



Learning to learn: Designing monitoring plans in the Pacific Islands International Waters Project

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Abstract

Project monitoring is now a standard requirement in natural resource management programs, bringing opportunities for greater accountability, adaptive management and social learning. While considerable effort has gone into designing appropriate monitoring frameworks and indicators for marine and coastal management, there has been less sharing of the mechanics of approaches that maximise collaboration and learning by multiple stakeholders. This paper outlines the project monitoring approach developed in the Pacific Islands International Waters Project (IWP), a project funded by the Global Environment Facility (GEF) involving 14 Pacific Island Countries. We find that a monitoring approach based on indicators to assess supportive processes, behavioural change and human–environmental conditions is useful for monitoring the long- and short-term impacts associated with integrated coastal management programs. Giving project staff the lead in indicator development has supported more strategic project planning and improved the relevance and value of the indicators developed. However, successful implementation of monitoring programs calls for ongoing collaboration, technical support and capacity building amongst key stakeholders.

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1. Introduction

Monitoring and evaluation are required components of contemporary natural resource management (NRM) programs, bringing opportunities for greater accountability, adaptive

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management and social learning [1]. In the integrated coastal management field there has been a rich discussion in recent times on appropriate frameworks and indicators for monitoring (for instance, [2–4]). In NRM more widely, there is considerable interest in learning-oriented management approaches as a foundation for sustainable NRM. While these approaches have differed in their detail, they share the common idea that M&E processes need to go beyond a measure of program effectiveness. If they are to support sustainable environmental management in the long term, M&E processes need to evolve towards a more integrated consideration of the interactions between human and environmental systems. They need to maximise collaboration and learning by multiple stakeholders as part of a process of collective or social learning, and to use indicators that are workable, appropriate and can usefully contribute to adaptive management [5–11]. This is a wide set of requirements that can prove challenging to realise at the field level, and there is much to be gained from the sharing of field-based experience in monitoring design processes and implementation.

This paper examines an attempt to realise these goals in the development and design of a monitoring system for the Pacific Islands International Waters Project (IWP). For the purpose of this paper, monitoring is defined as a continuous process of gathering information on progress towards the goals, objectives, and desired outcomes of a project or program for stakeholders to gain regular feedback on its implementation and performance [11]. Monitoring programs are generally based around identified indicators or parameters, often quantitative, which provide information on deeper processes of change [12,13]. Evaluation, as used here, is a systematic and independent assessment of a program or project to examine the relevance of its objectives, its contribution to wider development and NRM goals and the efficiency and effectiveness of its implementation. Evaluation thus has broader goals than monitoring and is conducted less frequently [11].

The initial section of this paper discusses the monitoring framework used, background to the IWP, the methodology for developing project monitoring plans, and examples from draft monitoring plans. The second section reflects on lessons emerging from the IWP case in light of recent discussions in the monitoring and evaluation literature.

It is important to note here that we write as a team of reflective professionals closely involved with the project and its monitoring program. While we draw on personal experience and observations, this paper is written with the explicit aim of critically evaluating the process to identify lessons learned for a wider community. While the particular focus of the IWP monitoring work is on Integrated Coastal and Watershed Management, many of the issues discussed have relevance to NRM programs in other sectors.

2. Designing a monitoring program in the Pacific Islands IWP

2.1. The International Waters Project

The Pacific Islands IWP is a 7-year (2000–2006) initiative to implement the Strategic Action Programme (SAP) for the International Waters of the Pacific Small Island Developing States [14]. It involves 14 participating Island countries: Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu. Funded by the Global Environment Facility (GEF), the IWP is implemented by the United Nations

Development Programme (UNDP) and executed by the Secretariat of the Pacific Regional Environment Programme (SPREP).

The Project is managed by a Project Coordination Unit (PCU) with six staff based at the headquarters of the SPREP in Apia, Samoa. SPREP is a regional organisation responsible for environmental affairs for its 25 member countries and territories. In each country a national coordinator (NC) has been appointed within a lead Government agency (in most cases this is the national Environment Department or Agency) to manage the project. A National Task Force consisting of key stakeholders from government, non-government agencies, and the local community, has been appointed to support the NC. This Task Force is responsible for using the lessons provided by the community-based activities to improve the management of resources at the national level.

The project vision for the IWP is to achieve sustainably managed and effectively conserved oceanic and coastal resources and habitats in the Pacific Island region [14]. It targets this through two major components with different emphases:

- an Oceanic Fisheries Management (OFM) component, which focuses on the management and conservation of migratory fish stocks and
- a coastal component concerned with Integrated Coastal Watershed Management (ICWM).

Diagnostic analysis undertaken for the SAP [14] observed three key degradation processes and concerns in the small island environments of the Pacific region:

- declining marine and freshwater quality;
- habitat and community modification and degradation; and
- unsustainable use of living marine resources.

Accordingly, the analysis highlighted four high priority areas for the ICWM component:

- the management of coastal fisheries;
- the establishment of marine protected areas;
- the protection of freshwater resources; and
- effective management and reduction of waste.

The project provides support to participating countries to develop pilot projects in one or more of these focal areas (see [Table 1a](#)).

