

**RURAL ELECTRIFICATION AS A PUBLIC POLICY INTERVENTION IN
IMPROVING HOUSEHOLDS' STANDARD OF LIVING: THE CASE OF
SENANGA DISTRICT**

By

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requirements of the degree of Master of Public Administration**

THE UNIVERSITY OF ZAMBIA

LUSAKA

@ 2019

DECLARATION

I, **JASON NGOMA**, hereby declare that this dissertation represents my own work and that it has not been previously submitted for a degree, diploma or other qualifications at this or another university.

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CERTIFICATE OF APPROVAL

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ABSTRACT

Reducing poverty levels and creating an enabling environment for socio-economic development in rural areas has been on the development agenda of successive governments in Zambia. Literature shows that in Zambia, rural areas have for a long time lagged behind in terms of development. Standard of living has considerably remained low for many years in many rural households. As a result, deliberate efforts have been made over the past years by the government to improve households' standard of living in rural areas through electrification. In the process so many rural Districts have been connected to national grid. However, one wonders how electrification of rural areas has affected standard of living. What is not known is whether rural electrification is indeed a panacea to improving standard of living in rural Zambia. Therefore, this study sought to investigate the contribution of households' electrification to improving standard of living in Senanga District. Specifically, the study sought to examine the effectiveness of the policy implementation framework for electrification of households in Senanga District. The study further sought to investigate the contribution of household electrification to domestic income; to investigate how electrification had impacted livelihoods of households; and to investigate the contribution of electrification to households' access to social goods in Senanga District.

The research was a descriptive case study and utilised mixed method approach. A total of 106 participants involving electrified households and key informants were utilised. Multistage sampling method which involved the use of cluster, weighted stratified, purposive and convenient sampling methods was used to select electrified households. Key informants were selected purposively. Self-administered semi-structured questionnaires were used for electrified household while interview guides were used to collect primary data from key informants. Quantitative data obtained from questionnaires was analysed using Statistical Package for Social Science (SPSS) and Excel spread sheet. On the other hand, qualitative data from questionnaires and interview guides was analysed using content analysis method. The key findings of the research show that electrification of rural areas via grid extension is not a perfect model to improve standard of living. The findings of the study also show that the various players in the electrification of households are faced with several challenges that deter

their smooth operations hence adversely affecting the electrification rate and households' access to electricity in rural areas. Some of the challenges been faced include: households' low incomes, low electricity tariffs, dispersed settlements, inadequate funding and centralization of electrical materials among others. The study also finds that rural households seldom use electricity for domestic business activities. Generally, the study finds the contribution of electrification towards improving rural standard of living through improved livelihoods negligible. In relation to households' access to social goods, the study finds the contribution of electrification towards improving households' standard of living through improved access to healthcare, clean water and sanitation insignificant. However, the study finds significant positive impact of electrification towards improving rural standard of living through improved access to information, communication and entertainment, preservation of foodstuffs and enhanced access to education and physical security of households. Based on the findings, government through Rural Electrification Authority (REA) need to consider and promote cheaper and affordable sources of renewable energy such as Photovoltaic systems for rural areas. Government should also consider reducing connection charges for rural households and introduce electricity tariffs that reflect socio-economic status of rural communities. Furthermore, there is need for government to enhance capacity of local institutions such as District Councils in rural areas to accelerate electrification rate. District Councils must be involved in the provision and management of electricity in rural communities. There is also need to decentralise operations of REA to rural District s.

Keywords: *rural electrification, standard of living, public policy intervention, rural development*

DEDICATION

To my Father Lloyd Jethro Ngoma and Brother Wellington Ngoma (Both Late)

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LIST OF ABBREVIATIONS

CMSPD	-	Customer Management System and Prepaid Management
CSO	-	Central Statistical Report
DSAR	-	District Situational Analysis Report
EKC	-	Energy Kuznets Curve
ESMAP	-	Energy Sector Management Assistance Programme
FNDP	-	First National Development Plan
FI	-	Fixed Effects
GDP	-	Gross Domestic Product
GRZ	-	Government of Republic of Zambia
IV	-	Instrumental Variable
KM	-	Kilometre
KV	-	Kilovolts
LCMS	-	Living Conditions Monitoring Survey
MEWD	-	Ministry of Energy and Water Development
MMD	-	Movement for Multiparty Democracy
MM	-	Millimetre
NEP	-	National Energy Policy
ICT	-	Information Communication Technology
IDZ	-	Intensive Development Zones
IEA	-	International Energy Agency
IEG	-	Independent Evaluation Group

IMF	-	International Monetary Fund
INDECO	-	Industrial Development Corporation
ORG	-	Operations Research Group
PSMD	-	Public Service Management Division
RBT	-	Ready Board Technology
REA	-	Rural Electrification Authority
REF	-	Rural Electrification Fund
REMP	-	Rural Electrification Master Plan
RGS	-	Rural Growth Centers
RHC	-	Rural Health Center
SAPs	-	Structural Adjustment Programmes
SHS	-	Solar Home Systems
SMEs	-	Small and Medium Enterprises
SNDP	-	Second National Development Plan
SNDP	-	Seventh National Development Plan
SPSS	-	Statistical Package for Social Science
UN	-	United Nations
UNDP	-	United Nations Development Programme
UNICEF	-	United Nations Children Emergency Fund
UNIP	-	United National Independence Party
USAID	-	United State Agency for International Development
USD	-	United States Dollar

- WB - World Bank
- WHO - World Health Organization
- ZESCO - Zambia Electricity Supply Corporation
- ZPA - Zambia Privatization Agency

CHAPTER ONE

INTRODUCTION AND BACKGROUND

1.0 Introduction

In all economies, but more in developing and transition economies, there is now a consensus among state policy makers, development economists, as well as international development partners that rural electrification is a potent driving force for industrial growth and overall economic development of rural areas (Cook, 2011). Many governments and policy makers all over the world have cited lack of energy infrastructure as one major contributor of underdevelopment in rural areas (Zomers, 2011). At present, it is estimated that approximately 1.6 billion people worldwide lack access to electricity and about 2.5 billion rely on traditional fuels as their primary source of energy. Furthermore, 85 percent of 1.6 billion people in the world living without access to electricity reside in rural areas. This status has long been associated with underdevelopment of rural areas (Chambers 1987; Harris (1995). Hence, policy makers have realised the vital role that electricity can play in improving standard of living of rural households (Pauser et al., 2015).

From this perspective, this study attempts to investigate rural electrification as a public policy intervention in improving standard of living of rural households. To achieve its purpose, the study starts by providing background to the study. This will be done by looking at rural electrification and households' socio-economic development in Zambia. Afterwards, it will provide information on the policy and legal frameworks for rural electrification in Zambia. Having achieved that, information on rural electrification in Senanga District will be provided. Thereafter, statement of the problem, objectives and research questions, rationale of the study, scope of the study, study area, conceptual framework, and structure of the dissertation are given.

1.1 Background to the Study

To achieve its purpose, this study begins by looking at rural electrification and households' socio-economic development in Zambia. Afterwards, it will provide information on the legal and policy framework for rural electrification in Zambia and then rural electrification in Senanga District .

1.1.1 Rural Electrification and Household Socio-economic Development in Zambia

Rural electrification is not a new phenomenon as a strategy for rural development in Zambia. Electrification of rural communities has always been seen as one major component of infrastructure development viewed necessary for social-economic development and supporting the industrialization agenda in rural areas (REA, 2009; 2015). According to Rothchild (1972), the establishment of the mining industry in Northern Rhodesia in the late 1920s created an economic vacuum, whereby the rapid inflow of investment, at that time, created a domestic migratory system which exacerbated urbanization and concentrated economic activity and wealth creation within urban areas and left most rural areas underdeveloped. The gap was mainly exacerbated by lack of economic activities and employment opportunities in the rural areas (Simukoko, 2006). Siame (2007) argues that, with the attainment of self-rule in 1964, the challenging and unfavourable conditions in which rural people lived were of great concern to the Kenneth Kaunda led government.

The government formally announced its first post-independence economic reform initiatives during the National Council meeting of the United National Independence Party (UNIP) at Mulungushi in April 1968 and additional economic reforms later announced at Matero in August 1969 (Sekwat, 2000). Both the Mulungushi and Matero reforms were aimed at removing foreign domination of Zambian economic life through acquisition of most of the major means of production and services. This was to be done within the framework of philosophy of Zambian Humanism (socio-political ideology espoused by President Kenneth Kaunda). One major element of the reforms was rapid development of rural sector so as to improve households' standard of living (Sekwat, 2000).

The Ministry of Rural Development was then established to spearhead implementation of First National Development Plan (FNDP) (1966-70) (later pushed to 1971), with much emphasis on developing rural areas to deal with rural-urban imbalances brought about by colonialism (Chipungu, 1988). The objectives of FNDP included: diversification of the economy so that it was not reliant solely upon mining; increasing domestic production of goods to meet local demand; increasing employment and real output per head; minimising inherited inequalities between the rural and urban sectors; raising the level of education and social welfare and development of economic and social infrastructure (Chipungu, 1988).

To give rural development agenda its impetus, the UNIP government introduced the programme of village regrouping (Tordoff, 1980). The idea was to regroup the villages and households into big town-like settlements. Thus, in 1971, the government passed the Village Regrouping Act. The Act provided for the registration of villages and inhabitants thereof, and to provide for the establishment of Village Productivity Committees, Ward Councils and Ward Development Committees. The idea of Village regrouping was central to government's rural development strategy. The Provincial Development Committees, District Development Committees, the structure of administration of Rural Councils, and the avenues for popular participation such as the Ward Development Committees and Village Productivity Committees were later to be structures through which rural development was to be coordinated (Ollawa, 1978; Tordoff, 1980).

The structures were established to intensify the rural development process, deal with rural-urban imbalances; reduce poverty levels and create employment opportunities to curtail the rural-urban migration which was mainly attributed to lack of employment opportunities in rural areas (Ollawa, 1978; Chipungu, 1988). However, despite the impressive record of economic growth rate achieved at independence and government concern for rural development, rural households continued to be socially and economically deprived social group in Zambian society. Rural poverty continued to be higher than urban poverty with 88 percent of the rural population regarded poor, accounting for approximately 70 percent of the country's population (Ollawa, 1978).

The idea of village regrouping was later incorporated in the Second National Development Plan (SNDP) (1972-76). With the adoption of SNDP, one idea which emerged was the concept of 'The Intensive Development Zones (IDZs). The background to IDZ is that, traditional rural farming sector, which engaged over half of Zambian population then, needed a network of economic services in order to increase production and cash income (Chipungu, 1988). The introduction of Intensive Development Zones was meant to be a step beyond the village-regrouping concept, which had aimed at merely bringing scattered households and villages together for purposes of easier provision of social amenities by the government (Siame, 2007; Simukoko, 2006). The IDZ concept was regarded as a major new policy strategy of concentrating public services and investment for integrated rural development of the rural areas. In the process, industries such as Kapiri Mposhi Glass Factory, Mwinilunga pineapple cannery, Coffee Scheme in Kasama, Mansa batteries and Luangwa Bicycle assembly were then set up in most rural areas (Simukoko, 2006).

It is worth noting that between 1973 and 1980 the country experienced some rapid economic growth. This growth rate was attributed to increased investments in industry sector whose proportion of total investment rose from about seven percent in 1964 to about 12 percent in 1980 (Ndulo and Mudenda 2010). Between 1964 and 1980, the share of value added in the industry sector rose by 15 percent and manufactured goods also diversified. The highest level of total employment was attained in this period. Thereafter, employment decreased steadily until it picked up slightly in 1980. After 1980, it continued its downward trend, decreasing by 0.6 percent per year (Yubai, 1999).

Despite notable gains in the country's economy, much of the presumed benefits for the rural households failed to materialise. The major problem of rural-urban drift persisted and income inequality still bridged the gap between rural and urban. Thus, while 80 percent of the Zambian population lived in the rural areas in 1963, it reduced to 71 percent in 1969. It further reduced to 65.5 percent in 1974. In direct proportion to rural population, the urban population grew from 20 percent in 1963 to 29 percent 1969 and 34.5 in 1974 (Ollawa, 1978). This situation was largely attributed to dominance of the mining sector that continued to receive major investments, skilled and talented manpower hence hampering rural development progress (Yubai, 1999; Ollawa, 1978).

Therefore, to address persisting high poverty levels in rural areas and stem the tide of rural-urban migration by promoting rural development, the government of Zambia was committed to taking energy infrastructure to rural areas. Rural electrification was seen by the government as key intervention and strategy to promoting sustainable development in rural areas (Mbewe et al., 1992; REA, 2009). One reason attributed to lack of development in rural areas was lack of access to electricity by rural households. Rural areas were seen lagging behind in the development process due to poor energy infrastructure (Phiri, 2017). Since independence, electricity has therefore been seen as key element of the rural economy. Access to electricity is expected to boost the agrarian rural economy and spur growth of the manufacturing sector and subsequently improve rural standard of living (REA, 2009).

Nonetheless, although post-independence national development plans that were adopted by the government had well-meaning objectives, rural development remained a far-fetched dream. As long as copper revenues remained lucrative, the government did not see the need for so much emphasis on rural development (Sekwat, 2000). Later, when copper prices and production tumbled from 1975 onwards, the Zambian government seemingly became more focused on agricultural development to stimulate rural development, but it was too late to do much to redress the impact as the damage had already been done. The economy went into a prolonged recession that resulted into fall of one third in per capita Gross Domestic Product and later proved a huge blow to Zambia's rural development strides (Sekwat, 2000). Towards, the early 1980s, the Government borrowed heavily from Multilateral institutions such as the International Monetary Fund (IMF) and World Bank, hoping that copper prices would go up and the loans would be repaid. This did not happen and at the same time, oil prices went up, hence, further aggravating the economic problems and creating further macro-economic instability (Siame, 2007; Craig, 1999).

Consequently, most parastatals in rural areas became unsustainable associated with inadequate funding, poor management and accountability for commercial returns and political patronage which resulted into political interference in their day to day running (Ndulo and Mudenda 2010). By 1980s, most established industries in the rural areas such as Mansa Batteries and Kapiri Mposhi Glass Factory had begun to show signs of collapsing. Owing to these external and internal factors, by mid 1980s, Zambia became

one of the most indebted countries in Africa. By 1990, there was rapid economic decline which greatly affected rural households and partly contributed towards change of government in 1991. Consequently, the Movement for Multiparty Democracy (MMD) led by Fredrick T. Chiluba came into power after the country's return to multi-party politics (Mtetsha, 2013).

The MMD government's greatest socio-economic change was that of transforming the country from a welfare society and socialist economic system to a liberalized market structure with greater economic freedom and choices (Heidhus and Obare, 2011). The government adopted International Monetary Fund (IMF) and World Bank championed Structural Adjustment Programmes (SAPs) in order to receive financial aid. The SAPs and their neo-liberal policies often called the "Washington Consensus" was the policy response of the World Bank and International Monetary Fund (IMF) to the African economic crisis of the 1970s. The SAPs were formally and mainly introduced across Africa in the 1980s (Heidhus and Obare, 2011; Streeten, 1989).

By and large, SAPs were a set of measures that sought to permit renewed, or accelerated, economic development by correcting 'structural' disequilibrium in the foreign and public balances. Such measures were required as pre-conditions for receiving World Bank and IMF loans (Streeten, 1989; Pillay, 2002). The reforms attempted to eliminate distortions such as an overvalued exchange rate, high fiscal deficits, and restrictions on trade and inefficient public services that often prevent an efficient allocation of resources in the economy. The key objectives were a reduction or elimination of balance-of-payments and public sector deficits; resumption of higher rates of economic growth; and the achievement of structural change to prevent future payments and stabilisation problems. Adoption of SAPs came with adoption and introduction of neo-liberal policies which resulted into liberalization of the economy and privatization of state owned parastatals (Killick, 1984).

The experience of SAPs in Zambia shows that the policy reform has not been particularly successful in creating long term sustainable development especially for rural households (Killick, 1984; Saasa, 2002). Saasa (2002) further argues that SAPs were unfriendly to the well-being of the people they had intended to uplift. The adjustment programme paid insufficient attention to the social aspects of the country.

The SAPs in Zambia began with stabilisation programmes, which focused on reducing the money supply and inflation, and together sacrificed economic growth and greatly affected rural development. Furthermore, in the long run an ambitious privatisation programme also began (Pillay, 2002).

To facilitate the privatization process, the government moved in quickly to pass the necessary legislation. In July 1992, the Privatization Act (No 21 of 1992) was passed by parliament. The Act established the Zambia Privatization Agency (ZPA) as the sole institution responsible for the divestiture of state enterprises (Fundanga and Mwaba, n.d). Arguably, privatisation in Zambia produced mixed results. Privatization of state assets and liberalization opened the economy to foreign investment and export-led strategies for economic growth. This combination was supposed to spur growth, employment and overall improvement in the living conditions of citizens in the country. However, the process suffered from political interference and bad sequencing and largely affected the country's development process and rural communities were badly hit in the process (Fundanga and Mwaba, n.d and Pillay, 2002).

The privatisation process bred incentives for corruption and was associated with several allegations of corruption. The consequences of a poorly-planned privatisation process in Zambia were severe. The process weakened the influence of the state in fostering industrialisation and many privatised companies subsequently collapsed leading to the loss of jobs and de- industrialisation (Fundanga and Mwaba, n.d). The situation was worse in rural parts of the country. Sekwat (2000) argues that the macro-stabilization did not immediately encourage private investment, and the manufacturing sector in rural areas declined and collapsed dramatically under economic instability and privatization. This saw an increase in numbers of socially distressed families due to loss of jobs and removal of subsidies on the staple food (maize meal) for the vulnerable groups in society as well as a worsening economic scenario characterized by collapsing industries.

Consequently, there was an increase in food insecurity in rural areas due to collapse of some of the institutions such as the agro-based lending institutions such as Lima Bank which used to provide services in rural areas leaving farmers with no guaranteed access to markets and credit. Access to key services such as credit, marketing and information became problematic especially to small-scale farmers in rural areas (Sekwat, 2000). In

addition, trade liberalization exposed local producers to tough competition from imports thereby contributing to collapse of infant industries that could not effectively compete on the market such as Mulungushi Textiles in Kabwe, and Kapiri Mposhi Glass factory among others. The social consequences of structural adjustment were enormous. In 1993, rural poverty was estimated to have increased from 88 percent to 90 percent (Sekwat, 2000).

As at 2016 Zambia's population was estimated at 15.9 million with close to 60 percent based in rural areas (GRZ, 2017). While the larger percentage of the population lives in rural areas, the country has had huge development deficits in rural areas, especially in key sectors that can help facilitate growth and development. Rural households continue to be associated with low standard of living, poor road networks and poor delivery of social services, and limited access to electricity with the majority of the population working in the informal agriculture sector, characterised by low productivity. To reduce the growing regional inequalities, government has been undertaking deliberate interventions such as electrification focusing on rural development (GRZ, 2017).

Currently, the overall national access to electricity in Zambia stands at 20.4% with 48% in urban areas and 3.1 % in rural. At household level, the electrification rate stands at 20.3 percent with 47.6 in urban and meagre three percent in rural areas. The situation shows that rural areas are lagging behind in terms of access to electricity. This perhaps explains high poverty levels in rural areas as lack of access to electricity underpins the pace and scope of economic development, reduces quality of life and welfare of the underprivileged population, and decreases the quality of basic social services such as education and health (CSO, 2015).

1.1.2 Policy and Legal Framework for Rural Electrification in Zambia

According to Siddle (1970), rural electrification in Zambia, as other African countries, such as Kenya and Tanzania has been driven by several forces. One of them has been the need for the sector to contribute towards economic development and poverty reduction in rural areas. Thus, rural electrification in Zambia dates back to the colonial period when electricity lines were extended to European settler farmers in rural areas. Electricity was mainly used for agricultural productivity. During the colonial period, indigenous Zambians in rural areas had no access to electricity due to racial

discrimination and segregation practiced by the British colonial masters. Conversely, following independence in 1964, the independent Zambian government began to make strides towards making electricity accessible to indigenous Zambians in rural areas (Siddle, 1970; REA, 2009).

President Kaunda led government reiterated the need for energy infrastructure development for many reasons. Electrification was seen as one major component of infrastructure development necessary to support industrialization agenda in rural areas and contribute towards improving rural standard of living (Mtetsha, 2013). The UNIP manifesto of 1974-1984 clearly highlighted the need for taking electricity to rural areas to support the industrial and agriculture sectors. The government saw electricity as an important component that could contribute towards the transformation of the stagnant rural sector. This transformation could only be made possible through improved road, rail, and telecommunication and energy infrastructures. Thus, provision of energy became part of the rural development agenda (Mtetsha, 2013).

However, it was the MMD government that gave rural electrification its impetus and placed concerted efforts towards taking electricity to rural areas (Siddle, 1970). Rural electrification was then to be guided by the National Energy Policy drawn up in 1994. In 1994, the Zambian Government adopted a National Energy Policy whose objective was to promote optimum supply and utilization of energy, especially indigenous forms, to facilitate the socioeconomic development of the country and maintenance of a safe and healthy environment (MEWD, 1994). This was in view of the fact that over 70 percent of total primary energy was supplied by biomass fuels, the energy policy document sought to promote accessibility to modern forms of energy, especially electricity by the majority of the people (MEWD, 1994). The National Energy Policy of 1994 was later supported by enactment of the electricity supply act of 1995 which sought to regulate the generation, transmission, distribution and supply of electricity; and to provide for matters connected with or incidental to the foregoing (MEWD, 1994).

Specially and related to rural electrification and development, the 1994 energy policy sought facilitate increased access to rural areas by liberalising and restructuring the electricity market and promoting the use of low-cost technologies and decentralised

renewable energies (Haanyika, 2005). Furthermore, in an effort to boost rural energy and create improved conditions for socio-economic development in Zambia, the Government established a Rural Electrification Fund (REF) in 1994 (MEWD, 1994). The fund was to be used towards improving energy infrastructure in rural areas and increase access to electricity for socio-economic development of rural areas. This was to be funded by collecting 3.45 percent of the sales tax on electricity consumption. The REF was administered by Ministry of Energy and Water development (MEWD) and priority was accorded to health facilities, schools and community centres (Haanyika, 2005). Despite the introduction of the fund, not much progress was made in providing electricity to rural areas, mainly due to the following reasons: The cost of extending the grid to remote areas was very high, since the load demand for most rural areas, was very low, and the cost of most projects could not be justified even from the social perspective. Since the levy of the fund was usually low, preference was given to economically productive areas and household connections were not financed by the levy. In other words, the pace of rural electrification was very slow, resulting in only three percent of the rural population having access to electricity by 2004 (REA, 2009; Haanyika, 2005).

