HOUSEHOLDS' PERCEPTIONS ON THE DOMESTIC USAGE OF GAS IN FORT PORTAL TOURISM CITY

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A DISSERTATION

SUBMITTED TO THE SCHOOL OF BUSINESS AND ADMINISTRATION IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF A BACHELOR OF SCIENCE OIL AND GAS MANAGEMENT AT INSTITUTE OF PETROLEUM STUDIES KAMPALA IN AFFILIATION TO UCU.

AUGUST 1, 2021

DECLARATION

I Kibalirwa Godwin declare that this research proposal is my original work and has never been presented by any student for assessment neither for the award of a degree in any university

_____ _____

Signature **Date**

KIBALIRWA GODWIN

APPROVAL

This is to certify that, this study entitled households' perceptions on the domestic usage of gas in fort portal tourism city has been done under my supervision and now it is ready for submission.

_____ _____

Signature **Date**

Mr. JAMES MUGERWA

DEDICATIONS

I humbly dedicate this work to my guardians for the unconditional support in terms of providing of welfare and moral support working tirelessly to make me who I am. They have cared for me since my high levels of Education and made me a responsible person and inspirational to be in the world of competition. I will always continue to love you my dear guardians and hopefully the good Lord God will bless you abundantly.

Furthermore, this work is also dedicated to my friends (fellow students and lecturers) who have always supported by guarding me were necessary to ensure I come up with quality work. Hopefully the almighty God will reward them accordingly.

ACKNOWLEDGEMENT

I greatly send my special thanks to the Almighty God for the wisdom, strength, guidance and hardworking which he granted me throughout my academic struggles and most importantly offering me life. I also thank my supervisor (Mugerwa James) and well as a role model in academics, lecturers, management and staff of the Institute of Petroleum studies for the wide scale of Knowledge taught to me during my three years' study period faced with challenges brought by the pandemic Covid19. I further extend my acknowledgement to all my respondents in fort portal tourism City for their cooperation during the data collection process.

I finally thank my host family in Kampala during the course of my studies for the great support rendered to me in form of well fare services and hopefully God will abundantly as per the support offered to me.

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ABSTRACT

The study intended to assess the households' perceptions towards domestic usage of gas in Fort Portal Tourism City. The objectives of the study are to assess the desire of the households to domestic usage Gas, to determine the main challenges and limitations of the households towards the domestic use Gas for Cooking finally to prove and confirm the major source of households' cooking energy in the newly created fort portal tourism city.

Before this study, other researchers indicated that Uganda firewood Consumptions still accounts for about 80 %, Charcoal and crop residues make up another 10 %. However, in reference to the methodology that were applied, the research was conducted using both quantitative and qualitative approaches using a Case study as Research Design. Data was collected using a self-administered Questionnaires, conducting interviews and as well as applying observation techniques. Data was analyzed using SPSS to come up with frequency tables where conclusions were drawn from.

This study particular study findings revealed that charcoal was the major source of cooking energy in fort portal tourism city and about 75.5% of the entire population in the city rely on it. This was followed by fire wood where only 21.7% rely it meaning a total of about 97.2% relay on wood fuel in fort portal tourism city as their major source of cooking energy. Gas is a major source of cooking energy at only 2.8% and hydropower was only used as an alternative source by a few households. The study further revealed a number of challenges gas user face while using it and limitations that households who never used gas perceived. Households' desire to adopt and relay on gas usage as their major cooking energy source was over 90%.

Therefore, concerned authorities (Government, NGOs CSOs among others) were appealed upon to sensitize and activate the desires of the households through eliminating and mitigating the existing challenges on gas usage and limitations of the non-gas users.

1 CHAPTER ONE: INTRODUCTION

1.1 Introduction

This chapter presents the background, objectives, problem statement, justification and the scope of this study.

1.2 Background of the study

1.2.1 Historical background

Globally, the consumption of Gas for domestic use raised up to 24% though the growth rate has not been rapid like other sources of energy (EnerData, 2020). According to IEA predictions, the Gas consumption is likely to increase by 2.8% making up to 110 Bcm above the recent Global gas consumption decline in 2020 caused by COVID-19 Pandemic (Stuart, 2021).

However, FAO research indicates that about 79% of people in African countries remain completely reliant upon wood for energy and cannot anticipate any rapid transition to other energy sources (Agea , Kirangwa & Okia , 2010).

In the new Future, Uganda is going to start the commercial production of Oil and Gas though statistical data still shows that "Uganda firewood Consumptions accounts for about 80 %, Charcoal and crop residues make up another 10 % (Laker Adiiki, 2020)."

1.2.2 Conceptual background

Fort Portal Tourism City in the last decade has been faced with dribbling forest cover due to increased deforestation and destruction of woodlands for charcoal. The National Forest Authority believes that if these vices are not promptly addressed, most of the forest areas could be destroyed in no time.

Fort Portal City needs to find a sustainable alternative energy source to allow the forests to recover and the most efficient and effective alternative source could be natural gas. With the oil discoveries at the Albertine Graben and the possibility of importing natural gas through the East African Crude Oil Pipeline from Tanzania, this prospect is now possible and sustainable.

Fort Portal City can now shift to an alternative energy such as Natural gas for its energy needs. An investigation is therefore required to determine the feasibility of natural gas for domestic usage.

1.2.3 Contextual background

Fort portal Tourism City is one of the seven recently approved cities that started operating in July 2020 and it is most likely to have an increment in population that will in the end rise the encroachment on the neighboring forests resources such as Kibale forest for wood fuel. The high demands result to consequences such wood fuel scarcity, rise in prices and lead to a continuous cut down of forests.

According to the 2002 national census, the population of Fort Portal was about 41,000 and in 2010, the Uganda Bureau of Statistics (UBOS) estimated the population at 46,300. In 2011, UBOS estimated the population at 47,100. In August 2014, the national population census put the population at 54,275. These statistics indicate a threatening growth of population in fort portal which highly depend on natural resources like forest for wood fuel (NPHC, 2014).

