



BLUE FORESTS

Protecting Biodiversity through Sustainable Farming of Coral Reefs

Year 1 Interim Report to the Darwin Initiative

1 July 2003 – 31 March 2004



JWP



Just World Partners

PCDF



*Partners in Community
Development Fiji*

FSPI



*Foundation of the Peoples of
the South Pacific International*

Darwin Initiative for the Survival of Species

Annual Report 2003-2004

1. Darwin Project Information

Project Ref. Number	<i>Ref: 162/12/033</i>
Project Title	<i>Blue Forests: Protecting Biodiversity through Sustainable Farming of Coral Reefs</i>
Country(ies)	<i>Fiji and Solomon Islands</i>
UK Contractor	<i>Just World Partners</i>
Partner Organisation(s)	<i>Foundations of the Peoples of the South Pacific International</i>
Darwin Grant Value	<i>£165,416</i>
Start/End dates	<i>July 2003 – March 2006</i>
Reporting period	<i>1 July 2003 to 31 Mar 2004 (Annual report Year 1)</i>
Project website	<i>http://www.justworld.org.uk/mainframe.htm</i>
Author(s), date	<i>Dr. Austin Bowden Kerby (PCDF), Dr. Hugh Govan (FSPI) & Mr. Robert Brunt (JWP) 26/04/04</i>

2. Project Background

Fiji is ranked 5th in the world in terms of its coral reef area, while the smaller Solomon Islands reefs have some of the highest coral reef biodiversity on the planet. Fiji is the Pacific centre of the growing international trade in aquarium and curio corals and of the "live rock" trade. These trades have been responsible for the removal of over a million corals annually from Fiji which has damaged reef biodiversity. The Solomon Islands are a major centre of traditional coral harvesting, with thousands of tonnes of live corals harvested annually, burnt to make lime or used for construction purposes. PCDF has been asked by the Departments of Tourism, Fisheries and Environment to assist communities in developing sustainable alternatives to the wild coral trades, and to help restore Fiji's reefs. Similar requests have come from the Solomon Islands. Commercial coral farming is proposed as a sustainable solution which provides for both traditional use and the cash needs of communities.

3. Project Purpose and Outputs

The project's purpose is to conserve coral biodiversity in Fiji and Solomon Islands by addressing the root causes of poverty-driven destructive coral harvesting or over-harvesting through the introduction of sustainable coral farming as a viable economic alternative in the Fiji and the Solomon Islands community based management areas (CBMAs). Progress towards meeting the project purpose includes:

- i. Areas in need of restoration have been identified in both countries and initial baseline data and coral replanting are in the process of being established, with small initial trials established in four Fiji sites.
- ii. The initial research coral farms have been well established, and community awareness activities have been carried out, building a foundation for future action.

Progress toward meeting the expected outputs includes:

- Three coral farming sites established in Fiji, actively testing whether or not the summer months are suitable for the work, with additional pilot work to assess site suitability in two other Fiji sites and in the Solomon Islands
- Awareness raising and management planning workshops conducted in the prospective coral farming communities, increasing community understanding of and acceptance of the approach.
- The first 450 farmed corals are now being cultivated.
- Preliminary draft of coral gardening handbook, focusing on replanting reef areas harvested in the Solomon Islands
- Initial non-intensive demonstration/ hands-on training sessions have been conducted in 3 communities (8 fish wardens, 48 other adults & youth & 50 school children).

The project logical framework (Annex 1) remains unchanged however there were minor adjustments to planned activities. Refer to Annex 2 for details on the specific activities that were determined by the project team as necessary to achieve the outputs and objectives, based on the cultural and specific site conditions. Annex 2 provides details of slippage based on our original work plans, developed early in the grant, as well as outputs completed early plus additional outputs.

4. Progress

The Darwin Initiative funded a PCDF project in 1999-2001 for managing waste and other land-based threats to coral reefs in Fiji (162/8/176). The project site has been chosen as a "regional model for coral reef conservation" by UNEP's ICRAN programme. The Blue Forest Project draws on lessons learned and best practice identified through this Darwin funded 'Living Waters' project and provides essential complementary support to the ongoing work of FSPI through the EC funded Coral Gardens Programme and is also relevant to the EC fund SMART project which focuses on the certification of products for the marine aquarium trade.

