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ANALYSIS OF RURAL AND URBAN HOUSEHOLDS CONSUMPTION OF LIQUIDIFIED PETROLEUM GAS (LPG) IN OYO STATE, NIGERIA

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Abstract

The major determinant of amount and type of energy consumed by household in urban and rural area is the function of population and urbanization. This study focused on comparative analysis of liquefy petroleum gas (LPG) consumption status among rural and urban households in Oyo State, Nigeria. A multi-stage sampling procedure was used to sample 110 household heads. Results showed mean age of rural household heads to be 40 years, with gender role of who decides consumption pattern in the respective household to be 76% (Male) - 24% (Female) household heads. An average household size of 4 persons was reported with average monthly income of ₦25,000. Analysis of LPG consumed between rural and urban household showed no little or no difference on the average of 7.5 to 7.8kg of LPG, respectively, with singular pattern of use for cooking. Result of Z-test ($Z\text{-cal} = 0.22$, $Z\text{-tab} = 1.95$) revealed that there is little or no difference in the quantity of LPG consumed between rural and urban household in the study area. It was concluded that household consumption of domestic energy like LPG has been a major household energy, despite available alternatives. Its convenience has changed the whole situation as households depend more solely on LPG in the study areas. The study recommended awareness intervention on prevention and control of fire outbreak at household level as well as masses' friendly policy that will accommodate both rural and urban households' purchasing power.

KEY WORDS: Rural and urban, liquefy petroleum gas (LPG), household head.

Introduction

In Nigeria, it has been observed that costs of exploration, transportation and conversion of energy resources into various end uses have increased tremendously in recent times. This had led to significant increase in energy costs for various uses especially cooking by household. There is wide gap between access by urban and rural households to clean energy supplies, with about 73% of Nigerian population lacks access to electricity although this may increase to about 90% for rural areas if properly disaggregated. It should be noted that energy needs for cooking represent the bulk of energy demand in Nigeria, although about 67% of the population uses dirty energy sources in form of fuel wood, charcoal, crop residues, animal dungs and plastics. This should raise a lot of environmental concerns because of its inefficiency and contributions to indoor air pollution. Similarly, households use kerosene for cooking although sometimes adulterated with petrol or diesel and this product is scarce and very expensive for the poor households (FAO, 2005). Some empirical studies on domestic energy demand had focused on sources of energy and factors responsible for choices made by the households. Abd'razack *et al.*, (2012) and Shittu *et al.*, (2004) have found positive relationship between income and improved energy demand in some studies on Nigeria. Shittu *et al.*, (2004) also found household heads' age as an important factor that influenced demand for biomass fuel in Ogun state. Babanyara and Saleh (2010) found that fuel wood, rural-urban migration, poverty and hikes in price of kerosene were critical factors influencing demand in urban Nigeria.

The objectives of this study is to analyze domestic energy use at household level and how people cope with amount and type of energy used at households level, as well as hypothetical finding of differences between urban-

rural cooking energy consumption pattern in the study area. This will help to understand that type and amount of energy used is a function of population and urbanization. Such understanding allows policy makers to better plan and takes actions that address the specific problems, as well as development potentials of the different population segments. Livelihoods-based analyses can lead to more appropriate and differentiated policies and actions. Findings of the study were expected to contribute toward bridging the existing literature gap on the understanding the domestic energy use and amount consumed at household level in the study area.

Methodology

The study was carried out in Oyo State, Nigeria. The study area lies between latitude $7^{\circ}3'$ and $9^{\circ}12'$ North of the equator and longitude $2^{\circ}47'$ East of the meridian. The population of the study comprised rural and urban household's heads within the study area. The sampling frame of the study targeted households head using LPG. Multi-stage sampling procedure was used to select the sample size.

At the first stage, 9% (3) local government areas out of the 33 L.G.A were purposively selected based on the population density and urbanization status, to have Ibarapa Central L.G.A, Egbeda L.G.A, and Ibadan-North L.G.A. At the second stage, simple random sampling technique was used to select 25 percent of political wards in each of the selected local government areas. In Ibarapa Central local Government area; Oke serin I & II, Idere III (Koso/Apa) and Iberekodo I were selected out of 10 political wards. In Egbeda L.G.A.; Olubadan Estate, Egbeda and Ayede were selected out of the 11 wards in the Local Government Area. At the third stage, purposive sampling technique was used to select eleven (11) households in the 11 political wards, to have sample size of 110 households.

