



Effect of Electricity Services on Microenterprise: Evidence from Ganaja Village, Kogi State, Nigeria

Innocent U. Duru^{1*} and Abubakar Yusuf²

¹*Department of Economics, University of Abuja, Abuja, Nigeria.*

²*National Metallurgical Development Centre (NMDC), Jos, Plateau State, Nigeria.*

Authors' contributions

This work was carried out in collaboration between both authors. Author IUD designed the study, wrote the introduction, literature review, performed the statistical analysis, wrote and revised the first drafts of the manuscript. Author AY searched for the literatures, wrote the methodology, administered the questionnaire and analyzed it. Both authors read and approved the final manuscript.

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ABSTRACT

The development of sufficient and sustainable access to electricity services for micro-enterprises have been acknowledged as a major challenge confronting most developing country, and fast becoming a prerequisite for reducing poverty and achieving robust development of micro-enterprises. The study employed descriptive statistics to examine the role of electricity services on micro-enterprises establishment, growth, expansion, decline, and closure in rural Ganaja. Data were obtained from one hundred micro-enterprises located in Ganaja village of Kogi State. The results from the study showed that electricity services had both positive and negative effects on micro-enterprises establishment, growth, expansion, decline, and closure in Ganaja village. The findings further revealed that the effect of electricity services was felt in the opening of new businesses, expansion of existing businesses, employment of more employees, the decline in turnover, increase in income and stoppage of production or operation. The problems and barriers experienced by Micro-Enterprises in accessing and using electricity services are lack of service line materials such as fuses, cables, poles and transformers, complicated tariff structure such as high initial connection and installation fees and high monthly bills; illegal connection and vandalism

*Corresponding author: Email: iud3x@yahoo.com;

of cables and cooling transformer oil which causes power rationing, low voltage and fluctuation. The study, therefore, recommends increase access to capital for investments in electricity generating equipment and appliances; rural electricity access projects should focus on micro-credit provision, allowing the poor to purchase direct-use electricity generating equipment and appliances. Also, subsidies from the Local Government and credit based sales need to be provided to the micro-enterprises, encouraging them to purchase equipment such as generators to increase development in the village.

Keywords: Electricity services; micro-enterprise; rural-areas; Kogi State.

1. INTRODUCTION

The term "micro-enterprise" refers to a very small business that produces goods or services for cash income" [1,2]. Also, micro-enterprises are productive or economic units operating in rural and urban areas, and, as in larger enterprises, generally combine at least two factors of production; labour and capital, as in furniture making or textile processing; labour and natural resources, as in agricultural goods processing; and labour and some type of organization in the workplace, as occurs in most petty trading and commerce [3].

It is well known today that technological, industrial and economic progress is heavily dependent on the readily available energy; the enormous technological, industrial and economic advancement of the so-called developed countries was primarily made through exploitation of Earth's vast reservoir of inexpensive fossil fuels [4]. These fossil fuels, often imported from countries that lack the science and technology required for their effective utilization, helped the developed countries to attain affluence. They also help to control the destinies of less developed countries of the world. Today, developed nations, with one-fifth of world's population consume four-fifths of world's fossil fuels.

Electricity services have played an increasingly important role in economic development throughout the World. Micro-enterprise development has recently been recognized as one of the most promising economic development strategies, especially in low-income communities [5]. Rural Ganaja constitutes a good example of the strong role these enterprises play in community economic development, because much of the business activity in rural areas centre's on micro-enterprises creating jobs locally, serving as an exit route from poverty, serving as an economic adjustment strategy and providing goods and services to local residents.

The development of micro-enterprises in rural areas is linked with the increase in access and use of electricity services, leading to changes in micro-enterprises, and changes in livelihood characteristics of entrepreneurs, employees and community members in areas where these enterprises are located [6]. Micro-enterprises are important in their role as contributors to the economy of the rural poor especially women, technological development of rural people and in their potential for employment creation. In rural areas of Kogi State, micro-enterprises act as a vehicle for creating income distribution for rural poor, they are resources of poverty reduction.