Alternatively, Fort portal Tourism City needs to focus on the Domestic consumption of Gas mainly for cooking since its accessibility, affordability, reliability and sustainability chances are to rise soon as Uganda start the commercial production of Oil and Gas.

Therefore, this research investigated the attitude of the consumers towards the domestic use of Gas and the results will help the City to make a reliable transition decision to Gas energy for domestic use

1.3 Problem statement

The majority of Fort Portal's residents depend on wood fuel for their energy needs. It is estimated that over 80% of its residents utilize wood energy for cooking. Its population is projected to increase tenfold by 2040 (Vision 2020), this will have significant implications on the forest cover in the area as the already limited wood fuel resources has been over exploited.

However, the city has the potential for domestic gas usage but its adoption has remained low even amongst the affluent households. Limited information is documented on the underlying factor for this low adoption.

But with the approval of the construction of the EACOP on 11 April 2021 by the various parties, economically viable natural gas will be transported from Tanzania via this pipeline to Uganda. Several cities in Uganda including Fort portal will have access to its supply and as such needs to prepare for the adoption of this energy resource for its domestic consumption. Therefore, this study assessed the household perceptions on domestic gas consumption in Fort Portal to generate evidence to inform interventions by private sector, Government, Civil Society Organizations and the other development actors.

1.4 Purpose of the Study

This study was motivated by the dribbling wood fuel resource in the area and the construction of the EACOP which will supply abundant natural gas into the country and therefore avail Fort Portal City with sufficient Gas to satisfy its domestic energy needs. The study was therefore aim to improve the adoption and domestic consumption of Gas in Fort Portal Tourism City.

1.5 Objectives of the study

1.5.1 General objective of the study

To assess the households' perceptions to the domestic usage of Gas in Fort Portal Tourism City

1.5.2 Specific Objectives

1. To assess the desire of the households to domestic usage Gas.
2. To determine the main challenges limitations of the households towards the domestic use Gas for Cooking.
3. To prove and confirm the major source of households' cooking energy

1.5.3 Research questions

To what extend is the desire of a household to the adoption of domestic usage of Gas to provide energy for cooking?

What limitations affect the adoption of Domestic usage of Gas to provide energy for cooking?

What is the household's major source of cooking energy?

1.6 The Scope of the study

1.6.1 Geographical Scope

The study was conducted in the recently created Fort Portal Tourism City located in western Uganda in the Rwenzori Region. It lies about 294 Km away from Kampala in footsteps of Mount Rwenzori with in Kabarole district. This study was particularly carried out on the two divisions of the city that is Central and North divisions.

1.6.2 Content scope

The study focused on the assessment of the perception of the households on the domestic use of the Gas and their source of the energy for cooking. It also assessed the major source of cooking energy that a house hold relied on for cooking and determine the challenges and limitations to low adoption to domestic usage of Gas. They study was conducted for a period of one month and two weeks that is to say starting with April 2021.

1.7 Justification of the Study

Over the last decade, the rate of consumption of wood fuel resource has greatly increased in Fort Portal due to the increasing population which has triggered developments, settlements among others and as such several forests and woodlands have been destroyed to satisfy their energy and food requirements.

The city has therefore had a significant reduction in their forest areas with severe environmental and climatic impact in the region. The city therefore needs to adopt natural gas as its dominant energy source in order to save the dribbling forest lands and mitigate the environmental impact of deforestation.

1.8 Significance of the Study

The study results provide evidence informing private sector, Government, Civil Society Organizations and the other development actors on the why there has been a low adoption to domestic use of Gas energy for cooking in fort portal.

The study provided facts about the sources of energy for cooking to the newly created Fort Portal Tourism City and appealed to the authorities to focus on the elimination and mitigation measures to the encroachment on the neighboring forest resource due to the expected increment in population relying on the wood fuel for cooking.

The research provided proof to the households on which source of energy for cooking can be more reliable to them for a long time than being rigged to one unreliable source.

1.9 Conceptual Framework

Below provides a graphical conceptual behind the variables of the study and how they are related to each other. Adapted from (Stanford Natural Gas Initiative, 2017).

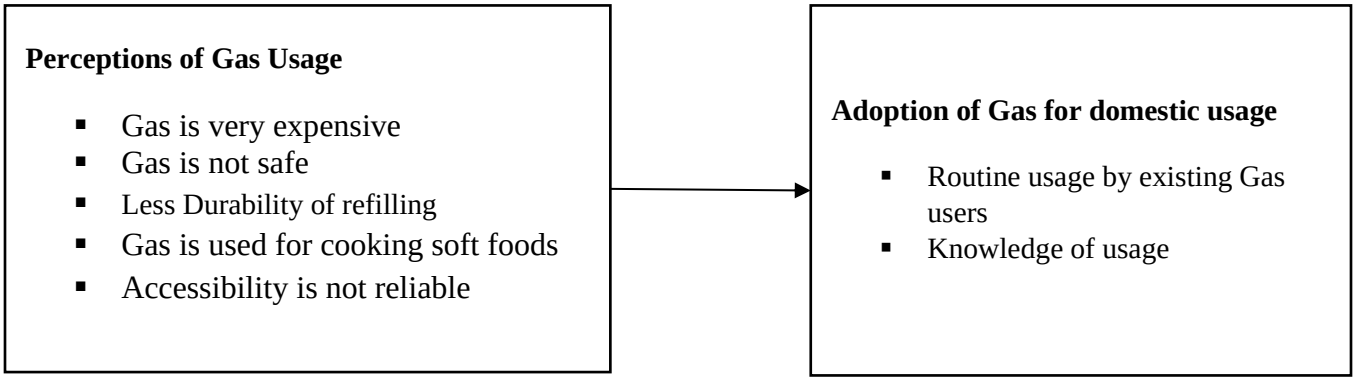

Figure 1 Conceptual framework

This study considered perceptions of gas usage as an independent variable with elements such as Gas is very expensive, gas is not safe, durability of refiling, not fast at cooking and gas is used for cooking soft foods. The dependent variable is adoption of gas for domestic usage with variables such as Routine usage of gas, Volume of gas consumed, and the Knowledge of gas usage.

