A STUDY OF RURAL HOUSEHOLD ENERGY USE AND RURAL TRANSFORMATION IN MADURAI DISTRICT

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ABSTRACT

The English term "energy" has its roots in the Greek word "energia," which means "at work." It is the capability or power to carry out labour. A nation's infrastructure for human growth and financial development must include energy as a fundamental and necessary element. Energy is the standard for all work, and global energy use is rising. It is necessary to function in the current world. In actuality, it forms the basis of contemporary civilisation. This study aims to assess the current status, rural household energy use patterns and rural transformation in Madurai district from 2021 to 2023. The research results show that before PMUY (Pradhan Mantra Ujjwala Yojana) Implementation of such scheme the usage of fire woods was high. After Implementations such scheme the usage of fire wood was low compare to LPG (Liquefied Petroleum Gas). The maximum of people usage for the L.P.G is 91 percent respectively.

KEYWORDS: *Lpg, Pmuy, Rural Household Energy*

INTRODUCTION

Energy is important for economic growth, but it also significantly raises the quality of life at home. One of the main factors that determine the development and standard of living of a country is the availability of energy resources. It is necessary to raise the country's standard of living, socio-economic progress and human development. It is an important element in the development of every civilized society. Household income and quality of life are significantly affected by the amount of energy used in rural and urban settings. While 1.06 billion people lack access to electricity, more than 3 billion people still cook and heat their homes with fuels including wood, peat, coal, and dung. Between 2015 and 2040, the world's energy consumption is expected to increase by 28%, with Asia outside the OECD (including China and India) accounting for more than half of this increase. Between 2015 and 2040, the energy consumption

of non-OECD nations will climb by 41%, compared to a 9% increase in OECD nations. Much of the growth is taking place in substantial, developing non-OECD countries, where people are still moving from rural to urban areas.

Most of the energy used in the domestic sector goes to lighting and cooking. The household sector in developing countries uses energy to prepare food, using wood and charcoal and plant waste as cooking fuel. Bullock carts were replaced by bicycles and other vehicles running on petrol and diesel as they made transportation considerably easier. In the initial phase, only human and animal power was used for agricultural operations. But as technology has advanced and the human mind has grown smarter, machines have taken the place of hard work. The trend is changing how homes use energy for heating, lighting, transportation and agriculture.The primary uses of rural household energy include all forms of energy used to provide for daily needs such as cooking, lighting, heating, hot water, cultural entertainment, and other necessities of life. The issue of rural energy consumption is intimately tied to the social and economic hardship in the area. Another crucial issue that is closely related to reducing regional poverty and comprehending regional socio-economic sustainable development is the issue of rural living energy and its poverty. In LDCs, the majority of total national energy consumption is consumed in rural areas. Inadequate residential fuel supplies have significant and increasing social and economic costs. According to UNDP and World Bank estimates, household energy consumption accounts for 30–95% of total energy use in 15 LDCs [as opposed to 25–30% in DCs].In most developing countries, cooking consumes more than half of the energy consumed in households.

Rural household energy use is an increasingly important concern for all emerging economies. Although household fuel consumption in rural areas accounts for a large share of total national energy consumption in many developing countries, the social and economic costs of household fuel for the rural poor are high and steadily increasing. In developing countries, according to UNDP and World Bank estimates, household energy consumption ranges from 30% to 95% of total energy consumption (25% to 30% in rich countries), with the share increasing with country poverty. Many households rely entirely or completely on biofuels. Rural households that rely on biomass supplies must spend more time and effort harvesting the fuel they need, as supplies are scarce in many places.

This makes an already challenging familial situation even more challenging. Therefore, there are more reasons than only energy to investigate how households use energy in rural locations. The pattern of household energy use or reliance on biomass in rural regions is not expected to change significantly over the long run, according to the World Bank's Energy Sector Management Assistance. The population of the globe has surpassed 6 billion, and according to growth predictions (FAO, 2000c), by 2030, there will be over 8 billion people on the planet. More over 2.8 billion people, or more than half of the world's population, reside in rural areas, making up the majority of the global population. There are 2 billion people who lack access to safe, affordable, and efficient energy sources. For cooking and space heating, at least two-thirds of them rely on the conventional fuels of wood, dung, and crop leftovers. Low energy conversion efficiency characterise these conventional fuels.

