

PROMOTION OF SOLAR COOKERS FOR CO-TOURISM DEVELOPMENT IN NEPAL

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ABSTRACT

Nepal is well known for mountain trekking. There are many tourism villages along various mountains trekking routes, through which thousands of tourists from all over the world trek, interact with the mountain communities and their culture and enjoy with local foods and traditions in an eco-friendly manner. Nepal has been promoting community based tourism development and the Himalayan snowy mountain range has been one of the preferred trekking destinations for the majority of tourists visiting Nepal from around the world.

The Centre for Rural Technology, Nepal (CRT/N) has been actively engaged in the promotion of Solar Cookers since 1992 to meet the energy needs of the rural and urban communities, tourism enterprises. CRT/N has launched a special Solar Cooking Promotion Project with internal and external support along the mountain trekking areas in 1993 integrating with eco-tourism development along the trekking routes leading to Mount Everest and other Himalayan region in Nepal. The impact of the solar cooking project has been positive in meeting energy needs of the tourist lodges and hotels as well as of local communities for cooking, pasteurizing water for drinking, supporting energy inputs for commercial ventures and contributing to the reduction of CO₂ and GHG emission. CRT/N has also played major role in mobilizing the Government support and incentive for solar cooker promotion and now has become key implementing partner organization of the Government's renewable energy program since 1999 in Nepal.

Based on the successes, experiences gained and lessons learned from the above initiatives, CRT/N is now up-scaling the promotion of the solar cooking project to other mountain tourist destinations of Nepal with the support from Wuppertal Institute for Climate,

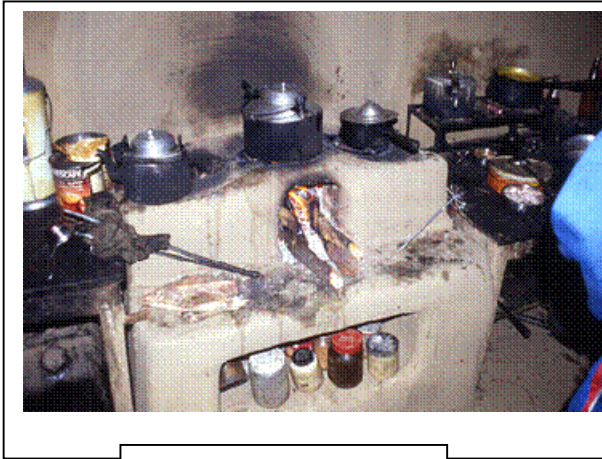
Environment and Energy (WISIONS), Germany to support eco-tourism and environment and energy conservation.

Given the above scenario, this paper will present CRT/N's initiatives and experiences in the promotion and dissemination of solar cookers mainly for eco-tourism development in Nepal and will highlight its continuing efforts with focus on institutional mechanism and implementation strategies adopted. The paper will also highlight the impacts of solar cooking projects which could be linked to poverty reduction and linking with Millennium Development Goals (MDGs) and Clean Development Mechanism (CDM) for future financing, and project up-scaling.

Key words: trekking, solar cooker, local capability, technology promotion, eco-tourism, environment, Millennium Development Goal, etc.

1. BACKGROUND

It is well known fact that Nepal is an attractive destination for tourists from all over the world. Everest, the tallest Himalayan peak lies in Nepal. There are many villages along various mountain trekking routes, through which thousands of tourists trek, interact with the local communities and enjoy their culture and traditions in a friendly manner. It is the general trend that Nepalese people are largely dependent on traditional energy sources such as fuel wood (76.3%), agricultural waste (11.1%) and animal dung (8.5%); all used primarily for cooking and space heating.



Firewood stove in operation

Consumption of huge quantities of firewood especially due to heavy inflow of the tourists in the tourist prone villages is causing fast depletion of nearby forests and health hazards (mainly eye and respiratory diseases) to the users, mainly the women with their children, due to indoor/kitchen air pollution and other local environmental and socio-economical problems. In some of the mountain parts, the land is getting naked day by day.



Firewood collection

In the increasing energy consuming scenario of tourism areas, promotion of solar cookers would serve as one of the appropriate alternatives to the use of traditional energy sources and provide income generation options of tourism based food enterprises reducing local poverty in mountain communities. Nepal has lot of potential for tapping solar energy to be used for various applications. Promotion of solar cooking helps in achieving United Nations Millennium Development Goals (MDGs) mainly goal numbers 7 and 8.

