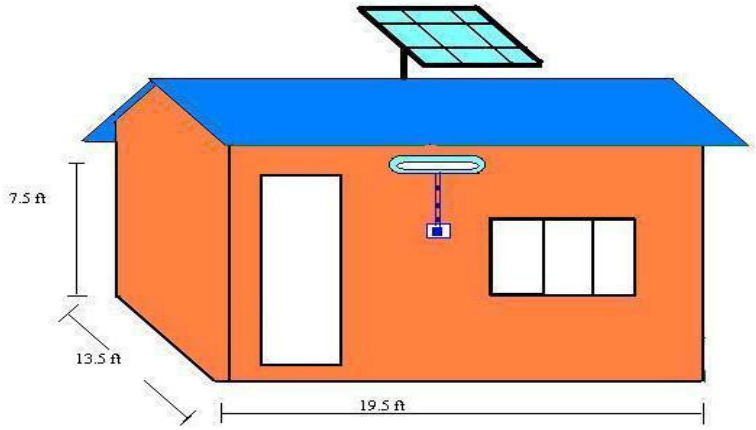
FINAL REPORT

~~ENEWABLE~~ ENERGY PROMOTION FOR SERICULTURE PROJECT

Supporting farmers with Silk house and Solar for Sericulture Promotion

(Bandipur, Tanahun)

Final report



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Submitted By
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LIST OF ACRONYMS

BS	Bikram Sambat
BSP	Biogas Support Programme
E & E Nepal	Energy and Environment Nepal
GBB	Gramin Bikash Bank
GEF	Global Environment Facility
HHs	Households
NGOs	Non-Governmental Organizations
PGG	Pragati Gobar Gas
PSSCDC	Parental Stock Seed Cocoon Development Center
REPSP	Renewable Energy Promotion for Sericulture Project
RET	Renewable Energy Technology
RF	Revolving Fund
SFGs	Sericulture Farmers' Groups
SGP	Small Grants Programme
SPC	Sericulture Promotion Committee
UNDP	United Nations Development Programmme
UNEP	United Nations Environment Programme
VDC	Village Development Committee

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SUMMARIES OF PARTICIPANTS/ BENEFICIARIES

Benefited from the project (generalized)

Total:	**285 household**
Population:	**1995**
Female:	**984**
Male:	**1011**
Children:	**564**

Beneficiaries / Participants (Specified Activities)

The main goal of project is to secure global environmental benefits in the area of climate change mitigation through community based approaches that also generate local benefits for enhancing livelihood of rural people. For the achievement of targeted goal, project implemented capacity building training, infrastructure development, revolving fund mobilization and renewable energy application among the twenty sericulture farmer groups. All total 1995 populations of 285 hh involving in sericulture cultivation. Project started its work from orientation program while implemented the project among eighty five selected farmers. 29% sericulture farmer adopted gobar gas for housing cooking purpose, 15% farmers adopted solar for lighting in silkworm rearing houses which minimize the 65% of household firewood consumption and 90% kerosene oil consumption in those houses respectively. Although farmers were involve in silkworm rearing but they did not have separate silkworm rearing room. They shared their kitchen room, storage room or bed room for the rearing of silkworm temporally which was unhygienic to both silkworm and human. Now, all total 38% farmer have separate silk worm rearing houses and involve in commercial sericulture cultivation. Similarly, traditional practice of sericulture shifted towards commercial cultivation in some extent after project supported in disease infection program, mulberry plantation and vermin compost. 120 farmers are involved in agriculture based income generation activities with the utilization of revolving fund. Project launched capacity building training like sericulture promotion, micro enterprise, vermin composting, gobar gas management for the sustainable use of renewable energy and sericulture in massive scale. 36% farmers were benefited from the training programme and involve in institutionalization of sericulture farmer group, commercialization of sericulture and adoption of renewable energy. For the detail activities and its beneficiaries see annex-1

BUDGET AND FINANCE

Funding and co funding status	Total Cost NRs.	percent	Remarks
Total project cost	**8,505,266**	**100 %**	
Amount received under this agreement	**1783751**	**21 %**	**Funding**
Amount Received from other source	**3141515**	**37 %**	
UNDP/GEF-SGP	2130015		**Main source of funding**
Alternative Energy Promotion Center	275000		Subsidy from the government
BSP Nepal (BSP)	494000		Subsidy from the government
Gramin Bikash Bank (GBB)	87500		Extra subsidy to the poor farmers
Pragati Gobar Gas Service Center	55000		Subsidy from Company
Parental ~~sotck~~ seed cocoon center	100000		Contribution in project activities
Contribution of local CBO/farmers	***3580000***	***42%***	
Solar installation	300000		Financial contribution
Gobar gas installation	780000		Financial and in kind contribution
Silkworm rearing house construction	2500000		Financial and in kind contribution

lUS $ = NRs. 70.05

Photo: Traditional silkworm rearing house (left) and project support silkworm rearing house(right)

1. INTRODUCTION

A. Project Background

Agriculture remains to be the mainstay of 80 percent Nepalese people. Since the country's high share of sloping terrain keeps limit in the areas for cultivation, there is a need to produce highly value-added crops towards achieving poverty reduction goals. Sericulture products, fruits and tea are some appropriate value added crops suitable for a wide range of terrains and climates of the country. In order to achieve the overall goals of poverty alleviation, country's plans and programs have considered this theme. Tenth Plan has made sericulture promotion initiation as a poverty alleviation policy for hilly and mountainous areas. The development of sericulture has been conceived as offering very good potential for development in the mid –hills of Nepal. Agro climatic conditions in these areas favor the cultivation of mulberry and rearing of cocoons. Sericulture is not only geographically suitable but also economically beneficial to the poor and marginalized people to raise their living standard and encourage them to adopt alterative source of livelihood. Sericulture and silk industry is an important employment generating sector of the nation. Many people are earning their living as Seri-culturists, reelers, weavers, workers and from the other related works.

Tanahun district is one of the leading districts in the field of sericulture practice in Nepal. The geographic suitability has resulted in the easy adoption of the economic development activity that has supported local livelihood to some extent. Bandipur VDC of Tanahun district represents one of the leading VDCs in the field of sericulture practice in the district. Due to agro climatic suitability, majority of farmers have been practicing the technology for sustaining their livelihoods and creating economic development opportunities. During the preliminary field survey as part of the preparation of the proposed project document, it was found that sericulture was the only source of livelihood for a total of 385 households (HHs), which are organized in 20 Sericulture Farmers Groups in Bandipur. The important fact is the involvement of the women, of all there are 44 percent women.

The range of silkworm cocoon production per household varies from 18 to 42 kg per household per shift. Farmers opined that they would produce more if they were provided training in the rearing and management of the silk worms. Each farmers produce at least for 3 times a year and most of them produce 4 times a year. Total cocoon production, on an average of 28 kg per household per shift, is estimated to be 108 kg per household per year. Thus, in the overall VDC, that the total production of cocoons is 40,608 kg (40.61 tons). At the established rate, Rs. 18,910.73 on average yearly could be earned from sericulture farming for each HH. Recognizing this problem, under the financial assistance of United Nations Environment Programme (UNEP) and UNDP Global Environmental Facility-Small Grants Programme (UNDP/GEF-SGP), Renewable Energy Promotion for Sericulture Project has been under implementation by Energy and Environment Nepal (E & E Nepal). The project is being located in Bandipur VDC of Tanahun district. The project is being implemented from April 2006.

B. Objectives of the Project

- To facilitate sericulture farmers in promotion and adoption of RET for heating the cocoons and lighting the cocoon room
- To support local people for developing essential infrastructures for the promotion of sericulture
- To support building local capacity and institutional development

C. Working Approach

Social Mobilization Process is being adopted to meet the objectives with the following strategies:

- Commitment and active participation of the stakeholders.
- Active participation of women
- Collaboration and coordination for maximizing co-funding and parallel funding
- Information dissemination and media coverage for communication and outreach
- Transparency
- Sustainability

D. Anticipated output

The ~~anticipate~~ output of the projects ~~were~~ reduction of at~~e~~ least 500 tones of carbon emission with the installation of solar dryer and biogas plant; development of necessary infrastructure for systematic sericulture practice. Enhancement of livelihood through additional income from quality silk production and marketing; Enhancement of institutional and managerial capacity of local sericulture farmer group and Sericulture promotion committee.

2. ACCOMPLISHED ACTIVITIES

Activities performed under this agreement are:

I. Activities under Objectives 1

(To Facilitate sericulture farmers in promotion and adoption of RET for heating the cocoons and lighting the cocoon room)

A. Project Orientation Programme

The Project Orientation with the local sericulture farmers was organized on Asar 3, 2063 BS. It was undertaken at Bandipur resort in Bandipur Bazaar, Tanahun district. A total of 85 participants participated in the dialogue and orientation as well as the discussion programme. The nature of the participants in the orientation programme included members of the sericulture farmers groups, local people, and members of the government's office for Sericulture Processing, etc. There was participation from both the men and women.

During the dialogue, the community members agreed to provide comments and suggestions including the problems associated with the activities. Suggestions provided by the SFGs during the orientation program are as follows:

a. Separate Silkworm Rearing House and Light System

Participants gave more focus on separate silkworm rearing house than that of solar dryer. They felt that silkworm rearing house hinder the commercialization of sericulture. Solar dryer can be used after massive production of cocoon. Silkworms were reared either in kitchen room, sleeping room or storage room temporarily. They said that there is fear of mice, bats and other insects eating them. This has been cited as important problem of low production. Likewise, during the winter, cold temperature refrains from higher growth rate and this demand more feeding and long time. Given this, farmers have suggested that it is good if support is obtained for constructing a small house for keeping the worms. They also have suggested that it is good to install solar for lighting and heating purposes during the cold season. Therefore, both the quantity and quality of the cocoons could be obtained.

b. Garden Management

Mulberry plants need to be grown in a managed way. Therefore it is required that the garden is managed. Based on the recommendation, information on what needs to be done for managing the garden and who need to perform different responsibilities, need to be finalized.

c. Fertilizers

SFG members identified that lack of sufficient fertilizers for the Mulberry plant is responsible for low production of cocoons. They therefore are demanding support for animal husbandry. It is planned that CETF could be partly used for giving loans in livestock keeping. However, since the project has provision of encouraging vermin composting, this problem is likely to be settled.

d. Trainings

The farmers also demanded that they are deprived from capacity building activities in the Sericulture farming. It was informed that a member from the group gets an opportunity to participate in the training once in three years. Thus, farmers have not been able to understand the ways to address the multitude of the problems they face. So, their expectation was training. The project can adjust required trainings.

e. Tools

Farmers have also suggested the need for good tools for better environment for the worms.

f. Irrigation

Since irrigation of Mulberry plants is essential, farmers have recommended the need to construct or maintain canals, water harvesting tanks, pipes, etc. These provisions have existed in the project plan.

