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A Study on Rural Energy Consumption and Household Behaviour in Theni District

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Abstract

Energy plays a vital role in improving the standard of living and promoting the socio-economic development of rural households. The present study mainly focuses on the pattern of household energy consumption for cooking, lighting, and water heating purposes in rural areas. It also examines the factors responsible for changes in energy consumption and identifies the major difficulties faced by rural households in accessing and utilizing different sources of energy. The study is based on both primary and secondary sources of data. Primary data were collected from sample households selected through the random sampling method from different rural regions of Theni District. Percentage analysis and the Chi-Square test were employed to analyse the collected data. The findings of the study reveal a significant shift from traditional energy sources such as firewood, agricultural residues, and dung cakes to modern commercial energy sources like LPG and electricity. The study concludes that socio-economic progress, modernization, improved living standards, changing lifestyles, and the greater availability of commercial energy sources have considerably influenced and transformed the energy consumption behaviour of rural households in Theni District.

Keywords: Energy Household, Consumption, Electricity, Kerosene and LGP.

Introduction

Energy is one of the essential factors for the functioning of any civilized society and plays a vital role in improving the standard of living and socio-economic development of a nation. Energy consumption is important for various household activities such as cooking and lighting, but the pattern of consumption differs between rural and urban areas. In rural areas, people traditionally depended on firewood, agricultural residues, dung, dry leaves, kerosene, gas, and electricity, whereas urban households mainly relied on kerosene, gas, and electricity. In recent years, significant changes have been observed in rural energy consumption patterns. About four decades ago, rural households largely used dry leaves, plants, firewood, and agricultural residues for cooking and heating purposes. However, due to modernization, improved living standards, and better access to commercial energy sources, a majority of rural households now use gas and electricity for preparing food, boiling water, and other domestic purposes.

Important Of The Study

Energy consumption is one of the basic necessities of human life and plays a vital role in everyday household activities. Human life is unimaginable without energy, as it is essential for cooking food, heating water, lighting, and other domestic purposes. Rural households use different sources of energy such as firewood, agricultural residues, dung cakes, kerosene, gas, and electricity depending upon their availability, affordability, and socio - economic conditions. In recent years, the pattern of energy consumption in rural areas of Theni District has undergone significant changes. The shortage of firewood, rising cost of kerosene and cooking gas, lack of time for collecting traditional fuels, improved income levels, educational advancement, and changing lifestyles have influenced rural households to shift from traditional energy sources to modern forms of energy such as LPG gas and electricity. These changes reflect the impact of economic development, modernization, and government initiatives aimed at improving rural living conditions and access to clean energy sources.

Review of Literature

Aggarwal (2011) analysed the pattern of rural household fuel consumption in India and observed that socio-economic conditions, income level, and availability of commercial energy sources significantly influence household energy use. The study pointed out that rural households gradually shifted from traditional fuels such as firewood and agricultural residues to commercial energy sources like LPG and electricity due to modernization, urban influence, and improvement in living standards. The author also emphasized that government policies and rural electrification programmes played an important role in transforming rural energy consumption behaviour. Pant D.K. (2005) studied household kerosene consumption patterns and found that rural households depended heavily on kerosene for cooking and lighting due to limited access to electricity and modern fuels. The study highlighted that rising income levels, changing lifestyles, and increased availability of LPG reduced the dependence on kerosene over time. It further observed that lack of awareness, fuel cost, and irregular supply of commercial energy sources continued to create challenges for rural households. The study concluded that improving access to affordable and clean energy sources is essential for rural development and better living conditions.

Objectives Of The Study:

The specific objectives of the present study are:

1. To study the changes scenario of rural energy consumption.
2. To identify the causes of changes in the energy consumption and household behaviour in rural area in Theni district.
3. To find out the problems of rural energy consumption in Theni District.

Methodology

The present study was conducted in the rural areas of Theni District of Tamil Nadu. It consists of Five taluks, namely Theni, Andipatti, Periyakulam, Uthamapalayam, Bodinayakanur Taluks.The study gave equal importance of the five taluks irrespective of size of population, size of age and environment thus; twenty eight samples have been selected from each taluk. The total number of respondents is 140. The sample random

sampling method was used for data collection. The data collected from the both primary and secondary data and analyzed with appropriate statistical tools have been used.

