

GS's goal of installing 1 million SHSs by 2015

Recently GS has undertaken a program to set up 20 Grameen Technology Centers (GTCs) in order to decentralize its services as well as contribute to women empowerment and increase its stake hold at the local level by training women technicians who will manufacture, market and carry out repair and maintenance services of SHS accessories. These GTCs will :



- Train 1000 Women Technician on repair and maintenance and assembling of SHSs and other electronic equipment. These women will work as GS certified technicians or set up their own businesses with the help of GS
- Train one woman from each of the 5000 user families on proper use, repair and maintenance of SHSs
- Develop awareness of 10,000 students on renewable energy technologies
- Train 300 GS engineers on renewable energy to implement all project activities efficiently



As of October 2006, 17 GTCs have been set up which have trained 240 women technicians and more than 200 women from users families. Nearly 1000 students from rural schools have also gained exposure on renewable energy technologies. More than 51 women engineers have also found employment at the GTCs. This means technology has been

transferred at the local level which is a great achievement in the context of Bangladesh.

It is expected that these GTCs will contribute :

- ◆ Greater awareness of renewable energy technologies in the next generation, thus increase the use of renewable energy technologies
- ◆ Increase local level employment and create renewable energy entrepreneurs who able to provide cost effective, efficient services at the local level
- ◆ Increase women empowerment by increasing their income generating opportunities and decision making power
- ◆ Lead to better maintenance of SHSs as women from user families will learn to take better care of their systems

All these will contribute to GS's goal of installing 1 million SHSs by 2015.

MICRO FINANCING OF RET FOR EMPOWERING POOR WOMEN IN SOLAR ECO VILLAGE DEVELOPMENT PROGRAMME

Zareen Myles

Introduction

Those of us in the development sector have often realized that the poor are poor not because they are lazy, and useless but because they are asset less and exploited by the rich. The poor in spite of their poverty and lack of assets still manage to survive because they are hard working and often creative. However we need to ask the question that in this 21st century when so many strides have been taken in all fields, and in India itself there are more people with spending power, then why do we still have families who are barely able to eke out a living? Why do these families still not have enough food to eat? Why do their children still not go to school or get proper medical aid? Why are these people not able to pull themselves out of their poverty status instead of letting these go in a perpetual vicious cycle? Why are they not able to adopt even the small technologies which will make their lives easier? Why do the poor still live in conditions which are from the middle-ages?

It is a well accepted fact that we cannot ask a hungry person to think about first washing their hands, or constructing a toilet so the environment around his/her house is not polluted. It is an equally well accepted fact that compared to the rich the poor are more credit worthy, especially poor women, and that charity is not really conducive to long term sustainable development. From practical experience of implementation of Micro Financing (MF), WAFD has learnt that MF can create positive impact in the lives of these poorest of the poor women and their families.

What is Micro Financing (MF)?

A simple and easy to understand the meaning of "micro finance" is easy access to small credit ranging from Rs.1000/- to Rs.5000/-, which is repayable in small and equal weekly or monthly installments over a period of 1 year.

Need for MF in WAFD programmes, based on the past experience of implementing community development (CD) programme

WAFD works with the poor, who do not have access to credit on easy terms. The local money lenders charge exorbitant rates of up to 3% per month, while at the same time keeping their land or house as collateral. In times of distress the poor take the loan and then spend an entire life repaying just the interest while the principal remains intact. When we talked about socio economic development of the people in our project areas, it was essential that we study how to help the people

overcome this need for credit. And so began WAFD's involvement with micro finance programme. However it was important that if we gave credit to the poor it should be easy to be repaid by them, otherwise the credit would be lost and our future growth in terms of helping the maximum number of people stopped midway. Thus it is that in the beginning the credit is given only for productive purposes, as opposed to distress or social spending. Giving credit for productive purposes ensures that the person is able to repay on time, and so be eligible for another and bigger loan if required. Our experience in this has been very good and so far WAFD has been able to help almost 1,500 people easily access small credit for productive purposes.

How it is done (Process followed) in WAFD project?

WAFD has adopted the Grameen Bank methodology and the working unit is the group of 5 women in the following manner:

- A general meeting is held in the project village where everyone is invited and explained about the program, specially the criteria for the women who can be part of the programme. The village community is also requested to identify the real poor who they think will benefit the most from the programme.
- The interested women are confirmed to see that they really fit the criteria of the poor, and then given 7 day training of 1 hour each day.
- In the training they learn how to access loan, the repayment and service tax on the loan, importance of weekly group meetings and savings, and group responsibility.
- After the training these group of 5 women decide the day and time for their weekly meetings and the members are given loans of Rs.3000/- each in a staggered manner of 2 in the 2nd week, another 2 in the 3rd week and last person in the 4th week.
- Repayments are made in equal weekly installments during the meetings and emphasis is put on group discipline and responsibility.

What WAFD proposes to achieve in terms of livelihood and poverty reduction?

Using micro finance as a means of poverty reduction, WAFD would like to reach at least 3,000 poorest of the poor during the next 3 years. Since the programme focuses on credit for livelihood, the results start getting visible from the first month itself. We can take the example of a woman whose only source of income is the rented hand cart on which the husband sells vegetables and fruits. The usual rent for the cart is Rs.20/- per day. Many of our members have taken a loan to buy the hand carts. This means an immediate saving of Rs.20/- per day. With this they can buy more vegetables and fruits, as well as save a small amount towards their weekly repayments. We have seen that for most of our people the first change is improvement in food intake, and gradually this goes to other things as well.

To explain the advantage of MF more clearly in terms of what positive impact it has and also in future can be created, a case study of Bhaggo from Bakoli village in Roopwas is given here. In 2001 she (Bhaggo) took a loan of Rs.2500/- from MF fund with which she and her husband got a second hand water lifting pump attached with motor. She used this to irrigate her fields, as well as gave it on rent to other farmers. With the irrigation possible she was able to raise 7 tonnes of wheat. She kept some for the annual requirements for her family and sold the rest, earning Rs.3000/-. After she had repaid her loan in one year, she took another loan of Rs.5000/- and got a camel and cart. Her husband earned Rs.50/- to 100/- per day carting stones and other materials. After deducting Rs.30/- per day for feed for the camel they still had some money saved at end of the day. By this time the living condition of the family had also improved, prompting Bhaggo to make sure all her children were going to school. Again after repaying this loan she has now taken a loan a 3rd time. This time it is Rs.10,000/- for starting a small shop in her house. Today just after 2 years Bhaggo is a happy and content woman. Her daughters have all gone to school and been married to good boys, and the family is no more in the "below poverty line" category.

This example demonstrates the success of reducing poverty using small credit for the poorest of the poor.

MF viz. a viz. other form of loaning, e.g. banks and NABARD

WAFD has experience of working in the SHG (Self Help Group) model promoted by NABARD (National Agricultural Bank for Rural Development) and the nationalized banks, as well as the Grameen Bank methodology. Our experience has been that in the SHG model too poverty reduction and livelihood is possible. However the reach is very limited, since in the SHG model usually only a few persons, who are more vocal, benefit in the beginning and the criteria is not well defined or any great importance paid to the "poorest of the poor". In the micro finance programme using groups of 5 targeting the poorest of the poor is a must, as well as giving access to all 5 members within a month of group formation, thus making it possible for all members to grow at the same time together.

Thus the 2 most important and crucial features of MF are:

1. Targeting of the poorest and asset less women with no compromises on this.
2. Making small credit of equal amount to each member at the same time.

WAFD feels it is these 2 differences that make the micro finance programme a success as well as reaching out to more people.

How can MF help in financing of RE activities and what kinds of activities?

The first small loans are most commonly given for income generation activities; however we have found that once the basic necessities of the family are taken care of, the members start looking at the possibilities of taking small loans to improve their standard of living. We have found that most people would like to have a toilet, or construct a small biogas plant or even go in for solar lighting. But lack of ready cash keeps them back. In the cities the large section of middle class families are now able to afford small luxuries like washing machines, refrigerators, color TVs etc as they have the option of being able to buy these on small installments with interest, which enables even the small salaried person to afford these.

In the villages the poor can also aspire for these if they are able to take small loans on easy terms and conditions with low rates of interest. In our project a large number of women have taken small loans to start their vermi-compost units, for they have understood the importance of organic manure for their lands, as well as the monetary benefit of having their own vermi-compost units.

Out of the 700 families from 12 solar eco-villages in the EVD programme at least 500 families would want to avail of small loans and for the different activities if these were made available to them today under the different breakup as follows:

- Loans for biogas– 25 families would want to avail soft loan (70% cost of construction with repayment in 52 equal weekly installments),
- Toilets– 150 families would take loans (1000/- repayment in 12 equal installments),
- vermi-composting– 200 families (1500/- repayment 52 equal weekly installments),
- Solar panels– 20 families (60% cost of solar panels as loan with repayment in 52 equal weekly installments),
- Organic farming– 200 families (70% cost as loan, repayment in 6 months at one time as lump sum after harvest), and
- Smokeless chulhas– 250 families (Rs.100/- repayable in 4 installments).

Once the rest of the families have seen the success of above-mentioned activities, they too will be willing to take the risk of taking the loan for these activities.

