high schools attended to construct the model (Rupeni et al. 2005).

[5] Fiji Locally Managed Marine Areas Network (FLMMA), WWF-South Pacific Programme, Technical Centre for Agricultural and Rural Cooperation (CTA), Native Land Trust Board (NLTB), National Trust of Fiji, Development of Sustainable Agriculture in the Pacific (DSAP) Project (SPC-DSAP) and Lomaiviti Provincial Council.

[6] Bathymetry is the underwater equivalent to topography. A bathymetric map gives the depth contours of the soil, rock, sand, etc. at the bottom of a body of water such as an ocean or a lake.

Figure 4: Mental transect walk along the landscape of the 3D model

Photo: Penina Namata

Figure 5: Transect diagram presentation

Photo: Penina Namata

Afterwards, 82 village representatives, mainly elders, depicted their spatial knowledge in three partially overlapping shifts of 1.5 days each (Figure 3).

The process was guided by a group of facilitators with backgrounds in collaborative natural resource management, cartography, GIS and community work. The P3DM exercise and follow-up activities focused on ensuring local ownership of both process and outputs. Once completed, the model displayed a wealth of spatial information with a legend containing 79 different features and a total of 83 places of cultural heritage significance.

In July 2005 the facilitators brought together 135 representatives from all villages for five days to conduct a visioning and planning workshop. The objective was to develop an action plan that would address collectively perceived natural and cultural/resource-related problems and opportunities.

Activities included 12 mental transect walks (Figure 4). Participants split into groups based on their geographic origin, professional background, and experience. There were three groups for each of the four districts, each assigned different tasks. The first group assessed the land habitats, the second assessed marine habitats, and the third identified potential economic, cultural, social and environmental development opportunities.

Each group nominated a highly knowledgeable elder as leader, and one documenter. Using the 3D model as a visual and tactile reference, each group selected its transect itinerary. Using a wooden stick (Figure 4), leaders mimicked the walk, pointing at and naming different habitats and relevant species found there, and describing their status, opportunities and threats. The groups discussed the findings until they reached consensus. This was noted down by the documenter on the transect diagram (Figure 5). All 12 groups went through the same process. Afterwards, these assessments were consolidated, reviewed and subjected to a problem tree analysis. Here, community-based solutions were put forward to address the root causes of perceived problems.

The four assessments were then presented to the community. Taking stock of these scenarios, participants concluded that the best approach was to collaborate island-wide 'as one people' and to create a *Vanua ko Ovalau Resource Management and Action Plan*.[7]

Mapping out cultural heritage

During the mapping workshop, an interesting collaboration developed amongst the older and younger generations. The youth did manual assignments (painting, writing labels, fixing yarns) while the elders advised on names, distribution of natural resources and harvesting grounds, and places of historic and cultural significance. On several occasions the elders started narrating stories and legends, generally associated with natural phenomena, features of the landscape, natural resources and people.

On the mental transect walks, participants described cultural heritage sites including old villages and fortifications, hunting caves and fields, old burial grounds, and natural features associated with historic events, myths and rituals. They also mentioned less location-specific legends associated with resource management practices.

In parallel to the description and assessment of the terrestrial and marine environments, cultural heritage features were added to the transect diagrams. Participants felt they deserved special recognition both at regional and national levels in

[7] For Fijians, '*vanua*' refers to the peoples, the land, the sea and everything they contain.

Box 2

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.

Statement by one elder participating in the P3DM exercise in Levuka, Fiji, 12 April 2005

Box 3

To take different perspectives on a 3D model, I move my eyes, turn my head, move my body; my brain automatically updates all that information so I don't lose orientation.

Tversky, personal communication, 2005.

terms of cultural identity building and as opportunities to pursue development initiatives focusing on cultural tourism.

The Ovalau Resource Management Plan

After it was endorsed by the elders, the plan was presented to the Lomaiviti Provincial Council.

As a follow-up to the workshop, the facilitators consolidated data from the transect diagrams and notes, as well as the visions, dreams and recommendations into a document. This was returned to the Ovalau residents for validation and endorsement. The resulting *Vanua ko Ovalau Resource Management Plan* now guides island-wide sustainable management of natural resources and cultural heritage, and is a reference for future development.

Considerations and lessons learnt

It is hard to compare the two exercises. Both benefited from substantially different financial and technical inputs. But considering the similar objectives and participating communities, and by comparing the two processes and outcomes, some useful lessons can be learnt.