2 CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter discusses the available information from other researchers on the households' perceptions on the domestic usage of gas, the adoption of domestic gas usage and the relationship between their perceptions and adoption of gas for domestic gas usage.

2.2 Perceptions on Usage of gas

It is believed that there is limited information to sensitize households on the domestic used of gas locally in the upcountry of Uganda. This could also be the reason to why FAO research indicates that over 79% of people in African countries remain completely reliant upon wood for energy and cannot anticipate any rapid transition to other energy sources (Agea & Okia.etal., 2010)

However, according to the study conducted by (Simcock, 2013) in the UK government suggested that "the factors influencing perceptions of energy information can be split into three major groups that is to say factors relating to the content and form of the information being communicated, factors related to perceptions of the information source and factors relating to the process through which information is communicated." Users have difference perceptions and among them are Gas being expensive, not being safe for a family set up with children, less durability of refilling, Gas is used for cooking soft foods, its accessibility not being reliable.

Gas being expensive

According to (Shell Uganda, 2021), the cost of refilling a 6kg portable gas pack ranges from 49000Ugx – 55000Ugx and the new purchase of the same cylinder with its accessories is 180000Ugx, refilling a 12kg gas cylinder pack ranges from 96000Ugx – 100000Ugx and buying a new one is 280000Ugx – 324500Ugx which is perceived to be every expensive to an ordinary household in Uganda.

Other researches shows that Uganda consumes a million cubic feet (MMcf) of natural gas per year as of the year 2017 and it was ranking 114th in the world for natural gas consumption, accounting for about 0.000% of the world's total consumption of 132,290,211 MMcf (Stanford Natural Gas Initiative, 2017). This is basically a very small amount of gas consumed according to the world's consumption of Gas which needs to be given attention.

Gas not being safe

According to the study conducted by (Jo-Young-Do, 2001), In spite of using safety devices, a few hundreds of gas accident were happened annually in residential houses. And also, it was suggested that the rate of accident was decreased quantitatively by increasing safety device which is adapted in domestic.

The study proved that gas safety devices were very effective to preventing catastrophic gas accident in domestic households'. The safety devices are included in domestic gas equipment such as extinguishing safety device and adapted at pipeline such as fuse cock, shut off device with gas alarm and so forth.

By analysis of 769 gas accidents in domestic homes in Korea, the order of effectiveness of safety device to prevent domestic gas accident was the multi-functional gas-safe-meter (micom-meter), fuse cock, gas leak alarm and CO alarm. It concluded that if the above four kind of safety device were to be adapted to every household, about 59% of accident will be reduced and the most of catastrophic gas accident will be Prevented in domestic.

Durability of refilling Gas cylinder

The durability of refilling a gas cylinder varies with the size of the gas, burner size and the number of times of usage per day.

According to (Hahn, 2019), a 12kg cooking gas bottle will last from about 8 days to 74 days, depending upon burner size and amount of use. If you use a small 5MJ burner for 30 minutes per day, the gas bottle will last 74 days.

Measuring in hours, a 12kg cooking gas bottle would last from about 37 hours to 12.4 hours, depending upon burner size and amount of use. This gas bottle estimate assumes having the burner on the maximum setting, and last longer on lower settings.

He further explains that a 12kg cooking gas bottle contains about 185MJ of energy and to calculate how long your cooking gas bottle will last, just divide the 185MJ by the burner size and if you use more than one burner, you need to add their MJ ratings together before you divide.

Accessibility of gas

Uganda imports all its petroleum products requirements from overseas since there is yet no local production. According to (EnergyPedia, 2015), about 90% of Uganda's petroleum imports are routed through Kenya with only 10% coming through Tanzania. The costs of transportation of the products from the seaports (Mombassa and Dar es Salaam) are high.

For this matter therefore, it indicated the consumption of petroleum in Uganda by 2015 was standing at 550,000 m^3 per annum and was low compared to those of her neighbors Kenya and Tanzania. Consumption of petroleum grew at an average of 14% per annum between 1993 and 1996, then slowed down to about 6% per annum since 1997 (EnergyPedia, 2015).

As of 2007, consumption of petroleum in Uganda stood at 800,000 m3 per annum growing at about 6% per annum since 1997. The petroleum import bill stands at US$ 250 million per year. This constitutes about 8% of total national imports and represents slightly above 20% of total export earnings. The information provided shows inconsistence in supply of the petroleum products hence making it not reliable for domestic usage especially on providing energy for cooking hence affecting adoption.

2.3 Adoption of Gas for domestic Usage

According to World meters, the worldwide natural gas consumption has been rising on a low pace over the past 20 years. In 2019, natural gas consumption worldwide amounted to nearly 3.9 trillion cubic meters (Sonnichsen, 2021).

The world's largest consumer of natural gas is the United States, which consumed some 846.6 billion cubic meters in 2019. The U.S. is also one of the largest producers of natural gas in the world, reaching 863 billion cubic meters in 2018.

According to Stanford Natural Gas initiative, the world's natural gas demand is projected to grow by 50% by 2040, with much of that driven by developing regions such as Africa. Africa's natural gas demand, in particular, is anticipated to grow because it's relatively cheap and abundant.

Stanford Natural Gas Initiative data shows that East Africa is a region that has benefited greatly from improvements in exploration and drilling techniques. "The large discoveries of natural gas

in offshore Mozambique and Tanzania will contribute to meeting the rapidly growing worldwide energy demand for both domestic and industrial needs (Stanford Natural Gas Initiative, 2017)."

However, FAO research indicates that over 79% of people in African countries remain completely reliant upon wood for energy and cannot anticipate any rapid transition to other energy sources (Agea & Okia.etal., 2010).

Furthermore, (Stanford Natural Gas Initiative, 2017) shows that 10% of households in East Africa will cook with natural gas by 2045 which is small percentage. It also makes an assumption that 20% of all petrol vehicles will like be converted to natural gas vehicles.

Uganda in the near further is going to start the production of Oil and Gas. Therefore, gas energy is going to be reliable, accessible, affordable and sustainable for domestic use compared to other sources of energy especially fuel wood which have continuously become a threat to the natural forests.

