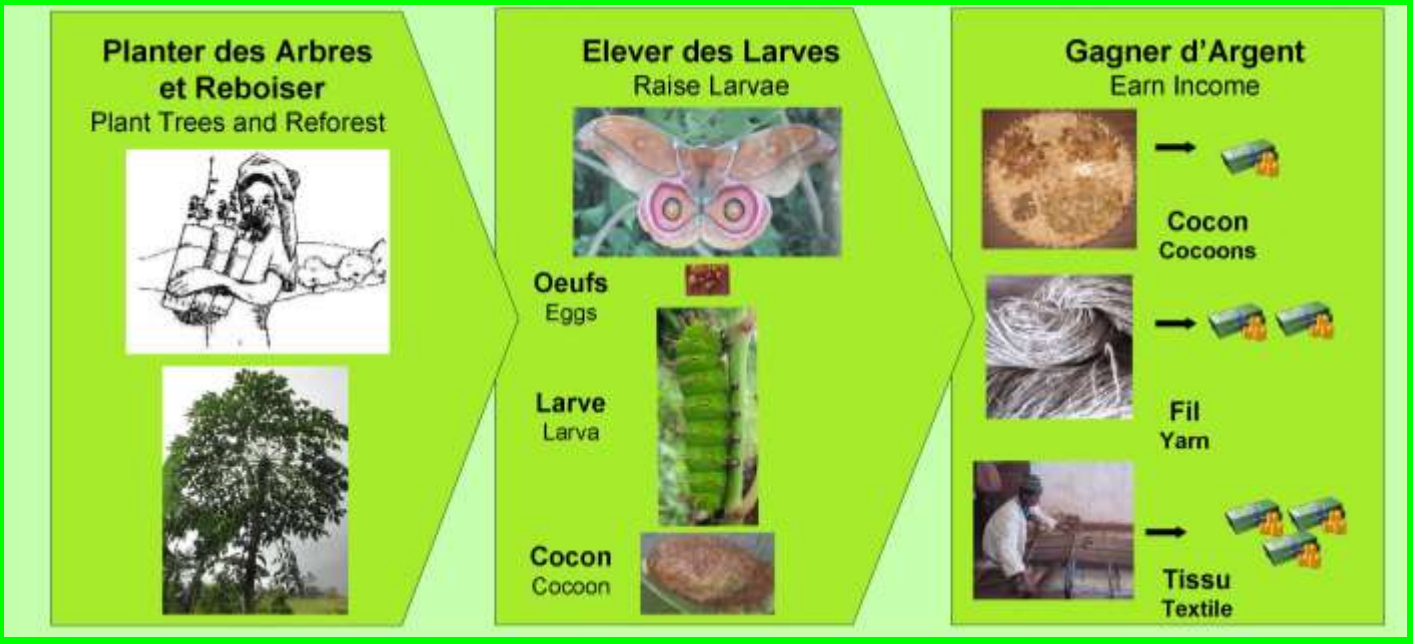



CPALI 18 Month Report
2007-2008



Cover: Above the fold from clockwise from left: Host plant of CPALI target species, Antherina suraka*; A.* suraka *larvae; collection of cocoons spun by* A. suraka; *cocoon found at base of larval host plant.*

CPALI Mission

Conservation through Poverty Alleviation, International (http://www.CPALI.org) is a US-based non-profit organization that works to identify, develop and implement new means of income generation for poor farmers living in areas of high biodiversity or conservation value. We were founded in 2002, incorporated in Massachusetts in 2003 and approved as a 501(c)(3) by the US Internal Revenue Service in 2004. CPALI's mission is to contribute to natural resource conservation by developing integrated, small enterprise systems that link the livelihoods of farm families and communities to the maintenance of natural ecosystems. We are currently working in Madagascar and assisting in the revitalization of the wild silk industry. CPALI is committed to this work because we believe long-term conservation will only be achieved if people living in and near endangered sites have a vested interest in protecting them.

Letter from the President

Dear Friends and Colleagues,
CPALI has had its most exciting year to date. We completed our initial field studies and we are now focusing on implementation. We have established a learning and training center in Maroantsetra for the Makira/Masoala communities. Farmers visiting the center can view the entire process of silk production from egg to finished product. Our gardens contain the plant foods of three species of silk producers and by June we expect to have 6000 tree seedlings of these plants in our nursery.

