

INTEGRATED APPROACH FOR PROMOTING SOLAR COOKERS IN RURAL AREAS IN TAMIL NADU

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ABSTRACT

A solar cooker is the simplest technology which has been developed for cooking the food without requiring any conventional fuels. Several advantages over solar cooker has been claimed such as no smoke emission, no soot deposition in the cooking utensils, retains nutrients, environment friendly and conserves precious conventional resources of the country. Today as an outcome of the concentrated work of the solar activists several types of solar cookers have been developed and disseminated. At this juncture it is imperative that all our efforts should concentrate in bringing the solar cooker from technical arena to household sector. The mass communication methods aimed at selling the idea of solar cooker in general, but had not reached the target group women – the ultimate users of the solar cooker in particular. To achieve the U.N. Millennium Development Goals (MDGs), rural women should be informed through well defined, effective communication methods. At this point the integrated approach can be viewed as the better strategy to effect the technology use in favour of women's daily needs. In this present exercise a low-cost solar cooker has been conceptualized, fabricated and steps have been taken to disseminate the message through an integrated approach.

Key words: Integrated approach, Solar Cookit, Mass approach, Folk media.

1. INTRODUCTION

Rural women have been shouldering the burden of domestic fuel management in most of the developing countries. As a direct consequence of this, they are the

worst affected by environmental degradation and economic distress. In spite of this a major shortcoming of all the rural energy programmes implemented so far has been the lack of inclusion of local communities especially women. Their potential is often unrecognized by the women themselves who are preoccupied with the ever increasing and over riding burdens of collecting fuel, fodder and water for their families. Introduction of solar cookers could play a tremendous role not only in reducing the demand for fossil fuel resources for cooking but also improving the work efficiency of the rural homemakers. A solar cooker is the simplest technology which has been developed for cooking the food without requiring any conventional fuels. Several advantages of solar cookers have been claimed, such as no smoke emission, no soot deposition in the cooking utensils, retention of nutrients, environment friendliness, conserving precious conventional energy sources of the country. Solar cookers of low-cost hold great immediate promise to cook food, pasteurize or just heat water, dry agriculture produce and for many other uses. Today as an outcome of the concentrated work of the solar activists, several types of solar cookers have been developed and disseminated. Solar Cookers International (SCI) has come out with a simple cooker – 'Solar Cookit,' which is made of cardboard, is foldable and is affordable for less privileged groups.

To achieve the MDGs, rural women should be informed through a variety of well defined, effective communication methods. At this point the integrated approach can be viewed as a better strategy to effect the technology use in favour of women's daily needs. An integrated approach is defined as a method through which one or more mutually reinforcing components, that effect the desired change are combined in order to achieve the benefits of planned objectives. This

approach was preferred for the objective as the access to technology and extension inputs, integrated with work needs during implementation, may bring desired results of increasing the level of satisfaction of women in their work. Also this approach is still overdue to be applied to women's work needs, and it was here the investigator felt the need to use the same for achieving the desired target. Hence, the need of the hour is to concentrate on women in small groups and to penetrate the idea of solar cookers into their minds, clarifying all their doubts. In this present exercise a low cost solar cooker – 'Solar Cookit' has been conceptualized and fabricated, and steps are taken to disseminate the message to the rural women.

2. METHODS AND MATERIALS

2.1 Selection of Area

Tamil Nadu or 'the land of Tamil' is the Southern – most state of India. Tamil Nadu is a beautiful state nestled in the Southern Indian peninsula on the shores of the Bay of Bengal and the deep blue Indian Ocean. Out of the 30 districts, 9 districts namely, Coimbatore, Erode, Salem, Namakkal, Ramanathapuram, Dindugal, Trichy and Madurai have been considered for the study. Earlier rapport, co-operation, availability of transport and the **interest evinced by the women are the reasons for selecting the above mentioned districts.**

2.2 Selecting an Appropriate Solar Cooker

An appropriate, light weight, low cost solar cooker, namely the 'Solar Cookit,' was designed by Solar Cookers International, USA for the rural households in developing countries. This solar cooker is simple, easily portable and less costly and caters to the needs of rural households, leading the researcher to select this design of the solar cooker. One thousand and two hundred prototype models were fabricated in a local industry of Coimbatore and transferred to the respective villages.

2.3 Preparation of Visual Materials and Methods

Successful implementation of the programme is a perfect blending of sound technology with artistic skills of communicating the same from the laboratory to the land use. During the course of promotion, various methods were used to promote solar cookers with the aim of selling the idea of harnessing solar energy through the use of solar cookers. Research evidence also shows that there is more gain and retention of knowledge by the use of different audio visual aids rather than delivering a lecture. People learn through all their five physical senses.

