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ADOPTION OF SOLAR COOKER BY RURAL WOMEN

MANASHI MOHANTY AND SUSMITA MOHANTY

ABSTRACT

Sustainable development requires an organized effort to develop and defuse new technology appropriate for agricultural production system, renewable energy system and pollution controls. Energy is one of the vital resources for development and survival of mankind. We are fortunate enough to have abundant sunlight during most part of the year. This untapped renewable energy could be the best substitute to save non-commercial fuels used in kitchen and keep the environment pollution free. In contrast, the traditional chullha used in villages are not considered efficient and environment friendly. Therefore, to save rural women from their drudgeries, solar cooker could be an easy and alternate answer. The study was designed to find out the attributes of solar cooker for acceptability among rural women and to know their attitudes to apply this innovation in future. Training cum demonstration was conducted in two districts namely Puri and Khurda district with 415 respondents. The limitations of solar cooker cited by the respondents were its inability to work in cloudy weather, long time taken to cook food, high cost and lesser utility in a large family which influenced its whole hearted acceptance by rural women. About 57.10 % respondent expressed favorable attitude towards the future acceptability of solar cooker.

See end of the article for authors' affiliations

Correspondence to :
MANASHI MOHANTY
Dept. of Family Resource Management, Orissa University of Ag. & Tech., BHUBANESWAR (ORISSA) INDIA

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Appropriate technology is not a utopian concept as it deals with practical utility. Appropriateness does not only apply to the users alone, it is also related to the environmental impact when the earth is being ruined with pollution and degradation of environment, appropriate technology is the dire need of the hour with its emphasis on sustainability. A technology compatiable with local, cultural and economic condition is appropriate for the rural people. Solar cooker is one such non-polluting technology that are required for rural India.

In India about 40 per cent of total energy is utilized for household activities. Cooking consumes about 19.2 per cent of total energy inputs in the villages (Sekhar *et al.*, 1996). A recent global study conduct by Shell Company indicated that the proven and economically recoverable all reserves will last only for 42 years at today's rate of extraction assuming the consumption level remaining unchanged.

Realizing pressure on energy sources various non-conventional energy technologies have been developed by the scientists. We are fortunate enough to have abundant sunlight during most part of the year. This untapped renewable energy could be the best substitute to save non-commercial fuels used on kitchen and keep the environment pollution free. Despite little bit high initial cost, in such a time the best alternative is to try and make best use of sources of energy that will last only with life on earth *i.e.* Solar cooker. Various doubts about its use are set even in the mind of the educated people. There is no exception in case of the rural mass. Hence it is necessary to create consciousness and to motivate them to use abundant natural resources for benefit of our nation.

Therefore, the present study was designed (1) to find out the attributes of solar cooker for acceptability among rural women and (2) to know their attitudes to apply this innovation in future

METHODOLOGY

The study was conducted in Puri and Khurda district of Orissa. Purposive and multistage random sampling procedure was followed to select the districts, blocks, villages and respondents for the study. A total of 16 villages were selected from two districts keeping operational feasibility in view. The sample consisted of 415 farm housewives (207 from Khurda district and 208 from Puri district).

Twelve recipies adjudged appropriate by the panel of judges for its taste and appearance were selected for the demonstration purpose. These recipes were tried out in solar cooker before the respondents. Four days training cum demonstration was organized in each selected village separately. All the respondents included in the base line study were motivated to attend the demonstration.

The attributes selected to study the perceptional set of rural women were taken as classification given by Rogers and Shemaker (1971). The attributes included were - simplicity-compatibility, Profitability , Compatibility and observability.

RESULTS AND DISCUSSION

Socio-economic profile :

The study reveals that out of 415 respondents about 55.90 % belonged to the age group of 20-35 years and 44.09 % respondents were in 36-50 years age group. The nuclear family system prevailed more in comparison to joint family, amongst the target group. A little more than half of the respondents (about 54 %) were literate. Majority of respondents (45. 06 %) monthly income was within Rs.2000/- followed by 32.04 % respondents monthly income was within Rs.2001-4000. The percentage of respondents in the monthly income category of 4001 to 6000 and 6001 and above was 13.73 % and 9.15%, respectively. Maximum number of respondents (52.53 %) were engaged in agriculture and allied activities, followed by laborer 31.31 %, self employed 12.52 % and service holders 3.61 %. Other caste respondents were highest followed by scheduled caste and scheduled tribes. About 89.39 % respondents were married and the rest were either divorce, separated or widow.