Our second breeding and demonstration center is in Manamby, an hour bike-ride south of Maroantsetra. This center was established and is run by a local farmer with support from the CPALI team. In addition to producing moth eggs, he has intercropped the silk moth food plant, Talandoa, with vanilla, pineapple, banana and wood crops. His goal (and ours for him) is to become an independent business selling eggs and seedlings to others in his community interested in silk production.

April - May, in collaboration with WCS, we completed field trials of our silk production methods in the community forest of Ambodivoahangy. Two new members of the CPALI team, Ranaivosolo Ravomiarana (a Malagasy student working on a PhD on wild silk moths with Dr. Olga Ramilijaona at the University of Antananarivo) and volunteer Maminirina Randrianandrasana (a Malagasy student working on PhD with May Berenbaum at the University of Illinois, Urbana-Champaign) lived in the community, introduced larvae to naturally occurring plants and monitored silk larvae growth and survival. Their results have lead to critical improvements to our in field methods.

Our goal is to produce, two kilos of high quality, *A. suraka* cocoons (about 8000 cocoons total) by July 2008. The cocoons that are produced by our target species are different than the cocoons produced by most species of silkworm; the cocoon is porous, the thread is porous, they vary in color from deep brown to gold to white and have a bright metallic sheen (cover picture, and Figure 1). Six artists in Tana are taking advantage of the cocoons' unique properties to develop new, high value products. We plan to test market jewelry made from cocoons and Malagasy semi-precious stones during the 2008 holiday

season. Please check the Rainforest Silk Cooperative website (www.rainforestsilk.org), our wholesale arm for wild silk products, and let us know if you have any local stores you would like to stock our current wild silk scarves and wraps.

During January I attended an international meeting in Tana on the effects of global warming on biodiversity and livelihoods. The group discussed the possibility of working to restore forests in Madagascar, and especially along the Eastern Forest Corridor, in an effort to link the forest that currently remains. CPALI is in the unique position of being able to offer a coherent livelihood program that could do just that. The three species on which we are focusing feed on plants that represent different stages of forest growth and succession. By tying the market value of the cocoons to the ecological value of the larval food plant, we may be able to provide new livelihoods that contribute to the restoration of the Eastern Forest Corridor. As a result of the meeting, we have a proposal pending with CI and ANAE, a Malagasy environmental NGO, to initiate wild silk production as part of CI's restoration of the Mantadia Corridor (http://www.conservation.org/learn/forests/Pages/project_mantadia.aspx).

Sincerely,

Catherine L. Craig

Catherine L. Craig, President
Conservation through Poverty Alleviation, International

Latest News from the Field

Target species and plants

During the past year, CPALI identified 3 target species to develop for wild silk production: *A. suraka* (primary interest), *Hypsoides* spp, and "ginger" *Borocera* (Figure 1). These species were selected because of the potential market value of the silk they produce, the ease with which they are reared and the potential conservation value of the host plants on which they feed. Each larvae feeds on a different plant food and each plant type represents a different stage of community plant succession and hence could be integrated into forest protection and recovery in the Makira/Maroantsetra area where we work. "Ginger" *Borocera* feeds on an aggressive, invasive species of native ginger that is common in deforested sites and that often out-competes other plant species. The silk

Figure 1. Target species – larvae, cocoon and moth. A. *Borocera sp*; food plant is *Longusa,* common name is wild ginger. B. *Antherina suraka* male and female (CPALI target species); food plant is *Polycias,* common name is Talandoa. C. *Hypsoides singularis* (ID to be verified). Upper left panel shows 5th stage larvae inside group cocoon spinning outer silk shell; upper right illustrates species in transit and hence the origin of their name, the "processionary moths"; bottom panel shows adult; food plant is *Rhopalocarpus,* common name Lombiry. There are likely multiple species of *Hypsoides* in the Makira/Masoala area that may specialize on different species of Lombiry.

produced by "ginger" *Borocera* is similar to the kind of silk currently used for textiles in Madagascar. *A. suraka* feeds on a fast-growing tree, *Polycias* (Araliaceae), that is found at the edges of forests and in pastures. Its silk is porous, has a metallic surface and can be used for multiple products and crafts. *Hypsoides* sp. (there are two in our area) feeds on the slow-growing, endemic tree, *Rhopalocarpus* sp. (Sphaerosepalaceae). *Hypsoides* silk is extremely soft and pliable. We are tying the economic value of the different types of silk produced by each species to its potential value to restore the Eastern Forest Corridor of Madagascar as well as its material properties. For example, the highest value silk is

produced by *A. suraka* which feeds on fast-growing trees, while the lowest value silk is produced by larvae feeding on invasive plants. Our goal is to encourage farmers to raise larvae on fast growing trees that they inter-crop with food crops, as well as more slowly growing forest species that could lead to reforestation and forest protection.