Appropriate posters, charts, slogans, leaflets and pamphlets depicting the idea of solar cooking were developed in the local language.

- **Charts: Charts are visual symbols for summarizing, comparing, contrasting or performing other services in explaining subject matter and they are diagrammatic presentations of facts and ideas.**
- **Posters : A poster is a visual aid which attracts the attention of the audience and passes on to them a simple message at a glance. The investigator compiled the posters on the solar cookit's significance with attractive colour, in an understandable form.**
- **Slogan: Effective slogans are short, simple, memorable, easy to report and catchy. Their memorability is enhanced by the use of rhythm. A good slogan generates its own excitement, e.g. "Reach out and touch someone;" when it works, stay with it. Slogans are messages given in a crisp manner in a nutshell. They convey the meaning in a short form which could be understood by all and are also meaningful and thoughtful.**
- **Leaflets, pamphlets and booklets were developed by the investigator and distributed to the homemakers.**

2.4 Integrated Approach for the Promotion of Solar Cookit

"Communication involves a systematic and continuous process of telling, listening and understanding. Communication is the art of sending ideas and opinions from one person to another.

Three terms described by scholars in people's communication are interpersonal communication, intrapersonal communication and mass communication. Inter personal communication with a combination of media has proven to be the most effective way of reaching people with new ideas. The effective use of visual images not only improves the understanding of an audience but also increases their ability to remember.

2.4.1 Individual Approach

This method builds up confidence between the speaker and receiver. Home visits involved dynamic interaction between two persons, face to face, by the investigator with the home maker for a specific purpose.

2.4.2 Group Approach

One to many interactions between the person and public is known as a group approach. It involves exchange of information within a group in an informal manner, and

transformation of facts and knowledge between the sender and people in an unstructured way. In group discussions the doubts are cleared to the fullest satisfaction of the homemakers.

Demonstrations are the oldest, simplest and best tools for transmitting sophisticated technology in a simple and understandable manner. This method of communication is one of the best methods of transferring any new technology. It is a step by step procedure in the operation, explaining each succeeding step as the demonstration proceeds. The homemakers watch the process, listen to the oral explanation and ask questions to get a clear procedure.

2.4.3 Mass Approach

Mass Communication is communication from one person or group of persons through a transmitting device to a large audience. In this project mass communication plays a major role to reach the people. During the phase of promotion, several methods have been adopted to transfer the technology with the aim of creating awareness of the use of 'Solar Cookit.' Exhibitions, wall paintings, public meetings, film shows, print media, and folk media were the mass approaches employed in the project to promote solar cookers among rural women.

Exhibition: Exhibitions are an ideal means to introduce a new idea or create a discussion point. An exhibition can show actual things, practices, results of demonstrations, and programmes in progress through charts, posters, diagrams, displays layouts and models.

Wall paintings: Wall paintings are non-photograph reconstructions of reality. It was mostly done on the walls of public buildings and in places where large numbers of people gather and witness and read the message written on the walls.

Print media: News is any timely information that interests a number of persons, and the best news is that which has the greatest interest for the greatest number. It is an accurate, unbiased account of the main facts of a current event that is of interest to the readers of a news paper. Seeing any programme through this media brings a closer relation to the technology for the entire family and also kindles the interest in adopting it in their households. Realising its significance, an article titled as 'Nutritious meals through Solar Cookers' was published in 'Malai Murasu', one of the leading local newspapers.

Folk media: The folk or traditional arts of India have been used from ancient times for moral, religious and socio-political purposes. The folk media are close to the hearts and minds of the people, as their appeal is at a

personal and intimate level. Folk media are available to all and sundry and enjoyed by persons of different age groups, all at a very low cost. The greater advantage of the folk media over the electronic media is their flexibility in accommodating new themes. It is this integrated approach that will strengthen the efficiency of both technology-based and folk media. A happy combination of the modern and the traditional would make for a practical approach.

Through this integrated approach, village women had a clear idea about the low cost solar cooker and many of them came forward to use the Solar Cookit for their meal preparation. In any programme, participation of the members plays an important role. Unless people participate with interest and initiative the message conveyed will not have any impact on them. A total of 11,361 members were made aware about the importance of solar cooking. It is interesting to note that 1208 homemakers readily accepted to use 'Solar Cookit' in their households.

