**CEPF FINAL PROJECT COMPLETION REPORT**

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| **Organization Legal Name:** | University of the South Pacific |
| **Project Title:** | A Pilot Study of the Impacts of Climate Change on Fiji's Cloud Forest |
| **Date of Report:** | 12.6.2013 |
| **Report Author and Contact Information** | Senilolia H. Tuiwawa senilolia.tuiwawa@usp.ac.fj/tuiwawasenilolia@gmail.com |

**CEPF Region:** Polynesia-Micronesia

**Strategic Direction:** 2. Improve management of key biodiversity areas

**Grant Amount** $49,300

**Project Dates:** January 1, 2010-December 31, 2012

**Implementation Partners for this Project (please explain the level of involvement for each partner):**

Dr. van Konrat - Field Museum, Chicago, USA

The bryologists involved were Dr. Matt van Konrat and other bryologists from the Royal Botanic Gardens (Australia) - Dr. Elizabeth Brown and Dr. Matt Renner, from LandCare New Zealand (Dr. Allan Fife), from Norway Dr. Lars Stroedum, the field Museum (USA) Dr. Thorsten and several fern specialists from Te Papare Museum (New Zealand).

A joint field expedition team, comprising the bryologists and the Fiji technical group were put together for the first collections on the 28th August - 15th September, 2011. The involvement of the various specialists, in the field collection was quite intense, as most of these were for their own research purposes, also funded through Conservation International. Together, collections were undertaken in potential sites to place long term monitoring plots and data loggers - these areas included Mt. Washington (Kadavu), Mt. Voma, Monasavu area and Mt. Nabukelevu (Viti Levu). During collection, there were also on site 'crash course' field training in recognizing some of the major bryophyte groups. Allan Fife was heavily involved in the moss training, Matt van Konrat and Matt Renner in the liverworts training. There was confirmation from the Field Museum of having a proper and formal training at the Field Museum including a complete checklist of bryophytes found but neither one fell through for unexplained reasons towards the end of both 2011 and 2012. This was despite our full participation in facilitating all visits thereafter the 15th of September, 2011.

Dr. Allan Fife & Dr. Leon Perry - Te Papare Museum Herbarium & LandCare NZ

> Allan Fife's involvement was kept at a minimal but was very helpful and effective in the field - we were in agreement to his participation in verifying some of the collection that would be later published as the first documentation of areas visited.
>
> Leon Perry - currently the authority on Fiji's fern was also heavily involved however, he has just completed an updated fern flora of Fiji (2 weeks after 28th February, 2012) that is now available on the Te Papa Museum website. We will be publishing a field guide of Fiji's fern that will be out before the end of this year - as it will also include some of the cloud forest data.

Mr. Samu Lagataki - Department of Forestry, Fiji

> Mr. Lagataki has been very supportive in the field component of the project. For all the trips undertaken, various forestry personnel were actively involved in chauffeuring of team members, implementing the traditional protocols, and were amongst other village locals, field guides in areas to be surveyed. Forestry personnel also assisted in the preparations of specimens for research and translation of local dialects.

## Conservation Impacts

***Please explain/describe how your project has contributed to the implementation of the CEPF ecosystem profile.***

**Problem – Improving the current management of these protected areas.**

It has pioneered cloud forest work in the pacific, profiling important ecosystems that not only are the source of water catchments to the lower altitudinal ecosystems, but subjective to other research areas and/or ecosystems subject to the impact of Climate Change. Knowing what's on the ground would provide a stronger strategic investment approach in managing the existing protected areas such as Monasavu catchment, in Fiji as well as identifying possibly other areas to fall into the same category of protection and investment.

***Please summarize the overall results/impact of your project.***

**Project Approach (500 words)**

Prior to any assessment, permission of the various local authorities (i.e. Conservator of Forest and Conservation International Fiji) was approached with the involvement of one personnel. Personnel participation included the implementation of traditional protocols, selection of local guides of the areas surveyed as well as participation in the basic data collections and identification techniques involved. Baseline data undertaken recorded a

