

Advancing towards achievement of Millennium Development Goals by training Rural and Tribal women in Solar Food Processing: A Hands-on Experience at Barli Development Institute for Rural Women in Central India

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1. Abstract

Barli Development Institute for Rural Women has been working for sustainable community development through training of rural and tribal young women as human resources since 1985. In doing this it attempts to stay aligned with the Millennium Development Goals. Following an initiative by the Ministry of Non-Conventional Energy Sources, New Delhi University of Indore, Solare Brucke, Gadhia Solar, and PLAGÉ; one of its priorities has been the promotion of solar food processing technologies in villages by training grassroots women in central India. During the past decade, the Institute has successfully trained these women in using devices like SK14 and various types of Scheffler cookers, 10 & 2.7-meter storage cookers, and tunnel dryers; both for income-generating and domestic use. The training empowers the women with knowledge, experience, and skills to build their capacity in the areas of socio-economic development. It is integrated in nature and covers human rights; healthy families and communities, successful management of self help groups; producing and marketing solar processed indigenous food and beverages, identification of locally available nutrients, and inexpensive supplements for food.

Technical training for the trainees incorporates assembling SK 14 kits, operating the cookers, their maintenance, as well as enabling them to understand the importance and relevance of these cookers. The Institute has developed training materials and disseminated information especially designed for the users. They are trained in a way not only to benefit themselves but also so that they can make optimum use of these skills in their villages, as the users introduce, demonstrate, and popularise the benefits of solar devices and food among fellow rural women and neighbouring communities.

The training of rural and tribal women in these solar devices has been provided to solar cooks for domestic kitchens and community solar kitchens, teachers for various NGOs and interested students and professionals from various universities. The Institute also trains Self-Help micro credit groups in solar food processing technology; one of the successful examples is SIRDI.

This intensive skill training and its direct application leads Barli advancing towards achievement of the Millennium Development Goals such as eradicating extreme poverty and hunger; achieving universal primary education; promoting gender equality and empowering women; reducing child mortality; improving maternal health; ensuring environmental sustainability; developing a global partnership for development; and improving the quality of life of rural women by helping to break down gender barriers and elevate status within their respective communities.

Paper

2. Barli Development Institute for Rural Women

The Barli Development Institute for Rural Women empowers young rural and tribal women to become agents of social change through the acquisition of a wide range of skills and knowledge needed to improve the lives of their families, their communities and themselves. 'Barli' is a very common name among tribal women in the districts where many trainees come from. It denotes the central pillar, which supports the tribal house typical of these areas, highlighting the belief of the Institute that women are the central pillars of society. Based in Indore, the Institute has completed residential training programmes for more than 4500 young women from 450 villages of Madhya Pradesh and other parts of India. Priority is given to the socially and economically disadvantaged, i.e., 'scheduled castes, scheduled tribes and backward classes', the physically challenged, orphans, widows, divorcees, the abused and the neglected.

The Barli curriculum is designed to achieve the following:

- To facilitate change in the traditional attitudes and practices which block or impede the efforts of men and women to live in equality with dignity and security
- To facilitate the initiation and execution of development activities in the communities
- To increase awareness and knowledge of the potential for improving the social and economic conditions in the communities.

The first stage of training is raising awareness, followed by motivation, and then empowerment of the women being trained. The second dimension is helping the women understand its relevance in their lives. Thirdly, the trainers should work as facilitators, not as instructors, and promote the independence and confidence of the trainees. Then, the young women will pass on their knowledge, skills, experience and individual qualities to the next generation. The trainees learn that they are equal members of society and that they have the power to transform their communities. It is in this context that the Institute's training demonstrates a programme of sustainable community development. 'Sustainability' here means that, once empowered, there is an instinctive and natural process for women to pass on their knowledge, skills and experience to future generations.

Being a Baha'i-inspired NGO, Barli is spiritually committed to train people to protect the earth's' resources. The trainees' involvement in sustainable development is built into the curriculum and their life at the campus. They are shown the value and benefits of the environment and begin their day with growing vegetables, fruits and herbs on the Institute's six-acre campus. In 1998 the Institute installed the first solar kitchen of central India with large Scheffler dishes that cooks two meals and breakfast everyday for 100 people. This solar kitchen motivated the trainees to adopt solar technology for domestic use and it helped them to overcome all the myths and barriers to accept and use this non-conventional source of energy. Now, the trainees and staff enjoy solar cooked food 300 days a year, are taught to use the Institute's solar cookers, and are encouraged to propagate energy saving devices in their villages. All they needed was knowledge, skills and access to resources and availability of solar technology that could be used to bring positive changes in their lives as well as of their families and communities.

