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Research Paper

Assessing the awareness of solar lighting gadgets among rural people of Uttarakhand

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■ **ABSTRACT :** Close to 70 per cent of India's population lives in villages. Even today, 80,000 villages in India have never been electrified. Even the electrified villages suffer from scanty power supply. This situation exist more in hill areas where there is scanty source of electricity. Even the government admits that decentralized renewable energy solutions have to be deployed in large numbers in rural areas of mountain and plain region to deprive the last mile connectivity for un-electrified areas. They can turn to a bright new phase in their life if solar power solutions could be made available in all these deprived areas. For this it is very essential that people are aware of solar lighting gadgets. Present study was conducted to assess the awareness of hilly respondents regarding solar lighting gadgets and to see the association between educational level of the respondents and their awareness level about solar energy. For this Chi-square test was applied and the results were found to be significant at $p<0.05$, indicating that educational level of respondents affect their awareness of solar energy and use of solar energy.

■ **KEY WORDS:** Solar energy, Solar lighting gadgets, Awareness level, Education level

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Close to 70 per cent of India's population lives in villages. Even today, 80,000 villages in India have never been electrified. Even the electrified villages suffer from scanty power supply. This situation exist more in hill areas where there is scanty source of electricity. At least one-third of the Indian population lives below the poverty line. With no electricity, rural India is left with no choice but to resort to using non-renewable forms of energy such as coal and kerosene. Even the government admits that decentralized renewable energy solutions have to be deployed in large numbers in rural areas of mountain and plain region to deprive the last mile connectivity for un-electrified areas. This is where solar power solutions, whether individual home lighting systems or village-level micro-grids can provide the solution which is simple, immediate, and cost-effective. It goes without saying that without electricity, large parts of rural India both mountain and plain is literally living in darkness even today. They can turn to a bright new phase in their life if solar power solutions could be made available in all these deprived areas.

Present study was planned with the objective to assess the awareness of hilly respondents regarding solar lighting gadgets and to see the association between

educational level of the respondents and their awareness level about solar energy.

■ RESEARCH METHODS

A bench mark survey was carried out by investigator. The multi-stage, purposive cum random sampling techniques was used to select the study area *i.e.* state, districts, blocks, villages and families. The Uttarakhand state was selected purposively. Districts Almora and Nainital were selected purposively. Hawalbag block and Bhimtal block from districts Amora and Nanital, respectively were selected purposively. The unit of enquiry was family and the key informant was head of the family. Total sample size comprised of 120 families selected randomly from the four villages which were selected purposively from the above blocks. To assess the awareness of the respondents regarding solar energy, solar lighting, its availability, benefits, and subsidy on it and important facts about solar lighting gadgets an awareness scale was developed. The awareness of rural people regarding solar light was measured on the basis of awareness scale. All the responses received on the data sheet were categorized and analysed using both descriptive and the rational statistics including frequency, percentage and Chi-square test.

■ RESEARCH FINDINGS AND DISCUSSION

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads :

Awareness among respondents regarding solar light:

Awareness among respondents regarding solar energy, solar lighting, its availability, benefits, and subsidy on it and important facts about solar lighting gadgets were summarized in Table 1 and graphic representation was shown in Fig. 1.

