Indian Journal of Sustainable Development
5 (1 & 2) 2019, 17-23
http://publishingindia.com/ijsd/

Role of Clean Energy Organisations in Rural Development

Renu Bala Pradhan*, Shiv Sankar Das**

Abstract

Energy is the solution to all problems in the world. It helps in human development to economic development of any region, state or country. Access to energy is a common problem in today's era. Access to energy can help in brining prosperity to earning livelihood. This paper consists of two sections. The first section focuses on a sustainable energy service model where a Digital Service Centre (DSC) was set up in rural areas of South Odisha. It helped in changing the life of a rural youth. Similarly, the second section focuses on designing and developing a solar dryer which was used by fisherwomen for earning their livelihood in the rural areas of South Odisha.

Design/Methodology/Approach - In the current research, a descriptive case method was used and cases were selected in a purposive manner. Data was collected for understanding the theoretical concepts of actors, factors and linkages among them and developing the conceptual framework. An action research method (of partial intervention in the ecosystem for applicability of the framework) has been undertaken.

Findings - Various actors and factors were found out and their linkages were established among them.

Originality/Value - A novel approach of clean energy intervention for income generation, a sense of entrepreneurial mindset was developed and an enabling environment for intervention of clean energy products and services in rural areas was created.

Keywords: Sustainable, Intervention, SELCO, DSC

Sustainable Energy Service Model

Today for any government registration or subsidy reimbursement etc. the documentation requirements would consist of either a copy of a ration card or a photo, for which we need a facility for photocopying and printing photos. But areas where such facilitation centre are away from the reach of community (radius of 10 to 20 km or more) people have to travel long distances, which results in loss of half a day to a full day wages. An average estimation was done by SELCO foundation and was found that for one, Rs 10 photocopy the total expenditure, including travel, amount to approximately Rs 300 (including loss of basic wages, food and transportation). These costs create a huge burden on the poor tribal people in remote areas of South Odisha. Recognising the need to cater to such basic services, their was a need to provide one of the mentioned services to the people in and around the geographical areas. Extremely erratic power with varied voltage fluctuations led to considerable disruption in business (substantial loss in income) and breaking down of expensive equipment, leading to further financial distress. These factors forced the poor tribal people to close their businesses irrespective of the high demand for similar services.

One of the solutions to overcome this power situation was going for adopting the use of clean energy product. As a result, SELCO Foundation bought an idea to set up a Solar Operated Digital Service Centre (DSC) in the rural areas of South Odisha. SELCO Foundation with the help of its own entity SELCO Incubation initially set up this DSC in the remote areas of South Odisha. Solar powered DSC could provide the necessary reliability of electricity

* Capital Business School, Bhubaneswar, Odisha, India.
** Independent Researcher in Clean Energy, Management, Bhubaneswar, Odisha, India. Email: shivsankardas85@gmail.com

and also nullify the voltage fluctuations, thus providing more economic stability to the people in those areas. The solar powered DSC could be easily replicated wherever there is a need for decentralised centres that can provide essential services to remote vulnerable communities.

SELCO Foundation and SELCO Incubation

SELCO foundation is a for-profit social enterprise based in Bangalore, India. SELCO has played an instrumental role in improving living standards of poor households in rural India especially in the state of Karnataka through solar energy based interventions and low smoke cook stoves. It seeks to inspire and implement socially, financially and environmentally inclusive solutions by improving access to sustainable energy. SELCO India was founded in 1995 by Dr. Harish Hande an alumnus of IIT Kharagpur with Rs 15000 funding from its co-founder Mr. Neville Williams. SELCO India has installed solar light systems in 350000 households till date in India (Hande, 2012).