The Blue Forest project started on the 1st of July. Work has focussed on orientation of staff, development of work plans and experimental protocols, communications with affiliate organisations in Fiji and Solomon Islands, development of scientific design and monitor regimes, establishment of research coral farms and the implementation of baseline surveys at Moturiki and Mamanuca restoration sites. The Moturiki research site has now been agreed with the traditional reef owners and fully delineated. The set up of the Solomon Island research sites has also now been initiated and scientific design and monitoring regimes are under way.

Proper Traditional Protocols and Permissions for the Project:

The Fiji partner, PCDF sent their community officer and field officer to attend a Moturiki district meeting, followed by the executive director and community officer attending the Lomaiviti Provincial Council meeting. The outcome of these meetings was very positive. PCDF made their customary presentation of 'i sevusevu', followed by project details, and, finally, sought the permission of the high chiefs and heads of clans to implement the project on their fishing grounds. The outcome of these meetings was welcome permission granted, cemented by presentation of a highly valued tabua (whale's tooth) to PCDF as a token of appreciation and support for the Darwin Initiative work.

Community Workshops:

PCDF earlier carried out participatory community workshops at Uluibau for the villages of Uluibai, Niubasaga, and Daku. Another workshop was carried out in Savuna for the three villages of Savuna, Wawa, and Niubasaga. The purpose of these workshops was to develop an overall sustainable coral reef management plan required

as a framework to conduct the coral farming experiments and follow-on economic development ventures within the area. The development of at least seven no-take marine protected areas was one of many outcomes of these workshops. Set aside for a preliminary period of five years, the sites have been marked in the traditional Fijian way, using vaivai poles and coconut leaves. This setting aside of roughly 25% of the resources into conservation zones is a significant unplanned outcome, the first time this traditional practice has been implemented in over 50 years in Moturiki.

Establishment of three Coral Farming and Reef Restoration Research Sites in Moturiki District, Fiji:

Three experimental coral farms have been established in Moturiki District: one each in Ulluibau, Niubasaga, and Daku waters. Each of these coral farms is within no-fishing conservation zones established as the direct result of the project. Each site has three underwater culture tables: two for the culture of brightly coloured “mother colonies”, and one for the culture of fragments on small cement discs. There are some 30 mother colonies established and 150 summer season corals (six mesh trays each planted with 25 corals) per site. In August, another table will be set up in each site, and the number of corals planted doubled, to compare growth and mortality between seasons. Mother colonies are being trimmed in order to gather data on survival and re-growth under various pruning regimes. Permanent transects have been established through each coral farm site, to measure relative impact of the coral farming on the back reef rubble sites over time. Small restoration sites have also been established in association with each coral farm, to utilise extra coral fragments from the mother colonies to test a new restoration methodology: wedging fragments into dead, non-recovering coral heads. Before and after photographs, of all work has also been undertaken taken.

Work at Other sites:

Work has also begun in two other districts in Fiji, where the communities requested assistance: Malolo District, spanning the Mamanuca Islands, and Conua District, on the Coral Coast of the main island of Viti Levu. Initial work has been completed to determine how these sites can be best incorporated into the Darwin project without derogating from the work at Moturiki. The outcome of this work is summarised below.

The project scientist made a preliminary visit to Malolailai Island in the Mamanucas for a recoverability assessment of a former dredged coral reef site at Musket Cove Resort. The assessment indicates that the reefs are not recovering after some 12 years due to a lack of larval recruitment. The presence of a few coral recruits over 4 years old indicates that the overall environment may be suitable for a restoration effort. Test plantings were implemented using a wide range of coral species ranging from sensitive to tolerant species on two frames placed in the affected area. Based on the outcome of these trials, the Resort may be willing to finance a restoration of the area, which will encourage the involvement of trainees from the adjacent reef-owning community.

The project scientist and PCDF field officer made a trip to the Conua coral replanting sites being established by OISCA International, a Japanese NGO, at the invitation of OISCA and the communities. We are providing them with an assessment of their work, with recommendations to improve the survival of the corals. The OISCA coral replanting activities are making some basic mistakes, and basic guidelines, based on the earlier work at Cuvu, are needed as soon as possible.