At the moment 165 women who are the poorest of the poor in the solar eco-villages have been formed into small groups of 5, and out of these 105 women have already availed of small loans of Rs.2,500/- each to start some small income generation activity of her choice. Most of these women would now want bigger loans after having successfully repaid their first loan with an interest rate of 15% flat per year. These women pay back their loans in small weekly installments, which make it easier for them to repay.

Summary and Conclusion

Experience has shown that the old Chinese saying that it is better to teach a person to grow rice rather than give him a bowl of rice free, is very true for making sure that the man never has to beg again. It is this same principle which when used to make access to small credit easy for the poorest of the poor women that works wonders. It gives them a sense of respectability that there is trust that she will return the small loan, and this encourages her to make sure she uses it optimally; being assured that once she repays this she will be able to access more credit for expansion of use in other things.

COMMUNITY ORIENTED MODEL SOLAR ECO-VILLAGE DEVELOPMENT (SEVD) PROGRAM[†]

Raymond Myles[‡] and
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Brief background of the SEVD program

1. The "solar eco-village development (known as SEVD and now commonly referred as EVD) program" is a joint partnership program of WAFD (WOMEN'S ACTION FOR DEVELOPMENT) and INSEDA (INTEGRATED SUSTAINABLE ENERGY AND ECOLOGICAL DEVELOPMENT ASSOCIATION) with the support from the Student's Union of the University of Jyväskylä (JYY) Finland. This project is a part of an on-going programme which is being funded by the Finnish Government International Development Aid Ministry, since 2002, and the second phase will be ending in December 2006.
2. This joint project of WAFD and INSEDA EVD program is a community-based initiatives for the systematic promotion and establishment of RE centered, environmentally friendly, socio-technical and economically viable, micro-level eco-model for sustainable human development.
3. Based on the practical experiences of WAFD and INSEDA, it was recognized that in order to promote any viable and sustainable rural development program, it is desirable to consider village as the smallest unit of development, for promotion and regeneration of micro environment and micro-agro-eco system. This is in order to facilitate the best integration of socio-cultural, political, economical activities with financing, technical inputs and external interventions. Moreover, such an approach would also ensure sustainable local management of the programme, after the withdrawal of external facilitating organisations.
4. Rationale of taking village as the smallest unit (or micro eco-system) for undertaking EVD programme to establish model solar eco-village.
 - a). A village is the smallest geographical unit recognised by the official agencies in India. It is a socio-politically as well as administratively defined for promoting and implementing any developmental programs.
 - b). NGOs have greater scope for successfully demonstrating this concept by taking village as the smallest unit for implementing, operating and managing it for a considerable period, to show the practicality of eco-village development (EVD) concept and its value for replicability for different agro-climatic situations.
 - c). After a successful demonstration by the two partner NGOs (namely, WAFD & INSEDA), a program like this would have greater chances of getting replicated in any geographical area in India by mobilising funds from government, financing institutions and other resource sharing agencies, for people centred development, thus making it sustainable.
 - d). At the end of the program these EVD villages could be used as the training-cum-demonstration units/centres for other grassroots NGOs and MLPs (micro-level people's institutions) as well as government agencies for wider dissemination and replication of such models with appropriate modifications.
5. The three broad objectives of the solar Eco-village development is program is - (a) To make these 12 model solar eco-villages sustainable for meeting all their essential needs from within these villages on the sound principle of environmental regeneration, conservation and protection;

[†] Prepared for the ENERGIA meeting of National Focal Points (NFPs) from South Asian region, held in New Delhi from Nov 1-3, 2006

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(b) Address the issues related to micro-level environmentally sustainable, organic-food security, energy security and water security, while adequately focusing on the livelihood issue, empowerment of poor and marginalized, women and youth and promoting income-generation; and (c) Undertake capacity building activities for preparing the local people for taking over the operation, maintenance and management of the program in due course.

Criteria and process of selection of 12 villages for establishing model solar eco-villages

1. Criteria for selecting these villages was that these should be small and homogenous as far as possible, the people should be interested in the programme and be willing to participate actively, and if possible located reasonably close to each other so that the results can be seen and felt.
2. Based on the preliminary reconnaissance survey done of the 30 villages jointly by WAFD and INSEDA 20 villages were short-listed from of the list. These 30 villages were from the three blocks in which WAFD had already been involved in the community development and educational program meant for women, adolescent girls and children for almost one decade.
3. Subsequently, a total of 12 villages (11 villages were chosen in Sewar block, and 1 village in Roopwas block of Bharatpur having a total of 700 families) were finally selected after having meetings with the villagers to explain them the objective of the program and to ascertain how much willingness and cooperation could be muster to start a long-term program for transforming these villages in to model solar eco-villages (MSEVs).



PHOTOS-1 (A), (B) & (C): ONE OF THE MEETINGS WITH VILLAGERS FOR SELECTION OF EVD PROGRAM VILLAGES AND OTHER MEETINGS WITH VILLAGERS DURING THE VISIT OF OVERSEAS DELEGATES TO EVD PROJECT VILLAGES.

Selection, induction and capacity building of local volunteers from these 12 target villages and the newly appointed EVD staff

1. A total of 48 rural volunteers were selected from each of the 12 target solar eco-villages (a team of 2 female and 2 male per village);
2. These rural volunteers were selected for creating awareness, motivation, training, demonstration and implementation in their respective villages, under the guidance and on going socio-technical and managerial support of WAFD and INSEDA;
3. These 48 people (24 female and 24 male) were provisionally selected through a process involving recommendation by the local communities, interview. The EVD being altogether new concept to these rural volunteers who were going to be the motivators, facilitators and key links between the two partner NGOs and the villagers from their respective EVD villages, it was important to give at least six-months of in-house training to these pre-selected group, directly by the chief functionaries WAFD and INSEDA on the social, technical and related aspects of the program, with out any stipend, to ascertain their commitment, dedication and aptitude, before final selection and induction as the member of REEVOCs (Rural Energy and Ecological Volunteers Corp);

4. After final selection, these 48 volunteer members (24 male & 24 female), who are now commonly referred as REEVOCs, were trained as barefoot consultants, initially by INSEDA and WAFD chief functionaries, subsequently by the EVD staff once they also under-went in-house trainings;
5. The newly appointed EVD (eco-village development) staff, who were also new to this concept were also trained by the chief functionaries of INSEDA and WAFD during the next six-months on participatory methods and training on various social, technical management aspects, to handle and to respond to the new and emerging challenges to effectively realize the overall goal of the Eco-village development (EVD) program;
6. Now, the volunteer members of the REEVOCs are constantly being trained, to up-grade their skills and knowledge, to make them effective barefoot motivator-cum-technicians to the local people in their respective villages; and
7. As a part of their overall capacity building of REEVOCs in the implementation of renewable energy technology, as well as other environmental and eco-friendly technologies, a few training-cum-demonstration units are also established in 12 selected villages for the EVD program.

Some of the key problems in villages selected for solar Eco-village development program

1. Detailed household survey of all the families living in these 12 target villages selected to gradually transform them in to model solar eco-villages in a foreseeable future was done and fed in to the computer to create data base in the Microsoft Access. As a result of survey and participatory exercise with REEVOCs to do situational analysis, and subsequently based on collecting information from some of the key villages leaders, the following key problems were identified to be addressed by WAFD and INSEDA through appropriate programs.
 - a). Lack of employment opportunity
 - b). Lack of sustainable energy, especially for women:
 - (i) Women and young girls often get respiratory disorders when cooking food indoor on open fire.
 - (ii) Cooking related problems, like drudgery and health and disease of women and infant children, in rural areas could be solved by introduction of other affordable renewable energy technologies, like smokeless cook stoves, biomass briquettes and solar cookers, while reducing indoor and outdoor pollution, protecting the local environment and reducing carbon dioxide emission to the atmosphere.



PHOTOS-2 (A) & (B): DEMONSTRATION OF CONSTRUCTION OF SMOKELESS CHULHA AND CORRECT USE BY EVD STAFF TO REEVOCs AND VILLAGERS

- c). Lack of drinking water and irrigation facilities
 - d). Most of the farmers take only one crop per year, if this fails due to failure of monsoon, they get into heavy debts from money lenders, and migrate to cities in search of jobs.
 - e). Lack of appropriate education, knowledge, awareness and skills for livelihood and income generation activities.
 - f). Lack of credit and marketing facilities
2. While addressing other problems listed above, it was also recognized that without energy, development would hardly be possible, and the goals of developing rural areas and reduce absolute poverty by half cannot be reached. It was also realized that due to the energy imports getting

increasingly costly, and meeting the import needs of fossil fuel for the developing country like India in the coming years could become more and more difficult. Therefore, WAFD and INSEDA, in consultation with EVD staff, REEVOCs and local villagers, have decided to concentrate more on renewable energy, mainly using local energy biomass sources for cooking and solar energy based on PV system for home lighting, as well as combining it with efficient use of energy to meet the development needs of the 12 target villages undertaken for the eco-villages development program.