The Nigerian government mandated the Bureau of Public Enterprise to assist in the restructuring and privatization of the National Electric Power Authority (NEPA) with a view to improving efficiency in the performance of the company. All these measures demonstrate the government interest to increase the number of energy consumers who had the ability and willingness to pay for electricity services.

Despite the importance, contributions, and potential of Micro-enterprises in the Nigerian economy, there are several factors that hinder their establishment, growth, decline and closure. Electricity services are one of the factors which may cause problems because modern electrical appliances such as welding kits and machinery which may pave the way to small and cottage industries cannot be used without accessible and dependable electricity services [6]. In addition, businesses such as bars and retail shops do not have convenient lighting and this reduces the number of customers. Moreover, there is a very little understanding of the linkages between uses and effect of electricity services and micro enterprises establishment, survival, expansion, growth, decline, and closure in rural areas in developing countries in general. In addition, there are no studies, to the best of our knowledge which concretely assessed the actual influence

of electricity services upon microenterprises development in the rural Ganaja.

Also, despite all government's policies directed at promoting and enhancing small business performances towards national growth, lack of direction, insecurity, corruption and poor infrastructure prevent them from really serving as motors of growth thus increasing the rate of their failure.

Arising from the foregoing, the following research questions were put forward; the key question is: Do electricity services play an important role in stimulating micro enterprises development in Ganaja village of Kogi State? The rest of the questions are what effect(s) do access to electricity services have in facilitating and supporting the establishment, growth, expansion, decline, and closure of micro-enterprises in rural Ganaja? and what are the main barriers and constraints experienced by micro-enterprises in Ganaja village of Kogi State by using electricity services? These are some of the issues this paper has looked at in order to obtain insight of relationship between electricity services and Micro-Enterprise's development in Ganaja village of Kogi State.

The findings and explanations in this paper are hoped to provide a better understanding of entrepreneurs, energy suppliers, policy-makers and other energy stakeholders on the linkages and influence of electricity services on micro-enterprises in rural areas.

In Nigeria, small businesses have been found to be limited in their performances by some factors that have not always been unconnected to their funding [7]. Electricity service is one of the factors, which may have both a direct and indirect impact on small micro-enterprises development. Generally, empirical evidence on the impact of electricity services on micro-enterprise success or failure is lacking. This lack of information/research about the role-played by electricity services in the performance of micro-enterprises in rural areas may be reflected in the lack of attention paid by responsible institutions, policy-makers and other stakeholders about rural electrification programmes. This paper assesses the influence of electricity services on micro-enterprises in rural areas of Kogi State and examines the effect of electricity services on micro-enterprise activity in rural Ganaja region to fill this gap.

The main objective of the paper is to examine the influence of electricity services on Micro-enterprises establishment, expansion, growth, survival, decline and closure in Ganaja village. The specific objective is to identify the barriers and constraints experienced by micro-enterprises in using electricity.

The rest of the paper is structured as follows. Section II reviews the literature. Section III describes the empirical methodology employed. Section IV will dwell on data presentation, analysis, and discussion. Finally, in section V, conclusion and policy recommendations are presented.

2. LITERATURE REVIEW

2.1 Electricity Energy as a Catalyst for Micro-Enterprise

Available literature shows that access to electricity energy is a necessary but not sufficient condition for the start-up and development of micro-enterprises. Another major finding is that, while lack of electricity energy is often viewed as a barrier to micro-enterprise development, removing this barrier (through, for example, energy development such as (rural) electrification) does not necessarily result in micro-enterprise development [8]. Moreso, access to electricity energy is neither the only nor even certainly the most important issue affecting micro-enterprise development. Other issues such as markets, access to finance, and other infrastructures are also very important.

There is a consensus in the literature that electricity energy motivates the emergence, growth and sustained development of micro-enterprises [9,10,11,4,12,13,14,6,8,1,15].

[14], quoted in [10], surveyed the increased economic activities and higher living standards due to the arrival of electricity in certain areas and concluded that electricity service is among the factors needed in influencing the decisions of local entrepreneurs to invest in a variety of productive enterprise. Nevertheless, due to lack of reliable information about the impact of electricity services on Micro-Enterprises development, many local entrepreneurs have little use of electricity services for production.