Result and discussion

Socio-economics Characteristics of the Rural and Urban Households Heads

The data presented in Table 1 showed the results indicating distinctive responses from selected urban and rural areas of the study locations. It was revealed that the pooled mean age of the respondents was 40 years. Respondents across the study locations were young-adult household heads as majority (57.27%) fell within the age group of 21-40 years. Also, in pooled results Table 1 revealed that majority (76.4%) of the respondents were male. Segregation into each LGAs revealed that Ibarapa Central Local Government Area 69.8%, an acclaimed rural area and 82.1% were male household heads in Ibadan North Local Government Area; an acclaimed urban area. This implies that male dominant culture of gender role and responsibility persist across the study locations. It was also revealed that majority (78.2%) of the respondent's practices monogamy while 21.8% being polygamy with average household size of 4 persons. Furthermore, it was shown that 14.5% of the respondents had primary education, 40.0% had secondary education, and 38.2% of the respondents had tertiary education while only 7.3% had no formal education. This implies that most of the respondents in the study area were fairly educated and this has attested to the important of being educated which help in embracing innovation like cooking gas utilization.

Furthermore, disparities in livelihood income differentiated the rural area from urban area as indicated on Table 1b. Average monthly income differs from one study location to another as Ibadan North L.G.A., an acclaimed urban area had an average monthly income of ₦45,000 compare to Ibarapa Central L.G.A. an acclaimed rural area with average monthly income of ₦28,000.

Uses of LPG Gas in Selected Urban and Rural Households of Oyo State.

Table 2 shows the distribution of the respondent as regards the major uses and pattern of LPG by rural and urban households in the study area. It is shown in from the Table that all (100%) of the respondents used LPG as means of cooking with partial alternative sources as; 25.5% of the respondents are using electricity, 26.4% use charcoal, 25.5% use kerosene, while 3.6% do not have alternative source of cooking. The table also reveals that 32.7% of

the respondent uses LPG 3 times per day, 33.6% uses LPG 2 times per day, 15.5% uses LPG more than 3 times per day while 17.3% of the respondent uses LPG occasionally. It is also shown from the study that all (100%) of households in the state are singular pattern of LPG usage.

Quantity of LPG use per Month by the Respondents

Table 3 showed the distribution of respondents according to the amount of LPG used per month. Majority (97.3%) of the respondents from the results were using cooking gas quantity range 1-20kg gas per month and 0.9% of the respondents were using above 40kg of kg per month with mean consumption quantity of 7.5kg per month across the study location. From the table, it shows that, level of consumption varies from rural to urban area as selected respondents from Ibadan-North L.G.A. used more above their other counterpart in two selected study locations. Furthermore, the Table shows average cost of purchase per kg to be ₦262 across the study locations. Amount spent per month at average for each household was recorded to be ₦2000 per month.

Level of LPG Consumption between Rural and Urban Households.

The test of differences between households quantity of LPG consumed was analyzed using Z-test as presented as shown in table 4. Rural households, mean consumption of cooking gas was 7.0 kg of cooking gas per month while mean consumption among urban household is 7.5kg of cooking gas per month. Since the Z-test calculation value of 0.22 is not greater than Z-test tabulated value of 1.95, the null hypothesis is accepted that; there is no significant difference in quantity of cooking gas consumed between rural and urban households in the study area. The implication of this is that; there is no much difference in the quantity of cooking gas consumed between rural and urban households across the study location.

Conclusion and recommendation

The key factors that affect the consumption of any kind of energy in urban area by households include: the price of the energy with average of ₦262 per kg across the study location; the availability of the energy, income, cultural preference and convenience. All these contributed to pattern of energy consumption by households. It has become an established trend and fact that there is no more or less disparities in the amount of LPG energy consumed by urban households and rural households in the study area. Based on this fact finding from research work, recommendations are made for awareness intervention on prevention and control of fire outbreak at household level as well as masses friendly policy that will accommodate both rural and urban household's purchasing power.