2. INITIATION OF SOLAR COOKER PROMOTION IN NEPAL

The Centre for Rural Technology, Nepal (CRT/N), an NGO established in 1989 with an aim to assist rural communities, has been involved in the promotion and dissemination of appropriate technologies suited to rural conditions. Its focus was on renewable energy technologies and the efforts on the promotion of solar cookers in Nepal started in 1992 with the box design. International volunteer friends from different countries played a very supportive role in initiating the promotional activities.

With the introduction of SK-14 Parabolic Solar Cooker in 1994, the demand for box type has been low and the use been limited as compared to Parabolic Cookers. The momentum for the promotion and dissemination of parabolic solar cookers in Nepal, although in slow pace, is quite encouraging. CRT/N has focused its promotion mainly in urban/semi-urban areas and tourism areas. HMG/Nepal has provided subsidy for its promotion. Some of the efforts made in the past were as follows:

- Initiation of awareness-raising activities in Nepal started in 1992. The support of Mr. Allart Ligtenberg of USA has been quite instrumental in this context. His efforts continue to date and helped in promotion and dissemination of solar cooking and water pasteurization.
- Similarly, Mr. Ulrich Aphedide of Germany, friends from University of Zyvas kyl, Finland and Solar Cookers International (SCI), USA have also contributed in its promotion during the early 1990s.
- Promotion of solar cookers by CRT/N in Banti Bhandar village of Ramechhap district, which lies on a trekking route to Mt. Everest, was done with support from Mr. Klaus Schulte of Sweden in 1996.
- Promotion of solar cookers around Kathmandu valley was supported by Dr. W. Ollendroff and Mrs. Angelika of LHWfN, Germany in 2000
- Promotion of solar cookers in Dolpa, one of the remote mountain districts in Far Western Development Region, was supported by Drokpa, an NGO in USA during 2001
- Promotion of SK-14 Parabolic Solar Cookers by Vajra Foundation in Beldangi Bhutanees Refugee Camp of Jhapa district was supported by Mr. Maarten Olthof of Holland initiated in 1998 and this effort is continuing.

More than 1000 units of SK 14 Parabolic Solar Cookers are disseminated in trekking routes, refugee camps, urban and rural areas of the country through collaborative efforts of various development partner organizations,

international Solar Cooker Volunteers and Promoters and Government support.

3. TECHNICAL FEATURES OF SK-14 PARABOLIC SOLAR COOKER

The followings are the main technical features of SK-14 model parabolic solar cooker.

- The SK 14 Parabolic Solar Cooker with parabolic dish of 1.4 meter diameter is developed in Germany.
- Sunrays are directed to reflecting surface, which concentrate at a focal point on which the black painted cooking pot is placed.
- The reflector sheets are imported from EG Solar, Germany while the required accessories such as frame, stand, pot base, pot, tracking indicator, etc. are produced locally
- The tracking position towards sun is monitored with the help of a tracking indicator attached to the cooker, tracking every 10-15 minutes for higher efficiency.
- The total weight of a parabolic cooker is 20 kg while the aluminum reflectors only weigh about 3 kg.
- High temperature is achieved in this cooker and generates about 700 watts net power in good sunshine. Very high temperature above 300°C can be attained in this cooker.
- Ten liters of water in a sunny day (atmospheric temperature 24°C) takes about 40-45 minutes to reach the boiling temperature of 100°C.
- Almost all types of cooking such as boiling of water/potato/eggs, cooking of rice/pulses/vegetables/meat, frying of omelets /meat, roasting of meat, baking of bread/cake, etc., can be done in this cooker. Also the pressure cooker can be used for increased efficiency.
- It requires only sunshine to operate; does not require any recurring cost except a nominal maintenance of repainting the frame and stand and keeping the reflector sheet clean.
- The cooker can be used all day long from sunrise to sunset. The cooking intensity is high during daytime from 11.0 am to 1.0 pm because of the high sunshine during that time.
- Due to its deeply curved parabolic shape, the focal point of the reflectors lies inside the dish and does not have the risk of burning to the user.
- Because of its high reflection, the user has to be careful of the eyes and needs to wear spectacles for safety. The user needs to use gloves and has to be careful to avoid putting hands at the focal point to protect from burning.

