



ECOSYSTEM AND SOCIO-ECONOMIC RESILIENCE ANALYSIS AND MAPPING (ESRAM)

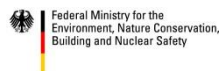
CONSULTANTS MEETING
'THE SHORE', SOUTH BANK, BRISBANE
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REPORT

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INTRODUCTION

In July 2015, SPREP began implementation of a five year ecosystem-based adaption project funded by the German Federal Ministry of Nature Conservation, Environment, Building and Nuclear Safety (BMUB). Participating countries are Fiji, Vanuatu and Solomon Islands and the project title is Pacific Ecosystem-based Adaptation to Climate Change (PEBACC). Phase 1 of the project entails detailed multi-disciplinary baseline assessments of social and ecological resilience linked to ecosystem services at project sites (two in each country). The assessments include a national level component.

Multi-disciplinary technical consultant teams were commissioned to conduct Ecosystem and Socio-economic Resilience Analysis and Mapping (ESRAM). ESRAMs focus on analysing and mapping resilience linked to ecosystem and socioeconomic systems at different scales taking into account existing trends and anticipated climate impacts. Specifically, they assess and integrate climate, ecological, social, economic, cultural, political and institutional factors; and address social and ecological systems dynamics across geographic and institutional scales, use landscape and oceanscape level analysis, focus on inter-connectivity, and combine technical skills and science with local and traditional knowledge. The ESRAMs will provide a baseline to inform the identification and selection of demonstration ecosystem-based adaptation (EbA) options (Phase 2 of the project (Feb – June 2017) and activities to be implemented by the broader PEBACC project and other development partners (Phase 3 starting July 2017).

Consultant teams and project sites include:

COUNTRY	SITES	CONSULTANT TEAM
Fiji	Macuata Province Taveuni Island National component	Watershed Professionals Network (WPN), Portland, USA
Vanuatu	Port Vila	RMIT University - Global Cities Research Institute, Melbourne, Australia
	Tanna Island National component	Griffith University - Climate Change Response Program Gold Coast Campus, Australia
Solomon Islands	Honiara Wagina Island National component	BMT WBM Pty Ltd Brisbane, Australia

Meeting Purpose

The purpose of the meeting was for the consultant teams, SPREP project staff and government counterparts to jointly reflect on experiences with the ESRAM approach to date.

Meeting Objectives

- i. To clarify the SPREP vision and expectations of the ESRAM framework and outcomes
- ii. To obtain an update on ESRAM work

- iii. To obtain feedback from government counterparts
- iv. To identify and reflect on issues emerging
- v. To map out the next steps

CONTEXT

Stuart Chape, Director of SPREP Biodiversity and Ecosystem Management Division, delivered a presentation providing the context for ecosystem-based adaptation in the Pacific island region. It was argued that hard-engineered adaptation options, when not planned well, lead to mal-adaptation. A holistic systems-based adaptation planning framework that factored in connectedness between ecological, social and economic systems was deemed more appropriate and was being promoted by SPREP. It was important to take a long-term view of climate and non-climate related impacts and trends affecting the resilience of social-ecological systems in the region. It was pointed out that growth in economic activities such as logging, mining, infrastructure, and socio-economic trends such as urban migration, population growth and modernisation needed to be carefully managed to reduce their negative impact on fragile island ecosystems and the critical social and economic services that they provide. Climate change projections needed to be evaluated against, and superimposed upon, the broader social and economic trends already taking place. The ESRAM framework was being put forward as a planning approach to guide assessments of social-ecological resilience in the context of climate change adaptation.

<http://sprep.org/attachments/Publications/Presentation/pebacc/eba-cc-pacislands-schape.pdf>

SPREP Project Manager, Herman Timmermans, delivered an overview of the PEBACC project. The purpose of the project was to raise the profile of ecosystem-based adaptation as a low-cost, appropriate response to building climate change resilience in the Pacific. The intended outcome was to have EbA included in relevant policy and planning processes

The project design was summarised as follows:

- Phase 1 – Baseline technical assessments (ESRAMs)
- Phase 2 – EbA options identified and evaluated. EbA plans developed.
- Phase 3 – Implementation of EbA demonstration activities
- Phase 4 – Policy integration

The project had a dedicated communications component and outreach products would be developed throughout.

http://www.sprep.org/attachments/bem/PEBACC/ESRAM/PEBACC_PPT_for_ESRAM_meeting_Brisbane_Herman.pdf

APPROACH

ESRAM as a Tool for Ecosystem-Based Adaptation Planning

Herman Timmermans explained that while building on similar approaches, the ESRAM approach was different in that it viewed the issue of climate change vulnerability and resilience through an ecosystem lens. This approach would provide an appropriate orientation to, and foundation for, ecosystem-based adaptation planning. The conceptual outline of the framework, the elements to be included in the assessment and the desired outputs were provided in the consultants' Terms of Reference. However, it had been up to the consultants to propose how they would approach the task and winning tenders were selected on the basis of their understanding of the task and the methodology proposed.

To provide focus, a simple input-output model was presented to explain the elements that SPREP expected the ESRAM study to contain (Figure 1).

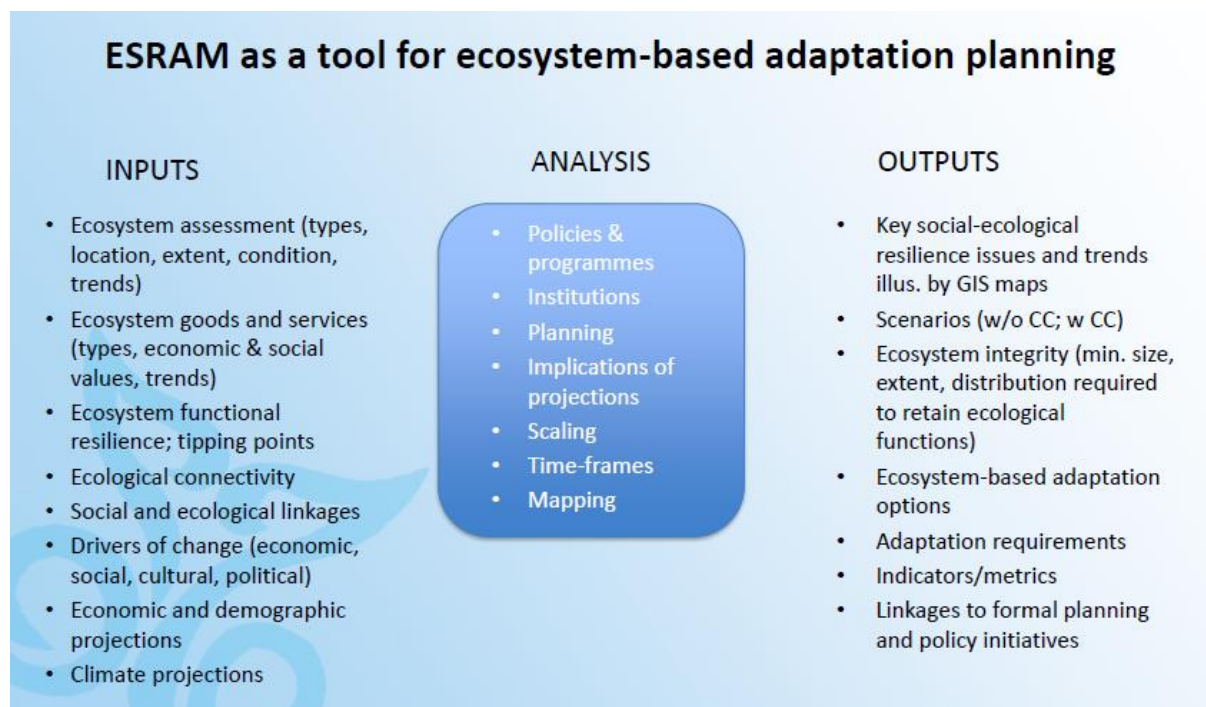


Figure 1 - Inputs, analysis and outputs of an ESRAM

CONSULTANT UPDATES

Each consultant team was requested to present on their work to date using the format: Methodology and approach; Work to date; Highlights and challenges; Process Issues emerging; Next steps.