Perceived attributes of solar cooker :

Table 2 displays the level of perception of respondents about the attributes of solar cooker. The data clearly reveals that majority of the respondents perceived the solar cooker as simple, somewhat profitable, somewhat compatible and somewhat observable which had helped the respondents to perceive the attributes correctly. It is being somewhat profitable can be justified In support of the fact that most of the respondents used non-commercial fuel due to its free availability which might have led them to feel it as somewhat profitable. As regards other characteristics like simplicity, complexity and observability, probably the repeated demonstrations had helped the respondents to perceive the functioning of the cooker in totality and responded this as somewhat compatible. The percentage of respondents perceived it as somewhat observable is 34.93 %.

Thus it was concluded that the training programme has created a positive attitude in the minds of the rural women who were totally unaware about the solar cooker prior to the training.

The co-efficient of correlation study on attitude towards solar cooker indicated that independent socio-economic variables such as age, caste and education have

Table 1: Socio-economic profile of the respondents

Attributes	District-I (n=207)	District-II (n=208)	Total (n=415)
Age (years)			
20-35	107 (25.78)	125 (30.12)	232 (55.90)
35-50	100 (24.09)	83 (20.0)	183 (44.09)
Family type			
Nuclear	90 21.68)	134 (32.29)	224 (53.97)
Joint	117 (28.19)	74 (17.83)	191 (46.02
Education			
Illiterate	96 (23.13)	95 (22.89)	191 (46.02)
Below high school	92 (22.16)	89 (21.44)	181 (43.61)
High school and above	19 (4.58)	24 (5.78)	43 (10.36)
Monthly Income (Rs)			
Upto 2000	89 (21.45)	98 (23.61)	187 (45.06)
2001-4000	73 (17.59)	60 (14.45)	133 (32.04
4001-6000	31 (7.47)	26 (6.26)	57 (13.73)
6001 and above	14 (3.37)	24 (5.78)	38 (9.15)
Occupation			
Service Holder	5 (1.2)	10 (2.4)	15 (3.61)
Laborer	68 (16.38)	62 (14.93)	130 (31.32)
Self-employed	21 (5.06)	31 (7.46)	52 (12.53)
Caste			
Other caste	134 (32.29)	128 (30.84)	262 (63.13)
SC	42 (10.12)	58 (13.97)	100 (24.09)
ST	31 (7.47)	22 (5.3	53 (12.77)
Marital status			
Married	184 (44.33)	187 (45.06)	371 (89.39)
Divorce/separation	5 (1.2)	8 (1.92)	13 (3.13)
Widow	18 (4.33)	13 (3.13)	31 (7.46)

(Figures in the parenthesis indicate percentage)

Table 2 : Attributes of solar cooker as perceived by the respondents.

S. N.	Attributes	Frequency (n=415)	Percentage
A.	**Simplicity-complexity**		
i	Very easy to understand and use	34.	8.19
ii	Easy to understand and use	185	44.57
iii	Neither very easy nor difficult to understand and use	123	29.63
iv	Difficult to understand and use	54	13.01
v	Very difficult to understand and use	19	4.57
B.	Profitability		
i	Most profitable	17	4.09
ii	Profitable	128	30.84
iii	Somewhat profitable	166	40.00
iv	Least profitable	98	23.61
v	Not at all profitable	6	1..44
C.	**Compatibility**		
i	Most compatible	18	4.33
ii	Compatible	61	14.69
iii	Somewhat compatible	207	49.87
iv	Least compatible	118	28.43
v	Not at all compatible	11	2.65
D.	**Observability**		
i	Most observable	56	13.49
ii	Observable	108	26.02
iii	Somewhat observable	145	34.93
iv	Least observable	77	18.55
v	Not at all observable	29	6.98

significant relationship with attributed (Table3).

A further analysis of the Table 3 reveals that age and caste were significantly related with different perceived attributes of solar cooker such as simplicity, complexity, profitability, compatibility and observability. However, education was found to be significantly related with profitability and compatibility but did not maintain any significant relationship with simplicity-complexity and observability.

Thus with increase in age of the respondents their positive attitude towards solar cooker increases. Similar type of relationship is also observed in upper caste.

Awareness on benefits of solar :

Most of the people are unaware of the solar cooking methods. There are various doubts about its use even in the minds of educated mass. There is no exception for rural women. Hence, it is necessary to change their attitude, to increase awareness and to motivate them to use this abundant natural resource for benefit of our nation. The data pertaining to awareness of respondents about the benefits of solar cooker after the training programme is presented in the Table 4.