B. Reactivate SFG and Formation of Sericulture Promotion Committee.

Government of Nepal has initiated the sericulture in the Bandipur with the Establishment of sericulture office at Bandipur. Farmers showed interest and involve in sericulture cultivation by receiving the seed of silkworm, *morus alba* plants with nominal prices and subsidies from the government. The only one of the agriculture products purchase by the government is cocoon. Government also worked in orchard management training, infrastructure development and disease infection in small scale. In later stage, Sericulture farmer group became inactive after decreasing support from the government. Renewable energy promotion for sericulture project

reactivates the interested farmer in the sericulture group and reconstructed 20 sericulture farmer groups. The name list of sericulture farmer group and their associated members are presented following table-1.

Table 1: Name list of Sericulture Farmer Group (SFG)

S.N.	Sericulture Farmer Group	No of Farmers
1	Deurali	7
2	Shiddeshowari	23
3	Jalpadevi	22
4	Pragatishil	15
5	Jumdanda	9
6	Dharapani	14
7	Machapuchre	19
8	Thanimai	5
9	Mukundeshowari	6
10	Naya Chautai	12
11	Kalika	25
12	Saraswati	23
13	Sirjana	15
14	Kaligandaki	10
15	Lalupate	16
16	Naya Thanimai	9
17	Shivashakti	21
18	Aarthumka	12
19	Nabadurga	8
20	Parbatiya digo	14
Total		285

Similarly, Sericulture Promotion Committee (SPC) ~~were~~ formed among the chair person of twenty sericulture farmer group for the coordination of sericulture farmer group, Sericulture office, village level institution and project. One representative from the Parental Stock Seed Cocoon Development Center (PSSCDC) was also including in the member of SPC.

C. Installation of solar Dryer

During the discussion, it was shared that the installation of solar dryers may not be cost effective and suitable at this time because of the low production ~~of the farmers~~. Farmers said that they could adopt ~~for~~ these technologies only if the production increase measures were adopted. Therefore the participants suggested that at the initial phase infrastructural support and training in sericulture could promote their production and this can encourage the farmers to use the Renewable Energy Technologies (RETs). During the proposal development time, the representatives from the government's office for Sericulture Promotion informed that they were willing to pay higher price for the dried cocoons. But at the time of the dialogue, they said that

the price for both the dry and wet cocoons was same. So at this time, it is useless for farmers to adopt for dryers. During the discussion, it was agreed that if the farmer's production is high enough, they can dry using the solar dryers and they can directly be involved in the marketing of the product. So, only one hybrid type solar is ~~using~~ for drying silkworm cocoon in the Sericulture office at Bandipur as a demonstration. Although Project aimed to install 20 solar dryer for drying silkworm cocoon, farmers don't show keen interest for installing solar dryer in their group. Less quantity of cocoon production, high investment from the farmer as ~~compare~~ to the production and accessible market at sericulture development office are the reason for not adopting solar dryer.

Design of a Cocoon Solar Dryer.

After a study on the sericulture and the process of drying the cocoon, the technical team of Energy and Environment Nepal visited the site of sericulture development division offices at Khopashi and Bandipur. It was observed and studied that the cocoons are to be dried in the way that the drying temperature is to be increased slowly and maintaining the temperature of 65 to 75 degree centigrade for certain time the temperature is to be lowered in the way it was increased. In a Solar dryer the temperature of 75 degree can be reached but it is a bit difficult to maintain the temperature. For maintaining the temperature of about 75 degree, additional and costly heat insulation mechanism was to be used that added the cost and the project would be inefficient. So a hybrid type of dryer is developed for the purpose. In such a specially developed hybrid dryer, there is provision of temperature increasing by burning fire in the cabin attached to the dryer. The hot smoke and air is managed to pass through a pipe which is passed through the cocoon placing chamber of the dryer. The hot air from the heat collector and from the burning chamber causes to dry the cocoons. Once the ~~burn~~ fire is stopped the solar heat causes to maintain the

Photo: Cocoon solar dryer at demonstration

dryer chamber temperature. Thus the process of cocoon drying is successfully carried out.

D. Installation of Solar Light System

In total 58% farmers are away from the facility of electricity. Their only one alternative light source may be renewable energy like solar which is cheaper and easily available than electricity in remote villages. 86% farmers were aware about useful of light in room for quality as well as quantity cocoon production. ~~There~~ will be easy for caring of silkworm, controlling pests if light system is available in the room. Although farmers were aware about role of light in sericulture, they cannot adopt without additional support from outsider because of their low purchase capacity. To get rid of these type of problem farmer are ready to install solar light in their silkworm rearing room and house by using revolving fund and paying in installment basis. Twenty nine household have adopted this technology for the lighting and heat in the silkworm rearing room and extra light used as their household energy which replace the consumption of kerosene oil. Out of 42, 12 farmers installed solar light using revolving fund. Remain farmer also shown keen interest for the installation of solar light in their house.

E. Gobar Gas Installation

With the support of REPSP 52 biogas plant with toilet were established. With biogas plant two compost pits in each farmer were establishment for preparation of compost by applying biogas slurry. So the amount and quality of organic manure will be increased in near future. Reduction of 2100kg fuel wood annually from each household which helps to conserve near by community forest in local level and foster for reduction of carbon emission on global~~ly~~ which is positive aspect for the controlling of global warming. Nabakalika Gobar Gas User committee was formed for the establishment of Gobargas by receiving support grant from REPSP

Table 2: Cost of Biogas plants with toilet and cost sharing (per plant)

Plant Size	Total Cost (NRs.)	Contributions (NRs.) of parter Organization				
		BSP	E&E Nepal	PGG	GBB	Farmer (in kind and Cash)
4 m^3 plant	29295	9500	3000	1295	2500	13000
6 m^3 plant	33795	9500	3000	1595	2500	17200

Photo: gobar gas plant with toilet (left) and old women with gobar gas stove (right)

F. Revolving Fund Mobilization

Before allocating revolving fund among the sericulture user group, a mass meeting was organized for fixing the criteria for fund mobilization in participatory way. Mass meeting concluded that the responsibility for repaying the allocated loan will be ~~beared~~ by chairperson, treasures, all members and those who have taken loan. The time period for the repayment of loan is 9 months and it can be invested for the silk rearing activities, mulberry plantation, gobar gas and solar establishment, construction of silk rearing house and other income generation activities as second priority. All total 88 farmers received loan for income generation activities, 12 members for home solar installation and 20 members for gobar gas install ion among the 17 sericulture farmer group at 8% interest rate. The amount of loan varies from the NRs. 1000 to the NRs. 18000 on the basis of need and purpose of farmer. The details of revolving fund mobilization is present~~ing~~ in Annex -2.

120 farmers from 17 Sericulture Farmers Groups had received loan for implementing income generation activities, mulberry plantation, rack set construction, maintenance of silkworm rearing house from the revolving fund. Revolving fund returned to the SFGs in installment basis by ~~dept~~ farmer and again remobilized among the new members within the Sericulture Farmer

Group. All sixty-nine farmers pay the first installment to the SFGs. During field monitoring it was found that 95% ~~depter~~ had fully utilized the loan for the purpose they received loan. They are demanding annual period for the paying back of the received loan to the SFGs instead of 3 month installment

Photo: Income generation activities using revolving fund; Morus alba plantation (left) and Goat keeping (right)

All these outputs delivered from the varieties of initiatives are helpful to achieve the essence of objective to Facilitate sericulture farmers in promotion and adoption of RET for heating the cocoons and lighting the cocoon room

II. Activities Under objectives 2

(To support local people for developing essential infrastructures for the promotion of sericulture.)

A. Construction of Silkworm Rearing House

i. Pre-Feasibility Study for Silk worm Rearing House

The pre-feasibility study was conducted for establishing silkworm rearing house and solar in project area. All total 50 houses were selected for questionnaire survey. From the study it was found that only 12% farmers have temporary shade house made by thatch and 8% have stone made houses that were constructed by receiving support from government. Farmers did not

prefer thatch houses because the life span of thatch houses are only 2-3 years and termites were destroying thatch bamboo houses. Remain 80% rearing silkworm temporally either in kitchen room or bedroom or storage room. During cocoon production period either farmers cooked their food out side the kitchen room or they have to share their bed with cocoon production rack. Their most urgent need was establishment of separate shade houses which act as catalyst for commercialization of sericulture. Form the field observation it was recommended that 92% farmers need outsider support for building permanent shade for motivation and commercial sericulture cultivation.

ii. Designing of Silkworm Rearing House

After conducting series of discussion with farmers and sericulture specialist, project decides to construct permanent types of house instead of temporary house. Although the cost of temporary house (bamboo made) is less as compare to the permanent (stone, timber and mud made) house but the life span is very low and could not seen feasible form the technical point of view. The length, breath, and height of the silkworm-rearing house are 19.5 ft, 13.5 ft and 7.5 ft respectively. One box silkworm (20,000 silkworms in number) can be easily reared in this house (room). House can be made by using stone and mud for wall and corrugated sheet or thatch for roof. It contains three windows, one door, and ceiling below roofing for maintaining the temperature of silkworm rearing room. The total cost and sharing cost form the project are presenting in below.

Total cost:	US$ 891 (NRs.57800)/ house	
Support from Project:	US $ 350 (NRs.22701)	# 40% of total cost
No of house construction:	50	

iii. Selection of Farmer for Silkworm Rearing House Construction

76 farmers were nominated by the 20 Sericulture Farmer Group for the construction of silkworm rearing house. Out of 76 farmers, only 50 farmers were selected based on following criteria in participatory approach.