Fiji ESRAMs¹

Project Team – Watershed Professionals Network (WPN)

- Project Management; Ecosystem Ecology (terrestrial & coastal) – **Chris Heider**
- Marine & Freshwater Ecology – **Rikki Dunsmore**
- Hydrology, Hydrogeology, Geomorphology – **Ed Salminen**
- Natural Resource Economics, Social Capital – **Mark Buckley** (EcoNorthwest)
- Traditional Culture & Heritage – **Simione Tuimalaga**

Geographic scope

National level – Fiji

Provincial level – Macuata Province, Vanua Levu

Island level - Taveuni

Methodology and approach

- **Step 1:** Characterize and Map Resources in a Watershed Framework. Assemble information sources (GIS, literature, interviews) at the appropriate scales to form the basis for the analysis.
- **Step 2:** Evaluate Ridge-to-Reef Connectivity. Construct an integrated model to identify how the ecosystem is functioning in the current climate condition, including identifying limiting factors.
- **Step 3:** Potential Changes in Connectivity due to Climate Change. Apply different climate scenarios to evaluate ecosystem functions, and compare with the current conditions to assess changes, risks, and affected resources.
- **Step 4:** Identify Supply & Demand of Ecosystem Goods & Services. Identify where the human and natural environments interact, and what key elements will fortify community and ecosystem resilience to climate change. Assess how climate changes may change the supply & demand (and potential value) of ecosystem services.
- **Step 5:** Identify Potential Activities to Increase Resilience. With a clear understanding of the supply and demand for ecosystem services (Step 4) and the changes in connectivity with climate change (Step 3), potential activities can be proposed to address the affected resources and potential community responses to increase overall resilience to climate change. Responses could include capacity and knowledge building, policy review, infrastructure, best management practices, community monitoring, incentives, etc.

Figure 2 provides a graphic of the conceptual framework guiding the Fiji ESRAM

¹ Presented by Chris Heider of WPN.

http://www.sprep.org/attachments/bem/PEBACC/ESRAM/WPN_PPT_for_ESRAM_meeting_Brisbane_Chris.pdf

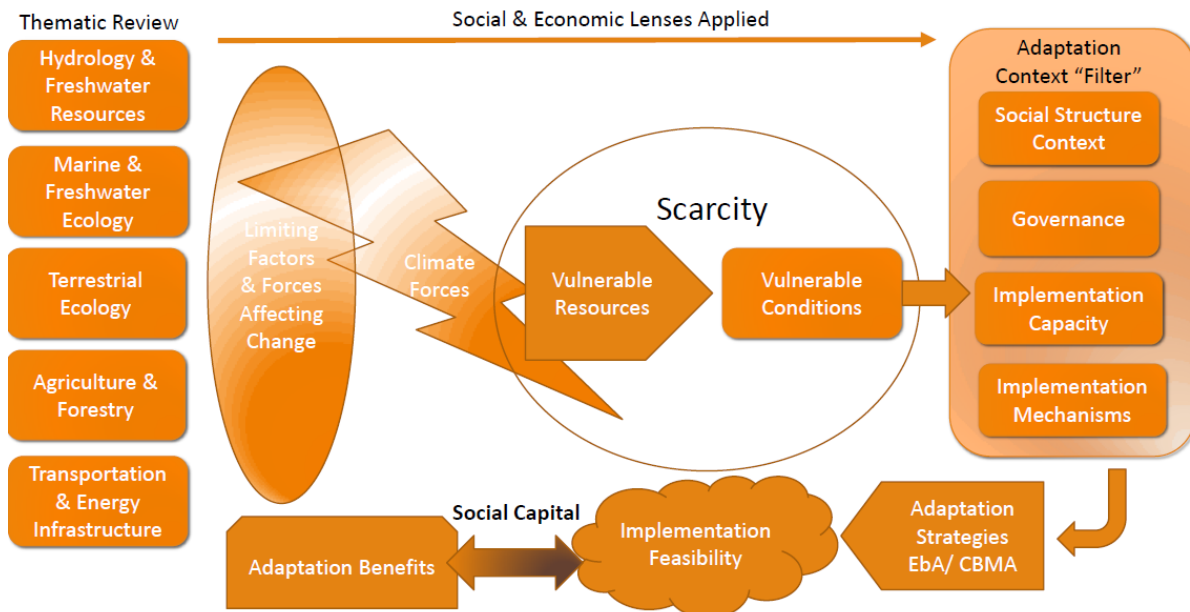


Figure 2 - Conceptual framework for the Fiji ESRAM

Each of the ecosystems, or thematic areas were being unpacked in terms of

- Climate change forces
- Additive forces (non-climate change)
- Vulnerable conditions
- Adaptation strategies
- Resilience benefits (see Figure 3 for an example of Marine/Coastal ecosystems)

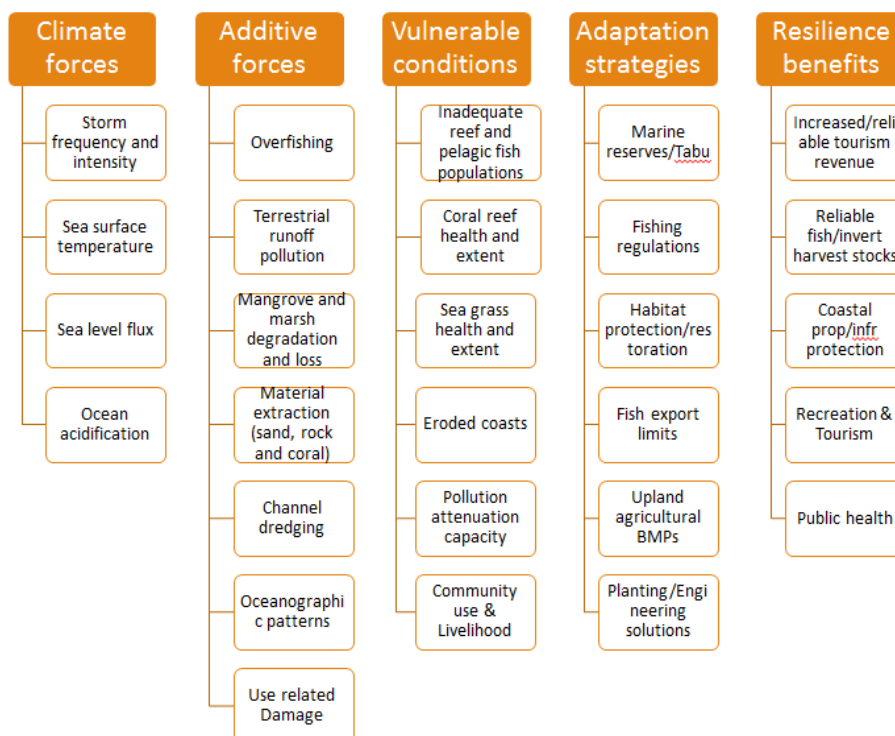


Figure 3 - Analysis framework for marine/coastal ecosystem thematic areas. Fiji

The analysis of ecosystems would be subjected to an 'Adaptation Context Filter' which would comprise the categories of 'social structure context'; 'governance'; 'implementation capacity'; 'implementation mechanisms' (Figure 4).

