

**INSTITUTE OF APPLIED SCIENCES
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**SUMMARY ANALYSIS OF SITE SUPPORT
COSTS FOR FIJI LOCALLY MANAGED
MARINE AREA (FLMMA) – IAS, USP SITES**

IAS TECHNICAL REPORT NO. 2009/02

by

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June, 2009

Summary analysis of site support costs for Fiji Locally Managed Marine Area (FLMMA) - Institute of Applied Sciences (USP) sites.

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April 2009

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IAS Technical Report

Background

Goal

Basic understanding of costs and inputs required to establish and run Locally Managed Marine Area (LMMAs) to form the basis for cost-effectiveness analysis and enable budgeting for support and up-scaling of such approaches.

Objectives

- Define standard types of cost that LMMAs can be expected to require including community in-kind contributions
- Pilot the use of this format on small but representative number of Fiji LMMA network (FLMMA) sites
- Analyze initial results and assess accuracy of costing
- If data are available attempt basic cost effectiveness analysis

Phases or stages

When costing interventions it will be important to distinguish between start up and ongoing management phases as costs would be expected to be higher during startup.

A generalized approach to LMMA establishment as widely used by FLMMA is presented in Govan et al 2008a described as Community Based Adaptive Management (CBAM) and for the purposes of this study can be described as follows:

- Phase One – Initial Assessment
- Phase Two – LMMA Design and Planning
- Phase Three – Implementation of Community Based Adaptive Management (CBAM)
- Phase Four – Ongoing (CBAM)