Table 1 : Awareness level of respondents regarding solar lighting **(n=120)**

Statements	Income groups						Total	
	Lower		Middle		Upper			
	Aware	Not aware	Aware	Not aware	Aware	Not aware	Aware	Not aware
About solar energy	0(0)	43(100)	4(7.27)	51(92.72)	22(100.0)	(0)	26(21.66)	94(78.33)
Solar energy used for lighting purpose	0(0)	43(100)	0(0)	55(100)	8(36.36)	14(63.63)	8(6.66)	112(93.33)
Solar energy is converted into electrical energy	6(13.95)	37(86.04)	11(20)	44(80)	17(77.27)	5(22.72)	34(28.33)	86(71.67)
Solar lighting gadgets use solar photovoltaic cell	0(0)	43(100)	4(7.27)	51(92.72)	14(63.63)	8(36.36)	18(15.0)	102 (85.0)
About solar lantern	0(0)	43(100)	0(0)	55(100)	8(36.36)	14(63.63)	8 (9.6)	112 (90.4)
About solar home lighting system	0(0)	43(100)	4(7.27)	51(92.72)	14(63.63)	8(36.36)	18(15.0)	102 (85.0)
About solar torch	0(0)	43(100)	0(0)	55(100)	5(22.73)	17(77.27)	5 (4.17)	115 (95.83)
Solar energy gadgets available in market	0(0)	43(100)	4(4.72)	51(92.72)	14(63.63)	8(36.36)	18(15.0)	102 (85.0)
About Akshay Urja shop	0(0)	43(100)	0(0)	55(100)	2(9.10)	20(90.90)	2 (2.4)	118 (97.6)
About UREDA	0(0)	43(100)	1(18.18)	54(98.18)	3(13.63)	19(86.36)	4 (4.8)	116 (95.2)
About UREDA office of your district	0(0)	43(100)	0(0)	55(100)	2(9.10)	20(90.90)	2 (2.4)	118 (97.6)
Any government subsidies on solar energy	0(0)	43(100)	0(0)	55(100)	0(0)	22(100)	0(0)	120(100)
Solar lantern is easy to use and operate	0(0)	43(100)	0(0)	55(100)	8(36.36)	14(63.63)	8(6.66)	112(93.33)
Solar lantern is portable and light weight	0(0)	43(100)	6(10.90)	49(89.09)	17(77.27)	5(22.72)	23(19.16)	97 (80.83)
Solar lantern does not require electrical wiring	0(0)	43(100)	7(12.72)	48(87.27)	19(86.36)	3(13.63)	26(21.66)	94 (78.33)
After the initial one time investment on the solar lighting system the power is free	0(0)	43(100)	0(0)	55(100)	8(36.36)	14(63.63)	8(6.66)	112(93.33)
Solar lighting save your electricity bills	0(0)	43(100)	5(10)	50(90)	15(68.18)	7(31.82)	12(10)	108 (90)
Solar light is 100% safe and 100% pollution free	0(0)	43(100)	0(0)	55(100.0)	19(86.36)	3(13.63)	3(2.500)	117 (97.50)
Solar light reduces the risk of fire accidents	0(0)	43(100)	0(0)	55(100.0)	6(27.27)	16(72.72)	6 (7.200)	114 (92.80)
Using solar energy resources would decrease the use of fossil fuels	0(0)	43(100)	1(1.81)	54(98.18)	14(63.63)	8(36.36)	15(18.00)	105 (82.00)
Using solar energy resources would remove the negative effects of the greenhouse gasses	0(0)	43(100)	0(0)	55(100.0)	22(100.0)	0(0)	22(18.33)	98(81.66)
Solar energy is stored in sealed and maintenance free battery	0(0)	43(100)	0(0)	55(100.0)	14(63.63)	8(36.36)	14(11.66)	106(88.33)