SELCO incubation centre, is to support and inspire local entrepreneurs in developing sustainable energy enterprises that deliver need-based solutions to underserved communities. SELCO Incubation centre identifies youth group, local entrepreneurs, with the help of other institutions like NGOs working locally in the area. They conduct workshops, for these incubatees and sensitise them to go for doing business in clean energy products and subsequently serving the communities. Few entrepreneurs mentored and ventures incubated by SELCO incubation centre are Abha Innovations, Mukti Solar Energy and Pioneer Power Solutions, are all based at South Odisha. 1.2 About the Study The Digital Service Centre (DSC) was set up in Dumerpadar village of Thuamul Rampur in Kalahandi district of South Odisha. Thuamul Rampur is one of the 13 blocks in Kalahandi district in Odisha, which belongs to the KBK (Kalahandi-Balangir-Koraput) group of districts. These districts in Southern and Western Odisha are regarded as the most backward regions by the erstwhile Planning Commission. While farming is mostly for subsistence, small parts of their produce are sold or traded in local markets when households need other essential supplies. As of 2011, less than 10% of the 20,000 families had access to electricity. It gave a comprehensive set of solutions from a single photocopy machine to a bunch of systems to provide several digital services all running by solar energy. This centre can help women, to become entrepreneurs at households, enhancing their earning potential and also to the extent of social status within the society. Moreover, starting the centre by differently abled person in rural areas can help them in earning a new livelihood option. Below is a small case described of an entrepreneur from Dumerpadar village in Kalahandi district in South Odisha. Haru Majhi from Dumerpadar village in Kalahandi district wanted to set up a shop to provide photography and printing facility to the people of his gram panchayat. People had to travel 70 km for just to get a photocopy of Rs 1. He realized that the area did not receive reliable power for functioning of the shop; as a result he opted for using a solar operated photocopier, printer and laptop. The total cost of the system was Rs 101500, out of which SELCO Foundation provided margin money of Rs 25000 and the rest was bought on loan of amount Rs 76500 from State Bank of India (SBI) at interest rate of 13% for a tenure of 4 years. He purchased the systems with technical support from SELCO foundation and installation was carried out by Abha Innovations. SELCO Foundation helped Mr. Haru initially in approaching bank and understanding, fulfilling the other terms and conditions for approval of loan. As a result he was provided with the loan and he started providing photography services, helping people in filling of panchayat forms, applications and other activities. Presently he earns Rs 10000-12000 per month on the service he provides and Rs 2100 he pays as instalment against the loan. In relation with the above implementation study a model has been devised in Fig. 1 along with the various factors and actors linkages given in Table 1.

From the above study we found various factors and actors which were involved in the intervention of Solar Operated Digital Service Centre in the rural area of South Odisha. Major factors included the price of the product, payment through EMI scheme, features of the product, support from SELCO Foundation in providing margin money, unavailability of reliable electricity and inconvenience caused to get the services and loss of one day wage were the major factors for setting up of DSC. The factors identified were categorized under four major factors like finance related, technology related, capacity building related and infrastructure related.