Thus, in order to give rural electrification a drive, the Rural Electrification Act No. 20 of 2003 which established the Rural Electrification Authority (REA) was passed by the government. The Act brought legislative backing to rural electrification (REA, 2009). The REA started operating in 2004 as a statutory body under MEWD. As provided for in the Act and among many other functions, REA was mandated to administer and manage the Rural Electrification Fund. The Act also gave REA the mandate to promote the utilization of available rural electrification technological options to enhance the contribution of energy to the development of agriculture, industry, mining and other economic activities in rural areas (REA, 2009).

Some of the other functions of REA include: developing mechanisms for the operation of a grid extension network for rural electrification as well as applying a smart subsidy for capital costs on projects designed to supply energy to rural areas. The government identifies rural electrification as a vehicle to eradicate poverty by stimulating the rural economy in the country. Largely, the passage of the rural electrification Act of 2003 provided a new platform for rural electrification in Zambia. With about 60 percent of

the Zambian population living in rural areas and only 3 percent of the rural population having access to electricity, the government prioritised rural electrification (REA, 2009).

Consequently, with the passage of Rural Electrification Act of 2003, REA prepared a detailed Rural Electrification Master Plan (REMP) to serve as a blueprint for Zambia's electrification efforts for the period 2008 to 2030 (REA, 2009). The REMP indicates the electrification targets, the roll out sequence, and the methods, timing and budgets required. The REMP further sets ambitious targets for increasing access to electricity by 2030. The plan identifies a total of 1,217 growth centers in rural areas throughout Zambia. These are the targets for electrification during the plan period. The target is to increase the electrification rate in rural areas to 66 percent by the year 2030 by focusing on system extension as the main vehicle for expansion of access (REA, 2009).

Nevertheless, the 1994 energy policy was revised in 2008 so as to meet the new changes in the energy sector and in order to meet the National Vision 2030 for energy sector. Zambia's Vision 2030 recognises energy as an important driving force for development of an economy as it cuts across most economic and social activities more especially in rural areas (MEWD, 2008). The new policy sets out government intentions of promoting rural development through rural energy provisions. The policy seeks to increase access to affordable energy in rural areas to reduce poverty and promote economic growth. Rural development is to be achieved through promotion, dissemination and utilisation of modern energy services to rural households through provision of energy to home based economic activities in order to directly raise household incomes and providing training and technical assistance to households to enable them to use modern energy for income generating activities (MEWD, 2008). In addition, the new energy policy seeks to reduce dependence on wood fuel and ensure sustainable provision of affordable, reliable modern energy services to rural and urban households as a means of raising productivity and standards of living (Salati, 2009; MEWD, 2008).

The Seventh National Development Plan (2017-2021) further seeks to devote efforts towards promoting rural electrification programmes to enhance rural development and increase access to rural and peri-urban consumers at an affordable cost. The government

focus is to transform underdeveloped rural settings into cohesive communities with profitable and productive opportunities where members enjoy equitable access to basic public and social services, with emphasis on agro-industrialisation, rural water supply and sanitation and creation of rural employment opportunities (GRZ, 2017). To this end, electrification of rural areas has continued to be an important aspect of government's development agenda.

Largely, the passage of the rural electrification Act of 2003 provides a new platform for rural electrification in Zambia. With about 60 percent of the Zambian population living in rural areas and only 3 percent of the rural population having access to electricity, the government has prioritised rural electrification (REA, 2009).

1.1.3 Rural Electrification in Senanga District

The electrification of Senanga District has mainly been promulgated and stems from the government's desire to improve households' standard of living (REA, 2015). Senanga is one of the rural Districts in the country and forms part of Western Province which is considered the poorest region with high poverty levels of about 82 percent. Senanga District shares the overall 82 percent poverty level of western province (CSO, 2015). The District happens to be one of three Districts in Western province that have in the recent past years benefited from rural electrification programme. The other two include Nalolo and Luampa. Until 2013 when REA commissioned the Nanjucha grid extension project, power was mainly concentrated in the town area of the District leaving most rural parts and households of the District electrified (REA, 2015). Therefore, extension of grid through the Nanjucha grid extension project was aimed at promoting socio-economic development of Senanga District (Senanga District Council, 2015; REA, 2015).

Among other notable factors, underdevelopment of the District has mainly been attributed to non-availability of energy infrastructure. Lack of access to electricity is said to have had negatively affected local people's standard of living for many years (REA, 2015). The District situational analysis report shows that about 70 percent of the population live under the poverty threshold and are without basic infrastructure in electricity, roads and telecommunication among other things. The District situational

analysis report further reveals that less than three percent of the local population have access to electricity (Senanga District Council, 2015).

Therefore, rural electrification project in Senanga District has targeted Rural Growth Centers (RGCs). Rural Growth Centers are mainly rural localities with high concentration of residential settlements and the center of rural economic activities (REA, 2015). Electrification of the District was expected to improve households' standard of living by enhancing people's ability to engage in income generating activities. It was also hoped that availability of electricity would connect social institutions and enhance households' access to social goods. Furthermore, electrification was expected to move people from traditional to modern ways of doing things so as to improve their social wellbeing and livelihoods (Senanga District Council, 2015; REA, 2015).

Nonetheless, information obtained from ZESCO's Customer Management System and Prepayment Department reveals an increase towards households' access to electricity in the District. In 2011, the District customer base for households (classified at residential) stood at 786. As of September, 2017, the figures stood at 2,163 (ZESCO, n.d). From this perspective, it becomes imperative to investigate whether indeed rural electrification is a strategic government intervention to reducing rural poverty and promoting improved standard of living. There is need to investigate the contribution of electrification towards improving households' standard of living in Senanga District.

1.2 Statement of the Problem

There is consensus among policy makers and researchers that rural electrification is paramount to socio-economic transformation of rural areas (Cook, 2011). Particularly, electricity has been identified as a prime determinant of household socio-economic development (REA, 2009). However, in Zambia, despite this emphasis, progress in electrifying rural areas has been slow. It is estimated that 48 percent of the urban population has access to electricity thus enabling the citizens to engage in various socio-economic activities. However, a meagre three percent of rural population has access to electricity. This shows an estimated 45 percent difference in access to electricity between the urban and rural population. At household level, electrification rate stands at 20.3 percent with 47.6 urban and three percent rural (CSO, 2015; REA, 2013).

Furthermore, According to 2015 Living Conditions and Monitoring Survey (LCMS) 77 percent of the population in rural communities are living in poverty compared to 23 percent in urban communities (CSO, 2015). Clearly, this situation shows challenges in the electrification process of rural areas and lack of development thereof. Despite great efforts to improve rural standards of living through various government programmes and interventions such as electrification, rural households have continued to be associated with high poverty and low standard of living (Phiri, 2017; CSO, 2015).

Therefore, this situation raises questions regarding the contribution of state driven interventions towards improving rural standard of living. Put simply, in the last two decades, the Zambian government has been making various efforts at the policy level to facilitate increased levels of access to electricity in rural areas to improve standard of living (REA, 2013). In the process so many rural District s have been connected to national grid (REA, 2013). However, one wonders how electrification of rural areas has affected standard of living. What is not known is whether rural electrification is indeed a panacea to improving standard of living in rural Zambia. This study is therefore undertaken to establish the contribution of state driven electrification towards improving standard of living in Senanga District.

1.3 Objectives of the Study

1.3.1 General Objective

1.3.1.1 To investigate the contribution of household electrification to standard of living in Senanga District .

1.3.2 Specific Objectives

1.3.2.1 To establish the effectiveness of the policy implementation framework for electrification of households in Senanga District .

1.3.2.2 To investigate the contribution of electrification to domestic income in Senanga District

1.3.2.3 To investigate how electrification has impacted livelihoods of households in Senanga District .

1.3.2.4 To investigate the contribution of electrification to households' access to social goods in Senanga District .

1.3.3 Research Questions

The general research question read as follows: What contribution has household electrification made towards improving standard of living in Senanga District ?

The sub questions are as follows:

1.3.3.1 How effective is the policy implementation framework for the electrification of households in Senanga District ?

1.3.3.2 What is the contribution of electrification to domestic income in Senanga District ?

1.3.3.3 How has electrification impacted on the livelihoods of households in Senanga District ?

1.3.3.4 What is the contribution of electrification to households' access to social goods in Senanga District ?

1.4 Significance of the Study

The significance of this research is that it will provide information on rural electrification as a public policy intervention in improving households' standard of living. Electrification has been chosen as it has been identified as a prime determinant of improving rural standard of living (REA, 2013). Standard of living has been chosen as it is one major facet of rural development largely affected by inadequate energy infrastructure. Information generated by this study may be useful to stake holders such as, the Rural Electrification Authority (REA), ZESCO, academics and rural communities. REA and ZESCO may use the information in the preparation and implementation of energy projects to promote rural development. The study may also facilitate for decision makers in government to improve their basis for future decisions on rural electrification activities. It is also hoped that rural communities will benefit from findings of this study through effective formulation and implementation of rural electrification programmes by the government. The study will also contribute to the existing body of knowledge in the academic field, as it will build on the existing

knowledge of state driven rural electrification and development. The researcher also hopes that the findings will provide answers to many questions; and help stimulate public debate and assist in directing government policy on matters relating to electrification and development of rural areas. Finally, scholars may find the information useful in building knowledge, especially in the energy sector that is so critical to development of rural areas in Zambia.

1.5 Conceptual Framework

The conceptual framework guiding this study is presented in figure 1.5.1 below. The presentation of the conceptual framework is in two parts. These are definition of key concepts and the conceptual framework guiding the research.

1.5.1. Definition of key Concepts

Electrification:- refers to the process of providing electricity to the households and villages located remotely or in isolated areas of a country (IEA, 2010).

Rural Electrification:- refers to the process of bringing electrical power to rural and remote households through grid electrification.

Standard of living:- refers to being able to start a business, own and use electrical appliances, improved access to healthcare, education, clean and safe drinking water, and enhanced physical security.

Public Policy Intervention:- refers to course (rural electrification) of action taken by the government to improve rural standard of living.

Policy Implementation Framework:- refers to the process and institutions involved in the electrification of rural households to improve standard of living.

Household:- refers to a dwelling unit with a group of persons who reside in it and managed by a family head.

Effectiveness: - refers to the degree to which the policy implementation framework for rural electrification is able to enhance households' electrification and improve standard of living.

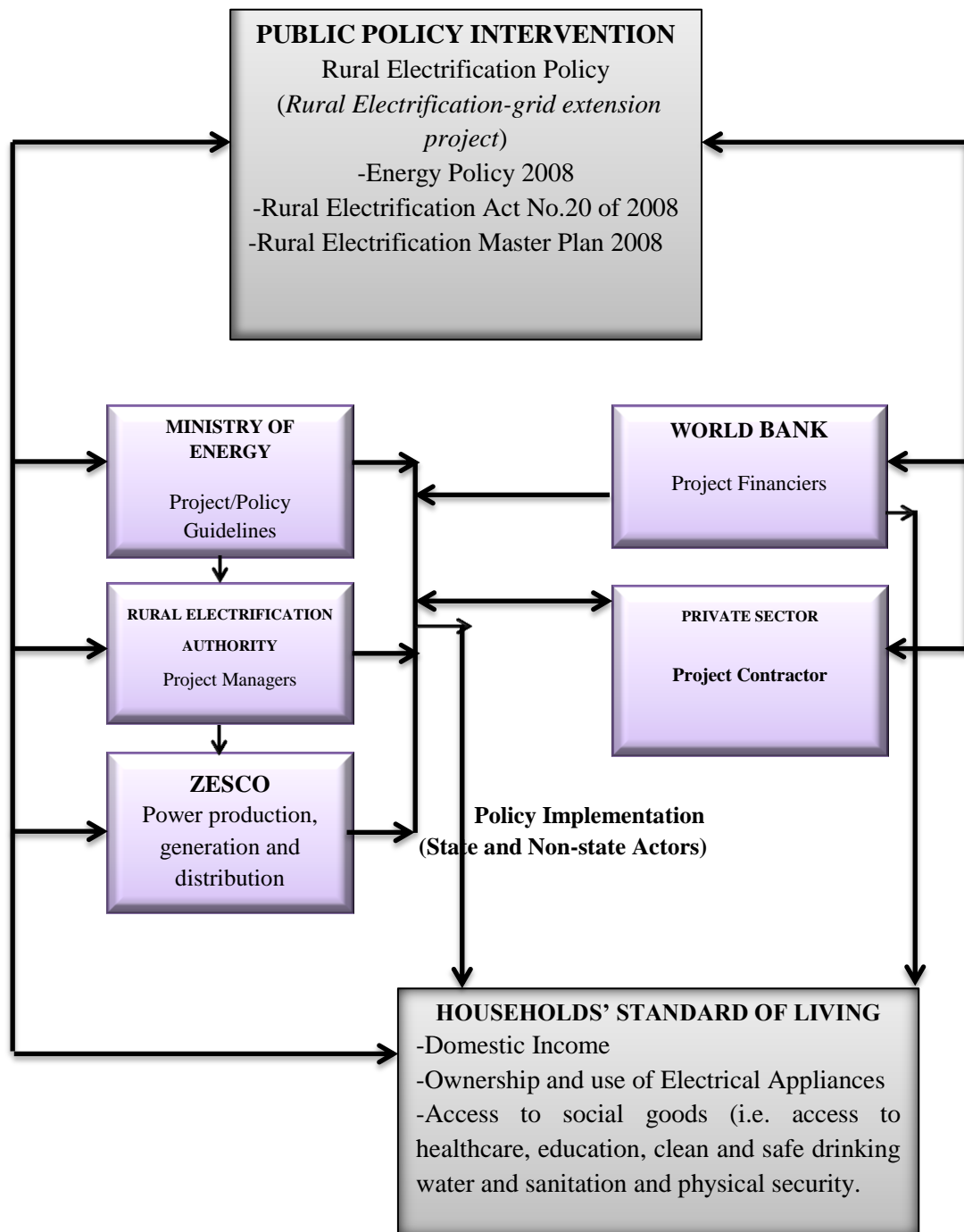
State Actors:- refers to government agencies, regional authorities, line ministries and government technical services working and involved with electrification of rural households.

Non-state Actors:- refers to the private sector, donor agencies and/or multilateral institutions involved in one way or another with electrification of rural households.

Social Goods:- refers to something that provides some sort of benefits to the greater number of people when accessed.

The conceptual framework shows the relationship between rural electrification and standard of living. The conceptual framework is based on the assumptions of William F. Ogburn's *Social Change Theory*. Ogburn in his theory highlights the social influence of technology in social change. The main premise of the theory is that technology is the basic cause of social change (Ogburn, 1922). The common pattern of social change is for technological advancement to affect social institutions like family and cause change in a social order (Ogburn, 1922). To derive Ogburn's argument in this study is to argue that electrification through grid electricity provides a diversity of usage to rural households which in turn can cause social change herein viewed as improved standard of living. White (1949) correspondingly provides an argument that technology particularly the amount of energy harnessed and the way in which it is used, determines the forms and content of society.. In this research, electrification is seen as a form of technology that can transform households' standard of living. For purposes of this study, standard of living refers to being able to start a business, own and use electrical appliances, and improved access to healthcare, education, clean and safe drinking water and physical security.

Figure 1.1 Conceptual Framework Illustrating Rural Electrification as a Public Policy Intervention in Improving Standard of Living



Source: Author's Construction, 2019.

Public Policy Intervention

Public policy intervention as used in this study refers to course (rural electrification) of action taken by the government to improve rural standard of living. Furthermore, as used in this study, effectiveness refers to the degree to which the policy implementation framework for rural electrification is able to enhance households' electrification and improve standard of living. Largely, public policies are usually backed up with appropriate institutions to achieve intended objectives. Therefore, in this study, the effectiveness of the policy implementation framework for electrification of households in Senanga District is determined by taking into account the process of electrifying rural households, stakeholders involved, roles played and challenges faced.

In Zambia, under Article 49 of the constitution, the cabinet's main function is to make policies of the country. The framework's premise is that the executive through cabinet is vested with the mandate (through respective line ministry and herein referring to Ministry of Energy) to formulate and implement rural electrification policies and projects to address challenges of underdevelopment in rural areas. To this end, the Ministry of Energy formulates and implements policies and projects incidental to rural electrification through Rural Electrification Authority. Another understanding is that cabinet will react to policy initiatives from rural households, local councils, traditional authorities or legislature regarding underdevelopment of rural areas. Also, the legislature which is a political institution shapes rural electrification policies. It is expected that through acts of parliament, government comes up with necessary institutions to propagate the rural electrification agenda to improve rural standard of living. Largely, the Zambian legislature is also expected to debate rural electrification policy intentions originating from the cabinet or from the much wider rural areas.

Additionally, the Judiciary as a public legal institution is also expected to influence public policies. It is expected that, through judicial review, the government can come up with a rural electrification policy to address rural households' poverty levels. In this study, rural electrification is therefore seen as a government response to improving households' standard of living. To this end, the piece of legislation upon which rural

electrification policy is anchored provides well-designed boundaries within which both state actors and non-state actors operate for effective electrification of rural households.

In this study, it is expected that the Rural Electrification Act No 20 of 2003, is the legal foundation upon which the electrification of rural households is anticipated. The Act then guides state actors about what they can and cannot do in the electrification of rural households to improved standard of living. Therefore, in this study, the understanding is that rural electrification as a public policy intervention to improve rural standard of living involves participation of both state and non-state actors with government taking a leading role thereof. The state and non-state actors then collaborate and play different roles so as to enhance rural households' access to electricity and improve standard of living.

Nonetheless, in order to have a better understanding of the rural communities and before embarking on rural electrification projects, government through REA will undertake socio-economic and demographic surveys of rural communities. The survey once conducted then provides information for implementation of rural electrification projects. The information will further inform future electrification projects and programmes (REA, 2013). The understanding is that, the promotion and development of rural households will to a large extent depend on the effectiveness of the policy implementation framework. The policy implementation framework that has been put in place is expected to act as an important tool and factor in terms of improving rural standard of living. To this end, any policy or institutional challenges and/or weaknesses are expected to affect the electrification rate of households and consequently impact negatively on improving standard of living. Weak and ineffective policy implementation framework will act as a major constraint for households' electrification rate and improved standard of living.

State actors as used in this study refer to government agencies, regional authorities, line ministries and government technical services working at community level and involved with electrification of rural households. In this study, it is expected that the government through established institutions undertake rural electrification projects/programmes to proliferate socio-economic development of rural areas. It is expected in this study that

the Rural Electrification Authority acts as project managers and oversees the implementation of rural electrification projects in rural areas. Once a project is completed and commissioned; rural households are then expected to be connected to grid electricity by ZESCO. Once households are connected to grid electricity, it is expected that the diverse usage of electricity at household level will improve standard of living. In this study, the state actors are expected to take a leading role and collaborate with non-state actors for effective electrification of rural households thereby leading to improved standard of living. ZESCO as a power utility is mainly mandated to produce, generate and distribute electricity for residential and industrial consumption.

For purposes of this study, non-state actors refer to the private sector, donor agencies and/or multilateral-institutions involved in one way or another with electrification of rural households. In this study, it is expected that rural electrification involves participation of non-state actors. For instance, multi-lateral institutions such as the World Bank are expected to provide finances in form of grants for rural electrification projects. The World Bank is also expected to provide grants that act as subsidies for rural households to enhance electrification rate. The understanding in this study is that provision of fiancés by the World Bank is expected to supplement government efforts in promoting socio-economic development of rural areas through development of energy infrastructure. In addition, rural electrification projects will involve participation of the private sector. In this case, REA is expected to award contracts to private companies to extend grid electricity by constructing transmission lines. The transmission lines are taken closer to rural households to enhance their access to electricity. Therefore, in this study it is assumed that the rural electrification policy implementation framework ensures that the state and non-state actors collaborate to ensure that rural households have increased access to electricity and consequently leading to improved standard of living. In the process, both ZESCO and REA also act as project supervisors to ensure that rural electrification projects undertaken by contractors are done in line with prescribed standards and requirements. Therefore, any challenges or lapses faced in the process are expected to negatively impact on households' access to electricity.

Rural Electrification

For purposes of this study, electrification is defined as the process of providing electricity to the households and villages located remotely or in isolated areas of a country (IEA, 2010). Rural electrification is thus seen as the process of bringing electrical power to rural and remote households through grid electrification. This is expected to involve the participation of both state and non-state actors.

Standard of Living

In this study, it is expected that electrification will positively contribute towards improving households' standard of living. In this study, standard of living refers to being able to start a business, own and use electrical appliances, improved access to healthcare, education, clean and safe drinking water, and enhanced physical security. On one hand, a household refers to a dwelling unit with a group of persons who reside in it and managed by a family head.

In this study, the understanding is that effective collaboration of state and non-state actors in the electrification of rural areas is expected to enhance households' access to electricity and lead to improved standard of living. For purposes of this study, the contribution of electrification towards households' standard of living is measured by households' ability to start domestic economic activities, ownership and use of electrical assets and improved access to social goods.

The promotion of electrification and development of rural areas requires support from effective policy implementation framework. Therefore, in this study, it is expected that the policy implementation framework put in place ensures that state actors and non-state actors work together to ensure that rural households have access to electricity so as to improve and better their way of life. Improved access to electricity by rural households is then expected to lead to improved households' standard of living. For instance, electrification will enable rural households to harness their skills and resources and engage in entrepreneurial activities which are then expected to improve standard of living through income generation and creating employment opportunities. Once rural

economy improves, the government through taxes can raise revenue and in turn fund rural electrification programmes. Therefore, any retardation towards getting connected or having access to grid electricity perpetuates households' poverty. Furthermore, any challenges faced by households to use electricity productively are expected to hamper strides to improve standard of living.

Additionally, electrification of rural areas is expected to help households move from traditional to modern ways of doing things. This can be achieved through ownership and use of electrical assets. For instance, the provision of clean electricity to low-income households allows for increased abilities to power lights, radios, televisions, stoves and many other small appliances that can make a significant contribution towards enhancing quality of life. Also, adjustment towards the use of clean and reliable energy instead of conventional forms of energy such as charcoal and kerosene can help households avoid the health risks associated with conventional forms of energy.