2.5 Examining the Resultant Change to the Life of Women

In order to assess the resultant changes in the life of women with empirical evidence, a survey was undertaken for the quantitative evaluation. In the process of evaluation, the investigator observed and gathered information on the qualitative changes that had taken place in the work life of rural women.

3. FINDINGS

3.1 Fuel Management Practices

Type of fuel used, the distance traveled and time consumed by the homemaker to collect fuels, the usage, the problems faced by using conventional fuels, and the homemaker's awareness about solar cooking are covered in this phase.

The type of fuel used by these rural homemakers is shown in Table 1.

TABLE 1: TYPE OF FUEL USED BY THE HOMEMAKERS

Fuel Used	N: 1200	Percentage
Fire wood	540	45
Firewood + Kerosene	160	14
Firewood + Gas	190	15
Kerosene	110	9
Gas	200	17

Fire wood was the oldest type of fuel which man used for centuries after the discovery of fire itself. A survey in

India indicates that 90 per cent of households in rural, 75 per cent in semi-urban and 25 per cent in the urban areas use firewood. This survey also revealed the fact that 74 per cent of the rural households use firewood for cooking and heating water. A few households supplement the firewood by using the twigs gathered from the near by fields.

3.2 Type of Chulah Used for Cooking

The traditional chulah used in the households was characterized by low thermal efficiency, giving drudgery due to smoke in the kitchen, and needing long cooking hours. It was found that in the open fire cooking in a traditional chulah, only 5-10 per cent of the potential energy in the fire wood was utilized, and the smoke emitted in the open fire cooking caused serious health hazards, particularly for the housewives and children. The open smoky chulah used by women needs frequent blowing of the fire.

Table 2 presents the distance and time consumed to collect fuel.

TABLE 2: DISTANCE AND TIME CONSUMED TO COLLECT FUEL WOOD

Distance in km	Time in hours	Weekly Once		Weekly twice	
		N : 560	Percentage	N: 200	Percentage
½ - 2	½ - 1	360	64	100	50
2 - 3	1 - 2	120	22	20	10
3 - 4	2 - 3	-	-	30	15
4 - 5	3 - 4	80	14	50	25

Mainly homemakers and children were engaged in collecting the fuel wood, twigs and bark. They had to spend 3 to 4 hours once in a week covering 4 to 5 km distance in order to procure firewood. Such an exercise results in wastage of precious resources, time and energy.

3.3 Quantum of Fuel Used

Table 3 presents the quantum of fuel used for cooking.

TABLE 3: QUANTUM OF FUEL USED

Type of Fuel	Quantum of fuel used per month	N : 1200	Percentage
Fire wood (in kg)	80 - 100	350	21
	100 - 120	150	12
	120 - 140	140	30
	140 - 160	20	15
	160 - 170	70	6
Kerosene (in litre)	1 - 5	120	10
	5 - 10	50	4
	10 - 15	100	8

Gas (in kg)	10 - 20	290	24
	20 - 30	100	8

Multiple response*

3.4 Problems Faced by Homemakers

The homemakers reported several constraints in procuring, storing and using firewood as fuel. The array of the problems in the usage of firewood are summarized and given in Table 4.

TABLE 4 : PROBLEMS ASSOCIATED WITH USE OF FIRE WOOD*

Problems	N : 890	Percentage
Difficult to collect	660	74
Insect menace	620	70
Causes body pain	550	62
Consumes more time	480	54
Difficult to store	430	48
Non-availability	350	39
Burns while cooking	340	38
Cause breathing problems	280	32
Cost more in winter	240	27
Smoky kitchen	120	14
Difficult to maintain	110	12
Energy loss	50	6
Prone to fire accident	3	3

* Multiple response

The homemakers explained that they face several problems in using firewood. More than 60 per cent of them mentioned the difficulty in collecting firewood, insect menace and causes of body pain as their major problems. The cooking process consumed more time according to 54 per cent of the homemakers. Lack of space to store the firewood was a problem for 48 per cent of the homemakers. Health associated problems were also reported by homemakers. The smoky kitchen as a result of using firewood was observed by 14 per cent of the homemakers. These problems made the rural women think and adopt an alternative strategy – solar cooking.

3.5 Status of the Homemaker's Opting Solar Cookit

The integrated approach adopted by the investigator convinced several homemakers to use a 'Solar Cookit' for cooking and heating water. Though, 1200 homemakers received the 'Solar Cookit' at the time of promotion programme only 1000 homemakers used them effectively.

Adoption Factors of Solar Cookit

Table 5 implies the adoption factors of Solar Cookit.