3. Why Solar Food Processing?

As in most of the world, cooking is the responsibility of womenfolk in the tribal societies of Madhya Pradesh. Right from early childhood, in addition to numerous other responsibilities, women are required to cook for their families. For these tribal women, cooking is not as simple

as it is for women in other societies. Communities in these remote, tribal areas do not have the 'luxury' of cooking on gas. They use firewood or cow dung cakes for fuel. The result: cooking becomes physically demanding, time consuming and above all hazardous to their health. Most of the rural women in these communities have accepted these environmental and socio-economic threats as part of life. So, for many, it is only when they become trainees at the Barli Institute that they realise how solar cookers can be used to change the lives of rural women.

4. Barli's Advancement towards the UN Millennium Development Goals

Participation of women is vital to achieving the UN Millennium Development Goals, it is very challenging for many poor, rural women and girls because of time-consuming fuel gathering and cooking. By training rural and tribal women in solar food processing, Barli is advancing towards these goals.

4.1. Goal 1 - Eradicating Extreme Poverty and Hunger

4.1.1. Introducing Solar Food Processing Technologies to Villages

Many rural families in central India spend a third of their daily income on cooking fuel, leaving them unable to purchase enough food. The solar food processing technologies introduced to the trainees at the Institute enable them to save the money spent on fuel by harnessing the free energy of the sun. Graduates using the cookers in their respective communities save 300-400 rupees a month by not buying wood for fuel as well as an average of 4-5 hours of time a day usually spent looking for it and bringing it home. As the solar cookers are so safe, the women are quite comfortable leaving cooking food unattended while doing other chores, thus saving time. One 35-year-old respondent said that her solar cooker saves her 320 rupees per month and she felt relieved of the hassle of getting leave from work to queue up to get gas. Also, the cookers do not blacken the kitchen and surrounding areas, nor the kitchen utensils in the way that cooking fire does. This saves money and resources, as the utensils do not have to be replaced as often.

Solar food processing has revolutionised the way cooking is now carried out and Barli actively promotes these technologies. Women in the tribal districts of Madhya Pradesh and the surrounding areas are now able to become pioneers of new sustainable technologies and consequently agents of social change who are not only transforming their own lives but in turn their rural communities.

4.1.2. Producing and Marketing Solar Food Processed Food

While promoting the technology itself, the Institute trains the women in producing and marketing solar processed indigenous food and beverages, how to identify locally available nutrients, and how to source inexpensive supplements for food. The trainees are encouraged to use locally available nutrients that are inexpensive and sensitive to village conditions. The Institute conducts week-long training workshops for graduates to teach them how to assemble the cookers from kits and how to use the cooker to make traditional recipes as well as new recipes, such as soya milk and tofu. Barli put a great deal of work into learning about food habits and collecting information about indigenous food and documenting those recipes after practically experimenting with them on an SK 14. Training materials, like recipe booklets, were prepared by the Institute in simple understandable Hindi and were made locally available. In these booklets the women are trained in making porridge from maize, which they can grow, rather than buying expensive ready-made wheat porridge. This training in solar food processing enables the women to use their solar cookers as income-generating tools.

4.2. Goal 2 - Achieving Universal Primary Education

For rural girls, collecting wood for fuel is an arduous daily task that often starts at the young age of 6 or 7 and these long journeys take time from school attendance and studies. The solar cooking training at the Institute aims to reduce this burden by enabling the girls to harness the free energy of the sun. By doing this, the girls have the time to pursue their education and focus on life-skills. As mothers are the first educators of their children it is crucial that the trainees at Barli are aware of solar food processing technologies and the impact they can have on their daughters' education.

