The Rufford Small Grants Foundation

Final Report

Congratulations on the completion of your project that was supported by The Rufford Small Grants Foundation.

We ask all grant recipients to complete a Final Report Form that helps us to gauge the success of our grant giving. We understand that projects often do not follow the predicted course but knowledge of your experiences is valuable to us and others who may be undertaking similar work. Please be as honest as you can in answering the questions – remember that negative experiences are just as valuable as positive ones if they help others to learn from them.

Please complete the form in English and be as clear and concise as you can. We will ask for further information if required. If you have any other materials produced by the project, particularly a few relevant photographs, please send these to us separately.

Please submit your final report to jane@rufford.org.

Thank you for your help.

Josh Cole, Grants Director

Grant Recipient Details	
Your name	Catherine L. Craig
Project title	Scaling-up and monitoring the ecological and economic impacts of the CPALI Wild silk project
RSG reference	9428-B
Reporting period	July 2011-July 2012
Amount of grant	£12,000
Your email address	ccraig@cpali.org
Date of this report	9 July 2012

1. Please indicate the level of achievement of the project's original objectives and include any relevant comments on factors affecting this.

CPALI together with our Malagasy Affiliate, SEPALI-M, has at least partially achieved all of the objectives we proposed. Our major achievements include the recruitment of a significant number of new farmers, partnering with the US Peace Corps for training, partnering with Cornell University for soil monitoring, and continued development of markets position, which position us well to continue to accelerate our scaling and beneficial effects. **+++ beyond expectation**

Objective	Not achieved	Partially achieved	Fully achieved	Comments
Organise lead farmers' programme; organise women's groups			+	Farmer leaders had their first meeting in July 2011. The first women's groups were organised in August 2011 and joined the farmer's meetings in November 2011. Farmer and women's group leaders meet every 3 months for training, network building and brainstorming to integrate farmers' ideas into the work.
Biological monitoring		+		We initiated mapping coordinates of farms but have not yet trained farmers to map their land and monitor plant and animal life. While we hope to do this in the future, currently all GIS work is being done by team members.
Inter-cropping		+		We have continued to inter-crop silk moth host plants on family farms but have not yet inter-cropped additional native, food trees, however, we have convinced farmers to intercrop vegetable crops such as cassava. Enhancing food security is a new initiative for the US Peace Corp who is introducing farmers to new kinds of vegetable crops. Our PC volunteer is involved in the programme and her work will benefit our farmers.
Soil Monitoring		+		We received additional support from Cornell University to initiate a long-term soil-monitoring programme by a recent Cornell PhD, Dr. Lydiah Gatare. I have been working with Lydiah since January to design the program and she will travel to MG in October 2012 to initiate soil mapping. Included is an illustration (Figure 1a,b) of the effects of our mulching and inter-cropping program to build soils in our demonstration site in Maroantsetra. We will use quantitative measures (e.g., nitrogen content) to track the effects of our treatments on our farmers' sites.

Textile production			+	SEPALI held two textile worships during the past year and will hold at least two more before the end of 2012. The last workshop was held in my absence (a first) and the team produced 5 m^2 of non-spun textile to specification that was sold to Habu Textile in New York. Our sale to Habu Textile is significant since they are our first, repeat buyer. Furthermore, Habu is opening a store in Japan and has assured me that our textile will be sold in it. Our focus for the rest of 2012 is to increase production by all farmers and the team's goal is 60 m^2 for 2012 and 240 m^2 for 2013.
Rear larvae			+	We have trained 45 farmers to rear larvae; of those, 30 farmers are currently engaged in rearing and seven farmers (two women, five men) have deposited cocoons in SEPALI's cocoon bank. We devised a new, 2-year incentive programme (see below) to stimulate farmers to work together as well as allow us to quantify the effects of social relationships on farmer rearing success.
Expand sites			++	The SEPALI program has expanded from six to 14 villages. One farmer from Sambava (an eastern coastal town, where no recruiting has taken place) voluntarily walked across the Masoala Penninsula to register with SEPALI! We hope that this suggests that people in new areas of Madagascar are learning about the programme.
Increase farmer number			++	We have registered 170 farmers in our 14 communities; 49 SEPALI members have each inter-cropped 250 trees on their farms. We are now working on training new farmers to plant nurseries and anticipate that over 100 of them will have inter-cropped 250 trees on their farms by the end of 2012. Our local director predicts that we need to register 500 farmers to ensure that at least 200 will succeed in rearing larvae. My goal is to make our current farmers more productive.