Solomon Island Sites

Meetings with Government and Fisheries officials have occurred, as well as the hiring and orientation of project personnel. Initial protocol visits with community leaders and chiefs have been made by the local staff in three Solomon Islands sites: Guadalcanal (Marau), Malaita (Langalanga) and Ngela (Maravaghi). Malaita has been assessed to be the most in need of restoration, and intensive experimental trials will be conducted in May.

Difficulties and solutions

We have had significant difficulties in the following areas:

Insufficient funds being budgeted for more widely-spaced research sites as initially planned. It was therefore decided to locate all three coral farming research sites in Fiji within various reefs of the same district (Moturiki, being isolated from river runoff and pollution, as well as being out of the major cyclone track), set among three different communities. Each coral farming site is several km from the others.

An outside assessment of the reefs using “Reef Check” methods has not yet been possible, and community training in appropriate biological monitoring, initially postponed by the community, remains an unfinished output. Plans are in the making to either bring in Green Force as earlier planned, or if that fails, to hire a consultant to conduct these two outstanding tasks during the next quarter.

Enhanced Project Design

As an output of the project, the research methods and experimental protocols have been properly defined, fleshed out, peer reviewed, and refined during the past several months, for implementation in the field sites. As the original proposal was rather general (see Annex1), the outputs have been more clearly defined and broken into components required by the site conditions and various cultural realities.

Development of the Year Two Workplan

An analysis of each aspect of the Fiji work has been done, indicating outputs that are on schedule, and those behind or ahead of schedule. This information has been incorporated into a detailed work plan for the next six months (Annex 2), assigning each task to particular staff so that unfinished tasks will be accomplished and do not fall behind.

5. Actions taken in response to previous reviews (if applicable)

- No applicable, as this is a report on the first 9 months of the grant.

6. Partnerships

JWP / FSPI / PCDF Partnership

JWP has a long-standing working relationship with FSPI and PCDF and works collaboratively with all partners on project monitoring. Through consultation, project partners identified the need to address JWP’s existing reporting requirement which previously followed a format independent to that of Darwin reports. JWP have now addressed this concern by revising the existing quarterly reporting format to follow that of the Darwin annual report. JWP assisted PCDF in Fiji with additional funding applications and has helped obtain a grant from the States of Jersey to support underestimated project costs such as boat rental and the purchase of capital items including diving equipment.

Project linkages and collaborations

The project has established and maintain links with both the SPREP-funded ICRAN project and EC funded SMART project which seeks to alleviate poverty within Pacific Small Island Developing States by linking coastal communities with the Marine Aquarium Council (MAC) Certified environmentally sustainable marine aquarium trade.

Acceptance of farmed corals by the aquarium exporting companies and consumers will be the key to success. The Blue Forest project will therefore continue to work closely with MAC and marine aquarium companies to develop a highly acceptable cultured product.

The project aims to have MAC certified aquacultured corals on sale to the aquarium industry by the end of year two. Production at each site will be monitored for sustainability with levels of production controlled as appropriate. This approach has the dual benefit of enabling communities to engage in economically viable enterprises whilst sustainably managing their coral reef resources.

The project team have reviewed the proposed collaborative work plans with other FSPI coastal programmes and Government projects, the results of which are detailed in the work plan (Annex 2) which covers the first six months of year two.

7. Impact and Sustainability

Visits have been made to National Government offices as well as provincial and district offices to explain the project work. People contacted have expressed keen interest in the possibility of replacing destructive coral harvesting with sustainable methods of coral culture that protects biodiversity. The communities in Fiji where the project is operating have taken concrete steps to conserve and restore lost biodiversity on their reef areas, and it is expected that the same will soon be true for the Solomon Island sites.

8. Post-Project Follow up Activities

- Not applicable

9. Outputs, Outcomes and Dissemination

Refer to the work plan (Annex 2) for details of the differences in actual outputs against those agreed in the initial timetable. As well as detailing both late and early

outputs the workplan also includes reference to additional outputs. The main additional outputs of significance to biodiversity conservation were the implementation of community resource management plans, including the establishment of at least seven no-take MPAs.