*Figure in parentheses indicate the percentage value

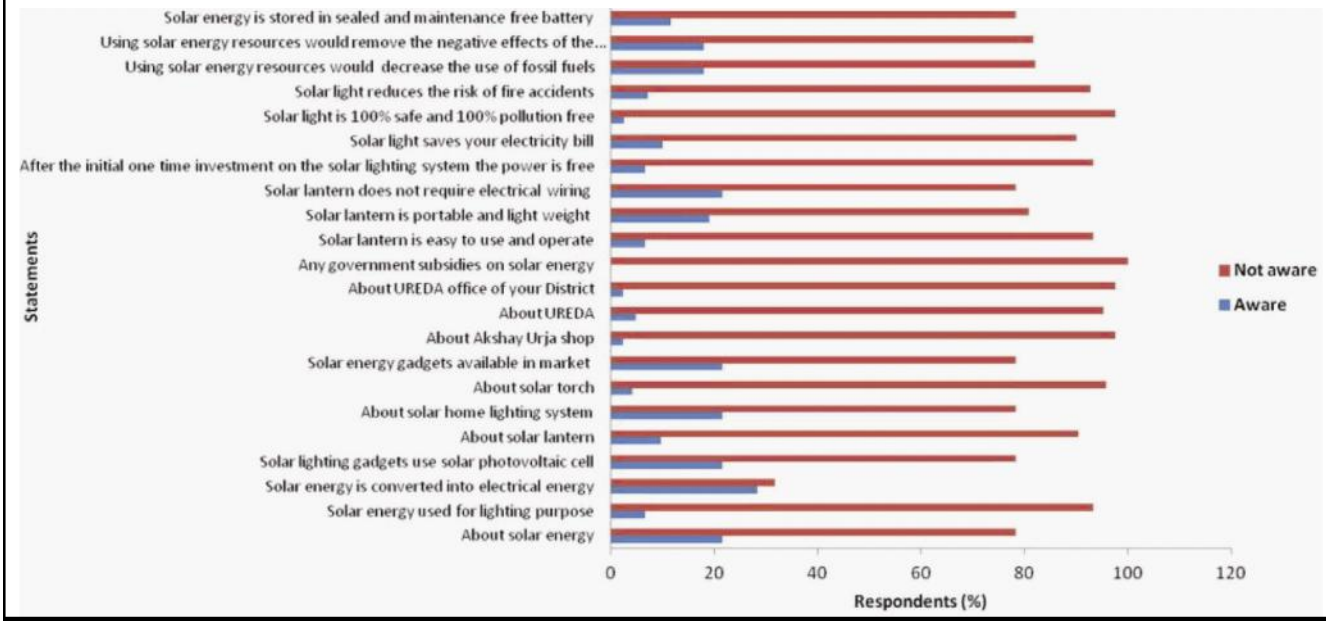

Fig. 1 : Awareness amomg respondents regarding solar light

It was found that more than 75per cent respondents were unaware about the solar energy, solar lighting, its availability, benefits and subsidy on it and important facts about solar lighting gadgets. About 28 per cent respondents were aware about the fact that solar light is converted into electricity. From lower income group about 14 per cent and from middle income group about 77 per cent respondents were aware about this fact, respectively. It was found that about 15 per cent respondents were aware about solar energy and solar photovoltaic cells which convert solar light into electricity and also aware about the solar home lighting system and availability of solar light. It was observed that those who knew above facts most of them belonged to upper income group. Data in the table further reflected that less than 3 per cent respondents were aware about solar home lighting system, Akshay Urja shop, UREDA office in their districts and those who knew this also were from upper income group. It was analyzed that among lower income group none of them were aware about any fact related to solar lighting including its availability, importance, benefits and subsidy given on it and only 13.95 per cent respondents knew that solar energy is converted into electricity. Further it was observed that only 9.6 per cent respondents were aware about solar lantern and all of them belonged to upper income group.

Towards the lean side, Fig. 1 shows that just 10 per cent respondents or less than that, new about facts that solar energy is stored in sealed and maintenance free battery, solar light reduces the risk of fire accidents, solar light is 100 per cent safe and 100 per cent pollution free, solar light saves families electricity bills, that after the initial one time investment on the solar lighting system the power is free, solar lantern is easy to use and operate/ government give subsidies on solar energy, UREDA office of district, about functions/role of UREDA, about akshay urja shop, about solar torch, solar lantern/ multipurpose lamp and about the fact solar energy is used for lighting purpose.

Chi-square test was applied to see the association between educational level of the respondents and their awareness level about solar energy and solar light and

Table 2 : Hypothesis testing

Null hypothesis	p-value
There is no association between awareness of respondents regarding solar energy and their educational level	1.82E-16
There is no association between educational level of respondents and their awareness that solar energy is converted into electricity	0.002562306
There is no association between the educational level of respondents and use of solar light.	1.31715E-14

*indicates significance of value at P=0.05 level

use and importance of solar light. The results are presented in the Table 2. The results were found to be significant at $p<0.05$, indicating that awareness regarding solar energy, fact about solar energy and use of use of solar light depend on the educational level of respondents. It revealed that use of solar light was found more among educated people. The reason may be that highly educated used to earn better and hence can afford to use solar gadgets. Similar work related to the present investigation was also carried out by Barki *et al.* (2008); Connette (2009); Krishnadas (2012) and Radhakrishana *et al.* (2010).

Conclusion:

From the whole, it was concluded that only few people were about solar energy and solar lighting especially in lower income and middle income group. The reason of this might be due to low level of education. One more reason of this might be lack of government and non government programmes initiated in these areas to create awareness and promotion of adoption of solar lighting.

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