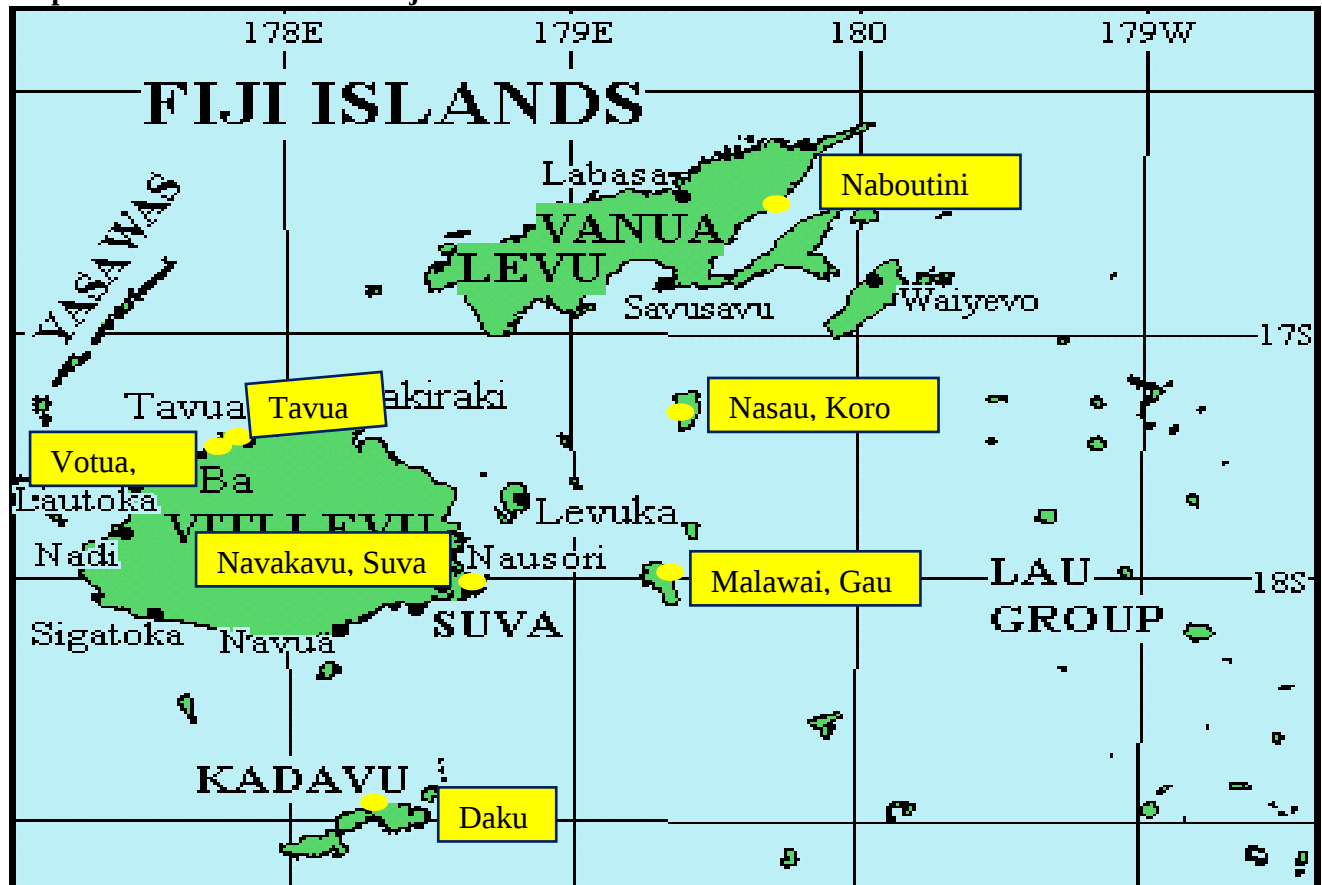
Methods

Cost data were compiled for a selection of IAS sites using university records and staff clarifications. The costs calculated are in Fiji dollars currency. The sites were selected in an attempt to get a variety of conditions, geographic spread and time spans but the ultimate criteria was availability of detailed records. Another criteria was that all the sites would have gone through the four phases and are referred to as ongoing CBAM or “sustainable sites”. The approach taken to implementing these projects were ‘site focused’ and are different from the current decentralization approach as they were treated as model sites in their respective islands and regions.

As illustrated on map 1.0 below, the sites selected were:

Daku – 1village (Kadavu island, Kadavu Province)	Votua -3 villages (Viti Levu, Ba Province)
Nasau 1 village (Koro island, Lomaiviti Province)	Tavua - 4 villages (Viti Levu island, Ba Province)
Navakavu – 4villages (Viti Levu island, Rewa Province)	Malawai -2 villages (Gau island, Lomaiviti Province)
Naboutini -1 village (Vanua Levu, Cakaudrove Province)	

Map 1.0. Selected sites across Fiji.



The major costs were classed under two categories systems:

Operational:

- Coordination (includes routine site liaison)
- Workshops
- External support (national and international networks and research)
- Other activities (enforcement, community contributions, misc.)

By input type:

- | | | |
|-------------|---------------------|--------------|
| • Salary | • Living allowance | • Volunteers |
| • Transport | • Equipment | • Research |
| • Comms | • Network | • Other |
| • Occupancy | • Training/Exchange | |

Results

Remarks on the data

Accuracy: Reconstructing the costs based on university records of expenditure and receipts proved to be a relatively arduous task and the potential exists for a number of expenses to have been overlooked. By comparing records for all seven sites though it is hoped that obvious omissions can be detected.

Overhead and occupancy: An area that is almost certainly underestimated in all cases is that of overheads, occupancy, administrative and general staffing costs. Although the cost of coordination covers some of this it is likely that having a permanent team of staff supported by IAS and on call

for community liaison is not adequately costed in this exercise. The direct overheads are charged at 15% (Aalbersberg pers. comm.).

Phases: The attempt to divide costs between the various phases of the CBAM cycle did not seem to tally with actual expenditure. For example awareness workshops may have been programmed at a late phase or monitoring work carried out early on. For this reason the analysis based on phases should be considered indicative only.

Sites versus clusters: A crucial feature of the FLMMA approach and indeed most other large scale CBAM approaches in the region is that costs are spread over a number of sites in clusters, networks or programmes. A “site” consists of 1 demarcated managed area (the LMMA), 1 or 2 no-take zones and with 1 or more villages. To ascertain the cost of supporting sites any expenditure on a larger cluster or group was divided by the number of sites supported by that particular event e.g. a particular workshop or trip. In general as time progresses a larger number of villages or sites are supported by the same events or team.

Sites with complete data sets: Only three sites appeared to have relatively complete data sets and these were Daku, Nasau and Navakavu – referred to as core sites. Data collected for the remaining sites was therefore used only for costing of specific workshops or events rather than for the whole process.

Community contribution: costing of the community contribution to resource management was only attempted for Daku and the results are considered to be partial at best.

Results of preliminary tabulations

With the above considerations and the need to continue to check the accuracy of all figures entered in the spreadsheets still in mind it was felt that the existing data was adequate to provide a useful overview of the costs involved in the FLMMA IAS CBAM support.

Cost of supporting a site

The cost of supporting a site is expected to be higher in younger sites and decrease as ongoing adaptive management becomes more routine. The three core sites are between 4 – 7 years old and show that average costs are around F\$1,300 per year, slightly higher in the younger site and lower in Daku the oldest (Table 1). Including data for the remaining 4 sites barely changes the yearly average cost.