Furthermore, electrification is expected to improve households' access to social goods. In this study social goods refer to something that provides some sort of benefits to the greater number of people when accessed. For instance, electrification is expected to improve healthcare delivery through improved ability to store drugs, offer services even after sunset, and use of health equipment such as microscopes. Once a health facility is electrified trickle down effects are expected to reach households and consequently lead to improved standard of living. In relation to education, it is assumed that electrification will provide households with good environment for studying. Electrification will also enable households have access to information and enhance their education. For instance, through improved access to information rural households can learn about better farming or health practices. Education is also expected to enhance skills of rural households and in turn help them escape the poverty nets. In this study, it is also assumed that electrification significantly enhances safety of households and property.

In conclusion, Figure 1.1 above is an illustration of rural electrification as a public policy intervention in improving standard of living. The understanding is that rural electrification is a public sector driven intervention aimed at improving households' standard of living. Provision of electricity to rural households through grid extension

involves effective rural electrification policy and well established institutions to spearhead the process. This process further involves participation of both state and non-state actors who collaborate and play various and different. Arguably, any policy implementation challenges faced by stakeholders in the electrification process of rural households are expected to hamper electrification rate and negatively affect standard of living. On the other hand, improved households' standard of living is expected to lead to increased access and uptake of electricity by rural households and trigger socio-economic development. Largely, the conceptual framework is based on the premise that rural electrification as a public policy intervention plays an important role in improving households' standard of living. To this end, any retardation towards getting connected or having access to grid electricity perpetuates households' poverty.

1.6 Structure and Presentation of the Dissertation

The dissertation is structured as follows.

Chapter One provided introduction, background, statement of the problem, objectives, rationale, significance, scope, study area, and conceptual framework.

Chapter Two provides literature review on rural electrification and Households' standard of living.

Chapter Three provides research methodology, ethical issues and limitations of the study.

Chapter Four presents and discusses effectiveness of the policy implementation framework for electrification of households in Senanga District . The section discusses the stakeholders involved in the electrification of households, roles they play and challenges they face in Senanga District . The chapter also looks at electrification process of households in Senanga District .

Chapter Five presents and discusses the contribution of electrification to domestic income in Senanga District . This is done by looking at the use of electricity by households, distribution of domestic economic activities, impact of domestic activities on households' income and challenges faced by households engaging in domestic economic activities.

Chapter Six presents and discusses electrification and livelihoods of households in Senanga District . This is done by looking at ownership and use of electrical assets with focus on access to information and communication, reduced use of traditional forms of energy for cooking and related activities and food preservation.

Chapter Seven presents and discusses the contribution of electrification to households' access to social goods. In the chapter, social goods constitute: healthcare, education, clean and safe drinking water and physical security.

Chapter Eight which is the last chapter of the study makes research conclusions and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter reviews literature on rural electrification as a public sector intervention in improving standard of living. The literature review highlights the role rural electrification plays in improving standard of living. However, due to scantiness of literature on Zambia, the literature review takes a general approach. It is anticipated that even in this case, important lessons can be drawn to inform the present study. In helping with progress, this study critically reviews and examines literature related to Zambia as well as other countries in Africa and rest of the World. The researcher attempted to identify gaps and lessons that provided a basis for this study.

2.1 Reviewed Literature

A study conducted by Phiri (2017) entitled “*The effects of Rural Electrification on the Rural Poor People in Zambia: Case Study of Solwezi Community*,” which paid attention to an area which had been electrified 2-3 years back as the pre-electrification era data had to be collected from the memory of the members is worth noting. 100 households were selected using simple random sampling method. Two focused group discussions were also held in order to get diverse views and to allow for researcher observation. This study demonstrates that rural electrification has both positive and negative effects on the rural people in the Zambian communities. This study further reveals that electrification of rural areas that had been lacking electricity supply for a long time resulted in mixed impacts on the rural people. It reveals that the poor, especially the very poor in rural areas do not benefit from rural electrification. The benefits of electrification to the rural poor are insignificant. Rural electrification does not directly lead to sustainable development in the rural areas. It also reveals that electrification has no effect on deforestation and particularly the use of other rural energy sources such as charcoal and fire wood.

The study by Phiri is important to this study as it reveals the extent of electrification benefits to the rural poor. Although Phiri’s study provides relevant information

pertaining to the impact of rural electrification on rural poor households, its inability to provide relevant information on the challenges faced in the electrification of rural poor households provides a basis for new studies.

Another related study was conducted by Buckley (2010) entitled, “*Rural Electrification in Zambia.*” Buckley examines the causes of deforestation in Zambia, and how the Environmental Kuznets Curve (EKC) can be used to illustrate the effects of rural electrification on GDP and deforestation. Contrary to Phiri (2017), Buckley reveals that, rural electrification addresses both primary agents of deforestation and the underlying causes. It reduces immediate pressures on forests through changes in agricultural practices and fuelwood use. He further reveals that electricity may be the backbone of rural development plan, but without appropriate and compatible infrastructure and equipment, it is all but useless to a population that never has it. Buckley also argues that rural electrification in Zambia requires substantial investments in latest technologies and appropriate institutional framework for change to happen. In order for rural electrification to provide the many benefits such as increasing productivity, improving education and enhancing recreation, extending the working day, and enabling higher incomes, a complete rural development plan must be in place.

Review of this literature is important as it shows that rural electrification on its own is not adequate to stimulate rural economic development. This finding is also in agreement with Phiri (2017)’s revelation that rural electrification by itself does not directly lead to sustainable development. However, Buckley’s study does not indicate the methodology which was used, hence, raising issues of validity and reliability of the findings. Although Buckley’s study reveals that rural electrification in Zambia requires substantial investments in latest technologies and appropriate institutional framework for change to happen, this study seeks to move further and establish the role electrification plays in stimulating development in rural areas with substantial investments made in latest energy technologies or infrastructure.

Haanyika (2005)’s work titled, “*Rural Electrification Policy and Institutions in a Reforming Power Sector*” is also worth noting. Haanyika provides insights on the influence of the power sector reforms on rural electrification and outlines the policies and strategies required to support rural electrification in a reformed or reforming power

sector. He points that some of the problems that have plagued rural electrification in most developing countries include; inadequate policies, limited application of appropriate technologies, limited financing and weak institutional frameworks. Governments have been making various efforts at the policy level to facilitate increased levels of access and affordability of electricity in rural areas. However, the introduction of market-based reforms in the power sector in the last decade has affected existing institutional and financing arrangements for rural electrification. Consequently, implementation of reforms has affected the rate of electrification and affordability of electricity in rural areas. He also argues for the need to formulate new strategies to support rural electrification. To him, electricity can meet a diversity of human energy needs compared to the other forms of energy, and that access to reliable and affordable electricity to rural areas has the potential to improve the provision of social services such as health and education.

Haanyika (2005)'s study mainly helps to inform this study on the problems that have affected rural electrification programmes and power sector reforms in developing countries. However failure by Haanyika to provide specific country information related to Zambia on prospects and challenges of rural electrification kindled the need for further studies.

Kageni (2015) in her study titled, *“An Evaluation of Rural Electrification Adoption Dynamics in Meru-South Sub-County, Tharaka-Nithi County, Kenya”* evaluate rural electrification adoption dynamics.” To achieve its purpose, household interviews were conducted from 150 randomly selected households using closed and opened ended questionnaire. Results of the study indicate that the greatest prior challenges to electricity connection were accessibility (proximity of the transformer) and cost of connection. The transformers were revealed to be in the upper and middle areas compared to lower areas. Adopters were mainly in upper zones while non-adopters were distributed in lower and upper zones. The findings indicate that electricity was not extensively used for income generating services. This study demonstrates some of the challenges rural households face in trying to connect to grid electricity. However, the study does not significantly show the extent to which these challenges impact on households' standard of living in rural areas.

Matungwa (2014) in his study entitled, *“An Analysis of PV Solar Electrification on Rural Livelihood Transformation*, analyses the contribution of Rural Photovoltaic solar energy electrification in the livelihood transformation process in the rural areas, based on Kisiju-Pwani village in Mkuranga District , Tanzania. The study further sought to understand people’s perceptions, attitude and sense of ownership over the project installed in the village. In the collection of information for this study, different interviews and focus group discussions were conducted from different households which are beneficiaries and non-beneficiaries. Findings of the study reveal positive attitude over the PV solar electricity installed in their village. The study further shows that purchasing and socialization time for most of the people in the village improved and people have more time to exchange ideas during the evening and night hours, while businessmen and women continue their businesses even after sunset. A review of this study is important as it shows the impact photovoltaic solar energy has on rural households. The study further highlights the attitude rural households have towards solar energy. However, the limitation of this study is that it solely focused on photovoltaic energy and not grid electricity. Furthermore, Matungwa (2014) does not comprehensively reveal the socio-economic effects of electrification on households’ standard of living.

Kembo (2013) in her study titled, *“Socio-Economic Effects of Rural Electrification in Tala Division, Machakos County, Kenya,”* establishes the socio-economic effects of the rural electrification programme in Tala Division of Machakos County in Lower Eastern Kenya. The study adopts a descriptive design. The target population was 4,780 households connected in 43 villages in the division through the programme. The stratified randomized sampling design was used. The study shows that electrification improved the lives of people but there is need to either improve infrastructure in order to connect more villages or to review the guidelines on rural electrification. The study further shows that rural electrification is not sufficient to have increased disposable incomes. Review of this study is important as it shows the extent to which rural electrification improves the lives of rural people. However, the study does not show the stakeholders, roles they play and challenges faced in the electrification process of households in rural areas.

Iliskog (2008)'s research study titled, *“And then they Lived Sustainably Ever After?- Experiences from Rural Electrification in Tanzania, Zambia and Kenya,”* also provides valuable information. The research objective was to reach increased knowledge of the impact from organisational and institutional factors on project sustainability, through interdisciplinary field studies, and studies of literature on rural electrification. The study mainly presents an analysis of rural electrification, based on interdisciplinary empirical studies of seven rural electricity cases in Tanzania, Zambia and Kenya. The study indicates that the national utilities perform better from a social/ethical perspective whereas the private organisations and the community-based organisations manage their client-relation issues in a more sustainable way. A review of this study is important as it shows the roles and performance of both public and private organizations in the electrification of rural areas. The study further shows that affect sustainability of rural electrification projects in rural areas. However, the study does not extensively show the performance of both public and private utilities towards improving rural livelihoods through electrification projects.

Khandker, Samad, Ali and Barnes' (2012) paper presentation titled, *“Who Benefits Most from Rural Electrification? Evidence in India,”* is in line with Phiri (2017)'s findings. Khandker et al (2012) applies an econometric analysis to estimate the average and distribution benefits of rural electrification using rich household survey data from India. The study also applies an instrumental variable (IV) method in a fixed-effects (FE) framework to obtain unbiased estimates of the impacts of rural electrification on rural households. The study reveals that rural electrification increased labour supply of men and women, schooling of boys and girls, household per capita income and expenditure. Electrification further helped to reduce poverty levels although larger share of benefits were accrued by wealthier rural households, with poorer ones having a more limited use of electricity. This study provides information to understand that wealthier rural households tend to benefit more from rural electrification than poorer rural households. However, Khandker et al (2012) in their study does not sufficiently and satisfactorily reveal factors or reasons to explain the discrepancy.

Litzow (2017)'s Master's thesis also provides valuable information to this study. Litzow's study titled, *“the Impacts of Rural Electrification in the Kingdom of Bhutan”* relies on survey data from three rounds of the Bhutan Living Standards Survey to assess

the impact of rural electrification in Bhutan. Applying linear and non-linear regression methods as well as propensity score matching, the study reveals that electrification program led to improvements in education and reduced fuelwood consumption. It also finds inconclusive evidence of the effects of electrification on non-agricultural employment and finds no effect on health. The study concludes that Bhutan's electrification program was a partial success in the time period studied, achieving fuelwood and education related outcomes and improving welfare in rural households. Litzow's study is quite educative as it shows that in some cases, the impact of electrification in improving welfare of rural households tend to be negligible.

However, the study does not investigate the effects of electrification on households' accessibility of other essential services like clean water and health. Realising that the relationship between electrification and standard of living is a complex one, Litzow is supposed to clearly draw variables that measure standard of living to comprehensively assess the impact of electrification on welfare of households.

Another related study into the subject matter is one conducted by Wamukonya and Davies (1999) titled "*Socio-economic Impacts of Rural Electrification in Namibia*". The study uses both quantitative and qualitative research methods. The research involved a questionnaire survey of close to 400 households in rural areas of Namibia. The sample was selected to include grid-electrified, solar-electrified and unelectrified households. The study shows that electrification generally improved welfare of both electrified and unelectrified households. Electrification was associated with changes in the standard and way of living. People perceived electricity as a symbol of social development. Review of this literature is significant as it reveals that electrification also improves standard of living of unelectrified households. However, the limitation of this study is that it focuses on socio-economic impacts of rural electrification at household level only. This leaves out other levels or sectors such as commercial enterprises, education, health and sanitation.

Marete (2016) in his study titled, "*Factors Influencing Electrification of Rural Households in Kenya: A Case of Meru South Sub-County, Kenya,*" sought to investigate factors influencing the electrification of rural households in Meru South Sub-County of Kenya. To select the test sample, multi-stage sampling was used in selecting wards and

sub-divisions for the study after which simple random sampling was used to pick the households. From the research findings, the study shows that the amount of funding to REA, availability of alternative sources of energy, distance of a household from a transformer and ability to pay had the most significant influence on rural electrification. Review of this literature is important as it shows some of the factors that hinder electrification of households in rural areas. The study also shows some of the issues affecting operations of key stakeholders in rural electrification. However, the limitation of Marete (2016)'s study is that it does not provide relevant information on the impact of electrification on rural households' standard of living.

Ouma (2013) in his Master's thesis, "*the Role of Rural Electrification on the Growth of Small and Medium Enterprises in Mbita Town,*" assesses the effects of rural electrification on the growth of SMEs in Mbita Town of Tanzania. The study uses descriptive research design and surveyed all 280 small and medium enterprises in Town. The study reveals that multiplier effect in the businesses was evident with one business triggering backward and forward value chains which made the residents experience an improved step in their living standards. In addition, the study reveals that most SMEs introduced new services as a result of the value addition that was enabled by the electrification. Therefore more people had connected to the grid and others were also registered awaiting connection at the next opportunity in order to also add new services. It also finds that many youths got engaged in economic activities that encouraged them to be self-reliant. Women were also able to fend for themselves and fully participate in economic development of their families. Review of this literature is significant to this study as it shows the effects of electrification on the growth of SMEs in rural communities mainly through value addition. However, the limitation of this study is that it solely focuses on SMEs. Therefore, there is need to ascertain the effects of electrification on the growth of SMEs transcended to improved standard of living of rural communities.

The Independent Evaluation Group (IEG) and World Bank (2008) study titled, "*the Welfare Impact of Rural Electrification: A Reassessment of the Costs and Benefits, An IEG Impact Evaluation*" conducted in India also provides valuable information to this study. The study reveals that solar home systems increased economic activities inside and outside households because business activities operated long hours in the evening.

The contribution of solar energy to economic growth is viewed in terms of the role it plays to lower the cost of energy to the rural dwellers, resulting to the consumer surplus and the way it helps spur growth of home business hence a boost to the household income growth. The study also indicates that the larger share of benefits from rural electrification is captured by the non-poor. However, the gap closes as coverage expands.

Review of the IEG and World Bank study is important to this study as it reveals the contribution of energy sources to economic growth of rural dwellers. The study also reveals that rural electrification programmes tend to benefit the non-poor in rural areas. However, the study focuses on solar energy hence it is imperative to ascertain the contribution of grid electricity towards growth of rural economy.

Kanagawa and Nakata (2008) in their study entitled, *“Assessment of Access to Electricity and the Economic Impacts in Rural Areas of Developing Countries”* developed an energy economic model on rural areas for one State in India, using cross sectional data. The research assesses the relationship between access to electricity and the advancement of the socio-economic conditions in the rural areas, with a focus on poverty reduction. Kanagawa concludes that the literacy rate above six years could be explained by household electrification rate, sex ratio and road density per 1000 kilometre per square, emphasising how educational improvements are attained through access to electricity. His study reveals that rural electrification contributes towards reduction in literacy levels through enhanced access to education which further contributes towards poverty reduction. Although the paper provides a good assessment of the relationships between electricity consumption and other socio-economic factors such as GDP (Gross Domestic Product) and literacy rate, the focus is mainly at household level and based specifically on the electricity consumption of lighting appliances at the expense of other appliances such as Radios, Televisions and Stoves that have a direct impact on households standard of living.

World Resource Institute (2016)’s report on *“Impacts of Small-Scale Electricity Systems: A Study of Rural Communities in India and Nepal,”* is also highly informative and makes interesting reading. The study selects three sites in Bihar, India, and Nepal, which have in close proximity villages without electricity, served by different types of

off-grid systems, and those served by the national grid. Data is collected through a household survey and interviews with small-business owners. Using quantitative techniques to control for confounding factors, the study compares electricity service benefits related to income, women's time use, kerosene use, and perceptions of education across households. Qualitatively, the influence of electricity access on key decisions of small businesses was assessed. The study also assesses and compares the benefits of electricity service to households and small enterprises from micro grids, solar home systems (SHS), and the national grid in selected rural communities in India and Nepal. The study reveals that electricity access in general leads to reduction in kerosene use, more time spent by women on income-generating activities, and the acquisition of home appliances. Electricity access benefited small businesses, but seldom drove key business decisions. Business owners also suffered high opportunity costs due to lack of supply or unreliable supply and, for the most part, were reluctant to make electricity-dependent investments because of unpredictable supply.

A study by World Resource Institute (2016) is important to this study as it helps to understand issues related to rural electrification such as unreliable supply which negatively affects businesses and development of rural communities. However, the study does not show what contributes effectively towards sustainable rural development among micro grid, solar home systems and national grid extensions. The absence of adequate information on the effectiveness of grid electricity towards improving standard of living of rural households provides a basis for further studies.

Another study conducted by Short (2015) entitled "*The Role of Productive Uses of Electricity in Rural Development: A Case Study of Xeo Tram and Hoa Duc Hamlets of Hòa An village, Vietnam,*" provides valuable information to this study. The study discusses how electricity is being used in rural areas and whether the uses are aiding in the national growth of Vietnam. The study comprises surveys, and in depth interviews in the selected areas. The findings reveal that although electricity is used productively, in most cases it is not being utilized economically. Data analysis reveals two main obstacles that keep rural villagers from using electricity economically. The first is lack of knowledge of potential electricity uses that would increase production of income and second, affordability and sustainable affordability of electricity.

Review of this study is important as it provides valuable information on some of the factors that prevent productive use of electricity in rural areas. However, this study does not comprehensively indicate the challenges faced by households in rural communities which prohibit productive use of electricity.

Samanta and Sundaram (1983) conducted a study on “*Socio-economic Impact of Rural Electrification in India.*” The study addresses the following key question: Does rural electrification increase productivity, income, and employment and bring structural change in rural areas? The analysis is based on primary data collected by the Operations Research Group (ORG) in 132 villages in four states--Andhra Pradesh, Maharashtra, Punjab, and West Bengal. Data was collected from the village and household levels, from State Electricity Board and research and manufacturing enterprises in the sample villages. For 108 of the 132 villages, data was supplemented by a baseline 1966 survey of agricultural innovation. The ORG study shows that rural electrification had made a major contribution to rural development. It also finds rural electrification positively associated with the two most critical inputs--irrigation and innovation--in the agricultural sector. The study further shows positive effects electrification on the development of rural industry and services. In the social sectors, the effects are less pronounced though still significant. Review of this study is important as it provides valuable information on structural changes brought by electrification in rural areas. However, a good number of years have passed since the study was conducted hence it is imperative to replicate similar study and ascertain if results would still be the same at the moment.

Energy Sector Management Assistance Programme (ESMAP) (2002) study conducted in the Philippines entitled, “*Rural Electrification and Development in the Philippines: Measuring the Social and Economic Benefits*” makes interesting reading. The study’s principal objective was to develop a practical method by which to measure the benefits of rural electrification. The study reveals that rural electrification is an important component of the social infrastructure that leads to development. The most important finding is the link between education and electricity. Not only did rural households perceive electricity as important for their children’s education by improving study conditions during the evening; the number of hours both children and adults spend reading was higher when a household had access to electricity. The study also reveals

that electricity improves the flow of information and entertainment to rural households; decreases the amount of time rural households spend collecting fuelwood or fetching water; and facilitates the start-up and improves the productivity of more small businesses in electrified regions.

Review of ESMAP study is important to this study as it reveals some of the socio-economic benefits of electricity to rural communities. However, the limitation of this study is that it was conducted in the Philippines. Since Philippines and Zambia are countries with different socio-economic characteristics, it is imperative to replicate similar study in Zambia and ascertain if results would be the same.

Van de Walle et al (2013) in their policy research working paper titled, “*Long-Term Impacts of Household Electrification in Rural India*”, examines the long-term effects of household electrification on consumption, labour supply, and schooling in rural India over 1982–99. The study indicates that household electrification brought significant gains to consumption and earnings, the latter through changes in market labour supply. The study also finds positive effects on schooling for girls but not for boys. External effects are also evident, whereby households without electricity benefit from village electrification. The study further finds a significant “internal” impact of household acquisition of electricity during the period. Consumption increases, and this is mainly food and fuel spending. This study is important as it shows some of the socio-economic effects of household electrification. It is also important as it attempts to address the distinction between internal (household-level) impacts and external, village-level, effects. The study shows that even rural households that are not connected to electricity tend to benefit from electrification indirectly. However, the study fails to show the effects of household electrification on other variables standard of living such as safety and ownership of appliances.

2.2 Conclusion

There is a general consensus in the reviewed literature that rural electrification has a considerable significant impact in stimulating social-economic development and reducing poverty in most rural communities. The literature reviewed illustrates that

provision and uptake of electricity in rural areas has the potential to improve rural livelihoods such as improved incomes, literacy levels and access to social services. Generally, the literature presents and provides a sketch understanding of the role rural electrification plays in rural development. However, the reviewed literature does not provide comprehensive information on how electrification affects other aspects of standard of living such as ownership of electrical appliances, safety, and also challenges faced in the process of electrifying rural households. In addition most studies carried out on benefits of electrification have been too narrow focusing on one or two variables of development. Furthermore, most studies focuses on private sector driven electrification projects in rural areas. Therefore, this study attempts to fill the gap in the existing literature by examining rural electrification as a public sector intervention in improving standard of living in Senanga District . The next chapter presents methodology used in the study.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This Chapter describes the methods that were used in this study to examine electrification as a public policy intervention in improving rural standard of living. It explains the research approach, study population, sample size, methods of data collection, sampling methods, methods of data analysis and reporting and ethical issues.