Project conceptualisation

The Ovalau exercise was better prepared in terms of design, procurement and financial forecast. Budgetary provisions were made from the onset to ensure that both the mapping and the visioning/planning workshops took place. But this was not the case in Beqa where financial resources were lacking at the start of the process. This example raises an important issue: when technology and development intermediaries venture into community-based initiatives, they need to be in the position of assisting participating communities until completion of the agreed processes.

Spatial learning and interpretation of space

In the two exercises the visual aid offered to informants differed substantially.

Understanding the landscape

The Ovalau 3D model was constructed at 1:10,000-scale and with a 1.5 vertical exaggeration to purposely enhance the perception of slope, elevation and depth. Being able to see a relief model from different angles helped participants to acquire different perspectives and easily comprehend of the entire landscape (Box 3).

Beqa Island is characterised by steep slopes. This was not perceivable from the aerial photos and so not discussed in spite of being of great importance to the islanders in terms of soil erosion and water conservation, access and economic development.

Surfacing tacit knowledge

Provided there is adequate facilitation, the three-dimensional nature of relief models enhances discovery learning through sensorial (visual and tactile) experiences.[8] This stimulates confrontational feedback, which in turn promotes debate and learning (Rambaldi *et al*, 2002) wherein elders reflect on their own knowledge and listen to each other. This makes tacit knowledge (knowledge everybody has, but is not aware of) become coherent and identifiable for the holder of that knowledge. This can be missed using other techniques. It is the link between memory, land and 3D maps that creates a particular focus (Crawhall 2006, personal communication).

Spotting error and change

On Beqa Island, the photos the participants used were 20 years old. But they were not alerted to this fact. Over that period, land use and cover and eventually the coastal line could have changed, but participants' made no specific comment on changes. It is fair to assume that the visual power of the information in the images may have led to a passive acceptance of what was displayed.

In Ovalau, participants started working on a blank 3D model. So they were less biased when depicting their mental maps. Participants spontaneously initiated a critical review of the landscape and identified several topographic features they could disagree with. These included e.g. a

[8] See www.iapad.org/p3dm.htm for more information on discovery learning.

Figure 6: Informants spot a missing peak and add it to the blank 3D model. Note: the landmark is missing on the official topography of the island.

Photo: Giacomo Rambaldi

missing peak (Figure 6), rock outcrops at sea, changes in the coastline (reclaimed areas) and insufficiently deep navigation channels.

In Beqa, participants experienced difficulties in rendering natural or physical features close to scale. They tended to remarkably exaggerate these. No support to assist mental processing of areas was provided. The issue was of less of a problem in Ovalau, because a purposely-prepared quick reference scaling guide (Figure 7) was provided.

Visual access

When working in a participatory mode in a remote village, there is a substantial difference in looking at an aerial photo and at a relief model. Arguably, a photo is flat. It is best viewed from the top. It is of no additional advantage to look at it from a different angle. But a 3D model can be observed from different angles (bird's eye view) with enormous advantages in terms of spatial learning (Box 3).

Broadening perspectives

At the visioning and planning stages, a 3D model – showing physical, biological, economic and cultural landscapes of both land and sea – helped participants to consider Ovalau holistically. They no longer viewed it from a purely administrative perspective. This led to the adoption of a comprehensive island-wide development and management plan.

The fun factor

Villagers and other stakeholders participated enthusiastically in both exercises. They noted the fun of discovery and learning while interacting with both the photomaps and the 3D model.

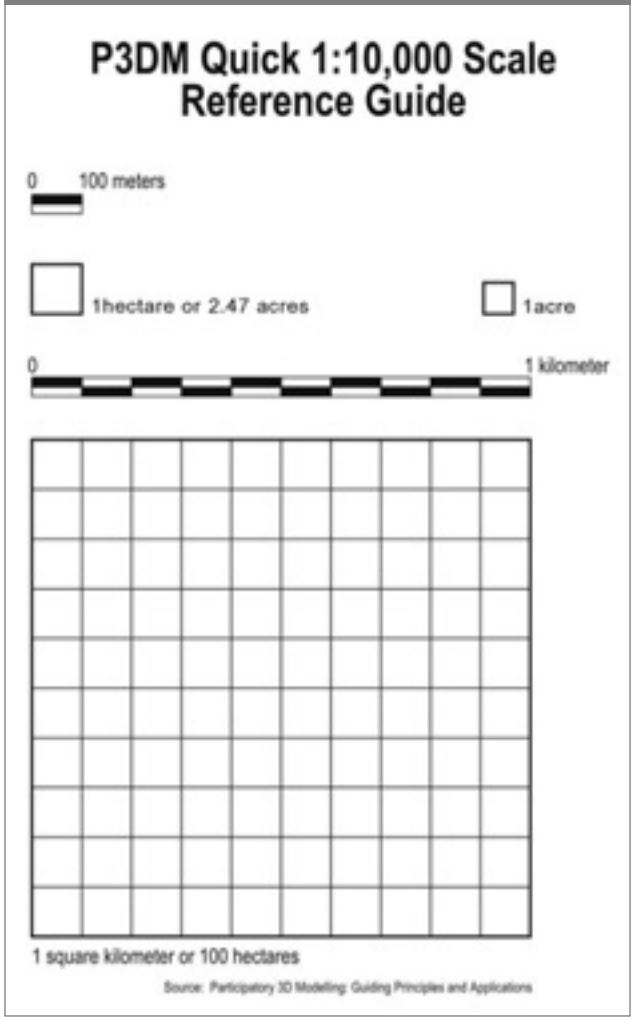
But when relating the levels of enjoyment to the number of calls necessary for participants to stop working (e.g. for meals), the Ovalau exercise definitely ranked as the one where participants felt the most excited.