Table 1: Overall costs for supporting site groups and individual sites. Note that sites and figures in italics are not considered to have complete or verified data sets. Total per site refers to the proportional cost of support to the site i.e. the cost of activities is shared with the other participating sites for each activity.

	Total support	Total for site	Years	Avg/site/yr
Daku	35,660	6,191	7	884
Nasau	19,511	6,944	4	1,736
Navakavu	12,179	6,712	5	1,342
<i>Tavua</i>	9,686	5,112	4	1,278
<i>Malawai</i>	13,907	5,915	6	986
<i>Votua</i>	13,422	10,205	6	1,701
<i>Naboutini</i>	9,672	1,935	3	645
			5	1,321 (<i>1,281</i>)

Breakdown of costs per site

Workshops (awareness, planning and monitoring) incur the greatest expenditure (56%) while coordination (including survey design) accounts for some 37% and external activities vary much more widely and account for less than 10% of cost on average (Table 2). These activities may include some national networking but are generally accounted for by external research projects that may not contribute specifically to a given site's management and should probably be discounted.

Table 2: Yearly costs per site for the major activities (External includes research and network activities). Note that sites and figures in italics are not considered to have complete or verified data sets.

	Coordination	Workshops	External	Others	Total
Daku	453	379	51	1	884
Nasau	622	1,114	0	0	1,736
Navakavu	377	730	236	0	1,342
Tavua	317	961	0	0	1,278
Malawai	64	922	0	0	986
Votua	180	1,521	0	0	1,701
Naboutini	85	560	0	0	645
Avg	484 (300)	741 (884)	96 (41)	0 (0)	1,321 (1,225)

Costs of the workshops varies and may depend largely on the number of communities or sites that can be catered for by the same workshop i.e. the number of sites that can benefit from one workshop, the length of the workshop and the number of facilitators and participants (Table 3).

Workshops cost approximately the same whatever the subject matter with the potential exception of the CPUE monitoring workshop that may be cheaper. The cost per site of workshops may be about F\$1-2,000 although Biological and other monitoring workshops do not represent a one-off investment and may be at least partially incurred again on subsequent monitoring events.

Table 3: Costs per site for the various types of workshop. Note that sites and figures in italics are not considered to have complete or verified data sets.

	All years				Cost/year			
	Awareness and Planning	Biological monitoring	Socio-economic monitoring	CPUE monitoring	Awareness and Planning	Biological monitoring	Socio-economic monitoring	CPUE monitoring
Daku	1,098	651	281	623	157	93	40	101
Nasau	708	2,907		840	177	727		87
Navakavu	1,377	145	760	1,370	275	29	152	124
Tavua	788	1,386	276	1,395	197	347	69	301
Malawai	3,415	1,366		750	569	228		
Votua	3,890	2,318	905	2,015	648	386	151	336
Naboutini	580		1,101		193		367	
avg	1,061 (1,694)	1,234 (1,462)	520 (664)	944 (1,748)	203 (317)	283 (302)	96 (156)	239 (191)

The major input types appear to be living allowances comprising accommodation and per diems for participants (26%), salaries (~23%), equipment (~16%), transport (<14%) and administration and development of survey designs (12%). As mentioned above it is probably more correct to remove the costs of non-site targeted research (Table 4 and Fig. 1 and 2).

Table 4: Costs per site since starting by input type.

Category	Daku	Nasau	Navakavu	Average	Range	% total	% total partial
Salary	1,557	2,128	819	1,066	12 - 31%	23%	25%
Transport	1,433	920	509	954	8 - 23%	14%	16%
Comms	153	60	0	99	0 - 2%	1%	1%
Admin and general	1,124	250	1,013	170	4 - 18%	12%	13%
Living allow.	928	2,470	1,735	1,711	15 - 36%	26%	28%
Equipment	636	1,117	1,459	934	10 - 22%	16%	18%
Network	100	0	0	33	0 - 2%	1%	
Training/Exch	60	0	0	20	0 - 1%	0%	
Volunteers	0	0	0	0	0 - 0%	0%	
Research	200	0	1,178	459	0 - 18%	7%	
Total	6,191	6,944	6,712	5,448			
Years	7	4	5	5.3			