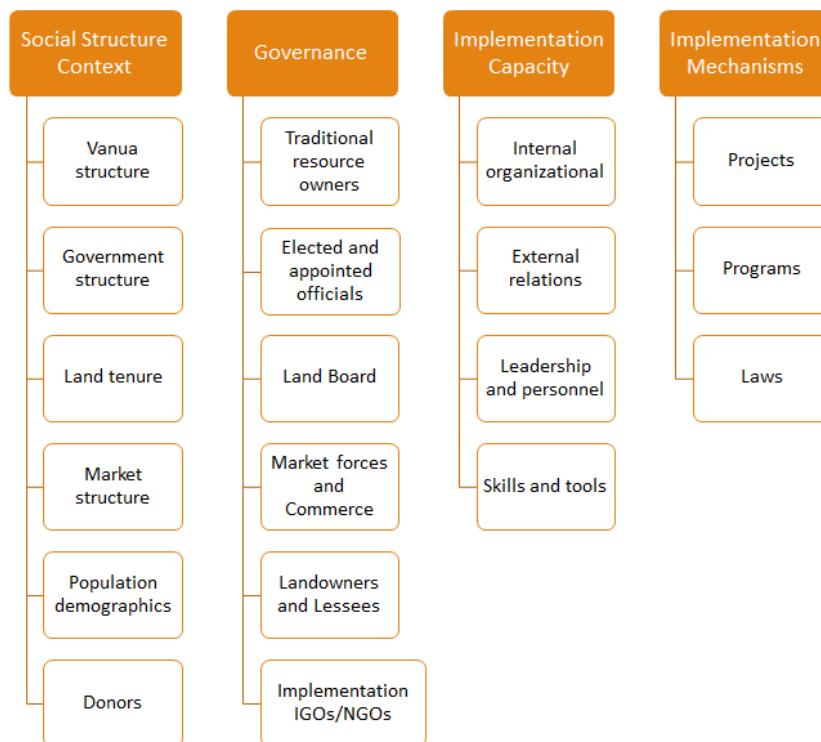


Figure 4 - Adaptation Context 'Filter'. Fiji

Work to date

- Published and unpublished sources of information pertaining to the major themes have been collected and organized into an annotated appendix
- Base spatial (GIS) and tabular data sourced and compiled into a restricted database and inventorised
- Orientation trip (C.Heider, Simione Tuimalaga) to Suva and Taveuni – June (5 days)
 - Project planning with SPREP
 - Meeting with Conservation NGO and government counterparts to introduce ESRAM
 - Data collection
 - Orientation trip of Taveuni Island
- Fieldtrip to Fiji (C. Heider, Ed Salminen) – August (14 days)
 - Macuata Province Multi-stakeholder Workshop (C.Heider & Ed Salminen) – August (1 day)
 - Round table discussion and information gathering with key provincial implementing agencies (Donor and NGO projects; national and provincial government; NR government reps)
 - Mapping of relevant projects and programmes in the province
- Taveuni: Traditional Leaders Workshop – (C.Heider, Ed Salminen, Simione Tuimalaga) August (3 days)

- To seek information and guidance on developing a stakeholder-based land and sea management system based on traditional Fijian values.
- To gather information and discuss issues relating to ecosystems (kinds, connectivity, goods and services provided, trends, management, etc.)
- To consider climate change related challenges and opportunities
- To identify potential groups/ communities/ watersheds to focus in developing ecosystem based adaptation activities.
- National Stakeholder Workshop – (Chris Heider, Ed Salminen) August (1/2 day)
 - Intergovernmental policy and direction
 - Programmes at the project sites
- Field trip to Fiji – (C.Heider. Ed Salminen, Rikki Dunsmore, Mark Buckley, Simone Tuimalega) November (14 days)
 - Data collection: Various meetings, interviews and on-ground assessments
- Currently busy with analysing the data and creating map products

Highlights and challenges

A key **highlight** of this program so far has been the Traditional Owners workshop run in August. The workshop brought together traditional leaders of Tavenui Island and gave them the opportunity to assess problems, map key areas and develop solutions. Eleven potential EbA actions were identified from this workshop including an approach to tourism operators, estate owners and immigrant farmers to be part of conservation efforts. The workshop was significant in that it (re)established the traditional Fijian framework for land and natural resource management and evoked a strong buy-in from traditional land owners to take steps to improve the management of ecosystems.

A **challenge** is managing the huge amount of data required for a multi-faceted assessment such as the ESRAM. Sourcing data is often difficult and time consuming and absorbs a lot of the time allocated. Finding the right balance between data collection, community engagement and analysis is challenging. Six months may not be enough time to undertake a comprehensive ESRAM.

Process Issues emerging

- How to incentivize conducting activities to increase resilience in a way that is not just “another project” funded and implemented by external groups?
- What motivation is there to participate in EbA? What happens in 10 years?
- Who is buying in? Communities to SPREP project or SPREP project to communities? How to ensure longevity?
- Land Tenure is a key challenge for being vested in long-term sustainability; how are other countries managing this?

Next steps

- Draft ESRAM Complete (2016)
- Field mission to communities (early 2017) to communicate findings and get feedback; further development of EbA specifics
- Contract amendment to include Phase 2 work

Solomon Islands ESRAMs²

Project Team – WBM BMT

- Project management and coordination, client liaison, marine/coastal ecosystem evaluation and options assessment - **Dr Beth Toki**
- Climate change and remote/Pacific communities, EbA options development - **Lynn Leger**
- Lead for community engagement and stakeholder liaison, options development and implementation plans, coastal ecosystems evaluation - **Dr Simon Albert** (Univ of Queensland)
- Climate change vulnerability, resilience and adaptation considerations, EbA options development - **Lisa McKinnon**
- Terrestrial ecosystem evaluation (ecosystem features, processes and threats) - **Suanne Richards**
- Aquatic ecosystem evaluation (ecosystem features, processes and threats) - **Brad Hiles**
- GIS and Mapping lead - **Geoff Long**
- Assist with community engagement in Honiara and general logistics - **Joshua Kera**
- Peer review and strategic direction - **Dr Darren Richardson**
- Environmental value of ecosystem services, options cost-benefit analysis - **Rod Coulton** (AITHER)
- Environmental value of ecosystem services, options cost-benefit analysis - **Lucas Van Raalte/Joseph Lorimer** (AITHER)
- Assist community engagement and stakeholder liaison, terrestrial ecosystems evaluation - **Dr Patrick Pikacha** (Ecological Solutions Solomon Islands)
- Assist community engagement and stakeholder liaison, aquatic ecosystems evaluation - **David Boseto** (Ecological Solutions Solomon Islands)
- Solomon Islands' planning, governance, policy, political advice, and existing/prospective adaptation and resilience works - **Donald Kudu** (DREGAR Consulting Solomon Islands)

Geographic scope

National level – Solomon Islands

Island level – Wagina Island (Choiseul Province)

Urban level – Honiara City

Approach and methodology

² Presented by Dr Beth Toki, BMT.

http://www.sprep.org/attachments/bem/PEBACC/ESRAM/BMT_PPT_for_ESRAM_meeting_Brisbane_Beth.pdf