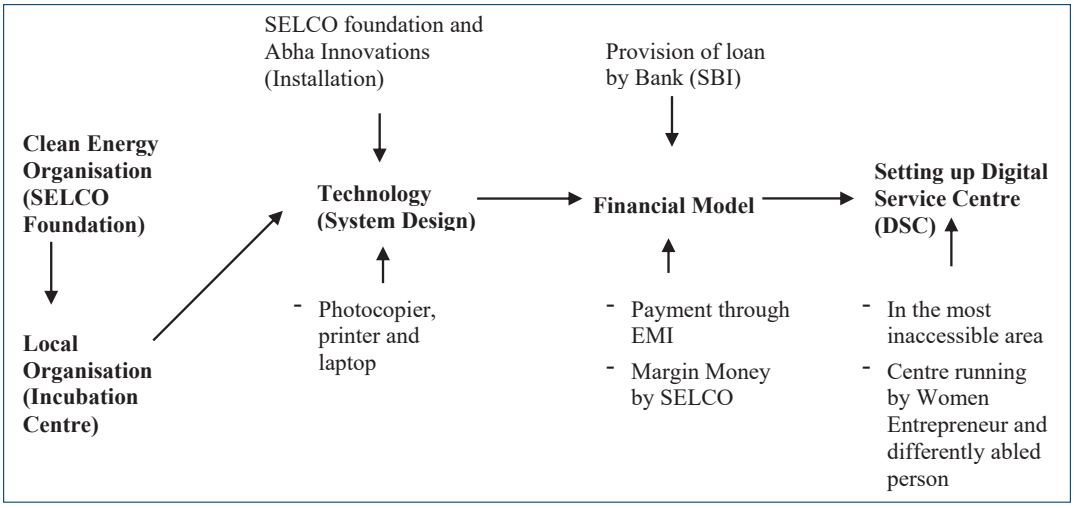

Fig. 1: Sustainable Energy Service Model

Table 1: Factors and Actors Linkages for Sustainable Service Model

Factors	*Actors*	*Linkages*
Finance	• Bank (SBI) • SELCO Foundation	• Payment of loan amount on instalment basis per month • Provision of Margin money
Technology	• SELCO Foundation and Abha Innovations helped in system designing, installation and service	• Availability of customized product • Product installation and service support • Alternative source of energy
Capacity Building	• SELCO Foundation and SELCO incubation centre	• Identified the entrepreneur • Conducting workshops- provided training on technical and managerial aspects
Infrastructure	• Absence of photocopy centres	• Installation of solar operated digital service centre Remoteness

From the above model, major role was played by SELCO Incubation and Abha Innovations which helped in providing margin money, providing handholding support, design and installation respectively. Loan provided by bank and payment through installment was the major financing options made the intervention easy. Partnership approach was developed among all the actors for intervention of DSC into the rural areas.

Sustainable Livelihood Initiative for Fishery through Solar Technology Intervention in South Odisha

Traditionally fisherwomen dry fish in open and often in unhygienic condition. This results in poor price realization from the market. Application of solar drying technology has the potential for higher value addition of fish products. In view of providing solutions to the same Voluntary Integration for Education and Welfare of Society (VIEWS) and Centurion University of Technology and Management designed and developed a clean energy product called solar dryer. They went on providing training to fisherwomen. The dryer was installed in Markandi village of Indrakshi Gram Panchayat (GP) of Rangeilunda block in Ganjam district of South Odisha.

About Voluntary Integration for Education and Welfare of Society (VIEWS)

Voluntary Integration for Education and Welfare of Society (VIEWS) is a registered grassroots development organization, initiated in 2002 by a group of development

professionals, academicians and social workers drawn from various backgrounds working to bring in change in lives of the poor and build empowered communities. They work out new innovations for up scaling development interventions to eradicate poverty in South Odisha.

About the Study

A solar dryer was designed and developed by Centurion University of Technology and Management (CUTM) and was used by the Divya Jyoti Mahila Vikash Samiti consisting of 10 fisherwomen, for preparing dry fish in Markandi village. About 20 kg of dry fish was processed every day whereas in traditional method only 7-8 kg was able to produce in a day. The processing of fish through the use solar dryer was eco-friendly and power saving. Below is a small case Divya Jyoti Mahila Vikash of Markandi village of Ganjam district in South Odisha.

Savitri Amma, from Divya Jyoti Mahila Vikash of Markandi village used to dry the fishes on the ground as a result of the end product sometimes contained sand particles and there was fear of loss due to birds and other animals. But with the introduction of the solar dryer she was able to dry fishes in a more hygienic condition. She started selling the solar dried fish in poly packs in the brand name of "Divya Jyoti" at Rs 75 per kg which earlier was sold at Rs 30-40 per kg. This dryer was not only used by Savitri, but also was used by other fisherwomen of the community who were using traditional method to drying fishes. "It has become our source of our income", says Savitri.

From the above study, we found various factors and actors which were involved in intervention of Solar Dryer in the rural area of South Odisha. Major factors include features of the product, financial support from VIEWS and technical support from Centurion University in designing, installation of the dryer and imparting training to fisherwomen. In relation with the above implementation study a model has been devised in Fig 2 along with the various factors and actors linkages given in Table 2.