total of 713 taxa of which there were 429 taxa of vascular plants, 253 bryophytes and 38 lichens. Vascular plants comprised 402 taxa identified to the species level and 70 taxa to the genus level. In total, there were 383 angiosperms (320 dicots and 63 monocots), 35 ferns and allies and 11 gymnosperms. Altogether 402 taxa identified to the species level and 70 unidentified species to which there were 347 native species (263 dicots and 41 monocots) comprising of 163 endemic species and (160 angiosperms and 3 fern and fern allies) 184 indigenous species (141 angiosperms, 2 ferns and 3 gymnosperms). A total of 75 introduced species (73 angiosperms and 2 fern and fern allies) were recorded and seven recognized invasive species. Four taxa were encountered that were considered important to highlight due to their rarity, botanical significance, very recent discovery in Fiji and conservation status (IUCN Red Listed) namely- *Podocarpus affinis*, *Acmopyle sahniana*, *Degeneria vitiensis*, *Macodes* cf. *petola* and *Cyphosperma tanga*. Ecologically, the study indicated Fiji's cloud forest ecosystem likely to occur at a 750m a.s.l. (Kadavu) and at 850m-1323m a.s.l. (Viti Levu). On site, anthropogenic activities (roads, regular visitation and mismanaged agricultural activities and/or eco-tourism), are the focal forms of major disturbance. In the more relatively intact forests, the incursion of established invasive species from adjacent vegetation (such as the lowland and upland vegetation) is the only major form of disturbance. The major habitat and/or forest type are the ridge and slopes that often dominated by mixed species composition of *Flagellaria* species, *Metrosideros collina*, *Podocarpus affinis*, *Syzygium* species to list a few. Of the 253 bryophytes there were, 55 species of mosses identified to the species level and 12 to the genus level, 172 species of liverworts and 9 species of hornworts with 38 species of lichens. Bryophyte collection was quite massive, as it is a poorly documented group but important for climate change purposes. To date, the floral, distribution and conservation status of bryophytes and lichens is work in progress whilst ecology and systematics study would be a frontier of research of the group for Fiji. Dually note these numbers are tentative as this pilot project excludes other potential sites in the outer islands. Given the few documents that are available on both the vascular and non-vascular plants in the area, any substantial measure of climate change impact would only be possible via establishing of weather stations. Weather conditions in the initial proposed timeframe would not have provided any substantial information on the impact of climate change, given they were consistent cyclones and heavy rainfall in the 2 years of the project and the 6 months allocation.

**Link to CEPF Investment Strategy**

Strategic Directions 2. Strengthen the conservation status and management of 60 key biodiversity areas.

The baseline data obtained puts into question a few plant species currently on the IUCN list and the management activities on the ground to protect its population given the historical threats of logging and mining. E.g. *Podocarpus affinis* and *Acmopyle sahniana* populations were discovered on high altitudinal ridges in the areas of collection but these areas are very prone to current logging and mining initiatives.

Investment Priority 2.2. Improve the management of existing protected areas that are priority sites outcome. Actions for the project are in direct support of the investment priority 2.2 list above.

It will expand the current protected areas to potential biodiversity hotspot sites.

**Planned Long-term Impacts - 3+ years (as stated in the approved proposal):**

1. Implementation of conservation strategies for Fiji's Cloud forests that takes into account climate change impacts

The long term impact of attaining primary data of this ecosystem will strengthen current and future conservation strategies, especially in the review of existing environmental legislations and laws on biodiversity.

2. Supplement current regional mitigation and adaptation activities towards climate change.

This pilot study is the first of its kind to look into the mitigation and adaption activities of climate change in a high altitudinal ecosystem, particularly in the south pacific. Existing activities on climate change is mostly on communal adaptations and mitigation of coastal dwellers with very few or no study at all looks at the impacts of mountain areas, which is rather critical given they are the source of water catchments. Further studies relating to these can only supplement current information obtained off the study.

**Actual Progress Towards Long-term Impacts at Completion:**

**Planned Short-term Impacts - 1 to 3 years (as stated in the approved proposal):**

Increased understanding of the actual and potential impacts of climate change on cloud forest systems in Fiji.

This study was the starting point to our knowledge on the type of elements and variables that exists in this ecosystem, the type of climatic conditions, the social, scientific response to undertaking this type of studies and the outcomes.

**Actual Progress Toward Short-term Impacts at Completion:**

The objective of the short term impact was to increase understanding of the actual and potential impacts of climate change on cloud forest systems in Fiji.

The process of ground-truthing and obtaining the baseline data of this system has been very useful in understanding the dynamics of cloud forest system and how much of further work that have yet to be done. It has also indicated that any measure to the impact of climate change on cloud forest system is best met at establishing weather stations for long term monitoring.

**Please provide the following information where relevant:**

This project was carried out into existing areas of biodiversity hotspots in Fiji.