Usage of a product can be determined by a measure of adoption, engagement and retention. For this particular study, adoption will be used to determine the perceptions of households towards domestic usage of gas.

Adoption

In the context of products and services, adoption is the act of beginning to use something new. Considering new features and new users, there are four types of user adoption (Tomer, 2018):

Internal adoption is when existing users begin using new features.

External adoption is when new users begin using existing features of a product.

Adoption flags is where new users adopt new features. A green flag is raised if they're successful, and no red flags are raised when they're not.

Routine adoption happens when existing users adopt existing features. For this case, adoption is irrelevant since it focuses at the number of time the existing user engages in the existing features of a product.

This study will basically focus the two types of adoption routine and adoption flag to identify the number of times the exiting users engage in users and those willing to have or already have the gas as new users. Investigations on the information concerning usage will be determined for both the new users and those will to start domestic usage of gas.

2.4 Relating perceptions to the usage of gas

In simple terms, a perception is the way in which something is regarded, understood, or interpreted. Therefore, the perceptions of a person towards a particular product/ service (gas for cooking) have an influence towards its usage.

As stated before that the cabinet of Uganda approved the creation of 15 cities in a phased manner for the purposes of decongesting the capital Kampala. Fort portal was one of the first 5 created cities which is likely to rise the population size who will need energy for cooking yet wood fuel remaining the main source.

Adoption to other sources of energy has remained low and this could be due to the way they perceive them. Therefore, the domestic usage of gas depends on the how the users perceive it. If there are negative perceptions toward usage, then adoptions are low and vice versa.

The information created internally in one's mind is regarded to how s/he interprets something and therefore if there is no clear information to sensitize that particular person, adopting it will remain low.

3 CHAPTER THREE: METHODOLOGY

3.1 Introduction

This chapter shows the various methods and techniques that applied while conducting this study. It also shows the measurement tools/ instruments on how data was collected, processed and analysed.

3.2 Study Area

The study was conducted in Fort Portal Tourism city situated in the mid-west of Uganda in the Rwenzori Region. Fort portal was recently created as a City with political divisions namely; Central and North divisions and its main source of energy for cooking is wood fuel and low adoption to domestic usage of Gas. For that reason, therefore, Fort portal was a good case study for this particular topic. The study focused on households both those currently using gas for cooking and those depending on wood fuels

3.3 Research design

The study basically used a cross sectional research design so that the researcher can apply survey techniques to gather data at a relatively low cost and take up little time to be conducted. This focused on a subsection (households) of the population of Fort Portal Tourism City for the purposes of responding to the research problem.

3.4 Population and sample size

According to August 2014 national population census, the population fort portal was estimated at 54,275. Nationally, the average household size is 4.7 people per household. It is calculated by dividing the household population by total households (Africageoportal, 2019). Therefore, the number of households (study population) in Fort portal was determined by dividing the heads of people in fort portal by the national average household size of people per household $54275/4.7$= 11,548 households.

Therefore, taking 8% as a margin of error and 90% as the confidence level, the sample size of the study will be 106 households representing the entire population (SurveyMonkey, 2021).

3.5 Sampling Techniques

The study adopted the clustered sampling technique and the two city divisions were used as sampling units. The population studied was already geographically divided as political divisions for the purposes of political leadership.

Therefore, the study involved simple random sampling while including different respondents from the two city division.

3.6 Data Collection Methods

The data was collected using a questionnaire through conducting or driven by interview. This method was applied because it was the most appropriate for the study since its fast. Interviewing creates a friendly relationship between the researcher and the respondent hence reliable information obtained. In addition to that, the research also involved observations data collection techniques and the researcher physically reached the household premises and witnessed the type of cooking equipment used.

3.7 Research Procedure

The researcher identified himself using the Institute of Petroleum Studies, Kampala academic Identity card. The researcher also introduced himself verbally introduced to Fort Portal City administrators who later gave him the mandate to reach out to the respondents. The researcher personally distributed research questionnaires and conduct interviews. Each questionnaire was accompanied by an identity card for evidence that he is studying at the mention academic institute.

3.8 Data Management and Analysis

The management of data involved processing of both quantitative data and qualitative data. The processing of quantitative data which involved coding, entering the data into the computer using the Statistical Package for Social Sciences SPSS, summarizing them using frequency tables to identity errors. Quantitative data analysis will involve calculation of descriptive statistics and frequencies for descriptive analysis. Processing of qualitative data will involve familiarization with the data through review, reading and exploration of relationships between categories after data has been analyzed.

3.9 Ethical considerations

This research involved respect and discipline without hindering the rights of others. For example, the social norms; way of greeting in Tooro region will be emphasized.

The respondents were appropriately informed by the researcher on the purpose of the study, clarified how to attempt a questionnaire/ briefed them before data collection commenced, why and how they were helpful in the study. This helped in ensuring that data presented, analyzed and interpreted is strictly base on the data that was collected hence its' honesty.

3.10 Limitation of the study

The study was limited to only one and half months to collect and analyze data, which wasn't enough for this researcher. However, the researcher utilized his time appropriately to and ensured data was collected and analyzed.

Even though the research was able to reach out to the respondents, some of them were not willing to respond to the questionnaire. To solve this challenge, the researcher convinced the respondents that their responses will be kept confidential and only used for academic purposes. In the end result, this created some delay to meeting the researcher's scheduled plan.

4 CHAPTER FOUR: DISCUSION OF RESULTS AND OUTCOMES

4.1 Introduction

This chapter presents, discusses the results and outcomes of the study in form of tabulations, pie charts, bar charts and histograms

4.2 Data presentation and analysis

This research targeted a sample size 106 households and the researcher was managed to reach out to all of them coming out with no missing respondents.

The research results indicated that more females of about 65.1% were interviewed than the males at 34.9% which proves that women are more domestic than men. The researcher's time of collecting data was corresponding with the prime hours where most females were available in their homes preparing lunch and dinner hence meeting them at home. The table below shows the frequency, percentage and the accumulating percentage of gender.