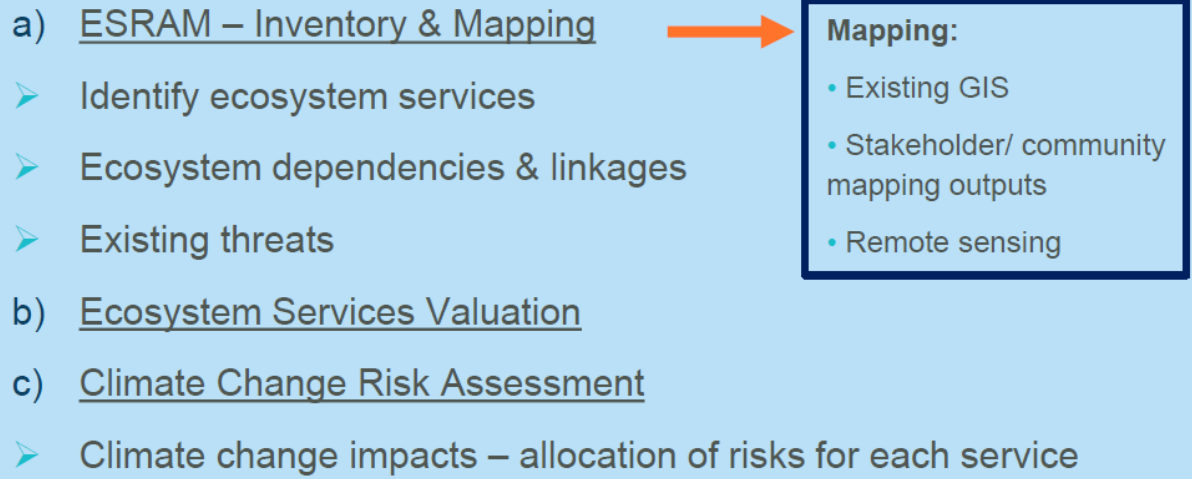


Figure 5 - ESRAM approach used by BMT. Solomon Islands

Consultations

- National: National level workshop: Inputs and advice from representative key stakeholders; Identify focus - key ecosystem services: what are they and where most important?; Identify threats; Identify available information
- Honiara City: Honiara stakeholder workshop: Site inspections; informal community-level discussions; Identify values & supporting ecosystem services; Indicative spatial maps; Identify linkages & threats.
- Wagina: Detailed community level consultation; Site inspections and guided tours each village; Field surveys to map critical locations and qualitatively assess ecosystem condition, particularly at high use areas; Mapping and water quality (EC/pH) at village wells and other key water sources

Ecological Character Description (ECD) framework - as developed by Australian Commonwealth environment agency under the National Framework for Australia’s Ramsar estate. This ecosystem level approach will then be integrated with standard social, economic and mapping methodologies.

Economic services valuation – using the Environmental Valuation References Inventory (EVRI) which is a recognised inventory for benefit transfer.

Climate Risk Assessment – Key documents used: AS/NZS ISO 31000:2009 ‘Risk Management Principles and Guidelines’; Australian Standard AS 5334—2013: ‘Climate Change Adaptation for Settlements and Infrastructure – a risk based approach’

Work to date

Phase 1 involved inventory and mapping of the sites, as well as gaining an understanding of the total economic value and benefits of the ecosystem services in the areas. Climate change impacts were assessed using a risk based approach. This mainly focused on the infrastructure in the two sites. This incorporated different components which allowed for the assessment of climate change consequences and justification of resource use allocation.

Throughout this phase, prioritising areas of high risk was a challenge. The complex underlying processes of ecosystem services are difficult to disentangle, particularly in light of climate change impacts.

Highlights and challenges

The highlight so far has been working with the local communities. Several people had never seen a map or aerial image of their island before. Spatial perspectives empowered the communities to visually see the links between ecosystems and their potential impact and services in light of future management decisions.

Challenges include:

- Data & information: balancing quality vs quantity
- Valuing ecosystem services with limited data, and not all ecosystem services can be valued
- Complexity of considering ecosystem services in climate change risk assessment
- Managing time allocation for Phase 1 (i.e. baseline inventory + ecosystem valuations + climate change assessment)

Process Issues emerging

- Data & information:- suggest SPREP have a 'data and information package' ready to transfer to future consultants on commencement
- Data & Information:- pre-arranged access agreement with key GIS data sources (e.g. national governments)
- Time schedule (Milestones):- suggest greater proportion of timeframe allocated to ESRAM component (as opposed to Options Assessment & Implementation Plan)

Next steps

2016:

- Completion of ESRAM reports! (... economic valuations and climate change risk assessments, in particular, still underway)

2017:

- Options Assessment, including consultations
- Implementation Plans

Vanuatu ESRAM (I)³

Project Team – RMIT Melbourne University, Global Cities Research Institute

Project Leader – **Prof. Darryn McEvoy**

Socio-economic and socio-ecological analysis – **Alexei Trundle**

Ecology, perma-culture and ecosystem services expert - **Naomi de Ville**

³ Presented by Dr Aimée Komugabe-Dixon.

http://www.sprep.org/attachments/bem/PEBACC/PV_ESRAM_Brisbane_Presentation.compressed.pdf

Natural resources and ecosystem services international expert – **Prof Rod Keenan**

Urban resilience / metrics international expert - **Michael Nolan**

Local partners - **Vatu Mauri Consortium; VEPAC**

Coastal and marine ecosystem assessments; local community engagement – **Dr Aimee Komugabe-Dixson**

Geographic scope

Urban level – Greater Port Vila

Approach and methodology

- Identification of ‘ecosystem hotspot’ communities using census data, post-Pam surveys & UNH VA.
- Desktop analysis of key drivers of change affecting the ecosystem and socio-economic resilience of Greater Port Vila (climate change and demographic)
- Participatory household survey of natural resource use
- Community workshops
- Mapping of resource collection areas

Work to date

- Desktop analyses conducted
- Interviews with key government, municipal, NGO, donor and community stakeholders
- Conducted baseline surveys of key ecosystems & their services (823 households surveyed; 10 ward workshops, 1 expert workshop) – see Figure 6 for location of wards)
- Ecosystem services assessed & mapped (Figure 7)
- Training and capacity building in conducting questionnaire surveys
- ESRAM Technical Report – almost finalised
- Community Briefings – to be translated and disseminated
- Google Earth database as an interactive resource

Highlights and challenges

Challenges were encountered in using local partners to conduct the household survey

Process Issues emerging

A number of assumptions were made about the level of local knowledge concerning scientific terms such as ecosystems, biodiversity, EbA, etc.

