BARRIERS IN ADOPTION OF RENEWABLE ENERGY APPLIANCE BY RURAL HOUSEHOLDS OF DANTIWADA TALUKA OF BANASKANTHA DISTRICT

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ABSTRACT

Barriers in adoption of renewable energy appliance by rural households of Dantiwada Taluka India is ranked fifth largest in the world in terms of power generation portfolio. High targets are set through make in India i.e., 175 GW of renewable power by 2022. At present Renewable energy contributes only 14.7% of the total installed capacity in the country. More could be achieved if adoption of renewable energy appliance is promoted and barriers are overcome at household level also. The present study was carried out in rural households of Dantiwada Taluka, Gujarat state; to find out the barriers in utilization of Renewable Energy appliances as alternative source of energy. The researcher identified and ranked the five major barriers in adoption of renewable energy appliances. The inadequate information, lack of incentives and failure of the market to value the public benefits of renewable appliances are the top three barriers. Gujarat has abundant animal resource for biogas plant and receives abundant radiant energy from sun as it is located in Tropic of Capricorn Sun Belt of the earth. Thus there remains wide scope for increasing household usage of renewable energy. This paper may help regulators and academician focuses their future efforts in adoption of renewable energy appliances in Gujarat. Further, this understanding may be helpful in framing the policies and strategies towards adoption of renewable energy appliances.

Keywords : *adoption, renewable energy and barriers*

INTRODUCTION

Renewable energy, at present contributes only 14.7% of the total installed capacity in the country. High targets are set through make in India i.e., 175 GW of renewable power by 2022. According to the 66th round of consumer Expenditure Survey 2009-10, 76 per cent of the households in rural areas still use firewood as the primary cooking fuel and 33.54 per cent of the households in rural areas use kerosene as primary lighting fuel.

Access to efficient and modern energy is extremely crucial for the developing nations to counter the economic and health issues and at the same time with the productive use of energy increase the economic growth and life standard of the people. Meeting the demand for households' energy is not an end in itself but there is need for proper energy management that takes into consideration the satisfaction of the basic human needs through economically feasible, energy efficient, environmentally sound and viable options. These are possible only if one knows the real picture of consumption pattern in rural households. Hence, the present study was conducted with following objective

OBJECTIVES

(a) To know the selected personal and socio economic characteristics of the respondents of rural household

(b) To find out the barriers in utilization of renewable energy appliances as alternative source of energy

METHODOLOGY

The present study was carried out in ten villages (Jorapura (12), Godh (15), Dantiwada (28), Marwada (10), Bhadali (18), Dhaniyawada (17), Sikariya (14), Chodungri (10), Kotha (11) and Nandotra (25)) of Dantiwada Taluka of Gujarat State from November 2013 to May 2016. Multistage (three stages) random sampling procedure was followed to collect the data. A representative sample of 160 households was selected for the study.

Independent variable such as village, caste category, family type, family size, type of house, family income, land

holding, family occupation, family education and mass media exposure (as per Bhati, 1985) was studied. Barriers in adoption of renewable energy were taken as dependent variable.

A pre-structured interview scheduled was developed to collect the data for measurement of dependent and independent variables. The collected data were classified and tabulated keeping in view the objectives of the study and were analyzed by applying following statistical tools (Sahu, 2010).

RESULTS AND DISCUSSION

After analyzing the data related to socio-economic characteristics of the respondents, the results obtained are shown in Table1.

Table1: Distribution according to socio-economic and communicational characteristics of head of family of the household n=160

Variables	Frequency (%)
Caste Category	
General	14(8.75)
SEBC	135(84.5)
SC/ST	11(6.75)
Family Income	
Low (<1,50,000)	55(34.75)
Medium(1,50,001- 3,00,000)	94(58.75)
High (>3,00,001)	11(6.50)
Land Holding	
Marginal (<1 ha.)	32(20)
Small (1-2 ha.)	59(36.75)
Medium (2.01-4 ha.)	65(40.75)
Large (>4.01 ha.)	4(2.5)
Type of Family	
Joint family	57(35.25)
Nuclear family	103(64.75)
Family Size	
Small (2-4 members)	71(44.25)
Medium (5-7 members)	66(41.25)
Large (> 8 members)	23(14.5)
Mass Media Exposure	
Low (5-8)	104(65.5)
Medium (9-12)	47(29.25)
High (13-16)	9(5.25)
Education of Head of family	
Illiterate	93(58.25)
Primary	56(35)
Secondary	03(1.75)
Higher Secondary	08(5)
Type of House	
Semi Kaccha	89(55.25)
Pucca	71(44.75)