The ICWM component aims to improve the management of coastal areas and resources by addressing root causes through a two-pronged approach: at both the local (village) level, as well as at a broader national level in each country. The two-pronged approach is based on the concept that many environmental problems can be solved by community action (at the local level), by supporting increased community involvement and responsibility for local resource management and conservation initiatives. At the same time, the project recognises that not all environmental problems can be solved by community action (at the local level) alone, for instance the cumulative impacts of resource degradation across several communities or regions (such as total catch levels or pollution from a number of villages), strategic and coordination issues (such as the need to manage multiple communities in a single management plan) and legislative and national

Table 1a
IWP focal areas and sites

Participating country and host community	IW focal area			
	Freshwater	Waste	MPA	Coastal fisheries
Cooks Islands (Takuvaive, Rarotonga)	●			○
FSM (Yap-Gagil, Rumung, Maap and Gilman)			●	○
Fiji (Vunisinu, Viti Levu)	○	●		○
Kiribati (Bikenibeu, Tarawa)	○	●		
RMI (Jenrok, Majuro)		●		
Nauru (Buada)	○	●		○
Niue (Makefu and Alofi North)				●
Palau (Ngarchelong and Madalaini)		●		
PNG (Barakau, Central Province)	○	●		○
Samoa (Apolima and Lepa)	●			
Solomon Islands (Chea and Mbili Passage, Marovo Lagoon)				●
Tonga (Nukuhetulu, Tongatapu)	○	●		
Tuvalu (Alapi and Senala, Funafuti)	○	●		
Vanuatu (Crab Bay, Malekula)	○		○	●

enforcement issues [15,16]. Accordingly, local initiatives ('pilot projects') under the IWP are complemented by supporting higher level (national and or regional) actions, and vice versa. National level actions include, for instance policy and legislative development.

Learning is a major theme in the IWP project. From a general standpoint, monitoring is critical to support adaptive management in in-country projects. However, a critical aim in the IWP is also to document and share lessons learned from IWP experiences with a wider audience. Monitoring and evaluation are accordingly central to the project, with specific activities including:

- completion of baseline socio-economic and ecological (or resource) assessments in pilot projects;
- development of monitoring plans for the regional program as well as in-country pilot projects; and
- project evaluation at the mid-term and at project completion.

The next section focuses on the development of monitoring plans in IWP and the role of baseline assessments.

2.2. The IWP monitoring framework

Processes to learn and apply lessons are essential to sustainable NRM. Monitoring involves gathering information on the impacts of actions and progress towards objectives as a basis for future action. It is an essential element in the process of adaptive management [17]. From a donor perspective, monitoring is also driven by a concern for accountability and a desire to assess project results and performance [18]. Saltmarshe et al. [19] add that we need to think not just in terms of upward accountability to donors, but also of downward accountability to stakeholders who invest their time, resources and hopes in projects.

As a GEF funded project, the IWP is expected to meet donor project monitoring requirements for all of the above reasons. A monitoring framework developed by the GEF for all of the IWP [20] was a basis for the approach adopted in the Pacific IWP, although this was adapted to benefit from experience in the wider literature on monitoring and evaluation.

The GEF framework is based around the use of three kinds of indicators that can assess various processes in program implementation as well as the outcomes the program is contributing to. These include:

- *Process indicators*: indicators that measure progress with implementation of project activities such as participation and collaborative processes and mechanisms, capacity building, review and amendment of legislation, and development of management plans.
- *Environmental stress reduction indicators*: indicators that measure actual on the ground changes in actions and behaviours that address and influence environmental threats, such as enforcement of legislation and resource management rules, evidence of increased stakeholder awareness, behavioural change for example in harvesting techniques and rates, and increase in areas under effective management or protection.
- *Environmental status indicators*: indicators that measure actual success in environmental outcomes such as improvements in ecological or biological conditions, improvements in water quality, improvements in social conditions (which should not be worsened, but preferably improved), and recovery of flagship or indicator species [20].

Parallels can be drawn between the GEF framework and Olsen's four orders of governance outcomes [2] in integrated coastal management. These four orders have been proposed as a basis for evaluating the performance of integrated coastal management initiatives, and include the following outcome areas:

- creation of enabling conditions (the first order), which is essentially the same as process indicators;
- achievement of changes in behaviour (the second order), which parallels environmental stress reduction indicators;
- achievement of change in harvest regimes and management systems, which corresponds with environmental stress reduction indicators; and
- achievement of sustainable coastal management involving improvements in social and environmental conditions (the fourth order), which corresponds to environmental status indicators) (see Fig. 1).

Olsen [2] notes that these changes occur in a phased way, so that initially program outcomes would relate to the first order, followed by later orders. We question the existence of a linear sequence in change processes along the lines suggested by Olsen, because change in supportive processes, behaviour and harvesting regimes may be layered and concurrent. For example, the establishment of local management institutions is not a one-off process leading to behavioural change, but from an adaptive management perspective would ideally be iterative over a long timeframe. However, in relation to the GEF indicator framework it is apparent that change in the area of supportive processes and behaviour is necessary to bring about changes in environmental status. This has important implications for monitoring efforts during initial stages of project