- The heat retaining “hay box” is now being planned to be introduced as complementary to the Parabolic Cookers.

4. PROSPECTS OF SOLAR COOKER PROMOTION IN ECO-TOURISM AREAS

There are a number of popular trekking routes and tourist areas in Nepal that attract the tourists. Along these trekking routes, a number of lodges have been providing required services to the tourists visiting each year. It was estimated that there are more than 1400 small and medium sized lodges in Nepal as shown in the following table.¹ The number of lodges is increasing also due to promotion of village tourism activities in the recent years.

Popular Trekking Routes and Tourist Areas	Estimated No. of lodges in 2002
Jomsom	197
Manang	175
Annapurna Base Camp	169
Everest	312
Langtang	107
Helambu	67
Dolpa, Rara, Mustang, Ganesh Himal, Rolwaling, Makalu-Barun, Kanchenjunga	150
Chitwan	50
Kathmandu valley	200
GRAND TOTAL	1428

The established lodges need more and more fuel due to their daily energy requirements. A “typical” lodge with 10 trekkers staying overnight and 10 trekkers using a snack or tea when passing through will use one back load (40 kg) of fuel wood per day². SK-14 can supplement the need tremendously if promoted among the lodge owners.

5. SOLAR COOKER PROJECTS INITIATED ON ECO-TOURISM DEVELOPMENT

5.1 Bamti Bhandar Case on Solar Cooker Promotion

Bamti-Bhandar Village in Ramechhap District, lies along the trekking route to Mount Everest from Kathmandu via the town called *Jiri*. Many tourists visit this village every year. Lodge owners and the local people have been heavily using firewood to manage their energy needs,

¹ Allart Ligtenberg, FAST, 2002, paper prepared for discussion with SNV/Nepal

² Allart Ligtenberg, FAST, 2002, paper prepared for discussion with SNV/Nepal

mainly for cooking and heating purposes. Fast depletion of an already poor nearby forest is resulting in an array of local environmental and socio-economical problems. Health hazards (eye and respiratory diseases) to the users, mainly the women with their children, are prominently seen due to indoor/kitchen air pollution.

The project was initiated in February 2003 with an aim to promote the SK 14 model solar parabolic cooker as a source of renewable energy and to support the local eco-tourism development. The project was financially supported by Alternative Energy Promotion Centre (AEPC) of HMG/Nepal and Gnesta-Daga Rotary Club, Sweden with technical support by CRT/N. The main project activities were identification of the local leaders, establishment of links with local lodge owners and community members, organization of orientation/demonstrations to create awareness, management and delivery of the cookers with subsidy support from the government, organization of skill development trainings, monitoring, etc.



A woman using the cooker

A snapshot assessment study³ undertaken during June 2004 indicated the following as the main outputs and results achieved from the project.

- 136 lodge owners and individual house owners are operating and maintaining 136 cookers skillfully

benefiting more than 1000 population (users and their family members) in the village

- The lodge owners and local people are capably managing the project and aware about the positive effects of the technology in terms of firewood saving and protection from health hazards.
- About 172.44 tons of fuel wood have been annually saved.⁴
- Saving of fuel wood has helped in reducing the carbon emission by about 310.39 tons annually giving an ample opportunity to tie up with carbon trading.

³ "Changes Brought by Solar Cookers in Bamtibhandar", An Assessment report, June 2004, CRT/N

⁴ "Changes Brought by Solar Cookers in Bamtibhandar", An Assessment report, June 2004, CRT/N

- Indirectly, the use of solar cookers has helped users in reducing the drudgery (due to reduction of collecting the firewood) and in improving the health situation due to a smokeless environment..
- The project has provided substantial employment opportunities to the local people (also in fabrication, transportation, assembling, etc., of the solar cookers).
- The village has been popular as a solar and eco-tourism village attracting more tourists to enjoy the solar dishes with extended stays, thereby helping the local people to increase their income level.