It was inferred from the table1 that 84.5 per cent of the respondents belonged to SEBC caste category, 44.25 were having small family size, 58.75 per cent were having medium income, 65.5 per cent were having low media exposure, 40.75 per cent were having medium land holding, 58.25 per cent were illiterate, 64.75 per cent belonged to nuclear family type and 55.25 were living in semi kuccha house.

Forms of energy available at rural household

It was inferred from the Table2, that cent per cent of the household was having electricity. Similar findings were reported by The Central Electricity Authority that rural Gujarat has 90-99 per cent of electrification. (CEA, 2013)

Further it was found that 90.25 per cent of the household were having firewood, 57.5 per cent were having agricultural residue, 35.25 per cent were having LPG, 21.75 per cent were having kerosene and 8.75 per cent were utilizing cattle dung. None of the household were having community bio gas plant neither were having any of solar appliance such as cooker and heater.

Table 2: Distribution of rural household according to availability of form of energy n=160

Commercial energy source	Frequency (%)	Non Commercial energy source	Frequency (%)	Renewable Energy source	Frequency (%)
Electricity	160 (100)	Firewood	145 (90.25)	Biogas	0 (0)
L P G	57 (35.25)	Agriculture residue (crop residue and saw dust)	92 (57.5)	Solar Energy Appliance (solar cooker/ solar heater)	0 (0)
Kerosene	35 (21.75)	Cattle Dung	14 (8.75)		

Barriers in utilization of renewable energy appliances as alternative source of energy

It is evident from the Table3 that 58.25 per cent of respondents were unaware about availability of solar appliance for household use. About 18.25 per cent assumed that handling of household solar appliance might be difficult. For biogas, 70.75 per cent of the respondents thought it to be difficult in handling.

Almost similar findings were quoted by (Ghosh et al. 2002; Chandrasekhar and Kandpal 2007; USAID 2006) that the reason for less/ no adoption of solar energy were the pricing policies of the government i.e., low electricity prices for households and agriculture, high start-up costs, uncertainties about the benefits of investments and lack of awareness

Table3: Distribution of respondents according to barriers in utilization of renewable appliance n=160

Sr. No.	Reasons for non utilization	Solar appliance	Biogas	The Barriers
		Frequency (%)	Frequency (%)	
1	Cost	17 (10.25)	11 (6.75)	Lack of incentives
2	Unavailability	09 (5.75)	24 (15)	Failure of the market to value the public benefits
3	Unawareness	93 (58.25)	00 (0)	Inadequate information
4	Handling Difficulty	29 (18.25)	113 (70.75)	Management problem
5	Process Complicated	12 (7.5)	12 (7.5)	Dependency of weather or others

Researches (Moorthy, 1990) show that the solar cooker can be used only on days when adequate sunlight is available and only at such times when solar insolation is sufficient (even in summer when clouds cover the sun, food may turn out to be half cooked). Thus, during the monsoon season, it is not possible to make use of the solar cooker. Also, there is a need for a convenient south facing terrace (which is the direction of the sun). Solar cooker takes much longer to cook and that too within the kitchen premises. Also, cooking can be done only at specific times (depending on the sun). Further, it is not possible to use it for frying or for making "rotis."

On the basis of reasons given by respondents the barriers were identified. It can be said that lack of incentives, Failure of the market to value the public benefits, inadequate information, Management problem and Dependency of weather or others are the main barriers in adoption of renewable source of household appliances

CONCLUSION

Gujarat has abundant animal resource for biogas plant and receives abundant radiant energy from sun as it is located in Tropic of Capricorn Sun Belt of the earth. Thus there remains wide scope for increasing household usage of renewable energy. The attempts should be made to overcome the barriers to enhance adoption of renewable appliances.

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Received : September 2017 : Accepted : November 2017