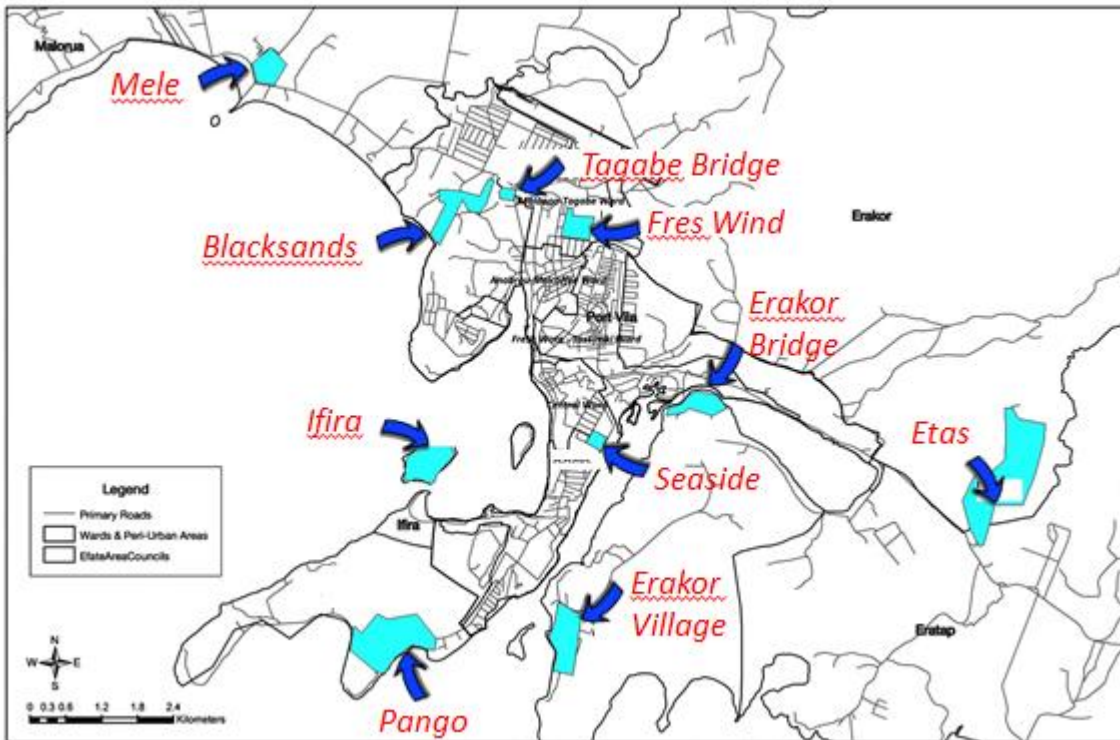


Figure 6 - Wards that were surveyed as part of the Greater PV ESRAM

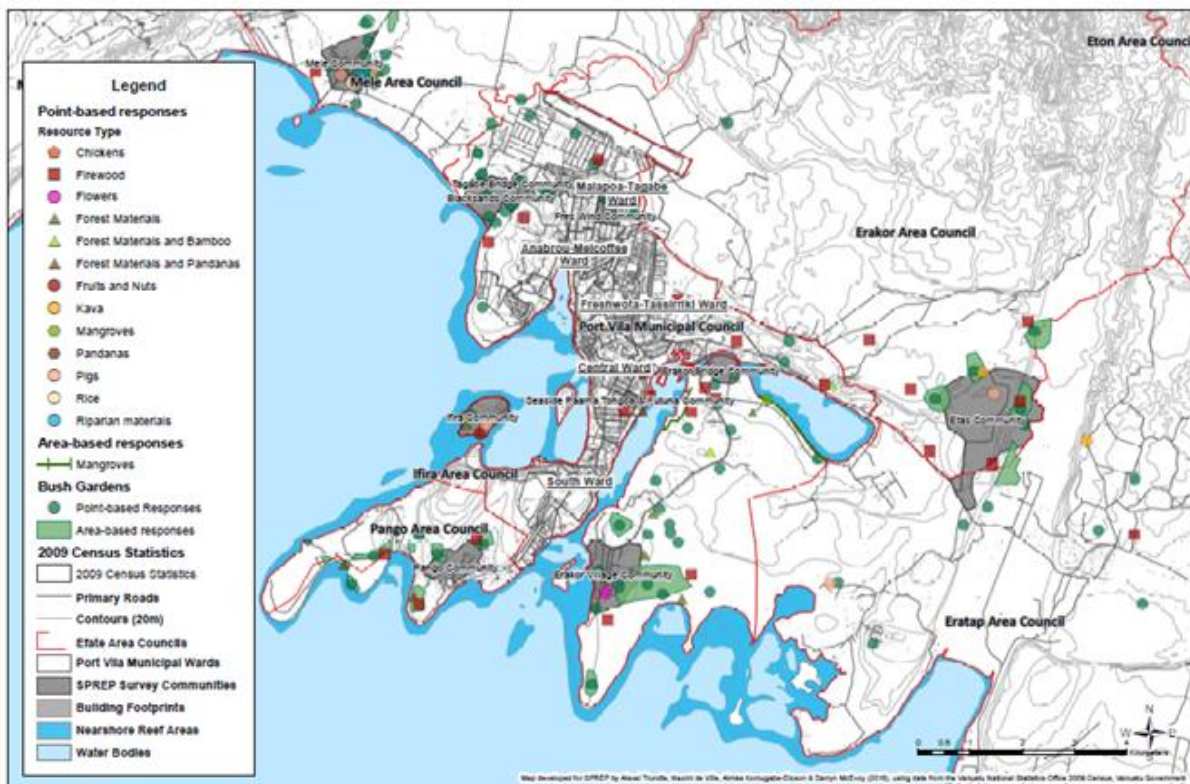


Figure 7 - Mapping of terrestrial resources used by communities – Port Vila

Next steps

- Addressing gaps in the ESRAM draft report
- Completion of ESRAM Report
- Completion of community briefing notes

Vanuatu ESRAMs (II)⁴

Project Team – Griffith University, Climate Change Response Program

Project director – **Prof Brendan Mackey**

Project manager – **Dan Ware**

Terrestrial ecosystems – **Dr Willow Hallgren; Prof Brendan Mackey**

Marine ecosystems – **Prof Rod Connolly; Tyson Martin**

Micro-economics – **Prof Chris Flemming; Dr Jim Smart**

Social Science – **Dr Johanna Naulu**

System integration & decision support – **Dr Oz Sahin**

Geographical scope

National level: Vanuatu

Island Level: Tanna

Approach and methodology

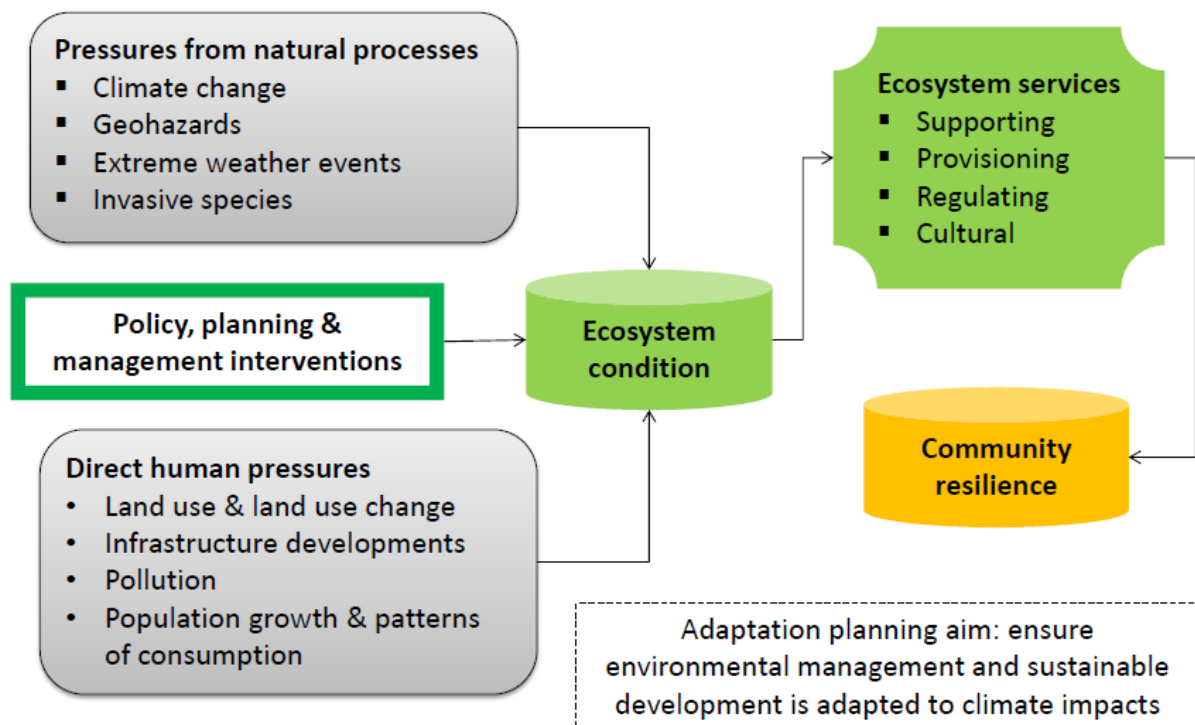


Figure 8 - Conceptual framework. Vanuatu (Tanna, National)

Ecosystem Services – based on Ecosystems & Human Wellbeing: a framework for Assessment. Millennium Ecosystem Assessment Report (2003)

⁴ Presented by Prof Brendan Mackey, Prof Chris Fleming and Dr Johann Nalau.
http://www.sprep.org/attachments/bem/PEBACC/ESRAM/Griffith_PPT_for_ESRAM_meeting_Brisbane_Brendan.pdf

Ecosystem Assets – using the concept of Ecosystem Assets - spatial areas containing a combination of biotic and abiotic components and other characteristics that function together and measured by:

- Ecosystem type
- Ecosystem extent
- Ecosystem condition and
- Ecosystem services

Terrestrial Ecosystem Condition Assessment – will conduct a TECA using a modification of the Vegetation Assets, States and Transitions (VAST) framework (Figure9).