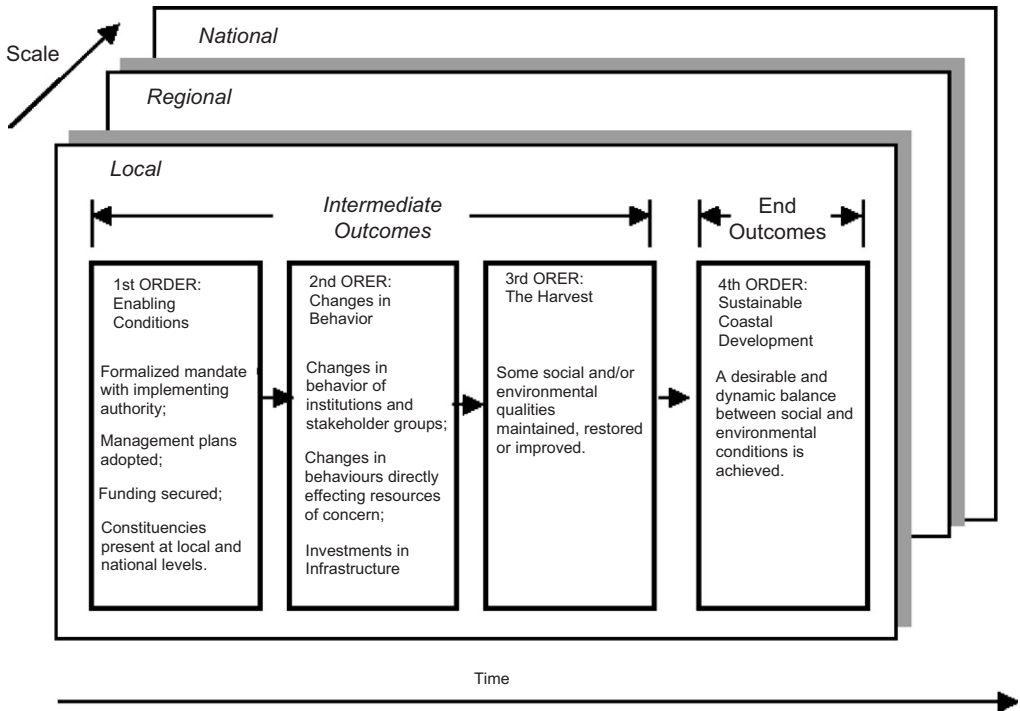


Fig. 1. Olsen's framework for evaluating ICM initiatives source: [2].

implementation, with the major effort likely to be in the area of process and stress reduction indicators.

Olsen [2] also notes the overlay of local, regional and national scales in ICM initiatives (shown in Fig. 1). In the IWP case, the two-pronged approach targets the local and national scale, and considers these two scales of outcomes and actions in developing a monitoring program.

A critical issue in monitoring and evaluation, not least in relation to the IWP, is the 'causality gap'. This is the difficulty that we may be able to observe change through monitoring programs, but that it may be more difficult to establish with confidence that those changes result directly from a specific intervention or action (clarifying cause and effect relationships).

This is an issue previously noted by a number of analysts (for example [10,21,22]). Earle et al. [10], for instance, suggest that interpreting monitoring findings collaboratively in the context of wider processes of change and development can help to deal with the causality gap, as the sources of change can be better understood through dialogue. A good understanding of the dynamics of social and environmental systems and their interactions can also help us to understand observed changes in the context of wider systemic processes. Accordingly, the IWP projects have been required to undertake detailed social and ecological baseline assessments which can, amongst other things, provide a context in which to interpret monitoring findings.

The need for stakeholder collaboration in monitoring is widely recognised in the literature, whether as a basis for social learning (a process of joint learning for collective

action—see [5,6]), or as the basis of sharing resources and knowledge to improve the effectiveness and efficiency of monitoring efforts [11,23]. Achieving collaboration in practice is more difficult, with the emphasis often placed on collaboration in the mechanics of data collection rather than joint definition of learning goals, monitoring parameters and data interpretation [5]. Experience from collaborative monitoring ventures has shown that facilitation and negotiation processes are central in fostering collaboration in setting learning goals as well as data collection and interpretation processes [6]. While the IWP monitoring framework aims to foster collaboration in developing and implementing monitoring plans, the responsibility for making this happen lies strongly with in-country project staff and stakeholders. Given the early stage of monitoring in most cases, it will not be possible to comment on this in any detail here, but some related issues are discussed further in the ‘reflections’ section.

A further issue in monitoring NRM programs is the complexity of the social and environmental systems being assessed. From a social learning perspective, there is a crucial need for the social and environmental dimensions of change to be understood in an integrated way if we are to have a chance at overcoming the patterns leading to environmental degradation [8]. This requires integration across disciplines (especially in baseline and periodic monitoring activities) and value systems, with a focus on designing a process to facilitate learning and joint action to determine agreed outcomes, rather than designing for a particular outcome [7]. In short, effective learning processes need to incorporate: reflection; integration; systems thinking; participation; and negotiation [8,9]. The IWP monitoring design process accordingly aims to stimulate participant learning, to facilitate and support their planning for monitoring through collaboration and opportunities for dialogue with participants encouraged to work across disciplinary boundaries and stakeholder groups, for example with the use of participatory appraisals and baseline assessments that addressed social and ecological contexts.

Finally, the best monitoring plan is worthless if it is unworkable in terms of the relevance of information captured, the resources demanded for implementation and complexity of the task. As promoted by Earle et al. [10], the aim in the IWP approach is to keep monitoring plans workable, ensuring that they are simple to grasp, ‘light’ to implement, produce useful information and meet reporting requirements. The UNDP has arranged of criteria to support the development of indicators to fit with the requirements, resources, and skills of those conducting monitoring activities [11], which were used by NCs in the development of monitoring plans.

The key elements and principles underpinning the IWP monitoring framework are summarised in Table 1b.

2.3. *Method for designing monitoring programs in IWP*

To facilitate the development of monitoring plans at the national level, NCs were taken through a process of clarifying project goals, objectives, outcomes and activities, and developing a set of indicators to capture the main outcomes and changes being supported by the in-country projects at the national and local level. This was undertaken over the course of two interactive workshops in 2004, with remote support from the PCU/SPREP in between as NCs continued the development of their plans in country.