Literature Review

ZHAO Chun-sheng et al, (2012) analyzed Environmental Consequences of Household Energy Use in Rural and Urban Areas, Current Affairs. The investigation took place in the Western Loess Plateau of China. In this study, the SPIRPAT model was used to examine how variables such as wealth and population affected the environmental impact of energy use. The results show that regional differences in per capita energy use are small. However, in terms of energy composition, urban households are dominated by fossil fuels, whereas rural households are dominated by biomass. Rural households produce more emissions than urban households. However, there are some differences between urban and rural locations in social emissions from residential energy use. According to the study, the overall energy and environmental footprint of electricity and coal in urban regions and electricity and biomass in rural areas are influenced by factors including population size and income levels.

Jitiwat Yaungket and Tetsuo Tezuka, (2013) investigated Electricity is available in every home in Thailand. Inverter and control unit, the two main system parts, both sustained damage to a more than 50% degree. The main cause of malfunctioning parts is because SHS users lack the expertise required to run and maintain the system. Each day, SHS users must purchase extra electricity. According to study results, 78 percent of households only use SHS to produce electricity, 16.9 percent use SHS and agricultural diesel engines, and 5 percent just use agricultural diesel engines to produce electricity. To fulfil the rising energy needs of a hamlet, a PV hybrid system can be constructed by integrating a diesel engine for agricultural usage. This is done to introduce a community micro-grid and provide reliable electricity to the neighbourhood.

Ioana AndaMilin et al, (2022) Chinese researchers evaluated energy use, energy and economic growth for rural and urban populations using annual data from 1995 to 2017. A balanced auto-distributed regression (ARDL) method was used to find intervariable correlations, along with long- and short-term estimates, two unit root tests to ensure that variables are stationary, and other methods. In this work, the univariate link between variables was evaluated using the Granger causality test and the vector error correction model (VECM). The short-term results show positive connections between the economy and all population access to electricity, urban population access to electricity, and energy use, with probability values of (0.004), (0.000), and (0.007), respectively. With p-values of (0.005), (0.000), and (0.047), respectively, long-term data show a positive link between energy use, electricity for urban populations, and overall population access to electricity. The Chinese government should implement conservative tactics and policies to encourage the adoption of clean energy sources to meet its energy needs as China consumes more energy and emits more CO2.

Methodology

Objective:

1. To study the nature and extent of rural transformation with respect to household energy used by scheme of Pradhan Mantra Ujjwala Yojana (PMUY).

2. To study the expenditure on rural household energy in Madurai.

3. To identify and evaluate the push and pull factors for the rural household energy use.

Sample Design

The district of Madurai in Tamil Nadu was chosen for the current study in order to meet the set of goals.This district has been classified into seven taluk such as Madurai South, Madurai North, Melur, Vadipatti, Thirumangalam, Peraiyur, and Usilampatti. Hence 10 villages namely, Doddappanaickanur, Nakkalapatti,Kovilankulam, Vikkiramangalam, Pothampatti, Uthappanaickanur, Karumathur and Valandur selected as the study village from the Madurai district. The researcher planned to select 10 households in each gram panchayat as sample households. Consequently, 300 sample households were selected and included in the study using direct random sampling method.

Data Source:

In this analysis, both primary and secondary data were employed. To gather the necessary information from 300 sample families, a systematic, validated questionnaire including questions about socioeconomics and energy use was created.