[9], embarked on a survey in four rural villages of Same, Sumbawanga, Babati and Njombe, all located in Tanzania, and concluded that

productive uses of electricity have resulted in a modest expansion of small-scale industries. A small factory, making nuts, screws, and bolts was established in Sumbawanga after electrification. In Kilimanjaro, six industrial projects had been started after electrification.

There is evidence that access to electricity services in rural areas in the developing world has led to the technological change in existing Micro Enterprises [6]. For instance, in rural areas of Indonesia, some shoe workshops changed from the use of manually operated machinery to electrical machines with an associated enhancement of productivity [10]. Also, many micro-enterprises transformed their technical and economic efficiency by going over to modern technology powered by electricity in the Philippines.

In Brazil and Mexico, the spread of electrification into rural areas stimulate an expansion of rural Micro-Enterprises activities through subcontracting, particularly of clothing and textiles production operations. Evidence of the impact of electricity from Elandsdraal, Northern Province in South Africa points out that electricity has a potential input for upgrading the condition of the Micro-Enterprises economy [10]. Also, [13], used Elandsdraal experience which provides strong support for the argument that the provision of electricity is an important precondition for the emergence and growth of diversified, dynamic small microenterprises.

[16] investigated the impact of rural electrification on social-economic development in Namibia and revealed that electricity services do not seem to have had a significant impact on the growth of income-generating activities. The findings from the same study show that the share of households with home-based income generating activities was highest among un-electrified households. Furthermore, few home-based enterprises use electricity for income generating activities, and when they do, mainly make use of electricity only for lighting. All the businesses using electricity started before rural electrification and hence electricity service could not have been the driving force behind the establishment of the new micro-enterprise.

[12] in his study on Rural Micro-Hydro Development Programme suggests that access to modern energy produced by micro hydropower in Nepal has been found to result in or contribute to the establishment of bakeries, photo studios,

battery charging shops, grocery stores, agricultural and saw mills and small-scale agricultural activities such as poultry farming and goat keeping. [11] reports a similar variety of Small and Medium Enterprises (SMEs) established and/or expanded following micro-hydro rural electrification projects in Kirinyaga and Meru Districts of Kenya.

[2] provided an overview of the current state of knowledge with regard to the impacts of modern energy on micro-enterprise and discussed the nature and extent of linkages that have been found to exist between modern energy and micro-enterprise activity. In terms of linkages between modern energy and micro-enterprise, their review indicated that: Modern energy can, but does not necessarily, affect the emergence, development, productivity and efficiency of micro-enterprise. In addition, [2], posited that irrespective of the fact that lack of access to modern energy is acknowledged as an obstacle to micro-enterprise development, eliminating this obstacle through electrification does not automatically result in the growth and development of microenterprise. Rather, modern energy should be viewed as one of a suite of critical enabling factors that act individually and/or in concert to create a suitable environment in which micro-enterprises can operate. It is therefore important to assess the significance of modern energy in terms of the hierarchy of other enabling factors needed for micro-enterprise development, for specific types of business, in particular circumstances. Furthermore, the linkages between modern energy and micro-enterprise, and the effects of the former on the latter can have a gender-specific dimension.

[6], employed descriptive statistics through the use of Triangulation method to explore the impact of grid electricity services on micro-enterprises establishment, expansion, growth, decline, and closure in rural areas of Tanzania. The research was a single case study, involving more than one unit of observation. Units of observation were selected from three villages in rural areas in Kilimanjaro; fifteen (15) enterprises were selected from each village Foo and Mahango, and thirteen (13) enterprises were selected from Lyasongoro village. These three villages are among the villages used by Enabling Access to Sustainable Energy (EASE) programmes in Tanzania as a study area. Foo and Mahango villages used by EASE for research on productive uses of electricity and

biomass heat energy. Lyasongoro village used for EASE for pilot projects on the promotion of improved firewood stoves, charcoal baking ovens, and charcoal production kilns for productive uses. In conclusion, the study revealed that there is evidence that rural micro-enterprises are enhanced by the availability of electrification programmes. The latter stimulate establishment, growth, expansion, decline, and closure.