2. Please explain any unforeseen difficulties that arose during the project and how these were tackled (if relevant).

Insecticide free nets. Initially, we had planned to recycle anti-malarial nets to make host tree nets but we found it difficult to adequately remove the insecticidal coating. Fortunately, in February

2012, Prof. Christian Borgemeister, the Director General of ICIPE, who I met at a seminar at Harvard, pointed me to a source of insecticide-free nets. The factory, *Vector Health*, located in Arusha, Tanzania, is a joint venture between Sumitomo Chemical (Japan) and A to Z Textiles Mills LTD (Tanzania). The nets are made out of polyethylene and are both stronger and cheaper than our current nets. Furthermore, *Vector Health* is introducing nets to protect agricultural products and is interested in our experiments. Hence, they donated an initial 94 nets but CPALI is paying for the shipping. In the future we plan to purchase our nets from *Vector Health* once we have tested the effect of net colour and net pore size on rearing effectiveness. The lack of appropriate nets has delayed our rearing in 2012.

Supply Logistics. Our recent challenge is to arrange shipment from Tanzania to Madagascar. That process took 3 months. Nevertheless, the team has established an import/export relationship with, Velogic, a reliable, Malagasy company. I am happy to report that our first shipment arrived by airfreight last week and our local director predicts that it will arrive in Maroantsetra by 15 July. As the project expands, future shipments will be made via container vessel.

Farmer motivation. A continuing problem is to motivate *all* farmers. Last year we organised the first farmer's picnic and T-shirt competition. Farmers who had inter-cropped at least 250 trees on their farms received a special issue, SEPALI T-shirt and picnic invitation. That approach was very successful in encouraging farmers to plant trees. We will hold another competition to encourage our new farmers to inter-crop their seedlings by the time of the 2012 farmers' picnic. In addition, I am working with the team to establish a new incentive programme to invest farmers in assisting other members of their rearing group. Specifically, for every 2000 cocoons (½ kg), deposited by a group member into SEPALI's cocoon bank, a 100-cocoon bonus will be awarded to each member of that group who has deposited at least as many cocoons. Our hope is that group members will encourage each other to raise larvae and eliminate "free-riding" by non-producing farmers. The cocoon incentive programme is designed to be a 2-year programme. At the beginning of the second year of the programme, farmers can reorganise their groups and decide with whom they would like to share rearing bonuses. These data will be analysed to determine the effects of group, network organisation and network member update on farmer motivation. Hence, the rearing programme will give us insight into farmer behaviour.

3. Briefly describe the three most important outcomes of your project.

1. ***Enthusiasm and recognition***. The local team is taking more responsibility for the project especially in the training and organization of farmers, farmer leaders, and women's leaders. Farmers are taking a more active role participating in the project through leader meetings and using the meetings to suggest how SEPALI can improve its programme. SEPALI Madagascar's popularity continues to grow because early adopters have received payments for cocoons produced. Our progress has been recognised by two international awards: A SEED Initiative Award from the UN and an invitation from the US Department of State to our Project Director to participate in a 2-week NGO training programme held in the US in early June, 2012. We have also attracted the attention of the US Peace Corps and our work now benefits from participation by a Peace Corps Volunteer, who has learned Malagasy and has provided valuable advice to the project team and collation of project data.

2. ***Innovative practice***. We established a "cocoon bank" that allows us to begin to build a "financial infra-structure" into the farmer's barter economy. Farmers deposit cocoons into the bank to build up assets or, if they choose, they can receive immediate payment. Members of our women's groups

(all members of the women's groups are also farmers) are able to "borrow" cocoons to make our innovative non-spun textile. CPALI sold all of its stock from the previous workshop to Habu Textile (www.habutextile.com) in New York. At the recent International Contemporary Design Fair in New York, I talked with potential buyers who assured me that our textile would be of interest to them as soon as we can increase production. Recently, DWELL on Design, one of the foremost arbiters of contemporary design in the US, displayed a textile sample at their Los Angeles show in June 2012. This represents our first introduction to the affluent, eco-aware markets in western US.