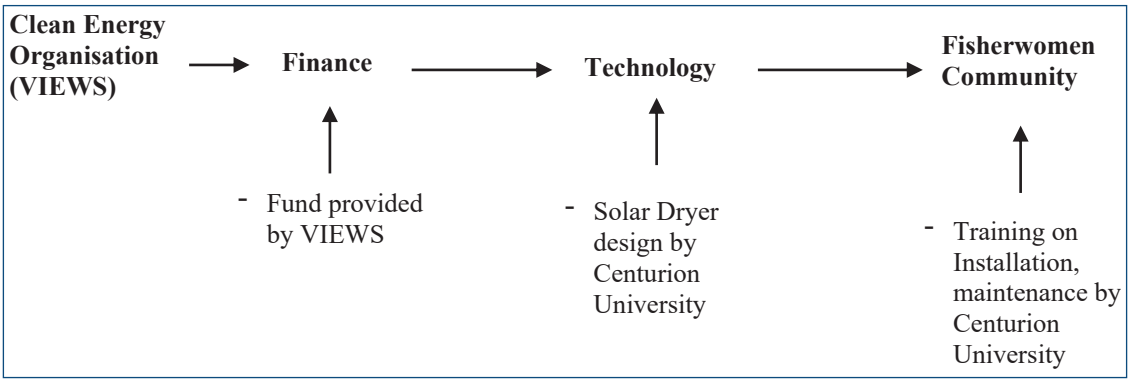

Fig. 2: Sustainable Livelihood by Solar Drying

Table 2: Factors and Actors Linkages for Sustainable Livelihood for Fishery through Solar Technology

Factors	*Actors*	*Linkages*
Finance	• Funding from VIEWS	• Association of fisherwomen with VIEWS
Technology	• Centurion University	• Product installation, maintenance and repair
Capacity Building	• Centurion University • VIEWS	• Imparting training to fisherwomen on how to operate • Asset creation and sense of ownership
Infrastructure	• Use of traditional method/Absence of modern drying technology	• Installation of solar dryer • Community asset • Quick, safe and reliable

From the above model, major role was played by VIEWS for providing financial support and Centurion University for its technical support and providing training to fisherwomen. CUTM sensitized them on how to use this solar dryer for higher value addition of fish products and economically strengthening their financial positions. In the present context a partnership approach, consent and ownership of the community was essential for the intervention to take place.

Process of Intervention for Clean Energy Implementation in the Rural Areas of South Odisha

In this section the process of intervention has been discussed for clean energy implementation in the rural areas of South Odisha.

For a successful intervention and implementation it was important to have a strong sense of involvement from each member. Participation from so called beneficiariasin all stages was important, which resulted in encouraging a sense of ownership and understanding the technology better. There was a need to have a close coordination among the planners, implementers, and the beneficiaries for intervention of clean energy product in each case. For the same frequent meetings, FGDs were conducted with all the beneficiaries on weekly basis. A sense of ownership and accountability was developed among the members, so that they do not see the initiative taken was from outside but rather it was for their own development and act as a source of income generation. It created a sense of value addition in their minds and further not resulting in a thought to disown it. Having a community consensus was necessary during the planning stage and involvement of local youths, leaders of the village and seeking their opinions helped in strengthening the community's ability to resolve disputes if occurred in future (Das, S. S. et al., 2020).

Appropriate guidance and mentoring in each and every step, was required from all members to take a decision. They took decisions not on the basis of friendships or neighbourly alliances but rather on well informed judgments and community consensus. During the implementation stage, the planning was transparent and non-partisan. Relevant people from all grounds were consulted during planning and decision making process so as to strengthen the implementation process by obtaining consensus across from each member. Detailed work plans were drawn and community expectations was managed so as to prevent a subsequent loss of trust by conducting meetings and FGDs with the members. Plans were tailored to the community's specific desires and requirements. Work plan was developed to which all the stakeholders, including the community agreed and emphasis was given to be more realistic with the objectives so as not to build false hopes among each member, as unmet expectations could shatter communities trust in the implementing organization. Involvement of all the stakeholders will give birth to trust building and higher user expectation (Das S. S., 2020).

