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Socio-Economic Benefits of Solar Energy

Economics

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ABSTRACT

Energy expenditure is the one most important domestic expenditure of a family. Thus is wise to have alternative energy source which is having both economical and social benefits. In this context renewable energy, mainly solar energy fulfills the both the conditions. In light of the above, the present paper analyses the empirical evidence of domestic sector solar energy users and the economic benefits and other perceived benefits after using solar energy.

Introduction:

The important domestic areas of expenditure are on food, energy, clothing, health, education, foot wear, communication, information, tours, travels, entertainment, cosmetics, rent, sports etc. Among all kind of family expenditure it is the food expenditure takes the first place and then energy expenditure. It is still intelligent if the expenditure control and reduction is environment friendly. In this context renewable energy fulfills the both the condition. Therefore, across the globe it is becoming a priority for all nations to focus more and more on the use of renewable resources like solar energy, wind energy etc. Those are not only goof for nature but also good in reducing the domestic expenditure of a family.

Objectives:

The present paper mainly focuses on; find out average and sources of annual income of the households; different heads and amount of domestic expenditure; economical and social benefits of using solar energy.

In light of the above, the present paper analyses empirical evidence of domestic sector. The survey was mainly confined to Dharwad and Bijapur cities of Karnataka State.

Sources of the Annual Income of the Sample Households:

The Table 1 reveals that the average annual income of the respondent households in Dharwad and Bijapur study areas was highest for those involved in salary employment compared to those households with other sources of income. The average annual salary income of the respondent households was Rs. 2,01,130 in Dharwad and Rs. 2,09,048 in Bijapur. The average annual income of the household involved in self employment in non-agricultural occupation was Rs. 64,940 in Dharwad and Rs.1,10,080 in Bijapur followed by the average annual household income of those engaged in agriculture, it was Rs. 8,500 in Dharwad and Rs. 16,200 in Bijapur. Average annual income of the households from other sources was Rs. 52,966 in Dharwad and Rs.12, 520 in Bijapur. The lowest average annual household income was from those who engaged in agricultural labour; it was Rs. 600 in Dharwad and Rs. 10,000 in Bijapur. There is a significant difference in the average annual income of the households belonging to different occupational groups.

Table 1
Average Annual Household Income by Different Sources (Rupees)

Sources of Income	Dharwad	Bijapur	Total
Agriculture	8500	16200	12350
Casual Wage Employment in Agriculture	600	10000	8000
Self Employment in Non-Agriculture	6494	110080	87510
Salaried Employment	201130	209048	205089
Others	52966	12520	32743
All	328136	357848	342992
Source: Primary Survey			

Heads of Annual Households Expenditure:

In Table 2 compared the ratios of different type's domestic expenditure with the total domestic expenditure of the respondent households in both the cities of Dharwad and Bijapur together. Food expenditure is the highest that was 28.18 percent (Rs.43,582), followed by energy expenditure 18.87 percent (Rs.29,186), which means food and energy expenditure together account nearly 50 percent of total domestic expenditure in the study area. Similar trend can also be found in both the cities, in Dharwad and Bijapur. Food expenditure accounts to 27.91 percent (Rs.42,380) and 28.44 percent (Rs.44,783) respectively followed by energy expenditure in Dharwad 20.08 percent (Rs.30,486) and in Bijapur 17.71 percent (Rs.27,886). Remaining 50 percent of domestic expenditure was covered by education, clothing, foot-wear, tours and travels, health etc. Thus it is inferred that energy expenditure is one of the major domestic expenditure of the respondent households in the study area.

Table 2
Distribution of Average Domestic Expenditure by Sources (Percentage)

Sources of Expenditure	Dharwad	Bijapur	Total
Food	27.91	28.44	28.18
Clothing & Foot Wear	6.54	10.75	8.68
Energy	20.08	17.71	18.87
Education	12.22	17.37	14.84
Health	5.99	5.71	5.85
Communication & Information	5.91	5.41	5.66
Tours & Travels 6.33 6.31 6.32			
Entertainment (Recreation)	2.25	2.20	2.22
Cosmetic & Toiletries	3.30	3.03	3.16
Rent	0.90	0.65	0.77
Sports	0.16	0.42	0.29
Miscellaneous	8.40	2.00	5.14
All	100 (151847)	100 (157444)	100 (154646)
Note: Figures in thebrackets indicate the actual data in rupees Source: Primary Survey			

Expenditure on Different Energy Sources:

Energy expenditure is one of the major domestic expenditures. Thus, it is important to know that the expenditure incurred on different energy sources. The study has revealed significant trends about the household expenditure on different sources of energy in comparison with average annual household income. It is found that the respondent households have been spending major part of their energy expenditure on petrol/diesel (55.05 percent) followed by expenditure on electricity (27.01 percent), gas (16.76 percent).