3.2 Research Type

The study employed a descriptive case study in combination with mixed method approach. Mugenda and Mugenda (2003) argues that a descriptive research design is one that allows one to present data collected from multiple methods such as surveys and document review to provide the complete story. This method can help to discover out what, where, and how of an occurrence. The method was used as it gave the researcher an opportunity of collecting information about the correct status of the standard of living of electrified households in Senanga District . It is descriptive in that it provides an account of rural electrification as a public policy intervention in improving standard of living. The study further combines both qualitative and quantitative research methods to enable an in-depth investigation into the subject matter studied. Mixed methods research design is a design that mixes both qualitative and quantitative research designs in collecting and analysing data in order to comprehend a particular research problem (Creswell and Clark, 2011). The reason for adopting such a research method is to try and facilitate for the benefits of both qualitative and quantitative research design. The quantitative methods help to quantify the occurrence/patterns of results and answer ‘what’ numbers or percentages of the population were affected while the qualitative helps to find reasons or ‘why’ this is the case. Thus the application of both methods complements each other thereby sealing the gaps that could have been created if just one method was used.

3.3 Study Location/Area

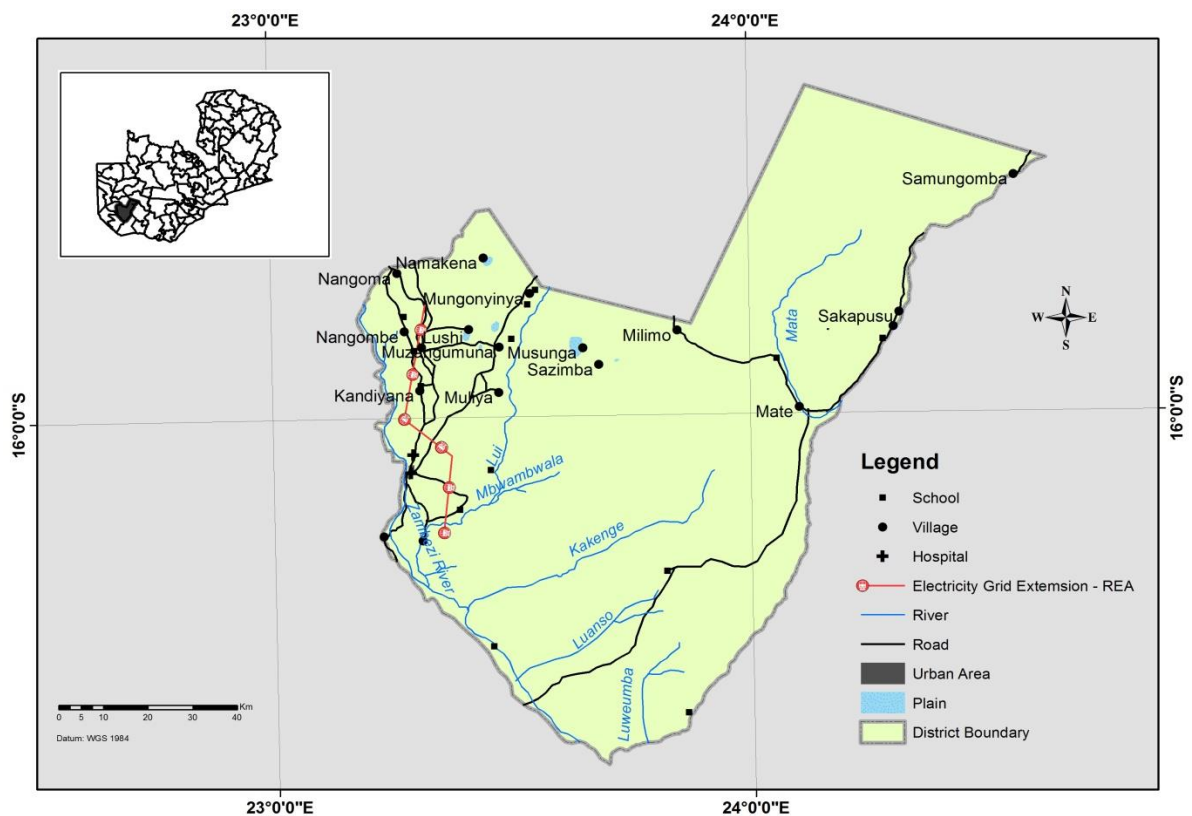
This study was confined to Senanga District of Western Province. The further was further confined to grid electrified households in the electrified parts of Senanga District. Senanga District is one of the sixteen Districts of Western Province. The District is centrally positioned in Western Province of Zambia, and is located about 105 km from Mongu, and approximately 900 km from Lusaka. The District shares boundaries with Shangombo on the west, Mongu on the north, Nalolo on the northwest, Sesheke on the south-east and Luampa on the northeast. Senanga is about 106 Kilometre (Km) away from the provincial capital, Mongu. The District covers an area of 8, 153 square kilometres, with a topography divided into two main physical features, namely; Upland (55 percent) and Lowland (45 percent). Senanga town is located on a plateau on the eastern bank of the Zambezi River (Senanga District Council, 2015). Households have an average family size of 6 persons. The female/male ratio stands at 52.2 percent to 47.8 percent and the annual growth rate of 1.5 percent. Ten percent or 11,063.4 of the population live in urban township while the majority 90 percent (99,570.6) live in the rural areas mainly in the plain edge and flood plains (CSO, 2010; Senanga District Council, 2015).

The major economic activities engaged by the local community include; agriculture, fishing and livestock production. Rice and cassava are major cash crops, while maize, and sweet potatoes are grown for subsistence and to some extent cash sale. Livestock keeping is also practiced where households keep dairy cattle, goats and poultry (Senanga District Council, 2015). Public infrastructures are moderate unevenly distributed in the area. The prime public infrastructure and facilities include: primary and secondary schools, Rural Health Centers (RHCs), markets, primary, feeder roads, electricity, and agro-service centers (Senanga District Council, 2015).

With history of having benefited from national rural electrification programs, diverse population, and geographic spread, Senanga District presented an ideal case for this study. Senanga District was chosen for this study for the following reasons. Firstly, the District formed part of the province (Western Province) with highest poverty levels (80 percent) in the country (CSO, 2015). Secondly, the District was one of few (three)

Districts of Western Province that have recently benefited from rural electrification programmes. Thirdly, no available literature indicated that any studies relating to rural electrification and rural development have been undertaken in the District. Thirdly, the researcher had reasonable understanding of the culture, geography, and terrain of the District. This was important as it helped the researcher easily communicate with the local people, identify research locations and collect necessary data.

Figure 3.1 Map of Senanga District



Source: Department of Geography, University of Zambia, 2019

3.4 Study Population

Senanga District is one of the 16 Districts of Western Province. According to 2010 census, the District population was about 126,506 (60,428 males and 66,078 females) with an approximate density of 6.2 persons per square kilometre. The District has 12 wards with about 20,691 households distributed across the wards. Information obtained from Zesco's Customer Management System and Prepayment Department (CMSPD)

shows that currently, 2,163 households classified as residential are electrified via national grid in the District (Senanga District Council, 2015; ZESCO, n.d).

3.5 Sources of Data

The study utilised both primary and secondary sources of data. Secondary data was collected from the internet and desk research from various sources such as journal articles, publications, news reports, and studies done by various scholars and organizations. Secondary data was used to supplement primary data and provide insights on what has been researched pertaining to rural electrification and development. On the other hand, primary data was collected from key informants and heads of electrified households in the electrified parts of the District .

3.6 Sample Size

Primary data was collected from a sample of 106 respondents selected from electrified households and key informants. In a summarised form, the sample was broken down as shown in Table 3.1 below.

Table 3.1 Category of Respondents

No	Category of Respondents	Sample size
1	Electrified Households	100
2	Official from Wilfro Investments (Contractor)	1
3	Official from Zesco	1
4	Official from REA	1
5	District Council Planner	1
6	Induna from BRE	1
7	District Commissioner	1
	TOTAL	106

Source: Author, 2018

3.7 Sampling Methods

The study used a number of sampling techniques to select the respondents. The methods used for each category of respondents are presented below. To select electrified households, cluster, weighted stratified, purposive and convenient sampling methods were used. The first step involved the use of cluster to select smaller geographic areas (wards). Cluster sampling method was used because it is quick and easier. Senanga District had a total of 12 wards out of which only four were connected to grid electricity. The study then used purposive sampling method to select all the four electrified wards of the District. The four wards were purposively selected as they were the only ones connected to grid electricity. The third step involved the use of weighted stratified, purposive and convenient sampling methods to select electrified households. Since the actual number and list of households connected to grid electricity was not available and unknown, the study relied on the total number of households per ward. Furthermore, since the population in the study area varies the number of households interviewed was proportionally determined, relative to the number of households in each sub-location to determine the number of households that were to be included in the overall sample.

The four electrified wards selected had a total number of 8,601 households (electrified and non-electrified). The distribution per ward is shown in table 3.4.1. Once the number of households per electrified ward was known; the fourth step involved the use of weighted stratified sampling method to determine the number of households to be sampled from each of the electrified wards (stratum). This was done to ensure proportional and equal representation of households from the electrified wards in the overall sample. The formulae involved dividing the number of households for each ward by total number of households in the four electrified wards. The answer found was then multiplied by sample of households (100). For example, for Mwanambuyu ward, $2,255/8,601 \times 100 = 26$ households to be samples. This meant that 26 electrified households were to be drawn from Mwanambuyu ward. The same formulae were repeated for the remaining three wards.

Once the number of households to be selected from each ward was known, the fifth step involved the use of purposive and convenient sampling methods to select the electrified

households. It was difficult to use any other method because households were not located in any orderly manner. The areas had no streets and houses had no numbers. Thus, in each of the electrified household selected, the study targeted the most resourceful person (Head of the Household). That is a person who could provide valid and reliable information for this study. The targets were household heads; wife or husband. In an event where both were absent, the eldest member of the family was interviewed. In this regard, heads of electrified households were purposively selected and administered with questionnaires. The use of different sampling methods helped to minimise baseness in the sampling process.

Table 3.2 Distributions of Households Per Electrified Ward

Name of Ward	Number of Households	Number of Households to be drawn into the Sample
Mwanambuyu	2,255	26
Imatongo	1,557	18
Imatanda	3,575	42
Naluywa	1,214	14
Total	8,601	100

Source: Senanga District Council, 2015; Author, 2018

The six key informants were selected using purposive sampling. The key informants purposively selected included an Induna from Barotse Royal Establishment (BRE), an official from Wilfro Investments (Contractor), District Commissioner, and District Planner from Senanga District Council, An official from ZESCO, Senanga office, and an official from Rural Electrification Authority (REA). The key informants were selected as they were best suited to provide detailed information and insight into the phenomenon under investigation.

3.8 Methods of Data Collection

In order to provide responses to the objectives, the study utilised questionnaires, interview guides, recorder and camera. A mixture of closed and open ended questions

was used in questionnaires self-administered to heads of electrified households. The use of closed and open ended questions in the questionnaire gave respondent's a choice of choosing from a list of pre-set questions and to create their own responses. Semi-structured interview guides and a recorder were used for key informants. The research also made use of a camera and available secondary data to supplement primary data that was collected

3.9 Methods of Data Analysis

The data from questionnaires was processed and analysed using Statistical Package for Social Sciences (SPSS) version 20 and Excel Spread Sheets. SPSS version 20 and Excel programmes were used to generate figures, tables and graphs for the various variables that were under analysis. Excel was used to create tables and graphs for data generated using SPSS. On the other hand, qualitative data from questionnaires and key informants was analysed using content analysis. Information was coded according to themes that were developed from the analysis of data collected. The themes used to analyse the data were categorised as institutional frameworks, increased domestic income, and household lifestyle and security of households.

3.10 Ethical Issues

Confidentiality: The participants were guaranteed that the information that they were going to provide would remain confidential and only for the purposes it was intended for.

Permission: The researchers also sought permission to carry out the research from key officials relevant to this study

Informed consent: The prospective research participants were fully informed about the procedures involved in the research and were kindly asked to give their consent to participate.

Anonymity: The participant remained anonymous throughout the study researcher and privacy was guaranteed.

3.7 Limitations of the Study

A number of problems were encountered during the study. These problems made the research process difficult. Some of the limitations encountered included:

1. The researcher was unable to collect some pertinent information for this study. The information relate to actual list and details of electrified households in Senanga District . This information was withheld by key informants. However, information pertaining to the total number of households in Senanga District connected to grid electricity was provided. Based on this data, the researcher was able to draw a representative sample. This situation made the researcher to rely on non-probability sampling methods thereby making generalization of findings difficulty.
2. Another important limitation faced by the researcher was language barrier. Some household respondents could hardly speak nor hear any Language apart from the Local language. The only Language familiar to them was local language-Lozi. In such instances, all communication was done through research assistants. Unfortunately with any translation, certain thoughts and ideas can get lost in the process or might not be reported accordingly. This might have caused inconsistencies in the quality and quantity of the data collected.

CHAPTER FOUR

EFFECTIVENESS OF THE POLICY IMPLEMENTATION FRAMEWORK FOR ELECTRIFICATION OF HOUSEHOLDS IN SENANGA DISTRICT

4.1 Introduction

This chapter presents and discusses research findings on the effectiveness of the policy implementation framework for electrification of households in Senanga District. For this study, policy refers to a course of action or activity for electrification of households aimed at improving standard of living. Effectiveness refers to the degree to which the policy implementation framework for rural electrification is able to enhance household electrification for improved standard of living. This is measured by looking at stakeholders involved, their roles and challenges faced, and household electrification process itself. The chapter is divided into four sections. The first section is the introduction while the second section discusses the stakeholders involved in the electrification of households in Senanga District, roles they play and challenges they face. The third section looks at the electrification process of households in Senanga District. The fourth section is a conclusion.

4.2 Stakeholders Involved in the Electrification of Households in Senanga District

This section presents and discusses research findings on the stakeholders involved in the electrification process of households in Senanga District. The section further highlights roles the stakeholders play and some of the challenges they face. This study reveals that, stakeholders involved in the electrification process of households in Senanga District include: Donors, REA, ZESCO, and Private Company (Contractor) and Senanga District Council, and local communities.

4.2.1 Donors

The findings of the research show that the World Bank has played an important role in financing most rural electrification projects in Zambia. An interview conducted on 28 February, 2018 with Monitoring and Evaluation Specialist from REA reveals that part of the money for the Nanjucha grid extension project was granted by the World Bank.

The World Bank provided some of the funds towards the Nanjucha grid extension project. However, an official from REA did not disclose the actual amount or percentage of the project money the World Bank funded. This finding of the study is similar to other countries like Vietnam and Philippines where the World Bank has been a major financier of rural electrification projects (Short, 2015; ESMAP, 2002). The study reveals that the World Bank's involvement in rural electrification in Zambia is on a large and multi-sectoral scale. The scope of their work embraces financing rural electrification programs over a long-term with a focus on the poorer and less electrified rural areas as well as network rehabilitation and management improvement. An official from REA further reveals that the World Bank through subsidies helps rural households connect to electricity. The official from REA narrated that:

So what happens is that the World Bank also provides funds to help vulnerable households connect to electricity...Households that have done the wiring and about 30 meters radius from an existing ZESCO pole or transformer only pay K250 as connection fee instead of the normal K2,400 (Interview, 28 February, 2018).

This finding reveals that rural households in Senanga District are provided with subsidies to connect to electricity. Above revelations by Monitoring and Evaluation Specialist from REA reveals that the World Bank plays an active role in the electrification process of households by financing the project and also providing funds to help households connect to electricity. This finding is also similar to experiences in other countries like Vietnam (Short, 2015).

At the time of this study, an interview with officials from World Bank could not be reached due to their non-availability in the country. Therefore, the researcher could not ascertain challenges faced by the World Bank in the electrification process of households in Senanga District .

4.2.2 Rural Electrification Authority (REA)

In Zambia, REA is obliged to supply “electricity to each and every village of the country”. As earlier alluded to, through the Rural Electrification Act No.20 of 2003, REA has been established to provide electricity infrastructure to rural parts of the country using appropriate technologies such as grid extensions, mini hydro (200KW-

10MW), Solar Home Systems, biomass and biogas, and also wind technologies, in order to increase access to electricity in the country. Since REA's inception, it has been in charge of managing rural electrification programs (REA, 2009; REA, 2015). REA has also been given the mandate to electrify all rural areas by 2030. The Rural Electrification Master Plan (REMP) serves as a blueprint for rural electrification in Zambia for the period 2008 – 2030 (Mengo, 2015). REA as a government institution established under an Act of Parliament number 20 of 2003 has been given this special purpose vehicle for promoting rural electrification because the national power utility, Zesco, which had been implementing the programme on behalf of government, in the past concentrated on commercially-viable ventures and projects, mainly in urban areas (Mengo, 2015). This situation is similar to other countries in the world such as India, Kenya and Tanzania where autonomous authorities have been established with the sole purpose of taking electricity to rural areas (Marete, 2016; Ouma, 2013).

4.2.2.1 Roles Played by REA in the Electrification of Households in Senanga District

In Senanga District, REA has mainly been responsible for creating energy infrastructure through grid extension. REA has been extending grid electricity closer to households to enable them have easy access to electricity. What REA did in Senanga District was to target Rural Growth Centers. As earlier explained, Rural Growth Centers are mainly rural localities with high concentration of residential settlements and the center of rural economic activities (REA, 2013). So, REA provides finances for extension of grid transmission lines and puts up transformers in the growth centers. In the process, all government institutions and houses in the locality are freely connected to electricity by REA. Once grid is extended, REA hands over the project to ZESCO for operations and maintenance (Interview with Monitoring and Evaluation Specialist, 28 February, 2018). REA with assistance from World Bank also provides subsidies to households to cover electricity connection fees. The Monitoring and Evaluation Specialist pointed that:

If a household is within 30 metres from a medium voltage ZESCO line, then it qualifies to benefit from our subsidy program where REA

in partnership with ZESCO connects any standard and grass thatched houses at K250 (Interview, 28 February, 2018).

This situation is similar to rural electrification projects in Philippines where the average cost of providing electricity to rural households is slightly below-average costs because of capital subsidies. Philippines. The Philippine government has a policy of cost-covering prices (offer subsidies for some of the capital costs of line extension to areas without electricity) (ESMAP, 2002).

During the project implementation phase, REA is also responsible for the supervision of the contractor awarded contract to extend grid transmission lines. The supervision is to ensure that the contractor works according to project and technical expectations and requirements. In this case, REA supervised a contractor during the Nanjucha grid extension project in Senanga District. An interview with an official from REA (28 February, 2018) also reveals that, REA has pioneered a safe electrification method for grass thatched houses in Senanga District using the Ready Board Technology (RBT). This method is a substitute for internal wiring normally done in electrification of standard houses. This finding is in line with the understanding in the conceptual framework.

4.2.2.2 Challenges Faced by REA in the Electrification Process of Households in Senanga District .

REA is reportedly facing a number of challenges in its quest to provide electricity infrastructure for households in Senanga District. An interview with Monitoring and Evaluation Specialist from REA (28 February, 2018) reveals that lack of funds is one major challenge REA faces in electrifying households in the District. The official narrates that:

REA needs about US\$50 million per year to implement its projects within the rural electrification master plan, meaning that each year, this money must be available. However, on average, REA receives US\$25 million and fails to implement all its projects outlined for the year. This is one major challenge affecting our capacity to provide electricity most rural parts of rural Districts such as Senanga.

This challenge faced by REA is further supported by Haanyika (2005) who argues that limited financing is one of the many problems that has besieged rural electrification in most developing countries. This is further reaffirmed by Khandker et al (2012) whose study reveals that, in India, many state electricity boards and smaller energy companies have significant financial problems with many operating at a loss and unable to make a profit with electricity tariffs that do not enable full recovery costs.

Another challenge REA face is designing electrical distribution systems in Senanga District owing to its dispersed settlement. Most households in Senanga District are typically far away from national grid and some difficult to access. Some households are also in the plains and very sandy areas which are difficult to do constructions for grid extensions (Interview with an Official from REA, 28th February, 2018). This challenge is also reaffirmed and echoed in a study by Schwan (2011).

This study also reveals that REA has not decentralised its structures and/or offices to District s countrywide. The authority is only found in the capital city, Lusaka which makes it difficult to effectively implement rural electrification projects for effective electrification of households in Senanga District .

This study also reveals that REA faced a challenge of poor workmanship from the contractor during the project implementation phase. An evaluation of the Nanjucha grid extension project conducted by REA between 2 and 7 January 2015 reveals that ZESCO which is mandated to connect households to electricity faced a challenge in connecting households due to the failed test of four transformers put up by the contractor. It was revealed that five out of six transformers that were installed by the contractor did not pass the test; hence, could not be energised to enable household connection. The REA evaluation team learnt that ZESCO was at that time working with the contractor to resolve the problems which led to the failure of the transformers that were scheduled to be connected during the week which begun on 4th January, 2015. The failure of transformers during testing by ZESCO, led to delay by ZESCO to energise the lines thereby denying the community of the valuable service. (REA, 2015; Interview with ZESCO Station Manager, Senanga Branch, 12th February, 2018). This finding of the study suggests that the private engaged by REA lacked technical capacity to undertake the project.

From the discussion with the interviewees and the desk review of progress reports and the supervision records sheet, it was learnt that even when there was supervision of contractor by REA, there were still lapses in the quality of works done by the contractor during the project implementation such that five (5) out of the six (6) installed transformers failed the test (REA, 2015).

This finding of the study suggests lack of proper, adequate and effective supervision of works done by private contractors in the construction of energy infrastructure for electrification of rural areas.

4.2.3 Zambia Electricity Supply Corporation (ZESCO)

Zambia Electricity Supply Corporation (ZESCO) is another key player in the electrification of households in Senanga District . ZESCO was established in 1970 after an Act of Parliament was passed in 1969. It is wholly owned by the Government of the Republic of Zambia (ZESCO, 2008). It is a parastatal company incorporated under the Companies Act, cap 388 of the Laws of Zambia as a company limited by shares (ZESCO, 2008). Sampa (2003) points that the corporation is mandated to, among other things, perform the following functions: To generate, acquire, transmit, transport and convert electricity; acquire, operate, control and manage undertakings for the generation of supply of electricity; to act as public undertaking as defined by and for all purposes of the Electricity Act and of every statutory modification or re-enactment thereof for the time being in force; and to supply electricity to any such undertaking as aforesaid or to any other person, Corporation, Authority, Board or Government.