4.3. Goal 3 - Promoting Gender Equality and Empowering Women

At the Institute the women are trained in the use and maintenance of solar food processing technologies. This enables them to return to their villages with a sense of pride in knowing that they have the knowledge and confidence to educate others in the benefits of solar technology. Barli gives rural women the capacity to act as agents of social and environmental change and the power to elevate their status in their communities. The Institute graduates who purchase solar cookers are breaking down gender stereotypes and changing rural attitudes towards women. One woman said that the modern look of the cooker had encouraged her father and her husband to start sharing the responsibility of cooking and one trainee's father said, "It is a miracle of science that has changed our lives. It shows we can do so many things that we still do not know".

4.3.1. Solar Food Processing Training at Barli

The Institute trainers have conducted a series of ten-day workshops in order to train women on solar cookers and the various processes involved in solar food processing through a combination of theoretical and practical methods. Every trainer has to analyse the circumstances of their target group. They need to ensure that the training is based on the specific needs and capacities of the trainees who will be participating. The way the information in the module is presented must also be adapted depending on the cultural and educational backgrounds of the trainees.

Trainees are taught how to assemble & operate the cookers from kits and the inherent benefits associated with solar cooking methods. They are also given a manual that contains guidelines for the day-to-day running of the cooker as well as general maintenance and repair information. The manual also acts as an educational tool to educate people about personal finance management, gender equality and environmental conservation. It has been designed specifically for illiterate and neo-literate rural and tribal women in Madhya Pradesh, India.

4.3.2. Training for Successful Management of Self-Help Groups

During the training, the women are helped to form their own self help group (SHG) in order to discuss and bring together ideas for using the food they make as an income-generating activity. They learn about the rules and regulations for self help groups and how to start one on their own. They are taught how the SK-14 solar cooker can be used as an income generation tool by making snacks that can be sold in the market. In groups the women practice working together to calculate the costs of the items they make and the prices that they should be sold for depending on the amount of profit they hope to gain from it. Along with this, they learn the importance of habit saving, social and economic benefits of saving, rules and regulations pertaining the formation of SHGs, rules regarding the membership in SHGs, essentials of a successful group, the SHG constitution and elected members and their responsibilities. After the training is completed, the trainees continue to hold meetings, pay membership fees and plan income-generating activities that they could undertake.

4.3.3. Use of Solar Devices for Income- Generation by Micro-Credit Groups

Since 2004 the Institute has expanded its solar cooker training to assist the existing micro credit groups in the state of Madhya Pradesh to use this technology to produce and market homemade food made with solar cookers. These programmes were from three to six days and one group even started generating regular income. Many NGOs started demanding this training and in 2005 an NGO named SIRD, based in the village of Behiram, 400 kilometres from Indore, sent women from three different micro credit groups for a complete theory and practical training course.

The women from SIRD did not own their own land so could not generate any income. They worked as daily wagers collecting and selling firewood from forests, earning only Rs. 20-25 for nearly eight hours of hard labour. At the Institute, the women learned solar cooking techniques for their own use and a variety of recipes for homemade food products that can be packaged for sale. At the end of the course all these women were given SK 14 Solar Cookers at only 10% of the cost, the other 90% being subsidised by an Austrian NGO, PLAGE. The Institute has distributed over 350 cookers and trained more than 750 women in their construction, use, and maintenance. Now, in addition to doing their own cooking, these women produce and sell sweet and spicy snacks, such as Matthi and Chivda. They transport them for sale at big fairs and by cooking for only two hours a day, during peak sunlight, they are able to make a profit of Rs. 30 per day per person. They are getting regular orders for their products and are cooking about 18 to 20 kilos per day.

Recently the women at the Institute have been learning to use the same cookers for ironing the clothes, boiling water, for textile work will be specially a blessing where there is no electricity. They are also preparing natural dyes and melting wax for batik printing. Surely some of them will start generating income out of this soon.

Barli's contribution to the development of Self Help Groups has led to the Institute's appointment as an associate of The Rashtriya Mahila Kosh (National Credit Fund for Women), an apex micro-credit institution under the Ministry of Women and Child Development, Government of India. This Institution provides training to women self-help group members and the NGO/Government partners in the field of Non-conventional energy.

4.4. Goal 4 - Reducing Child Mortality

Rural children fall victim to waterborne and smoke-related diseases but fuel is scarce and expensive and families are unable to use their cooking fuel to boil drinking water and use for oral rehydration drinks. But, every solar-cooked meal is smoke-free and the cookers easily pasteurise both water and milk. One recipient of an Institute cooker said they are also very safe as the conventional fireplace is a common cause of burns for babies and young children.