The first workshop was conducted over one and a half days, introducing NCs to key monitoring concepts and the monitoring framework being used. Fictional project

Table 1b
Principles informing the IWP monitoring framework

Principle/issue	Description
Social learning	Monitoring processes need to contribute to collective learning and action by stakeholders
Adaptive management	Monitoring processes should provide relevant feedback to inform decisions about future actions
Assess processes as well as outcomes	Adopt the GEF guidelines for process, environmental stress reduction and environmental status indicators Document and share lessons on the process of monitoring plan development
Analyse change through dialogue and contextual understanding	Recognise it may not be possible to trace observed changes to project actions, but deal with this by collaboratively interpreting findings with project partners and a rich understanding of the social and ecological context
Phasing of change processes	Focus early monitoring efforts more on process indicators, with stress reduction indicators becoming more significant during project implementation. Changes in environmental status are longer term
Fostering collaboration	Collaboration between stakeholders is important during design, implementation and interpretation of monitoring findings, and involves careful facilitation and negotiation
Integration	Monitoring plans should span the different aspects of in-country projects (ecological, social, institutional and so forth), incorporate the knowledge held by different groups, and address different scales of action and outcome
Workable	Plan is simple to grasp, 'light' to implement, produces useful information and meets reporting requirements

scenarios had been designed to illustrate key issues and activities in the various national projects underway. In groups, NCs went through a process of clarifying the desired outcomes and key activities in these case studies, and discussed potential indicators that could be used to assess performance. The activity aimed both to build an understanding of key concepts in monitoring and to develop a set of example indicators that could subsequently be used and adapted by NCs in the monitoring plans for their own projects.

Following this activity, NCs commenced the process of articulating the goals, objectives, outcomes and key activities in their in-country projects as a basis for developing their monitoring plans. To do this, they used a template that incorporated the main elements of a logical framework (see Table 1c). This turned out to be time consuming, but was possibly the most crucial step in the design process. Many coordinators had presumed the value of their activities but had not explicitly considered how one activity linked to another in terms of achieving desired outcomes, and or how goals were supported by specific objectives, which were in turn supported by relevant activities. In many cases, NCs had intuitively adopted multiple goals for their projects and it became difficult to map the relationship between goals/objectives, prioritise them and relate specific activities to these. This might in part be attributed to a need to more strategically plan projects as well as to the participatory planning process for IWP pilots, which meant that goals and activities had evolved over time and had not been articulated at the outset—or re-articulated as projects evolved.

Table 1c
Template for goals, objectives, outcomes and activities

Goal
Objective 1
<i>Outcome 1</i>
Activity 1.1
Activity 1.2
Activity 1.3
<i>Outcome 2</i>
Activity 2.1
Activity 2.2
<i>Outcome 3</i>
Activity 3.1
Activity 3.2

Table 2
Template for development of indicators

Outcome	Indicator	Verification source (how)	Timing of data collection (when)	Frequency (how often)	Who would do the monitoring (who)	Who are the results for? (audience)	Estimated Cost?
Outcome 1							
Process indicators	PI 1.						
	PI 2.						
	PI 5.						
Environmental stress reduction indicators	ESRI 1.						
	ESRI 2.						
Outcome 2							
	PI 1.						
	PI 2.						
	ESRI 1.						
	ESRI 2.						
Environmental status indicators for project							
	ESI 1						
	ESI 2						

Following articulation of goals and objectives, a template was provided to NCs to assist in the development of monitoring indicators (see Table 2). The table invited NCs to connect process and environmental stress indicators to project activities and outcomes, respectively. In order to keep the monitoring plans workable, NCs were encouraged to develop no more than 15 indicators overall for the project, and to think about methods for verifying the indicator, timing, and implementation issues at the initial stages to ensure that limited monitoring resources could be well used. This prioritisation process was very important in engaging NCs to analyse the relevance and workability of the many indicators they had developed.

After the first workshop NCs continued to develop and clarify project goals, objectives, activities and potential indicators for monitoring. They were encouraged to consult other project stakeholders in this process, and technical advice and support was made available to them over a period of about 4 months. Assistance was provided to clarify and sharpen the indicators that were being developed in-country, and help prioritise indicators that would capture information about key project processes and outcomes in a cost-effective way. Three NCs were supported more intensively to elaborate and refine their plans for presentation at the next monitoring workshop. This was done to provide examples to other coordinators of more developed plans, and to strengthen the capacity of selected NCs as a future resource in the project and within their organisations and the region.

The second monitoring workshop aimed to support NCs with the refinement of their project monitoring plans. It started with presentations by nominated ('champion') NCs on the draft project monitoring plans they had so far produced. These presentations were intended to stimulate discussion on common challenges they faced in developing monitoring plans in practice. Individual support was then provided to the NCs on their goals/objectives during interactive sessions. By the end of this workshop, all NCs had a draft project monitoring plan to discuss and develop further in collaboration with project stakeholders.

Examples of indicators developed in two projects are shown in [Tables 3 and 4](#) below. These have been simplified from the original templates to illustrate the relationship between indicators and project goals, objectives, outcomes. The relationship between process and stress reduction indicators and project outcomes is evident in both of these tables. The environmental status indicators on the other hand tend to measure the achievement of wider project goals such as the improvement of water quality. It was noted during discussions that these status indicators dealt with longer-term outcomes that would be influenced by developments beyond the boundaries of the project. In some cases this was also true of environmental stress reduction indicators where behavioural or institutional change was the focus, and could be influenced by factors beyond the intervention boundary.

The example in [Table 3](#) shows part of the monitoring plan for watershed activities conducted under the IWP in the Cook Islands. Most of the national level activities lent themselves to assessment through process indicators as they were primarily aimed at the development of supportive institutional arrangements to facilitate freshwater and catchment management. It is noteworthy that the two ESRI's at the local level measure the presence or absence of a characteristic (unfenced animals and unguided tourists), rather than the degree of change because the activities are considered to be so detrimental to freshwater quality that complete prevention was seen as the ultimate measure. An alternative approach would be to assess the degree of change over time, for example a reduction in number of roaming animals.