Respondents' knowledge about the solar cooker was noticed to be almost nil prior to the training. It is clearly

Table 3: Relationship of socio-personal variables with perceived attributes of solar cooker.

Socio-personal characteristics	Attributes of solar cooker			
	Simplicity complexity	Profitability	Compatibility	Observability
Age	0.91*	0.74*	0.96*	0.91*
Caste	0.73*	0.74*	0.85*	0.81*
Education	0.12*	0.85*	0.77*	0.68

*Significant correlation

Table 4: Awareness on benefits of solar cooker after the training programme

Benefits	Frequency		
	Dist-1(n=207)	Dist-II (n=208)	Total (n=415)
Noble way of cooking	124 (29.88)	85 (20.48)	209 (50.36)
No fuel consumption	96 (23.13)	67 (16.14)	163 (39.27)
Pollution free coking	149 (35.9)	203 (48.91)	352 (84.81)
Easy to clean the utensils	137 (33.01)	104 (25.06)	241 (58.07)
Utilization of available natural resources	188 (45.3)	209 (50.36)	397 (95.66)
Problem of collection and storage is eliminated	71 (17.10)	58 (13.98)	129 (31.08)

(Figures in the parentheses indicate percentage)

revealed from the Table 4 that majority of respondents were aware about the benefits like utilization of available natural resources (95.66 %), pollution free cooking (84.81 %), Benefits which were known to a sizeable portion of the respondents were easy to clean the utensils (58.07 %) and noble way of cooking (50.36 %). However, the awareness with regards to benefits like 'no fuel consumption' and 'problem of collection and storage is eliminated' was found to be possessed by 39.27 % and 31.08 % respondents.

Analysis of data revealed that Dist-I has a higher increase in awareness on benefits of solar cooker than Dist-II after the training programme.

Since knowledge is a prerequisite for adoption of any improved technology, gain in awareness through training would motivate them to change their attitude about solar cooking.

Attitude of rural women in relation to future applicability

In order to asses the attitude of rural women in relation to future applicability of solar cooker, the respondents were asked regarding their ability to apply this fuel conservation technology in future as felt by them. Their responses were quantified in terms of ease and difficulty they foresee for the applicability of solar cooker.

The data in Table 5 reveals that about 45.54 per cent and 32.28 per cent respondents expressed that solar cooker' could be used without difficulty', and 'with somewhat difficulty' respectively. Only about 9.63 per cent said that it 'could be used with difficulty' whereas 12.53 per cent were quite strong to opine that this could not be used by them. Out of total respondents who expressed that this 'could be used without difficulty', majority (42.40 %) had favorable and 3.13 % remain neutral but none remarked it as unfavorable. Contrary to it those who had expressed difficulty in its use and said that it could not be used, were reported to have unfavorable attitude, 7.95 % and 10.12 %, respectively. Further look at the Table 5 reveals that total women respondents who had developed favorable attitude were 57.01 % and neutral attitude 9.15 % as against unfavorable

Table 5: Attitude of rural women in relation to the future applicability of solar cooker.

Attitude	Future applicability of solar cooker				
	Could be used without difficulty	Could be used with somewhat difficulty	Could be used with difficulty	Could not be used	Total
Favorable	176 (42.40)	61 (14.69)	-	-	237 (57.01)
Neutral	13 ((3.13)	8 (1.92)	7 (1.68)	10 (2.4)	38 (9.15)
Unfavorable	-	65 (15.66)	33 (7.95)	42 (10.12)	140 (33.73)
Total	189 (45.54)	134 (32.28)	40 (9.63)	52 (12.53)	415 (100)

(Figures in the parentheses indicate percentage)

attitude 33.73 %. These findings are in line of the study conducted by Kaushik *et.al.* (1994) and Mohanty, M. (2000)

From the analysis of the data, it can be concluded that the limitation of solar cooker such as its inability to cook food in rainy season and winter, taking considerably long time to cook food, its high cost etc., might have affected its acceptance by rural women. However, some improved ways and means have to be found out and vigorous attempt is required to take full advantage of this technology which harnesses renewable energy.

Authors' Affiliations

SUSMITA MOHANTY, Dept. of Family Resorce Management, College of Home Science, Orrisa University of Agriculture and Technology, BHUBANESWAR (ORISSA) INDIA

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