Economic valuations – using data derived from de Groot, et al. (2012) to estimate a monetary value for seven relevant ecosystem types, for each ecosystem service flow, for each of the eight most populated islands in Vanuatu. Approach will be informed by ‘Experimental Ecosystem Accounting’ published by the UN in 2012.

Climate Change projections – using downscaled WorldClim data for projected seasonal changes across Vanuatu and across Tanna for the period 2000 – 2050.

Mapping – preparing a number of GIS layers and using consolidated layers to inform analysis. Prepared a DEM of Tanna.

Community Engagement – Main means of engagement through workshops and meetings and semi-structured surveys. Engagement include scoping out main development and livelihood issues with the communities; Creating context-specific understanding of the challenges and opportunities; Development of Community-based Monitoring and Evaluation (M&E) processes and indicators; Identifying relevant Traditional Knowledge practices (kastom) to be included in each project activity; Integrating gender equality in project roles and management practices.

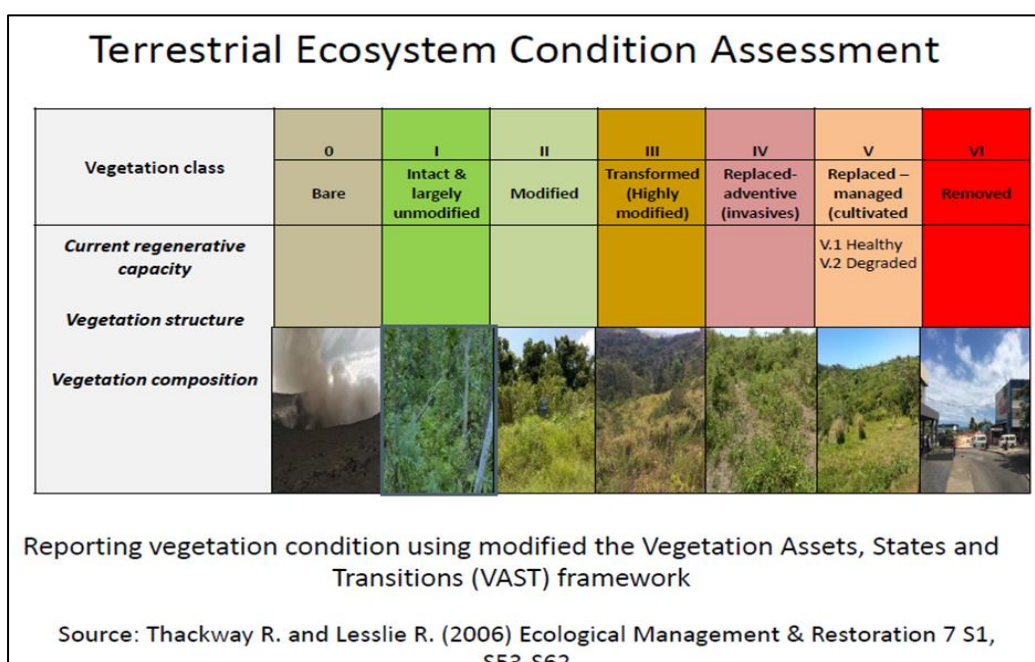


Figure 9 - Terrestrial Ecosystem Condition Assessment. Griffith

Work to date

National Level

- Sourced Vanuatu Forestry Department national vegetation map which will form a key component of the national level ESRAM. The map has twenty classes to describe vegetation cover and land use. These classes are being used as ESRAM ecosystem types (Figure 10).
- Exploring use of WorldClim downscaled climate projection data
- Sourced RapidEye satellite imagery

Island Level

- National vegetation map extends to Tanna but found to be in need of validation/updating
- Acquired satellite imagery (RapidEye) and developed a DEM (Figure 11).
- Ground trothing field mission undertaken
- On-ground assessments of coastal ecosystems: Corals, Seagrass beds and Mangroves. Conducted detailed fish and coral surveys using line transects.
- 72 freshwater systems identified
- Catchments and settlements mapped
- Engaged in seasonal climate change analyses using WorldClim 2000 – 2050 (Figure 12).
- Community workshop was held in Lenekal

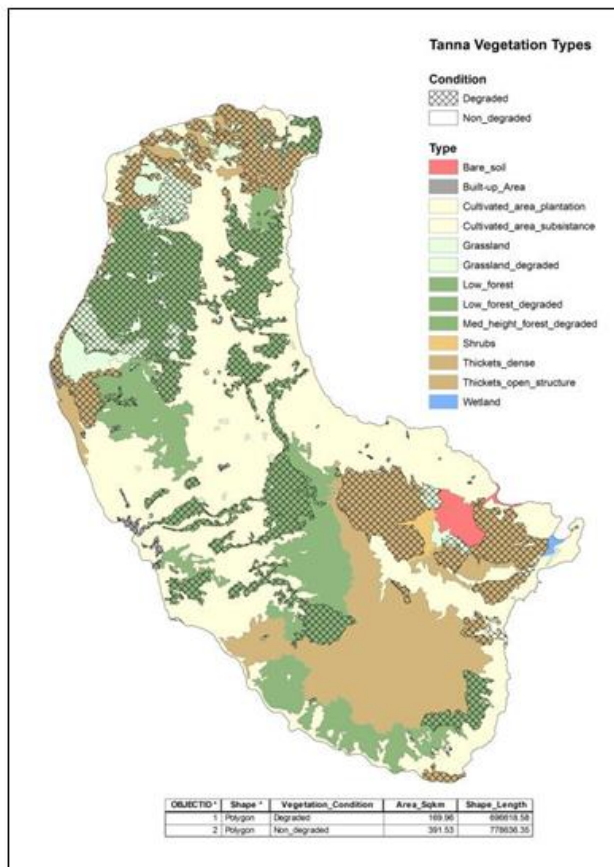


Figure 10 - Vanuatu Forestry Department Vegetation Map

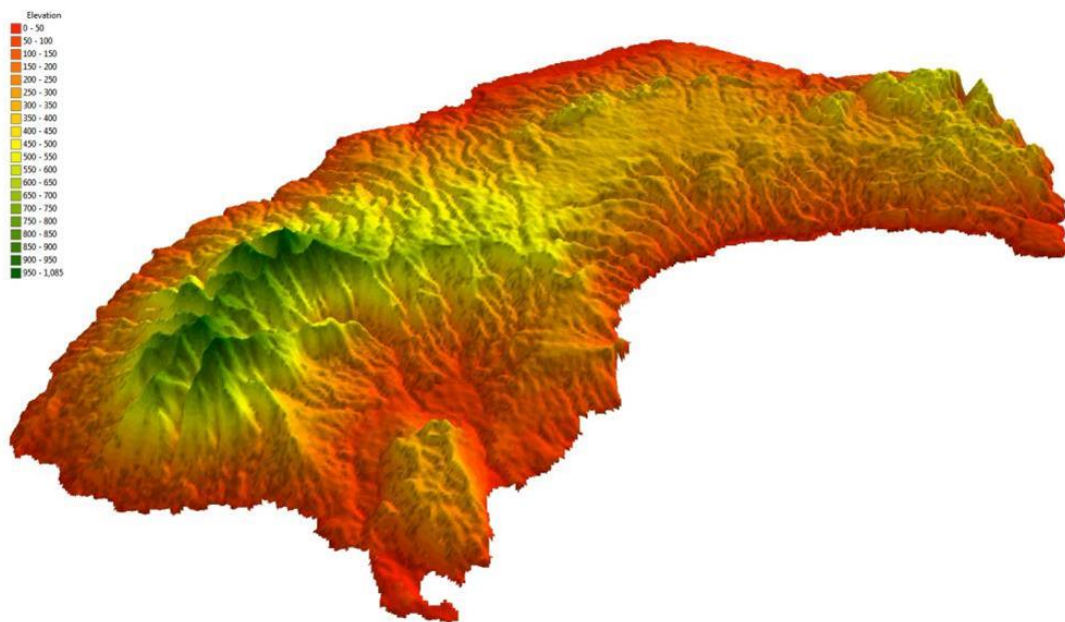


Figure 11 - ASTER Digital Elevation Model (DEM) of Tanna Island (30m resolution)

