Bodhi International Journal of
Research in Humanities, Arts and Science

Vol. 10 Special Issue 2 December 2025
E-ISSN: 2456-5571

Rural Household LPG Consumption of Manikandam Block of Tiruchirappalli District

Mrs. M. Manimegalai[1] & Dr. S. Seethalakshmi[2]

[1]Ph.D. Research Scholar, PG and Research Department of Economics
Bishop Heber College (A) Tiruchirappalli
Affiliated to the Bharathidasan University Tirucirappalli, Tamil Nadu
[2]Head, Associate Professor & Research Advisor, PG and Research Department of Economics
Bishop Heber College (A), Tiruchirappalli
Affiliated to the Bharathidasan University Tirucirappalli, Tamil Nadu

Open Access

Manuscript ID:
BIJ-SPL2-Dec25-ECO-054

Subject: Economics

Received : 22.08.2025
Accepted : 08.09.2025
Published : 31.12.2025

DOI: 10.64938/bijsi.v10si2.25.Dec054

Abstract

In this research paper, the researcher focuses on LPG consumption by rural households in the Tiruchirappalli district. The researcher chose the random sampling method to select the study area. Based on the pilot survey, the Manikandam Block of Tiruchirappalli District was chosen, with five highly potential villages identified using the 2011 census data. Thirty samples were selected from each village, totaling 150 sample respondents for this research work. The study identified several issues. LPG serves as an alternative to other energy sources for cooking in households and is more environmentally friendly. It reduces air pollution, preventing respiratory diseases. The Indian government is making significant efforts to increase LPG usage across the country. The researcher concludes that in the Manikandam block, the majority of sample households are adopting LPG despite facing various challenges. Some households continue using traditional cooking methods due to the lower cost of wood and other available energy sources. However, with the increasing use of LPG, its cost has risen, affecting the day-to-day lives of rural people. Some are unable to afford the high costs, hindering their adoption of LPG.

Keywords: LPG consumption, problems to adopting LPG, and impact of LPG in rural areas

Introduction

In recent years, there has been a significant push towards increasing access and affordability of liquefied petroleum gas (LPG) to address the issue of Indoor Air Pollution (IAP). According to the Government of India's latest estimates issued in March 2020, 97.4 percent of Indian families consider LPG either important or a common cooking fuel (Ministry of Oil and Natural Gas, 2020). Some of the changes observed in the past four years are attributed to the implementation of the Government of India's flagship program – Pradhan Mantri Ujjwala Yojana (PMUY), which has notably expanded LPG coverage in the country, especially among economically poor and marginalized populations. PMUY was established in May 2016 to alleviate the national health concern of IAP resulting from the combustion of conventional cooking fuels. However, a substantial proportion of rural Indian families still rely on conventional fuels as their primary cooking source

The "Give It Up" LPG Subsidy initiative was established in March 2015 by the Indian authorities, led by Prime Minister Narendra Modi. The initiative

aims to encourage LPG users who can afford it to voluntarily give up their LPG subsidy. A total of 10 million people have voluntarily given up their subsidies. The government redistributes these subsidies to provide free fuel connections to poor families in rural households. The top five states contributing to this subsidy initiative are Maharashtra, Uttar Pradesh, Karnataka, Delhi, and Tamil Nadu.

The main areas of interest for the researcher are LPG usage in rural areas and the difficulties that rural communities have in implementing LPG in their homes.

Statement of the Problem

Reducing pollution, especially from household emissions, is considered a significant policy goal to achieve triple benefits: a reduction in home pollution, decreased dependence on traditional fuels, and lower carbon emissions. Over the past few years, the Indian government has been encouraging rural families to adopt either improved stoves or cleaner fuels to enhance societal well-being. There has been a robust policy push to incentivize rural communities, especially the economically disadvantaged, to adopt liquefied petroleum gas (LPG) cylinders across various states in India.

It has been observed that strategies aimed at enhancing agricultural income have a positive impact on LPG refill rates. Female literacy is also positively associated with refill rates, while female workforce involvement has a negative impact on refills. Additionally, areas with dense forests and scrub forests show a positive effect on refills, whereas areas with extensive land have a negative impact.