4.2.3.1 Roles Played by ZESCO in the Electrification Process of Households in Senanga District .

In Senanga District ZESCO is the sole supplier and distributor of electricity to households. ZESCO through the directorate of transmission is responsible for the bulk transmission of high voltage power from the power stations to the load areas through the use of high voltage transmission lines and then to households in the District . The company also inspects households' electrical wiring system before connecting them to electricity. This is done to ensure that households' electrical wiring is done according to ZESCO's technical and mechanical standards and expectations (Interview with Station

Manager-ZESCO Senanga Branch, 12 February, 2018). This finding of the study is in line with the understanding established in the conceptual framework.

ZESCO also supervises grid extension projects in Senanga District . During the Nanjucha grid extension project, ZESCO supervised the contractor to ensure that the project works met their expected standards as guided by the technical specifications. Once the project was handed over to government, ZESCO had to test and energise the transmission lines in readiness for supply power to households.

In Senanga District , ZESCO is also responsible for the operation and maintenance of the distribution system throughout the District to ensure supply availability to the households. The company is also responsible for system development and business growth by carrying out electrification projects to connect new customers. Specifically, ZESCO performs the following functions; receives fault reports from customers, complaints and query handling and handling of special and/ or urgent customer requests. ZESCO is further responsible for the operation, maintenance and repair of the distribution facilities and the technical aspects of consumer installations and appliances (Interview with Station Manager-ZESCO Senanga Branch, 12 February, 2018).

4.2.3.2 Challenges Faced by ZESCO in Electrifying Households in Senanga District

According to the Station Manager, ZESCO Branch-Senanga, ZESCO faces a number of challenges in electrifying households in the District . One problem cited is inconsistent supply of connection materials and burdensome procurement procedures within ZESCO (Interview, 12 February, 2018). The manager narrated that:

Shortage of connection materials is one major problem affecting speedy connection of households. This shortage is usually of materials such as conductors, aluminium, and insulators. Connection materials are mainly kept at Central Bulk Stores in Lusaka. Whenever, we order the materials from the Head office, they take long to reach Senanga. This is what causes us to delay connecting houses to the grid.

This finding suggests that centralization of electricity materials by ZESCO is hampering connection of households in Senanga District to grid electricity.

Another challenge cited is that some houses in Senanga District are very far from the existing grid distribution service lines. This situation increases the installation cost as the applicant in certain instances is expected to pay additional costs towards connection and installation materials such as poles and cables. This finding suggests that rural households situated far from the grid bear additional costs to access electricity. This finding is similar to experiences in other countries like Kenya (Marete, 2016).

Another challenge ZESCO is facing in the electrification process of households in Senanga District involves substantial shortage in generation capacity which forces load shedding especially during peak periods in most parts of the District. This situation seems to explain the problem of frequent intermittent power supply and power cuts experienced and reported by interviewed households in the electrified parts of Senanga District. The ZESCO station Manager narrated that:

Most households here are low income earners with low paying capacity. So we have a problem of low levels of demand for electricity connection and low tariff levels. Households are also scattered making it difficult to extend grid and make household connections (Interview, 12 February, 2018).

The finding of this study is in line with a study by Iliskog (2008) who argues that with the commercialisation of power supply activities, rural electrification is now being classified as a social activity that must be directly supported by government resources. Consequently, implementation of reforms has affected the rate of electrification and affordability of electricity in rural areas. The affordability of the grid electricity by the rural population seems to be a challenge of its own nature.

4.2.4 Private Company (Contractor)

The rural electrification programme has been designed in a way that the project creates an environment to develop private and business sector markets (Mengo, 2015). Firms are usually awarded contracts to undertake power line installation, maintenance and establishment of a commercial market for electrification systems within a defined project area (Mengo, 2015). For Nanjucha grid extension project, a private company was awarded the contract by REA. The project involved construction and establishment of power lines and transformers to the designated six load centers in the project sites

(REA, 2015). This finding of the study is in line with the conceptual framework established in the study.

4.2.4.1 Roles played by a Private Company in Electrifying Households in Senanga District .

According to the detailed scope of the project work, the private company constructed 3.4.3 Kilometre (Km) of 11Kilovolts (Kv) overhead line from the existing 11 Kv line to the terminal and T-offs (REA, 2015). The project duration was for forty weeks starting on 18 December 2013 and was expected to be completed on the 17 December 2014. However, the completion date for the project was extended to 22 December 2014 to facilitate for the completion of the project which was delayed due to late delivery of materials from abroad. In the initial stages of the project, operation and maintenance of facilities was solely done by the private company. After project commissioning, ZESCO took charge of the responsibilities (REA, 2015). This finding is similar to experiences in other countries like Kenya where private firms take an active part in rural electrification projects (Marete, 2016).

4.2.4.2 Challenges Faced by the Private Company in Electrifying Households in Senanga District

One major challenge the private company reported was delay of material delivery from abroad. The reasons for the delay were withheld by the informant. Another challenge faced was project variations which were as result of items not being in the bill of quantity (BOQ) (Interview with an Official from a private company, 28 February, 2018).

4.2.5 Senanga District Council

Senanga District council also played a vital role particularly in the implementation process of the project in the District . The council mainly participated by organising the community to provide labour, security, way leave and mutual support to ensure project ownership and sustainability. The Nanjucha grid project also required cutting down of trees to install feeder lines and transformers. The council provided labour to the contractor. The contractor was then responsible for payment of wages for the work that was done. The study finds that the main challenge the council faced was delayed

payment of wages to the labourers by the contractor. The study reveals that the District council does not play any technical role in the implementation phase of the project. Furthermore, the council does not play any role in the electrification process of households in Senanga District (Interview with council official, 12 February, 2018).

4.2.6 Local Community

The local communities in Senanga particularly those in the project area participated in the implementation of the project. The community participated through provision of labour, security and way leave and support of the project. However, the study reveals that the community does not participate in the actual electrification of households in Senanga District (Interview with BRE induna, 12 February, 2018). This finding of the study suggests lack of participation by key stakeholders (households) in rural electrification projects.

4.3 Electrification Process of Households in Senanga District

The electrification process of households in Senanga District can be traced as far back as 1980s (Senanga District Council, 2015). Households were supplied with electricity via 66Kv power lines from the Victoria Falls hydro power plant, through the town center to Mongu and Kalabo. ZESCO was the sole supplier and distributor of electricity to households. Households were connected to grid electricity by ZESCO. The District situational analysis report reveals that households' access to and use of electricity was mainly confined to the town area of the District covered by two wards. This meant that most households in rural parts or wards of the District remained without access to electricity thereby hindering development process (Senanga District Council, 2015).

As is the case in most rural parts of the country, ZESCO has for a long time been unable to extend services to rural households in Senanga District due to its concentration on commercially-viable ventures and projects, mainly in urban areas or town areas of rural Districts (REA, 2013). Therefore, in 2015 REA commissioned the Nanjucha grid extension project to enhance households' access to electricity (REA, 2015). The project started on the 18th September, 2013 and ended on 22nd December, 2014. A named private company was awarded the contract to undertake this project. The project involved the construction of 11kV overhead HT line of 34.3 kilometres (km) long from

an existing 11 kV line to terminals and T-offs from Mongu and extended to two more wards of the District . The project further involved installation of Six (6) transformers with the total capacity of 350kV at the targeted beneficiary facilities inter alia: houses, schools and rural health centers in the project area (Senanga District Council, 2015 and REA, 2013). This project was expected to trigger development process in the District by increasing households' access to electricity. This situation shows that in the electrification process of rural areas in Zambia, there is participation of the private sector.

With commissioning of the project, Zambia's national electricity utility company ZESCO remains the sole supplier and distributor of electricity to households. An interview with ZESCO station manager, Senanga Branch reveals that households that wish to connect to grid electricity make connection applications to ZESCO. Once ZESCO is satisfied with the households' wiring system, households are expected to pay about K2, 400 connection charge. The study further reveals that there is a silent empowerment fee of about K769 which households in Senanga District pay as connection fee instead of the normal K1, 709. It is silent empowerment fee because households ought to apply for it (Interview, 12 February, 2018). This finding is similar to experiences in other countries. A study by Kageni, (2015) reveals that rural households in Kenya are usually provided with subsidies to cover electricity connection fees.

4.4 Conclusion

In conclusion, the findings of the study show that the electrification of households in Senanga District involves participation of various stakeholders. Electricity is mainly provided to households by state owned power utility company ZESCO. On the other hand, REA has been providing electricity infrastructure by extending transmission lines to take electricity closer to households in the District . Some of the challenges faced by stakeholders that have negatively affected electrification of households in Senanga District include: scattered households, non-availability of connection materials, low electricity tariffs, inadequate funding and low household incomes among many others. These challenges are adversely negatively affecting electrification rate and rural households' access to electricity to enhance standard of living. This study also

concludes that engaging private companies to undertake rural electrification projects makes the projects expensive in the process. This study also takes a view that centralization of household electricity connection materials by ZESCO is hampering electrification rate of rural households. This study further concludes that electrification of rural areas via grid electricity is an expensive venture for promotion of rural development and improving rural standard of living.

CHAPTER FIVE

CONTRIBUTION OF ELECTRIFICATION TO DOMESTIC INCOME IN SENANGA DISTRICT

5.1 Introduction

The previous chapter presented findings on the policy implementation framework for electrification of households in Senanga District . This chapter now presents research findings on the contribution of electrification to domestic income in Senanga District . In this dissertation, domestic income refers to household earnings obtained by engaging in economic activities using grid electricity. To achieve its purpose, the chapter is divided into three sections. The first section is the introduction. The second section presents and discusses the contribution of electrification to domestic income by looking at the following variables: use of electricity by households, distribution of domestic economic activities, input of domestic economic activities to households' earnings and challenges faced by households engaging in domestic economic activities. The third section is the conclusion.

5.2 Use of Electricity in Households

The recent literature on rural electrification has emphasised the importance of linking electrification to widened economic activities at household level (Khandker, Samad, Ali and Barnes, 2012). IEG and World Bank (2008) contend that although electricity provides improvements in the quality of life through household applications, it is the “productive uses” of electricity that can increase incomes to rural areas. Electrification creates an enabling environment for rural households to engage into income-generating activities which can then affect their incomes and create employment opportunities thereby reducing poverty levels. Within the confines of this study, productive use of electricity is any use of electricity that helps generate income for households. Therefore, this study sought to establish if there was any productive use of electricity by households in the electrified parts of Senanga District .

The research findings in Figure 5.1 show that the main uses (71 percent) of electricity are concentrated in domestic use compared to 26 percent concentrated in both domestic

and business use. Three percent gave no response. The study reveals that domestic uses of electricity mainly include lighting, entertainment (Television and Radio) and refrigeration. The study further establishes that domestic business activities engaged by households mainly include: grocery shops, salons, barbershops, baking, and welding and poultry production. This finding suggests low productive use of electricity by households in the electrified parts of Senanga District . Some of the reasons cited by households for not engaging in economic activities include: high electricity tariffs, frequent power cuts, low power voltage, lack of market and access to capital. This further means that electricity is mainly utilised for domestic rather for economic purposes by electrified households. To this end, it can be concluded that the contribution of electrification towards the growth of domestic business activities in Senanga District is negligible. This finding of this study agrees with Short (2015) who found that access to electricity by rural communities has no significant impact on growth of income generating activities. The foregoing findings are also in line with Wamukonya and Davis's (2001) who found that access to electricity by rural communities had no significant impact on growth of income generating activities. The use of electricity by rural households to engage in economic activities was insignificant. Wamukonya and Davis (2001) further found that the share of households with home-based income generating activities was highest amongst households without electricity.

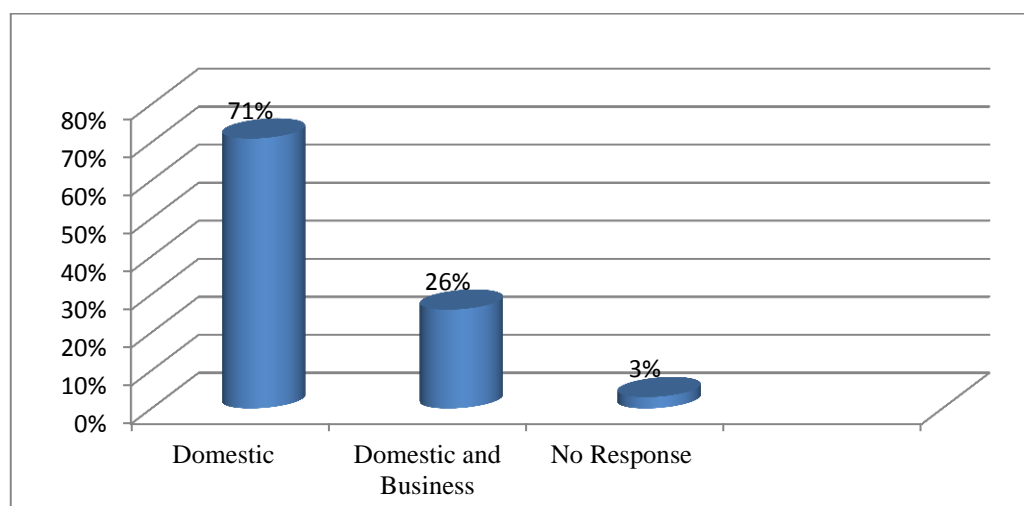
Although, Short (2012) and Wamukonya and Davis (1999) find affordability of electricity and access to capital as main obstacles towards productive use of electricity by rural households; this study further notes that low voltage supply and connection demands by ZESCO and lack of knowledge on the productive uses of electricity are other obstacles. The study further reveals that most transformers installed in the electrified parts of Senanga have low power load hence the electrified areas experience frequent power cuts. This demotivates households from engaging into income generating activities. The study also reveals that ZESCO requires households to pay for purchase of transformers to connect their houses if far from any mounted transformers or grid. One head of an electrified household narrated that:

Most households in the District are low income earners; therefore it is unrealistic for ZESCO to ask households to pay for purchase of transformers whenever they want to connect to electricity. Households

that are willing to connect their business outlet to grid electricity are hindered by this ZESCO demand. The Household head also reveals that the connection fees and tariffs for electricity are extremely high for people in the District . This further hampers accessibility and productive use of electricity by households.

In a related interview, ZESCO station Manager-Senanga Branch, did not refute assertions made by some households. The ZESCO manager narrated that only households with houses far from any nearby transformer were asked to contribute something towards purchase of transformer. He argues that this was the case in most parts of the country (Interview, 12 February, 2018). This finding is similar to experiences of other countries like Kenya (Merete, 2016).

Figure 5.1 Households' Use of Electricity



Source: Field Data, 2018

5.2.1 Economic Use of Electricity by Sex of Household Heads

As seen in Table 5.1 of the respondents, the majority (17) representing 20 percent of those engaging in domestic business activities are females. This is against nine (35 percent) who are males. This shows that majority of households engaging in domestic business activities are headed by female. This further suggests that women are predominantly engaging in domestic business activities than men in the electrified households of Senanga District than men. This finding of the study is in line with

World Resource Institute (2016) study which found that electrification led to more time spent by women on income generating activities.

Table 5.1: Economic Use of Electricity by Sex of Household Heads

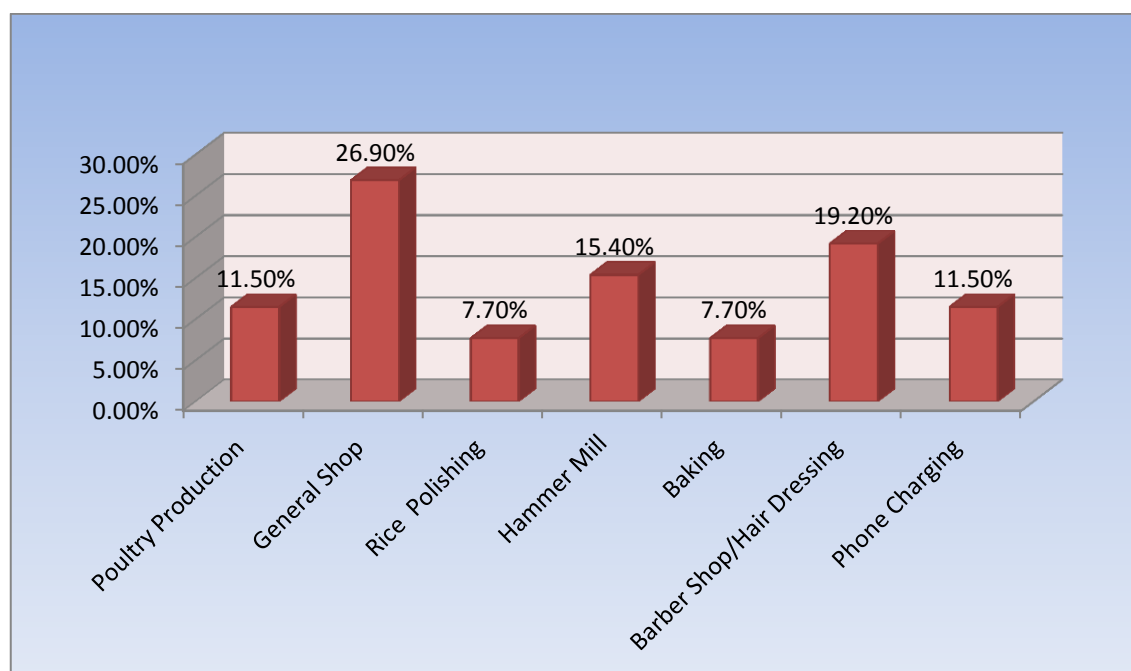
		Use of electricity for Economic activities		Total
		Yes	No	
Sex	Male	9	46	55
	Female	17	28	45
Total		26	74	100

Source: Field data, 2018

5.3 Distribution of Domestic Economic Activities

The study sought to establish the distribution of economic activities by households engaging in business activities requiring electricity. As seen in figure 5.2, the majority (26.9 percent) have general shops. 19.2 percent own barbershop/hair saloon while 15.4 percent own hammer mills. 11.5 percent are into poultry production and others of similar parentage use electricity for phone charging business. About eight percent are into rice polishing and similar percentage are using electricity for baking activities

Figure 5.2 Distribution of Domestic Economic Activities Undertaken by Households



Source: Field data, 2019

According to Bensch, Peters, and Schmidt (2011) agriculture has been considered as the main economic stay of most rural areas and electrification an integral part of a rural economy. Rural electrification is seen as a prerequisite for development and the removal of barriers hampering economic growth in rural parts of any given country. In the context of rural development, the traditional view of the productive use of energy is that it is associated with the provision of motive power that households can use for agricultural and commercial related activities. As seen in Figure 5.3.1, most (65.4 percent) households in the electrified parts of Senanga District are mainly engaging in commercial related activities. This is against 34.6 percent engaging in agro-based related activities. Based on the findings, it can be deduced that contribution of electrification towards growth of commercial related activities in the electrified parts of Senanga District is significant while its contribution towards growth of agro-based enterprises is negligible. This finding is not in line with IEG and World Bank (2008) who argue that electrification of rural areas is expected to enhance productivity and growth of the agricultural sector in rural areas.

Furthermore, since most studies on rural electrification (Khandker et al, 2012; ESMAP, 2002; Samanta and Sundaram, 1983) focus on impact of electrification on irrigation

farming, this study found that in the electrified parts of Senanga District , households did not have any irrigation infrastructure for any agricultural activity. The use of electricity for any irrigation activities was negligible. One household head narrated that:

Most farmers in the District are small scale farmers with limited capacity to use irrigation systems. Households are using traditional methods of farming and not accustomed to and acquainted with irrigation systems. The Household head also reveals that most agricultural productive areas of the District still remain unelectrified as grid has not been extended to such areas. Electrification was mainly concentrated on the western part of the District with the bigger part (Eastern part) with massive potential for agricultural growth unelectrified.

Above, revelation by the Household head somewhat explains why most households are engaging in commercial related activities in the electrified parts of Senanga District . This finding suggested lack of consultation and coordination between REA and local institutions. However, an Interview on 28 February, 2018 with an official from REA reveals that REA consults various stakeholders in targeted project areas before embarking on the project. This suggests that consultation is usually there between REA and local institutions in rural communities. The findings of this study are not in agreement with Samanta and Sundaram (1983), whose study of rural India found that electrification of rural areas led to increased productivity through replacement of diesel pumpsets and traditional methods of irrigation with electrical pumpsets, thereby having more land irrigated, and cropping intensified. The productive areas in India had been supplied with appropriate equipment such as irrigation pumps in order to enhance agricultural productivity. However, this study finds that electrification mainly impacted positively on agro-based activities related to processing, poultry and dairy production. The impact on crop farming was negligible. It can then be argued that households in the productive areas of electrified parts of Senanga District lack appropriate equipment such as irrigation pumps in order to enhance agricultural productivity related to farming to improve their standard of living.

This study further finds that electrification has led to diversification of goods and services provided by some households. The study finds that with availability of

electricity some households are now able to provide certain goods and services which they initially could not manage to provide due to lack of electricity. This was supported by one household head who opined, “Electricity has really helped us. It has enabled me to open a hammer mill apart from owning a shop (*See Appendix C I*). Respondents from electrified households are also of the view that electrification has enabled them have easy access to certain goods and services in the community. For example, hair dressing was one business that was mainly found in the town area but with coming of electricity, saloons have opened in some villages of Senanga District .

One head of the electrified household opined that “life was hard before we received electricity. We had to walk long distances of about 10 Km to go and treat our hair; now we have saloons right on our door.” The study also finds that shops in most electrified villages are now able to sell soft drinks and other products that required refrigeration. This suggests that households in the electrified parts of Senanga District are now provided with a wide range of goods thereby improving their quality of life.