[Table 4](#) shows selected indicators from the draft Vanuatu IWP monitoring plan.

The Vanuatu example highlights that one well selected environmental status indicator can get to the heart of the environmental degradation process that a project is trying to address. Stress reduction indicators were more readily identified at the local than the national level, as the impact of national level policy and legislative change was seen to be best assessed in terms of the change in fishing practices at the community level.

Table 3
Selected indicators from the IWP in Cook Islands

	Process indicator	Environmental stress reduction indicator	Environmental status indicator
Objective 1: Improve freshwater management in local catchment			
Outcome 1: Freshwater management plan	Management plan developed, endorsed and legalised		
Outcome 2: Freshwater management plan implemented		No more roaming domestic animals in the catchment No tramping without tour or community guide	Faecal coliform level decreases Fall in number of water related illnesses Fall in sales of bottled water
Objective 2: Improve freshwater management nationally			
Outcome 1: National freshwater management plan	National freshwater management plan completed and legalised	Island wide catchment areas zoned	
Outcome 2: National freshwater management plan implemented	National Monitoring and coordination agency established Monitoring of compliance with rules at village level Tourist accommodation promotes management rules		

Project goal: Improve the management of freshwater quality by IWP Cook Islands on Rarotonga.

Source: IWP Cook Islands draft monitoring plan.

3. Reflections on the IWP case

We previously outlined key elements and principles underpinning the IWP monitoring framework (Table 1). These form the basis for the discussion below of lessons learned from the IWP monitoring design process.

3.1. Collaboration and social learning

The process of designing monitoring plans has fostered collaboration and learning between staff working on IWP projects across the Pacific region. The workshops fostered exchange, collaboration and learning between NCs from a number of Pacific Island nations working on a large regional project with multiple focus areas (i.e. water, waste, and fisheries). Feedback in workshop evaluations highlighted that participants had progressed in their understanding of monitoring and its potential, and how to approach designing and implementing a monitoring plan. Post-evaluations of the South Pacific Biodiversity Conservation Program, an earlier community-based NRM project in this region (1992–2001), found that this building of networks and capacity is crucial in a region where capacity in NRM is still growing [15].

Table 4
Selected indicators from the Vanuatu IWP

	Process indicator	Environmental stress reduction indicator	Environmental status indicator
Objective 1: Improved national capacity for management of sustainable subsistence and artisanal coastal fisheries (particularly land crabs)			
Outcome 1: Legislation and policy reformed and implemented	Endorsement of policy and legal amendments to manage land crab Information programs on policy and legislative changes (e.g. number of press articles, radio shows; posters distributed, theatre performances, etc.)		
Objective 2: Strengthen Crab Bay community capacity to sustainably manage artisanal coastal fisheries resources with focus on land crabs			
Outcome 4: Improve community understanding of the causes of fisheries resource depletion in Crab Bay	Number of trained local facilitators running community resource management activities		
Outcome 5: Strengthen local management of land crabs in Crab Bay	% of community members attends project meeting and their background	Decreased number of infringements over time (size limits, quotas, female carrying eggs) Decrease in number of people using destructive harvesting techniques Reduced proportion of household income from crabs	Increased population of land crabs within and outside the MPA

Goal: sustainable management of subsistence and artisanal coastal fisheries in Vanuatu (focus on land crabs).

Extending this collaboration and collective learning within country is also crucial. Some support for facilitation of stakeholder engagement in-country was provided by the PCU, and projects have funding to resource this further. The level of stakeholder collaboration is still to be determined and will be assessed in terminal evaluations of the project in the coming years. In future initiatives of this type, it would definitely be worth extending monitoring design to include some facilitation of stakeholder discussions on monitoring plans at project sites. In a best case scenario, similar workshops on monitoring plans would be repeated in-country with their technical advisory groups/teams and some modification for most local (community) stakeholder training in monitoring. This could build on the efforts of many participating countries to engage local stakeholders in social assessment and resource surveys for baseline assessments. Further in-country activities of this type would help to build capacity in collaborative monitoring, and facilitate collaboration and

negotiation between project stakeholders at those sites to a greater extent than could be achieved by working solely with NCs. Site-based activities could also work through issues in collaborative collection and interpretation of monitoring data.

3.2. *Potential for adaptive management*

As noted previously, adaptive management involves obtaining feedback on the impacts of actions and adjusting them to improve outcomes. It is somewhat early yet to comment on whether the monitoring plans have contributed to adaptive management at the project level. Some NCs have been revising monitoring plans and are starting to report on monitoring findings in their quarterly narrative reports. However, some important points can be made based on the IWP experience to date.

The process of designing monitoring plans has helped project staff to clarify the goals of management actions. Projects came to be seen as a set of goals and objectives supported by related actions, rather than a set of activities per se, as they were previously seen. Framing projects in this way helped NCs to see that while a whole range of actions may be desirable, it was important to prioritise those that could best contribute to the outcomes that stakeholders are trying to achieve. This is an important prerequisite for adaptive management, which calls for flexibility and an experimental approach to project activities in order to meet environmental management goals.

The timescales of projects greatly influence the potential for adaptive management. Where project timeframes are longer, monitoring activities are more likely to find data on stress reduction and environmental status indicators. This means that the scope for adapting projects to ensure behavioural change (and perhaps environmental status change) is greater. Where monitoring timeframes are shorter, this potential is diminished because of insufficient time to observe changes in stress reduction and environmental status. Therefore project adaptation may be limited to the process level issues. The findings relating to stress reduction and environmental status indicators may still inform future NRM initiatives, and can be seen as part of a broader scale process of adaptive management going beyond the project boundaries, where a range of policy and intervention strategies are tested. However such indicators—at least environmental status indicators—are unlikely to inform adaptive management within the life of the project cycle in the IWP case because of the limited project time frame.