In India, a significant portion of the population still harbors fears about using LPG. The government's subsidies and initiatives have led to an increase in LPG usage. The researcher aims to understand the current situation and identify the challenges faced by the sample respondents in using LPG in the study area.

Research Questions

1. What is the extent of LPG usage in households in the study area?
2. What challenges do households face in adopting LPG in the study area?

Objectives of the Study Area

1. To analyze the extent of LPG usage in households in the study area.
2. To investigate the challenges faced in adopting LPG in the study area.

Hypotheses for the Study

1. There is no significant difference between family size and usage of LPG in the study area.
2. There is no challenge in adopting LPG consumption in the study area.

Methodology

This research paper relies on both primary and secondary data. The researcher opted for the random sampling method, selecting Manikandam Block based on the pilot survey. Five potential villages were identified using the 2011 census data. Thirty samples were collected from each village, totaling 150 samples for this research work.

Result and Discussion

Table 1 Gender of the Head of the Household in the Maniandam Block

	Male	Female	Others	Total
Adhavathur	26 (86.67)	04 (13.33)	00 (00.00)	**30**
Kumaravayalur	23 (76.67)	07 (23.33)	00 (00.00)	**30**
Mudikandam	20 (66.67)	10 (33.33)	00 (00.00)	**30**
Navalurkottapattu	28 (93.33)	02 (06.67)	00 (00.00)	**30**
Somarasampettai	24 (80.00)	06 (20.00)	00 (00.00)	**30**
Total	**121 (80.67)**	**29 (19.33)**	**00 (00.00)**	**150**

Source: Computed from the Primary Data **Note**: Percentages in the Parenthesis

Table 1 shows the gender distribution of household heads in the study area. In Manikandam village, out of 30 sample households, 86.67% (26) of the household heads are male, and 13.33% (4) are female. In Kumaravayalur village, out of 30 sample households, 76.67% (23) of the household heads are male, and 23.33% (7) are female. In Pettavaitalai village, out of 30 sample households, 66.67% (20) of the household heads are male, and 33.33% (10) are female. In Navalurkottapattu village, out of 30 sample households, 93.33% (28) of the household heads are male, and 6.67% (2) are female. In Somarasampettai village, out of 30 sample households, 80% (24) of the household heads are male, and 20% (6) are female. Therefore, out of 150 sample households, 80.67% (121) of the household heads are male.

Table 2 Number of Family Members in the Study Area

	2 - 4 Members	5 – 7 Members	8 – 10 Members	11 – 13 Members	Total
Adhavathur	3 (10.00)	7 (23.33)	16 (53.33)	4 (13.33)	**30**
Kumaravayalur	2 (06.67)	5 (16.67)	18 (60.00)	5 (16.67)	**30**
Mudikandam	3 (10.00)	4 (13.33)	17 (56.67)	6 (20.00)	**30**
Navalurkottapattu	4 (13.33)	7 (23.33)	14 (46.67)	5 (16.67)	**30**
Somarasampettai	2 (06.67)	5 (16.67)	17 (56.67)	6 (20.00)	**30**
Total	**14 (09.33)**	**28 (18.67)**	**82 (54.67)**	**26 (17.33)**	**150**

Source: Computed from the Primary Data
Note: Percentages in the Parenthesis

Table 2 presents the number of family members in the study area. In Adhavathur village, out of 30 sample households, 53.33% (16) of the sample households have 8 to 10 members, while 10.00% (3) have 2 to 4 members, representing high and low percentages, respectively. In Kumaravayalur village, out of 30 sample households, 60% (18) have 8 to 10 members, and 6.67% (2) have 2 to 4 members, indicating high and low percentages. In Mudikandam village, out of 30 sample households, 56.67% (17) have 8 to 10 members, and 10.00% (3) have 2 to 4 members, representing high and low percentages. In Navalurkottapattu village, out of 30 sample households, 46.67% (14) have 8 to 10 members, and 13.33% (4) have 2 to 4 members, indicating high and low percentages. In Somarasampettai village, out of 30 sample households, 56.67% (17) have 8 to 10 members, and 6.67% (2) have 2 to 4 members, representing high and low percentages. Therefore, out of 150 sample households, 54.67% (82) have 8 to 10 members in the study area.