- Involve in commercial silkworm rearing (minimum 20, 000 silkworm in one season)
- Farmer did not have separate silkworm rearing house
- Farmer who cannot bear the all cost of silkworm rearing house

After selection of fifty farmers in participatory approach separate agreements were done with each framers for the completion of construction in proper manner at fixed time (see the agreement format at annex -3).

iv. Construction of Silkworm Rearing House

Farmers are fully devoted for the construction of houses. Remaining farmers also requested for the same type of support. Monitoring team regularly monitored the construction site. All total 50 houses are successively completed their construction work. Silkworms were reared by the farmers after completion of construction work in the silkworm rearing house in April season. Official record of Parental Stock Seed Cocoon Center shows that the production of cocoon was high those farmer who reared the silkworm in constructed houses as compare to the other farmer and their previous production, which is quite helpful for commercialization of sericulture in the Bandipur area. Farmers shared their happiness for this type of opportunity. Staff of Parental seed Cocoon Resource center showed keen interest and fully supported for the silkworm rearing house construction programme. Although the estimated total cost of house was NRs 57,800 in an average the total cost of house comes to NRs 70,000. Local labors got job opportunity for the construction of house. The Name list of farmer who ~~was~~ involved in silkworm rearing houses constructed with detail information is presented in Annex-4.

Out of selected fifty households 58% (29 in no), 24% (12 in no), 10% (5 in no) and 6% (3 in no were using corrugated sheet, thatch, slate and RCC respectively as a roofing materials of silk worm rearing houses. Poor farmers use thatch as roofing materials whereas rich and medium people use RCC and corrugated sheet respectively. Use of roofing materials also depend on the availability of resources, distance from the market and road linkage.

Silkworm rearing house construction site were visited by the monitoring team in two times. Regular inspections and suggestions provided to the farmer help successively completion of targeted silkworm rearing house ~~whit~~ designed dimension. The monitoring team had been formed with the involvement of E and E Nepal team leader, Chief Officer of Sericulture Development Office and chairperson of Main Sericulture Promotion Committee.

B. Support for Disease Infection Program

The market price of disease-infected cocoons is very low and farmers were facing lots of lost due to disease during rearing period. REPSP organized disease infection program in collaboration with Parental Stock Seed Cocoon Resource Center, Bandipur, Tanahun. PSSCRC provide technical and drug support for the disease program and REPSP arrange the program and provide spraying tools for controlling disease.

C. Base Line Survey

Basic information related to sericulture and Renewable energy was collected from all (285) farmers of project area. Number of family member in household, orchard establishment year, Productive *morus alba* plant, silk worm rearing capacity, silk worm rearing place, silkworm rearing year, involved trainings, family member involved in sericulture and their education level, presence of gobar gas, solar and electricity and annual consumption of firewood were covered by base line survey. From the baseline survey it was found that only 30% farmers were using biogas for cooking purpose, 7% and 21% had solar and electricity for lighting purpose respectively.

D. Mulberry (*Morus alba*) Plantation

Before implementing this Project in the Bandipur and Kehsabtar area of Tanahun, local farmers used to destroy the mulberry plants from their land and cultivating the traditional cereals crops because of lack of silk rearing room for the rearing of silkworm and additional support from the outsider. But these days' farmers involved in mulberry plantation using revolving fund. With the supports of E and E Nepal and Parental Stock Seed Cocoon Resource Center, 120 farmers planted 135,000 mulberry plants. Farmers are showing keen interest for the commercial mulberry plantation and demanding extra supports for other activities in addition of energy sector.

Photo: Morus alba plantation

E. Information dissemination

Local paper and electronic media were informed about the events and articles about the possibility of renewable energy use. All of the events being conducted by Energy and Environment Nepal were informed to the media and were published with priority. During the opening of training on "Use of Renewable Energy Technology in Sericulture" organized at Bandipur, head of the district offices of Tanahun district were invited. With such an invitation of head of the offices, electronic and paper media put forward the news and the events with higher priority. Not only the information dissemination but also the disseminated information is found to create awareness among the people about the possible use of renewable energy technology in the sericulture.

For disseminating project activities project leaflet were distributed to the different stakeholders, Government officials and farmers which covers the existing problems, goal and objectives of the project and activities under the project. It was also distributed in the regular learning and review workshop organized by UNDP-GEF-SGP and Pragati Nepal. Similarly, Project flex chart was also displayed during learning and review workshop which clearly explained about problems, key activities, outputs and working strategy for the sustainability of project.

F. Vermin composting materials support

After conduction of three days training on vermin composting from the representatives of 20 sericulture farmer group, these farmer were involved in vermin composting. Project supported the vermin and wooden boxes for the production of vermin compost. Vigor growths of mulberry were not seen in the project area due to the lack of manure and project aimed to produce organic products. These days vermin compost is using in the mulberry and vegetable crops in small scale. Only few farmers are able to sell vermin seed to the neighboring farmers. But the adoption of vermin composting is not satisfactory as it needs to protect form the termites and ants.

III. Activities Under objective 3

(To support building local capacity and institutional development)

A. Using solar dryer and silk thread weaving training cum Demonstration

A weak long training programme was organized by E & E Nepal from 2063 / 09 / 06 to 2063 / 09 / 12 at Bandipur VDC of Tanahun district. There were all together 25 participants in the

training. Though the expectation of the targeted community was to get support for garden management, fertilizers, trainings, Worms house maintenance and irrigation, they all were not related to the renewable energy. After few meeting with the user groups it was concluded that other than the community expectation the use of renewable energy technology could also add value to the sericulture products. The program at the site was firstly focused to demonstrate the possible use of Solar Dryer that can be used for drying the cocoon at the production site. Once the cocoons are dried at the site by the use of dryers the dried cocoons are to be further processed for an end product. The steps in between the end product and the dried cocoons are floss removing, cooking (boiling), reeling or spinning, re reeling, drying, tan fitting, weaving and final product separation. For motivating the farmers they should be capable for the all the process for the end products from sericulture. So in the training along with the dryer demonstration, the further process for processing the cocoons were also incorporated. At the end of the training program, farmers were trained for producing silk shawl in the local level. Due to various limitations, training was designed just to train the community for producing smaller pieces of silk products. But the success of the training and the enthusiasm showed by the trainee has proved the success of the program and has shown a better hope in the future.

Photo: Silk threading process

B. Micro- Enterprise Development Training

Local farmer sell their fresh cocoon in the market with low price. Sericulture Farmer group wants to add the value of their silk cocoon in their local level by establishing one micro enterprise. They have planned to establish one Cocoon Collection center with solar dryer. They are also planed making threads from the silk and weaving clothes in the local level and Bandipur eco-cultural project gave commitment for buying the silk made clothes. Visitors are showing keen interest for buying sign of Bandipur, unfortunately there weren't any handicraft especial as Bandipur. For the initiation of silk related micro-enterprise four members of SFGs actively participate in long week micro enterprise development training in Bharatpur, Chitwan. After taking micro enterprise development training and Participated in rearing and weaving demonstration in Bandipur organized by REPSP, Pragtishil SFG have planned to establish Cocoon collection center with micro enterprise and REPSP have planned to provide reeling machine, loan from revolving fund, extra training and other technical support. But it cannot be established up to now.

Name list of Participants in micro-enterprise development training:

- Miss. Sarita Bhattarai
- Miss. Kalpana Lamichane
- Mr. Ramsharan Kunwar
- Miss. Lila Giri

C. Vermin-Composting Training

Although chemical fertilizers were not applied previously, these days the applications of chemical fertilizers are increasing day by day to fulfill the demand of fertilizer in sericulture. Application of chemical fertilizer is not sound form environment, economic, and biological point of view. In the other hand, most of plant nutrients are lost due to the improper preparation and application of farmyard manure in the farmland. By reminding these facts three days vermin compost training program was conducted in Bandipur among 20 leading farmers.

Date: 2063/12/13-2063/12/15
Venue: Parental Stock Seed Cocoon Resource Center, Bandipur, Tanahun
Key Resource persons:

- Mr. Rabin Kadariya, Renewable Energy promotion for Sericulure Project, Tanahun
- Mr. Sanjuk Kuswar, Innovative vermicomposting farmer, Chetana rganization, Sarlahi
- Mr. Binaya Jha, Integrated Rural Development Center, Chitwan
- Mr. Ramesh Babu Sapkota, Parental Stock Seed Cocoon Resource Center, Tanahun

Nature of Participants:

- Involve in commercial sericulture cultivation
- Showing interest for organic farming
- Can play key role in group
- Showing commitment and ability to share acquired knowledge to remaining farmers

Total Participants

Objectives of training

- Application of organic manure in sericulture
- Proper utilization of farmyard manure and composition, biogas slurry
- Approve technology for farmyard manue and composting
- Familiar with use of effective microorganism (EM)
- Benefit and methods of vermin compost

Covered area:

- Need and Benefit of organic manure
- Vermin-composting
- Improved farm yard manure
- Proper use of biogas slurry
- Use of EM while preparing organic manure
- Compost preparation
- Time schedule and methods for using organic manure in sericulture

Expected outcomes:

- Farmers are aware about the effect of chemical fertilizer application.
- Previously un-decomposed manure were using in the farmland.
- Now farmer are able to prepare good compost, farmyard manure and biogas slurry by using EM.
- Farmers are aware about lost of manure from traditional preparation, transportation, spreading and cultivation methods.
- All 20 participants are engaged in vermin culture and use of EM in their farmyard manure and compost for the good manure preparation.
- Participants showed commitment for organic farming.

D. Enhancement of project staff capacity

- Capacities of project staffs are enhanced through social mobilization and solar maintenance training. Two local staffs of Bandipur are involved in social mobilization and solar maintenance training. Motivation skill of social mobilizer is raised after the training and solar technician provides maintenance service at local level.