Figure 1: Average breakdown of all inputs to the three core sites

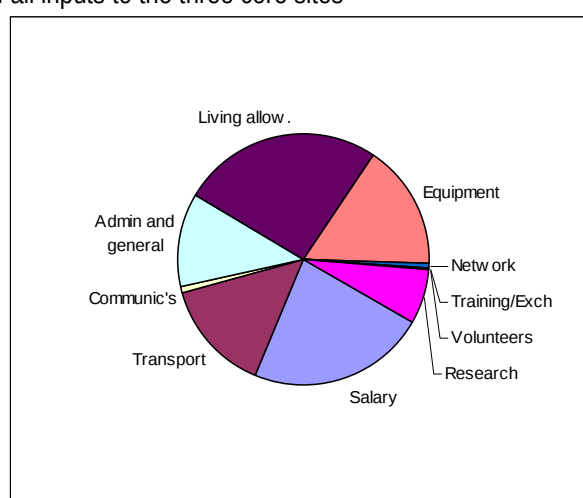
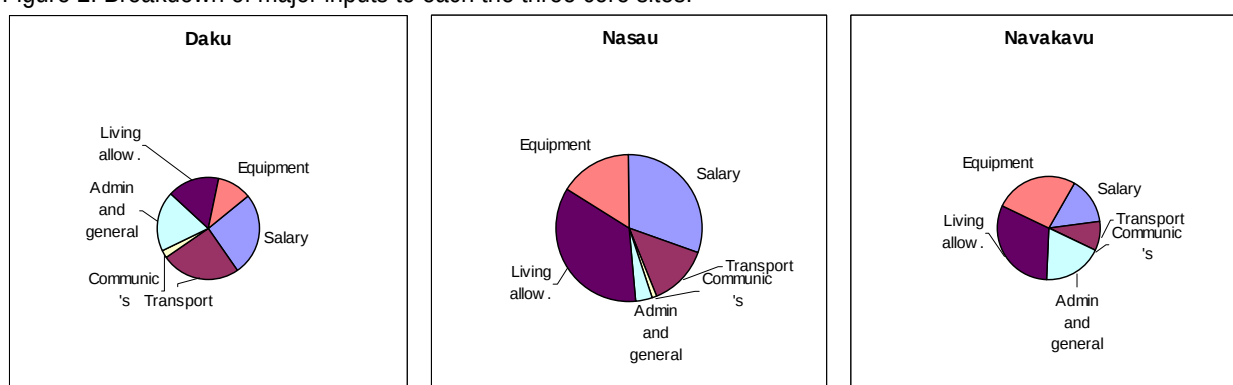


Figure 2: Breakdown of major inputs to each the three core sites.



Of major note here are the elevated equipment costs owing to the CPUE monitoring forms that are required for each site, the relatively low salary component perhaps due to underestimation and the high living allowance allocation. Transport costs are reduced the nearer the sites to Suva and will escalate where teams are more reliant on air travel or shipping (e.g. Daku).

Breakdown of costs per phase

An analysis of costs per phase do not support a clear picture of changes in costs dependent on project phase (Table 5). This is not surprising given the limited data, the potential for confusion when assigning costs to different phases, the generally lower number of sites sharing costs in initial stages and the advent of more expensive monitoring (CPUE) at a late stage in these core sites. The

available data would likely permit some modeling of various scenarios (with/without certain types of monitoring for instance).

Table 5: Costs per site according to project phase (relating to CBAM cycle - 1. Initial Assessment, 2. LMMA Design and Planning, 3. Implementation of Community-Based Adaptive Management, 4. Ongoing CBAM).

Costs per phase				
	1	2	3	4
Daku	1,987	1,117	1,269	1,818
Nasau	135	4,202	186	2,422
Navakavu	0	1,120	2,848	2,744
Total	2,122	6,439	4,303	6,984
Average	707	2,146	1,434	2,328

Discussion

Costs of IAS FL MMA sites to date

The cost per site from start up to present day appears to be F\$6,000 - F\$7,000 over 4-7 years. These data do not provide a clear estimate of what the total cost of setting up a site may be as the sites selected are all entering a phase of further and possibly more expensive monitoring and thus costs are not tailing off as expected.

The alternative approach to estimating site costs employed in a number of other projects is to divide the total project expenses by the number of sites and years. Using this approach for IAS supported sites Aalbersberg (pers comm.) reports site-based funds of about US\$700,000 for about 170 sites or about US\$4,000 per site. Assuming an average time of 5 years per site that is USD\$800 or about F\$1,400¹. Some other funds were used but also some of the project funds were not used for site development. The estimates match with the F\$1,300 estimated yearly cost above (Table 1) and indeed give potentially some idea of the overhead component.