3.3. *Assess processes as well as outcomes*

Given the above issues, it remains important to have a range of indicators that assess shorter- and longer-term change processes, rather than focusing only on outcomes that may occur beyond the life of the project. The modified GEF framework used in IWP provided this potential in the use of process, stress reduction and environmental status indicators.

There are reasons other than just time frames for assessing processes as well as outcomes. Projects aiming to promote capacity building and learning have a major focus on establishing supportive processes for sustainability. It is a logical expectation then that monitoring processes should assess the effectiveness of the strategies in this area and the extent to which they are supporting sustainability outcomes.

NCs in the IWP generally found process indicators fairly easy to generate and these were by far the most numerous. However, indicators often focused on the completion of a

process rather than looking at the quality or level of engagement in it, for example holding community meetings rather than assessing participation and engagement in those meetings. Much of the technical support in this area aimed to encourage participants to further define process indicators that incorporated quality and engagement issues.

Stress reduction and environmental status indicators were on the whole more difficult for NCs to articulate and became easier once the project goals, objectives and outcomes were clearly articulated. Because of the linkage to higher-order objectives, in general fewer of these kinds of indicators were required since several activities might be geared towards one higher order outcome. In general these indicators also required more monitoring effort and more specialised skills, for instance to assess the population of a particular species. The range of process, stress reduction and environmental status resembled a pyramid (see Fig. 2), where process indicators were numerous and more closely linked to project activities, stress reduction indicators were slightly less in number and environmental status indicators were less again, and linked to higher order goals and outcomes.

3.4. Understanding social and ecological systems and change processes

As noted previously, IWP projects were strongly encouraged to undertake detailed baseline assessments of social and environmental conditions. These frequently went beyond the more targeted indicators used in monitoring to gain a detailed understanding of social and ecological issues or resources (e.g. waste), and the ‘root causes’ of focal environmental degradation issues. These were generally supplemented with participatory analyses using participatory rural appraisal tools to collaboratively analyse the contributing factors to environmental degradation issue (discussed further in [24]). The outputs of these were used in participatory planning processes for the pilot projects [25,26].

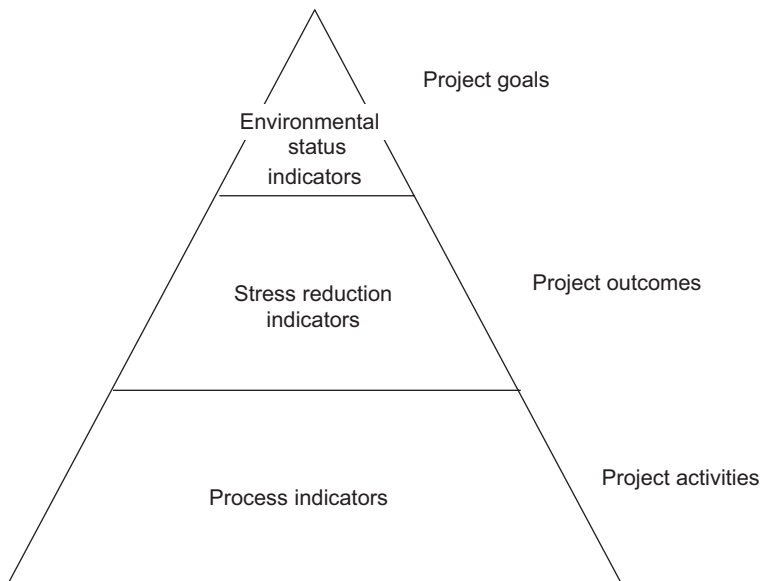


Fig. 2. Indicator pyramid.

Both the participatory and technical processes were important to gather sufficient information for project planning and should subsequently assist countries to interpret monitoring findings in the context of wider change processes. They also enabled specific pilot projects to contribute to environmental management initiatives beyond the project boundaries. For example, the island of Niue was affected by a cyclone during project implementation, and baseline studies conducted prior to the cyclone helped to establish the extent of damage to the fisheries there. Conversely, it was important to keep the impacts of the cyclone in mind when assessing the outcomes of project activities.

However, detailed ecological and social assessments are resource intensive and complex undertakings. Not all projects have completed these, and often they occurred well into the project cycle, as it took time to (i) get stakeholders to agree the focus and nature of data collection and (ii) make administrative, logistical arrangements and obtain necessary technical assistance and advice from experts. In some cases expertise could be found in-country, for instance in the Marshall Islands and Fiji, Vanuatu, and Kiribati. In others external advice was sought, as was the case in, for instance, the Solomon Islands, FSM, and Niue.

The lesson that can be drawn from IWP is that this kind of baseline analysis is crucial for project planning and later monitoring activities, but also resource intensive. The necessary skills and knowledge may go beyond those present in-country, which adds to the cost of the undertaking. In the IWP case, these issues were addressed by building assessment costs into project budgets, and making training and capacity building a requirement for technical advisers working with national staff and local stakeholders. However, there is also a need for long-term efforts to build capacity in these areas amongst Pacific Island nations—for example through the tertiary research scholarships provided under the IWP.

Resources for gathering and interpreting data are scarce, and there is a critical need to share such information across initiatives. In initial training for NCs, they were encouraged to seek out existing information on the issues and communities they were working with. Conversely, because the information gathered in IWP social and ecological baseline studies were broader than the specific issue being addressed in the pilot project, they could be used by a wider range of stakeholders. For example, a socio-economic baseline study of Jenrok in the Marshall Islands highlighted crucial social and health issues, which stimulated further socioeconomic studies in several other villages and initiatives.