3. ***Assessment of programme effects on soil***. A programme to initiate long-term soil monitoring has been planned. Soil assessments will allow us to determine the effects of the silk moth host plants on farm soils. By putting a soil-monitoring programme in place in our communities now, we will have the basis for long-term tracking of the environmental effect of this initiative on sustainable farm systems. As an early indicator of the benefits of our work, consider that the CPALI demonstration site in Maroantsetra was built on grey sandy soils like those shown in Figure 1, left. The past 5 years of mulching and care have produced a 60 cm layer of rich loamy top soil that at least looks like it should be more fertile (Figure 1, right). Our soil-monitoring programme will quantify the benefits and inform future soil conditioning.

Figure 1. Left: original soil; Right: soil after 5 years of conditioning

4. Briefly describe the involvement of local communities and how they have benefitted from the project (if relevant).

Farmers can participate in and benefit from the CPALI/SEPALI program in several, cascading ways that stem directly from the biology of the silk-producing moths. Since the whole concept is new to the farmers, we have constructed a graduated scale of participation (Table 1) that encourages participation at a comfortable and sustainable rate.

Table 1. Levels of participation in the CPALI/SEPALI programme

Rank	Threshold	Benefits	Number In 2008	Number to date	Projection for 2015
Registered Farmer	Establish a tree nursery Care for seedlings	Preparation and training for intercropping host plants	5	170	500

Lead Farmer	Provide technical assistance to team	Salary 3 for days/month; invitation to attend lead farmers meetings 4 times/y	0	14	50
SEPALI Member	Inter-crop a minimum of 250 trees on farm	CPALI T-shirt; invitation to farmer picnic; qualified to receive eggs	0	48	500
Breeder	Produce eggs for self and to share	Sell eggs and/or participate in group incentive targets	0	27	250
Producer	Produce cocoons	Earn financial benefits for self and group; enhance soil quality due to mulching; access to added protein from excess pupae	0	9	500

At the start of the current Rufford grant period, we were working with five farmer organisations in the villages of Ambodivoangy, Marovovonana, Ambinanitelo, Ambalamahogo. We now have farmer groups in 14 villages. We have registered 170 farmers and 48 of them have each planted a minimum of 250 trees as of October 2011. We hope to double the number of productive farmers (and the total number of trees) by October 2012. Forty-five of the farmers are trained breeders and 27 have initiated breeding. Nine of our farmers have deposited cocoons in our cocoon bank or have chosen to receive immediate payment. Six women's groups have self-organised to make baskets that the farmers are using to in cocoon production.

We are beginning to gather information about our farmers that allows us to understand which communities members are involved in our programme and why. The average age of our farmers is 49 years. While our initial idea was to focus on 20-30 year old farmers, we learned that farmers in that age group do not typically have land user rights; instead, their parents hold them. Hence, the composition of our programme members mirrors the population that has land user rights and includes both men (average age 49 years) and women (average age 47 years) (Table 2). Our findings also showed no initial gender bias with respect to who joined the project (Figure 2) although in the last month, slightly more men joined (total of 68 women and 81 men). More men (37) have planted slightly more trees (averaging 285 per farmer) than women (27 females, averaging 234 trees per farmer). Participating men have an average of 4 children and participating women have an average of 3 children. Among our 9 producers, 7 men have deposited an average of 701 cocoons per farmer and 2 women an average of 459 per farmer (Table 2).