E. SFG Meeting and SPC Meeting

- Regular meeting of SFG and SPC were conducted. Social mobilizer is actively involved for helping them. SFG were regularly saving money in monthly ~~wise~~. SPC have selected Priority area for the construction of conservation pond where farmer are facing scarcity of water for

irrigation of mulberry plant. Stationery supports were provided by Energy and Environment Nepal to the SPC. SFG were regularly saving money in monthly ~~wise~~. SPC have made the criteria for the selection of farmer for the construction of silk rearing house. The amount of saving in the sericulture farmer group is presented in following table.

-

Table 3: Total saving of SFG

S.N.	Name of Sericuluture Farmer Group	Saving Amount(Excluding RF)
1	Deurali	6208
2	Shiddeshowari	11336
3	Jalpadevi	6800
4	Pragatishil	13000
5	Jumdanda	3200
6	Dharapani	4051
7	Machapuchre	16424
8	Thanimai	3536
9	Mukundeshowari	1254
10	Naya Chautai	400
11	Kalika	6500
12	Saraswati	4000
13	Sirjana	15063
14	Kaligandaki	1200
15	Lalupate	9898
16	Naya Thanimai	6300
17	Shivashakti	6264
18	Parbatiya digo	22050
19	Nabadurga	NA
20	Aarthumka	NA
Total		NRs.1,37,484

F. Gobar Gas Management Training

One day training was organized for the proper management of gobar gas, simple maintenance techniques and proper management of biogas slurry. All total 24 women ~~were~~ participat~~ing~~ in the training.

G. Consultation Workshop

A one day Consultation workshop was organized for the sustainable development of sericulture and alternative energy. Staffs of Parental Seed Cocoon Development Center, Energy and Environment Nepal and Chairpersons of SFGs were participated in this workshop. Project activities were reviewed and future strategies for the sustainability of project were discussed in the workshop. Main Sericulture Promotion committee committed for the mobilization of SFGs after the withdrawal of project support. Silkworm rearing house construction was seen quite

helpful for the commercialization of sericulture. Parental Stock Seed Cocoon Development Center also going to support for Silkworm rearing house construction with the establishment of sericulture based micro-enterprise. The provision for the mobilization of revolving fund was also made.

H. Demonstration Programme

A demonstration stall was organized in the Bandipur festial, Mangsir 29-paush 4, 2064 for disseminating the project activities, solar dryer and silkworm rearing houses and to uplift the awareness level about the renewable energy and sericulture as income generation activities among the district users. More than 50,000 people visited the stall and found very effective for the sericulture and renewable energy promotion. Member of main sericulture promotion committee shared the project activities with the visitors.

Photo: Demonstration program organized at Bandipur

I. Relation Extending with the Concerned

With the collection of demand for demonstration and training about the solar dryer, concerned were contacted. Sunworks Nepal (Solar dryer manufacturere at Balkhu, Ktm), Srijanatmak Kala

Guthi (A Guthi at Pulchowk, Lalitpur that produces hand made products) & Sericulture Development Devision (A government authority at Khopasi, Kavre that work for development of sericulture in Nepal) were contacted and resources like the expertise, product design and suggestions were gathered. With support from the mentioned, training was conducted in the project site at Saharpani of Tanahun district. Mr. Niraj Shrestha, Technical Manager of Sun Works Nepal, Mrs. Urmila Garg of Srijanatmak Kala Guthi and Mr. Nathuni Sahu, Undersecretary of Sericulture Promotion Division office at Khopashi has helped a lot for conducting the training programme at the site.

3. RESULTS

I. Accomplished Objectives of Agreement

Although the major objective of project was installation of solar dryer for drying the cocoons instead of firewood, SFGs did not show interest for the installation of dryer. Installation of solar dryers may not be cost effective and suitable at this time because of the low production of cocoon. Farmers told that they could adopt for these technologies only if the production increase measures were adopted. While provisions for the dryer was made, community in series of interactions with the project stated that there is no need of hardware installation unless they were supported in the silkworm rearing house construction where they would feed the worm with the leaves of the plant on which silkworm fed. Less quantity of cocoon production, high investment from the farmer as compare to the production and accessible market at sericulture development office are the reason for not adopting solar dryer. ~~In~~ the agreement with the SGP has not covered the ~~C~~construction of silkworm rearing house and home solar system. After the co-funding from the UNEP, 50 silkworm rearing houses were constructed which ~~motive~~ the farmers for the commercialization of sericulture and adoption of RETs in the sericulture. It is learned that adoption of RET will be successful after the support~~ed~~ the infrastructure and software parts like, silkworm rearing house construction, mulberry plants, training for sericulture promotion etc. Installation of gobar gas was highly successful which helps for the kitchen cleanness and growing demand of kitchen energy in the hill farming system. Reactivation of SFGs, formation of Sericulture Promotion Committee and its institutionalization for the cultivation of sericulture in group approach are major achievement for its commercialization. All the accomplished activities and its achievement are presented in following table 4.

Table 4: Accomplished activities and its achievement

S.N	Proposed activities	Targeted	Achieved	Achievement	Remarks
1	Reactivation of SFG	19	20	105 %	
2	Formation of SPC	1	1	100 %	
3	Gobar gas installation	50	52	104 %	Demand based
4	Solar dryer installation	20	1	5 %	Not adopted
5	Home solar system	54	29	53 %	Ongoing

6	Silkworm Rearing house construction	50	50	100 %	
7	Mulberry seedling	-	1,35,000		Farmer initiatives
8	Disease infection Program	1.	1	100 %	
9	Publication of Project leaflet	1	1		Completed
10	Irrigation canal	2	-	-	Remain

11	Water harvesting tank	2	-		Remain
12	Vermin support	-	30		
13	Fencing	-	1		Need based
14	Baseline survey	1	1	100 %	
15	Enterprise Development Training	1	2	200 %	
16	Sericulture Promotion Training	3	1	33 %	
17	Vermin Compost training	1	1	100 %	
18	Technical and marketing training to staffs	1	2	200 %	
19	Exposure Tour	1	-	-	Remain
20	Project orientation	1	1	100 %	
21	Consultation workshop	2	2	100 %	
22	Demonstration Programme	-	1		

Photo: Silkworm rearing practice: Before project support (left) and after project support (right)

II. Immediate Benefits Received by the Participants

- After the construction of silkworm rearing houses and other infrastructure development, farmer are involved in commercial cultivation of mulberry plants with their own initiatives .i.e. without any additional support by the project. Within

the project more than 1,35,000 seedlings of mulberry plants were planted. Farmer those who have constructed are involved in massive sericulture cultivation. According to Sericulture Development Officer of Parental Stock Seed Cocoon Development Center, Mr. Parshuram Adhikari, the demand of mulberry seedlings has been increased these days than previous years and orchard are also managed in proper wary.

- The level of awareness about organic farming was increased after organic manure nagement training. Previously only 4 kg /year of nitrogen was available to plants from farmyard manure of one pair livestock. But these days they are able to ~~prevent~~ 20 kg from urine, 10 kg from direct sunlight and plants can get 34 kg of Nitrogen/year from the same livestock.
- All total 52 biogas plants were established. Time for collection of firewood, clean ~~for~~ cooking utensils and cooking food are saved and involve in income generation activities like goat keeping, pig farming and sericulture with the use of revolving fund. Smoke of firewood create health problem in previous days but nowadays, these types of problem are solved. Houses and villages become cleanness ~~ness~~ after toilet construction with gobar gas. Separate compost pits were prepared which helps to improve the quality of compost and quantity of organic manure. 2100 kg of firewood will be reduced form each household annually which helps to conserve nearby community forest and reduce carbon emission.
- The production of cocoon is raised by in an average 7 kg from the farmer involve in separate silkworm rearing houses. Farmers are able to earn extra NRs. 1440 in one season. Income level of farmer increased from the sericulture and going to adopt massive mulberry plantation. Innovate farmer Birkha Bahadur Gurung express his happiness as he is able to produce additional 10 kg cocoon from newly constructed separate silkworm rearing house and he claims that the production of cocoon will be higher in next season.
- In the light of solar, easy for rearing the silkworm and extra light use in the houses help for the children study and indoor works in the night time. Farmers are able to save the expenditure of kerosene oil (NRs. 135/month/house). Poor farmers ~~are~~ also use solar in their home and silkworm rearing room by using revolving fund. Currently, farmers are rearing silkworm in hygienic and proper place in systematic manner which control the bird, insect and mice attracts. Community members said that construction of house and provision of solar light in the house and other project support increased their

production by 20%.

- Awareness level among the sericulture framers about sericulture, sericulture basedenterprise and application of Renewable energy technology in sericulture has been increased. Chairperson of main sericulture promotion committee Mr. Buddhi Bahadur GC. says, "People are able to know that cocoon can be dried from the solar light instead of firewood as they previously dried the cocoon from the firewood."

III. Long Term Benefits

- Commercial cultivation of sericulture generates employment opportunities in rural area which is quite helpful for poverty reduction.
- Reduce in consumption of firewood protect the near by community forest and carbon consumption helps to control global warming.
- Properly application of decomposed manure will increase farmland productivity.
- Life age of women will increase from their smokeless kitchen and reduction of their workload.

4. NEW DEVELOPMENTS AND UNEXPECTED DIFFICULTIES/PROBLEMS

Unexpected Problems	Action Taken to solve them
Only solar cannot maintain the temperature for drying cocoons	Hybrid type of solar developed in which extra heat supply from the firewood ~~of~~ external chamber
Initially farmers were not showing interest for project activities especially in RETs.	Project able to receive co funding from ~~the~~ UNEP for the construction of silkworm rearing house and solar light in silkworm rearing room.
Selection of targeted 50 farmers for silkworm rearing house construction.	Most of farmer demanded support for silkworm rearing houses but the project ha~~ve~~ limited ~~a~~ resource which was only for 50 farmers. For the selection of fifty members out of 285 sericulture farmers following procedure was adopted: Forward the letter in each sericulture farmer group to nominate 4 farmers for the silkworm rearing house construction. SFGs send their name list following fixed criteria like: member involve in commercial sericulture cultivation, member away form the other organization support, member who did not have silkworm rearing house, Poor farmer who need external support. Members of Main sericulture promotion committee, Parental Stock Seed Cocoon Development Center and project jointly selected 50 farmers out of nominated 75 farmers from the Sericulture farmer group with quota system, annual production of cocoon and socio-economic condition of farmer.