Participatory preparation of social maps of 12 target villages by REEVOCs and their vision/dream of future “Model Village” in pictorial forms

1. These 48 rural volunteers from 12 villages, who together form the Rural Energy and Ecological Volunteers Corps (REEVOCs) along with the WAFD’s EVD Staff at Bharatpur went through an exercise for preparing social maps of the existing situation in their respective villages in pictorial, based on knowledge and inputs of REEVOCs, under the guidance of Secretary General, INSEDA.
2. Subsequently, during the process of regular monthly training workshops these 48 REEVOCs prepared final social maps of their existing villages and what is their shared vision of their “Model Village” which they would like to live in.
4. After a few months, when a number of training-cum-demonstration RETs were built by EVD staff, the REEVOCs understanding of renewable energy grew to a reasonable extend.
5. At the end of the workshop, these 48 REEVOCs developed a common understanding of a futuristic “community-oriented sustainable energy based eco-village”, based on their shared vision, and called it as their “Model Solar Eco-Village-MSEV”, in which they would like to live.



PHOTOS-3 (A) TO (D): MONTHLY MEETING OF REEVOCS TO PREPARE THEIR COMMUNITY ORIENTED DREAM SOLAR ECO-VILLAGE SHOWN IN CHART-I

6. Pictorial understanding of model solar eco-village by REEVOCs which is the long-term goal of this program, proposed to be achieved in about 15 years from the present/existing situation in their existing villages, is shown in **chart-1**.



COMMUNITY ORIENTED SOLAR ECO-VILLAGE, WHICH WAS PREPARED AS A COMMON DREAM VILLAGE BY REEVOCS, THROUGH PARTICIPATORY PROCESSES, OVER A FEW MONTH PERIOD DURING MONTHLY TRAINING WORKSHOPS

Chart- 1

7. Now the entire group is working towards the goals of achieving this “Model Solar Eco-village-MSEV)” during the next 15 years under the guidance of WAFD and INSEDA. Based on the implementation for a few years, and experience gained, the pictorial model give in chart could be refined and appropriately modified to make it more realistic.

Implementation of different activities with in the Solar EVD program

1. Based on demonstration, several RE and the ecological and environmental oriented programmes have been implemented with in the solar EVD program. Some of them are:
 - a). Implementation of Household biogas plants (Grameen Bandhu and Deenbandhu models)
 - b). Roof-top rain water harvestings structures,
 - c). Vermi-culture
 - d). NADEP Compost,
 - f). Solar cookers demonstration (Parabolic Solar Cookers)



PHOTOS-4 (A), (B) & (C): PARABOLIC SOLAR COOKER-TRAINING OF EVD STAFF & REEVOCS IN ASSEMBLY & COOKING

- g). Household briquetting demonstration
- h). Making smokeless chulhas (improved cook stoves)
- i). Demonstration-training and implementation of local affordable fixed dome biogas plant (Grameen Bandhu models)
- j). Stand alone Solar PV system for home lighting
- k). Training on making of briquettes from locally available biomass wastes



PHOTOS-5 (A) TO (D): TRAINING OF REEVOCS AND VILLAGERS ON MAKING OF BRIQUETTES FROM LOCALLY AVAILABLE BIOMASS WASTES HELD IN ONE OF THE EVD VILLAGES

- k). Training and construction of rain roof water storage
- l). Training and construction of low cost latrines

- m). Promotion of organic manure use (vermi-composting, NADEP composting)
- n). Promotion of organic farming
- o). Plantation of Jatropha for use as bio diesel at later stage
- e). Biomass experimental biogas plants.



PHOTOS-6 (A) TO (E): BIOMASS EXPERIMENTAL BIOGAS PLANTS (IT IS IN OPERATION SINCE 2003, WITH MUSTARD HUSK, AS FEEDSTOCK, WHICH IS AVAILABLE IN ABUNDANCE DURING THE HARVESTING SEASON.

- p). Installation of stand alone solar PV home lighting system (SPVHLS)
 - q). Micro-credit/Micro-financing groups for small loans for income generation activities,
 - r). Capacity building and trainings are the on going activities
 - s). Formation of youth clubs, mahila mandals
 - t). Promotion of kitchen gardens for better health and nutrition
 - u). Training in soak pit construction
 - v). Repair and maintenance of solar gadgets
 - w). Repair of hand pumps
 - x). Formation of groups for micro finance for livelihood activities as well as for use in adopting small technologies
2. After four years of implementation these volunteers (REEVOCs) have understood the importance of eco village development, and the role of renewable energy such as biogas plants, plantation of energy crops like Jatropha, and solar energy. In addition they have also become aware about the production of SVO (straight vegetable oil) and bio diesel from non-edible oil seed like Jatropha seeds for operation of diesel pumping sets, as well as decentralize power generation at the rural household and village levels, by using bio-diesel operated generating sets. They are now motivated to undertake Jatropha cultivation on the boundaries and their other wise unproductive waste lands.
 3. Now for more systematic and organized implementation of RE and other related activities in an integrated manner for desired output/results in a foreseeable future, the 48 REEVOCs have formed a "management committee". This "management committee" has been elected by the volunteers themselves which has one representative from each of the 12 project villages. The management committee in tern has elected 6 office bearers- out of them three are the key office bearers, i.e., President, Secretary and Treasurer, to oversee the day to day operation aspects of the programs in these 12 eco-villages. The other office bearers are, Vice president, Joint Secretary and Joint Treasurer. The office bearers take more responsibilities on behalf of the management committee and meet EVD staff and WAFD and INSEDA members more frequently during the inter-sessions of the management committee meetings and they are delegated the responsibilities to meet the district level government functionaries to present the problems of the group as well as find out appropriate govt programs to implement in these 12 solar eco-villages.



PHOTOS-7 (A) & (B): MEETING OF THE MANAGEMENT COMMITTEE OF THE REEVOCS HELD IN ONE OF THE EVD VILLAGES

Achievements and impact of solar eco-villages development programme till date

1. As the local people are developing confidence, they are demanding other RE gadgets. However, they have been asked to wait till appropriate trainings are organized for them and the local skills are up graded in the installation, maintenance and repairs, so that these facilities could be available with in villages.
2. An important innovation for the construction of bio gas plants has been the experimentation on using bamboo baskets as the base instead of the usual brick and mortar in the construction of the plants as is conventional. The use of bamboo baskets brings down the price of the plant by at least 15% for a 2 cubic meter plant, as compared to the most popular Indian model fixed dome BGP, called as Deenbandhu model, while also ensuring the participation of women in the weaving as well as earning their livelihood in spare time sitting in their own villages, after appropriate skill training on step-by-step weaving of bamboo structures used for building this bamboo reinforced cement mortar (BRCM) biogas plant. This model built using is deigned by the Secretary General, INSEDA-cum-INFORSE Regional Coordinator for South Asia and christen as the Grameen Bandhu plant-GBP (Friend of the rural people), as it s rural people friendly and 45% cost of building goes to rural people, especially the landless daily wage earning village women.



PHOTOS-8 (A) TO (F): TRAINING ON THE STEP-BY-STEP CONSTRUCTION CUM BIOGAS UTILISATION OF CUM-DEMO GRAMEEN BANDHU BIOGAS PLANT (GBP) OF EVD STAFF, REEVOCS AND VILLAGERS BY INSEDA. THE POOR LANDLESS VILLAGES WOMEN TRAINED GET WAGES SITTING IN THEIR VILLAGES AT THEIR SPARE TIME, AS AND WHEN THE WEAVING OF BAMBOO STRUCTURE ARE BUILT IN THE EVD AS WELL AS OTTHER VILLAGES BY WAFD TECHNICIANS

3. An important step taken by the project is training and promotion of "Jatropha" plantation for bio diesel. Farmers have shown a lot of interest in this and this year 100,000 seeds were planted, but due to heavy and excessive rains only 60,000 plants are surviving. The communities are looking at these with great expectation and interest. Once the oil seeds are produced in proper quantity after 3 years, plans are to use it as bio-fuel for running engines.



PHOTOS-9 (A), (B) & (C): SHOW DISTRIBUTION OF JATROPHA SEEDS TO REEVOCS AND PLANTATION IN THEIR RESPECTIVE VILLAGES

4. Youth of each village have been organized to form youth clubs, the main objective being awareness and promotion of ecological components in their villages. Thus 4 of the youth clubs are preparing 4 demonstration sites in their villages which will have all the components of the eco-living concept, including fencing of Jatropha plants.
5. Mahila Mandals in each village have from 15 to 20 women members who meet regularly discussing health issues, gender, and environmental issues affecting the women. Women have also formed small saving groups where WAFD provides them loans for livelihood as well as soft loans for construction of toilets and vermi- compost units. These mahila mandals have also provided the women with an effective platform to be able to discuss their problems find solutions and even motivate each other for joint effort.
6. The strategy followed in the solar eco-villages is not to overwhelm or to push for mass promotion of any activities, but to follow a process oriented approach. Thus for promotion of organic farming first it was information to the farmers about the benefits of organic farming, which most farmers understood. However there were many myths about this also and they were afraid of going into heavy losses during the first few years. They also felt that it would be very costly as organic manure was not easily available and would be expensive. Their doubts were cleared and it was suggested to them that instead of going in a big way at once they should try organic farming in only in small plots of either $\frac{1}{2}$ acre or less of land, see the results for themselves before increasing gradually every year.
7. Due to the critical awareness, followed by motivational efforts, very good demand has been created for the installation of stand alone solar PV home lighting system in the EVD villages. The local people from these and other surrounding villages are coming forward and asking for the installation of solar PV home lighting systems (SPVHLS). However, as the cost of SPVHLS are still very high for these people to pay the entire amount, they want some subsidies, backed by appropriate credit facilities/soft loans with small affordable installment repayment amount, returnable on longer period than the present WAFD micro-financing program for giving loans to villages for purely house-hold level activities. In spite of this, using the provision of small fund by the donor agency under the current EVD project, a total of 10 solar PV home lighting systems have already been installed in villages. If a larger seed money could be provide for subsidies and loan under the micro credit/finance scheme on easy & affordable repayment basis, including the administrative cost for WAFD and INSEDA, to handle and manage the fund, and also provision of funds for capacity building and monitoring etc, then a large number of SPV home lighting system could be installed in the EVD as well as other program villages. Due to the critical awareness, followed by motivational efforts, very good demand has been created for the installation of stand alone solar PV home lighting system in the EVD villages. The local people from these and other surrounding villages are coming forward and asking for the installation of solar PV home lighting systems (SPVHLS). However, as the cost of SPVHLS are still very high for these people to pay the entire amount, they want some subsidies, backed by appropriate credit facilities/soft loans with small affordable installment repayment amount, returnable on longer period than the present