Figure 2. Farmer characteristics

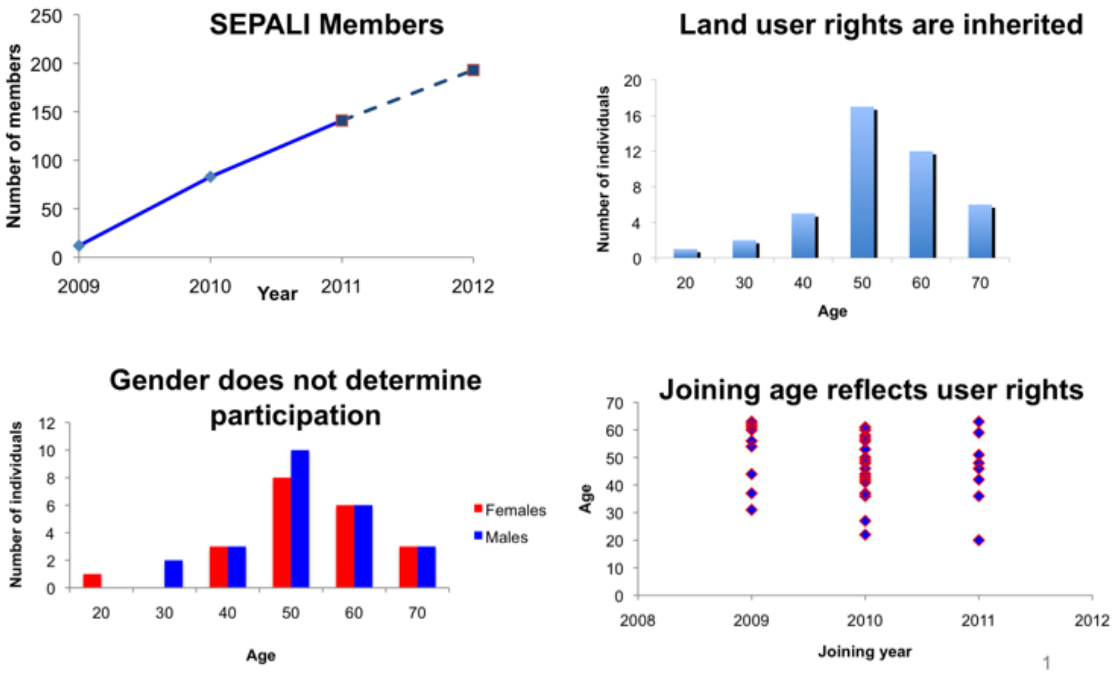

Table 2. Farmer characteristics.

	Males	Females
Average number trees	285(STD=301, N=37)	234(STD=200, N=27)
Deposited cocoons	701 (STD=550, N=7)	459(422;n=2)
Age	49(13) (STD=13, N=28)	47(10; n=24)
Children	4(3; n=14)	3(2.5; n=14)

5. Are there any plans to continue this work?

The CPALI project is continuing and we will be working in Madagascar with SEPALI Madagascar until that organisation is financially independent, targeted for 2015. CPALI would like to generalise this programme to other areas of need in Madagascar and is hoping to collaborate with larger organisations that are already on the ground in new locations. Our goal is to establish a "conservation industry". We envisage different types of wild silk being produced by farmers in different habitats who in turn market their products cooperatively.

6. How do you plan to share the results of your work with others?

We continue to share our work through frequent newsletters written by the SEPALI Madagascar team to document monthly progress and newsletters written by CPALI that illustrate our progress as an

organisation, in the field and in marketing. The SEPALI newsletters are distributed to the farmers, posted on our websites (SEPALI and CPALI) and are distributed to the friends of CPALI and SEPALI (including our funders). In addition, we have written two technical papers, which are in press and should appear by the end of 2012:

2012 Craig, C.L., R.S. Weber, H. Akai. (in press). Wild silk and its potential to support impoverished communities near protected areas. Types, properties and factors affecting breeding and cultivation (Volume 1) Edited by R Kozlowski, Institute of Natural Fibres (INF), Poland.

2012 R.S. Weber, C.L. Craig (in press). Weber, R.S. and C.L. Craig. Wild silk production to support farmers displaced from protected areas. Biotechnology of Silk. (Ed. Thomas Miller). Springer

The CPALI webpage http://www.cpali.org is constantly being updated — and SEPALI Madagascar has now established its own website: http://www.sepalim.org. CPALI also posts project updates on Facebook and Twitter.

In 2011 I gave an invited presentation at Princeton titled "Using social capital to build environmental security in the developing world" and featuring our work in Madagascar. In 2012, I have given seminars at Harvard University, USAID and TEDxFulbright on the CPALI/SEPALI programme. I presented the CPALI program at the Aspen Environmental Forum in June. I will also present a paper at the Ecological Society of America in August, titled: "Enterprise approach to ecosystem security in Madagascar."