Surveys and target sites

Our goal is to invest local farmers in protecting forest resources. We do this by adding value to border forests and disturbed sites that edge areas of high conservation value. The Community Managed Forests (COBA's organized by WCS) that border Makira and Masoala protected areas vary in soil types, degree of deforestation and elevation. Not surprisingly, the different COBAs also vary in the distribution and density of food plants fed on by different some types of silk moth larvae than others.

CPALI's approach is to survey the distribution of available food plants in specific sites and determine the availability of existing natural resources that could be used for rearing. CPALI's 2007 field teams (Felipe Trabanino and Mamy Ratsimbazafy; Mia Park and Tsiresy Razafimanantsoa), spent a total of about 4 months in the field mapping the distribution of potential food plants for *A. suraka* and *Hypsoides* as well as collecting *Hypsoides* nests. The *Hypsoides* project mapped and collected cocoons in the four northeast COBAs of Makira and the *A. suraka* project focused in Ambodivoahangy and

Figure 2. CPALI's field teams 2007-2008.

Figure 2 (cont). 2008 Field team initiating field trials in Ambodivoahangy.

Marovonana. Both yielded important data. In particular, *Hypsoides* was found in all forest sites but at different densities. Furthermore, there are probably two *Hypsoides* species in the area that feed on two species of Lombiry. Lombiry is an important mature forest tree and some species are critically endangered. Wild silk production might be a stimulus for farmers to plant these trees instead of cutting them down.