WAFD micro-financing program for giving loans to villages for purely house-hold level activities. In spite of this, using the provision of small fund by the donor agency under the current EVD project, a total of 10 solar PV home lighting systems have already been installed in villages. If a larger seed money could be provide for subsidies and loan under the micro credit/finance scheme on easy & affordable repayment basis, including the administrative cost for WAFD and INSEDA, to handle and manage the fund, and also provision of funds for capacity building and monitoring etc, then a large number of SPV home lighting system could be installed in the EVD as well as other program villages.

8. In one of the EVD villages, for the first, one larger size Grameen Bandhu model (designed by the Secretary General, INSEDA) of 6 CuM (biogas per day) capacity was built jointly by WAFD and INSEDA on the request of q farmer so that he could operate his diesel engine as dual fuel engine to simultaneously operate, both his generating set as well as give mechanical power. Subsequently, the diesel engine was converted by INSEDA and WAFD to operate on mixture of 70% biogas and 30% diesel. This dual fuel engine is now connected through belt and pulley to supply power to both, the generating set for the production and supply of electricity for domestic lighting as well as providing mechanical power for operating agricultural machineries, like chaff cutter for chopping fodder for his milch animals.



PHOTOS-10 (A) TO (E): SHOW 6 CuM CAPACITY GBP OPERATES A DUAL FUEL ENGINE ON MIXTURE OF 70% BIOGAS & 30% DIESEL, OPERATING A GEN-SET AND ALSO POWERS TO DOTRVY OPERATE AGRICULTURAL MACHINERIES, LIKE CHAFF CUTTER.

Social benefits due to the solar eco-village program

- 1 The EVD project has aimed to support the local people to find their own solutions for their problems. Thus WAFD and INSEDA have been encouraging participation of REEVOCs and the local community in each and every stage of programme implementation. As a result of this, it has been observed that when communities' work together to improve their own lives, the result is a permanent strengthening of the community and refreshed hope for the future.
- 2 **Benefited and impact on women:** The female REEVOCs and women from the mahila mandal and other women beneficiaries of the project are gradually coming out and making their presence felt in the earlier male dominated interventions. This can be observed in all the 12 eco-villages.
- 3 **Capacity building:** This has been one of the key areas of interventions of the solar eco-village programme. It has brought both qualitative and quantitative inputs and impact in the 12 villages. Various types of trainings, e.g., on renewable energy, organic farming and tree plantations were carried out for the beneficiaries and village community. Trainings have proved useful in empowering the individuals, REEVOCs and the EVD staff teams with practical knowledge in terms of environment and ecology. The capacity building activities have also provided the local people opportunity to expand their knowledge, express their views, exchange ideas and learn by sharing their experiences. This has enabled them to function more effectively in team environments, including enhancing their skills in communication.

Solar Home Light System

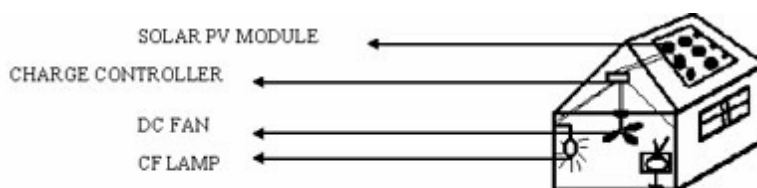
Rural Energy Department, AIWC

Home lighting Systems are powered by solar energy using solar cells that convert solar energy (sunlight) directly to electricity. The electricity is stored in batteries and used for the purpose of lighting whenever required. These systems are useful in non-electrified rural areas and as reliable emergency lighting system for important domestic, commercial and industrial applications. The SPV systems have found important application in the dairy industry for lighting milk collection/ chilling centres mostly located in rural areas.

Solar Home Systems are designed to meet the basic requirements of end users in semi-urban, remote areas and places where the conventional supply is erratic.

The Solar Home Lighting system is a fixed installation designed for domestic application. The system comprises of Solar PV Module (Solar Cells), charge controller, battery and lighting system (lamps & fans). The schematic of the HLS is given below. The solar module is installed in the open on roof/terrace - exposed to sunlight and the charge controller and battery are kept inside a protected place in the house. The solar module requires periodic dusting for effective performance.

Operation Time



Operation Time

The above systems are designed to give a daily working time of 3-4 hours with a fully charged battery. The system provides for buffer storage for 1-2 days.

Models

Under the subsidy scheme of GEDA /MNES, 50% subsidy for the four models approved by MNES, is being provided. The specifications of the models included in the subsidy scheme (2002-03) are shown in the table below.

Models	System Capacity	No.of Lights	Tubular Battery
II	37 Wp	2 nos. – 9W CF Lamps	12V, 40 Ah
III	37 Wp	1 – 9W CFL + 20W DC Fan	12V, 40 Ah
IV	74 Wp	2 – 9W CFL + 20W DC Fan	12V, 75 Ah
V	74 Wp	4 nos. – 9W CF Lamps	12V, 75 Ah

Solar Home Systems can be developed to meet specific customer requirements and the following data is needed for providing a suitable system.

- Location of the Customer.
- Purpose of light and fan.
- No. of lights and fans required at a single location.
- Back up time required per day.
- Shadow free area available on the ground or roof.
- Whether conventional supply is available?

Solar Home Lighting System or Solar Photovoltaic Domestic Lighting System is a solar-powered fixed light system, which gives omni-directional and pure white light. It works on the principle of Solar Photovoltaic.

Salient Features:

1. Renewable and Free Energy Source.
2. Repair and maintenance free.
3. Works without any recurring and expensive conventional energy sources.
4. The CFL Lamp of 9 W rating gives light output of a normal 6 W AC bulb.
5. The Home Lighting System also works on slightly cloudy days.

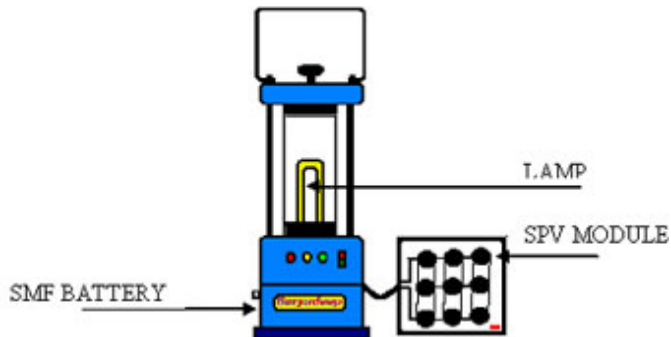
AIWC Experience

Being the Nodal Agency for the Ministry of Non Conventional Energy Sources, Govt. of India, AIWC had implemented both solar Lantern & Home Light systems propagation through the market mode. In the states of Karnataka, Orissa, Bihar & Delhi, around 1035 Solar PV homelight systems and 2906 solar lanterns have been installed. A lot of awareness has been created in the rural areas as a result of growing demand for the systems. According to the study conducted by the renowned Govt. Agency EPRI (Environment & Power Research Institute) in Kolar district in Karnataka, it has been found that when even one of the professionals like the doctor or a teacher adopt this technology, the whole village comes forward to take up the use of SPV systems. The most important point which emerged was when the beneficiaries said "We get the power when we want it" by using SPV systems.

For more information consult websites:- <http://www.balajicastings.com/lighting-en.shtml>
<http://www.oredaorissa.com/SolarHomeLight.html>
http://www.geda.org.in/solar/so_slr_hmlight.htm

Solar Lantern

Rural Energy Department, AIWC



A Solar lantern is a simple application of solar photovoltaic technology, which has found good acceptance in rural regions where the power supply is irregular and scarce. Even in the urban areas people prefer a solar lantern as an alternative during power cuts because of its simple mechanism.

Works of Solar Lantern

A solar Lantern is made of three main components - the solar PV panel, the storage battery and the lamp. The operation is very simple. The solar energy is converted to electrical energy by the SPV panel and stored in a sealed maintenance-free battery for later use during the night hours. A single charge can operate the lamp for about 4-5 hours.