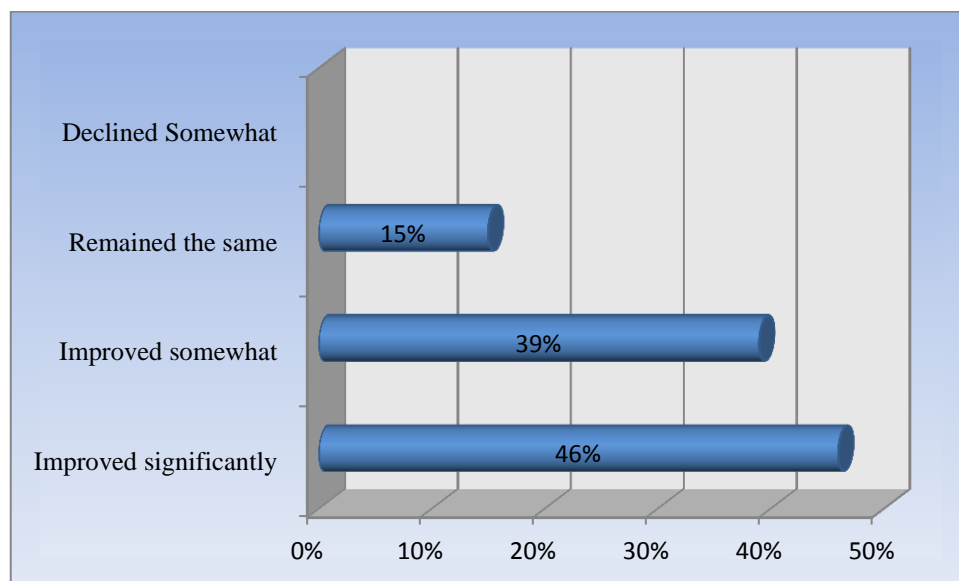
Findings of this study are in agreement with Ouma (2013) whose study reveals that the multiplier effect in the businesses was evident with one business triggering backward and forward value chains. His study also finds that most SMEs introduced new services as a result of value addition enabled by electrification. This study is also in consensus with ESMAP (2002) study whereby it is established that the spread of electricity lead to development of other types of investments in rural areas.

5.4 Contribution of Domestic Business Activities towards Income of Households

Heads of electrified households engaging in domestic business activities were further asked to rate the extent to which their business activities had increased their household income. Findings in figure 5.3 reveal that the majority (46 percent) of the respondents feel that their business activities have significantly improved household income. This is followed by 39 percent who feel that their household income had somewhat improved. On the other hand, the minority (15 percent) feel that their household income had remained the same. The finding suggests that the contribution of electrification towards increasing income of households engaging in domestic business activities is significant. This further suggests that the business activities engaged by electrified households are

profitable and contributing towards employment creation in the electrified parts of Senanga District . The finding of this study is supported by the Independent Evaluation Group (IEG) and World Bank (2008) study that reveals that the contribution of solar energy to economic growth was viewed in terms of the role it played to boost households' income and help spur growth of home businesses.

Figure 5.3 Distribution of Responses by Respondents on the Contribution of Domestic Business Activities towards Income of Households



Source: Field data, 2018

5.5 Electrification and Challenges Faced by Households Engaged in Domestic Business Activities

Households engaging in domestic business activities reveal a number of challenges faced while conducting their domestic business activities. One main challenge reported by households is prolonged power cuts and low power voltage which is negatively affecting their operations, and perishable products that require refrigeration. This situation is actually worse during rainy season. The respondents also complain of high electricity tariffs negatively affecting their profit margins. The study further reveals that ZESCO takes long to connect households and enterprises even after connection fees are paid by households. In locations without transformers, ZESCO requires households to pay for purchase of Transformer to have them connected to the grid. An Interview (12th February, 2018) with ZESCO station manager, Senanga Branch reveals that delay to

connect households is mainly necessitated by unavailability of connection materials. Connection materials are mainly kept in Lusaka and they take long to reach Senanga District whenever requested. This finding shows that centralization of electrical materials by ZESCO is negatively affecting electrification of rural areas and growth of domestic business activities in Senanga District . The findings of this study agree with World Resource Institute (2016) study that found that business owners suffered high opportunity cost due to lack of supply or unreliable supply and for most part were reluctant to make electricity dependent investments.

5.5 Conclusion

This chapter has presented and discussed research findings on the contribution of electrification to domestic income in Senanga District. The study findings and discussions in the chapter reveal low productive use of electricity by households. Electricity is mainly utilised for domestic use rather than business. Therefore, the study concludes that the contribution of electrification towards growth of domestic economic activities in Senanga District is negligible. This further means that the contribution of electrification towards improving households' standard of living through domestic business activities is negligible. It is further concluded that most households in the electrified parts of Senanga District are mainly engaging in commercial compared to agro-based activities. This further suggests that the impact of electrification towards enhancing the growth of the agro-sector; the mainstay of rural households is negligible. This study also reveals that some of the challenges affecting domestic business activities include prolonged and unreliable power supply, high connection fees and expensive electricity tariffs. The study also concludes that centralization of electricity connection materials by ZESCO is delaying connection of houses and businesses outlets in Senanga District . However, though the impact is negligible, development of domestic businesses suggests creation of employment opportunities thereby contributing towards growth of the local economy. The study also finds that for households engaging in domestic business activities, their household income has improved. The next chapter looks at how electrification has impacted livelihoods of households in Senanga District .

CHAPTER SIX

ELECTRIFICATION AND LIVELIHOODS OF HOUSEHOLDS IN SENANGA DISTRICT

6.1 Introduction

The previous chapter presented research findings on the contribution of electrification to domestic income in Senanga District . This chapter now presents research findings on how electrification has impacted livelihoods of households in Senanga District . In this study, livelihood refers to household's experiences, assets (material) and activities required for a means of living. For this study, the impact of electrification on households' livelihoods in Senanga District is measured by ownership and use of electrical assets by households. The use of electrical appliances is further measured and restricted to the following variables: access to information and communication, reduced use of traditional forms of energy or biomass for cooking or related activities, and food preservation. The following variables have been chosen as they are perceived to provide a good basis to establish the contribution of electrification to households' livelihoods. Therefore, to achieve its purpose, the chapter is divided into three sections. The first section is the introduction. The second section presents and discusses research findings on how electrification has impacted livelihoods of households in Senanga District . The third section presents a conclusion.

6.2 Ownership of Electrical Appliances by Households

As alluded in the conceptual framework, the rational decisions to electrify rural communities are often entrenched in deep beliefs that household will use electricity for their livelihood on the powering of basic appliances and improve their way of life. These would be seen through ownership and use of electrical appliances (Kembo, 2013). Put simply, electrification is expected to improve households' standard of living through ownership and use of electrical appliances. To establish the extent to which electrification enabled households own electrical appliances, heads of electrified households were asked to select all electrical appliances they now own by having access to and using electricity. As seen in Table 6.1, in the electrified parts of Senanga District

,the most commonly owned electrical appliances are Radios (78 percent) and Televisions (76 percent). Fans (69 percent) and Refrigerators (47 percent) are other common electrical appliances owned by households. Pressing Irons (28 percent), Stoves (10 percent), Electrical Kettle (two percent) and Microwave (three percent) are other electrical appliances owned by electrified households. The study finds that none of the electrified households indicates owning a Heater, Geyser, Washing Machine and Water Pump. A closer look of Table 6.2.1 shows that, overall most (60 percent) electrified households at most does not own electrical appliances in the electrified parts of Senanga District . Findings of this study suggests that majority (60 percent) of electrified households do not use most electrical appliances. This can be explained by the fact that most rural households are low income earners and therefore most electrical appliances are out of their reach. To this end, it can be deduced that the contribution of electrification towards improving households' standard of living through ownership of electrical appliances is negligible. This finding of the study is not in line with IEG and World Bank (2008) which found that electrification improved households' way of life through increased ownership of electrical appliances by households.

Table 6.1: Electrical Appliances Owned by Electrified Households

Appliance	Yes (%)	No (%)	Sample (N)
Television	76	24	100
Radio	78	22	100
Stove	10	90	100
Refrigerator	47	53	100
Fan	57	43	100
Pressing Iron	28	72	100
Electric Kettle	2	98	100
Heater	0	0	100
Microwave	3	97	100
Geyser	0	100	100
Water pump	0	100	100

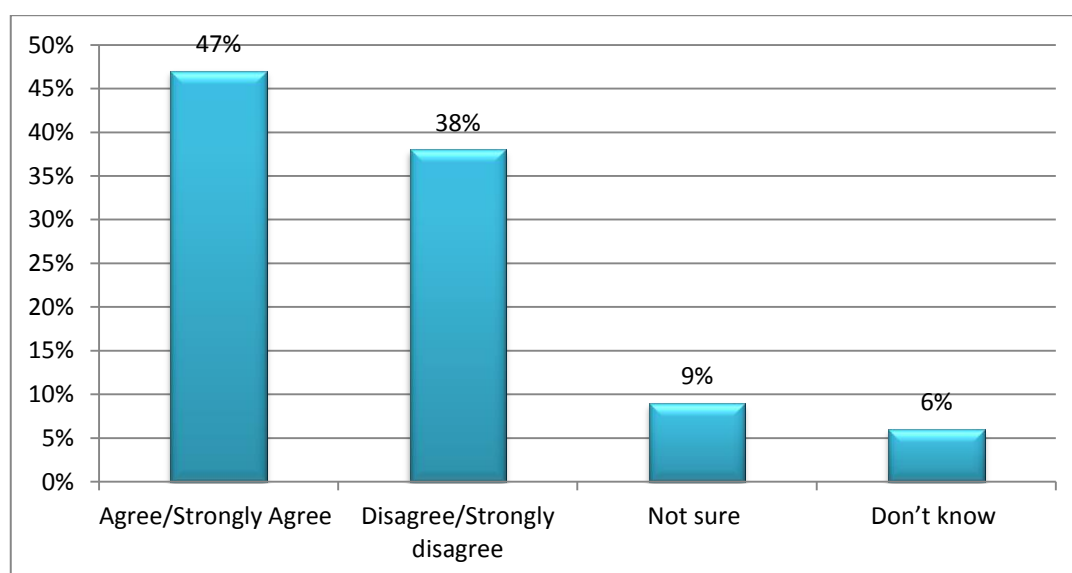
Source: Field data, 2018

6.3 Households and Use of Electrical Appliances

6.3.1 Access to information and Communication

Access to electricity is regarded essential in improving households' wellbeing by enhancing their access to information and communication. This is even more essential for rural communities that tend to lag behind in many facets of human life. Enhanced access to information and communication is expected to improve the general wellbeing of any household. If a household is connected to good and reliable grid electricity, standard of living is expected to improve through improved access to information and communication (Torero, 2014). This is because electrical appliances such as Televisions, Radios and even mobile phones can be used without difficulties thereby improving households' well-being. If electricity is absent, such appliances cannot be used effectively. Heads of electrified households were asked to rate the extent to which electrification had enhanced their access to information and communication. Findings of the study are presented in Figure 6.1 below.

Figure 6.1 Responses by Heads of Electrified Households on Whether Electrification had Enhanced Households' Access to Information and Communication



Source: Field data, 2018

As seen in Figure 6.1, the majority (47 percent) agreed that access to and use of electricity had enhanced their households' access to information and communication.

This was against the minority (38 percent) who disagreed. nine percent were not sure and six percent did not know. The high response rate that electrification has enhanced households' access to information and communication suggests that the impact is significant (*see Appendix C II*). For this study, those who feel that electricity has enhanced their access to information and communication gave varied reasons. Some of the reasons given are that electricity exposes them to Television and Radio for longer hours. This was not the case before electrification when households used solar panels and batteries to watch Television or listen to the Radio. Some households reveal that before electrification, the use of rechargeable batteries only made them watch Television and listen to the Radio for about 5 to 6 hours in a day. Solar panels on the other hand were not reliable in rain season or whenever the sun was covered by clouds. The study also reveals that electrification has relieved some households from the burden of buying battery cells to power their Radios frequently owing to their (battery cells) short lifespan.

The study further finds that electrification has enabled households to easily charge their mobile Phones. Even households without electricity benefit by taking their phones to any nearby house connected to grid. The presence of electricity has enabled a lot of people in the electrified communities to easily charge their phones. This finding of the study suggests that even non-electrified households tend to benefit from electrification in some ways as revealed herein. One head of electrified household opined that:

Even villagers now know what is happening throughout the country and in the world. Even “Bo kuku” meaning an “old Man” will tell you who the president is”. I can tell you that even people with phones have increased in the village because they are sure of charging them when they run out of charge. Even those with houses not connected to electricity can easily charge their phones from their neighbours with power.

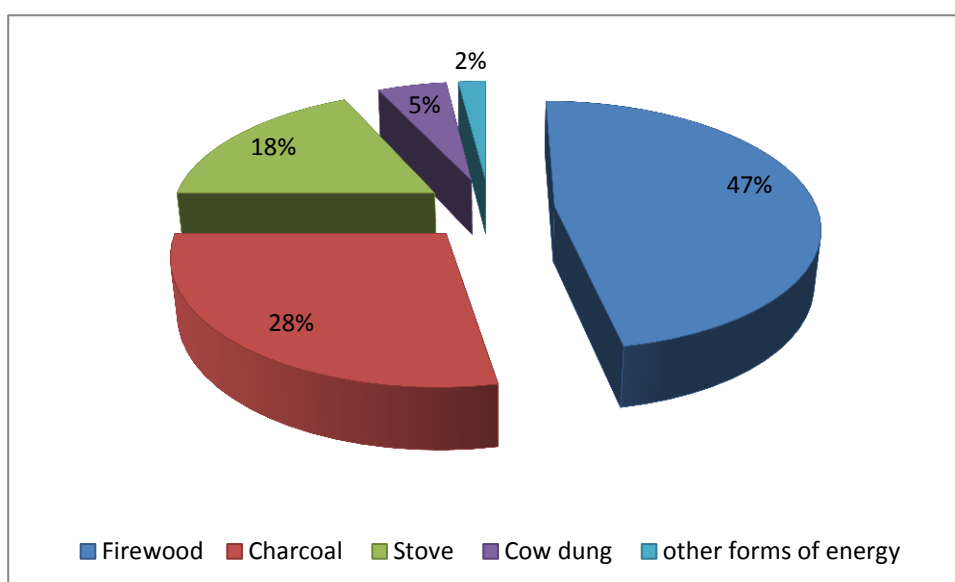
However, the 38 percent who feel that electrification has not enhanced households' access to information and communication mainly complain of lack of a radio station in the area and poor Zambia National Broadcasting Corporation (ZNBC) signal in the District . However, from the findings, it can be deduced that electrification has improved households' livelihood by enhancing access to information and

communication. This finding agrees with findings of Energy Sector Management Assistance Programme (ESMAP) (2002) that found that Television was a significant source of entertainment and information in areas with higher levels of electricity and weakest in the areas where fewer households had access to electricity. While the findings are similar, this study used a different methodology.

6.3.2 Reduced Use of Traditional Forms of Energy or Biomass for Cooking or Related Activities

According to Torero (2014), electricity is an essential commodity for most human activities directly or indirectly in rural households. Availability of clean and reliable electricity is expected to help households avoid the health risks associated with the use of conventional forms of energy such as charcoal, firewood or cow dung for cooking. Electrification is expected to enable households use modern electrical appliances such as stoves for cooking. In order to ascertain whether electrification led to reduced use of traditional forms of energy or biomass, heads of electrified households were asked to indicate what they predominantly use for cooking or any related activities. Findings of this study are presented in Figure 6.2 below.

Figure 6.2 Distribution of Responses by Households on the Predominant Form of Energy Used for Cooking and Related Activities



Source: Field data, 2018

The findings show that the majority (47 percent) of households use firewood for cooking and related activities. This was followed by the use of charcoal represented by 28 percent. 18 percent use stoves while five percent use cow dung. Only two percent indicated using other forms of energy. Findings of this study suggest that the impact of electrification towards reducing the use of traditional forms of energy or biomass for cooking or related activities in the electrified households of Senanga District is negligible. This further suggests that electrification has not improved households' livelihood by enabling them avoid the health risks associated with the use of conventional forms of energy such as charcoal or firewood for cooking or related activities. The study finds that households are mainly using firewood and charcoal for cooking. The main reason indicated for using firewood is that it is readily available in the village areas. One household head opined that:

As you can see we are surrounded by trees. We are in the bush (as he smiled).....firewood is readily available, so we just collect from the bush freely and easily. Sometimes we even make and use Charcoal.

Other households' heads reveals that using firewood for cooking is cheaper than using a stove. This was supported by one responded who narrated that electricity units finish faster whenever we use the stove for cooking, so it is better and cheaper using firewood and charcoal. This finding suggests that grid electricity is expensive for rural households. Findings of this study disagrees with research findings of Buckley (2010) who reveals that rural electrification addresses both primary agents of deforestation and the underlying causes. It reduces immediate pressures on forests through changes in fuelwood use. This study finds that most households in the electrified parts of the Senanga District continue predominantly rely on traditional energy sources such as charcoal and firewood. For cooking and heating, most households use firewood and charcoal. This means that the contribution of electrification towards improving households' livelihood and health by reducing the use of unclean sources of energy in Senanga District is not significant.

6.3.3 Food Preservation

As established in the conceptual framework, electrification of households is expected to improve households' standard of living through enhanced ability to preserve food

through refrigeration and other related means. To this end, heads of electrified households were asked to rate the statement, “access to and use of electricity has improved my households’ ability to preserve food.” Figure 6.3 shows that on aggregate, majority (45 percent) agreed that access to and use of electricity has improved their households’ ability to preserve food. This is against the minority (40 percent) who disagreed. Nine percent were not sure while six percent did not know. To this end, it can be deduced that the impact of electrification towards improving standard of living through provision of better methods of preserving foodstuffs is significant. This was supported by one respondent who narrated that:

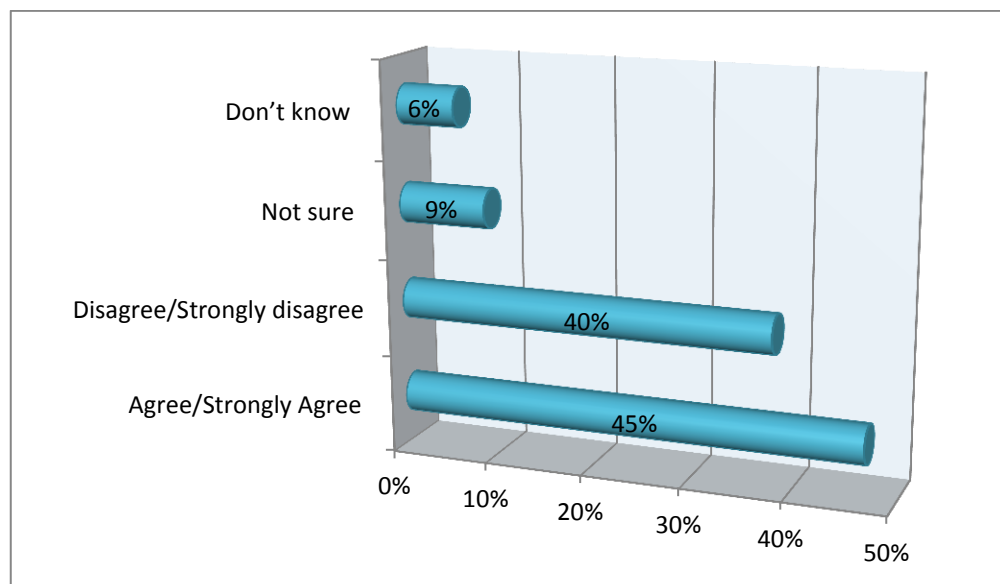
Before we had access to electricity...we were forced to sundry and smoke food to preserve it. But with power, we can easily put the food in the fridges and at least eat fresh food. It is not just about eating dry food now [*as the respondent smiled*].

Another respondent narrated that:

Fishing is one of the main economic activities in our District . So as a fishing community, we used to smoke most of the fishes caught from the river. Electrification has really helped in preserving fresh fish as we can now use refrigerators.

This finding of the study is in line with the conceptual framework were it is argued that electrification of rural areas is expected to help households to move from traditional to modern way of doing things thereby improving their livelihood and standard of living (*See Appendix CIII*)

Figure 6.3 Distribution of Responses by Households on Whether Electrification Has Improved Preservation of Foodstuffs



Source: Field data, 2018

6.4 Conclusion

The study findings in the chapter indicate that most electrified households in the electrified parts of Senanga do not own and use most electrical appliances. This implied that the contribution of electrification towards improving households' standard of living through ownership of electrical appliances is negligible. The study concludes that most households in the District are low income earners who cannot afford to purchase or use some of the electrical appliances. Furthermore, the study concludes that the impact of electrification towards reducing the use of traditional forms of energy or biomass for cooking or related activities in the electrified households of Senanga District is insignificant. This implies that electrification has not improved households' livelihood by enabling them avoid the health risks associated with the use of conventional forms of energy such as charcoal or firewood for cooking or related activities. However, the study concludes that electrification has enhanced households' access to information and communication and entertainment through the use of Radios, Televisions and Mobile Phones. Therefore, the study establishes that the contribution of electrification towards improving households' livelihood through enhanced access to information and communication is significant. The findings of the study further indicate that

electrification has improved households' standard of living through improved methods of preserving foodstuffs.

CHAPTER SEVEN

CONTRIBUTION OF ELECTRIFICATION TO HOUSEHOLDS' ACCESS TO SOCIAL GOODS

7.1 Introduction

The previous chapter presented research findings on how electrification has impacted livelihoods of households in Senanga District . This chapter now presents research findings on the contribution of electrification to households' access to social goods. In this study, social goods refer to something that provides some sort of benefits to the greater number of people when accessed. For purposes of this study, social goods will constitute: healthcare, education, clean and safe drinking water and physical security. Within the confines of this study, electrification is expected to have a positive impact on households' ability to access healthcare, education, clean and safe drinking water and physical security. This in turn is expected to improve households' standard of living in various ways. It must be mentioned here that is not within the confines of this study to ascertain the contribution or impact of electrification towards provision of healthcare, education, clean and safe drinking water and physical security by social institutions. The study mainly provides research findings on households' experiences and how they feel electrification has impacted their access to aforementioned social goods. Therefore, to achieve its purpose, the chapter is divided into three sections. The first section is the introduction. The second section provides findings on the contribution of electrification to households' access to social goods. The third section provides a conclusion.

7.2 Electrification and Households' Access to Healthcare

Electrification plays an important role in the delivery of primary healthcare especially in rural areas. The World Health Organisation (WHO) (2014) argues that, without energy many life-saving interventions cannot be undertaken. In order for healthcare facilities to operate as intended and provide proper healthcare to households, they need to have good sources and reliable supply of electricity. Furthermore, the United Nations' (UN) Sustainable Energy for all (SE4All) program puts emphasis on universal access to clean energy and modern energy sources by 2030 and emphasises the need for healthcare

facilities to have sufficient access to energy in order to support quality healthcare delivery. In this regard, energy has been recognized as an enabler and enhancer of healthcare service delivery and imperative towards improving rural households' standard of living (Torero, 2014). Thus, provision of modern energy services is expected to enhance households' access to healthcare.