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Table 1a: Distribution of the Household Heads by their Socio-economic Characteristics Across the Study Locations (n =110)

Characteristics	Egbeda (n =39) Frequency/Percentage	Ibarapa Central (n =31) Frequency/Percentage	Ibadan North (n =43) Frequency/Percentage	Polled Results (n = 110) Frequency/Percentage	Mean
Age/Years					
21 – 40	21(53.9)	22(51.2)	20(71.4)	63(57.27)	40 years
41 – 60	13(33.3)	18(41.9)	8(28.6)	39(35.45)	
61 – 80	4(10.3)	3(6.1)	-	7(6.36)	
81 – 100	1(2.6)	-	-	1(0.90)	
Sex					
Male	31(79.5)	30(69.8)	23(82.1)	84(76.4)	
Female	8(20.5)	13(30.2)	5(17.9)	26(23.6)	
Marital status					
Single	3(7.7)	6(14.0)	4(14.3)	13(11.8)	
Married	33(84.6)	32(17.4)	24(85.7)	89(80.9)	
Widowed	3(7.3)	5(11.6)	-	8(7.3)	
Household nature					
Monogamy	32(82.1)	34(79.1)	20(71.4)	86(78.2)	
Polygamy	7(17.9)	9(20.9)	8(28.4)	24(21.8)	
Household size/Persons					
1 – 5	25(64.1)	29(63.4)	19(67.9)	73(66.36)	4 persons
6 – 10	13(33.3)	14(32.6)	8(28.6)	34(30.90)	
11 above	1(0.9)	-	1(3.6)	3(2.72)	
Religion					
Christianity	22(56.4)	22(51.2)	9(32.1)	53(48.2)	
Islam	16(41.0)	21(48.8)	19(67.9)	56(50.9)	
Traditional worshiper	1(2.6)	-	-	1(0.90)	
Educational level					
Primary education	3(7.7)	8(18.6)	5(17.9)	16(14.5)	
Secondary education	19(48.7)	9(20.9)	16(57.1)	44(40.0)	
Tertiary education	16(41.0)	20(46.5)	6(21.4)	42(38.2)	
No formal education	1(2.6)	6(14.0)	1(3.6)	8(7.3)	

Field survey, 2019

Figure in parenthesis are in percentage

Table 1b: Distribution of the Household Heads by Monthly Income across the Study Location. (n =110)

Egbeda (n =39)	Ibarapa Central (n =31)	Ibadan North (Urban Area) (n =43)	Polled Results (n = 110)
MONTHLY INCOME /N			
2,500 – 50,000	38(97.5)	5,000 – 15,000	23(53.5)
51,000 – 100,000	-	16,00 – 25,000	9(20.9)
101,000 - 150,000	1(0.9)	26,000 – 35,000	6(13.1)
		36,000 above	5(11.6)
		41,000 above	3(10.7)
		43,500	3(2.7)
		Above 43,000	11(10)
			₦24,525

Field survey, 2019

Figure in parenthesis are in percentage

Table 2: Distribution of Respondents by Uses of Cooking Gas (n =110) Polled

	Frequency	Percentage	Mean
Major uses			
Cooking	110	100	
Pattern of usage			
Single	110	100	
Frequency of usage			
3 times	36	32.7	
2 times	37	33.6	
Once in a day	1	0.9	
More than 3 times	17	15.5	
Occasionally	1	17.3	2.51
Alternative source of cooking			
Yes	105	95.5	
No	5	4.5	
Type of alternative			
Electricity	28	25.5	
Kerosene	49	44.5	
Charcoal	29	26.4	

Field Survey, 2019

Figure in parentheses are Percentages

Table 3: Distribution of Respondents According to the Amount of Cooking Gas Used Per Month

Polled Results (n= 110)		Egbeda LGA (n =39)		Ibarapa Central LGA (n =43)		Ibadan North LGA (n =28)	
Quantity (kg)/Month		Mean		Mean		Mean	
1 – 20	107(97.27)		39(100)		41(95.3)		27(96.4)
21 – 40	2(1.8)		-		2(4.7)		-
41 – Above	1(0.9)	7.5kg	-	7.7kg	-	7kg	1(3.6)
Cost / KG							
200 – 300	104(94.5)		37(94.9)		41(95.3)		26(92.9)
301 – 400	6(5.45)	₦265	2(5.1)	₦256	2(4.7)	₦273	2(7.1)
Cost Spent in ₦/ Month							
500 – 5000	107(97.27)		39(100)		41(95.3)		27(96.4)
5500 – 10000	2(1.81)		-		2(4.7)		-
10500 – 15000	1(0.9)	₦2,000	-	₦1,964		₦1,981	1(3.6)
							₦2,087

Source: Field Survey, 2019.

Figure in parentheses are Percentages

Table 4: Z-test Showing Differences in Quantity of LPG Consumed by Households across the Study Locations.

Variable	N	Mean	Standard deviation	Df	Z-cal	Z-table	Remark
Rural	82	7.414	4.416	108	0.223	1.95	Not significance
Urban	28	7.785	8.418				

Field Survey, 2019