Specifications

1. DEFINITION

A Solar Photovoltaic Lantern is a lighting system consisting of a lamp battery and electronics all placed in a suitable housing made of metal, plastic or fiberglass and a PV module. The battery is charged by electricity generated through the PV module. The lantern is basically a portable lighting device suitable for either indoor or outdoor lighting covering a full range of 360 degrees. A lighting device which provides only unidirectional lighting will not be classified as a solar lantern in the present context

2. DUTY CYCLE

The solar lantern should provide a minimum of three hours of lighting per day under average daily solar radiation conditions of 5 kWh / sq.m. on a horizontal surface. The actual duration of lighting may vary depending on the location, season, etc.

3. Since the Solar Lantern has become quite popular even in States like U.P., Bihar, Gujarat, etc. MNES has withdrawn the subsidy. But still some states provide small amount of subsidy.
4. Average costs of the Solar Lantern vary from Rs. 4500 to 7500. the battery lasts usually for 3 years and the solar panel is guaranteed to work for 15 years without any trouble.

By AIWC experience charge controllers work without any problem for 5 to 6 years.

Solar Photovoltaics Programme

Rural Energy Department, AIWC



A view of a stand-alone solar photovoltaic array for generation of electricity

In India there are about 300 clear sunny days in a year and solar energy is widely available in most parts of the country. Solar photovoltaic technologies offer a unique decentralized option for providing electricity locally at the point of use

MNES & SPV programme

A country wide Solar Photovoltaic Programme is being implemented by the Ministry for about last two decades. The Programme is aimed at developing the cost effective PV technology and its applications for large scale diffusion in different sectors, specially in rural and remote areas. Major components of PV programme include, R&D, Demonstration and Technology Utilization, Testing & Standardization, Industrial and Promotional activities.

The following PV systems are covered under the programmes of MNES: Solar Street **Lighting Systems**, Solar Lanterns, Solar Home Lighting Systems/Solar Home Systems; Stand-alone PV Power Plants; Solar PV Water Pumping systems; Other applications of PV Technology including new applications.

Achievement

PV systems of about 245 MWp aggregate capacity (about 13,00,000 systems) have been installed by December, 2005, for various applications including export of about 160 MWp aggregate capacity of PV products. Under the PV program, about 10 lakh systems have been installed. This includes 5.6 lakh solar lanterns; 3.42 lakhs solar home lighting systems; 54,000 street lighting systems, 7,002 water pumping systems and of about 4.75 MWp aggregate capacity of stand alone and grid interactive power plants/packs.

POTENTIAL

The solar radiation falling over India is about 5,000 trillion kWh / year. The average insolation incident over India is about 5.5 kWh / sq. meter over a horizontal surface.

PRODUCTS



Solar lantern can lit any corner

The following PV systems are covered under the programmes of MNES:

Home Lighting Systems / Solar Home Systems, Street Lighting Systems, Stand Alone PV Power Plants, Solar PV water pumping systems and the other applications of PV Technology including new applications

PROGRESS

Significant progress has been made in deployment of small

capacity stand-alone PV systems in the country. By 31st December, 2005 PV systems of about 245 MW aggregate capacity (about 13,00,000 systems), including export of about 160 MW have been in use for various applications.

Under the PV program, about 10 lakh systems have been installed. This includes 5.6 lakh solar lanterns; 3.42 lakhs solar home lighting systems; 54,000 street lighting systems, 7,002 water pumping systems and of about 4.75 MWp aggregate capacity of stand alone and grid interactive power plants/packs.

SPECIFICATIONS OF PV SYSTEMS

Specifications of various PV systems have been laid down and are regularly revised in consultation with industry

- SOLAR LANTERNS

(10 W Module, 7 W CFL, 12 AH Battery.)

HOME LIGHTING SYSTEMS

(37 W Module, 2X 9 W CFL, 40 AH Battery)

STREET LIGHTING SYSTEMS

(74 W Module , 11 W CFL, 80 AH Battery)

PV PUMPING SYSTEMS

(200 Wp – 3000 Wp PV array, Example : 1800 W PV Module, 2 hp Motor pump set)

SOLAR HOME LIGHT SYSTEMS

- Solar systems for lighting, and operating TV, Radio and Fan
- Designed for powering 2-4 lights, 20 w dc fan and tv set for about 2-4 hours daily
- Ideal for remote homes/hospitals/hostels/lodges/hamlets and villages.
- Light – 2-4 cfl (7-11w cfls); Storage-12 v 40/75 AH battery; PV module – 37/74 Wp.
- Manufactured by more than 35 companies

COST

- Rs. 11,000-12,000 (for 37 Wp System)
- Rs. 20,000-22,000 (for 74 Wp System)

Central Subsidy for Individuals / Non-Commercial Users

- Rs. 5500 (in General Areas)
- 90% in North – Eastern Region (Max : Rs. 10,000)

Available Form

- 29 'Aditya' Solar Shops in major cities
- District/block level offices of state nodal agencies
- NGOs involved in SPV programme

Repair & Servicing

Facilities are provided by Aditya Solar Shops, State Nodal Agencies & manufacturers / dealers of the solar energy devices.

Reference : Publication of MNES – “Renewable Energy Devices For Your Daily Use”
For more information consult websites: - <http://mnes.nic.in/>

GOOD PRACTICE (Solar PhotoVoltaic)

By AIWC

Introduction

The Ministry of Non Conventional Energy Sources has been implementing a country wide Solar Photo Voltaic (SPV) Programme for more than the last two decades. It has all the components to develop a cost effective SPV technology and its manufacturing base in the country for large scale applications of SPV systems in different sectors.

Under the demonstration Programme , SPV systems for lighting and other applications are being installed all across the country ,primarily in the rural and remote areas. These SPV systems are like portable solar lanterns, fixed type solar home systems, street lighting and stand alone village –level power plants, which are supported by the Ministry through Central subsidy for non commercial users and technical guidance and service charges to the Programme Implementing Organizations (PIOs). New applications of SPV technology are also supported under the programme. The PIOs include the State Renewable Development Agencies/ Departments/Corporations. 'Aditya Solar Shops , reputed NGOs with a good track record and selected PSUs . The programme is implemented by the PIOs either by procuring the systems through the tendering mode and then distributing to the end users or by allowing the SPV manufacturers to directly market their systems.

As on 31st March 2004, more than 500,000 solar lanterns , 2,50,000 solar home systems , 46,000 street lighting systems and about 300 stand alone power plants of more than 1500 KWP aggregate SPV capacity have been installed in the country and are performing satisfactorily. AIWC has been actively participating in the propagation of SPV systems since the last four years.

Case Study I - Solar Lanterns.

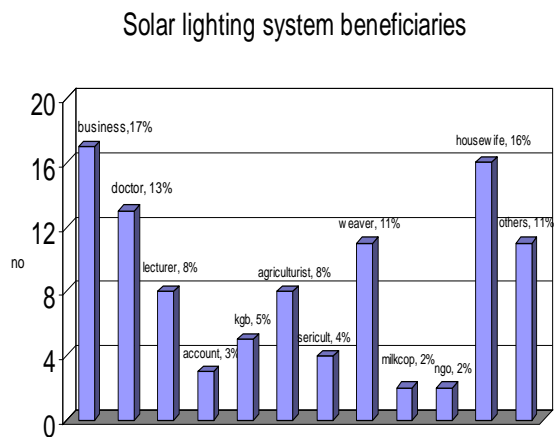
Elliot Beach in Chennai. The "Other" beach of the city – as against Marina, to the north is becoming increasingly popular as the evening destination of the people, especially from the nearby residential areas of Indira Nagar, Shastri Nagar, Besant Nagar Kalakshetra Colony etc. of late, a number of small mobile stalls have sprung up, which function in the evenings, from about 6 pm to 10 pm selling small eats- chilly cutlets, wafers, etc, and some offering amusements like shoot the balloon, darts etc in the beginning about 20 of these stalls used solar lanterns. Chandran and his wife – residents of a nearby fishing village , run a Veg. Cutlet stall. They have two lights which they take from a house from nearby. An enterprising person there had purchased about 24 solar lamps takes an advance of Rs. 100/- per light and Rs. 10/- per light per day after 10 pm they return the lights to the owner who gets them charged the next day keeps them ready for use in the evening. Chandran and his wife make about 50 to 75 rupees on week days and 100 to 150 rupees on week end evenings. They have no problem in paying the one time deposit of Rs. 100/- and the daily charge of Rs. 10/- per lantern. They say the light effectively gives light for a little more than 4 hours, which is enough for them. They do not have to buy Kerosene for the petromax lights they were using earlier, and they don't have to buy those lights or spend a lot of time cleaning them . Their hands also used to smell of kerosene, which was not relished by the customers! And the solar lights are not "hot" to be near. They are very happy with the solar

lights. It not only avoids kerosene pollution in the beach but also proves profitable to the enterprising persons who rent them out on a daily basis.

Now , 3 years later there are hundreds of Solar Lantern being used along the beach and it is a beautiful sight to see in the evenings.

Case Study II - Karnataka

In another instance AIWC had implemented the National SPV Programme through market mode with the help of MNES in the states of Bihar, Orissa, Karnataka and Delhi. Solar systems and solar lanterns were installed and sold in the remotest districts where electricity grids were not available . A recent evaluation was carried forth on the projects in a number of villages in the Kolar district of Karnataka. The Central Power Research Institute conducted it. Their Joint Director Dr. Sujatha Subhash made the following observations. "In general all the beneficiaries in the village comprising of various classes of the society like agriculturists, weavers, teachers etc were fully satisfied with the system rendering a four hour service daily without any problem wherever needed. They appreciate the fact that electricity was available to them whenever they needed it!"