Replicability

In both exercises the role of intermediaries was pivotal in introducing and using community-based geo-spatial information technologies. In Ovalau, specific attention was paid to giving the villagers control over the process. In fact, during the mapmaking exercise one elder from group one introduced newcomers from group two to the task. Consequently one elder from group two did the same for group three. In the process, facilitators progressively stepped back and handed over control to locals while maintaining a critical role in ensuring consistency in the use of codes, in regularly updating the legend, and in calling participants' attention on 'drawing/painting close to scale'.

While replicability at local level is welcome, it is crucial to decide on which level to focus in terms of building capacity – and for what purpose. The Ovalau exercise had a specific regional capacity building component. Both technology intermediaries from government and NGOs benefited from hands-on training in P3DM and related GIS applications. This has resulted in two major P3DM exercises being planned in Fiji and Papua New Guinea for 2006.

Figure 7: Quick reference guide 1:10,000 scale



Giacomo Rambaldi

Ovalau community members were trained in dealing with the 3D model itself; using codes; updating the legend; importing and exporting data; and all actions necessary for nurturing and putting the model to work to serve the island's community.

Students and teachers learnt on the job and got excited about replicating the process elsewhere. In agreement with the local council, the schools were given leftover materials to construct smaller models of the school areas.

Both methods depend on quality organisation and professional facilitation. Provided communities have access to e.g. orthophotos or base maps, organised groups (e.g. community-based organisations) can master the processes. The bottleneck may lie at the end of the mapmaking process, when data from the photomaps or 3D models needs to be imported into a GIS environment. This is the phase, where external support is usually needed.

Procedural issues

A pre-requisite for good practice is to leave the outputs of any mapping exercise with those who made them: the villagers. Facilitators should make their own copies and ensure that village representatives are in a position to oversee the transfer, manipulation and further analysis of the data in the context of the recipient GIS.

On Beqa Island, after a traditional farewell ceremony, facilitators left the village together with all maps, aerial photographs and the legend. This is a problem inherent to IT-assisted participatory mapping. Often little is left with the community after its effort and no long-term empowerment stems from the exercise. Valuable community knowledge is carried away and the community loses control over its storage and usage.

But on Ovalau Island, the 3D model, legends and unused coding means were left with the Provincial Council, the body entrusted by the traditional leaders to cater for its maintenance and updating. A comprehensive activity report was compiled soon after the workshop and distributed to representatives of all stakeholders involved, including schools.

The same applied to the planning workshop, where the transect diagrams were copied and the originals left with the community.

For planning purposes, annotated aerial photographs and/or transparencies are of limited use to the community until converted into thematic maps. So sometimes the community outputs need to be taken away from the village for processing. This is potentially disempowering, as local spatial knowledge is taken away by outsiders (although temporarily). A 3D model, due to its sheer size and weight, must remain where it was made and – if not hijacked by village elites – becomes integral to the local cultural and intellectual 'landscape'. It is available for local use in a variety of contexts.

Concluding note

It appears that the Ovalau exercise benefited from careful planning and implementation in addition to the adoption of a more demanding, but ultimately more user-friendly P3DM medium, favouring visual access and spatial learning.

Similar to many community mapping exercises carried out around the globe, the Beqa exercise raised a number of

ethical questions about the building blocks of participation: ownership, empowerment, control, access and use, and appropriation of local spatial knowledge. These and other ethical issues have been discussed in more detail in the article published on page 106 of this issue (Rambaldi *et al*, 2006).

The authors believe that participatory approaches are open ended and based on continuous innovation and change. 'Conclusions' are never 'real conclusions' – and this fact should be considered as the beauty of innovation. The conclusions are therefore kept short to give more space to the lessons learnt.

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