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	37	34.9	34.9	34.9
	Female	69	65.1	65.1	100.0
	Total	**106**	**100.0**	**100.0**	

Table 1: Gender of respondents

Furthermore, the position of being a mother in a household in particular participated more than any other position in this research at 53.8% which is an evidence that they are care takers a home regarding family welfare in as far as cooking is concerned. Household heads participated at 36.8% which also involved both fathers and some few mothers who could acted as single parents in their families.

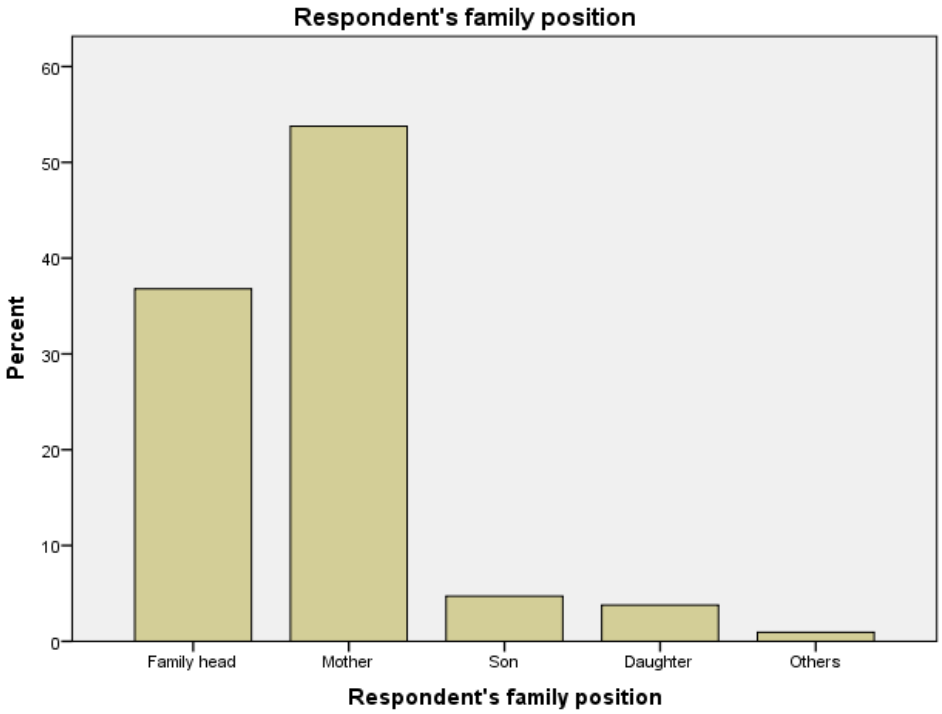

Figure 2: Graph showing the position of the respondents and their rate of response

The overall population sample size was categorized in different levels of education and 28.3% represented the most participants at certificate level, followed by the 27.4% representing secondary leavers, below & primary leavers at 17% with diploma holders at 13.2% and the respondents at a level of a degree and above were at 14.2% as shown in the table below.

Level of education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Primary and below	18	17.0	17.0	17.0
	Secondary	29	27.4	27.4	44.3
	Certificate	30	28.3	28.3	72.6
	Diploma	14	13.2	13.2	85.8
	Degree & above	15	14.2	14.2	100.0

	Total	**106**	**100.0**	**100.0**

Table 2: Level of Education of the respondents

Certificate and secondary level respondents scoring the highest percentage could also mean that most women in these families did not go beyond the level of a certificate since they were the also the most respondents at 65.1% and of which 53.8% of the total respondents were house wives.

The table below reflects the research findings about a bout different occupation's percentage responses and frequency. Some of the occupations that participated in the research included the business people, teachers, doctors, nurses, farmers, police men and others among others as shown in the table.

Occupation

		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Business	33	31.1	31.1	31.1
	Teacher	10	9.4	9.4	40.6
	Doctor/ Nurse	11	10.4	10.4	50.9
	Driver/ Boda boda	9	8.5	8.5	59.4
	Student	6	5.7	5.7	65.1
	Farmer	22	20.8	20.8	85.8
	Community/ social worker	5	4.7	4.7	90.6
	Police offer	6	5.7	5.7	96.2
	Finance/ Accountant	4	3.8	3.8	**100.0**
	Total	**106**	**100.0**	**100.0**	

Table 3: Occupation of the respondents showing their rate of participations in the study.

About 31.1% of the entire respondents were from the business community which is an indication the that fort portal tourism city is occupied my most of the business women and men followed by farmers at 20.8% as per the research findings.

According to research findings, charcoal was confirmed the major source of energy for cooking in fort portal tourism city followed by wood at 75.5% and 21.7% respectively.

Only 2.8% used gas as their major source of energy for cooking and non was found relying on hydroelectricity except a few people using it as an alternative. Charcoal taking the lion's share as an energy source for cooking followed by wood confirms the that households in the tourism city are still reliable wood fuels.

Major Energy source for cooking

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Charcoal	80	75.5	75.5	75.5
	Fire Wood	23	21.7	21.7	97.2
	Gas	3	2.8	2.8	100.0
	Total	**106**	**100.0**	**100.0**	

Table 4: The major cooking energy sources and their rate of usage

This reliability of people on wood fuels could be brought up by the fact that they lacking Information concerning the domestic usage of gas for cooking since one of their main limitation to adopting to using gas was basing on the cost of buy yet this cost is encountered once and forever.

However, more than a half of the sample size households were having an alternative source of energy for cooking. About 56.6% of the households had an alternative energy source for cooking and 43.4% were did not have any other alternative.

Any alternative energy source for cooking

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	60	56.6	56.6	56.6
	No	46	43.4	43.4	100.0
	Total	**106**	**100.0**	**100.0**	

Table 5: Ownership of the any alternative energy source

The 43.4% of the households who didn't have any alternative energy source for cooking are most likely relying on wood fuels and particularly fire wood which is an alarming concern that requires attention by the concerned parties.

The results show that most of the households used firewood as their alternative for cooking. Surprisingly, 34.9% of the households used fire wood as their alternative source of energy for cooking and by observation, the researcher beliefs that most of these households are the very ones using charcoal as their major source of energy for cooking. However, Gas was the second main alternative energy source for cooking at 10.4% usage. This was an impressing figure about the gas consumption by households which was an indication that if there is a cost friendly gas gadget and a sustainable way of minimizing its attached challenges, there are high changes of adoption.