While there was an initial hesitation in adopting this technology , there were instances where an owner whose haystack got burned due to the use of oil wick lamps , while milking the cow ,changed to solar lanterns for the greater safety and lower risk benefits it offered , besides the other advantages.

Case Study III - SAGAR ISLAND WIND DIESEL HYBRID POWER PROJECT

Lalita Balakrishnan
Manjushree Banerjee

Another case study comes from the supply of grid quality solar power for an isolated cluster of islands known as the Sagar Islands (total area of 350 sq km) of the West Bengal coast in India. This work commenced with the first installation of an SPV system for 26 KW over seven years ago is expanding continuously since then, owing to its popularity through the home lighting system and street lighting schemes. The pioneering work has been done by the West Bengal State Renewable Energy Development Agency (WBREDA) with funding from the Ministry (MNES) and the Indian Renewable Energy Development Agency (IREDA).

The local government has also borne part of the total costs and the supply of power at fixed monthly rate (four-hour daily supply) was done by a co-operative formed for this purpose. The Director of this program Mr. Choudhary says that the success of this project can be attributed entirely to the assurance of uninterrupted supply of electricity, which he was able to provide due to the hybrid backup systems that they have created through diesel/biomass gasifiers as well.

Sagar island wind diesel hybrid system is one of the first of its kind in Asia. The plant with its two units of wind turbines is providing electricity to 861 households and commercial establishments at Sagar Island during the evening hours. With support from MNES and ICEF, WBREDA is progressing towards installation of the second phase of the project. The project is expected to provide electricity to more households, commercial complexes, education and health centre. This is presumed that the system will lead to social and economic development of the island, where electricity was a distant dream.

Presently, 861 households, commercial centres, education and health centres, social and religious agencies and offices are availing connections. Out of the 861 consumers, 455 opted for 3 CFL connections while 406 are using 3 CFL and 2 plug point connections. With the installation of synchronizing panel in the month of May, the efficiency of diesel engine had increased. Over 100 pending applications requesting new connections reflect the unfulfilled electricity demand in the area.

Two schools and three small commercial centers are also availing electricity supply from the plant.

Electricity supply is provided for six hours (5 PM to 11 PM) during the period of October to February and for six hours (6 PM to 12 midnight) from March to September. Wind penetration is better during summer months (25 to 30 % of total electricity generated), thus electricity is provided for an extra hour during this period. The plant reached maximum load of 150 kW. The system is supported by 10 km HT line and 12 km LT line along with two 63 kVA transformers and four 25 kVA transformers.

Charges for electricity is collected by SREDCOP (Sagar Rural Energy Development Cooperative) and is handed over to WBREDA on monthly basis. KoPT being the largest consumer pays directly to WBREDA.

Some of the benefits are clearly visible as extended business hours leading to enhanced income, uninterrupted quality supply of electricity till late night facilitating more study hours to children, more activities in the households, better health services during evening hours, replacement of individual diesel generators and other lighting sources, are few to name. More over, before the wind diesel hybrid system was installed, with sunset, life in the area used to come to a stand still. But now with sunset, the activities pace up and the individuals carry out different sort of development activities, utilizing the time.

These three case studies have given a clear indication that with the Distributed Generation scheme gaining prominence, the Solar PV systems on their own (individual supply) or as Grid quality power with a more elaborate system will gain further prominence.

A New Solar Powered Air dryer has recently been developed by an organisation (Society for Energy, Environment and Development, SEED) in Hyderabad, India. It has been successfully tested for mango bar processing and also other products. The basic principle of this appliance is an integration of solar, thermal, and solar PV technologies with a cabinet dryer made of Aluminium with non corrosive components. Solar Radiation penetrates through a top glass window on the top of the cabinet to the fruit bar kept for dehydration. With an increase in the cabinet temperature due to the green house effect the moisture from the product is contained by the hot air at the top of the cabinet under the glass window and at this point the **exhaust fan run by the solar PV throws the moist air into the atmosphere and draws in the fresh air from the ambient**. With the cabinet temperature being 15 degrees to 30 degrees higher than the ambient this can reach a maximum of 70 degrees. The efficiency of the drying process increases and time is cut down resulting in faster productivity.

Against this background it should be noted that the solar panels that cost \$100 in 1976 have come down by more than half cost and are highly durable, with no moving parts, no noise, no associated emissions and are perceived by many to be attractive.

5. Conclusion

It is expected that with present acceleration in the efforts on the part of manufacturers, designers, planners and utilities with adequate Governmental support, PV systems will within the next two decades occupy a place of pride in the country's power sector, ensuring optimum utilisation of the energy directly from the sun around the year.

By Lalita Balakrishnan
16.11.2005

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MNES – Annual Report

SURYADEEP PROJECT

In Neemrana Block District Alwar Rajasthan

Case Study

Village Blahir & Sewawali Dhani

Social Action For Human Resource Development (SOHARD)

Village Anandpur, P.O. Mandhan 301 704

District Alwar Rajasthan

Ph. 91-1494-244024

Email: sohardapr@yahoo.com

CASE-STUDY I

Project Title:

Suryadeep Project in Neemrana Block of Alwar District Rajasthan

Project Duration:

25th October 2003 to 24th October 2004; One Year

Executing Agency:

Gandhi Project Initiative, Germany

Implementing Agency:

Social Action for Human Resource Development (SOHARD), Alwar, Rajasthan

Beneficiaries:

Men and women of Balaheer village belong to *Brahmin*, *Rajput*, *Sonar* (Goldsmith), and *Lakhera* (Bangle maker) castes. While *Brahmins* and *Rajputs* are so-called upper castes, the *Sonars* and *Lakheras* come under the so-called OBC (Other Backward Classes) category. Balaheer village belongs to the Neemrana block of Behror *tehsil*, District Alwar, Rajasthan. Families of forty-four (44) people of this village have benefited from this project:

1. Anita Devi
2. Premwati
3. Suman Devi
4. Sunita Devi
5. Usha Devi
6. Ram Chander
7. Bimla Devi
8. Amar Devi
9. Prem Devi
10. Omvir Singh
11. Savitri Devi
12. Saroj Devi
13. Rajbala Devi
14. Prithvi Singh
15. Dharmender Singh
16. Ramesh Devi
17. Santosh Devi
18. Maya Devi
19. Sharda Devi
20. Kamlesh Devi
21. Vimla Devi
22. Mohan Lal
23. Rajpal Singh
24. Arjun Singh
25. Surender Singh
26. Ashok Singh
27. Mukesh Singh
28. Bhagwan Singh
29. Ramrati Devi
30. Shakuntala Devi
31. Jagat Singh
32. Goverdhan Singh
33. Rupwati Devi
34. Raghbar Dayal
35. Jai Singh
36. Vikram Singh
37. Brajesh Soni
38. Prem Singh
39. Vijay Singh
40. Manju Devi
41. Bhagwati Devi
42. Ravinder Singh
43. Raj Dulari
44. Asha Devi

Project Cost (Amount, Source of Funds):

Rs. 132,000/ Gandhi Project Initiatives, Germany

Donors:

Gandhi Project Initiatives, Germany

Background/Overview:

Balaheer village, which belongs to Neemrana block, lies to the north-western corner of Alwar district in Rajasthan. Balaheer in itself is not a revenue village, but part of the neighbouring Nangli village, so it is popularly known as Nangli Balaheer. It falls under Mehtawas *Gram Panchayat*. According to village elders, just about 150 to 200 years ago, Jaswant Singh, a *Rajput Zamindar*, led the way from Nangli village to settle first in the village. Then, others followed him. It's a medium-sized village having a population of 850.

Rajputs are the predominant caste here, while there is a sprinkling of *Brahmins*, *Khathis* (Carpenter), *Sonars* (Goldsmith) and *Lakheras* (Bangle maker). The main occupation is agriculture. As an interesting aside, it is pertinent to note here that on an average, 15% to 20% of all able-bodied men (at least one from every family) opt for service in the police and/or armed forces, with a predilection to enlist into the army and the Border Security Force. Other occupations prevalent are animal husbandry, goldsmith, carpentry, artisans and craftsmen.

Prior to SOHARD's interventions in the village, women were generally deprived of independent decision-making powers, and were yoked under various socio-cultural constraints. But now, a perceptible change has swept through this village. The veil (*pardah*) system has taken a downtrend and women now share public places with men more freely. Literacy rate is relatively high; at 70 per cent it may be said to be well above the state average (A Government Primary School was set up in the village way back in 1973).

Water lifting for irrigation through tube-wells began in 1986. In 1996, a 2 Km long gravel road was laid to connect Balaheer with the neighbouring village, Nangli. A big storage tank for water came up in 1987, which ameliorated the water problem here quite a bit. Telecommunication facilities in the village are near non-existent, there is a solitary STD booth run by a franchisee of a private service provider, Rainbow.

Medical facilities are absent in the village, and whenever there is an emergency case, patients are rushed to Dr. Deendayal Hospital, a local facility 10 kilometres from the village in Kund (in Rewari district of neighbouring Haryana), which is run by a Registered Medical Practitioner (RMP). There are no MBBS doctors in this hospital.