5.2 Solar Cookers for Eco-tourism Development along Annapurna Himalayan Range

CRT/N has been continuing its efforts to promote solar cookers to supplement the fuel needs of the rural communities, especially in eco-tourism villages. In an attempt to continue the efforts in this front, CRT/N has recently initiated a 1 year project on "Solar Cookers for Eco-tourism Development in Nepal" from February 2006. The project, supported by WISIONS, Germany and HMG/Nepal, has the target of promoting 300 SK-14s along the trekking routes of Annapurna Himalayan Range. The secondary districts are Lamjung, Myagdi and Kaski.⁵ Brief highlights of the project are given below:

5.2.1 Objectives

The objectives of the project are:

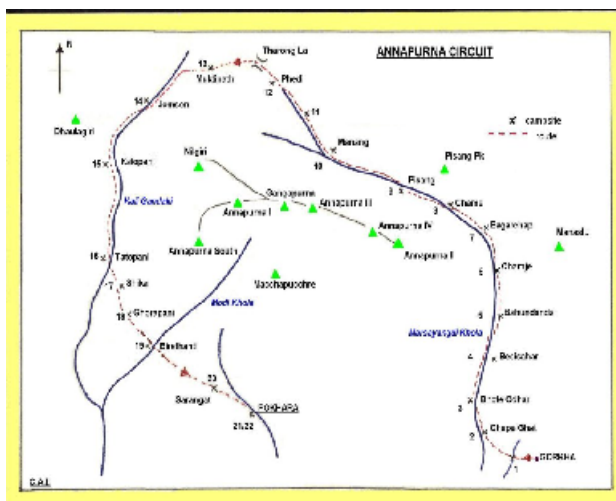
- To develop villages along the trekking routes as sustainable eco-tourism areas attracting more tourists.
- To promote solar cookers to provide better livelihood opportunities to the participating lodge owners and other beneficiaries through demonstrations and training along the trekking routes and linking promotion with financing mechanism,
- To reduce the dependency on firewood consumption as an energy source and protect the local forests/environments,
- To reduce drudgery of users, especially women and children, and protect them from health hazards by reducing firewood collecting time and indoor air pollution,
- To reduce the carbon emission rate and contribute to protecting people from the fallouts of global warming.

⁵ "Solar Cookers for Eco-tourism Development in Nepal", An approved project proposal document

5.2.2 The Main Implementation Strategies Adopted

The main strategies adopted within the framework of the project implementation are:

- Design improvements to make cookers more portable and user friendly
- Mass awareness making campaigns
- Emphasizing local participation in decision making, management, coordination and linkage development, monitoring, financing, etc.
- Local capability development
- Establishing sustainable institutional mechanisms.



Trekking Routes and Eco-tourism Sites-Nepal

5.2.3 Major Activities to be undertaken

The major project activities to be undertaken are:

- Building up the contacts with related stakeholders at the central level and establishing linkages with them
- Recruitment of project staffs and project familiarization/capability development training to them
- Identification and selection of district level Local Partners Organizations (LPOs)
- District level Project Initiation Workshops and establishment of Local Level Project Coordination Committees (LLPCC)
- Orientation/skill development trainings to LPOs
- Baseline collection and need identification
- Organization of mobile type orientation/demonstration for creating mass awareness among the potential users
- Procuring reflector sheets from Germany, producing quality frames/stands and delivering them at project sites
- Demand collection, disseminating solar cookers after linking with government for subsidy

support and financing institutions for lending support

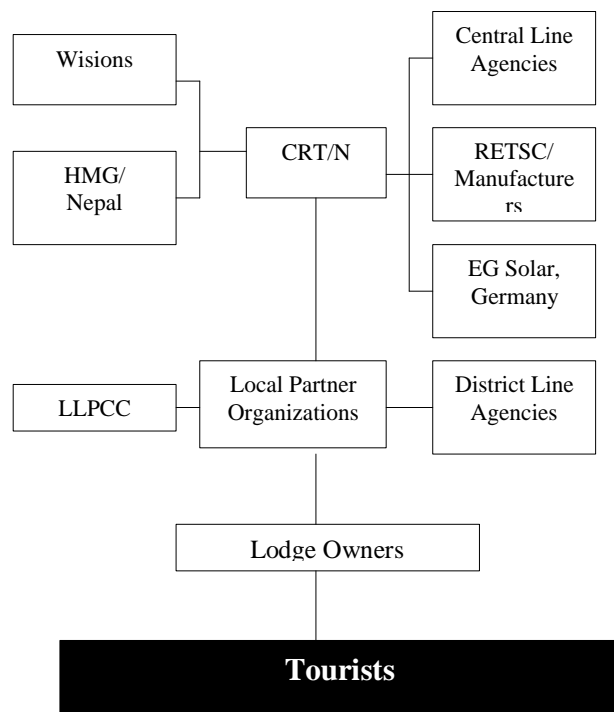
- Operational trainings to solar cooker users
- Follow up of the activities undertaken, participatory monitoring and snap shot assessments
- Reporting