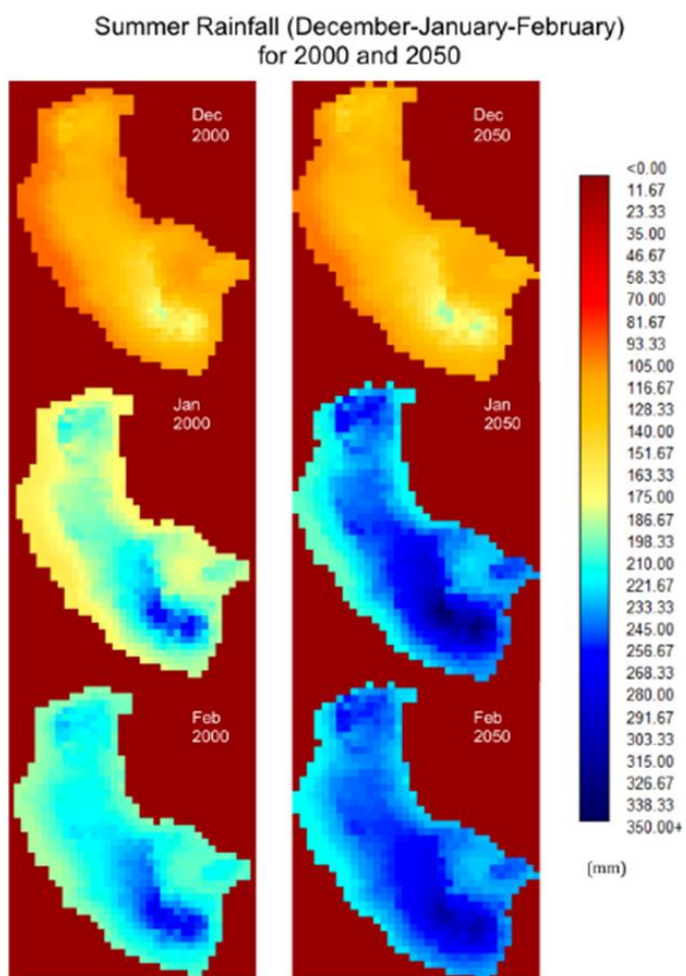


Figure 12 - Seasonal climate change analyses using WorldClim

Highlights and Challenges

None mentioned

Process Issues Emerging

- Griffith has two other projects running simultaneously at Tanna so these projects are able to feed off and inform each other.

Next steps

- Completion of draft ESRAM reports
- Preparation for Phase 2 fieldwork

DISCUSSION

Government Feedback

Fiji⁵

- Emphasised the need to build on existing planning frameworks
- Suggested incorporating the Fijian calendar and clan totem animals
- While economic valuation in \$ terms is useful there is a need to include 'intangibles' in the valuation of environmental goods and services
- Flagged a bio-genetic resources project for possible partnering

Solomon Islands⁶

- Question of which climate models to use to inform climate projections is a source of frustration to the SI Government.
- Highlighted the difficulty in downscaling climate projections
- Encouraged teams to meet with CSIRO to discuss use of consistent climate models
- Supported use of PASSAP country projections as the NMS's are familiar with this
- Suggests a stronger focus on 'impact modelling' particularly with respect to food security

Vanuatu⁷

- Stressed the importance of linking the ESRAM process up to provincial and national level planning processes
- Suggested the use of proxies to calculate 'intangible' values of ecosystem services
- Questioned the capacity of national stakeholders to use the ESRAM tool and its longevity beyond the project.
- Supported the development of a decision-support tool and a process to keep the ESRAM updated.

⁵ Mr Aminiasi Qareqare. Acting Director, Department of Environment

⁶ Dr Melchior Mataki, Permanent Secretary, Ministry of Environment, Climate Change, Disaster Management and Meteorology

⁷ Ms Rosemary Apa. Chief Environment Officer. Environment and Conservation Division. Ministry of Climate Change, Geohazards and Environment

Conceptual issues arising

How is ESRAM different from other similar methodologies? CHARM, IVA, social planning?

SPREP representatives explained that the key difference is that ESRAM approach is designed to view vulnerability and resilience through an ecosystem lens. It is also unique in that it actively explores social-ecological linkages in a holistic systems framework. As such it is the first step in a sequential process to identify effective ecosystem-based adaptation interventions to address development problems linked to climate and non-climate factors.

Griffith University representatives pointed out that EbA has its policy origins in the Convention on Biological Diversity (CBD), whereas tools such as CHARM and IVA were linked to the UN Framework Convention on Climate Change (UNFCCC) and related climate and disaster management instruments.

If planning is the solution- what is the problem? Is degradation of ecosystem services the result of an absence of planning?

It was pointed out that addressing ecosystem degradation requires a holistic approach based on an integrated and mutually reinforcing package of actions. Planning is an integral part of the package but needs to be supported by other related actions such as policy development, regulation, enforcement, incentives, institutional capacity, awareness and funding, for example. The value of the ESRAM planning approach is that it takes a long-term view based on future scenarios linked to current trends. Much of the current planning in the Pacific lacks this forward-looking component. The need for long-term scenario based planning is reinforced by concerns with the changing climate.

Given the connectivity between systems – how do you determine the boundaries for an ESRAM?

Boundaries commonly used to frame ESRAM studies are watershed boundaries. This is because the structural components of ecological connectivity are most strongly represented along vertical gradients. This is especially the case on small volcanic islands which is why the ESRAM places emphasis on a ridge to reef approach. Challenges arise when administrative boundaries traverse watershed boundaries and in these cases ‘cross-boundary integrated water catchment management’ approaches may be needed. ESRAMs can take place at various geographic and/or administrative scales depending on the need of project. However the assessment would work if it were able to incorporate a landscape level of analysis. The concept of ‘nested’ social-ecological systems (or panarchys) informs further (c.f. Gunderson and Holling).

Who decides on scenarios and what is the basis for scenarios?

It was pointed out that the basis for the scenarios were the current trends in the social-ecological systems identified through the ESRAM. The scenarios were simply extensions of currently observable trends into the future. Scenarios could be framed by time-periods or by looking at the impact of different types of management decisions vs ‘business-as-usual’.

The question about who decides on scenarios is therefore not really a relevant one as the scenarios are objective and evidence-based.

Where and how are uncertainties managed in the process?

Uncertainties find expression in a number of areas. These include modelled outputs of climate projections for various climate variables. They may also include uncertainty regarding the absence or presence of future management interventions; disturbance regimes; economic forces, etc. Risk Assessment and Scenario Planning are two tools that need to be incorporated in the ESRAM process to address uncertainties impacting on the future of the social-ecological system. In this light, 'business-as-usual' based on current governance and ecological and social trends should be regarded as the baseline condition for risk assessment and future scenario planning. Adaptive management needs to be promoted as the dominant management paradigm to respond to unexpected changes in the system.

How do we use opportunities to use common approaches, e.g. climate risk assessment, economic valuation?

Meeting participants agreed to hold follow-up side meetings on the use of common climate models to inform climate projections. It was also decided that a follow-up side meeting would take place amongst the economists to explore the use of common valuation approaches and datasets, where possible.

Which currency to use for ecosystem values? Do we need to use \$'s or can we use a system of cascading benefit transfer/scarcity?

BMT representatives suggested that the economists' first preference, for the longevity of a report, is the use of international currency as it is the standard approach and allows for a current day conversion. However, SPREP representatives noted that the use of both US dollars and local currency is preferred.