At this stage we cannot comment on whether broad assessments have specifically assisted with the interpretation of monitoring findings. Often the breadth of the studies meant that sufficient baseline information was there for the indicators developed in monitoring plans. In some cases, NCs found that they needed additional baseline information on specific parameters, for example faecal coliform levels in water, and they were encouraged to obtain this additional data as soon as possible. In terms of overcoming the ‘causality gap’ referred to earlier, it is too early to know yet whether detailed baseline studies have helped with this.

3.5. *Integration*

Related to the above discussion, the literature on social learning has highlighted the importance of gaining a detailed understanding of social and ecological systems and the linkages between these. This calls for interdisciplinary analysis, and consideration

of various scales relating to ecological and social issues. The focus on analysing root causes, and the two-pronged approach of the IWP explicitly worked with these goals in mind.

In terms of the monitoring plans, a range of social and ecologically oriented indicators were developed to assess changes in human behaviour (process and stress reduction indicators) as well as ecological outcomes in the longer term (environmental status indicators). As noted in the section on adaptive management, changes in the status of the environment were likely to be longer term and go beyond the life cycle of the IWP. The implications for future initiatives are that the benefits of a truly integrated approach will often need longer than a 5–7 year timeframe to be realised, especially where monitoring plans are developed in the latter years of a project (in the case of the IWP, 4 years into the project).

A continuing issue for integration is the bridging of disciplinary knowledge and skills. In the IWP, social and economic assessments were conducted by social scientists, and ecological assessments by ecologists in the relevant field (for example fisheries, and water). The integration of findings between the various studies was largely left to project staff with the support of the PCU, notwithstanding the fact that technical advisers experts were expected to liaise with other relevant stakeholders and experts in different disciplines. In some cases, such as Kiribati, preliminary assessments involved social baseline and waste stream analysis as part of one exercise. In the future, it may be beneficial for projects to enhance integration through joint workshops to integrate and analyse the findings across disciplines.

3.6. Workability of monitoring plans

Gaps in technical knowledge and skills to undertake monitoring and assessment work have been flagged previously in this paper. The need to draw on technical experts to support assessment is a challenge in the Pacific, and capacity building in the social and ecological sciences is a recognised need. In addition to this, however, there is a need for simple to implement monitoring processes that can be adopted at the community level, for example keeping meeting records, and monitoring water quality and the population of a fish species. Programs such as the Locally Managed Marine Area Network and Waterwatch have developed a range of easy to apply methods (for example, [27]) that are starting to meet this need, although these initiatives have tended to focus more strongly on ecological monitoring. Interpretation of findings is, however, as important as the collection of data and this is an important area for future training and development to build greater independence in monitoring activities.

Since the final workshop to assist in the development of monitoring plans for the IWP finished in November 2004 and draft plans subsequently had to be discussed, refined and approved by in-country stakeholders subsequent to that, implementation of monitoring plans is at an early stage. The technical advisory committees and in-country teams will play a key role in the implementation of monitoring plans, and using the information generated for decision making. Nevertheless, some NCs have started to report on their monitoring findings as part of their quarterly narrative reports, indicating that implementation is occurring in some projects.

The development of monitoring plans earlier in the IWP, rather than when there was about 2 years left to the end of project funding, would have helped both with

implementation of monitoring plans and use of the information for project management. However, many of the IWP projects were not ready to do this at an earlier time given that, as is often the case with participatory projects, the project goals and objectives took some time to be clearly articulated.

We referred previously to a set of UNDP criteria for selecting indicators. These were not applied directly by most NCs, but the principles of finding indicators that meet reporting and assessment requirements, available resources, and technical skills were used to identify the 'best' indicators for monitoring. The need to prioritise down to a workable number of indicators, in this case up to 15, helped to facilitate the analysis of indicators to select the most useful and workable ones.

4. Conclusions

We consider the monitoring framework used in the IWP to be a useful one in that it drew on recent thinking in the social learning, adaptive management and monitoring and evaluation literature, and was able to be grasped and used by project staff. The focus on collaboration and social learning is yet to be realised and will need further assessment down the track. At this point, it is possible to say that the process of developing monitoring plans helped project staff to better integrate management decisions with the goals, objectives and activities of the various IWP pilot projects.

The GEF monitoring framework, using process, stress reduction and environmental status indicators, has provided a useful basis for developing a set of indicators that reflect processes as well as outcomes in the short and longer term.

That being said, a number of challenges have also been encountered in the process. The 7-year lifespan of the project has limited the potential for adaptive management within the project and observing ecological change. The time needed to get a participatory project off the ground has meant that that monitoring was not attended to until well into the project cycle (5 years in for a 7-year project), although baseline assessments commenced earlier. Not surprisingly, implementation of plans has so far been limited as they have only recently been developed. Yet in the IWP case, it may be time rather than resources that proves to be the limiting factor for implementing monitoring plans and engaging stakeholders in monitoring.

Cumulative experience from the SPBCP and IWP is showing that it takes considerable time to undertake participatory projects in the Pacific, and that NCs can face considerable logistical constraints, such as travel time between sites in some countries. As the project nears its final stages, the information generated from monitoring may have less direct value for managing the current pilot projects, although findings may still be useful to future initiatives. A key lesson is that a genuine commitment to adaptive management calls for a longer timeframe of engagement, particularly where project goals and monitoring plans are being collaboratively defined, implemented and used.

For the Pacific, capacity and longer-term commitment to environmental management initiatives are a vital issue for NRM generally, but are particularly crucial in learning-oriented intervention such as the IWP. A shift in knowledge and understanding of monitoring concepts has been observed and commented upon by NCs, but nurturing and extending this to a wider group of stakeholders will be important if monitoring processes are to sustain social learning and adaptive management.