4.5. Goal 5 - Improving Maternal Health

The changes solar cookers have made to the lives of rural women and their families are nothing short of remarkable. Smoke from cooking fires is a major threat to young rural women in central India and is linked to low-birth weight and infant mortality. Not only this, walking 15-20km to gather wood for fuel leaves women open to a number of threats, including abuse, rape, or mental and physical harassment from forest officials. The journey home is physically taxing on the body and rape attacks are particularly common during this time. Solar cooking, in contrast, is clean, smoke-free, and the families get to enjoy improved air quality and cleaner surroundings in the home.

4.6. Goal 6 - Combating HIV/AIDS, Malaria and Other Diseases

Caring for a sick family member or orphans takes time away from livelihood activities. Solar cookers enable these carers to leave meals cooking unattended so that their time can instead be focused on the patients of HIV/AIDS, Malaria and other diseases. Larger solar cookers reach temperatures of 150°C (300°F), enough to sanitise dry materials in rural clinics and households for those with weak immune systems. They are also capable of pasteurising water and many women have commented on how the solar cooker enabled them to heat water for washing and bathing.

4.7. Goal 7 - Ensuring Environmental Sustainability

One-third of humanity has only wood, charcoal or poor substitutes to cook daily meals. When wood becomes scarce, tribal women in remote areas use firewood and cow dung cakes for fuel – a method that is not only physically taxing and time consuming but more significantly, a potentially hazardous chore. A solar cooker saves about one ton of wood per year thereby reducing carbon dioxide emissions by 1.8 tons per year.¹ These cookers also eliminate any risk of fire, gas leaks or explosion – all of which are also potentially damaging to the environment. Barli encourages its trainees to use sustainable solar cooking and ironing methods as well as introducing the girls to a near-zero rubbish policy that works towards sustaining the environment. The Institute is an environmentally friendly campus that is almost entirely self-sufficient. It serves as a working model for caring for the environment and as a demonstration of sustainable practice. The farming techniques used on-site aim to be sustainable and effective in training the students how to work in an environmentally friendly and resource efficient manner. Caring for the environment is taught as a spiritual responsibility and more importantly theoretical knowledge is applied practically in the garden of the Institute and in the solar kitchen. On their return home, the graduates are happy not to be contributing to environmental degradation and one graduate who had bought a solar cooker said that the cooker had brought her back to *“equilibrium with nature, as she is no longer exploiting forest resources and therefore contributing towards land degradation, erosion and drought”*. The curriculum provides not only technical skills, but also a sense of personal worth, giving the women confidence to implement sustainable initiatives of their own.

Every year on World Environment Day the Institute stresses the importance of conservation and prevention of the environment through workshops whilst graduates independently launched the parabolic solar cookers to 5 tribal families in the Jhabua district. A solar kitchen with five solar dishes was also built and installed by Barli at a high school in the Jhabua district.

4.8. Goal 8 - Developing a Global Partnership for Development

4.8.1. Global Exchange

The Institute has been participating and exchanging its work at global conferences; some of the most important have been during the Earth Summit, The Fourth World Women's Conference, Beijing, China and those for the United Nations. Many others include in countries like: Sweden, Spain, Thailand, Austria, Germany, Nepal, United States, Israel, England, Italy, China and Brazil and Israel.

As well as this the Institute Manager and Director serve as a resource people for UNICEF, the National Institute of Public Cooperation and Child Development and many other NGOs in Madhya Pradesh along with many departments of DAVV University of Indore.

¹Thorne, S. & S. Raubenheimer, Evaluation of a potential in attracting finance through Clean Development Mechanisms – Solar cookers and carbon mitigation possibilities, Energy transformations, South Africa, 2003

The manager was one of the invited speakers to a conference in Spain where he was asked to share his experience of the 'First solar kitchen at Barli Institute'; he was also recently invited to be keynote speaker at three universities in Taiwan. As a result of his efforts he has been awarded an OBE by the Queen of United Kingdom for his services to social causes and the use of alternative energy sources in rural communities in India.