5.2.4 Major Stakeholders

The major stakeholders of the project are:

- WISIONS / Germany: one of the main support organizations, also responsible for providing technical and monitoring support
- Alternative Energy Promotion Centre (AEP) of HMG/Nepal: for policy, subsidy and monitoring support
- Centre for Rural Technology, Nepal (CRT/N): for implementation of the project
- EG Solar, Germany: for supply of reflector sheet
- Rural Energy and Technology Service Centre (RETSC): for supply of Solar Cookers
- Sustainable Tourism Network: for facilitating the network members
- Annapurna Conservation Area Project (ACAP): for facilitating the local community members
- District Development Committee (DDC) and Village Development Committee (VDC): for facilitating coordination and mobilizing available local funds
- Local Partner Organizations (LPOs): for implementing the project locally
- End Users: Lodge owners and other potential community users, tourism camp owners

Strong institutional linkages among the project stakeholders are required for effective implementation of the project. The linkages are presented below.



5.2.5 Expected Benefits of the Project

The expected benefits from the project are:

- 300 lodge owners and other solar cooker users will directly be benefiting from the project in terms of fuel saving (firewood and kerosene) and protection from health hazards (reduction of indoor air pollution).
- Local Partner Organizations (LPOs) participating in the project will be capable to promote the technologies on their own with strengthened local institutional mechanism.
- The project will provide ample employment opportunities at the local level.
- The project will help in reducing the pressure to local forest and also emission of carbon to atmosphere.
- Tourists will be attracted with the use of solar cookers for enjoying foods specially “solar cooked delicacies” and solar pasteurized drinking water, helping develop eco-tourism villages.
- The project will have positive impact in terms of meeting energy needs of the tourist lodges and local communities for cooking, pasteurizing water for drinking, supporting energy inputs for commercial ventures and contributing to the reduction of about 684 ton CO₂ and GHG emission annually.

6. CONCLUSION AND WAY FORWARD

The efforts to promote solar cookers in Nepal have contributed in the development of eco-tourism in Nepal. It has helped in achieving Millennium Development Goals (MDGs) that stress environmental sustainability (goal 7) and global partnership for economic development and poverty eradication (goal 8). There are tremendous opportunities for promoting solar cookers as a supplementary energy source in rural eco-tourism areas. However, more and more efforts as well as the policy and institutional supports are required for developing and promoting decentralized energy supply systems including solar cooking in these areas from the Government, NGOs and International Donors and Advocacy Forums. In this context, CRT/N plans to promote 2000 Solar Cookers within next 5 years for eco-tourism development, helping income generation and poverty reduction. This is highlighted in the Poverty Reduction Strategy Paper (PRSP) for Nepal and supporting the MDGs⁶ giving emphasis towards:

- Integration with other renewable energy technologies development (solar dryers, solar PVs, solar water heaters, solar passive heating, improved stoves with back boilers, etc.)
- R&D on technology designs suited to local conditions
- Promotional campaigns through mobile orientations and demonstrations and national media, TVs, etc.
- Local capability development of NGOs, private companies and promotional agencies
- Building partnerships, linkages and networking
- Seeking funding support through collaboration and linking with Clean Development Mechanism (CDM), Commercial Banks and other funding sources

Promotion of 2000 solar cookers in the next 5 years will help not only boost eco-tourism development in Nepal but also reduce about 4,560 tons of CO₂ annually, contributing to the reduction of GHG emission. In this context, CRT/N is looking for supporting organizations and partners to implement various eco-tourism development projects through promotion of solar cookers along different trekking routes.

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