The added value of the exercise presented here comes mainly from the opportunity to compare and assess the costs of various different activities and budget headings. A further estimation worth making is that of cost per unit area. Based on the data collected by IAS FL MMA and the FL MMA database of sites there appear to be costs averaging FJD 122 / year / km² of LMMA and FJD 462 / year / km² of no-take zone or tabu (Table 6). Based on the data derived from Aalbersberg pers. comm.. and assuming an area of LMMA for the 170 sites of just over 10,000 km² and tabus covering some 550 km² (see Govan et al 2009) a lower estimate for annual cost per km² of LMMA of around US\$15 (F\$27) and of US\$266 (F\$492) for NTZs may be derived.

Table 6: Estimates of costs of establishing LMMAs and tabu/no-take zones calculated on yearly basis.

	Km2		FJD/year		USD/year	
	LMMA area	NTZ area	Cost/LMMA Km-2	Cost/NTZ Km-2	Cost/LMMA Km-2	Cost/NTZ Km-2
Daku	5.92	2.87	149	308	81	166
Nasau	5.92	5.47	293	317	158	171
Navakavu	18.71	2.94	72	457	39	247
Tavua	690.77	13.61	2	94	1	51
Malawai	3.01	1.2	328	822	177	444
Votua	1,531.8	10.57	1	161	1	87

¹ Using an exchange rate of 1 US Dollar = 1.85161 Fiji Dollar from November 21, 2008. By May 2009 the FJD had devalued by some 20%.

Nabouini	67.19	0.6	10	1,075	5	580
			122	462	66	249

Implications for costing national approaches to coastal resource management

A future model of nation-wide coastal resource management could be achieved through implementation of FLMMA approaches by all interested communities in the country. Such an approach will most likely be de-centralized to the provincial level following the Kadavu example (Tawake 2007) and intensive monitoring would be restricted to an indicative number of sites. At present of the 216 FLMMA sites some 130 do not routinely perform scientific monitoring (i.e. are guided by data-less management) and of the remainder 86 carry out biological monitoring and, of these, 40 also monitor socio-economic parameters (Govan et al. 2008b). Monitoring costs from sample sites discussed in this report includes both community-based monitoring costs for community adaptive management as well as IAS/FLMMA scientific monitoring expenses for FLMMA and LMMA Network learning and thus may have relatively high investments in monitoring. The proportion of scientifically monitored sites is unlikely to increase and this proportion will likely continue to cost similar amounts to those calculated for the sample sites above; around 1,300 FJD/year.

The Kadavu decentralized approach has grown to over 50 sites in 2003-2008 and received direct funding (mainly staff and workshops) of some FJD 112,000. These sites are now averaging FJD 450 each and even considering other institutional support costs appear considerably cheaper than the sample sites in this study.

The basic elements in costing a nation-wide approach (drawing on Govan et al 2009) might therefore be:

- Coordination at national level: A role hopefully to be carried out by government departments, in particular Fisheries Department with key technical input from the Environment Department, but historically with substantial university and NGO support. The cost of this coordination seems to be around 10-20%.
- Coordination at provincial level: A decentralized approach to coastal resource management would rely on coordination at the provincial level with staff and logistical implications. The cost of this is yet to be estimated but may cover one officer, communications and other occasional technical inputs.
- Technical assistance and key monitoring: This role has been covered by NGOs but would seem to be compatible with an enhanced oversight role by Fisheries and Environment departments, the latter with responsibilities to Fiji's international commitments to biodiversity conservation and protected areas as well as endangered species and ecosystem wide issues. The costs of this component could be extremely high unless a strategic approach to key research and monitoring is taken using cost effective and locally appropriate techniques.

Almost all research on FLMMA may be considered at least partially driven from outside Fiji, usually related to sites monitoring and evaluation and are commonly done by students, researchers and NGOs both local and external. The cost of this component could be extremely high with questionable outcomes. Research costs in direct support of local and national priorities in the above examples are certainly an underestimation

- Indicator locally managed marine sites: Locally managed marine area sites which receive particular research and monitoring efforts to answer key questions and adaptively enhance

the design of FLMMA approaches based on ongoing results. Costs from the above examples in the range of FJD 1-2,000 / year / site which also include some national coordination costs.

- Locally managed marine sites: The bulk of sites which will be managing using appropriate locally implemented low-cost monitoring including perceptual and data-less approaches as part of adaptive management. Costs around FJD 450 per site which also include some provincial level costs.

The model outlined above would be aimed at achieving basic coastal resource management at a nation-wide and provincial level. Ongoing land-based progress and process monitoring would allow for early warning of problems. Coordination and selected monitoring would aim to identify geographical, habitat, species and other gaps and design most cost effective approaches to addressing these.

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