5. LESSON LEARNED

Energy and Environment Nepal works on SGP focal area of climate change mitigation by implementing renewable energy promotion project for sericulture. Although the major activities is adoption of solar dryer for drying the cocoon by replacing firewood but this activities ~~cannot~~ be launched effectively in the Bandipur area due to low production of cocoon and costly for the farmer. Instead of solar dryer, firewood and kerosene oil are replaced by implementing gobar gas and solar home system by removing the barriers for the adoption of renewable energy technology. Project hits its focal area through gobar gas, solar home system and awareness on solar dryer. After the support ~~form~~ the project, farmers are involved in commercial sericulture cultivation with technically sound approach. Income level of farmers increased from the sericulture with frequency and quantity of cocoon production which helps for the agricultural employment generation in the local areas and sustainable livelihood of farmers those depend on sericulture. Re-activation of sericulture farmer group and formation of main sericulture promotion group helps to institutionalize the sericulture cultivation. Capacity building training helps to improve the management of sericulture and implementation of renewable energy in sericulture and rural village. Women workload has decreased after the gobar gas installation and involve in commercial sericulture. Cocoon can be produced with less labor and utilization of free times. Similarly, using of solar light and gobar gas with smokeless energy improves the health of women. Parental Stock seed cocoon Development Center is going to implement silkworm rearing house and solar energy in its annul plan by seeing the effectiveness of silkworm rearing house for commercialization of sericulture which shows that sustainability of project.

In summery, It is learned that adoption of RET will be successful after support in infrastructure and software parts like, silkworm rearing house construction, mulberry plants, training for sericulture promotion etc. Farmer adopted renewable energy technology after massive production of sericulture productions. Need felt by the farmers is the major achievements for the successful completion of project and project should be design to hit their basic needs and demands together with outsider interest.

Date: 3rd September, 2008 Prepared by: Rabin kadariya

6. ANNNEXURES

Annex -1. Summary of Participants/Beneficiaries

S.N.	*Activities*	*Total*	*Male*	*Female*	*Remark*
1	Project orientation program	85	32	53	Participation record
2	Sericulture Farmer Group	20	18	2	Group benefited
3	Main Sericulture Promotion Committee	11	6	5	Representation of female and male in committee
4	Gobar gas	52 hh		52	Work load of women reduce
5	RF mobilization	120 hh	79	41	On the basis of debtor name
6	Silk worm rearing house	50	34	16	On the basis of official record
7	Disease infection program	285 hh			
8	Mulberry plantation	75000			Number of *Mulberry* seedlings
9	Vermin compost	20 hh	13	7	
10	Home solar system	42			
Capacity Building Training					
11	Sericulture promotion Training	25	8	17	
12	Micro Enterprise Training	4	3	1	
13	Vermin Composting Training	20	13	7	
14	Saving and Credit	285			
15	Gobar Gas Mgt Training	24	-	24	
16	Enhancement of project staff	2	2	-	
17	Consultation Workshop	27	23	4	
18	Demonstration Program	50,000	30,000	20,000	Record of festival organizer

Annex -2 Beneficiaries from Revolving Fund Mobilization

Name list of Farmers using RF for Gobar gas establishment			
S.N.	***Name of Farmer***	***SFG***	***Capacity***
1	Ganga Ram B.K.	Thanimai	$4m^3$
2	Dilli Ram Shahi	Thanimai	$4m^3$
3	Biba Nepali	Thanimai	$4m^3$
4	Raju Nepali	Thanimai	$4m^3$
5	Dal Bdr Barsel	Thanimai	$4m^3$
6	Man Kumari Nepali	Thanaimai	$4m^3$
7	Bharat B.K.	Thanimai	$4m^3$
8	Ram Bdr Kunwar	Thanaimai	$4m^3$
9	Raju Shah	Thanimai	$4m^3$
10	Suman Gurung	New Chautari	$4m^3$
11	Anju Bhatta	Dharapani	$4m^3$
12	Tika Bhandari	Dharapani	$4m^3$
13	Im Bdr Kunwar	Kalika	$4m^3$
14	Ram Chandra Pandit	Kalika	$4m^3$
15	Thritha Raj Bhattta	Deurali	$4m^3$
16	Prem Roka	Deurali	$4m^3$
17	Khusi Ram Nepali	Deurali	$6m^3$
18	Durga Bdr. Karki	Machapuchre	$6m^3$
19	Kalpana Bhhattarai	Pragatishil	$6m^3$
20	Padam Sharma	Nabadurga	6m3

Name list of Farmer using RF for Home solar system			
S.N.	***Name of Farmer***	***SFG***	***Capacity***
1	Bishnu Bhattari	Kalika	20 watt
2	Hari Prasad Bhattari	Kalika	20watt
3	Santi Bhattari	Kalika	32 watt
4	Ram Prasad Sharma	Kalika	40 watt
5	Nirmala Bhattari	Kalika	20 watt
6	Harimaya Bhattari	Kalika	10 watt
7	Dhananjaya Sharma	Kalika	16 watt
8	Tulalasimaya Bhattari	Kalika	10 watt
9	Urmila Bhattari	Sarswati	20 watt
10	Mina Thapa	Jumdanda	32 watt
11	Prem Bdr Karki	Machapuchre	32 watt
12	Purna Bdr B.K.	Siddeshowari	20 watt

Name list of farmer using RF for income generation activities					
				Install Date	
S.N.	*SFG Name*	*Name of Farmers*	*Objectives*	*Amt*	*Issue Date*
1	Kalika	Ram Bdr KC	Goat keeping	5000	2064/3/7
2		Samsher Bdr GC	Goat keeping	5000	2064/3/7
3		Ramesh Chandra Pandit	Goat keeping	5000	2064/3/7
4		Surya Kanta Sharma	Goat keeping	5000	2064/3/7
5		Bishnu Bhattari	Silk worm rearing house	5625	2064/6/7
6		Surya Bdr GC	Goat keeping	5000	2064/3/7
7	Sirjana	Til Kumari Gurung	mulberry plantation	5000	2064/3/7
8		Devi Maya Gurung	mulberry plantation	3000	2064/3/7
9		Shanta Maya Gurung	Mulberry plantation	3000	2064/3/7
10		Lal Maya Gurung	Mulberry plantation	4000	2064/3/7
11	Thanimai	Jag Bdr Kunwar	Pig farming	5000	2064/3/7
12		Man Bdr Kunwar	Goat keeping	5000	2064/3/7
13		Man Bdr Kunwar	Rack Construction	1125	204/6/7
14		Ram Sharan Kunwar	Rack Construction	1025	2064/6/7
15	Jumdanda	Janga Bdr Sinjali	Goat keeping	3000	2064/3/7
16		Kul Bdr GC	Mulberry plantation	4000	2064/3/7
17		Bhum Bdr Ghumi	Goat keeping	3000	2064/3/7
18		Mina Rana Magar	Roofing	2250	2064/6/7
19	Kali Gandaki	Bijaya Baniya	Mulberry plantation	5000	2064/3/7
20		Tika Kumari Paudel	Mulberry plantation	2500	2064/3/7
21		Devu Baniya	Mulberry plantation	2500	2064/3/7
22		Manahari Sapkota	Solar Maintenance	2250	2064/6/7
23	Machapuchre	Sharmila Karki	Mulberry plantation	1500	2064/3/7
24		Harikala Nepali	mulberryplantation	1500	2064/3/7
25		Durga Bdr Karki	Mulberry plantation	3000	2064/3/7
26		Jahinda Katuwal	Mulberry plantation	1000	2064/3/7
27		Prem Bdr Karki	Rack Construction	5000	2064/3/7
28		Mankauri Thapa	Goat keeping	2000	2064/3/7
29		Khambir Baniya	Buffalo	5000	2064/3/7
30		Phul Maya Nepali	Mulberry plantaion	1000	2064/3/7
31		Jiban Baniya	Rack Construction	3000	2064/6/7
32		Guman sing Katuwal	Rack Construction	3000	2064/6/7
33	Dharapani	Jit Bdr Paudel	Mulberry plantation	5000	2064/3/7
34		Jal Maya Kunwar	Mulberry plantation	5000	2064/3/7
35		Sammar Bdr Kunwar	Goat keeping	5000	2064/3/7
36		Sanu Maya Karki	Silk worm rearing house	3375	2064/6/7
37	Lalupate	Anjala Bhattari	mulberry protection	5000	2064/3/7
38		Parbati Bhujel	small shop	5000	2064/3/7
39		Bishnu Pariyar	mulberry protection	5000	2064/3/7
40		Damanti Rana	Silk worm house	3375	2064/6/7
41	Pragatishil	Sharda Bhattari	Goat keeping	5000	2064/3/7
42		Sabitri Adhikari	Goat keeping	5000	2064/3/7
43		Bamdev Bhattari	small shop	5000	2064/3/7
44		Bhola Bhattari	Goat Keeping	3375	2064/6/7
45	Deurali	Hom Shrestha	Mulberry plantation	5000	2064/3/7
46		Khusi Ram Nepali	Mulberry plantation	5000	2064/3/7
47		Hom Shrestha	Silk worm house	2250	2064/6/7