How to value ecosystems in a limited data context?

This issue was referred to the follow-up side meeting of economists.

Managing the complexity of ecosystems in doing climate change risk assessment? From what perspective do we assess risk and what timelines to use?

BMT and Griffith University representatives suggested to concentrate on key threats and issues and to decide whether it is ecosystem services or simply ecosystems. It was noted that there are a few conceptual issues that need to be addressed and discussed to make the work consistent.

Practical issues arising

How to align ESRAM planning with existing government planning initiatives?

It is the responsibility of the ESRAM consultant teams (while contracted) as well as the PEBACC project team to identify relevant government planning processes in each country

and to explore linkages and coordination opportunities (mainstreaming). The synthesis reports of the ESRAM assessments would be valuable advocacy tools in promoting awareness of EbA planning approaches amongst government planners.

How to reduce the scope of ESRAM to align with short timeframes?

It was recognised that the consultant teams were finding it challenging to complete the ESRAMs within the allocated six months, given the breadth of the research and the range of data required, including the need for in-country consultations. Country datasets were not always in place or readily assessable. This meant a lot of time was used in accessing and inventorising data. It was proposed that this portion of the research could be speeded up if SPREP negotiated access to country databases and cooperation ahead of tendering and/or made data libraries available to consultants at the onset.

How to communicate complex concepts in a way that is locally relevant?

All groups agreed this is an important but challenging issue and that communication is a key aspect of the project. Consultant teams needed to draw on the 'participatory action research' skills of the social scientists on their teams to assist in facilitating community-level consultations. PEBAACC staff was also available to accompany technical specialists in the field and support the participatory and communications components of community engagements.

Lessons learnt

The BMT group felt that understanding the complexities and level of detail required was an important learning curve. BMT representatives pointed out that communication between all groups and levels of SPREP is vital as the project moves forward.

The Griffith University representatives agreed that proper data and data management is a vital lesson, for example, making climate data available and accessible. It was appreciated that almost all their team had spent time in the field at Tanna which proved critical in understanding the community and involving them in the project. This team also found that community member engagement differed greatly between workshop situations and informal community meetings, which was perhaps related to cultural reasons. This highlighted the importance of informal community engagement.

The WPN representative expressed appreciation of the logistical and facilitation support to his team whilst in the field as well as the sharing of relevant documents and data. The systems approach being advocated by the project was considered appropriate for the analysis of community resilience linked to ecosystem goods and services and in the context of climate change. However given the complexities involved it was challenging to do in practice and his team had learned many lessons along the way.

WAY FORWARD

All parties agreed the next step would be to hold follow-up side meetings as discussed. There was also a need for each team to consolidate all aspects of the ESRAM work to date and to prepare their draft and final ESRAM reports within the contractual deadlines. This would enable the transition to Phase 2 of the project which would involve the detailed assessment of EbA options.

APPENDIX 1 – LIST OF PARTICIPANTS

	NAME	POSITION	ORGANISATION	COUNTRY
1.	Stuart Chape	Director	SPREP BEM	SAMOA
2.	Dr Tommy Moore	Oceans Officer	SPREP CCD	SAMOA
3.	Peniamina Leavai	CC Officer	SPREP CCD	SAMOA
4.	Herman Timmermans	PEBACC Project Manager	SPREP PEBACC	FIJI
5.	Aminiasi Qareqare	Director	Dept of Env	FIJI
6.	Fred Patison	PEBACC Country Manager	SPREP PEBACC	SI
7.	Dr Melchior Matakai	Permanent Secretary	MECDM. SI Govt	SI
8.	Rosemary Apa	Chief Environment Offcier	Env and Cons Division, MECDM	SI
9.	David Loubser	PEBACC Country Manager	SPREP PEBACC	VANUATU
10.	Malcolm Dalesa	NAB Coordinator	VMGD	VANUATU
11.	Aimée Komugabe-Dixson	Researcher	RMIT	VANUATU
12.	Dr Beth Toki	Lead Consultant. Marine Ecologist	BMT	AUSTRALIA
13.	Dr Simon Albert	Consultant - CCA, CBNRM, Coastal processes	BMT/Univ of Qld	AUSTRALIA
14.	Lynn Leger	Consultant. Env risk assessment	BMT	AUSTRALIA
15.	Sophie Hipkin	Consultant. Env Auditing, EIA, Ecology	BMT	AUSTRALIA
16.	Chris Heider	Lead Consultant. Terrestrial Ecologist	WPN	USA
17.	Simione Tuimalega	Community Engragement Consultant	WPN	FIJI
18.	Prof Brendan Mackey	Lead Consultant. Director Griffith Climate Change Response Program	Griffith University	AUSTRALIA

19.	Dan Ware	Project Manager ESRAM	Griffith University	AUSTRALIA
20.	Prof Rod Connolly	Director of Marine Science	Griffith University	AUSTRALIA
21.	Dr Oz Sahin	Research Fellow, Griffith Climate Change Response Program and Griffith School of Engineering	Griffith University	AUSTRALIA
22.	Dr Willow Hallgren	Research Fellow, Griffith Climate Change Response Program	Griffith University	AUSTRALIA
23.	Dr Johann Nalau	Postdoctoral Research Fellow, Griffith Climate Change Response Program and Griffith Institute for Tourism	Griffith University	AUSTRALIA

APPENDIX 2 – EVALUATION

ESRAM CONSULTANT'S WORKSHOP - EVALUATION RESULTS

Question 1: Has this workshop made the SPREP vision and expectations of the ESRAM process and Outcomes Clearer for you?		
1. Significantly	5	Presentation by Stuart on day 1 clarified this Feels like we have good communications with our country rep. However there seems to be an expansion of scope and expectations. Important to capture the actual ESRAM process that each team has gone through including language issues, translating central concepts, choosing fieldwork assistants, creating relationships and buy-in with Stakeholders. These could be compiled into "ESRAM fieldwork insights" that are probably relevant to the broader research/NGO community.
2. Clarified Some issues	8	
3. Have not learned anything new	1	
4. Still have questions		
5. Still Confused		
Question 2: Have the various speakers provided you with sufficient information for you to know how each of the ESRAM projects are progressing?		
1. Yes	10	Maybe a focus on impact forecasting/modelling would have been helpful.
2. Somewhat	4	Some were clearer than others.
3. No		The consultants provided 4 different perspectives
Question 3: Do you have a better understanding of what the various government and regional bodies expect from the ESRAM process?		
1. Yes	5	Clear that this is needed and good understanding whether this is a robust process and what value it provides.
2. Somewhat	7	Would have been nice to have broader attendance, but good feedback.
3. No	2	It would be good to identify in each country a government focal point to make sure the expectations are clearly communicated to SPREP and project teams. I still have questions regarding how the National Governments will actually use the results from the project. Significant implementation challenges remain to be overcome.
Question 4: Are there issues emerging from this workshop that you do not feel were adequately addressed?		
1. Yes	1	Clearer explanation of the role of the communications officer. Eg creating comms products such as infographics and assistance in helping teams in producing summaries of their reports. Use of social media, role of government input in choosing and deploying EbA options, community briefings.
2. Somewhat	5	We have plans to conduct sidebar meetings to clarify.
3. No	6	Management of expectations of consultants, miscommunication in leadership. More clarification on other EbA models that have been developed. Who will be implementing the projects that emerge from the ESRAM and subsequent analysis? Consensus and consistency between country projects is needed. Inclusion of impact based modelling in the ESRAM process Integration of data collected into a wider National statistics infrastructure. Question as to how data collected will support broader statistical databases. How ESRAM work connects with building on-country capacity and linkages to National focal points. Communications tools/products should be broader than just printed infographics. Good to consider production of DVDs to better tell stories which audiences can relate to.
Question 5: was not covered		
Question 6: Was the Organisation and catering of expected standard		
Unanomous thumbs up to the venue and catering		