Effective management was very much essential to acquire sustainability and have a welfare impact on the members of the community. The members were trained in both technical and managerial aspects in local language, on the advantages of using these clean energy products, problems we face due to pollution, and harmful effect on health. They were also provided training on the basics of how to run a business and sustain it. After completion of the training program they were assigned the responsibility how to manage, operate, repair, maintain and service the product. In future, it was also decided that responsibility will be given to each members on a rotation basis, so as to develop the sense of seriousness and accountability. With frequent meetings and discussions with the members, clean energy products were given. Gradually with the experience of using the product it created a sense of owing it. They purchased the product with a minimum amount and rest amount was paid in installment basis. Another strategy adopted was word of mouth where a party was organized at the home of a member, where people from around the village were invited to watch the demonstration of how the clean energy product works and its usefulness. It created a sense of urge, and motivated other people of the village to own it.

Banks themselves played an important role in the intervention of the clean energy product at their own branch. When they identify a potential consumer who could afford and benefit from the system they can give loan to purchase it. Rural haat was also used for promotion of clean energy products into the rural areas. Campaigning of the product in weekly market was done, as a result more number of people from distant villages showed interest for knowing and adopting the clean energy product.

Use of clean energy products for income generation activity needs to be taken up in more number to improve purchasing power of the consumers and also to generate additional revenue. Nowadays many clean energy organizations have entered the rural market and are trying to lead the market by developing the products according to the requirements of the rural consumers. But the major hurdle is ensuring quality after-sale at minimum effort and time is always a better option. For intervention of clean energy products, there was involvement of local people.

It was beneficial to train local people to operate and carry out the maintenance of the products. Engaging full time service engineers was not advisable as it may be time consuming and expensive, therefore engaging local capacity for a continued operation and maintenance was very essential. Further it was required that well organized communities were likely to manage a system and self sustained, after the project leader or the study team leaves. As a result, the members were empowered to provide after-sales service in quick time. It was difficult for the members to access the capital at the initial stage. Hence, if finance could be mobilized either through loan, grant, or through EMI option, even the poorest of the poor will prefer have access to the better-quality and long lasting product. As a result members were provided with easy financing solutions, products were provided on EMI scheme which led to the intervention of the clean energy products in the rural areas. In each case for intervention to take place either the products were given in installment basis, or through a CSR initiative. Intervention of clean energy products in the rural areas needs to be demand-led, although the mobiliser needs to assist in enhancing the local motivation and drive it forward. A strong leadership with proactiveness was required to take it forward from the stage of conception to completion. The members, entrepreneur act as leaders for taking the process forward. They generated a sense of social acceptance and interest from and within the community to make the intervention process start and move it forward. The whole process was linked to the possible way which could generate an additional income for the community as a whole or for a large number of individuals within it.

They act as a community mobiliser, instilling a sense of responsibility for the product and service within the community and were also stimulating the benefits for the product in development spheres. It was an essential component, perhaps was the main component in the intervention process. Several organisations like SELCO Foundation, VIEWS and Centurion University worked together with State Bank of India (SBI) to improve the lending terms offered by them, raising the awareness of clean energy products and preparation of business models. Socially motivated organization like SELCO Foundation provided financial, technical and managerial support to aspiring entrepreneurs in different areas of South Odisha in collaboration with Centurion University.

In case of Digital Service Centre (DSC) the entrepreneur was supported with margin money by SELCO Foundation to start his business. Loans were typically offered only after a rigorous due diligence process has taken place by bank. They were involved in taking training on how to prepare business plans etc. held at Centurion University where resource persons from School of Management were involved. Centurion University and SELCO Foundation has been providing entrepreneurship and technical training to more than 90 rural youths specifically from tribal areas of South Odisha. The intervention study implemented, were also used as the demonstration sites for others to boost awareness, encourage and sensitizing to adopt clean energy products. Showcasing the systems can give the community, pride and strengthen their sense of responsibility for its upkeep. Here the role of the implementers was not only to make the implementation as beneficial to the local community but also spread information about the work. Liaising with the communities to seek permission to use their systems to showcase to others, rent the system to others so that the community would be able to earn extra income.