48	Saraswati	Guna Kunwar	Rack Construction	3000	2064/3/7
49		Sharda Kunwar	Rack Construction	3000	2064/3/7
50		Madhumaya Bhattarai	Rack Construction	5000	2064/3/7
51		Mina Bhattarai	Rack Construction	4000	2064/3/7
52		Lila Giri	Rack Construction	5000	2064/3/7
53		Sita Bhattari	Goat keeping	3000	2064/6/7
54		Lila Giri	Orchard Management	1100	2064/6/7
55	Mukudesowri	Gyan Bdr Gurung	Roofing	5000	2064/3/7
56		Birkha Bdr Gurung	Orchard Management	1125	2064/6/7
57	Jalpadevi	Chhali Maya Thapa	Goat keeping	5000	2064/3/7
58		Chij Bdr Nepali	Goat keeping	5000	2064/3/7
59		Sukmaya Nepali	Goat keeping	5000	2064/3/7
60		Prem Bdr Nepali	Goat keeping	5000	2064/3/7
61		Lurimaya Nepali	Goat keeping	5000	2064/3/7
62		Chij Kumar Nepali	Goat keeping	2600	2064/6/7
63		Man Bdr B.K.	Goat keeping	3000	2064/6/7
64	Shivashakti	Ram Bdr Karki	Mulberry Plantation	2000	2064/3/7
65		Krishna Bdr Gurung	Mulberry Plantation	2000	2064/3/7
66		Udaya Bdr Gurung	Mulberry Plantation	2000	2064/3/7
67		Rup Bdr K.C.	Mulberry Plantation	2000	2064/3/7
68		Bhakta Bdr Aacharya	Mulberry Plantation	2000	2064/3/7
69		Buddhilal Thapa	Mulberry Plantation	2000	2064/3/7
70		Dil Bdr K.C.	Mulberry Plantation	2000	2064/3/7
71		Tek Bdr Thapa	Mulberry Plantation	2000	2064/3/7
72		Aananta Sing Gurung	Mulberry Plantation	2000	2064/3/7
73		Giri Bdr Thapa	Mulberry Plantation	2000	2064/3/7
74		Giri Bdr Thapa	Silk worm house	4500	2064/6/7
75	N.Thanimai	Lil Bdr Gurung	Goat keeping	5000	2064/3/7
76		Man Bdr Gurung	Mulberry Plantation	5000	2064/3/7
77		Maan Gurung (sano)	Silk worm house	6250	2064/6/7
78		Khadka Shrestha	Silk worm house	4000	2064/6/7
79	N.Chautari	Buddhi Bdr Gurung	Orchard Management	5000	2064/3/7
80		Daya Ram Kunwar	Rack Construction	5000	2064/3/7
81		Minmaya Gurung	roofing	2250	2064/6/7
82	Shideshowari	Bishnu Maya KC	Gobar gas	5000	2064/3/7
83		Resham Gharti	Mulberry plantation	5000	2064/3/7
84		Shushila Pardhan	Mulberry Plantation	5000	2064/3/7
85		Ash Bdr Gurung	Mulberry Plantation	5000	2064/3/7
86		Om Parkash Sharma	Mulberry plantation	5000	2064/3/7
87		Himal devi Pardhan	Goat keeping	5625	2064/6/7
				324100	

Annex-3 Name List of Farmer Constructing Silkworm Rearing House

S.N.	*Name Of Farmer*	*Sericulutre Group*	*Start date*	*Complete*	*House*	*Roof*
1	Mer Sing Gurung	Arthumka	2064/10/6	3/15/2008	Complete	Corrugated Sheet
2	Som Lal Gurung	Arthumka	2064/10/6	3/15/2008	Complete	Thatch
3	Hom Narayan Shrestha	Deurali	2064/8/29	2/28/2008	Complete	Corrugated Sheet
4	Jit Bdr Paudel	Dharapani	2064/6/28	2/28/2008	Complete	Thatch
5	Sanumaya Karki	Dharapani	2064/7/14	2/28/2008	Complete	Thatch
6	Indra Mani Rijal	Dharapani	2064/7/14	3/15/2008	Complete	Corrugated Sheet
7	Kalpana Lamichane	Dharapani	2064/7/16	2/28/2008	Complete	Thatch
8	Prem Baniya	Dharapani	2064/9/23	3/15/2008	Complete	Corrugated Sheet
9	Surya Kumari Gurung	Jalpadevi	2064/8/29	2/28/2008	Complete	Thatch
10	Kul Bdr G.C.	Jumdanda	2064/7/12	2/28/2008	Complete	Thatch
11	Til Bdr Gurung	Jumdanda	2064/7/12	2/28/2008	Complete	Corrugated Sheet
12	Ek Bdr Rana	Jumdanda	2064/8/28	2/28/2008	Complete	Corrugated Sheet
13	Bijaya Baniya	Kali Gandaki	2064/6/28	3/15/2008	Complete	Corrugated Sheet
14	Kisan Thapa	Kaligandaki	2064/6/28	2/28/2008	Complete	Corrugated Sheet
15	Surya Kanta Sharma	Kalika	2064/10/18	2/28/2008	Complete	Corrugated Sheet
16	Hari Parsad Bhattari	Kalika	2064/10/18	2/28/2008	Complete	Corrugated Sheet
17	Krisna Parsad Bhattari	Kalika	2064/11/9	2/28/2008	Complete	Corrugated Sheet
18	Bishnu Parsad Bhattari	Kalika	2064/119	3/15/2008	Complete	Slate
19	Parbati Bhujel	Lalupathe	2064/8/28	3/15/2008	Complete	Rcc
20	Damanti Rana	Lalupathe	2064/8/28	3/15/2008	Complete	Rcc
21	Kalpana Rana	Lalupathe	2064/116	2/28/2008	Complete	Slate
22	Tika Bhandari	Machapuchre	2064/6/28	2/28/2008	Complete	Thatch
23	Prem Bdr Karki	Machapuchre	2064/6/28	2/28/2008	Complete	Slate
24	Tek Bdr Baniya	Machapuchre	2064/7/21	3/15/2008	Complete	Thatch
25	Bishnu Maya Gurung	Mukundehowari	2064/6/28	2/28/2008	Complete	Corrugated Sheet
26	Birkha Bdr Gurung	Mukundehowari	2064/7/24	2/28/2008	Complete	Corrugated Sheet
27	Motilal Gurung	Mukundehowari	2064/9/23	2/28/2008	Complete	Corrugated Sheet
28	Padam Sharma	Nabadurga	2064/10/6	2/28/2008	Complete	Corrugated Sheet
29	Buddhi Bdr Gurung	New Chautari	2064/6/28	2/28/2008	Complete	Corrugated Sheet
30	Minmaya Gurung	New Chautari	2064/6/28	2/28/2008	Complete	Corrugated Sheet
31	Bal Kumari Kunwar	New Chautari	2064/9/12	2/28/2008	Complete	Slate
32	Khadka Kumar Shrestha	New Thanimai	2064/6/28	2/28/2008	Complete	Slate
33	Man Bdr Gurung	New Thanimai	2064/6/28	2/28/2008	Complete	Thatch
34	Bharat Kumar Kayasta	Parbatiya Digo	2064/8/20	2/28/2008	Complete	Corrugated Sheet
35	Devimaya Bhattarai	Pragatisil	2064/7/12	2/28/2008	Complete	Corrugated Sheet
36	Sushila Bhattarai	Pragatisil	2064/8/2	2/28/2008	Complete	Slate

37	Devaki Bastola	Pragatisil	2064/9/23	2/28/2008	Complete	Thatch
38	Krishna C. Bhattari	Pragatisil	2064/11/3	3/15/2008	Complete	Rcc
39	Guna Kunwar	Sarswati	2064/10/16	3/15/2008	Complete	Corrugated Sheet
40	Lila Giri	Sarswati	2064/11/8	3/15/2008	Complete	Thatch
41	Dan Bdr K.C.	Shiddeshowari	2064/9/23	2/28/2008	Complete	Corrugated Sheet
42	Nar Bdr K.C.	Shiddeshowari	2064/9/23	2/28/2008	Complete	Thatch
43	Giri Bdr Thapa	Shiva Shakti	2064/7/21	2/28/2008	Complete	Corrugated Sheet
44	Nir Chanra Gurung	Sirjana	2064/6/28	2/28/2008	Complete	Corrugated Sheet
45	Man Lal Gurung	Sirjana	2064/7/29	3/15/2008	Complete	Corrugated Sheet
46	Ash Kumari Gurung	Sirjana	2064/7/29	2/28/2008	Complete	Corrugated Sheet
47	Damanti Thapa	Sirjana	2064/8/27	2/28/2008	Complete	Corrugated Sheet
48	Man Bdr Kunwar	Thanimai	2064/8/2	2/28/2008	Complete	Corrugated Sheet
49	Jag Bdr Kunwar	Thanimai	2064/9/12	2/28/2008	Complete	Corrugated Sheet
50	Santa Bdr Aale	Thanimai	2064/9/12	2/28/2008	Complete	Corrugated Sheet

Annex-4 Name list of SFG and committee

S.N.	SPG	Adress	Member Name list	Designation
1	**Pragatishil**	Bandipur-6, Jhapri	Krishna Chandra Bhattarai	Chairperson
			Shusila Bhattarai	Vice chairperson
			Kalpana Bhattarai	Secretary
			Sharada Bhattarai	Treasure
			Bamdeb Bhattarai	Member
			Madhab Bhattarai	Member
			Binod Wagle	Member
			Debaki Bastola	Member
			Sabitri Adhikari	Member
			Til Bahadur Aale	Member
			Gauri Dhungana	Member
			Debimaya Bhattarai	Member
			Harichandra Bhattarai	Member
			Aasha Aacharya	Member
			Bharimaya Gurung	Member
2	**Saraswati**	Keshabtar-9, Ghartitar	Lila Giri	Chairperson
			Shreemaya Bhattarai	Vice chairperson
			Dilkumari	Secretary
			Mina Bhattarai	Treasure
			Shreemaya G.C.	Member
			Yasoda G.C.	Member
			Madhumaya Bhattarai	Member
			Urmila Bhatttarai	Member
			Parbati Bhattarai	Member
			Tirtha Sharma	Member
			Ganga Bhattarai	Member
			Bhagawati Bhattarai	Member
			Sita Bhattarai	Member
			Indira Bhattarai	Member
			Ritukala Bhattarai	Member
			Laxmi Bhattarai	Member
			Bindu Bhattarai	Member
			Basundhara Adhikari	Member
			Chija Kunwar	Member
			Saraswati Adhikari	Member
			Kamala Kunwar	Member
			Sarda Kunwar	Member
			Manmaya Bhattarai	Member
3	**Kali Gandaki**	Bandipur-2 kunwadi	Manahari Sapkota	Chairperson
			Kishor Gurung	Vice