TABLE 5 : ADOPTION FACTORS OF SOLAR COOKIT

Particulars	Solar Cookit		Chi-square Value (%)
	Accepting N : 1000	Non-accepting N : 200	
Size of family			
Small (1-30)	270	50	58.07*
Medium (3 – 5)	700	20	
Large (5 – 7)	30	130	
Age			
< 30	120		16.11*
31 – 40	240	40	
41 – 50	380	20	
> 50	260	140	
Educational Status			
Literate	35	50	0.75**
Read and write only	260	130	
Informal Education	390	20	
Occupational Pattern			
Textile labour	50	150	79.50*
Coolie	100	-	
Mill workers	50	-	
Agriculture worker	30	50	
Full-time homemakers	770	-	
Income per Month			
< 1250	460	10	10.46*
1250 – 2650	370	40	
2650 – 4450	170	100	

* Significant at 1% level

** Non-significant at 1% level

The inference clearly points out that any programme implementation depends upon age, education, occupation and income to be successful in reaching the target group.

Table 6 brings forth the features of a 'Solar Cookit' as rated by the homemakers.

TABLE 6 : FEATURES OF SOLAR COOKIT AS RATED BY THE HOMEMAKERS

Features	Percentage		
	Good	Fair	Poor
Affordable	100	-	-
Storable	100	-	-
Portable	100	-	-
Weightless	100	-	-
Maintenance free	98	2	-
Workable	90	10	-
Conducive height	55	40	5
Adequate size	54	40	6
Proper shape	42	30	28
Durable	25	19	56

All the homemakers unanimously voiced their opinion that Solar Cookit could be obtained in affordable price, is easy to store, and easy to transfer from one place to another without difficulty. Ease of care and maintenance and ease of handling ranked next as rated by the homemakers. More than 20 per cent of the homemakers expressed their concern about the durability of the Solar Cookit since it was made out of cardboard. A meagre percentage of homemakers mentioned that the height was not convenient and they had to bend to keep the food inside the Solar Cookit. The shape was not conducive to cook two items at a time, as opined by 28 per cent of the homemakers. Fifty six per cent of the homemakers were doubtful about the durability of the materials used for construction.

Benefits accrued by using the 'Solar Cookit' as rated by the homemakers are presented in Table 7.

TABLE 7 : BENEFITS REPORTED BY THE HOMEMAKERS USING SOLAR COOKIT

Benefits	Percentage N = 1200
Promotes Environmental cleanliness	96
Reduces the dependence on fossil fuels	95
Exposes to the novel way of cooking	94
Requires less attention	92
Offers possibility for the children to cook	90
Saves fuel and money	88
Relieves drudgery of homemaker	86
Drives smoke away from the kitchen	75
Gives opportunity to use it in the work spot	64
Less soot formation on utensils	60
Reduces the fear of accidents	60
Helps to dry food items and medicinal plants	58

Most of the homemakers have stated their positive opinion towards the Solar Cookit. Homemakers overcome their constraints by utilizing Solar Cookit, which is cheap, portable and offers hygienic cooking, etc.

3.6 Qualitative Change

The introduction of Solar Cookit in the rural households brought notable qualitative change in their life style.

Relives drudgery : The women and children who toiled to carry a heavy load of firewood are happy to take the Solar Cookit to their workspot due to its light weight. The collection of firewood involves long hours of work and the use of 'Solar Cookit' brings leisure 'to the homemakers'.

Conserve money: The women were happy because they could save some amount of money by using a Solar Cookit.

Clean Indoor Environment: The smoky, dirty kitchen which spoiled the family gathering was turned into a clean environment and fostered the family relationships.

Safe water: The Solar Cookit helps to pasteurize and provide clean, potable drinking water.

Saves time: The women who spend long hours in the queues for getting kerosene felt happy to use a 'Solar Cookit'. The long hours of standing in front of the smoky chulah made the rural women very tired, hence they welcomed the 'Solar Cookit,' where they could prepare the items in a relaxed way, sitting in the 'Thinnai' (a platform normally found in the rural veranda).

4. CONCLUSION

The day when fossil fuels get exhausted one needs to turn on the perennial sources of energy – the radiating sun, the blowing wind, the surging tide, and other sources of biomass are not far off. The efforts of the project revealed that a number of hurdles need to be crossed before then. Solar cookers find a place in the Indian kitchen. Continuous effort on a large scale by government, universities and voluntary agencies is the need of the hour to promote solar cooking among the people. The public should shed their inhibition, traditional habits and cultural practices and come forward to adopt this simple technology.