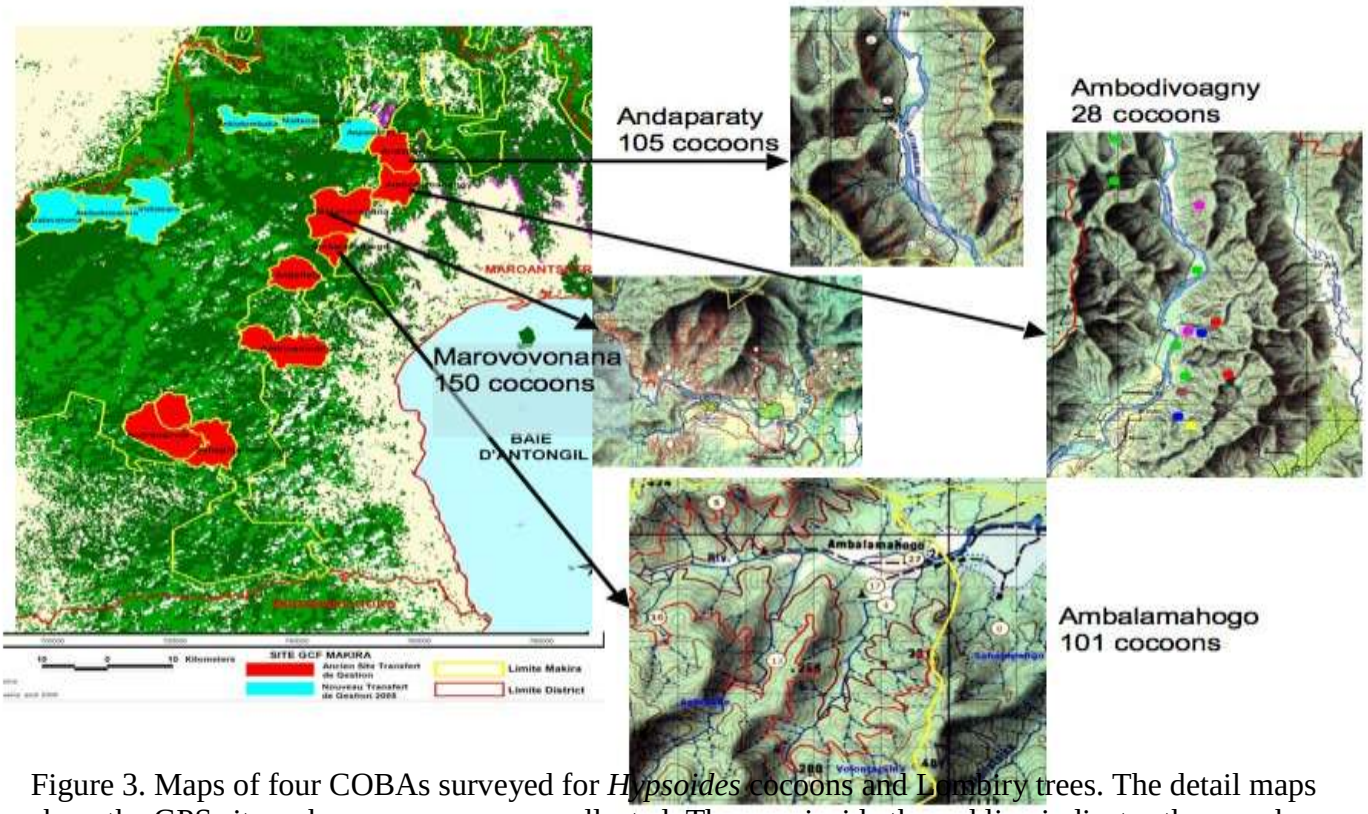


Figure 3. Maps of four COBAs surveyed for *Hypsoides* cocoons and Lombiry trees. The detail maps show the GPS sites where cocoons were collected. The area inside the red line indicates the search area. The yellow line indicates the border between the Makira Protected Area (outside) and the COBA (inside). Bubbles indicate cocoon collection sites; total number of cocoons given in figure.

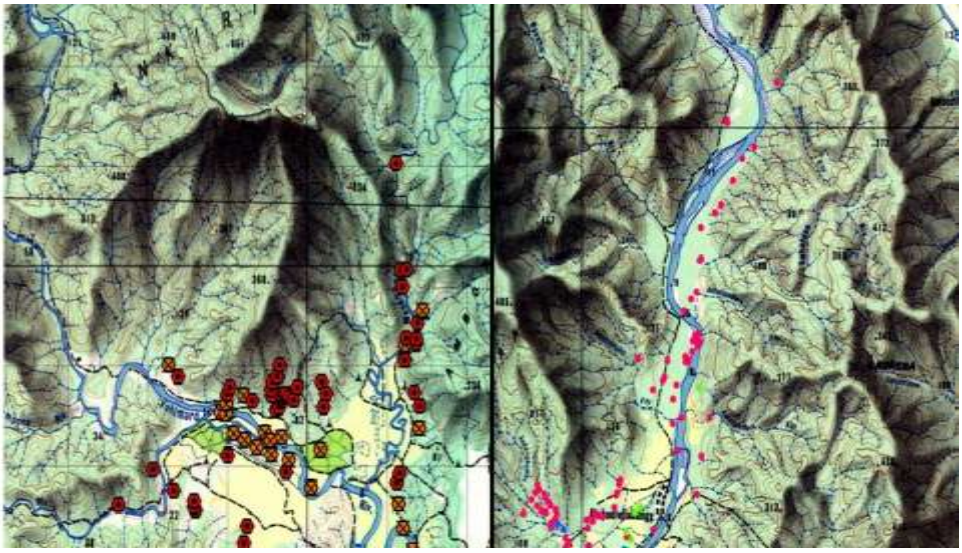


Figure 4. Maps of host plants. A. Map of Talandoa and Antafana in the COBA of Marovovonanana. B. Map of Talandoa, Antafana, and Hintzina in the COBA of Ambodivoahangy.

As a result of this work, and the interest of the communities, CPALI, in collaboration with WCS, completed field trials in Ambodivoahagny in June 2008. The goal of these experiments is to collect information on the viability of our rearing techniques in the field as well as the amount of time a farmer will have to invest to farm larvae in marketable numbers on Talandoa trees.