Barli's passion and commitment in promoting solar cooking and food processing on a local, national and international level has led to the first International Solar Food Processing conference being hosted here. The conference will bring together researchers and practitioners from all over the world to exchange knowledge and decide future actions and collaborations to spread access to solar cooking, water purification and related solar food processing applications.

4.8.2. Sensitising People towards the Environment

The Institute receives many visitors interested in observing classes, seeing the environmental advances at the Institute and various other educational research purposes. These have included local, regional, national and international individuals with personal interests in the Institute and its solar food processing technologies. Overseas volunteers frequent the institute throughout the year in order to learn about the Institute's aims and frequently train in the construction and maintenance of solar cookers. These volunteers become an integral part of the institute, especially for raising awareness in their home countries about the benefits of Barli's work and how technologies like solar cooking can be adapted to everyday life anywhere.

5. Conclusion

Thousands of women, from rural and tribal districts of Central India, are trained by the Barli Institute and are emerging as pioneers of solar food processing and cooking technologies, making a difference to the lives of their people. SK 14 solar cookers have been a great source of socio-economic empowerment for rural and tribal women in Madhya Pradesh and by promoting these cookers Barli is contributing towards achieving the Millennium Development Goals.

The Institute has been successful because of its approach and methodology of transfer of technology "only by choice" accompanied by systematic training and the organic growth of the programme. The use of solar food processing technologies has improved the lives of hundreds of women and their families whilst saving time, money and preserving the environment. It has demonstrated how to successfully build the capacity of local women to play their role as equal participants in all areas of life but this solar training is only one element of the Institute's holistic approach to overall sustainable community development through training women as human resources. The curriculum covers education and experience in literacy, leadership training, tailoring, agriculture, artisan crafts-work, human rights knowledge, environmental awareness, self-esteem and personality development, a sense of social commitment, nutrition and health, and income-generating skills. Apart from its main residential programmes of 6 months and 1 year, the Institute has extension centres in Chattisgarh specifically for those women who are unable to come to the institute. On an average 400 women go through its main programme every year. These young girls and trainees, who when they come to the Institute are illiterate, semi-literate and literate rural and tribal women of Madhya Pradesh, are empowered at Barli to be positive agents of change in their communities and with this new role they are gaining respect and status. They are a source of inspiration and are role models for other women everywhere as they keep proving that it is possible to change the world where millions of women are yet to access such technology.

The experience of Barli, of more than two decades, has shown that no matter what subject is being taught, be it Literacy, Health, Social sciences, Management, Engineering, Computers, Medicine, Information Technology, Sports, Tourism, Home Science, Agriculture,

Communication, Arts, or Culture; Solar Energy should be incorporated into all that people do so that they learn how they can use solar energy to save our planet. Solar energy should not be seen in isolation from life!

6. References

- McGilligan, Janak Palta, 'Towards Environmental Transformation: A Baha'i Experience', *Women and the environment: Partners in Life* (March, 1991)
- McGilligan, Janak Palta, *Training of Rural and Tribal Women in Promoting the Practice of Healthy Nutrition: Case Study of Bahai Vocational Institute for Rural Women*, presented at Seminar at National Institute of Social Science, MHOW (MP) India (July, 1994)
- McGilligan, Jimmy, and McGilligan, Janak Palta, *Role of Women Scientists in Non-Governmental Organizations in Promoting Scientific Attitude Among Indian Masses*, Forum on "Women and Science" Social Work Section, 81st Congress on Indian Science at Jaipur (January, 1994)
- McGilligan, Janak Palta, *Role of NGOs in Government Strategies and Policies for Propagation and Commercialisation of Renewable Energy Technologies*, National Workshop in Pune, (March, 1994)
- McGilligan, Janak Palta, *Equal Partnership of Women in Agro Forestry for Sustainable Development*, Workshop on Agro-Forestry in Bundelkhand region, Jhansi (June, 1995)
- McGilligan, Janak Palta, *Role of NGOs in Motivating People in Adopting New Technologies For Sustainable Development*, National Workshop on Combining Sustainable Development and Bio Diversity Conservation in Integrated Watershed Management, Bhopal (June, 1995)
- McGilligan, Janak Palta, *Rural Women's Home or Cottage Industries; Extent and Future Prospects; Women's Entrepreneurship in Tribal and Rural Areas of Central India – A Bahá'í Experience*, Annual Meeting of the International Society for Agriculture and Rural Development, Acuto, Italy (October, 1995)
- McGilligan, Janak Palta, *Women's Role in the Economy, Decision-Making, Education and the Environment*, Review of Beijing Platform for Action-Asia Pacific Watch Meet, Chandigarh (August, 1998)
- McGilligan, Janak Palta, *Literacy the Key to Individual and Social Transformation Using the Bahá'í Approach: An Experience of Training Rural and Tribal Women in Central India*, Annual meeting of the International Society for Agriculture and Rural Development, Oxford, UK (October, 1998)
- McGilligan, Janak Palta, *Cooking with Solar Energy at Bahá'í Vocational Institute for Rural Women*, School of Biotechnology DAVV, Indore (February, 2000)
- McGilligan, Janak Palta, *Training Rural and Tribal Women in Madhya Pradesh, Environmentally-Friendly Food, Nutrition and Health, an Integrated Approach: Case Study of Baha'I Vocational Institute for Rural Women*, Indian Science Congress 88th Annual Session (January, 2001)