7. Timescale Over what period was the RSG used? How does it compare to the anticipated or actual length of the project?

The funds were used over a 1-year period (July, 2011- July 2012), as anticipated. The overall project continues.

8. Budget: Please provide a breakdown of budgeted versus actual expenditure and the reasons for any differences. All figures are in £ sterling.

Item Description	Estimated	Actual cost	Difference from estimate
1. Salaries for lead farmers	1095	582	-513
2. Salaries for 2 new supervising farmers	365	0	-365
3. Cost of nets made in Madagascar	7804	4300	-3504
4. Transportation Boston TNR-Boston	1935	1935	0
5. Air transportation Maroantsetra TNR-Maroantsetra	657	751	94
6. Bank wiring feesx3	97	323	226
7. SKYPE 25/wk 45 wk	1125	748	-377
8. Shipping nets Tanzania to MG		503	503
9. MG customs and clearing		143	143
10. Defrayed costs of farmer onsite training		2767	2767
Total		12052	

Budget notes.
Category 2 was reallocated to new Categories 8-10, which were not budgeted initially.

1. Salaries to lead farmers are not paid unless the lead farmer completes the data sheets that they are required to fill out. Therefore, we paid less in lead farmer salaries than expected.
2. We added one new supervising farmer but he did not pass his trial period. We identified an excellent new local farmer and added him to the team full time. So far the new team member has worked out well but is still in his trial period. We will continue to search for supervising farmers in the villages.
3. Upon receiving Rufford Funds we began making nets by recycling bed nets. Unfortunately, while the team thought nets had not been treated with insecticide, in fact, they had been treated with insecticide. Therefore, the team had to develop a processing system to remove the insecticide. Almost all of the nets that were originally made have now been processed and have been deployed. However, once the problem was identified, we stopped making new nets and begin a search for new materials. I located a source in Tanzania (see above). The nets produced by A to Z Textiles are much cheaper than the nets we purchased in MG. Furthermore, they can be made to order with specified mesh size and colour and because they are made from polyethylene, they will likely last longer than those we bought in Madagascar. The remainder of the funds granted for nets was used to pay shipping costs from Arusha, from Tana to Maroantsetra, for clearing customs and for on-site training in net use.
8., 9. I have delayed submitting this report because I wanted to have a clear idea of the costs of purchasing nets in Tanzania, shipping them, clearing them through customs and sending them to Maroantsetra. I am happy to report that the nets are in Tana but the team is still working to get them cleared through customs. Thanks to the patience of the Rufford Foundation we now have a new source of nets that are cheaper and better than those previously purchased and an import/export system in place for future use.
10. To deploy the nets for rearing, we needed to shift our breeder-training program to the villages. Hence, a portion of the field costs incurred to were paid using Rufford funds.

9. Looking ahead, what do you feel are the important next steps?

1. The most important step continues to be increased cocoon production. Mr Mamy Ratzimbazafy, the Director of SEPALI, estimates that we will need at least 500 farmers to begin to positively affect the local economy and make SEPALI sustainable.

2. We need to build or renovate a building in which we can hold textile workshops and provide a permanent place for women to work.

3. We need to continue to build long-term monitoring on the ecological effects of the project. Our director is sure that none of the farmers are currently expanding their farms in the Makira Protected Area but in the future we need to gather quantitative data to insure the programme is doing what we expect.

4. While we need to continue to expand our marketing, I am increasingly optimistic about the marketability of the products at a price that will return significant profits to the farmers.

5. We need to introduce techniques for rearing of a second silk producer, *Argema mittrei*, a species that feeds on a slow growing host plant and that produces a silk that can easily be spun and woven.

6. Finally, we need to stay aware of the fluid political situation in Madagascar and continue to seek ways that we can expand the programme.

10. Did you use the RSGF logo in any materials produced in relation to this project? Did the RSGF receive any publicity during the course of your work?

YES! The Rufford logo is displayed on our project brochure and Rufford is thanked in our annual reports, website and our project signs displayed at CPALI House Maroantsetra website.

11. Any other comments?

I am extremely grateful for the extended support to CPALI by the Rufford Foundation and I think that our achievements in the past year have been impressive. We believe that we are on the road to significant expansion and are only limited by the size of our team and hence ability to train new farmers in more distant sites.