Designing Sustainable Methodologies for Rearing

Demonstration site, experimental gardens and nurseries

Based on the experience of a local villager, we estimate that it takes about 84 hours to raise 300 larvae (100 g of silk) to pupation in captivity. Based on our experiments, we estimated that a single individual can rear 5000 larvae in 6-7 hours a day over about 25 days. Both cases include 1-2 hours of travel time spent collecting leaves and changing leaves for larvae reared in captivity. This process is clearly too labor intensive to be adapted by a single family or even a group of families who are involved in the cultivation of rice. As a result, we planted an experimental garden at the CPALI House to see if moth food plants could be grown "at home" and if larvae could be reared by putting them directly on the host plant. What started out as our experimental area is now a learning and demonstration site where Talandoa are intercropped with manioc, greens tomatoes, sweet potatoes and peppers in a small "kitchen garden" (Figure 5). The Talandoa are planted close enough together that larvae can move from tree to tree. Our next project in Ambodivoahangy will be to convince villagers to intercrop the trees in family gardens. We are planning to offer a contract production plan whereby CPALI will ensure a markets for cocoons produced by farmers using our methods. Cocoons will be purchased only from farmers with whom we have a prior agreement.

Figure 5. CPALI House has been converted from a living facility into a training and demonstration site. In 2009, we plan to turn what is currently the "laboratory" into a crafts center where we can teach villagers how to make products from silk cocoons.

A farmer's success and CPALI's second demonstration site

One of the most exciting events of the year occurred when a local farmer came to CPALI headquarters and requested that we help him start rearing larvae. Denis, a skilled horticulturist, farmer and Lepidoptera enthusiast, raises plant seedlings for sale to other farmers in his area. He has now added moth food plants to his nurseries. In addition, Denis has intercropped Talandoa with pineapple, sweet potatoes, vanilla, coffee, mangos and trees to be used for wood. He has germinated both Talandoa and Lombiry seeds in his nurseries and refurbished his rearing chamber and house with CPALI's assistance. Last year, Denis started off with about 500 eggs and from these he produced 300 cocoons. This year he is working under contract for CPALI to produce 3000-4000 cocoons by June. He is planning to produce more than we have contracted and hopes to develop his own products for local markets. Our mutual goal is that Denis' farm will serve as a second breeding center and experimental site for CPALI projects. As soon as CPALI is producing silk papers, (our second product) we expect Denis will want to do the same!

QuickTime™ and a
Motion JPEG OpenDML decompressor
are needed to see this picture.

Figure 7. Denis has established an independent silk moth breeding center on his farm. Talandoa, the host plant of *A. suraka,* has been inter-cropped with sweet potatoes, coffee, pineapple, vanilla, mango, papaya, and wood. Denis and CPALI are working together to establish a second demonstration and training center for COBAs located at Makira's south eastern border.

Marketing Wild Silk

We have taken an innovative approach to production and marketing of wild silk cocoons. We combine conservation with a scaleable, profit-making enterprise whose markets are sequential, large and rich. Enterprise-based conservation efforts often have chicken/egg

economics (no market until there is significant production; no interest in production if the market is small). Over 4 years we have assembled production techniques, designers, designs, distributors and logistics for high-end products made from wild silk that can be farmed sustainably in border forests near protected areas. Initial products (jewelry) exploit the beauty of unprocessed cocoons whose metal-like surfaces can be incorporated into products that retail for more than $100 per piece in a $570 billion/year target market. Later products (luxury fabrics) offer the scale (~1 T/ha; 500 workers/T; ~$300/family, according to our model) required to achieve our conservation and poverty alleviation goals. By producing semi-finished products at multiple sites, we expect to achieve higher market volumes and higher returns than have been delivered to rural farmers previously.

Collaborations and Partnerships

Wildlife Conservation Society

The Wildlife Conservation Society, and in particular Dr. Christopher Holmes and Dr. Helen Crowley, have been providing logistical and institutional support to CPALI's mission in Madagascar. We are also grateful to the WCS-Maroantsetra team who have assisted us in working in the COBAs as well as with the Maroantsetra community. In return, CPALI is working to directly support WCS's mission and will be implementing its first production the Ambodivoahangy COBA. We hope for a continued and mutually productive association.