Prior to the Solar Lamp Project, electrification of Balaheer village was a distant dream. Problems confronted by the villagers due to lack of power and electricity were as follows:

1. Children could not study after nightfall.
2. Constant threat of being bitten by poisonous snakes or scorpions.
3. Impending fear of cows or buffaloes of being stolen.
4. Difficulty in taking care of the aged, the sick and the infirm.
5. Use of kerosene lanterns meant women had to inhale kerosene fumes while engaging in household chores during the night.
6. Danger of mishaps due to electrocution as villagers messed inexpertly with power supply cables in an attempt to steal electricity.
7. All these problems escalate to tortuous levels during the sweltering summer.
8. Difficulty In milking cows/buffaloes in the dark.

The project goals were as follows:

1. To provide 44 solar lighting systems in the village to 44 families.
2. To develop Balaheer as a model village, which used solar lighting, systems so that this model could be replicated in other villages of the region.
3. To use advocacy and networking with government and other like minded voluntary agencies to encourage the use of renewable solar energy in the villages.
4. To make the Solar Lighting Project an entry point activity from which interventions could be broadened to integrate the village communities into the other developmental initiatives being undertaken by the NGO.

After the implementation of the project, some tangible results followed, which may be said to have directly addressed the problems stated above:

- a) Household sanitation and consequently community health improved.
- b) The performance of children in studies improved.
- c) A feeling of security did away with fear of livestock theft.
- d) Kerosene lanterns were obsoleted resulting in pollution free household environments.
- e) Villagers stopped stealing electricity, and the danger of electrocution and fire that loomed large earlier, was done away with.
- f) Summers became bearable, as the solar system could also be used to run fans.
- g) Milk productivity levels also improved.

Strategy:

1. Focussed on rural women, especially of deprived and marginalised sections of the society.
2. Rapport building with the village community, through active collaboration with the women Self Help Groups (SHGs).
3. Ensured community participation in the Project by taking 50% contribution from the villagers for the purchase of Solar Lighting Lamps.

4. Devised proper follow up mechanism for minimum one year for analysing success and sustainability of the Project.

Activities:

- Social Mobilisation
- Information Education Communication
- Capacity building through training workshops, village group sittings and monthly SHG meetings
- Sensitisation on the project during cluster level meetings

Impact:

Quantifying accurately the impact of the project would be a gigantic task. However, during the short span of the project, it could give boost to SOHARD's activities whose focus has been mainly on women's empowerment. Involvement of women in the project had a cascading effect on the empowerment of women who have so far been kept out of the decision making process. The NGOs thrust in organising women into user groups and involving them in the management of the project resulted in binding women from the community to community's wealth creation mechanism. The excellent by product of the project had been strengthening of women's SHGs, by actively involving them in the entire process from the beginning. Rapport building with the village community through women SHGs had a far-reaching impact and helped in mobilising support from the village community and it even ensured 50% contribution for the purchase of solar lighting lamp.

Lessons learned/Success Factors:

Solar Lighting Lamp project, which was underway for 1 year in the village under the nomenclature of Suryadeep Project, progressed due to mobilisation of people at the village level and their active participation. The outcome of the project shows how the activities were designed in tune with SOHARD's mandate. The interesting side of the project was that kept with the pace of the activities such as 'Women in Local Self Governance', management of natural resources, income generation programmes undertaken in the region by SOHARD at a consistent tempo. It meant that the NGO had a good grasp of socio-political undercurrents and dynamics of inter-societal relationships inherent in the community. This project reaped manifold benefits and helped in understanding the building blocks for rural development as well as planning for sustainable growth.

While designing similar interventions, the socio-cultural background of the region should be kept in mind. It is also imperative to include gender perspective in the programmes and interventions as designed by SOHARD, which were implemented to improve the status of women and children. Emphasis should also be on capacity building and skill enhancement especially of women and their children too, for making them prime beneficiaries. Interventions tailored to add value to the human

resource capacity of the communities would have positive impacts on the following fronts:

- Income Generation
- Cleanliness, and Sanitation.
- Increased participation of women in local self-governance, and
- Village level microplanning for sustainable development

For more information, contact:

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CASE-STUDY I

Suryadeep Project – Solar Lighting

Project Title:

Suryadeep Project in Neemrana Block of Alwar District Rajasthan

Project Duration:

25th October 2003 to 24th October 2004; One Year

Executing Agency:

Gandhi Project Initiative, Germany

Implementing Agency:

Social Action for Human Resource Development (SOHARD), Alwar, Rajasthan

Beneficiaries:

Seawali Dhani is a *Rajput* hamlet, in the Neemrana block of Behror *tehsil*, District Alwar, Rajasthan. Families of nine (9) people in this hamlet have benefited from this project:

1. Smt. Raj Rani Devi
2. Smt. Bhanwari Devi
3. Smt. Hukma Devi
4. Smt. Suresh Devi
5. Smt. Ram Pyari Devi
6. Smt. China Devi
7. Smt. Saroj Devi
8. Smt. Kela Devi
9. Smt. Naval Devi

Project Cost (Amount, Source of Funds):

Rs. 27,000/ Gandhi Project Initiatives, Germany

Donors:

Gandhi Project Initiatives, Germany

Background/Overview:

Sevawali Dhani, a hamlet of 10 families in the Neemrana block of Alwar district, Rajasthan, lies to the north-western extreme of the district. Sevawali Dhani falls under Giglana *Gram Panchayat*. According to elders, just about 70 years ago, Rude Singh, a *Rajput*, moved out of Giglana village to settle here at Sevawali Dhani, and some others followed him. All the inhabitants in the hamlet are *Rajputs*. The main occupation is agriculture.

Prior to SOHARD's interventions in the hamlet, women were generally deprived of independent decision-making powers, and were burdened under various socio-cultural constraints. Today, a wind of change is sweeping through sleepy Neemrana through the medium of the interventions of SOHARD, which are focused on women and children. The veil (*pardah*) system has taken a downtrend and men are now more willing to share public places with women. Literacy rate is quite high here (a Government Primary School was set up in the neighbouring Pithawali Dhani in 1989, which has since become a Secondary School).

The *Dhani* due to lack of power and electricity problems were as follows:

9. Use of kerosene lamps was common here.
10. Oil lamps tend to get extinguished whenever there was a strong wind and there was impending fear of fire in the huts that have been built using local materials.
11. Children did not fare well in their examinations, as they could not study after nightfall.
12. Use of kerosene lamps meant women had to inhale kerosene fumes and it was quite problematic for them. Doing household chores during the night was also an ordeal.
13. Danger of mishaps due to electrocution and fire (there used to be rampant theft of electricity and unshielded wires used to dangle over the huts).
14. All these problems escalate to tortuous levels during the sweltering summer.

The project goals were as follows:

45. To provide solar lighting systems in the hamlet to 9 families.
46. To develop Seva ki Dhani as a model hamlet, which used solar lighting systems so that this model could be replicated in other hamlets of the region.
47. To use advocacy and networking with government and other like minded voluntary agencies to encourage the use of renewable solar energy in the hamlets.
48. To make the Solar Lighting Project an entry point activity from which interventions could be broadened to integrate the hamlet communities into the other developmental initiatives being undertaken by the NGO.

After the implementation of the project, some tangible results followed, which may be said to have directly addressed the problems stated above:

5. Domestic workload lessened and it was no more so burdensome.
6. The performance of children in studies improved.
7. Strong winds did not cause fear in anyone's mind.
8. Summers became bearable, as the solar system could also be used to run fans.
9. Illumination during the dark has lent a feel of security.
10. The feeling of security also did away with fear of livestock theft.
11. Kerosene lamps were obsoleted, resulting in pollution free household environments.

Strategy:

5. Focussed on women in the hamlet, especially of the farming community.
6. Active collaboration with the women Self Help Groups (SHGs) for building rapport with the village community.
7. Ensured community participation in the Project through 50% contribution from the villagers in the purchase of Solar Lighting Lamps.
8. Devised proper follow up mechanism for minimum one year for analysing success and sustainability of the Project.

Activities:

- Social Mobilisation
- Information Education Communication
- Capacity building through training workshops, village group sittings and monthly SHG meetings
- Sensitisation on the project during cluster level meetings

Impact:

SOHARD's activities whose focus has been mainly on women's empowerment. Involvement of women in the project had a cascading effect on the empowerment of women who have so far been kept out of the decision making process. The NGOs thrust in organising women into user groups and involving them in the management of the project resulted in binding women from the community to community's wealth creation mechanism.

The excellent by product of the project had been strengthening of women's SHGs, by actively involving them in the entire process from the beginning. Rapport building with the village community through women SHGs had a far-reaching impact and helped in mobilising support from the village community and it even ensured 50% contribution for the purchase of solar lighting lamp.

Lessons learned/Success Factors:

Solar Lighting Lamp project, which was underway for 1 year in the village under the nomenclature of Suryadeep Project, progressed due to mobilisation of people at the village level and their active participation. The outcome of the project shows how the activities were designed in tune with SOHARD's mandate. The interesting side of the project was that kept with the pace of the activities such as 'Women in Local Self Governance', management of natural resources, income generation programmes undertaken in the region by SOHARD at a consistent tempo. It meant that the NGO had a good grasp of socio-political undercurrents and dynamics of inter-societal relationships inherent in the community. This project reaped manifold benefits and helped in understanding the building blocks for rural development as well as planning for sustainable growth.