McGilligan, Janak Palta, *Training Rural and Tribal Women as Social Change Agents: A Case Study of Barli Development Institute for Rural Women*, National Conference on Emerging Technologies & Women (October, 2002)

McGilligan, Janak Palta, *Alternative Model of Development: Capacity and Skill Building of Tribal and Socially Disadvantaged Women: Case Study Presentation of Barli Development Institute for Rural Women*, Orientation Workshop of Senior NGOs of MP and Chattisgarh on Issues Relating to Women's Empowerment, organized by NIPCCD, Indore (January, 2003)

McGilligan, Janak Palta, *Sustainable Community Development Through Training of Tribal and Rural Women as Human Resources*, Ph D. Thesis, Devi Ahilya Vishwavidyalaya, Indore (October, 2004)

McGilligan, Janak Palta, *Sustainable Community Development Through Empowerment of Rural and Tribal Women as Human Resources: A Case Study of Barli Development Institute for Rural Women*, International Seminar on Growth Strategy and Environmental Issues organized by the School of Economics and Baha'i Chair in Development Studies, Devi Ahilya University, Indore (November, 2005)

McGilligan, Jimmy, *Empowering Rural and Tribal Women in Solar Technology for Sustainable Rural Development: A Case Study of Barli Development Institute for Rural Women*, National Workshop on Technologies for Rural Development organized by Shri G. S. Institute of Technology and Science, Indore (March, 2005)

McGilligan, Jimmy, and McGilligan, Janak Palta, *Hands On Experience of Manufacturing and Using SK 14 Parabolic Cookers for Socio-Economic Empowerment of Rural and Tribal Women in India: A Case Study of Barli Development Institute for Rural Women*, presented at the Workshop on Testing of Parabolic Solar Cookers: Concern for the Uniformity of the Procedure 21 March 2006 for RTC's, Manufacturers and Users organized by Regional Test Center-cum-Technical Backup Unit for Solar Thermal Devices, School of Energy and Environmental Studies, Devi Ahilya Vishwavidhyalaya, Indore (March, 2006)

McGilligan, Jimmy, and McGilligan, Janak Palta, *Partnership in Transfer of Solar Cookers in Rural and tribal Communities of Central India by Barli Development Institute for Rural Women Indore*, presented at Christian Doppler Gymnasium, Salzburg, Austria (June, 2006)

McGilligan, Jimmy, *Establishing first solar kitchen in Madhya Pradesh and centre for the Awareness Generation and Dissemination of Solar Cooking Technology among Rural Women of Central India*, International Conference of Solar Cooking and Food Processing in Granada, Spain (July, 2006)

McGilligan, Jimmy, *Socio-Economic Empowerment of Rural and Tribal Women in India Through Training in Solar Cooking Using SK 14 Parabolic Solar Cookers*, International Conference of Solar Cooking and Food Processing, Granada, Spain (July, 2006)

McGilligan, Jimmy, and McGilligan, Janak Palta, *Indo-Swedish Partnership in Sustainable Community Development Through Empowerment of Rural and Tribal Women in Central India*, Malardalens Hogskola University, Eskilstuna, Sweden (September, 2006)