Conservation International

CPALI is working to expand its program by developing a partnership with Conservation International. Our goal is to demonstrate that wild silk products can be used as a tool to maintain as well as reestablish the Eastern Forest Corridor of Madagascar. In particular, Dr. James MacKinnon and Dr. Jeannicq Randrianarisoa of Conservation International, and Mr. Minombolanoro Razakafoniaina from (National Agency for Environmental Action (ANAE) are facilitating this work in the Mantidia Forest Corridor. ANAE, with funding from CI, has helped establish 7 local associations, developed extensive nurseries and begun forest restoration. While the CPALI target species, *A. suraka* is found in the area, its host plant is not known. Our goal is to initiate studies in March 2009 to determine the host plant and assist ANAE in introducing wild silk production in the areas where it works. CPALI will provide training and technical services for production and product transformation as well as access to markets where goods can be sold. Through this partnership we hope to scale up production to meet commercial market needs.

Ny Tanintsika

CPALI continues to work closely with the Malagasy non-profit Ny Tanintsika. We continue to market Ny Tanintsika textiles in the United States and Europe on our new, wholesale only website, ***www.rainforestsilk.org***.

The Rainforest Silk Cooperative

The Rainforest Silk Cooperative is a web-based nonprofit business, founded by CPALI to develop a market for wild silk products in the United States and Europe. Our secondary

goal is to assist other nonprofit wild silk producers to achieve sustainability and provide a forum for information exchange among them. Our partners include Ny Tanintsika (fabric), AtIndia (yarns), Royal Silk Project (papers) and CPALI (jewelry). We would be pleased to provide ordering information to your favorite, local businesses should you like them to carry wild silk products. Please contact *ccraig@cpali.org* or visit our website, www.rainforestsilk.org.

Education and Outreach

CPALI has been working to encourage its staff to continue in school as well as provide opportunities students from Madagascar and overseas. Maminirina Randrianandrasana, a PhD student working with Prof. May Berenbaum at the University of Illinois Urbana-Champaign is considering working at CPALI's sites for her doctoral studies. Maminarina and Ravo Ranaivosolo initiated CPALI's first field trials in May 2008.

Allison Van, a student at Harvard University's Kennedy School of Government won 2 summer fellowships to work and to travel in Madagascar July-August 2007. Her goal was to determine current production volume of wild silk, identify the types of silk produced and locate the sites where wild silk is currently produced.

Abby Wolf, Oberlin College Senior, spent the 2007 summer developing product catalogues for CPALI to send to interested buyers as well as interviewing local store and boutique owners as to their interest in selling wild silk products.

Board of Directors

The current board members are:

May Berenbaum, PhD. Swanlund Professor at the University of Illinois Champaign-Urbana and Head of the Department of Entomology

Leslie Brunetta, Writer
Jack Croucher, PhD. Founder of ATIndia Wild Silk Project Founder and Independent consultant

Catherine Craig, PhD. *CPALI* founder and President, Research Associate, Harvard University

Matthew Hatchwell, PhD. European Coordinator for the Wildlife Conservation Society (WCS)

Jacob Mulegetta, PhD. Kirby Laing Lecturer in the School of Engineering at Surrey

Robert Wolf, PhD. Independent consultant

Walter Simons. Founder of Industry Council for Development

Robert Weber, PhD. Independent consultant

CPALI Publications

Portelese, J., C.L. Craig and R.S. Weber (to be submitted with article below). Conservation through Social Enterprise I: Site selection for Wild Silk Production in Madagascar.

Weber, R.S. and C.L. Craig. (in prep.). Production of wild silk textiles to support Madagascar's conservation and poverty alleviation goals.

2006 Razafimanantosoa, T., O. Ramilijaona, and C. L. Craig. 2006. Indigenous silk moth farming for communities surrounding Ranomafana National Park: report on a feasibility study. *Madagascar Conservation and Development* . 1:34-37.

Thanks to Our Partners and Supporters.

CPALI is grateful to the National Geographic Foundation for funding our research for a second year, to the International Resources Group for its support of CPALI's community work and students, and to the Wildlife Conservation Society for logistical support and personnel to our field expeditions.

The Fulbright Foundation has greatly extended the CPALI program by providing an 8-month Fellowship to C.L. Craig. The Kenney Family and Norvig Family both provided substantial support to CPALI's Learning and Demonstration Site. We thank Art for the Animals for working to generate donations for our work and Catherine Musinsky for continuing to update our website. We are also grateful to the Rufford Small Grants Foundation whose generous funding allowed us to expand to our second demonstration site in Manamby.