Results and Discussion

TABLE 1 BEFORE PRADHAN MANTRI UJJWALA YOJANA WHAT ARE FUELS YOU USING

SL.NO	Before Pradhan Mantri Ujjwala Yojana What Are Fuels You Using	Frequency	Percent
1	Fire Wood	298	99.3
2	Agriculture residues	2	0.7
3	Total	300	100.0

Source: Primary Data

In this above table explain about before of Scheme in Madurai District. If before PMUY Implementation of such scheme the usage of fireweeds was high compare to 6th. It was 291 and 993 per cent similarly the usage of Agriculture residues was Just 2 and 0.7 percent respectively.

TABLE 2 AFTER PRADHAN MANTRI UJJWALA YOJANA WHAT ARE FUELS YOU USING

SL.NO	After Pradhan Mantri Ujjwala Yojana What Are Fuels You Using	Frequency	Percent
1	fire wood	9	3
2	Agri residues	5	1.7
3	Kerosene	4	1.3
4	Lpg	273	91
5	Electicity	9	3
	Total	300	100.0

Source: Primary Data

In this above table explain about after prove of Scheme in Madurai district. If after Implementations such scheme the usage of fire wood was low compare to LPG. The maximum of people usage for the L.P.G that is 91 percent respectively. In usages of was and usages of "Kerosene was 4 respectively. In firewood and electricity usage was 9 and 3 percent respectively.
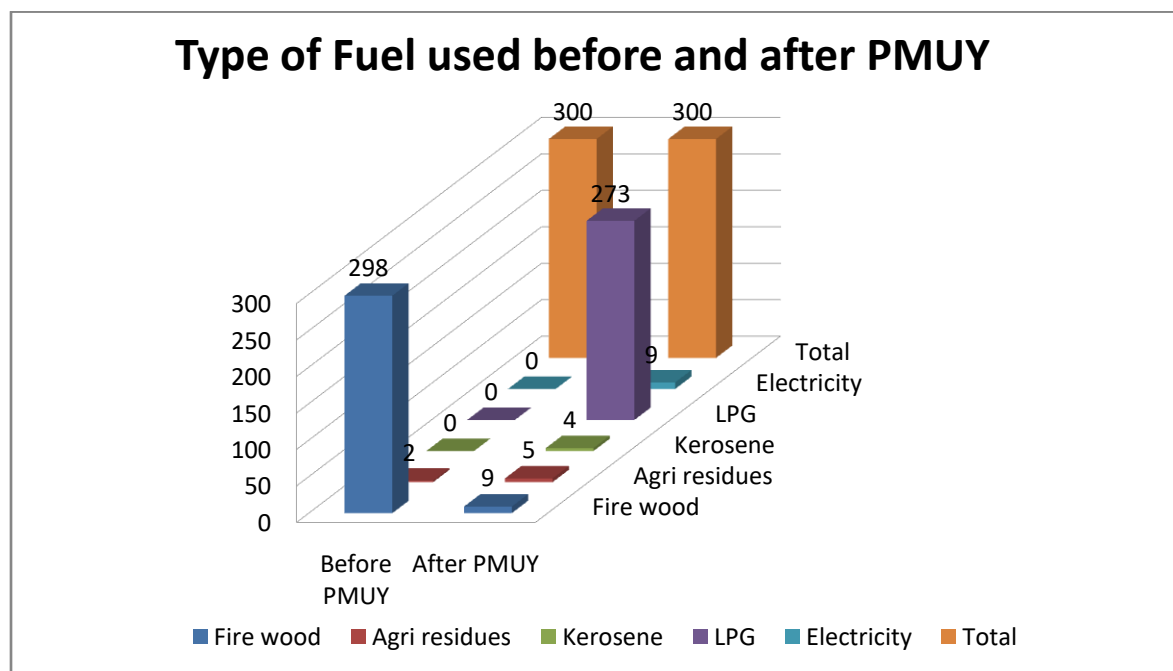
Figure 1

Type of Fuel used before and after PMUY

TABLE 3:- MONTHLY HOUSEHOLD INCOME BY SOURCES

SL.NO	Monthly Household Income By Sources	Frequency	Percent
1	Agricultural income	66	22
2	Allied farm income	220	73.3
3	income farm earnings	13	4.3
4	old age pension / other transfer income	1	0.3
	Total	300	100.0

Source: Primary Data

In the above table to explain the monthly household Income of source in Madurai district. The first source Agricultural income 66 respondent getting income from agricultural and 22 percent . In source of income from Allied farm that in 220 and 73 percent. In 13 respondent earn income from farm earning and 4.3 percent. In income of source in old age person was just only one and 0.3 percent respectively. Therefore, the maximum household income from Allied farm income that in 220 and 73 percent respectively.