[8], in his study, explored the relationship between modern energy and economically productive activities in rural Kenya. Employing a descriptive method of analysis and using Mpeketoni Village as a case study, the findings revealed that access to electricity, in combination with simultaneous access to markets and other infrastructure (roads, communication, schools, etc), have contributed to the robust growth of microenterprises in clear and compelling ways.

[4] in his study combined quantitative and qualitative methods, including informal surveys, intra-business energy allocation studies and historical analysis, to analyze off-grid electricity access among micro-enterprises in rural western Uganda. He explored the linkages between off-grid electricity access and the influence it has on microenterprises. Data were obtained from 56 micro-enterprises located in 11 village-towns within 3 districts in Uganda. The study showed that access to electricity can impact micro-enterprises by enabling the use of electric appliances, thus increasing productivity.

Nonetheless, there are contradictory reports and divergences in opinion in the literature regarding the influence that modern energy can and does have on entrepreneurial activities, and hence its developmental importance. A number of authors have offered explanations for these variations. One view is that modern energy is one of a number of critical enabling factors necessary for micro-enterprise development. For example, [17], reports finding greater numbers of businesses in rural areas with electricity than those without it, but also highlights that there were other complimentary local conditions such as "ready availability of adequate credit finance and access to markets".

Another perception is that while electricity is imperative to existing and well-established micro-enterprises, it is not so much a contributing factor in the emergence of new ones. Based on a literature review of international work on rural

electrification programmes [10], concludes that access to electricity encourages the modernization of existing rural Small and Medium Enterprise (SMEs) but it exerts only a modest stimulus for the growth of new enterprises. This skepticism is echoed by [16] who observed that overall, rural electrification does not seem to have had a significant impact on the growth of income-generating activities in Namibia. They noted that very few home-based businesses used electricity and when they did, they mainly made use of electrical lighting only. In their view, access to finance and markets are more important for Small and Medium Enterprises (SMEs) than electricity.

On the other hand, the supply of electricity in rural areas can have negative impacts on some people, particularly to the most defenseless or helpless people who may be displaced; for them, there may be no alternative source of livelihoods [2]. When households' tasks such as milling, weaving or other forms of food preparation are mechanized through electricity energy, they can be transformed into income generating activities with the resultant increase in the scale of output. This shift to mechanization can have a negative impact since it displaces traditional labour, particularly the unskilled and female home-based workers with smaller numbers of men [2].

Other proof concerning the negative impact of electricity is the replacement of hand – milling by small-scale motorized mills which meant that the poorest people in rural villages were often deprived of the small wage-earning opportunities available to them [18], cited in [2].

As noted by [19], electricity services may have a negative impact on women's welfare. This is because of decline in their welfare as a result extended working hour likely to result to increase in working days in home-based Micro-Enterprise's made possible by electrical lighting. They may derive little benefit from the increased income depending on the gender roles within the households (i.e. the male 'head of household' may control how the household income is spent). Also, craft persons making handmade goods fear switching to electric operated equipment, which changes the nature of the product, which may result in a low price per product, and finally the product, does not look hand-made anymore.

3. METHODOLOGY

For the purpose of accomplishing the objectives of this study, and to have an objective and

realistic picture of the extent to which electricity services has impacted on the micro-enterprises in Ganaja village, data collection was based on both primary and secondary sources. In terms of secondary data, there has been so much written work on the linkages between electricity services and micro-enterprises world over and a desk-research was done to review the sources relevant to the topic. The desk research involved a review of relevant literature relating to the nexus between electricity services and micro-enterprises, including relevant textbooks and journal articles, and other publications. A sample of hundred (100) micro-entrepreneurs was randomly selected in Ganaja village for the study. The aim was to incorporate micro entrepreneurs' perspectives in the study and to obtain their perceptions regarding the concrete barriers, specific constraints and impact of electricity services to business engagement. The data for this study were collected from these respondents through the use of questionnaire and interviews. The questionnaire collected information on the demographic characteristics of respondents, greatest obstacles facing micro entrepreneurs in accessing and using electricity, the influence of electricity services on micro-entrepreneurs' entrepreneurial career and other constraints confronting micro entrepreneurs in Kogi State. The questionnaire was administered to the one hundred micro-entrepreneurs randomly selected and eighty-seven responded to the questionnaire. The data collected were analyzed using descriptive statistics. The Statistical Package for Social Sciences (SPSS) was employed for this study.