				chairperson
			Bijaya Baniya	Secretary
			Purna Bahadur Thapa	Treasure
			Aekendra Shahi	Member
			Kisan Thapa	Member
			Devu Baniya	Member
			Amrita Karki	Member
			Tikamaya Paudel	Member
			Bhabadhata Aacharya	Member
4	**New Thanimai**	Bandipur-2, Kamidanda	Khadaka Kumar Shrestha	Chairperson
			Ram Bahadur Thapa	Secretary
			Ganga Bahadur Thapa	Treasures
			Dal Bahadur Thapa	Member
			Man Bahadur Gurung	Member
			Lila Bahadur Gurung	Member
			Rudra Bahadur Gurung	Member
			Purna Bahadur Chettri	Member
			Karna Bahadur Bika	Member
5	**Nabadurga**	Keshabtar-9, Ramkot	Krihnakanta Sharma	Chairperson
			Krishan Prasad Bhattarai	Vice chairperson
			Padam Parsad Sharma	Secretary
			Rajeshori Bhattarai	Treasures
			Mithudevi Bhattarai	Member
			Shusila Bhattarai	Member
			Yamuna Bhattarai	Member
			Bishnuprasad Bhattarai	Member
			Ganesh Subedi	Member
			Bhagawani Bhattarai	Member
			Hira Bahadur Thapa	Member
			Mankumari Bika	Member
			Harimaya Basel	Member
			Padam Kumari Bhattarai	Member
6	**New Chautrai**	Bandipur-2, Bartar	Buddhi Bahadur Gurung	Chairperson
			Suman Gurung	Secretary
			Baburam Thapa	Treasures
			Tej Bahadur Kunwar	Member
			Dayaram Kunwar	Member
			Balkumari Kunwar	Member
			Minmaya Gurung	Member
			Parbati Kunwar	Member
			Sommaya Bika	Member
			Gane Pariyar	Member
			Chandra Bahadur Thapa	Member

7	**Thanimai**	Bandipur-3, Khahare	Padam Bahadur Aale	Chairperson
			Shanta Bahadur Aale	Secretary
			Man Bahadur Kunwar	Treasures

			Jag Bahadur Kunwar	Member
			Ram Bahadur Kunwar	Member
8	**Kalika**	keshabatar-9, Ranabhat	Bishnu Prasad Bhattarai	Chairperson
			Khemaraj Sharma	Vice chairperson
			Hari Prasad Bhattarai	Secretary
			Rameshchandra Pandit	Treasures
			Tulasimaya Upadhya	Member
			Harimaya Bhatttarai	Member
			Ram Prasad Sharama	Member
			Shnta Bhattarai	Member
			Lok Bahadur K.C.	Member
			Dhananjya Sharma	Member
			Pabitra Kunwar	Member
			Madhudhara Bhatttarai	Member
			Ram Bahadur K.C.	Member
			Shamsher Bahadur K.C.	Member
			Dan Bahadur Nepali	Member
			Narayan Dhatta Sharma	Member
			Nirmala Bhattarai	Member
			Lalumaya Bhattarai	Member
			Im Bahadur Kunwar	Member
			Narakanta Sharma	Member
			Ramesh Kant Pandit	Member
			Samser Bahadur G.C.	Member
			Dilaram Giri	Member
			Surya B. G.C.	Member
			Shreemaya Bhatarai	Member
9	**Shivashakti**	Bandipur-2, Kukurdi	Giri Bahadur Thapa	Chairperson
			Antasingh Gurung	Secretary
			Krishna Bahadur Gurung	Treasures
			Tek Bahdur Thapa	Member
			Dil Bahadur K.C.	Member
			Rudra Bahadur K.C.	Member
			Harka Bahadur Gurung	Member
			Aaitasingh Gurung	Member
			Udaya Bahadur Gurung	Member
			Tritha Raj Gurung	Member
			Dal Bahadur Gurung	Member
			Chandra Bahadur K. C.	Member
			Bhot Bahadur K. C.	Member
			Dil Bahadur Gurung	Member

			Til Bahadur Gurung	Member
			Suk Bahadur Gurung	Member
			Dhan Bahadur Gurung	Member
			Purnasingh Gurung	Member
			Bishnu Kumari Gurung	Member
			Dammar Kumari Gurung	Member

			Man Kumari Gurung	Member
10	**Sirjana**	Bandipur-2, Kunwadi	Nirajchndra Gurung	Chair person
			Asha Kumari Gurung	Treasure
			Damayanti Thapa	Secretary
			Dhan Bahadur Gurung	Member
			Bhanlal Gurung	Member
			Ser Bahadur Gurung	Member
			Santa Maya Gurung	Member
			Devi Maya Gurung	Member
			Trikuli Gurung	Member
			Mang maya Gurung	Member
			Som Bahadur Gurung	Member
			Til Kumari Gurung	Member
			Lok Bahadur Gurung	Member
			Maeti Maya Gurung	Member
			Lal Maya Gurung	Member
11	**Jumdanda**	Bandipur-6, Jumdanda	Kul Bahadur G.C.	Chairperson
			laxmi Rana	Secretary
			Aek Bahadur Rana	Treasure
			Tika Ram Paudel	Member
			Til Bahadur Gurung	Member
			Janga Bahadur Sinjali	Member
			Bhum Bahadur Chumi	Member
			Mina Thapa	Member
			Khadka Maya Makim	Member
12	**Shiddheswari**	Keshabtar-9 Parthuna	Buddhi Bahadur G.C.	Chairperson
			Shree Bahadur K.C.	Secretary
			Om Parkash Bhattari	Treasure
			Krishna Prasad Sharma	Member
			Ritukala Bhattarai	Member
			Indira Bhattarai	Member
			Bindu Bhattarai	Member
			Sundar singh Pradhan	Member
			Harimaya Pradhan	Member
			Himlal Devi Pradhan	Member
			Nar Bahadhur K.C.	Member
			Dan Bahadur K.C.	Member
			Bishnu Maya Gharti	Member
			Resham Bahadur Gharti	Member
			Bhagawati Bhattarai	Member
			Ganesh Bahadur G.C.	Member
			Devbhakta K.C.	Member
			Bishnu Maya K.C.	Member
			Aash Bahadur Gurung	Member
			Khadka Bahadur Thapa	Member
			Basundhara Adhikari	Member
			Manlal Gurung	Member
			Laxmi G.C.	Member

13	**Lalupathe**	Bandipur-6, Bhainsekhar	Anjala Bhattarai	Chairperson
			Laxmi Devi Bhattarai	Secretary
			Madhu Maya Bhattarai	Treasure
			Damayenti Rana	Member
			Sanudebi Bhattarai	Member
			Kalpana Rana	Member
			Narmada Bhattarai	Member
			Parbhati Bhujel	Member
			Mangal Kumari Thapa	Member
			Gita Bhattarai	Member
			Nanumaya Thapa	Member
			Kausila Bhattarai	Member
			Jau Kumari Thapa	Member
			Aaitimaya Rana	Member
			Sita Shrestha	Member
			Bishnu Pariyar	Member
			Narimaya Namjali	Member
			Sukmaya Thapa	Member
			Durga maya Namjali	Member
			Shata Bhattarai	Member
14	**Deurali**	Bandipur-3, Pipalchok	Homnarayan Shrestha	Chairperson
			Chitra Bahadur Rokka	Vice-chairperson
			Basana Bhattarai	Secretary
			Dil Kumari Rana	Treasure
			Rajkumar Pata	Treasure
			Chhetra B. Shrestha	Member
			Khusi Ram Nepali	Member
15	**Mukundeshwari**	Banipur-2, Bartar	Brikha Bahadur Gurung	Chairperson
			Dhan Kumari Gurung	Secretary
			Bhim Bhadaur Gurung	Treasure
			Gyan Bahadur Gurung	Member
			Motilala Gurung	Member
			Mukti Bahadur Gharti	Member
16	**Aarthumka**	Bandipur-2, Aarthumka	*Mer Singh Gurung*	Chairperson
			Tul Bahadur Bhujhel	Vice-chairperson
			Shila Raj Bhujhel	Secretary
			Buddhimaya Bhujhel	Treasure
			Somlala Gurung	Member
			Sani Maya Gurung	Member
			Deu Bahadur Bhujhel	Member
			Sansara Bujhel	Member
			Sanukanchi Gurung	Member
			Sun Kumari Gurung	Member
			Chun Lal Bhujhel	Member
			Kumar Bhujel	Member

			Dhan Bahadur Bhujhel	Member
17	**Dharapani**	Bandipur-3, Dharapani	Indra Mani Rijal	Chairperson
			Devi Parasd Lamichane	Vice-chairperson
			Sanumaya Karki	Secretary
			Kalpana Lamichane	Member
			Mina Pathak	Treasures
			Kabita Pathak	Member
			Jit Bahadur Paudel	Member
			Krishna Bahadur B.K.	Member
			Tritha Kumari Bhatta	Member
			Jal Maya Kunwar	Member
			Shre Dapta Paudel	Member
			Yam Bahadur Karki	Member
			Dhan Kumari Jarsi	Member
			Kalabati Kunwar	Member
18	**Machapuchre**	Bandipur-3, Tharubans	Prem Bahadaur Karki	Chairperson
			Bimala Baniya	Secretary
			Durga Bahadur Karki	Treasures
			Harikala Nepali	Member
			Khambira Baniya	Member
			Kamala Aacharya	Member
			Tika Kumari Bhandari	Member
			Shova B.K.	Member
			Karna Bahadur Khatri	Member
			Jun Maya Shahi Ka	Member
			Sharmaila Karki	Member
			Jahindra Katuwal	Member
			Indira Pathak	Member
			Kamala Baniya	Member
			Phul Maya Nepali	Member
			Mankarui Thapa	Member
			Jun Maya Shahi Kha	Member
			Puja Bhandari	Member
			Jamuna Sapkota	Member
19	**Jalpadevi**	Bandipur-2, Bhuchuk	Ash Bahadur Gurung	Chairperson
			Chij B. Nepali	Vice-chairperson
			Dev Bahadur K.C.	Secretary
			Tham B. Thapa	Treasure
			Surya Maya Gurung	Member
			Lal Maya Gurung	Member
			Suk Bahadur Gurung	member
			Chhali Maya Gurung	Member
			Bhuwan Bahadur Kunwar	Member
			Man B. K.C.	Member
			Dil B. Thapa	Member
			Dammar B. Aale	Member

			Bal B. Thapa	Member
			Padam B. Rana	Member
			Bhim B. B. K.	Member
			Prem Bahadur Nepali	Member
			Sukmaya Nepali	Member
			Sushila Nepali	Member
			Krishna maya Nepali	Member
			Luri maya Nepali	Member
			Gobinda B.K.	Member
			Sukmaya Gurung	Member
20	**Parbatiya Digo**	Bndipur, Tanahun	Communal farming	NA

Annexure 5 Key findings

June 2010

Key Findings

"Supporting farmers with silk house/and solar for sericulture promotion" – A Project Review report

Prepared for
UNEP

Project Report No. 2007BE04

Contents

Tables

Figures

CHAPTER 1 "Supporting farmers with silk house/and solar for sericulture promotion" – Project Review report

1.1 Background

E&E Nepal, an NGO involved in project execution for improved solar rearing hose in selected districts of Nepal. TERI is involved in project review and input for improvements.