Figure 2

Sources of Household Income (per month)
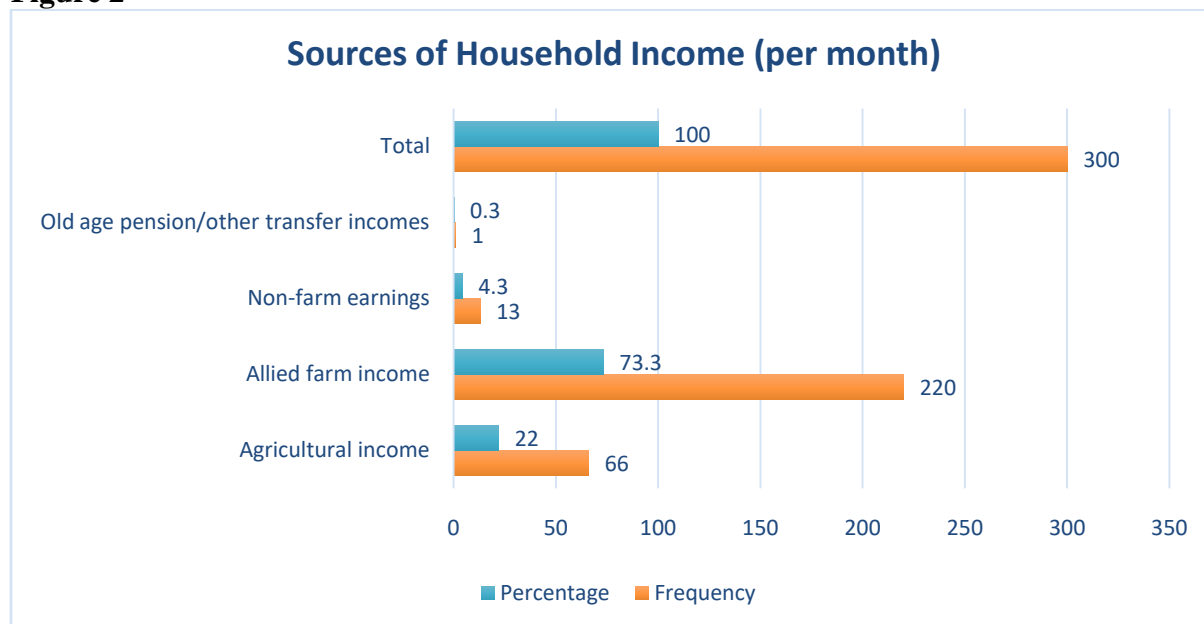
The study results show that before PMUY Implementation of such scheme the usage of fireweeds was high. After Implementations such scheme the usage of fire wood was low compare to LPG. The maximum of people usage for the L.P.G is 91 percent respectively. In usages was and usages of "Kerosene was 4 respectively. In firewood and electricity usage was 9 and 3 Percent respectively. The maximum household income from Allied farm income is 73 percent respectively.

CONCLUSION:

Attaining energy self - sufficiency through adoption of solar and biogas should be the goal of households in the future days to come, which helps in reducing dependency on imported fuels and thereby boosting the economy as well as in curtailing pollution in the long run.To meet the emerging energy needs in the future, India has to focus more on research activities and up gradation of the existing technology. Biogas production not only meets the energy needs of the agrarian households, but also helps to improve the health and overall wellbeing of the rural population. Through pollution reduction and minimizing waste generation it also brings down the energy deficit and further promotes green and sustainable development.

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