Table 3 LPG Usage Level in the Households Per Month in the Manikandam Block

	Below 01 Cylinder	01 Cylinder	02 Cylinder	Above 3 Cylinder	Total
Adhavathur	4 (13.33)	16 (53.33)	7 (23.33)	3 (10.00)	**30**
Kumaravayalur	5 (16.67)	18 (60.00)	5 (16.67)	2 (06.67)	**30**
Mudikandam	6 (20.00)	17 (56.67)	4 (13.33)	3 (10.00)	**30**
Navalurkottapattu	5 (16.67)	14 (46.67)	7 (23.33)	4 (13.33)	**30**
Somarasampettai	6 (20.00)	17 (56.67)	5 (16.67)	2 (06.67)	**30**
Total	**26 (17.33)**	**82 (54.67)**	**28 (18.67)**	**14 (09.33)**	**150**

Source: Computed from the Primary Data
Note: Percentages in the Parenthesis

Table 3 explains the level of LPG usage per month in households in the study area. In Adhavathur village, out of 30 sample households, 53.33% (16) use 1 cylinder per month, while 10.00% (3) use above 3 cylinders per month, indicating high and low cylinder usage percentages. In Kumaravayalur village, out of 30 sample households, 60% (18) use 1 cylinder per month, and 6.67% (2) use above 3 cylinders per month, representing high and low cylinder usage percentages. In Mudikandam village, out of 30 sample households, 56.67% (17) use 1 cylinder per month, while 10.00% (3) use above 3 cylinders per month, indicating high and low cylinder usage percentages. In Navalurkottapattu village, out of 30 sample households, 46.67% (14) use 1 cylinder per month, and 13.33% (4) use above 3 cylinders per month, representing high and low cylinder usage percentages. In Somarasampettai village, out of 30 sample households, 56.67% (17) use 1 cylinder per month, and 6.67% (2) use above 3 cylinders per month, indicating high and low cylinder usage percentages. Therefore, out of 150 sample households, 54.67% (82) use 1 cylinder per month in the study area.

Statistical Inference – I: There Are no Significant Difference between Family Size and Usage of LPG in the Study Area:

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	**.808[a]**	**.652**	.650	.494	.652	277.736	1	148	.000	1.518
a. Predictors: (Constant), No of Family Members										
b. Dependent Variable: LPG Usage Level Per Month										

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	67.846	1	67.846	**277.736**	.000[a]
	Residual	36.154	148	.244		
	Total	104.000	149			
a. Predictors: (Constant), No of Family Members						
b. Dependent Variable: LPG Usage Level Per Month						

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	-.062	.142		**-.435**	.664					
	No of Family Members	.808	.048	.808	**16.665**	.000	.808	.808	.808	1.000	1.000
a. Dependent Variable: LPG Usage Level Per Month											

$R = 0.808$; $R^2 = 0.652$; $F = 277.736$; $t = 16.665$

There is a high positive correlation between No of Family members and LPG usage Level per month. The F – Test and T – Test vales indicates that the Correlation is significant.

H0: There is no significant difference between no. of family members and LPG usage level per month.

The statistical inference – I reveals that there is a high positive correlation between no. of family members and LPG usage level per month in the study area. Therefore, the null hypothesis is rejected and alternative hypothesis is framed.

H1: There is a significant relationship between No. of family members and LPG usage level per month in the study area.

Statistical Inference – II: There are no Problems to Adopt the LPG Consumption in the Study Area:

Correlation Matrix[a,b]

		Uneducated Females	Price of LPG is High	Lacking of Knowledge	Willing to traditional Energy consumption	Getting Wood without cost	Fear to Using LPG
Correlation	Uneducated Females	1.000	-.256	-.199	.145	-.029	-.013
	Price of LPG is High	-.256	1.000	.261	-.255	.333	-.273
	Lacking of Knowledge	-.199	.261	1.000	-.378	.056	-.030
	Willing to traditional Energy consumption	.145	-.255	-.378	1.000	-.431	.179
	Getting Wood without cost	-.029	.333	.056	-.431	1.000	.063
	Fear to Using LPG	-.013	-.273	-.030	.179	.063	1.000
Sig. (1-tailed)	Uneducated Females		.086	.146	.223	.439	.474
	Price of LPG is High	.086		.082	.087	.036	.072
	Lacking of Knowledge	.146	.082		.020	.383	.437
	Willing to traditional Energy consumption	.223	.087	.020		.009	.172
	Getting Wood without cost	.439	.036	.383	.009		.371
	Fear to Using LPG	.474	.072	.437	.172	.371	

a. Only cases for which Village = Manikandam are used in the analysis phase.