Dissemination of project information has been targeted at localised regions through a campaign of workshops, education and training programmes. The only national-level dissemination was the original press release at the beginning of the project published in the Fiji Times. Greater levels of national and international marketing are expected to take place in Year 2, a large proportion of which will be targeted at the marine aquarium trade.

Table 1. Project Outputs (According to Standard Output Measures)

Code No.	Quantity	Description
SOM #5	6 personnel	Selected field personnel in Fiji and the Solomon Islands are presently being trained in the monitoring and experimental methods, to take place over the duration of the project.
SOM #6A	106 people	8 fish wardens and 48 other adults and youth, plus 50 school children thus far have been given basic training in coral farming.
SOM #7	1 draft	Draft of handbook in English on coral planting for reef restoration produced for the Solomon Islands, and copies circulated for review.
SOM #8	8 weeks	UK Project manager has moved to Fiji, funded by three additional marine/coastal grants, and has spent an estimated 8 weeks on the Darwin work in Fiji thus far, with an initial one week of work thus far in the Solomon Islands.
SOM #11B	1 publication	Chapter on community coral farming submitted to well-known German publisher of aquarium books.
SOM #15A	1 press release	National press release in Fiji on the project in the <i>Fiji Times</i> "Waterfront" section
SOM #22	3 sites established, 2 other sites under development	Three coral farming sites thus far established in Fiji, with restoration experiments begun at all three. Initial field assessments completed in the Solomon Islands and in the Malolo District in Fiji, with initial restoration pilot work begun at Malolo and with a series of restoration experiments to be established in the in May.
SOM #23	1 new supporting	A States of Jersey grant for £15,150 was obtained exclusively for support of the Darwin Blue Forests

grant obtained	project, to make up a shortfall in the Fiji budget allocated for field support. This is in addition to two ongoing EC grants and ICRAN funds (through SPREP)
1 supporting grant submitted	for community based marine resource management, which are laying a foundation for implementation of the work in the communities, once the methods are proven effective in the present experimental phase. Proposal written and submitted to SPREP that if granted will considerably enhance the socioeconomic aspects of the project.

Table 2: Publications List

Bowden-Kerby. A. 2004 (In Press). Coral farming for the marine aquarium trade and to support coral reef conservation. 25 pp. In: The rearing of marine invertebrates and marine ornamental fishes. Brockmann, D. Editor. Birgit Schmettkamp Publishers, Germany.

Bowden-Kerby. A. 2003. Community-based Management of Coral Reefs: An Essential Requisite for Certification of Marine Aquarium Products Harvested from Reefs Under Customary Marine Tenure. Chapter 11: 141-166 In: Marine Ornamental Species: Collection, Culture and Conservation. Cato, J and C. Brown Editors. Iowa State Press/ Blackwell Scientific Publications, NY, 395 pp.

Bowden-Kerby. A. 2003. Coral transplantation and restocking to accelerate the recovery of coral reef habitats and fisheries resources within no-take marine protected areas: hands-on approaches to support community-based coral reef management. International Tropical Marine Ecosystems Management Symposium (ITMEMS 2), Manila, Philippines March 24-28th 2003. 15pp. Web pdf file publication.

10. Project Expenditure

Table 3: Project expenditure during the reporting period

Item	Budget (please indicate which document you refer to if other than your project schedule)	Expenditure	Balance
------	--	-------------	---------

11. Monitoring, Evaluation and Lessons

At the start of the project, baseline data was collect at each site and used to help choose specific indicators for monitoring project outputs. The overall indicators of success for the project will be the adoption of the methods developed by the project by the communities and industries alike, establishing sustainable aquaculture-based enterprises to replace the destructive wild coral harvests presently threatening reef biodiversity.

Environmental monitoring of restoration and coral farming sites was to be established to see if the methods are sustainable or have a positive impact on coral reef biodiversity, however the initial plans to adopt Reef Check Methods have not been forthcoming so alternative arrangements are currently being arranged.

The project team have recently identified the need to make information on coral replanting more accessible, as other communities and NGO’s are getting into the area of coral farming for reef restoration and tourism. This information should include appropriate cautions on the wider application of these methods. This points to the need for careful attention to the dissemination of information and training materials relevant to those considering coral replanting programmes.