4. DATA PRESENTATION, ANALYSIS AND DISCUSSION OF RESULTS

The analysis of the sample includes the demographic characteristics of the respondents and other aspects related to the research questions. On the demographic characteristics of the respondents, Table 1 shows that out of the 100-sample size of the respondents, 34 or 39.08% of them belong to the age range of 18-28 years, 21 or 24.13% of them are in the age range of 29-39 years, 25 or 28.74% of them are in the age range of 40-50 years while only 7 or 8.05% of them belong to the age range of 51 years and above. In terms of their gender, 57 or 65.52% are male while 30 or 34.48% are female. Looking at the marital status of the respondents, 18 or 20.69% of them were never married, 9 or 10.34% of them were engaged to be married, 10 or 11.49% of them were married, 18 or 20.69% of them were separated or divorced while 32 or 36.79% of them were widowed. In terms of their education, 1 or 1.15% of them had Primary School education, 4 or 4.60% of them had Secondary School education, 4 or 4.60% of them had a Technical or Vocational education while 78 or 89.66% of them had University or higher education. In terms of work experience, the table also revealed that 10 or 11.49% of them belong to work experience range of 0-5 years, 7 or 8.05% of them belong to the work experience range of 6-10 years, 15 or 17.24% of them belong to the work experience range of 11-15 years, 21 or 24.14% of them belong the work experience range of 16-20 years while 34 or 39.08% of them belong to the work experience range of 21 years and above.

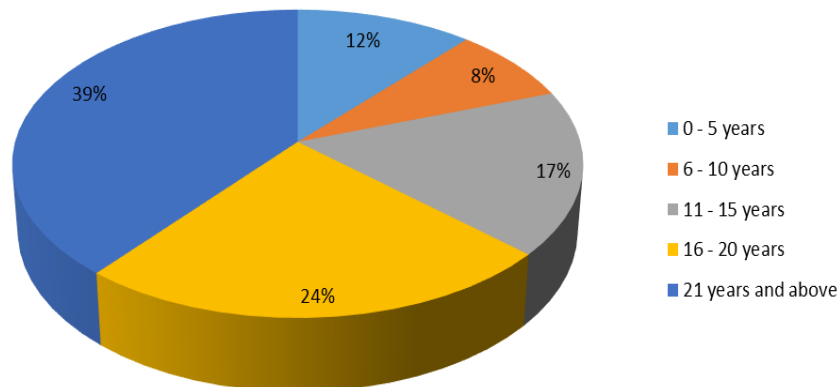


Fig. 1. Percentage distribution of respondents based on work experience as a micro-entrepreneur

Source: Author's Computation based on Field Survey, 2017

Table 1. Demographic characteristics of respondents

Variable	Items	Frequency	Percentage (%)
Age	18-28	34	39.08
	29-39	21	24.13
	40-50	25	28.74
	51 and above	7	8.05
	Total	87	100.00
Gender	Male	57	65.52
	Female	30	34.48
	Total	87	100.00
Marital status	Never married	18	20.69
	Engaged to be married	9	10.34
	Married	10	11.49
	Separated/Divorced	18	20.69
	Widowed	32	36.79
	Total	87	100.00
Education	Primary school	1	1.15
	Secondary school	4	4.60
	Technical & vocational education	4	4.60
	University or higher education	78	89.66
	Total	87	100.00
Work experience	0 - 5	10	11.49
	6 - 10	7	8.05
	11 - 15	15	17.24
	16 - 20	21	24.14
	21 and above	34	39.08
	Total	87	100.00

Source: Field Survey, 2017

The result in Table 2 shows the problems and barriers experienced by micro-enterprises in accessing and using electricity services. Majority of the respondents accepted the fact that they have experienced problems and barriers in trying to access and use electricity services. The field findings of this research confirm that in Ganaja village, there were problems and barriers experienced by micro-enterprises in accessing and using electricity services. Some of these barriers are due to lack of connection materials like fuses, cables, poles and transformers from electric supply utility;

complicated and expensive tariff structure for rural people; illegal connection and vandalism of cables and theft of cooling transformer oil, which results to low voltage and fluctuation of power; this discourage new customers to apply for connection. From Table 2, 20 or 23% of the respondents were of the view that lack of transformers was the major problem/barrier in trying to access and use electricity services. On the other hand, vandalization of cables was viewed as the least problem in trying to access and use electricity services among micro-entrepreneurs.