Enabling environment like the supportive infrastructure and regulation is required to be sustainable, scalable and replicable. If the government and other actors do not have the capacity to monitor and enforce regulation, then the competent donor agencies and self sustained cooperative and SHGs need to propel the programmes forward and monitor the activities (Ramanathan, 1993). Quality of the product and after sales service standards must be realistic, affordable, monitor-able and enforceable for the intervention to take place (Das S. S. et al., 2020). An enabling government can be one that is non-intervent-ionist during the implementation stage, yet consistent and transparent in terms of policies and regulations. Actors involved in the intervention process needs to set stringent

targets so that work is propelled forward.

Three major elements were required for a successful intervention of clean energy products and services in the rural areas, that is a sense of responsibility needs to be developed among all the members, which includes the users, implementing agency, manufacturers, financiers, and other actors. All members need to participate in planning and decision making process. The presence of motivators such as the provision for incentives, EMI schemes, income generation activities, improving purchasing power of the consumers, generating additional revenue and creating path for opportunity towards employment generation and livelihood enhancement needs to be focused for the intervention to take place.

Here an enabling environment like accessing to technical and financial networks, conducting awareness and effective monitoring and working along with the Govt, policy makers and other members is also required for the intervention to take place (Das S. S., & Debashree B., et al., 2020). Conducting workshops, seminars, bankers meet, on sensitizing the use of clean energy products, financing aspect needs to be carried out. A network here is the alliance between the practitioners, research organizations, educational institutions, financial institutions, relevant private sector companies, think tanks and funders. It should have a long term mission which will provide a base for the clean energy sector. It should work in policy making process and facilitate cross learning. It should facilitate finance outreach, conduct bankers awareness program, establish training needs, help in innovation linkage, product development and also act as information hub for this sector and facilitate knowledge sharing. However the ability for a successful intervention depends on the supporting conditions from all the factors and actors involved in the ecosystem approach.

Conclusion

Here all the actors of the models needs to co-create, co-exist, collaborate and compete (4C) with each other. Three most important elements was required for a successful intervention, first is the sense of responsibility needs to be taken up by all the members to adopt clean energy products, second are the motivators such as provision for incentives, providing easy financial solutions like EMI schemes, value addition, local employment generation and finally building networks, going for an effective monitoring mechanism and supporting infrastructure. These elements are very much required for creating an enabling environment for intervention of clean energy products and services in the rural areas of South Odisha.

References

Hande, H. (2012). *Ecosystem creation for off-grid solar: Achieving diffusion across India,* (pp. 1-10). Selco Foundation and Renewable Energy Working Group (REWG).

Ramanathan, M. (1993). Linking banks and SHGs. *Sri Lankan Experience-Rural Finance, 10,* 11-20.

Ecosystem approach vital for clean energy access: WWF-India & SELCO. (n.d.). Retrieved from http://www.wwfindia.org/?14861/Ecosystem-approach-vital-for-clean-energy-access-WWF-India--SELCO

Census of India. (2011). Office of the registrar general and census commissioner, India. New Delhi.

Das, S. S., Behera, D. D., Mishra, S. P., & Pradhan, G. (2020). Clean energy access and productive use by bottom of pyramid clients in ethnic & tribal areas of Odisha: An appraisal. *Current Journal of Applied Science and Technology, 39*(36), 38-50.

Das, S. S. (2020). Diffusion of clean energy products: A conceptual framework. *Indian Journal of Natural Sciences, 10*(59), 18251-18268.

Das, S. S., Debashree, B., & Giri. N. (2020). Diffusion of solar lights in South Odisha. *Indian Journal of Natural Sciences, 10*(60), 20589-20596.

Das, S. S., & Debashree, B. (2020). Clean energy products and distribution, revenue collection model. *Indian Journal of Natural Sciences, 10*(60), 24912-24918.