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References

- [1] Keen M, Mahanty S. Learning in sustainable NRM: challenges and opportunities in the Pacific. *Society and Natural Resources* 2006;19(6):497–513.
- [2] Olsen SB. Frameworks and indicators for assessing progress in integrated coastal management initiatives. *Ocean and Coastal Management* 2003;46:347–61.
- [3] Belfiore S, editor. The growth of integrated coastal management and the role of indicators in integrated coastal management: introduction to the special issue (Editorial). *Ocean and Coastal Management* 2003;46:225–34.
- [4] Bowen RE, Riley C. Socio-economic indicators and integrated coastal management. *Ocean and Coastal Management* 2003;46:299–312.
- [5] Guijt I, Proost J. Monitoring for social learning: insights from Brazilian NGOs and Dutch farmer study groups. In: Leeuwis C, Pyburn R, editors. *Wheelbarrows full of frogs: social learning in rural resource management*. Assen, Netherlands: Koninklijke Van Gorcum; 2002. p. 215–31.
- [6] Keen M, Mahanty S. Collaborative learning: bridging scales and interests. In: Keen M, Brown V, Dyball R, editors. *Social learning in environmental management: building a sustainable future*. London: James & James/Earthscan; 2005. p. 104–20.
- [7] Leeuwis C, Pyburn R, Boon A. Concluding reflections on social learning: tadpoles, lily pads and lotus flowers. In: Leeuwis C, Pyburn R, editors. *Wheelbarrows full of frogs: social learning in rural resource management*. Assen, Netherlands: Koninklijke Van Gorcum; 2002. p. 449–70.
- [8] Keen M, Brown V, Dyball R. Social learning: a new approach to environmental management. In: Keen M, Brown V, Dyball R, editors. *Social learning in environmental management: building a sustainable future*. London: James & James/Earthscan; 2005. p. 3–21.
- [9] Leeuwis C, Pyburn R. Social learning for rural resource management. In: Leeuwis C, Pyburn R, editors. *Wheelbarrows full of frogs: social learning in rural resource management*. Assen, Netherlands: Koninklijke Van Gorcum; 2002. p. 11–24.
- [10] Earle S, Carden F, Smutylo T. *Outcome mapping: building learning and reflection into development programs*. Ottawa: IDRC; 2001.
- [11] United Nations Development Program. *Handbook on monitoring and evaluating for results*. New York: UNDP Evaluation Office; 2002.
- [12] Russell D, Harshbarger C. *Ground work for community-based conservation: strategies for social research*. Walnut Creek, CA: Altamira Press; 2003.
- [13] Bunce L, Pomeroy B. *Socioeconomic monitoring guidelines for coastal managers in Southeast Asia (SocMon SEA)*. Townsville: World Commission on Protected Areas and Australian Institute of Marine Science; 2003.
- [14] United Nations Development Program and Global Environment Facility. *Implementation of the strategic action plan of the Pacific Small Island developing states, project document*. Washington DC: GEF; 1999.
- [15] Baines G, Hunnam P, Rivers M, Watson B. *South Pacific biodiversity conservation programme*. New York: UNDP; 2002.
- [16] Nakashima S. *Integrated coastal management as best practice in GEF Project development: lessons learned from selected biodiversity projects in marine, coastal and freshwater ecosystems*. Washington DC: UNDP/GEF; 1997.
- [17] Jiggins J, Röling N. Adaptive management: potential and limitations for ecological governance of forests in a context of normative pluriformity. In: Oglethorpe JAE, editor. *Adaptive management: from theory to practice*. Gland, Switzerland: IUCN; 2002. p. 93–104.
- [18] Gariba S. *Collaboration for development evaluation. Paper to DAC-OECD workshop on partners in development evaluation: learning and accountability, 25–26 March*. Paris: OECD; 2003.
- [19] Saltmarsh D, Ireland M, McGregor A. The performance framework: a systems approach to understanding performance management. *Public Administration and Development* 2003;23:445–56.
- [20] Duda A. *Monitoring and evaluation indicators for GEF International Waters Projects, monitoring and evaluation working paper 10, November*. Washington, DC: GEF; 2002.

- [21] Lucas H, Evans D, Pasteur K. Research on the current state of PRS monitoring systems. London: IDS/DFID; 2004.
- [22] Keen M, Mahanty S. Evaluating aid: a process for learning, reflection and change. *Development Bulletin* 2004;65:63–7.
- [23] Mahanty S, Stacey N. Collaborating for sustainability: a resource kit for facilitators of Participatory Natural Resource Management in the Pacific. Apia, Samoa: IWP/SPREP; <http://www.sprep.org/ws/iwp/Resources_Handbook.htm>, 2004.
- [24] Mahanty S, Stacey N. Collaborating for sustainability: a resource kit for facilitators of participatory natural resource management in the Pacific. Apia: SPREP, <http://www.sprep.org/iwp/Resources_Handbook.htm>, 2004.
- [25] Stacey N, Wright A, Holland P. The Pacific International Waters Project: aims, approaches and challenges. *Ocean and Coastal Management* 2006;49(9–10):610–26.
- [26] Wright A, Stacey N, Holland P. The cooperative framework for ocean and coastal management in the Pacific Islands: effectiveness, constraints and future direction. *Ocean and Coastal Management* 2006;49(9–10):739–63.
- [27] The Locally-Managed Marine Area Network. Learning framework for the Locally-Managed Marine Area Network. Suva, Fiji: LMMA Network, LMMA Network, 2003 (available online at <http://www.LMMA-network.org>).