12. Outstanding achievements during the reporting period

Although the project has made great progress in the first 9 months of operation, it is possibly too early to comment on any outstanding achievements. However, as the project develops and gains strength we do expect it to receive great recognition for its achievements in successfully pioneering positive sustained changes to biodiversity conservation in Fiji and the Solomons.

- **I agree for ECTF and the Darwin Secretariat to publish the content of this section**

Annex 1 Report of progress and achievements against Logical Framework for Financial Year: 2003/2004

Project summary	Measurable Indicators	Progress and Achievements April 2003-Mar 2004	Actions required/planned for next period
<p>Goal: To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but poor in resources to achieve</p> <ul style="list-style-type: none"> • The conservation of biological diversity, • The sustainable use of its components, and • The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources 			
<p>Purpose <i>To conserve coral biodiversity in Fiji and Solomon Islands by addressing the root causes of poverty-driven destructive coral harvesting or over-harvesting through the introduction of sustainable coral farming as a viable economic alternative in the Fiji and the Solomon Islands community based management areas (CBMAs).</i></p>	<p>Monitoring data indicate a significantly increased coral cover and increased biodiversity in reef restoration sites.</p> <p>Communities earning income from certified coral being produced and marketed.</p>	<p>1. Areas in need of restoration have been identified in both countries and initial baseline data and coral replanting are in the process of being established, with small initial trials established in four Fiji sites.</p> <p>2. The initial research coral farms have been well established, and community awareness activities have been carried out, building a foundation for future action.</p>	<p>1. Intensive Solomon Islands restoration work is planned for early May.</p> <p>2. Progress in the area of income generation will be based on the results of coral farming research and the not yet possible marketing trials.</p>
<p>Outputs</p>			
<p>1. Coral farming research sites established in Fiji and Solomons testing sustainable CITES compliant and MAC certifiable methodologies.</p> <p>2. Coral farming established as a direct economic incentive to poor coastal reef-owning communities.</p>	<p>1. Environmentally sustainable coral farming and coral replanting methods developed and implemented in 6 field sites.</p> <p>2. At least six communities in areas being affected or threatened by destructive coral harvesting become</p>	<p>1. Three coral farming sites established in Fiji, actively testing whether or not the summer months are suitable for the work, with additional pilot work to assess site suitability in two other Fiji sites and in the Solomon Islands</p> <p>2. Awareness raising and management planning workshops conducted in the</p>	<p>1. Project was under-funded as far as the number of sites the project is able to support, but a States of Jersey grant, with additional support for the Darwin Initiative work has now been secured.</p> <p>2. Important to integrate coral farming with an overall reef conservation and</p>

<p>3. Establishment of coral farming as a sustainable alternative to uncontrolled harvesting.</p> <p>4. Handbooks produced.</p> <p>5. Minimum of 100 people trained.</p>	<p>actively engaged in coral replanting and coral farming.</p> <p>3. Acceptance of farmed corals by industry.</p> <p>4. Handbooks printed and distributed.</p> <p>5. Trained community members running coral farms.</p>	<p>prospective coral farming communities, increasing community understanding of and acceptance of the approach.</p> <p>3. The first 450 farmed corals must grow a few more months before they we can start fulfilling this output</p> <p>4. Preliminary draft of coral gardening handbook, focusing on replanting reef areas harvested in the Solomon Islands</p> <p>5. An initial non-intensive demonstration/ hands-on training has been conducted in three communities (8 fish wardens and 48 other adults and youth, plus 50 school children).</p>	<p>management approach</p> <p>3. Cultured corals from the research farms will be ready in August for trials with exporting companies</p> <p>4. Refine and circulate the draft. Handbooks on commercial coral farming methods may or may not be appropriate for wider distribution, as it may encourage coral farming in areas not tied to reef conservation.</p> <p>5. Full training can not be conducted until companies express willingness to place guaranteed orders for sustainable grown, high-quality farmed corals.</p>
--	---	--	---

Note: Please do NOT expand rows to include activities since their completion and outcomes should be reported under the column on progress and achievements at output and purpose levels.