Rural Energy Consumption In India

India is the second most populous country in the world after China and is characterized by vast ecological and geographical diversity. A major share of the Indian population, nearly 70 per cent, still resides in rural areas where agriculture and allied activities form the primary source of livelihood. Energy plays a crucial role in improving the quality of life and supporting rural economic development. However, meeting the energy requirements of rural households in a sustainable and efficient manner continues to be a major challenge for the country. Rural households largely depend on traditional sources of energy such as firewood, agricultural residues, and dung cakes for cooking and heating purposes. Rapid population growth, increasing pressure on natural resources, environmental degradation, rising fuel costs, and limited access to modern energy sources have intensified the rural energy crisis. Therefore, ensuring affordable, accessible, and clean energy for rural households has become an important objective for sustainable development and inclusive economic growth in India.

House Hold Rural Energy Consumption

The household sector is one of the major components of total energy consumption in India. According to national energy estimates, the household sector accounts for nearly 50 per cent of the total energy consumption in the country. A significant proportion of the population still resides in rural areas, where energy is required mainly for cooking, lighting, water heating, and other domestic activities. Since the present study focuses on rural households, it analyses the pattern of energy consumption for cooking and water heating purposes in the rural areas of Theni District.

The demand for household energy in rural areas is met through both commercial and non-commercial sources of energy. Commercial sources of energy include LPG gas, kerosene, and electricity, which are purchased from the market and widely used due to modernization and improved living standards. Firewood is also used extensively in many households, although its availability has declined in recent years. On the other hand, non-commercial sources of energy consist of dry leaves, sticks, plants, agricultural residues, and dung cakes, which are generally collected freely from farms, nearby fields, or common lands. These traditional sources are mostly used by economically weaker households due to their low cost and easy accessibility.

In recent years, rural energy consumption patterns have undergone considerable changes because of socio-economic development, rising income levels, urban influence, educational advancement, government welfare schemes, and increased awareness regarding clean energy use. Many rural households have gradually shifted from traditional fuels to modern energy sources such as LPG gas and electricity for cooking and heating purposes. This transition has not only improved household convenience and health conditions but has also contributed to environmental protection and sustainable rural development.

Changing Energy Consumption

People live in rural areas have been changing energy consumption and water heating for the last four decades in Theni District.

Table - 1

CHANGING ENERGY CONSUMPTION

Year	Fire wood	Agricultural residue	Dung	Kerosene	Gas	Electricity	Total & percentage
1980	100 (71.4)	18 (12.9)	12 (8.6)	10 (7.1)	-	-	140 (100)
1990	90 (64.3)	18 (12.9)	10 (7.1)	21 (15.0)	1 (0.7)	-	140 (100)
2000	67 (47.9)	13 (9.3)	7 (5.0)	14 (10.0)	36 (25.7)	3 (2.1)	140 (100)
2010	51 (36.4)	8 (5.8)	4 (2.7)	12 (8.7)	56 (40.0)	9 (6.4)	140 (100)
2022	46 (32.9)	7 (5)	3 (2.1)	11 (7.9)	63 (45.0)	10 (7.14)	140 (100)

Source: Compiled from the Field study.

It could be observed from the Table: 1. The changing energy consumption in rural areas for the last 42 years. It is seen that the number of fire wood users decreased from71.4 per cent in 1980 to 32.9 per cent in 2022. The percentage of agricultural residue users declined from 12.9 per cent in 1980 to 5 per cent in 2022.The number of respondents who use dung as energy decreases from 8.6 per cent in 1980 to 2.1per cent in 2022. The number of kerosene user's decreased from 7.1per cent in 1990 to 7.9 percent in 2022. It is important to note the number of respondents who use LPG increased from 0.7 per cent in 1990 to 45 per cent in 2022.The number of respondents who utilize electricity increased from 2.1 per cent in 2000 to 7.14 per cent in 2022 the study observes that people shift from non- commercial energy to commercial one and they use almost all types of energy in rural areas. The study also found that number of respondents who use gas (45 per cent) is more than fire wood (32.9 per cent) users in the study area. It shows the changing energy consumption in rural areas in current years.

Chi – Square Test For Energy Consumption Pattern

Chi-Square Formula

$$\chi^2 = \sum \frac{(O - E)^2}{E}$$

with (r-1).(c-1) degrees of freedom

where,

O = Observed frequency

E = Expected frequency

$$E = \frac{\text{Row total x Column total}}{\text{Grand Total}}$$

c = Number of columns in a contingency table

r = Number of rows in a contingency table

The Chi–Square test was applied to analyse the changes in the pattern of household energy consumption from 1980 to 2022. The null hypothesis stated that there is no significant difference in the pattern of energy consumption over the years, while the alternative hypothesis stated that there is a significant difference. The calculated Chi–Square value was 190.13, which is much higher than the table value of 31.41 at 5 percent level of significance with 20 degrees of freedom. Hence, the null hypothesis is rejected. This indicates that there has been a significant change in household energy consumption patterns during the study period. The results clearly show a gradual decline in the use of traditional energy sources such as firewood, agricultural residue, and dung, while the consumption of modern energy sources like gas and electricity has increased considerably. This transition reflects improvements in living standards, urbanisation, technological development, and better access to clean energy sources over time.