Some other important significant trends of expenditure on different source of energy are; annual expenditure on electricity of 21.6 percent constituted Rs. 8,412 of the total energy expenditure of the Dharwad households covered by the study. Similarly the annual expenditure on electricity by the households of 26.3 percent represented Rs. 7,356 of the total energy expenditure of the respondent households in Bijapur. The total annual expenditure on electricity of 27 percent accounted for Rs. 15,768 of total energy expenditure in two cities.

Annual Expenditure on gas at 15.7 percent accounted for Rs.4,800 of the total energy expenditure of the households in Dharwad. Similarly, the annual expenditure of 17.8 percent on gas per household in Bijapur constituted Rs.4,986 of total energy expenditure. The total expenditure on gas annually by the households in both the cities at 16.7 percent accounted for Rs. 9,785 of total energy expenditure.

The average value of expenditure on different sources of energy by the household in Dharwad comes to 27.60 percent (Rs.30,486) and in Bijapur it was 26.37 percent (Rs.27,886). The average value for the household expenditure on different sources of energy in Dharwad and Bijapur together comes to Rs.29,186. The expenditure on individual sources of energy in the two cities does not show substantial variation. The following table provides the details.

The following Table 3 shows the expenditure incurred by the respondent households on different energy sources. It shows that household's energy expenditure is highest on petrol and diesel and followed by electricity, hence it is concluded that electricity expenditure is more than other energy expenditure.

Table 3
Distribution of Average Energy Expenditure by Sources (Percentage)

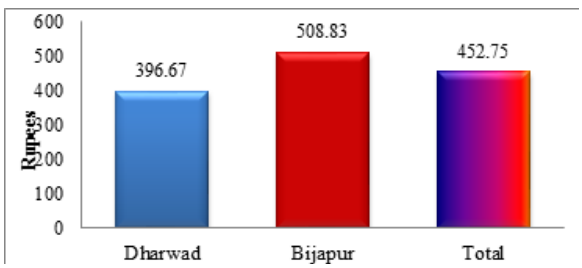
Energy Source	Dharwad	Bijapur	Total
Electricity	27.60	26.37	27.01
Solar	0.08	0.37	0.21
Gas	15.75	17.87	16.76
Kerosene	0.07	0.38	0.22
Petrol / Diesel	56.29	53.68	55.05
Cow-Dung & Wood	0	0.27	0.14
Others	0.23	1.01	0.61
All	100 (30486)	100 (27886)	100 (29186)
Note: Figures in the brackets indicate the actual data in rupees Source: Primary Survey			

Economical Benefits of Using Solar Energy:

Change in the Total Domestic Expenditure of the Household:

The figure 1 shows that solar energy has immense benefits for the users as it can be harnessed without any regular payment as in the case of electricity consumption. Hence the respondent household users of solar energy have been saving Rs.396.67 per month in Dharwad and Rs.508.83 per month in Bijapur. Thus solar energy is serving both the purpose of saving in expenditure on energy and also uninterrupted supply of the same.

Figure 1
Reduction in Per Month Energy Expenditure after Using Solar Energy
(Rupees)



Source: Primary Survey

The field study has revealed that the maximum of 45.50 percent of the respondent households using solar energy have been able to reduce energy expenditure of Rs.251-400 per month in the study areas of Dharwad and Bijapur. A substantial number of others constituting 31 percent have been saving more than Rs.551 per month followed by 21 percent of respondents saving Rs.401-550 per month and 2.5 percent of the respondents saving less than Rs.250 per month due to use of solar energy. Economy in the cost of energy use is the major advantage in the use of solar energy (Table 4).

Table 4
Scale of Reduction in Total Energy Expenditure Due to Use of Solar Energy

(Percentage)			
Scale of Reduction	Dharwad	Bijapur	Total
Rs.≤250	4	1	2.5
Rs.251-400	67	24	45.50
Rs.401-550	14	28	21
Rs.551+	15	47	31
All	100	100	100
Source: Primary Survey			

Change in the Electricity Expenditure of the Household:

To analyze a change in the per month electricity expenditure after starting the use of solar energy systems by the sample households, the data pertaining to only users of solar lighting systems are taken. Because the use of solar lighting system will have more effect on the normal monthly electricity bill and also; the use of solar lighting systems and electricity expenditure are inversely related. But only 24 sample respondents are using solar lighting systems in both the cities together, in those users' 19 households are from Dharwad city and only 5 households are from Bijapur city.