Table 2. The problems and barriers experienced by micro-enterprises in accessing and using electricity services

Problems	Frequency	Percentage (%)
Lack of fuses	8	9.2
Lack of cables	10	11.5
Lack of poles	10	11.5
Lack of transformers	20	23.0
Vandalization of cables	4	4.6
Illegal connections	5	5.8
Expensive tariff structure	15	17.3
Low voltage and fluctuation of power	15	17.3
Total	87	100.0

Source: Field Survey, 2017.

Questions were asked about the effect of electricity services on the establishment, growth, expansion, decline, and closure of Micro-Enterprises in Ganaja village of Kogi State. It is interesting to note that majority of the micro-entrepreneurs positively affirmed that electricity services have really helped them. The impact of electricity services on micro-enterprises are different from one micro-enterprise type to another. For example, for hairdressing salon, hair-cutting salon, welding workshops, and milling machines, lack of electricity services in these micro-enterprises creates significant constraints; that is, if there is no electricity service at a particular time, the enterprises would stop production or operation. Because there were no available alternative sources of electricity to run such machines, the businesses close down if there are blackouts of electricity. Those who used power for lighting only such as retail shops and local beer brewing were observed to use kerosene lamp, candles, and dry cells torch for lighting during electricity blackout. In terms of percentage distribution, employment of more hands and stoppage of production or operation was the least effect of electricity services on micro-enterprises in rural areas of Kogi State. However, expansion of existing businesses had the highest effect.

In addition, it was observed that the growth rate of micro-enterprises was evidently higher in areas with electricity services than in areas without electricity services. Seven micro enterprises owners (7) out of eighty-seven (87) interviewed said they had added more permanent employee since its establishment because there are enough activities and long working hours, which needed assistance from these permanent staff.

Furthermore, the establishments of new branches/expansion of micro-enterprises within and outside the studied areas were observed.

Ganaja village, people were selling wood, grains and building materials but the business grew and branches within the village increased and now there are grain milling machines, grinding machines, welding workshops and wood workshop, all these used electricity services for production.

Another example was observed in Ganaja village where four micro-entrepreneurs said they initially owned grain milling but has expanded their business; one had opened a retail shop and a bar within the same village. The second micro-entrepreneur opened retail shop within the same village. The third opened a business centre while the fourth started fish farming; all these were possible because there was the availability of electricity services.

Furthermore, in Ganaja village, one tailor with one machine expanded and now had three machines and a hairdressing salon with three driers. In the same area, three respondents said that they started with a small retail shop but now owned one "pick up" car each. This facilitates buying and selling for them. Closure of micro-enterprises was observed in the study area at a very low rate - 10 or 11.5% to be precise. These declines of business were caused by high competition and market saturation. Introduction of electricity services creates more micro-enterprises of the same nature without having a good plan for market penetration. This ends up in market saturation. The market saturation caused a low turnover, low saving from electricity services and high running costs. This situation was observed in all the places visited.

As a result of electricity services, micro-entrepreneurs realized income increase from energy saving and a higher turnover. The savings obtained enabled entrepreneurs to make extensions of electricity services to their homes;

Table 3. Effect of electricity services on the establishment, growth, expansion, decline and closure of micro-enterprises in Ganaja village

Options	Frequency	Percentage (%)
Opening of new businesses	15	17.3
Expansion of existing businesses	17	19.6
Employment of more hands	7	8.1
Decline in turnover	15	17.3
Closure of business	10	11.5
Stoppage of production or operation	7	8.1
Increase in income	16	18.4
Total	87	100.0

Source: Field Survey, 2017

this extension benefited the low-income households to charge their mobile phone and be able to get news through watching TV and playing radio cassette. The increased income enables the micro-entrepreneurs to pay school fees and buy school uniforms for their children and improve their living standards. Also, electricity services in rural areas provided lighting in shops, lighting, power in rural workshops, such as carpentry, and welding shops.