To this end, heads of electrified households' were asked to rate the following statement, "Electrification has improved my households' access to healthcare in the District " As seen in figure 7.1, the majority (57 percent) feel that electrification has not improved their households' access to healthcare. Respondents who feel that electrification has not improved households' access to healthcare mainly cited inadequate healthcare facilities in the District , non-availability of essential drugs and shortage of health personnel as main factors which have made benefits that come with electrification insignificant. This study further reveals that despite electrification of some health facilities, households still lack access to essential drugs. This finding suggests that access to and use of electricity to improve primary healthcare delivery is inadequate without taking into consideration other factors such as availability of essential drugs, required number of health facilities and personnel in an area.

For instance, according to the Government of the Republic of Zambia (2006), a population of 3,500 people is supposed to be serviced by one (1) health post while a population of 10,000 people is supposed to be serviced by one (1) rural health center in order to ensure effective delivery of health services. However, Litoya village which has an estimated population of about 4000 people only has one electrified health facility which is also servicing households from other villages not electrified. Electrification of the Health facility has also made households from other communities to seek services from the facility thereby putting more pressure on the already overwhelmed facility. The findings are in support with one head of the electrified household who narrated that:

Despite the District benefiting from rural electrification, a number of health facilities still remain unconnected. Furthermore, most times when we go to the clinic, we do not find medicine. We are always told go buy this medicine.

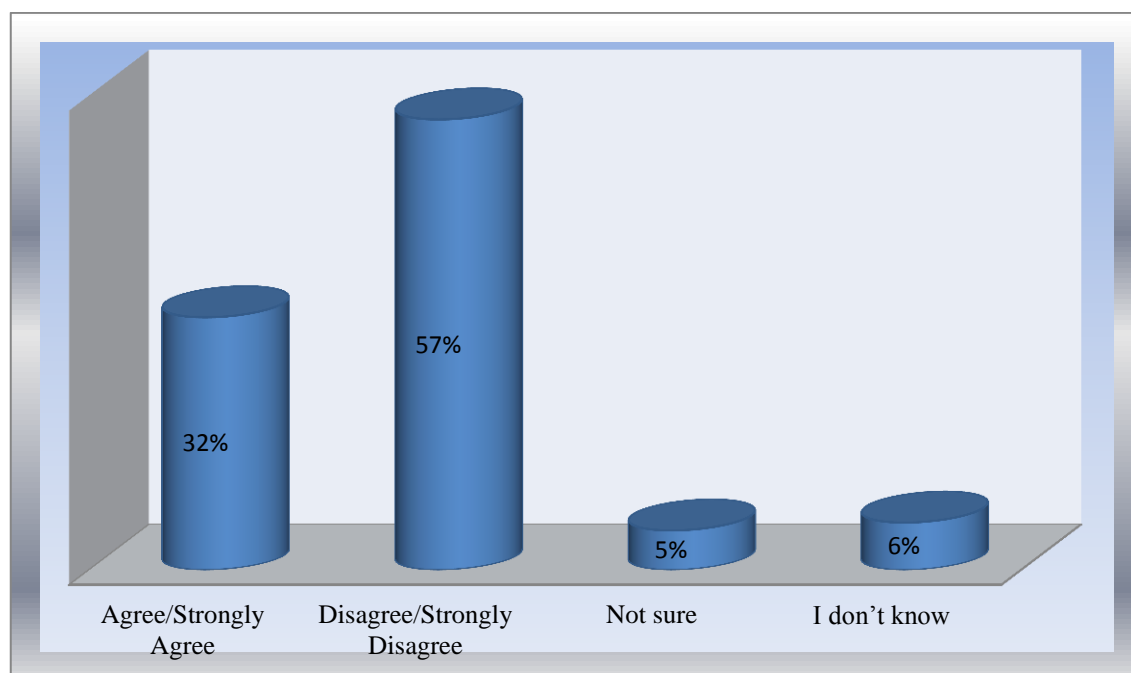
This study further reveals that Senanga District has 10 health posts, eight Rural Health Centers, and one general Hospital. Of the 19 health facilities, only five are connected to grid electricity. According to the Government of Zambia (2006), skilled and motivated health workers in sufficient numbers, at the right place and at the right time are critical to deliver effective health services and improve health outcome. However, this study finds that majority of Rural Health Centers in Senanga District do not have the required number of staff. For instance, at the time of this study, only one Classified Daily Employee was found at Liangati village health facility attending providing healthcare to surrounding households. The study also reveals that some respondents feel that their healthcare facilities do not have sufficient machinery. The study shows that most health facilities in the electrified parts of Senanga District do not have sufficient medical equipment such as microscopes, suction machines, and autoclaves to support healthcare delivery to households. This suggests that provision of electricity alone to a health facility is not enough to provide quality healthcare to households.

However, the 32 percent who feel that electrification has improved their access to healthcare are mainly of the view that, electrification enables them to access healthcare even after sunset. The findings of the study reveal that the night time services are restricted to emergency cases only such as child delivery. The respondents are also of the view that electrification has enabled them stop travelling or walking long distances to Senanga District Hospital for some medical tests such as Tuberculosis tests which were not usually conducted due to insufficient energy to power the medical equipment. The study further reveals that electrification has enhanced energy capacity of some health facilities to enable them use some refrigerators to store some drugs. For instance, in Mwanabinyi Village, the study reveals that households no longer have to walk long distances to access certain drugs that were not usually available at the local health center due to refrigeration challenges. On the other hand, five percent of the respondents

are not sure and six percent do not know whether electrification has enhanced their household's access to healthcare.

The findings of this study are not in line with a study by ESMAP (2002) which found that access to electricity improved the health of household members in several ways such as improved access to healthcare services. The finding is also not supported by IEG-World Bank (2008) study which indicates that electrification extended healthcare benefits by extending opening hours and adoption of healthcare equipment. Though ESMAP (2002) and IEG-World Bank (2008) and other reviewed literature shows that electrification improves storage of essential drugs in rural health facilities through the use of refrigerators; this study finds that Rural Health Centers in the electrified parts of the District are associated with shortage of essential drugs and refrigerators are abused by health personnel who mainly use them to store water for drinking and home relish.

Figure 7.1 Distribution of Responses by Heads of Households on Whether Electrification has had Positive Impact on their Households' Access to Healthcare

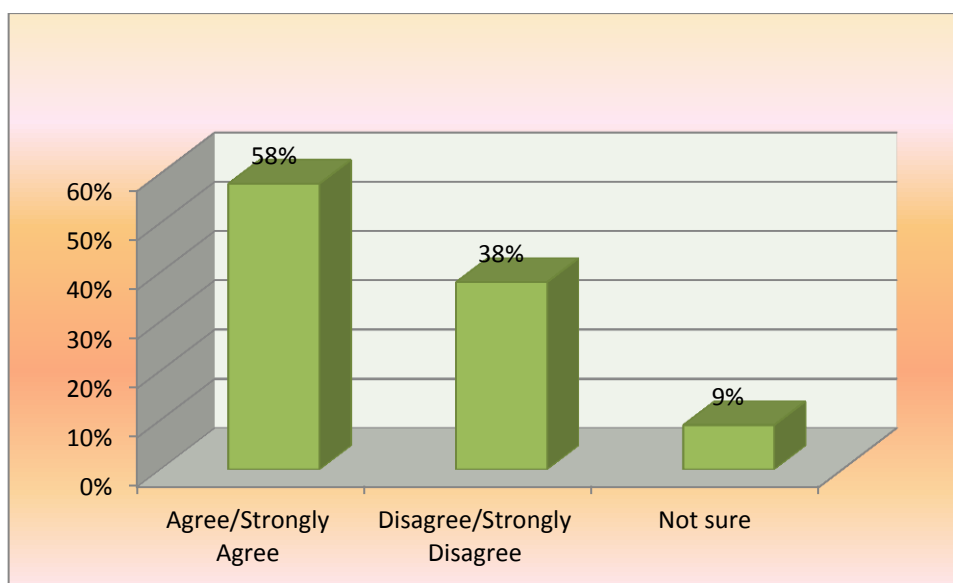


Source: Field, 2019

7.3 Electrification and Households' Access to Education

It is often assumed that electrification results in significant positive education outcomes for households. The United Nations (2005) argues that households' access to education is the foundation to creating sustainable development and improving quality of life. For this to be achieved, increasing access to electricity at household and school level is imperative. Availability of electricity is expected to improve households' standard of living through improved education outcomes. It must be mentioned here that it was not the main aim of this study to look at the impact of electrification on education in the District . This study merely intends to ascertain the experiences and how households feel electrification has impacted their access to education. To this end, heads of electrified households were asked to rate the following statement, "electrification has had a positive impact on my households' education."

Figure 7.2: Distribution of Responses by Heads of Households on Whether Electrification has had Positive Impact on their Households' Access to Education



Source, Field data, 2019

As seen in figure 7.2, the majority (58 percent) of respondents feel that electrification has had positive impact on their households' access to education. Respondents are mainly of the view that electrification has had positive effects on their children's study time and consequently good implications for their education. The provision of lighting

has provided school going children with a good environment for studying at home. This is in support with one household head who narrated that:

I can tell you, with electricity, my school going children freely study at night. In the past, it was not safe leaving a child to study at night with a candle. With proper lighting, my children are now able to study any time at night without any worries of them dozing off with the candle on.

Another respondent said that, “electrification has made it possible for some of us to be attending GCE classes which are mainly conducted after sunset.” This finding suggests that electrification has contributed towards reducing illiteracy levels in the District . However, about 38 percent feel that the impact of electrification on their households’ access to education is negligible. The respondents are mainly of the view that despite electrification of the District ; a good number of local children are still unable to attend school due to limited and sparsely located schools. Some pupils need to travel long distances to attend school. The situation is even worse during rainy season as most pupils are forced to help their parents prepare rice and maize fields and also take cattle for grazing. This study also reveals that most schools are unelectrified in the District . According to the District Situational Analysis Report, Senanga District has a total of about 98 schools (66 primary schools, six secondary schools and 26 community schools. Out of 98 schools, only 11 schools (6 primary schools, 4 secondary schools and 1 community school) are connected to grid electricity. This suggests that a large number of pupils in the District are not benefiting from electrification. The findings of this study are similar to those of Khandker et al, (2012) whose study came to the conclusion that electrification resulted into better schooling outcomes. The findings are also in consensus with IEG-World Bank (2008) report that acknowledged and attributed positive impact of rural electrification on service provision to the greater willingness of education and other service workers to stay in communities that have electricity.

7.3 Electrification and Households’ Access to Clean and Safe Drinking Water

Access to improved clean water and sanitation plays a critical role in reducing deprivations known to constitute multidimensional poverty particularly in rural households (UNDP 2010). Access to and use of electricity is regarded key in this

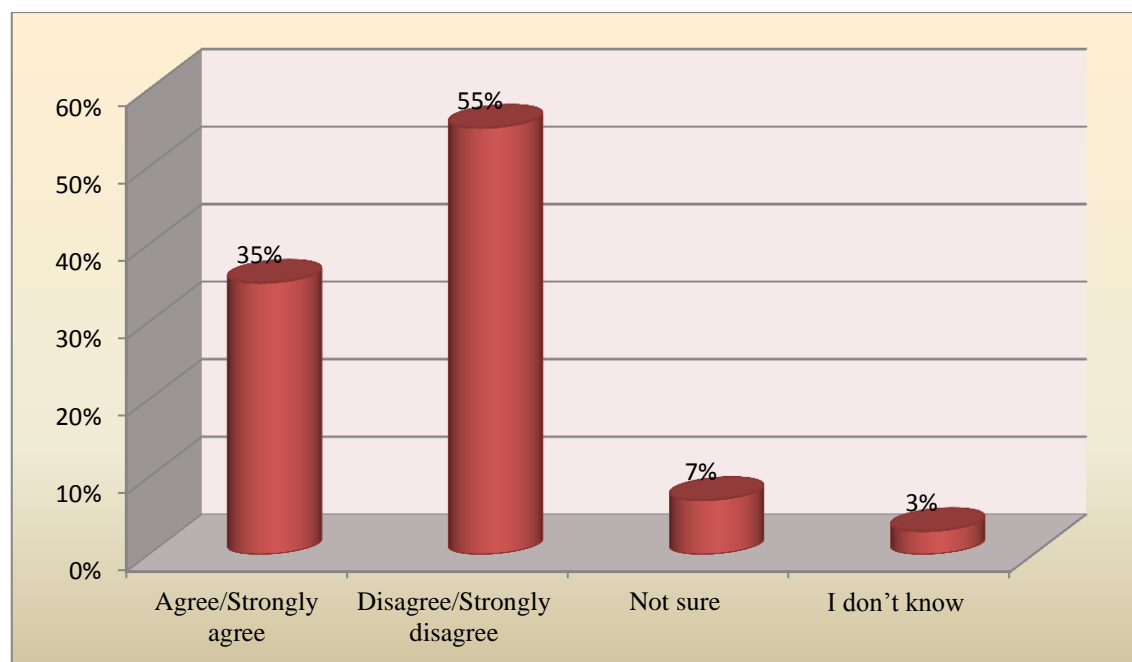
regard. UNICEF (2015) argues that electricity is necessary to treat water and pump it to people's homes and other facilities. In order to examine the contribution of electrification towards improving households' access to clean and safe drinking water, heads of electrified households were asked to rate the following statement, "electrification has improved my households' access to clean and safe drinking water." Figure 7.3, shows that, the majority (55 percent) feel that electrification has not improved their households' access to clean and safe drinking water. The study reveals that despite the fact that Senanga Western Water and Sewerage Company is using electricity to pump water from the Zambezi River, the quality of water supplied to households is not conducive for drinking.

The study also reveals that the water utility company mainly provides water to some households in the town area of the District . Surrounding villages mainly depend on shallow wells and streams to access clean water. These sources of water are susceptible to contamination. Thus, lack of access to clean and safe drinking water in the electrified parts of the District suggests that households are prone to water borne diseases such as diarrhoea, dysentery and cholera as they are drawing water from unprotected and untreated sources of clean water. Most respondents are of the view that living in the midst of the might Zambezi River should have given them access to clean water, but it is rather the opposite. This is evidenced by one head of the electrified household who narrated that: "as you can see, we have abundance of water/Zambezi River surrounding us but we cannot access clean water my brother."

The findings of this study are in line with the District Situational Analysis Report (DSAR) (Senanga District Council, 2015) which reveals that the District is among the lowest in the provision of households with safe drinking water. Total safe water coverage is inadequate. This study further reveals that even after electrification most households still use shallow wells, dug out holes, streams and the river as sources of clean water (*see appendix C IX*). Furthermore, most households do not have proper sanitation facilities like flush toilets connected to sewer system nor pit latrines. The study notes that there is no proper sewer system in the electrified parts of the District . Households mainly use pit latrines and nearby bushes to answer the call of nature.

However, about 35 percent of the heads of electrified households feel that electrification has improved their access to clean and safe drinking water. The respondents are mainly of the view that electrification has enabled some schools, and health facilities to put up boreholes which gives surrounding households access to clean water. On the other hand, about 7 percent of the respondents are not sure while 3 percent do not know whether electrification has improved their households' access to clean and safe drinking water. Findings of this study are inconsistent with the study by IEG-World Bank (2008) which indicates that investments in electricity help in increasing accessibility of services such as clean water for people in rural areas. The IEG-World Bank study further shows that on a community level access to electricity promotes the use of water treatment technologies and gave rural communities access to clean water.

Figure 7.3 Distribution of Responses by Heads of Households on Whether Electrification has Had Positive Impact on their Households' Access to Clean and Safe Drinking Water.



Source: Field data, 2019

7.4 Electrification and Households' Access to Physical Security

Heads of electrified households were asked to rate the following statement, “with access to electricity, my household feels safe and secure. Figure 7.4, indicates that, on

aggregate, the majority (74 percent) feel that electrification has improved physical security of their households. This finding means that the impact of electrification towards improving households' physical security is significant. A baseline study conducted by REA (2013) reveals that before introduction of electricity, most households depended on kerosene lamps, and candles which proved expensive and never provided reliable and quality lighting. This study reveals that of the respondents who feel that electrification has improved security of their households; some are of the view that electrification makes them feel safe at night because of better and quality lighting. The use of candles and kerosene lamps could not provide them with proper lighting outside their homes and surrounding areas. The respondents are further of the view that electrification has improved visibility of key areas of their households and community. Some heads of electrified households are of the view that the use of candles and kerosene lamps made their households susceptible to fire outbreak and put their lives and household property at risk. Thus, electrification has significantly reduced the possibility of their households catching fire.

One respondent narrated that:

Before electrification, we used to use candles a lot which sometimes caused fire and destroyed a lot of household goods. With access to electricity, the likelihood of my house catching fire has reduced tremendously.

A related interview with a District Council official (Interview, 18 February 2018) reveals that electrification has enabled the local authority to put up street lights along the main road of the town area which have contributed to the safety of people. The Council official narrated that:

Before electrification of the District and the council putting up street lights along the main road of the town area, a lot of people used to get attacked. It was not safe driving or passing along this road at night. Now, with the street lights in place, we no longer hear of too many attacks or crime along the road. The street lights have really helped in reducing crime and attacks.

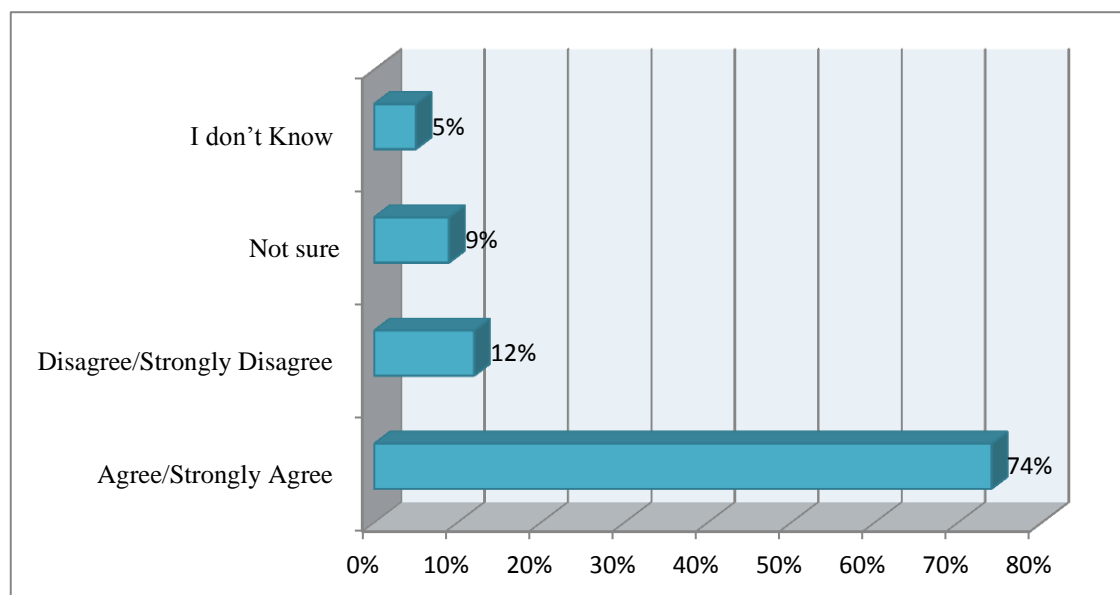
The study also reveals that some respondents feel that electrification has enhanced social interactions in the electrified parts of the District . One respondent reveals that before electrification, social interactions among community members were low as there was no movement in the evening hours because there was no proper lighting in most parts of the District . Another respondent narrated that:

With coming of power in the village, bars and other entertainment centers close late. People now can stay on and on to watch Television and Football in particular without fear of being attacked because lighting is sufficient.

Another respondent narrated that electrification has heightened social gatherings after dark and therefore strengthened social life through improved security brought by lighting. This is the case especially during Kuomboka ceremony and other national events like Independence

However, about 12 percent of the respondents feel that electrification has not improved physical security of their households. These respondents mainly cited electricity supply problems. The study reveals that the quality of power supply is bad in the electrified villages compared to the town area. This suggests that prolonged power cuts have disadvantaged households the potential benefits of electricity associated with quality lighting. For instance, at the time of this study, power had gone in Itufa village of Imatongo ward for about nine hours. The findings of this study are similar to those by World Resource Institute (2016) whose study shows that electricity profoundly provided households with quality lighting which impacted positively on their wellbeing. The findings of this study further agree with World Resource Institute (2016)'s report which reveals that electricity reduced households' use of Kerosene lamps thereby improving their lighting and security. The findings are also similar with findings of Wamukonya and Davis (2009) whose study found that most people felt safe in their homes, but those with electricity had a stronger feeling of security than those without access.

Figure 7.4 Distribution of Responses by Heads of Households on Whether Electrification has Had Positive Impact on their Households' Physical Security.



Source: Field data, 2019

7.4 Conclusion

This chapter presents research findings on the contribution of electrification to households' social wellbeing in the electrified parts of the District . The study establishes that electrification has had significant positive impact on households' access to education and physical security. This further suggests that the contribution of electrification towards improving households' social wellbeing through enhanced access to education and physical security is significant. For education, most heads of electrified household indicates that electrification (through improved and quality lighting) has provided an enabling environment for school going children to properly study even after sunset. In relation to physical security, heads of electrified households are mainly of the view that electrification through reliable lighting has made their households and some parts of the communities more safe and secure. However, the study finds the contribution of electrification towards improving households' standard of living through improved access to healthcare and clean and safe drinking water negligible. The findings indicates that inadequate healthcare facilities, non-availability of essential drugs and shortage of health personnel in the electrified parts of the District are some of the factors hampering primary healthcare delivery and have made benefits that come

with electrification and healthcare delivery insignificant to households. The study finding also shows that electrification has not significantly improved supply and availability of clean and safe drinking water to households. This study finds that even after electrification most households still use shallow wells, dug out holes, streams and the river as sources of clean water.

CHAPTER EIGHT

CONCLUSIONS AND RECCOMENDATIONS

8.0 Introduction

This chapter provides the conclusions and recommendations of the dissertation. The general objective of the study was to investigate the contribution of household electrification to standard of living in Senanga District . The specific objectives were: To establish the effectiveness of the policy implementation framework for electrification of households in Senanga District ; to investigate the contribution of electrification to domestic income in Senanga District ; to investigate how electrification impacted on households' livelihoods in Senanga District ; to investigate the contribution of electrification to households' physical security in Senanga District . The chapter begins by providing conclusions on the research objectives discussed in this dissertation. Thereafter, policy recommendations and further research area information are provided.