While designing similar interventions, the socio-cultural background of the region should be kept in mind. It is also imperative to include gender perspective in the programmes and interventions as designed by SOHARD, which were implemented to improve the status of women and children. Emphasis should also be on capacity building and skill enhancement especially of women and their children too, for making them prime beneficiaries. Interventions tailored to add value to the human resource capacity of the communities would have positive impacts on the following fronts:

- Income Generation
- Cleanliness and Sanitation.
- Increased participation of women in local self-governance, and
- Village level microplanning for sustainable development

For more information, contact:

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[synergy/nedap/introlet](#)



Safe Drinking Water For Rehabilitation Camps,
Hospitals,
Schools, Villages, Children etc.

Hello,



Nedap, the Netherlands developed ‘**NAIADE**’ - a solar powered drinking water UV disinfection unit, capable of producing 2,500 liters / day, covering the needs of about 800 people per day. The unit is stand-alone, requires no maintenance other than cleaning the PV panel. Spare parts like the UV lamp needs replacement only after 10,000 hrs of operation. It provides water according to WHO standards. It can be installed within 30 minutes and can be used at all places since it needs no fossil fuel or electricity.

Filtration of unsafe water is done by washable bag filters and disinfection by UV. The unit weighs less than 75 kg and is shipped in ready-to-use packed palletized box. The unit has been tested and approved by various leading water research labs worldwide, such as UNESCO-IHE, Ghanaian Water Research Institute, Atitra India, KIWA, and many more.

We are now registered supplier with UN. The European Commission, World Globe Award and others have donated the Naiade for its sustainability and usefulness.



As you know, access to **safe drinking water** is one of the most **fundamental human needs**. Today's key challenge is to provide **community based, community managed and sustainable** systems to supply safe water to **poor and disadvantaged** men, women and children in places without electricity.



It hurts to know that **a child dies every eight seconds** (equivalent to 20 jumbo jets crashing every day) from drinking contaminated water. 2.2 million deaths/year are linked to bad hygiene in water in developing countries. About 1.1 billion people in the world do not have access to safe water, roughly one-sixth of the world's population. The contamination in water can be by bacteria, viruses, or by small parasites. Most outbreaks of water-borne disease are caused by the contamination of drinking water systems with the feces of infected animals or people.

To economically meet the growing drinking water need of remotely located villagers without electricity, **a mobile, stand-alone, reliable, robust and environment friendly system** has been designed and developed by Nedap, the Netherlands. It can purify over **2,500 lit/day** by utilizing freely available '**Solar Energy**' and proven, free from chemicals '**Ultra Violet Disaffection**' technology.

WHO (World Health Organization) estimates that **80 percent of illnesses** worldwide are transmitted by contaminated water. Therefore, emphasis should be **on prevention and not on cure**. At any one time it is estimated that **half of the world's hospital beds** are occupied by patients suffering from water-borne diseases. Improved water quality can reduce childhood diarrhoea by 15-20 percent.



India is a huge and diverse country with over one billion people. 38% live in poverty. 170 million don't have access to safe water. 69% of the population (690 million people, 10 times the UK population) lack adequate sanitation. As a result **600,000 children** under five **die** from diarrhoeal diseases **every year**. Waterborne diseases cost the Indian economy 73 million working days a year. The Indian Government has set ambitious targets to ensure all the rural population has safe water and sanitation by 2010. However, the task is huge.

We believe, one unit serving a typical village community of 800 person (2.5 lit/person/day) or 150 families for 10 years will avert deaths of a few children below age 5 and avoid the stunted growth of lot many more children. Under aggravated conditions, (e.g., epidemics) life savings and health benefits will be much larger. Because young girls and women are primarily responsible for collecting fuelwood, fetching water, and bearing and caring for children, the UV disinfection system could greatly improve woman's quality of life by reducing their workloads as well as the number of children they lose to waterborne diseases.

Our efforts were recognized and we received the prestigious '2004 European Award for Environment'. We believe provision of safe drinking water is a must for fighting poverty, enhancing progress and sustaining democracy.

We shall be obliged to receive **your valuable views, comments and suggestions** on how this unique system could reach the needy, **poor and disadvantaged** people. In the meantime, if you wish to know more, please do contact us by email, SynergyPuri@hotmail.com.

With regards,

Er. M.P.S. Puri
Managing Consultant
Sustainable Development

Technical Data

Energy Source	Sunlight
Solar Panel	75 watt
Energy Storage	Battery
Daily Average Capacity to Purify	2,500 liters / 8 hours of sunlight
Water Prefilters	Included
UV Disinfection Lamp	20 watt
Water Tank storage Capacity	100 litres
Weight	44 kg
Dimensions	54 x 75 x 140 cm (excluding solar panel)
Effective Against	viruses, bacteria, protozoa and worm eggs.

Some Facts & Figures

- At any time, 1.5 billion people suffer from parasitic worm infections stemming from human excreta (one gramme of faeces can contains:10,000,000 Viruses, 1,000,000 bacteria, 1,000 parasite cysts, 100 parasite eggs.) and solid wastes. These parasites can lead to malnutrition, anaemia and retarded growth.
- In the past 10 years diarrhoea has killed more children than all the people lost to armed conflict since World War II.
- In 1998, 308,000 people died from war in Africa, but more than two million (six times as many) died of diarrhoeal disease.
- In Europe \$11 billion is spent each year on ice cream; in USA and Europe, \$17 billion is spent on pet food; in Europe \$105 billion is spent annually on alcoholic drinks, ten times the amount required to ensure water, sanitation and hygiene for all.

Case-Study

Project Title:	Micro-utility Model
Theme:	Solar Home Systems (SHSs)
Project Duration:	7-6 years
Executing Agency/Agencies:	Grameen Shakti(GS)
Implementing Agency/ Agencies:	Grameen Shakti
Partners/Beneficiaries:	Shopkeepers, groups of people who cannot afford a Solar Home System and individuals.

Project Cost: Average of \$350 per person for installation; 10,000 beneficiaries.

Background/Overview: There cannot be any economic development without electricity. Only 30% of Bangladeshi people have access to grid electricity and most of them live in cities. As a result, rural communities suffer from an under-utilized economy and depressed business activities. This lack of power reduces business hours and does not enable people to access modern technology and equipment which are required for development. Mobility of the people is also hampered after dusk due to security problems.

GS solar program has addressed many of these issues by extending business hours and increasing business turnover. However, many people cannot afford Solar Home Systems individually. This is one of the barriers to the scaling up of the GS Solar Program and the revitalization of the rural economy, through the use of Solar PV technology.

Strategy/What was planned: GS has developed a special program to make it easier for those who cannot afford SHSs individually. Under this program, GS allows people to share the cost and the subsequent benefit of using a SHS. This model allows the installer of the system, who is the actual owner, to share his costs and increase his income, by giving other people the benefit of electricity without buying the SHS. This program is based on the ownership model because this ensures individual responsibility. The actual owner of the system is responsible for paying installments to GS. He/she repays the due amount to GS by renting out electricity to other people, especially to his/her neighbors. This project is particularly targeted towards the shopkeepers.

Activities: GS staff implemented intense promotional campaigns among the shopkeepers to popularize the model. GS has also developed an attractive package so that more people become interested to become owners of SHSs. For instance the entrepreneur or future owner of the SHS does not have to pay any service charges, but makes a down payment of only 10% to become the owner in three and a half years. Hence, micro-utility model has become very popular among the shopkeepers. Currently, more than a thousand SHSs have been installed under this model. This solar PV technology model has facilitated income generation, thus bringing immense benefit to its users. This model has also helped GS to scale up its program by reaching those who cannot afford a SHS individually. Currently, GS has been installing more than 2000 SHSs per month.

Impact: Mr. Umor has a grocery shop at Kormal bazaar. He had bought a SHS with six lamps. He is using one lamp himself and has rented out the other lamps to neighboring shops for a fee of 7 cents a night per lamp. In this way he has increased his income and the income of the neighboring shops.

Micro-utility model has increased business turnover and has extended business hours in rural bazaars. Shopkeepers can now afford pollution free, efficient lighting at minimum costs and keep their shops open after dusk. Some shopkeepers under the micro-utility model have also started to pursue other businesses, besides renting out light and earnings from their shops. They have installed solar powered mobile phones, called Polli Phone or village pay phone. This has been a hugely successful income generating application of the GS technology.

Customers have enjoyed greater mobility and can come to markets after dusk; there are reduced health risks and less danger of fire due to kerosene lamps not being used. Apart from earning more than Tk. 450 users also save 360 taka, spent on kerosene. Installment for SHS per month is about Tk 650. Most important of all; women enjoy greater mobility and freedom because their security has been enhanced.

Technological level after activity: The technology used is highly modern, but it is easy to use and maintain. One usually needs 50 W solar modules with four/five 6 W fluorescent lamps. Health cost and kerosene cost is reduced. After making full payment, there are very little additional costs. Costs are covered by the income generated in a very short time (3 to 4 years). Lamps can be used 4 hours a day.

Lessons learned/Success factors: This model has been a success because it maximized the utility of clients by tying the appropriate technology with income generation. The following factors should be kept in mind when designing similar models:

- identifying and meeting the needs of the people.
- proper identification of the target groups.
- designing simple, easy to use but effective technological packages.

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