b. Determinant = .432

Inverse of Correlation Matrix[a]

	Uneducated Females	Price of LPG is High	Lacking of Knowledge	Willing to traditional Energy consumption	Getting Wood without cost	Fear to Using LPG
Uneducated Females	1.116	.307	.106	-.127	-.138	.133
Price of LPG is High	.307	1.424	-.305	-.097	-.516	.433
Lacking of Knowledge	.106	-.305	1.284	.538	.274	-.156

Willing to traditional Energy consumption	-.127	-.097	.538	1.554	.689	-.333
Getting Wood without cost	-.138	-.516	.274	.689	1.471	-.350
Fear to Using LPG	.133	.433	-.156	-.333	-.350	1.197
a. Only cases for which Village = Adhavathur are used in the analysis phase.						

KMO and Bartlett's Test[a]		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.466
Bartlett's Test of Sphericity	Approx. Chi-Square	21.956
	Df	15
	Sig.	.109
a. Only cases for which Village = Adhavathur are used in the analysis phase.		

Anti-image Matrices[b]							
		Uneducated Females	**Price of LPG is High**	**Lacking of Knowledge**	**Willing to traditional Energy consumption**	**Getting Wood without cost**	**Fear to Using LPG**
Anti-image Covariance	Uneducated Females	.896	.194	.074	-.073	-.084	.099
	Price of LPG is High	.194	.702	-.167	-.044	-.247	.254
	Lacking of Knowledge	.074	-.167	.779	.270	.145	-.102
	Willing to traditional Energy consumption	-.073	-.044	.270	.644	.301	-.179
	Getting Wood without cost	-.084	-.247	.145	.301	.680	-.199
	Fear to Using LPG	.099	.254	-.102	-.179	-.199	.836
Anti-image Correlation	Uneducated Females	.556[a]	.244	.089	-.096	-.108	.115
	Price of LPG is High	.244	.522[a]	-.226	-.065	-.357	.332
	Lacking of Knowledge	.089	-.226	.496[a]	.381	.199	-.126
	Willing to traditional Energy consumption	-.096	-.065	.381	.512[a]	.456	-.244
	Getting Wood without cost	-.108	-.357	.199	.456	.401[a]	-.264
	Fear to Using LPG	.115	.332	-.126	-.244	-.264	.294[a]
a. Measures of Sampling Adequacy(MSA)							
b. Only cases for which Village = Manikandam are used in the analysis phase.							

Communalities[a]		
	Initial	Extraction
Uneducated Females	1.000	.671
Price of LPG is High	1.000	.568
Lacking of Knowledge	1.000	.529
Willing to traditional Energy consumption	1.000	.629
Getting Wood without cost	1.000	.837
Fear to Using LPG	1.000	.919

Extraction Method: Principal Component Analysis.
a. Only cases for which Village = Manikandam are used in the analysis phase.

Total Variance Explained[a]

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.017	33.622	33.622	2.017	33.622	33.622
2	1.083	18.050	51.672	1.083	18.050	51.672
3	1.051	17.523	69.195	1.051	17.523	69.195
4	.869	14.480	83.675			
5	.642	10.708	94.383			
6	.337	5.617	100.000			

Extraction Method: Principal Component Analysis.

a. Only cases for which Village = Manikandam are used in the analysis phase.

Component Matrix[a,b]

	Component		
	1	2	3
Uneducated Females	-.414	.185	.682
Price of LPG is High	**.714**	-.221	.098
Lacking of Knowledge	.585	-.079	-.424
Willing to traditional Energy consumption	-.754	-.202	-.141
Getting Wood without cost	.579	.616	.350
Fear to Using LPG	-.301	.758	-.504

Extraction Method: Principal Component Analysis.

a. 3 components extracted.

b. Only cases for which Village = Adhavathur are used in the analysis phase.