**Hectares Protected:** n/a
**Species Conserved:** n/a
**Corridors Created:** n/a

***Describe the success or challenges of the project toward achieving its short-term and long-term impact objectives.***

Success

1. The most successful component of the project was the documentation of organisms in the areas. For both the short and long term objectives, the information obtained is both fundamental and groundbreaking for new discoveries of current and future research. Some of the areas visited would provide the first ever record of plants in the area. Publications of these are currently in preparation.

2. The second most successful component of the project was identifying areas where long term monitoring gadgets (i.e. weather stations and/or data loggers) would not work including biological indicators of climate change in a cloud forest system.

3. Thirdly, there are several potentially new species and biological indicators that were collected and recorded to occur in the cloud forest vicinity. These were identified only to the genera level including several unknown taxa.

4. The first field guide book for bryophytes in Fiji's Cloud forest will be published. This was seen as an important need after the brief social encounter and interactions with the locals. Attached is the front and back cover of the booklet- these are in both the English and Fijian (i-taukei) translations. Process of review is currently underway in addition to the standard posters and pamphlets.

Challenges

1. Organizing a joint expedition comprising an international group and schedule date for collection.

2. Weather - aftermaths of cyclones in the last 2 years; unpredictable rain and adverse weather conditions in the high altitudes were unexpected.

3. Lack of bryology expertise in Fiji - lag in identification lists after training of students.

4. Overseas counterparts failed to fall through after verbal discussions on the training of the project coordinator in the field of bryology including conferences agreed to via e-mail to represent the project.

***Were there any unexpected impacts (positive or negative)?***

Negative
1. Failure to comply with some of the challenges listed resulted to lagging in meeting some of the objectives on time.

Positive
1. Under our own initiative-we have compiled a few guiding tools for awareness purposes that was thought necessary for the locals and villages that were interested in the project. These have been translated in both English and Fijian (i-taukei) languages and will be made available for distribution later on the year.

**Project Components**

**Project Components***: Please report on results by project component. Reporting should reference specific products/deliverables from the approved project design and other relevant information.*

**Component 1 Planned:**
Flora for the Cloud forest of Fiji

**Component 1 Actual at Completion:**
Done

**Component 2 Planned:** Vegetation Ecology of the Cloud Forest in Fiji

**Component 2 Actual at Completion:**
Done

**Component 3 Planned:** Taxonomic/systematics and biogeographic review of selected plant groups

**Component 3 Actual at Completion:**

Done

**Component 4 Planned:** Long term monitoring of climate change

**Component 4Actual at Completion:**
It was also determined that 6 months period is not and will not suffice the primary weather information due to the adverse and unique weather conditions in the high altitudinal areas. Thus, we have eliminated possible areas of not planting data loggers due to firsthand experience of adverse weather. Also decided in the field, that we weather stations and or data loggers were to be used - these are still on order, and will be put into place for long term monitoring.

**Component 5 Planned:** Capacity Building

**Component 5 Actual at Completion:**

Community level:

Produced field guide (book) and posters translated in both Fijian (i-taukei) and English languages

Technical level:

Produced posters, pamphlets and a book made available to the South Pacific Regional Herbarium and the Institute of Applied Sciences at the University of the South Pacific, Fiji for the distribution

Forestry personnel with a bit more knowledge, awareness and hands on experience with basic botany

Academic level:

PhD level - Looking for scholarships and universities for further studies in the subject area

Institutional level:

Attained funding to further cloud forest works in the Cook Islands

***Were any components unrealized? If so, how has this affected the overall impact of the project?***

1. Adverse weather conditions of high altitudinal areas were underestimated and it resulted in the delay of carrying out the field work for several weeks and months.

2. Repetitive low depression and cyclones in the last 2 years has been overwhelming with similar impact stated in point 1.

***Please describe and submit (electronically if possible) any tools, products, or methodologies that resulted from this project or contributed to the results.***

Attached is the front and back cover of the two field guides that will be published later on the year.

- Primary book awareness materials:
    1. A Field guide to the Bryophytes in Fiji's Cloud Forest [Fijian (i-taukei) and English translation]
    2. A Field Guide to the Large Ferns of Fiji

## Lessons Learned

***Describe any lessons learned during the design and implementation of the project, as well as any related to organizational development and capacity building. Consider lessons that would inform projects designed or implemented by your organization or others, as well as lessons that might be considered by the global conservation community.***

***Project Design Process: (aspects of the project design that contributed to its success/shortcomings)***

- Qualification and Experience play critical role in the design of the project. This project was fortunate to have a people within the organization with both aspects as they provided insightful prospects and feasibility of the project being carried out.