The project is success fully demonstrated with construction of Low cost and efficient rearing house in NEPAL. The project report is prepared with continuous interaction with E&E along with and field visits.

1.2 field visit and final review report

A Team of TERI and E&E, Nepal visited the project implementation area in February 2009. The team had a meeting with the silk board members, farmers using rearing house. The project out come and future course of actions were discussed in detail.

A view of the silk board office and the active participation of the members are given in Figures 1 & 2.

Figure 1 A view of the silk board office at Tanhun District

Figure 2 Active participation of members during the meeting held at silk board office

Several operating parameters of the improved silk worm rearing houses, which have come out during the meeting are given in the following Table 1. The Silk Board provides egg lays (in a compact box) to the farmers who have the silk worm rearing house. The Silk Board sells about 300 boxes of "Egg lays" per year. The farmers have four crops (Cocoon production) in a year.

300 boxes of egg produce is equivalent to about 4000 kg of Cocoon. Currently the Silk Board purchases the cocoon from the farmers. Creation of post-cocoon activities can encourage the farmers to produce more cocoon as well as entry of new farmers. It also will increase cultivation of "Morus Alba" (mulberry) and can create sustainable livelihood for the farmers living in remote rural areas of Nepal.

Table 1 Several Operating parameters of the improved silk worm rearing houses

Sl.No	Component	Quantity	Unit
1.	Number of crops per year	4 times/year	No
2.	Total number of Egg-lays used	300 boxes*/year	Leafs/sheets
3.	Total amount of Mulberry used	1200 Kg/ropani•	Kg/bundle/hectare
4.	Amount of cocoon produced	4000 Kg	Kg/year
5.	Amount of money spent		Rupee
6.	Selling price of cocoon produced	212NRS/Kg	Rupees (Nepal)*
7.	Profit		Rupees

* 1 box = 20,000 seed
• 300 ropani + 4 ha (government) subsistence farming
(1 ropani = 20 ha)
* 1 US$ = 78 NRs

The amount of money spent (by the Silk Board) in Bandipur, Tanhan, towards promotion of the silk worm rearing in the region:

- Annual Budget of parental stock seed Cocoon Research Center = 40,52,000/- (Permanently 11 staff + 6 Technician) (Including administration, salary of others).

- Total annual budget for specified activities (Morus Alba / Mulberry cultivation + seed production + training + subsidy towards farmer) = NRs 24,10,000.

1.1 The over all Activities conducted at local level for promotion of silk industry

1. Conservation period of irrigation
2. Fencing
3. Training (orchard management, fertilizer management)
4. Kibu (Morus Alba/Mulberry) cultivation & distribution towards farm
5. Nursery establishment
6. Seed (for cocoon) production and dispersion
7. Research (insignificant amount)
8. Logistic support to the farmer (technical, equipment, medicine, etc.)

1.2 Amount of money/effort spent by farmers

- Farmers do not spend any money but they contribute labour support during their leisure time.
- Outsider support includes , especially PSSCRC, Silk Board & Energy & Environment, Nepal
- Cultivation of mulberry is in subsistence level
- Technical input, seed cocoon Morus Alba plants were supported by PSSCRC (part of Nepal Government /Ministry of Agriculture Cooperatives/Department of Agriculture

- Silk worm rearing houses, home solar system & revolving fund provided by "Energy of Environment", Nepal.
- The farmers earn about 12,000 to 16,000 NRS annually. The amount of income among the farmers may vary depending up on the number of crops, amount of silk worm rearing and area of mulberry cultivation..
- Labour contribution:

    - Farmer fully utilizes their leisure time; specially by women and children. They do not go for jobs in Nepal
    - 20 days in a month contributing their time in mulberry cultivation & for silk worm (cocoon) production.
    - When going for job out side, women earn NRS 100 per day and men earn NRS 200/-.per day

The silk board has initiated some research activities on stifling and reeling of cocoons. Enormous work has been already done on this area by other countries like Thailand, India. There is a need to organize capacity building / knowledge transfer in bi-lateral or multilateral project modes. A view of silk reeling machine developed at silk board and different types of yarn produced in Nepal are given in the Figures 3 &4.

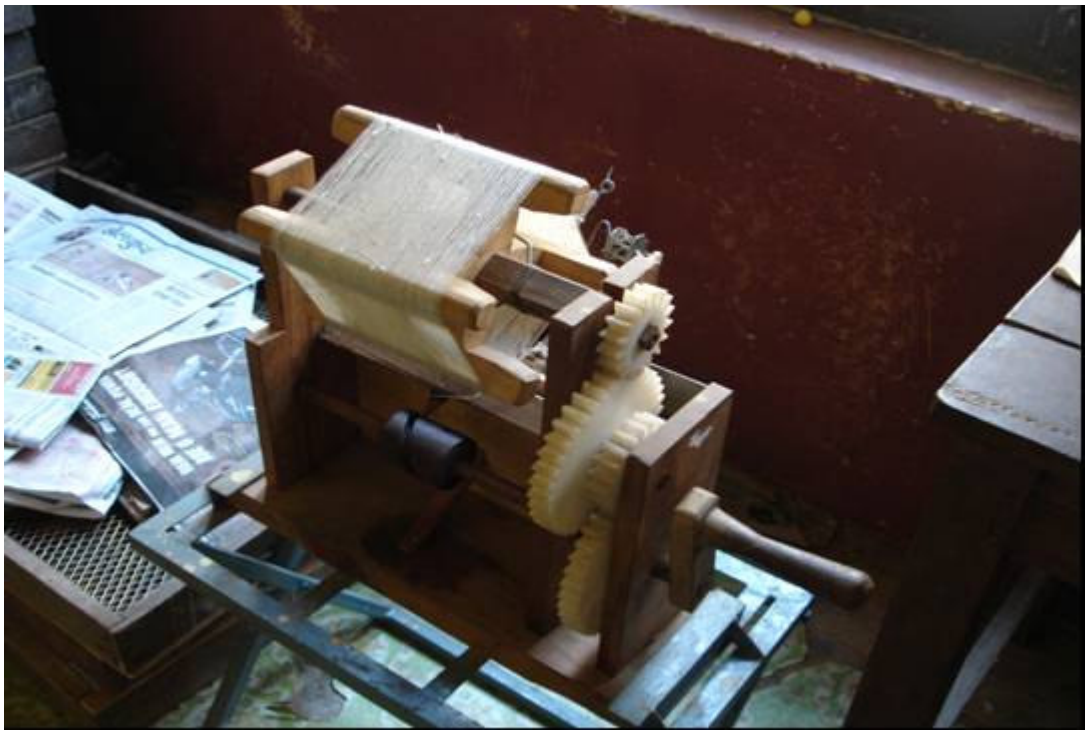

Figure 3 A view of the Silk reeling machine, developed locally (prototype)

Figure 4 Diferent types of Cocoons and silk yarn produced (at lab level)

In addition to the above facts, in continuation with the review & comments sent earlier, the following points are added to conclude the project:

- An improved rearing house is constructed by locally available material and labour.
- The project is successfully implemented at very remote areas, where access is difficult, only Jeeps can be used to travel in such hilly and muddy terrains.
- The farmers are well benefited by the improved rearing house and silkworm rearing.
- The support of the local silk board is of great help for the farmers by training them on the sericulture and extending them various facilities for silk worm cocoon production.

A view of the mulberry field and improved rearing house is given in Figures 5 & 6.

Figure 5 A view of the improved, silk worm Rearing House

Figure 6 A view of mulberry plantation for feeding the Silk Worm

1.3 Conclusions

An improved rearing house was constructed, thus meeting the project objectives. Farmers are benefited by the improved rearing house and producing of cocoon has increased to four crops in a year. To carry out the program in a sustainable manner and for a large scale replication of the solar assisted rearing houses, it is needed to initiate programme on post-cocoon activities, which can enable:

1. Increase in number of silk worm rearing houses.
2. Increased mulberry cultivation.
3. Increased opportunity for local livelihood.
4. Establishment of a sustainable market for the cocoon produced in the area.
5. New market (for post-cocoon) generation like silk yarn reeling, weaving, dyeing etc.
6. Export of silk products (yarn/fabric) to increase the income of the people living in remote villages as well as to the nation.

Annexure 6 Improved “Silk Worm Rearing House” project in Nepal-Views

Figure 1: View of a conventional rearing house with thatched roof

Figure 2: View of a Conventional rearing house with roof of stone

Figure 3: A view of the improved rearing house with G.I roof

Figure 4: Side view of the improved rearing house with large windows for validation purpose

Figure 5: False roof made with bamboos clay in the improved rearing house for providing a cool & comfort atmosphere for rearing purpose

Figure 6: Mulberry plantation for feeding the silk worm

Figure 7(a) & 7 (b): Different view of rearing arrangement

Figure 8: Bamboo sticks used as support for worms

Figure 9: Treatment of rearing house to make it hygienic for silkworm rearing

Figure 10: Collection of cocoon

Figure 11: View of volatile cocoon collected from the improved rearing house

Figure 12: Collection of cocoon in basket

Figure 13: Cocoon ready to pack and go to the market

Figure 14: Cocoon being weighted and sold in silk board