Charcoal was at 9.4% consumption as an alternative energy source for cooking despite the fact that it led as a major one for over 75% consumption.

Hydro-power was only use and alternative energy source for cooking at 1.9% and it was never used as a major source of cooking energy.

The table below shows the findings obtained from energy sources usage for cooking as an alternative by the households of fort portal tourism city.

Name of alternative energy source

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Don't have any	46	43.4	43.4	43.4
	Charcoal	10	9.4	9.4	52.8
	Fire Wood	37	34.9	34.9	87.7
	Gas	11	10.4	10.4	98.1
	Electric power	2	1.9	1.9	**100.0**
	Total	**106**	**100.0**	**100.0**	

Table 6: The alternative energy and their rate of usage by respondents

The table below shows the alternative energy sources names and how often then households use used their alternative energy sources for cooking. The measure on the alternative energy source usage was as shown; Not at all representing "**Can't remember, never used and used over a month ago**", Once in a while was representing "**1-5days a month**", sometimes was representing, "**6-10 days a Month**" and finally fairly often was represented by "**above 10days**". Firewood was used most as an alternative source of cooking energy as stated earlier and about 21 (56.8%) of 37 households used it for about 1-5days in a month. About 14 (37.8%) of the firewood users as their alternatives used it in 6-10 days a month and those who used it beyond 10 days was only 1 (2.7%) and only 2.7% never used Firewood as their alternative energy source in the last one month.

Gas was the second most used as an alternative source of cooking energy as shown in the previous table and about 6 (54.5%) of 11 households used it for about 1-5days in a month. About 5 (45.5%) of the Gas users as their alternatives used it in 6-10 days a month and there was no household which used it beyond 10 days. Gas being used as the second main energy source was displaying some impressing adoption, however, the users could have been households with a few members if not the ones already in the middle income status.

Charcoal usage as the alternative cooking energy and it being the major cooking energy in Fort portal tourism city, only 10 households chose it as an alternative where 50% of them used it in 1-

5 days and the other half used it in 6-10 days a month. According to the researcher's observation these were the adopters of charcoal as their cooking energy from wood.

Hydroelectric power was still lagging behind chose as alternative energy for cooking with only 2 households where half used it as in 1-5 days and the other in 6-10 days. This could have been due to the fact that a cooker consumes high electricity and the cost of a unit is high compared to other energy sources.

Name of alternative * Often of usage of alternative energy for cooking Cross-tabulation

Count

		Often of usage of alternative energy for cooking				Total
		Not at all	Once in a while	Sometimes	Fairly often	
Name of alternative	Don't have	44	1	1	0	**46**
	Charcoal	0	5	5	0	**10**
	Fire Wood	1	21	14	1	**37**
	Gas	0	6	5	0	**11**
	Electric power	0	1	1	0	**2**
Total		**45**	**34**	**26**	**1**	**106**

Table 7: The Alternative cooking energy source and its' often of usage by particular households

Most importantly, over 32% of the entire households sampled had ever used gas for cooking and the researcher's concern was on why only 2.8% used it as a major source of energy for cooking and 10.4% only as an alternative energy source. This could also mean that some households could have used gas as their third alternative since the researcher focused on usage and not on ownership. The 67.9% of the sampled households had never used Gas at all and these could mean that they are the ones who rely on firewood as their major and those relying on charcoal with no any other alternative energy for cooking. The figure below is the table showing the statistical results of the households to the close ended question of whether they ever used gas for cooking.

Did you ever use Gas

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	34	32.1	32.1	32.1
	No	72	67.9	67.9	**100.0**
	Total	**106**	**100.0**	**100.0**	

Table 8: Rate at which respondents ever used gas for cooking

Several challenges were pointed by households which ever used Gas energy for cooking and about 9.4% mentioned the challenge of gas not lasting for long after refilling followed by the cost of refilling at 8.5%, inconsistence gas supply at gas station at 5.7%, rare or unavailability of spare parts at 4.7% and finally gas not being safe for property and life especially the children at 3.8%. However, 67.9% comprised of the households who never used gas and therefore couldn't face challenges on usage.

The challenge of not lasting longer leading the others may indicate that even the few that are using the gas complain about the refilling charges and this could lead to them to dropping it or making it the alternative energy source for cooking.

The point of concern was the rare availability of gas spare parts and inconsistence supply of gas on stations. The challenge of unavailability of the spare parts would be the reason to why some many households were identified to have ever used gas but the ones using it as major and alternative were few. The same applies to the inconsistence gas supply of gas on the gas station, however this could be brought up by the low demands that make suppliers reluctant in supply.

Challenges on usage

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never used/ No challenges	72	67.9	67.9	67.9
	Cost of refilling	9	8.5	8.5	76.4
	Doesn't last long after refilling	10	9.4	9.4	85.8
	Rare spare parts	5	4.7	4.7	90.6
	Not safe for children	4	3.8	3.8	94.3
	Inconsistence gas supply at gas stations	6	5.7	5.7	**100.0**
	Total	**106**	**100.0**	**100.0**	

Table 9: The challenges gas users faced while using gas for cooking

The researcher further assessed the households that never interacted with gas for cooking and a number of limitations were appointed and at most thinking it is very expensive buy ranking it at 42.5% followed by it not being safe for property and life especially to children at 14.2%. The cost of refilling was mentioned by 4.7% as a limitation for households from adopting Gas usage as their source of energy. Among other limitations mentioned was households thinking that gas do not last longer after refilling gas cylinders, have less knowledge on usage, and they also perceive it to be associated with risks of explosion at 2.8%, 2.8% and 0.9% respectively. This could mean that most households perceive gas as very expensive to be afforded which covers close to a half the sample population.

Economically, this could also mean that most citizens in the fort portal tourism city may either be low income earners or just a fixed perception that need to be eliminated out from their minds. The table below shows the limitations and how they are ranked according to how households perceived them in this particular study.