The figure 2 reveals that the average reduction in electricity expenditure per month has been Rs.319.30 as mentioned by the respondent households in Dharwad after using solar system. The average per month reduction in expenditure on electricity after using solar system has been Rs.241.67 as indicated by the respondent households in Bijapur. The data implies relatively more use of solar lighting systems by the respondent households in Dharwad compared to those in Bijapur.

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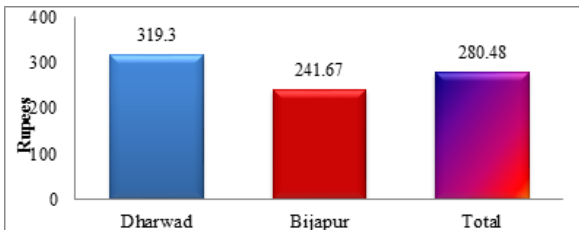
Figure 2
Reduction in Per Month Expenditure on Electricity after Using Solar Energy (Rupees)



Source: Primary Survey

The maximum number of 45.84 percent respondents have realizing the reduction in per month expenditure on electricity is less than Rs.250 after using solar lighting system followed by 33.33 percent respondents realizing a reduction in expenditure on electricity of Rs.251-400. Those realizing reduction in expenditure on electricity per month in the range of Rs.401-550 are found in Dharwad and Bijapur cities and their percentage is 21.05 and 20 percent respectively. Larger number of respondents in Dharwad and Bijapur realized reduction in expenditure per month on electricity in the range of less than Rs. 250 after using solar lighting system; the following Table 5 provides the details.

Table 5
Scale of Reduction in Expenditure per Month on Electricity after Using Solar System

(Percentage)

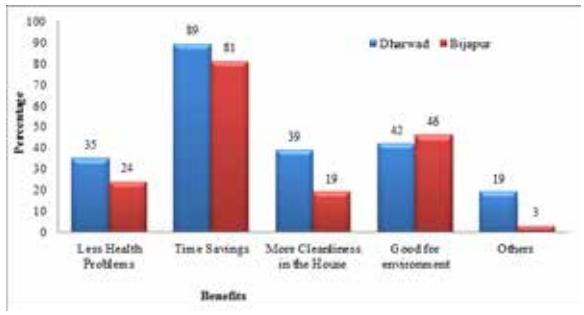
Scale of Reduction	Dharwad	Bijapur	Total
Rs.≤250	42.10	80	45.84
Rs.251-400	36.84	20	33.33
Rs.401-550	21.05	20	20.83
All	100 (19)	100 (5)	100 (24)

Note: the data in the brackets indicate the actual numbers.
Source: Primary Survey

Social Benefits of Using Solar Energy

The figure 3 shows the solar energy and its use and how they have multiple benefits for the consumers and also for the community. Among the important benefits of using solar energy is the lower incidence of health hazards, savings of time, cleanliness in the house and environmental safety, etc. Maximum number of 170 respondent users of solar energy had indicated the benefit of time savings in the use of solar energy followed by 88 respondents mentioning the environment friendly impact of the use of solar energy. A less number of 59 and 58 respondents in the two cities indicated the benefits of lesser health problems and cleanliness in the house due to the use of solar energy respectively.

Figure 3
Social Benefits of Using Solar Energy (Percentage)



Source: Primary Survey

Conclusion:

The analysis in this paper relate to the background study of the respondents about their domestic income and expenditure, the ratio of energy expenditure to their income and total expenditure etc. The focus of the study is on the use of solar energy by the respondents and social and economical benefits of using solar energy in the two study areas of Dharwad and Bijapur are also highlighted. It is found that the respondent households has highest energy expenditure is on petrol/diesel in both the study area followed by electricity, gas etc. By using solar energy in the households most are getting subsidy in their monthly electricity bills and it also felt by the respondents that their monthly total energy and electricity expenditure is decreased. Of the other social benefits the respondent households expressed that the use of solar energy saving their time and also felt it good for health and as well for environment. Due to these economic and social benefits most of the sample respondents have suggested for the use of solar energy.

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