***Project Implementation: (aspects of the project execution that contributed to its success/shortcomings)***

- Adverse and unpredictable weather conditions can be the biggest set-back in implementing field work activities in a cloud forest system-regardless of how good the design maybe. But it is also a good learning ground that safety and liability of the team members is paramount to anything else when in the field.

***Other lessons learned relevant to conservation community:***

- On observation, monetary value seems to take precedence over the environment or any aspect of research in areas, particularly biodiversity hotspot areas. It looks as though, the biggest challenge for the conservation community will be to convince the landowners, local people or the grass root people alternative compensation means to support any form of conservation.

## Additional Funding

***Provide details of any additional funding that supported this project and any funding secured for the project, organization, or the region, as a result of the CEPF investment in this project.***

| Donor | Type of Funding* | Amount | Notes |
|---|---|---|---|
| MacArthur Foundation | Project Co-Financing | US$25,000 | |
| University of the South Pacific | Project Co-financing (In-kind) | US$8,000 | |
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***Additional funding should be reported using the following categories:***

***A*** *Project co-financing (Other donors or your organization contribute to the direct costs of this project)*

***B*** *Grantee and Partner leveraging (Other donors contribute to your organization or a partner organization as a direct result of successes with this CEPF funded project.)*

***C*** *Regional/Portfolio leveraging (Other donors make large investments in a region because of CEPF investment or successes related to this project.)*

## Sustainability/Replicability

***Summarize the success or challenge in achieving planned sustainability or replicability of project components or results.***

None

***Summarize any unplanned sustainability or replicability achieved.***

## Safeguard Policy Assessment

***Provide a summary of the implementation of any required action toward the environmental and social safeguard policies within the project.***
None

## Additional Comments/Recommendations

None

## Information Sharing and CEPF Policy

CEPF is committed to transparent operations and to helping civil society groups share experiences, lessons learned, and results. Final project completion reports are made available on our Web site, www.cepf.net, and publicized in our newsletter and other communications.

**Please include your full contact details below:**

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*****If your grant has an end date other than JUNE 30, please complete the tables on the following pages*****

**Performance Tracking Report Addendum**

| **CEPF Global Targets** | | | | |
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| **(Enter Grant Term)**<br><br>**Provide a numerical amount and brief description of the results achieved by your grant. Please respond to only those questions that are relevant to your project.** | | | | |
| **Project Results** | **Is this question relevant?** | **If yes, provide your numerical response for results achieved during the annual period.** | **Provide your numerical response for project from inception of CEPF support to date.** | **Describe the principal results achieved from July 1, 2007 to June 30, 2008. (Attach annexes if necessary)** |
| 1. Did your project strengthen management of a protected area guided by a sustainable management plan? Please indicate number of hectares improved. | n/a | | | |
| 2. How many hectares of new and/or expanded protected areas did your project help establish through a legal declaration or community agreement? | n/a | | | |
| 3. Did your project strengthen biodiversity conservation and/or natural resources management inside a key biodiversity area identified in the CEPF ecosystem profile? If so, please indicate how many hectares. | n/a | | | |
| 4. Did your project effectively introduce or strengthen biodiversity | n/a | | | |

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| conservation in management practices outside protected areas? If so, please indicate how many hectares. | | | | |
| 5. If your project promotes the sustainable use of natural resources, how many local communities accrued tangible socioeconomic benefits? Please complete Table 1below. | n/a | | | |

**If you answered yes to question 5, please complete the following table**

**Table 1. Socioeconomic Benefits to Target Communities**

**Please complete this table if your project provided concrete socioeconomic benefits to local communities. List the name of each community in column one. In the subsequent columns under Community Characteristics and Nature of Socioeconomic Benefit, place an X in all relevant boxes. In the bottom row, provide the totals of the Xs for each column.**

| Name of Community | Community Characteristics | | | | | | | | Nature of Socioeconomic Benefit | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Increased Income due to: | | | | | | | | | | | | | |
| | Small landowners | Subsistence economy | Indigenous/ ethnic peoples | Pastoralists/nomadic peoples | Recent migrants | Urban communities | Communities falling below the poverty rate | Other | sustainable natural resources management | Ecotourism revenues | Park management activities | Payment for environmental | security due to the adoption of sustainable fishing, hunting, or | More secure access to water resources | or other natural resource due to titling, reduction of | natural disasters (fires, landslides, | More secure sources of energy | public services, such as education, health, | traditional knowledge for environmental | decision-making due to strengthened civil society and | Other |
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| **If you marked "Other", please provide detail on the nature of the Community Characteristic and Socioeconomic Benefit:** |
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