Limitations if never used gas

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Ever used gas	34	32.1	32.1	32.1
	Not safe for property and life	15	14.2	14.2	46.2
	Doesn't last long after refilling	3	2.8	2.8	49.1
	Cost of buying is high	45	42.5	42.5	91.5
	Cost of refilling is high	5	4.7	4.7	96.2
	Risks of exploding	1	0.9	0.9	97.2
	Less knowledge on usage	3	2.8	2.8	**100.0**
	Total	**106**	**100.0**	**100.0**	

Table 10: The limitations of non-gas user perceive not to adopt to gas usage for cooking.

While accessing the desire and reliability of the household indicated that most of them were passionate to adopt and rely on gas as their main source of cooking energy irrespective of the challenges and limitations. Therefore, if the hindrances mentioned are mitigated, there could be a great change increase in adoptability. About 80.2% of the sampled households were strongly will to adopt to the usage of Gas energy for cooking and rely on as their main without doubt as long as their hindrances are mitigated without doubt. In a relatively a similar way, 15.1% were willing to adopt to gas usage for cooking though the researcher identified some doubts.

Finally, about 4.7% of the households were honestly open and clear that they can't adopt to gas usage for cooking (not willing at all). The reason behind this according to the observation of the researcher was low self-esteem. Some households never believed positively about themselves and instead had a negative attitude towards the usage of gas for cooking though others did not have reason for not willing. If only 4.7% are not willing to adopt, this means about 95.3% have the desire to adopt and fully relay on the gas as their source of cooking energy.

Therefore, something needs to be done to eliminate the negative perceptions of the households toward the domestic usage of gas and particularly cooking by the authorities. In the same way attracting those with no desire to adopting to Gas usage for cooking.

Desire to usage of Gas for Cooking

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly willing to adopt and rely on it	85	80.2	80.2	80.2
	Somehow willing to adopt	16	15.1	15.1	95.3
	Not willing at all	5	4.7	4.7	**100.0**
	Total	**106**	**100.0**	**100.0**	

Table 11: The desire of the respondents to adopting to using and relying gas energy for cooking

The researcher further assessed the reasons to why the 4.7% of the sampled population was not willing at all. Some of the reasons that were mentioned included households being comfortable with their current cooking energy in use, households not convinced that challenges and limitations can be eliminated or mitigated, can't shift to usage of gas while not in their permanent houses and some were still in rental houses with low self-esteem and each one of these reasons were mentioned at 0.9%. Only 1.9% of the households did not have any trust on the energy source for cooking and there had no dream to adopt it.

As said earlier on, these households standing at 4.7% are same households who will remain standing as laggards in adoption as gas is gaining market share in Fort portal tourism city as major source of energy.

Reason for not willing to adopt/ rely

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Have no reason to why they should not adopt/ rely on gas for cooking	101	95.3	95.3	95.3
	Comfortable with the energy I am using	1	0.9	0.9	96.2
	Not convinced that limitations/ challenges can be avoided	1	0.9	0.9	97.2
	Cant shift to it when I am poor and still in rent	1	0.9	0.9	98.1
	No trust at all	2	1.9	1.9	**100.0**
	Total	**106**	**100.0**	**100.0**	

Table 12: Reasons mentioned by respondents to why they are not willing to adopt.

According to the general observation of the researcher basing on the attitude, sight of the kitchen and political involvement had a great impact on determining the general population's perceptions towards gas usage for cooking.

5 CHAPTER FIVE: RECOMMENDATION AND CONCLUSIONS

5.1 Introduction

This chapter contains the summary of the main findings, recommendation and the conclusion of this particular study. The study was assessing the households' perceptions towards domestic usage particularly cooking in fort portal tourism city. However, it is estimated that over 80% of its residents utilize wood energy for cooking yet its population is projected to increase tenfold by 2040 (Vision 2020) which is most likely to have some significant implications on the forest cover in the area as the already limited wood fuel resources has been over exploited.

The city has the potential for domestic gas usage but its adoption has remained low even amongst the affluent households. Limited information is documented on the underlying factor for this low adoption.

5.2 Summary of the findings

The general response rate to the study, the entire targeted sample population was able to fully respond up to a hundred percent. About 72 questionnaires were distributed to households and 34 were conducted through interviews and all actively participated.

The was more females responding compared to men and this was expected due to the fact that they were more target than males since traditional norms in Tooro are they mums and more for cooking unlike the dads.

There was no much range/ difference between the education levels of the respondents in terms responding to the questionnaire. However, the results showed the certificate holders being the highest respondents and diploma holders the least respondent even though the range is minimal. Looking at the respondents at the angle of occupation, the business community highly respondent to the with huge percentage compared to the others and this was due the fact that the study was urban and in the business environment.

Charcoal was massively used as the major source of cooking energy in most of the households followed by the firewood then finally Gas. Hydroelectricity power was not used at all as a major source of cooking energy in any household rather is was used by a very few households as an alternative energy source for cooking. Firewood was the leading alternative energy source for cooking and the researcher observed that most households were migrating from firewood to

charcoal which still contains the same impact on the natural forest. The worst part of it, firewood was used by most of the households at a rate of 1-5days am month followed by a few households using gas. Gas usage appeared as the second alternative for some families and with most used in about 1-5 days a month, which means that it's not only about it being perceived as per many families mentioning many limitations but also its adoption is possible if intervention is done by the concerned authorities. This was confirmed by the high percentage of respondents saying they had ever used Gas before.

For the gas users, challenges such as Cost of refilling, not lasting long after refilling, Rare spare parts, not safe for children and proper and finally inconsistence of gas supply at gas stations were mentioned with "*the time taken after refilling being short"* dominating most by most users. However, the households who never used gas before perceived gas to be very costly to buy and own followed by the it being hazardous to property and life especially to children. These perceptions mentioned as limitations by the most households who never used gas could have been due to less information available though some few households sounded rigged with less hope at adoption.

5.3 Recommendations

Basing on the findings of study mentioned above, below are some of the recommendations made;

The fact that most of the households who ever used gas for cooking complained of it not lasting longer for cooking, the relevant producers of gas cylinders need to come up with reliable, effective and efficient gas gadgets. This will eliminate or mitigate the challenge of quick exhaustion after refilling which most households (gas users) are facing.