Reasons For Changing In Energy Consumption

The reasons for energy consumption changes in different place to place time to time and family to family, this is because the availability of energy sources, time for cooking cost of energy and socio- economic back ground play need role in the use of energy in rural area in Theni District.

Table- 2

Reasons for changing in energy consumption

S.No	Cause	No. of Sample Households	Percentage
1	Lack of fire wood	29	20.7
2	Lack of Agricultural resides	7	5.0
3	Lack of Dung	4	2.9
4	Lack of Time	22	15.7
5	Availability of commercial energy	28	20.0
6	Changing life style	33	23.6
7	Cropping pattern	17	12.1
Total		**140**	**100**

Source: Compiled from the Field study.

It could be seen from Table -2 The study shows that among the total households (140) 23.6 per cent change the energy consumption due to the their socio – economic back ground and style. In fact, education income and nature of occupation have modified their standard of living and these have great impact of energy consumption. Among the total households 20.7 per cent households 5 per cent and 2.9 per cent considers

lack of agricultural residues and dung as the causes of change in energy consumption in rural areas in Theni District.

The study identify that about 15.7 per cent households change the energy due to lack of time. It is seen that 20 per cent households state that availability of commercial energy such as LPG and electricity bring about change in energy use of study area. More over 12.1 per cent households change energy due to change in cropping pattern and land used for non- agricultural purpose. They convey that these change affect; the availability of agricultural resides and fire wood. As a result they depend on LPG and electricity for household uses. Thus the study found that change in life style. Cropping pattern, lack of time for cooking, lack of fire wood, dung and agricultural residues change energy consumption in rural areas in Theni District.

Various Problems Of Energy Consumption

The people faced by the various problems in energy consumption in rural areas in Theni district. Lack of energy, cost of energy changing environment, delay in the supply of LPG, lack of energy subsidy, lack of knowledge about modern energy and accident are some problems identified in the study area.

Table -3

VARIOUS PROBLEMS OF ENERGY CONSUMTPTION

S.No	Problem	No.of Respondents	Percentage
1	Lack of energy	22	15.7
2	Cost of fuel	29	20.7
3	Changing Environment	21	15.0
4	Delay in supply	37	26.4
5	Lack of subsidy	17	12.2
6	Lack of knowledge	9	6.4
7	Accident	5	3.6
Total		**140**	**100**

Souces: Compiled from the Field study

Table -3 reveals that various problems of respondent in energy consumption in rural areas in Theni district. The study depicts that out of the total respondent 15.71 per cent suffer from lack of energy like fire wood and agricultural residue. about 20.71 per cent respondents suffers from increase in the cost of fuel like fire wood, LPG and electricity.

The changing in environment such as cropping pattern, land used for agricultural purpose, extension of urbanization and changing life style reduce the availability of non- commercial energy and increases price of commercial energy. In fact, it causes for the many problems of energy consumption in the study area. Moreover, delay in the supply of LPG and frequent power cut create the problems in energy use pattern. The reveals that 26.43 per cent respondents suffer from this problem. Rural people expect subsidy for using energy like LPG and electricity. The non – availability of energy subsidy affects 12.2 per cent respondents. The study observed that

6.43per cent respondents do not know how to use LPG gas and they fear about it. Moreover, 3.5per cent respondents state that use of energy like LPG and electricity causes accidents.

Conclusion

Rural households mainly depended on firewood, agricultural residues, and dung cakes for cooking and water heating purposes. However, due to changing lifestyles, modernization, improved economic conditions, and increasing awareness about health and cleanliness, rural people now prefer modern energy sources such as LPG and electricity. The shift towards gas and electricity is mainly because these sources save time, reduce physical effort, and help avoid smoke-related health problems caused by traditional fuels. The study further observes a steady increase in the use of modern commercial energy sources, while the dependence on traditional fuels has considerably declined. This clearly indicates a gradual transition from traditional to commercial energy sources in rural areas. The findings also show that convenience, efficiency, cleanliness, and ease of use influence energy consumption decisions more strongly than the mere availability of fuels. Thus, socio-economic development and changing household preferences have played a significant role in transforming the rural energy consumption pattern in Theni District.

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