The law firm of Covington and Burling, LLP provides legal advice regarding the development of the Rainforest Silk Cooperative and the Tonneson Company provides financial advice and prepares CPALI's IRS filings. Harvard University has provided substantial in-kind support to C.L. Craig for which we are grateful.

Financial Summaries

CPALI Consolidated Financial Statement

All amounts in US Dollars
Through 31 December 2007

Operating Revenues and Expenses

REVENUE	**2004**	**2005**	**2006**	**2007**
Grants & Contracts	25,000		26,000	21,124
Donations	15,038	2,841	150	17,950
CPALI silk sales net revenue		4,645	4,359	1,222
In kind	1,476	2,906	6,005	7,374
Investment income			203	-219
Total revenue	**41,514**	**10,392**	**36,717**	**47,451**
EXPENDITURES				
Research expenses	18,422	18,352	25,640	33,676
Professional fees	1,037	1,000	1,523	
General and Administrative	2,861	812	5,144	5,723
Depreciation		316	541	204
Website development			1,800	
Total Expenses	**22,320**	**20,480**	**34,648**	**39,603**

Assets and Liabilities

Assets				
Cash and cash equivalents	19,194	6,182	8,140	10,892
Purchase orders				52
Investments		1,841	2,038	1,670
Silk inventory			900	900
Capital Equipment		2,074	2,165	1,961
Total Assets	**19,194**	**10,097**	**13,243**	**15,475**
Liabilities				
Advances and commitments		1,269	900	3,000
RSC accounts				226
Total liabilities	**0**	**1,269**	**900**	**3,226**
Net Assets	**19,194**	**8,828**	**12,343**	**12,249**
Total Liabilities and Net Assets	**19,194**	**10,097**	**13,243**	**15,475**

How You Can Help CPALI

We appreciate any and all donations of time, money equipment, stocks, frequent flyer miles, Amtrak miles – see below what your dollars will allow us to do. All of your gifts and donations are tax deductible. Donations can be made by credit card through PayPal directed to ccraig@cpali.org, or by sending a check made out to CPALI to:

CPALI
221 Lincoln Road
Lincoln, MA 01773

What your funds could provide:

$10
2 days of manual labor
1 Tarp for camping

$25
Fanny pack for field assistant
Rain gear for team member

$50
Food for expedition for 3 days
Backpack for field assistant

$75
Sleeping bag
Hiking boots for a team member

$100
Labor costs to build plant nursery
One-month salary for field assistant

$250
Boat and fuel for one round trip Maroantsetra-Masoala-Maroantsetra
6 porters, 6 days labor in field
A tent

$350
1-year Medevac insurance for project workers
Project bicycle

1 month rent for CPALI demonstration site

$500
Expedition costs for 10 days
1-month salary for Field Manager

$1000
12-month support of plant nursery manager
12 Month support of silk moth nursery manager
Computer for field project manager

$2000
8-month support and transport for Malagasy student to work with the project
Materials for local community to build a weaving and spinning center
Materials to build an egg rearing facility
Purchases one floor loom for community

$5000
Gene sequencing needed for moth identifications
Two round-trip airfares US-Madagascar

$10000
Year salary for Program director

$25000
Maintain Maroantsetra Project for 1 year
Establish crafts workshop for product production in Maroantsetra and COBA's

Donate stock

Please contact Catherine Craig (ccraig@cpali.org) for information regarding stock donations.

Donate frequent flyer miles

We make a minimum of 3 trips per year to Madagascar. Frequent flyer miles for Air France, Madagascar Airlines, or Delta Airlines, and its sky team partners would be greatly appreciated.

All members of the Rainforest Silk Cooperative need frequent flyer miles to attend partner meetings in India, Indonesia, Madagascar and Namibia as well as miles to attend the New York International Gift Fair.

Donate Amtrak miles

Major marketing centers are located New York and Washington, DC. We would greatly appreciate donations of Amtrak miles to allow us to travel more frequently.

Purchase RSC products

Alert local botiquets to the opportunity to stock wild silk products advertised at: http://www.rainforesilk.org

Give a gift donation to CPALI through Art for the Animals fund