7.1 Conclusions

The study presents conclusions in accordance with the objectives of the research.

7.1.1 Effectiveness of the Policy Implementation Framework for Electrification of Households in Senanga District

The objective of the study was to establish the effectiveness of the policy implementation framework for electrification of Households in Senanga District . The study establishes that the electrification process of households in Senanga District involves participation of both state and non-state actors. State actors take a leading role in the process. The study concludes that electricity is mainly provided to households by state owned power utility company ZESCO. On the other hand, REA provides electricity infrastructure by extending transmission lines to take electricity closer to households in the District . Nonetheless, this study concludes that the use of private companies to extend grid transmission lines is not an effective way of enhancing

electrification rate of rural households as it seems to be a costly venture. The study also concludes that provision of electricity to rural households via grid is associated with a number of challenges which include: non-availability of connection materials, low electricity tariffs, inadequate funding, dispersed settlements and low household incomes among many others. These challenges are adversely negatively affecting electrification rate of rural households' and ability to enhance standard of living. This study further concludes that electrification of rural households via grid electricity is not an effective way of promoting socio-economic development of rural households'. Electrification via grid electricity is not an effective way of improving rural standard of living. In summary, what can be deduced from the research findings is that, electrification of rural areas via grid extension is an expensive venture which has the potential to delay increased electrification rate and further hamper the process of improving standard of living.

7.1.2 Electrification and Domestic Income

The second specific objective of the study was to investigate the contribution of electrification to domestic income in Senanga District . The study concludes that electrification in Senanga District is mainly utilised for domestic use. The productive use of electricity towards income generating activities is insignificant. Therefore the study concludes that the contribution of electrification towards improving households' standard of living through enhanced domestic business activities is negligible. Some of the challenges affecting productive use of electricity by households include prolonged power cuts, low load supply, high electricity tariffs and connection charges. The study also finds that households that are using electricity for economic activities are mainly engaging in commercial compared to agro-based activities. The study also establishes that electrification is not utilised for irrigation purposes in the electrified parts of the District . One reason cited is that most households lack the capacity to utilise electricity for irrigation farming in the District . The study also concludes that female headed households are predominantly engaging in domestic business activities than male headed households in Senanga District .

7.1.3 Electrification and Households' Livelihoods

The third objective of the study was to investigate how electrification has impacted livelihoods of households in Senanga District . The conclusions of this objective are that the contribution of electrification towards improving households' standard of living by enabling ownership and use of electrical appliances is negligible. The study shows that majority (60 percent) of electrified households do not own and use most electrical appliances. It can then be implied that most rural households are low income earners and therefore utmost electrical appliances are out of their reach. The study also concludes that households seldom use electricity to power electrical appliances such as stoves and pressing irons to improve their livelihood. They consider it costly using electricity to power such appliances. The study also shows that the contribution of electrification towards improving households' livelihood through reduced use of conventional forms of energy such as charcoal and firewood is not significant. Households seldom use electricity for cooking, heating or related activities as they consider using conventional forms of energy cheaper. This implies that electrification has not significantly helped households avoid the health risks associated with the use of conventional forms of energy such as charcoal, firewood, and cow dung.

However, the study concludes that the contribution of electrification towards improving households' livelihoods through enhanced access to information, communication, and entertainment is significant. The study further finds that electrification has enhanced households' ability to preserve foodstuffs. Before electrification, households mainly preserved food through smoking, and sun drying. Electrification has provided households with an opportunity to preserve foodstuffs through the use of fridges. Generally, what can be deduced from this chapter is that the contribution of electrification towards improving standard of living through improved livelihoods is generally negligible. Most households do not have access to and do not use most electrical appliances that can provide them better and efficient way of doing things. This suggests that most rural households are low income earners hence need to be provided with cheaper but reliable energy such as photovoltaic systems.

7.1.4 Electrification and Households' Access to Social Goods

The fourth objective of the study was to investigate the contribution of electrification to households' access to social goods in Senanga District . The conclusions of this objective are that electrification has had significant positive impact on households' access to education and physical security. What can be implied is that electrification has improved households' standard of living through enhanced education outcomes and physical security. For instance, in relation to education, most households are of the view that electrification has provided an enabling environment for school going children to study. Electrification has also enabled households to have access to educative information on health and agriculture related matters. For instance, households are able to have access to information on the best agricultural practices. In relation to physical security, households are mainly of the view that they now feel safer and secure with electrification of the District . However, the study finds the contribution of electrification towards improving households' standard of living through improved access to healthcare and clean and safe drinking water negligible. The findings indicates that inadequate healthcare facilities, non-availability of essential drugs and shortage of health personnel in the electrified parts of the District are some of the factors hampering primary healthcare delivery and have made benefits that come with electrification and healthcare delivery insignificant to households. The study finding also shows that electrification has not significantly improved supply and availability of clean and safe drinking water to households. This study finds that even after electrification most households still use shallow wells, dug out holes, streams and the river as sources of clean water. It can then be implied that, the contribution of electrification towards improving households' standard of living through access to healthcare and clean and safe drinking water is negligible.

7.2 Recommendations

Following the above conclusions, the following are the recommendations to enhance development of rural areas, improve standard of living and make rural electrification programs more responsive to the needs of the rural communities, the people the programme is intended to benefit.

7.2.1 Policy Recommendations

Rural electrification is necessary but not sufficient for improving rural livelihoods and reducing poverty. Reliable and low cost electricity services need to be part of a multi-sectoral approach and electrification projects have to be embedded in projects with other development factors. REA need to focus on providing cheaper and renewable sources of energy such as Photovoltaic systems for rural communities. There is differently need for strategic shift from focusing on grid electricity to other cheaper sources of energy.

The study found that most electrified households preferred using non-clean sources of energy such as cow dung, charcoal and firewood for cooking and other energy needs. Therefore, it is recommended that Government, concerned stakeholders and Non-governmental and Organizations (NGOs) sensitise the masses on the importance of using clean sources of energy such as electricity.

A high initial connection fee is one of the hindrances to increase electricity access, even in areas where distribution line has been extended. The tariff charged by ZESCO should be reflective of rural households' socio-economic status and introduction of subsidies or tariffs for rural people should be considered. In addition, the payment of initial connection fee by the consumers in rural areas should be spread over time an instalments.

There is also need for the government to build capacity of institutions at local level especially in rural District s to spearheaded electrification programmes. Government need to enhance capacity of rural District councils and allow them take an active role in the management and provision of electricity.

Currently the operations of REA are centralised. REA is only present in Lusaka the Capital City and an Urban area. It is therefore imperative for the government to consider decentralising the operations of REA to rural areas to effectively promote rural electrification agenda. There is also need for ZESCO to decentralise and distribution and management of electricity connection materials.

It is also important that the government harmonises the operations of REA and ZESCO especially in rural areas to enhance electrification of such areas.

7.3.1 Areas for further Research

Future research studies may wish to look at how electrification of social institutions such as schools and hospitals, and commercial enterprises has affected the development of rural areas. Other areas of study could be comparative analysis of grid and off-grid energy sources and their roles in the development of rural areas. Further research is required to understand how both grid and off-grid systems can deliver electricity services that support broader development of rural areas.

Furthermore, since this research was a case study of Senanga District and strictly conducted for academic purposes, it is imperative for government and other stakeholders concerned with rural electrification and development of rural areas to conduct a country wide study for comparison purposes and holistic analysis.

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APPENDICES

APPENDIX A I: QUESTIONNAIRE FOR HOUSEHOLDS CONNECTED TO ELECTRICITY

Hello, I am Jason Ngoma, a Master of Arts (Public Administration) student at the University of Zambia. As part of my MA research thesis requirements, I am conducting a research on ***“Rural Electrification as a Public Policy Intervention in Improving Standard of Living in Zambia: A Case of Senanga District ”*** This questionnaire is for research purpose only. Therefore, the information you give will be treated with utmost confidentiality. Please answer all the questions provided as honestly as possible, to the best of your knowledge.

- *Tick [✓] the appropriate option/answer*
- *For the question without any options given, write your answer in words using the spaces provided*
- *Do not write your name on the questionnaire*
-

Section A: Demographic Data of the Respondent

1. Sex (a) Male [] (b) Female []
2. Age (a) 16 – 26 [] (b) 27 – 37 [] (c) 38 – 48 [] (d) 49 – 59 [] (e) Above 60 []
3. Marital status (a) Unmarried [] (b) Married [] (c) Separated [] (d) Divorced [] (e) Widowed []
4. Household role of the respondent (a) Husband [] (b) Wife []
5. Highest level of education completed by the respondent (a) No formal education [] (b) Primary [] (c) Secondary [] (d) College [] (e) University [] (f) Any other specify []
6. Total number of people living in your household? (a) 1 – 5 [] (b) 6 – 10 [] (c) 11- 15 [] (d) any other specify..... []
7. Residential area of respondent.....
8. What is the average monthly net income (ZMK) of your household? (a) Below 100 [] (c) 1000 – 3000 [] (d) 3000 - 5000 [] Above 5000 []

9. What are your two main sources of income? (a) Salary [] (b) Business (c) Business/Salary (d) Farming
10. When was your household connected to electricity grid? (a) Less than 1 year [] (b) 1 – 2 years ago [] (c) 2 – 4 years ago [] (d) 4 – 6 years ago [] (e) over 6 years ago []

Section B: Electrification and Households' Domestic Income

11. On average, how much (ZMK) do you spend on electricity units per month?
(a) Less than 200 [] (b) K200 – 500 [] (c) 500 – 800 [] (d) 800 – 1000 [] (e) Over 1000 []
12. To what extent do you agree with the statement: “I find access and use of Electricity affordable” (a) Agree [] (b) Strongly agree [] (c) Disagree [] (d) Strongly disagree [] (e) I don't know [] (f) Not sure []
13. In what ways do you use electricity in your household's daily livelihood?
.....
.....
14. Does your household use electricity for any economic activities (a) Yes [] (b) No [] (*If No skip to Q 19*)
15. If yes to question 14 above, mention the economic activities.....
.....
16. Please rate the impact of domestic economic activities on your households' income (a) Reduced significantly [] (b) Reduced somewhat [] (c) Remained the same [] (d) Increased somewhat [] (e) Increased significantly []
17. Does your household face any challenges using electricity for domestic business activities (a) Yes [] (b) No [] (*If No skip to Q 19*)
18. If yes to question 17 above, explain.....
.....
.....

Section B: Electrification and Households' Livelihoods

19. Has access to electricity enabled you to have access to the following appliances?

	Electrical Appliance	Yes	NO
a	Stove		
b	Fan		
c	Microwave		
d	Electric Kettle		
e	Radio		
f	Water Pump		
g	Pressing Iron		
h	Geyser		
i	Mobile Phone		
j	Refrigerator		
k	Heater		

20. If yes to question 19 (a, b, c, d, e, f, g, h, i, j, k) above, explain how they have contributed to your households' livelihood.....

.....

21. If No to question 19 (a, b, c, d, e, f, g, h, i, j, k) above, explain.....

.....

22. What does your household predominantly use for cooking and related activities?

.....

23. Using the scale provided, rate the statements below on how you feel electricity has impacted your household? 6- Strongly agree 5- Agree 4- Strongly disagree 3- disagree 2- I don't know 1- Not sure

NO		6	5	4	3	2	1
23.1	Electrification has enhanced my households' access to information and communication						
23.2	Electrification has improved my households ability to preserve food						

Section C: Electrification and Households ‘Access to Social Goods

24. Using the scale provided, rate the statements below on how you feel electricity has impacted your household? 6- Strongly agree 5- Agree 4- Strongly disagree 3- disagree 2- I don't know 1- Not sure

NO		6	5	4	3	2	1
24.1	My children perform better in class because they have more time to read at home						
24.2	Electrification has improved my households' access to healthcare in the District						
24.3	Electrification has had a positive impact on my households education						
24.4	I have quality and reliable source of lighting with electricity						
24.5	There is more security at home and the community because of lights						
24.6	With access to electricity, my household feels safe and secure						
24.7	Electrification has improved my household's access to clean and safe drinking water						

25. Regardless of your answer in question 24 above, give reasons.....

.....

.....

.....

26. Indicate any challenges your household face with electrification of the District and/or house.....

.....

.....

.....

THANK YOU FOR YOUR TIME AND PARTICIPATION!!!

APPENDIX B I: INTERVIEW GUIDE FOR SENANGA DISTRICT COMMISSIONER

Hello, I am Jason Ngoma, a Master of Arts (Public Administration) student at the University of Zambia. As part of my MA research thesis requirements, I am conducting a research on **“The Role of Rural Electrification in Rural Development in Zambia: A case of Senanga District of Western Province”** The information you provide will be treated with utmost CONFIDENTIALITY. Your assistance in answering questions will be highly appreciated

For official use

Date of interview/...../..... Time of Interview:
Start.....End.....

Section A: Personal Information

1. Position held of respondent
2. Sex (a) Male [] (b) Female []
3. Level of position in the organization (a) Top [] (b) Middle [] (c) Lower

Section B: Rural Electrification and Development of Senanga District

4. Has Senanga District been zoned for developmental purposes?
5. Has the electrification of Senanga District prioritised the zoned areas?
6. Was the office of the District Commissioner involved in any activities related to electrification of Senanga District ?
7. In which ways do you think the electrification of some parts of Senanga District has affected the following conditions in the District ?
 - (a) Environmental protection
 - (b) Security
 - (c) Provision of social goods (Health, education, water)
 - (d) Social-cultural activities
 - (e) People's standard of living
 - (f) Performance of commercial and agricultural sectors
8. Overall, how do you rate the contribution of electricity towards stimulating development in the District ?
9. Are there any factors preventing the use of electricity for developmental purposes in Senanga District ?

10. What do you think should be done to ensure that the electrification programme enhances the development of Senanga District ?

Thank you very much for agreeing to do this interview. Is there anything else that you would like to add on to what we have discussed?

APPENDIX B II: INTERVIEW GUIDE FOR COUNCIL SECRETARY

Hello, I am Jason Ngoma, a Master of Arts (Public Administration) student at the University of Zambia. As part of my MA research thesis requirements, I am conducting a research on **“The Role of Rural Electrification in Rural Development in Zambia: A case of Senanga District of Western Province”**. The information you provide will be treated with utmost CONFIDENTIALITY. Your assistance in answering questions will be highly appreciated

For official use

Date of interview/...../..... Time of Interview:
Start.....End.....

Section A: Personal Information

1. Position held of respondent
2. Sex (a) Male [] (b) Female []
3. Level of position in the organization (a) Top [] (b) Middle [] (c) Lower

Section B: Rural Electrification and Development of Senanga District

4. Has Senanga District been zoned for developmental purposes?
5. Has the electrification of Senanga District prioritised the zoned areas?
6. Was the Council involved in any activities related to electrification of Senanga District ?
7. In which ways do you think the electrification of some parts of Senanga District has affected the following conditions in the District ?
 - (a) Environmental protection
 - (b) Security
 - (c) Provision of social goods (Health, education, water etc)
 - (d) Social-cultural activities
 - (e) People's standard of living
8. Overall, how do you rate the contribution of electricity towards stimulating development in the District ?
9. Are there any factors preventing the use of electricity for developmental purposes in Senanga District ?

10. What do you think should be done to ensure that the electrification programme enhances the development of Senanga District ?

Thank you very much for agreeing to do this interview. Is there anything else that you would like to add on to what we have discussed?

APPENDIX B III: INTERVIEW GUIDE FOR ZESCO OFFICIAL (SENANGA BRANCH)

Hello, I am Jason Ngoma, a Master of Arts (Public Administration) student at the University of Zambia. As part of my MA research thesis requirements, I am conducting a research on **“The Role of Rural Electrification in Rural Development in Zambia: A case of Senanga District of Western Province”**. The information you provide will be treated with utmost CONFIDENTIALITY. Your assistance in answering questions will be highly appreciated.

For official use

Date of interview/...../..... Time of Interview:
Start.....End.....

Section A: Personal Information

1. Gender of interviewee (a) Male [☐] (b) Female [☐]
2. Position held of respondent
3. Level of position in the organization (a) Top [☐] (b) Middle [☐] (c) Lower

Section B: Rural Electrification and Development of Senanga District

4. What roles does ZESCO play in the electrification process of households in Senanga District ?
5. What responsibilities does ZESCO have in electrifying rural areas?
6. Would you give some examples of how rural electrification programme has contributed towards improved standard of living?
7. For the years you have been involved in the electrification of households in Senanga District , what lessons have you learnt?
8. Which other players does your organization work with in electrifying rural households?
9. Do you involve local players?
10. Have you noticed any changes (social, economic and environment) in the District as a result of introduction of electricity services?
11. Are you facing any challenges/constraints in providing and connecting households to electricity in Senanga District ?

12. Are there any factors preventing the use of electricity for developmental purposes by households in Senanga District ?

13. What is ZESCO doing to improve access and utilization of electricity for developmental purposes by households in Senanga District ?

Thank you very much for agreeing to do this interview. Is there anything else that you would like to add on to what we have discussed?

APPENDIX B IV: INTERVIEW GUIDE FOR RURAL ELECTRIFICATION AUTHORITY (REA) OFFICIAL

Hello, I am Jason Ngoma, a Master of Arts (Public Administration) student at the University of Zambia. As part of my MA research thesis requirements, I am conducting a research on **“The Role of Rural Electrification in Rural Development in Zambia: A case of Senanga District of Western Province”**. The information you provide will be treated with utmost CONFIDENTIALITY. Your assistance in answering questions will be highly appreciated.

For official use

Date of interview/...../..... Time of Interview:
Start.....End.....

Section A: Personal Information

1. Gender of interviewee (a) Male [] (b) Female []
2. Position held of respondent
3. Level of position in the organization (a) Top [] (b) Middle [] (c) Lower

Section B: Rural Electrification and Development of Senanga District

4. What roles does REA play in the electrification process of households in Senanga District ?
5. What responsibilities does REA have in electrifying rural areas?
6. Would you give some examples of how rural electrification programme has contributed towards improved standard of living?
7. For the years you have been involved in the electrification of households in Senanga District , what lessons have you learnt?
8. Which other players does your organization work with in electrifying rural households?
9. Do you involve local players?
10. Have you noticed any changes (social, economic and environment) in the District as a result of introduction of electricity services?

11. Are you facing any challenges/constraints in providing and connecting households to electricity in Senanga District ?

12. Are there any factors preventing the use of electricity for developmental purposes by households in Senanga District ?

13. What is REA doing to improve access and utilization of electricity for developmental purposes by households in Senanga District ?

Thank you very much for agreeing to do this interview. Is there anything else that you would like to add on to what we have discussed?

APPENDIX B V: INTERVIEW GUIDE FOR BAROTSE ROYAL ESTABLISHMENT (BRE) INDUNA

Hello, I am Jason Ngoma, a Master of Arts (Public Administration) student at the University of Zambia. As part of my MA research thesis requirements, I am conducting a research on **“The Role of Rural Electrification in Rural Development in Zambia: A Case of Senanga District of Western Province”**. The information you provide will be treated with utmost CONFIDENTIALITY. Your assistance in answering questions will be highly appreciated.

For official use

Date of interview/...../..... Time of Interview:
Start.....End.....

Section A: Personal Information

1. Position held of respondent
2. Sex (a) Male [] (b) Female []
3. Level of position in the organization (a) Top [] (b) Middle [] (c) Lower

Section B: Rural Electrification and Development of Senanga District

4. Has Senanga District been zoned for developmental purposes?
5. Has the electrification of Senanga District prioritised the zoned areas?
6. Was the BRE involved in any activities related to electrification of Western province and Senanga District ?
7. In which ways do you think the electrification of some parts of Senanga District has affected the following conditions in the District ?
 - (a) Environmental protection.
 - (b) Security
 - (c) Provision of social goods (Health, education, water)
 - (d) Social-cultural activities
 - (e) People's standard of living
 - (f) Performance of commercial and agricultural sectors
8. Overall, how do you rate the contribution of electricity towards improving households' standard of living in Senanga District ?
9. Are there any factors preventing the use of electricity for developmental purposes by households in Senanga District ?

10. What do you think should be done to ensure that the electrification programme enhances households' standard of living in Senanga District ?

Thank you very much for agreeing to do this interview. Is there anything else that you would like to add on to what we have discussed?

APPENDIX B VI: INTERVIEW GUIDE FOR COUNCIL DISTRICT PLANNER

Hello, I am Jason Ngoma, a Master of Arts (Public Administration) student at the University of Zambia. As part of my MA research thesis requirements, I am conducting a research on **“The Role of Rural Electrification in Rural Development in Zambia: A case of Senanga District of Western Province”**. The information you provide will be treated with utmost CONFIDENTIALITY. Your assistance in answering questions will be highly appreciated

For official use

Date of interview/...../..... Time of Interview:
Start.....End.....

Section A: Personal Information

1. Position held of respondent
2. Sex (a) Male [☐] (b) Female [☐]
3. Level of position in the organization (a) Top [☐] (b) Middle [☐] (c) Lower

Section B: Rural Electrification and Development of Senanga District

4. Has Senanga District been zoned for developmental purposes?
5. Has the electrification of Senanga District prioritised the zoned areas?
6. Was the Council involved in any activities related to electrification of households in Senanga District ?
7. In which ways do you think the electrification of some parts of Senanga District has affected the following conditions in the District ?
 - (a) Environmental protection
 - (b) Security
 - (c) Provision of social goods (Health, education, water)
 - (d) Social-cultural activities
 - (e) People's standard of living
 - (f) Performance of commercial and agricultural sectors
8. Overall, how do you rate the contribution of electricity towards improving households' standard of living in Senanga District ?
9. Are there any factors preventing the use of electricity for developmental purposes by households in Senanga District ?

10. What do you think should be done to ensure that the electrification programme enhances households' standard of living in Senanga District ?

Thank you very much for agreeing to do this interview. Is there anything else that you would like to add on to what we have discussed?

Appendix C: Illustrations

Appendix C I: *A Household head who now owns a shop and hammer because of electrification of the Senanga District*



Source: Field photography, 2018

Appendix C I *A Head of an Electrified Household in Liangati Village Showing How Electrification Had Enhanced His Household's Access to information and entertainment*



Source: Field photography, 2018

Appendix CIII: A Household making use of a fridge to preserve foodstuff in Litoya Village



Source: Field photography, 2018

Appendix C IX: Households main sources of clean and safe drinking water in Liangati Village



Source: Field photography, 2018

Appendix C V: A Rural Electrification Authority Project Poster in Senanga District



Source: Field photography, 2018