Annex 2: Darwin First Year Work Plan: September 2003- August 2004

x = not initiated when planned; ✓ = completed; √ = initiated; √ = initiated late; √ = completed late; o = planned

WS = Wana Sivoi will lead ; ES = Etika Sing will lead; ABK= Austin Bowden-Kerby will lead

Fiji Work: Moturiki	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug
Agree on conditions for work	√	√	√									
Scope for and designate 3 coral farming sites ABK and ES		√	√	-	-	-						
Design experiments and monitoring protocols ABK	√	√	√	-	-	-	√					
Baseline surveys; biological ABK and independent outside consultant			√	x	x	x	√		o			o
Baseline surveys; socioeconomic WS			x	x	x	x			o	o		
Setting up coral farming experiments ABK and ES			√	x	x	x	√	√				o
Monthly (Quarterly or regular) site visits for monitoring field experiments ABK and ES			√	x	x	x	√	√		o		o
Carry out restoration activities and experiments ABK and ES				x	x	x	√	√			o	
PLA workshop in Savuna (changed to Naivabevabe) WS, ES NEW OUTPUT			x	done								
Assist the community with demarcating their MPAs ES NEW OUTPUT			√ Uluibau			√ Daku		√ Niubas aga		o Savuna	o Other three villages	
Fish Warden's training workshop Govt, WS, ES, ABK NEW OUTPUT				x					o			
P. Fisheries Officer Involvement WS, ES				√			x			o	o	
Fish catch data collection by fish wardens WS, ES, ABK NEW OUTPUT										o		

Community training in biological monitoring WS, ES, ABK,				x						o		
Training communities in coral planting, and raising awareness on corals to lowering negative impacts in the environment ABK, ES							√				o	
Project monitoring and evaluation strategy developed ABK, WS				x	x	x	x	o				
Carrying out the strategy, following the implementation of community management plans WS, ES			√				√	√		o		o
Maintain Government Protocols and Contacts, including Lomaiviti Provincial Meetings WS							√					?
Darwin Quarterly Reports from FSPI to JWP WS, ABK, HG				√				o				o
Feedback on suitability of our cultured corals with Fiji-based companies ABK												o
Fiji: Malolo/ Mamanucas												
Negotiate with Musket Cove Resort for additional resources ABK and AD NEW OUTPUT		√	√		√							
Scope for and designate research site ABK				√								
Design experiments and monitoring protocols ABK	√			√								
Rapid assessment surveys ABK				√								
Baseline surveys of restoration sites												
Start setting up restoration experiments. Malololailai ABK				√	x							

Monitoring visit for assessment of pilot experiments at Malololailai ABK									o			
1 PLA workshop for Tavua and Yanuya (Mamanuca) WS NEW OUTPUT									√			
Coral Planting workshop, financed in part by the resorts ABK, WS, ES NEW OUTPUT												o
Fiji: Conua/ Coral Coast												
Meeting with OISCA and initial site visits in Conua ABK and ES		√	√									
OISCA collaborations: to include sharing information on each site, problems encountered, trouble shooting, etc ABK, ES										o		
As time allows, re-monitor the fish houses at Shangri-La ABK, ES												
Draft Coral Gardening Guidelines for OISCA, resorts, and ongoing work outside of our control ABK										o		
Solomon Islands Work												
Experimental design for Initial Solomon Islands coral work ABK, HG									o			
Malaita coral restoration experimental set up work and baseline monitoring ABK, SW										o		
Quarterly monitoring/ maintenance visits SW											o	
Site scoping and community work in Ngela,					√		√			o		o

Guadalcanal, and Malaita, with implementation of work as indicated by results <i>SW, ABK</i>												
Regional FSPI Work												
<i>Draft rapid assessment protocols and methods</i> ABK NEW OUTPUT								<i>o</i>				
<i>Draft Publications: ABK</i> - coral farming methods handbook - coral restoration handbook		<i>√</i>								<i>o</i>		
<i>Evaluate available economic and market studies</i> HG	<i>x</i>	<i>√</i>	<i>x</i>							<i>?</i>		
<i>Develop socioeconomic monitoring protocols</i> HG										<i>o</i>		
<i>Compile market information and economic weak points</i> HG		<i>x</i>	<i>x</i>	<i>x</i>								<i>o</i>