The statistical inference – II explains the factor analysis of the challenges in adopting LPG consumption in rural households in the study area. Six factors have been considered in this regard. Among these six factors, the factor analysis indicates that the high price of LPG (0.714) holds the first position as the influencing factor in the study area.

It appears that you have formulated a null hypothesis (H0) and an alternative hypothesis (H1) related to the problem of adopting LPG consumption in the study area.

Null hypothesis: There is no issue with adopting LPG consumption in the study area.

Alternative hypothesis: The major problem for adopting LPG consumption in the study area is the high price of LPG.

To reject the null hypothesis in favor of the alternative hypothesis based on the statistical inference – II, which indicates that the high price of LPG is a highly influential factor in the study area.

Findings

- Table-1 reveals that, out of 150 sample households, 80.67% (121) have male heads of the family in the study area.
- Table- 2 concludes that, out of 150 sample households, 54.67% (82) have 8 to 10 members in the study area.
- Table 3 indicates that, out of 150 sample households, 54.67% (82) use 1 cylinder per month in the study area.

- There is a high positive correlation between the number of family members and LPG usage level per month. The F-Test and T-Test values indicate that the correlation is significant.
- The statistical inference – I reveals a high positive correlation between the number of family member and LPG usage level per month in the study are. Therefore, the null hypothesis is rejected, and the alternative hypothesis is framed (H1: There is a significant relationship between the number of family members and LPG usage level per month in the study area.)
- The statistical inference – II explains the factor analysis of the challenges in adopting LPG consumption in rural households in the study area. Six factors have been considered in this regard. Among these six factors, the factor analysis reveals that the high price of LPG (0.714) holds the first position as the influencing factor in the study area.
- The statistical inference – II reveals that the "Price of LPG is high" factor is highly influential in the study area. Therefore, the null hypothesis is rejected, and the alternative hypothesis is framed (H1: Price of the LPG is a major problem for adopting LPG consumption in the study area.

Conclusion

LPG serves as an alternative to other energy sources for cooking in households, offering significant environmental benefits. Its usage contributes to increased productivity for the environment and helps prevent air pollution, reducing the risk of respiratory diseases for individuals. The Government of India has undertaken initiatives to promote LPG adoption across the nation, from Kashmir to Kanyakumari. The researcher concludes that in the Manikandam block, a majority of sample households face challenges in adopting LPG, despite its advantages. Some households continue traditional cooking methods due to the lower cost of wood and other available energy sources. The increasing demand for LPG has led to rising costs, making it challenging for rural people to afford and incorporate into their daily lives. To address these issues, the researcher suggests that the government should take measures such as reducing the price of LPG, increasing subsidies, and enhancing the supply of LPG. These remedies are proposed to make LPG more accessible and affordable for rural communities, facilitating a smoother transition from traditional cooking methods.

References

1. Alem, Y., et.al., (2016), Modeling household cooking fuel choice: a panel multinomial logit approach, *Energy Economy, Vol:59, Page: 129-137.*
2. Bhattacharyya, Subhes C., (2006), Energy access problem of the poor in India is rural electrification a remedy? *Energy Policy, Vol: 34, No: 18, Page: 3387-3397.*
3. Biswas, Haimanti, Jyoti Parikh, and Shyam Karmakar (2003), Cooking with biofuels, *Economic and Political Weekly, Vol:38, No.:26, Page: 2681-2692.*
4. Davis, M., (1995), Fuel choice in rural communities, *Energy for Sustainable Development, Vol:2, Page: 45-48.*
5. Farsi, M., Filippini, M., and S. Pachauri (2005), Fuel choices in urban Indian households, *CEPE Working Paper Series 05-42, Center for Energy Policy and Economics ETH Zurich.*
6. Kowsari, R., (2011), Three dimensional energy profile: A conceptual framework for assessing households energy use, *Energy Policy, Vol: 39, No.: 12, Page: 7505-7517.*
7. Pachauri, Shonali and Leiwen Jiang (2008), The household energy transition in India and China, *Energy Policy, Vol: 36, Page: 4022-4035.*