There is need for the concerned authorities such as the local leaders, NGOs, civil society Organizations and other private development actors to rise up the voice and sensitizing the residents on how good it is to use gas than encroaching on the natural forests for wool fuel.

The major limitation for the households from adopting to the gas usage for cooking was its high cost of buying. Therefore, there is a need by the concerned service providers to establish cost friendly gas cylinders that are efficient enough for the household to adopt since almost all the households expressed their desire to adopting and relaying of gas for cooking.

Over 90% of the households were confirmed depending on wood fuel for cooking. Therefore, much sensitization is still required for the local government and other concerned authorities to emphasize concept of "*cut one plant five*" to ensure the environment is conserved and mitigate the environment disasters, climate change among others.

Furthermore, recommendation goes to the Government of Uganda to the focus on the oil and gas industry not only for commercial business but also transforming the households financially to eliminate their perceptions that domestic gas usage is only for the rich since it is expensive.

I finally appeal to the households that have already adopted to the domestic usage of gas as their major source of energy for cooking to emphasize their neighbors to adopt and rely on it especially those who already use gas as their alternatives energy for cooking. Spread benefits you have expressed while using gas over other alternatives of energy source for cooking.

5.4 Areas for further research

Firstly, there is need to examine the impacts of excessive usage of wood fuel by households to the surrounding natural forests. The study should look at these impacts comparing the current previous years, the current and the coming years by the use of satellite images. This will determine how unsafe the nature forests are if the households consistently depend on them for wood fuel.

Secondly, research needs to be made to examine the households' income status and expenditures on cooking energy. This will help to identify the ability of each household and prove which energy source for cooking is more experience for a period of time.

Finally, research is needed to identify and evaluate the capacity of petrol stations available in fort portal to providing energy services to the increasing population. This will provide information regarding the supply of gas in the Tourism City.

5.5 Conclusion

In the conclusion therefore, after assessing the households' perceptions to the domestic usage of Gas in Fort Portal Tourism City, a number of perceptions were mentioned by various households where same of them were continuously mentioned to prove the general belief of the residents of fort portal towards gas usage. It is confirmed that wood fuel still remains the major source of cooking energy and particularly charcoal.

Therefore, the new created fort portal tourism city is most like to be highly populated in the near future since the main purpose of creating more cities was to decongest the capital city Kampala. This has a great impact on the natural resources in the neighborhood of fort portal city if the authorities haven't gotten the solution to the problem of encroachment on forests for the wood fuel mainly charcoal.

Having found out that the most of the households are strongly willing to adopt to the domestic usage of gas, this proves that their perception perceptions are easy to manage and influence the to adopt and relay on gas. This can only be possible if the concerned authorities intervene to activate their desire into reality by eliminating/ mitigating the households' challenges and limitations.

Finally, the availability of information to the households is the first step to solving the problem of over depending on the natural resources.

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Appendix 1…… Questionnaire

Good morning/ evening

My name is **Kibalirwa Godwin,** a student at the Institute of Petroleum Studies- Kampala in affiliation with Uganda Christian University pursuing a Bachelor of Science in oil and gas. I am currently conducting an academic research about ***households' perceptions on the domestic usage of gas in fort portal tourism city.***

Your participation is voluntary and I assure you that your personal data remains confidential and neither will it be disclosed to any person nor entity.

Any other information obtained from this study will only be used for academic purposes. Therefore, I kindly request you to answer each question appropriately and don't mind leaving any question unanswered if you are not sure.

Part 1

This part of the questionnaire will capture your personal data and you are required to answer by a tick or write where necessary

1. **Gender**

   (a)Male (b) Female

2. **Position in a family**

(a) Father (b) Mother (c) Son (d) Daughter (e) Grand Child (d) Others

3. **Level of education**

(a) Primary (b) Secondary (c) Certificate (d) Diploma (e) Degree and above

4. **Occupation** _____

Part 2

This part is capturing the perceptions on towards domestic usage of gas. You are required to tick or write the appropriate answer as per your opinion.

6. **What is your major source of energy for cooking?**

(a) Charcoal (b) Wood (c) Gas (d) Electric power (e) Specify others……

7. **Do you have any other alternative Energy source for cooking?**

(a) Yes (b) No

8. **If yes, Name that alternative Energy source.**

(a) Charcoal (b) Wood (c) Gas (d) Electric power (e) Specify others……

9. How often do you use this alternative energy for cooking? _____

1 Not at all	**2** Once in a while	**3** Sometimes	**4** Fairly Often	**5** Frequently, if not always

10. **Have you ever used gas for cooking?**

(a) Yes (b) No

11. **If yes, how often are you faced with these challenges associated with using gas for cooking?**

Please answer items below by ticking a number from **1 to 5** that best reflects your perception. Judge how frequently each statement fits you. Use the following rating scale

1 Not at all	**2** Once in a while	**3** Sometimes	**4** Fairly Often	**5** Frequently, if not always

	Challenges on Usage of Gas for Cooking	1	2	3	4	5
	Cost of refilling is high					
	Doesn't last long after refilling					
	Hard to operate					
	Rare spare parts					
	Not safe for children					
	Inconsistence gas of refilling at petrol/Gas stations					

12. If you have never used gas for cooking what is limiting you from using it

Please answer items below by ticking a number from **1 to 5** that best reflects your perception. Judge how frequently each statement fits you. Use the following rating scale

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

	Factors limiting you from Using Gas for Cooking	1	2	3	4	5
	Not safe for property and life					
	Doesn't last long after refilling					
	Cost of buying it is high					
	Cost of refilling is high					
	Risks of exploding					
	Less knowledge on usage					

13. If your limitations and challenges are mitigated or removed, are you willing to adopt or rely on Gas as your major source of cooking energy?

Tick the appropriate answer that fits your desire to adoption of domestic usage of Gas

(1) Strongly willing to adopt

(2) Somehow willing to adopt

(3) Not willing at all

14. If no, give a reason

_____

_____

THANK YOU FOR YOUR TIME