The field findings of this research confirm that Micro-enterprises such as hairdressing salon, hair cutting salon, grain milling and welding shop in Ganaja village of Kogi State, depended heavily on electricity services. A blackout means no operation for micro-enterprises involved in welding business. This is mainly because of the high cost of generators required for such businesses. All the hair-cutting salon found in Ganaja village was having a stand by generator popularly known as "I pass my neighbour" for backing up power in case of a blackout. For those enterprises that used electricity services for lighting only, when there were blackouts, they continued the operation because of having back up lighting solutions like kerosene lamps, candles, and torch. The micro-entrepreneur's opinion on this situation was that lighting from electricity was better and cheaper compared to other sources of lighting such as diesel and kerosene but the electricity bill is high when compared to what one earned per day or per month.

The findings also showed that availability of electricity services is one of the factors facilitating the decision of micro-entrepreneurs to invest in income generating activities such as milling machines, wood works, welding workshops in rural areas of Kogi State. Availability of electricity services in the study areas allows people to have more working hours. For example, observations showed that retail shops, local beer bars, tailors shops and sometimes grain milling extended their working hours. In addition, people especially school children were found to have more time to read because of the good lighting from the electricity services. This situation implies that electricity services are important not only for production but also for social benefits.

5. CONCLUSION AND RECOMMENDATIONS

The paper looked at the relationship between electricity services and micro-enterprises in Ganaja village of Kogi State. The results of this

study should help economic development officials and policy makers in Kogi State formulate more effective rural economic development policies. The paper found that electricity services had a significant effect on micro-enterprises in Ganaja village. The results of the analysis provided an answer to the long-posed question of whether electricity services actually influence micro-enterprises establishment, growth, expansion, decline and closure of micro-enterprises in rural Ganaja.

The problems and barriers experienced by Micro-Enterprises in accessing and using electricity services are lack of service line materials such as fuses, cables, poles and transformers, complicated tariff structure such as high initial connection and installation fees and high monthly bills; illegal connection and vandalism of cables and cooling transformer oil which causes power rationing, low voltage and fluctuation. This causes blackouts, which discourage new customers to apply for a connection.

This study also quantified the effect of electricity services on micro-enterprises establishment, growth, expansion, decline and closure in Ganaja village. The effect of electricity services on micro-enterprises in Ganaja village was in terms of the opening of new businesses, expansion of existing businesses, employment of more hands, the decline in turnover, closure of business, increase in income and stoppage of production or operation.

In addition, the linkage between electricity services and micro-enterprises in terms of employment of more hands and stoppage of production or operation within the villages were observed at a low rate. This may be more advantageous if the electricity services supplied were available, reliable and affordable to most of the rural poor people. However, the nexus between them in terms of expansion of existing businesses within the villages was observed at a high rate.

There were changes observed in livelihood characteristics of enterprises owners, people involved in the enterprises and community members where these enterprises are located. For example, there was an accumulation of physical assets such as modern houses, radio cassette, cattle, pick-up cars and saloon cars among the interviewed enterprisers. Financial assets had changed as well; there was an increase in income earning which facilitated

change in living standards like being able to pay good medical charges, school fees, and a good meal. In addition, human assets had increased; as observed, people gained business knowledge after dealing with customers for a long time; young people gained knowledge and experience after they had participated in training like carpentry, welding, and tailoring.

Based on the foregoing, the paper, therefore, recommends: increase access to capital for investments in electricity generating equipment and appliances; improvement of income for the poor through access to electricity and further improvement in well-being; rural electricity access projects should focus on micro-credit provision, allowing the poor to purchase direct-use electricity generating equipment and appliances; subsidies from the local government and credit based sales need to be provided to the micro-enterprises, encouraging them to purchase equipment such as generators to increase development in the village towns; financing those already accessing electricity and providing services such that they can improve their productivity and expand their markets; institute education for the micro-enterprise owners on effective use of equipment like generators, maintenance and ability to plan ahead for upgrades, focusing on long-term economic benefits; priority on enabling and assisting women-owned micro-enterprises in accessing electricity due to gender inequality.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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