Rural Electrification and Maize Value Addition in Mpumudde Sub-County, Lyantonde District

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DECLARATION

I, **Ssegilinya Sulaiman,** hereby declare that this dissertation is my original work and has never been submitted to any Institution before for any award.

Signed.....Date 10/06/2024

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APPROVAL

This research dissertation has been submitted with my approval as the supervisor for examination.

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DEDICATION

I dedicate this dissertation to my beloved wife and children, whose prayers of day and night made me able to get such success and honor, along with all hardworking in collaboration with respected supervisors.

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ABSTRACT

The study was about rural electrification on maize value addition in Mpumudde Sub-County, Lyantonde District. The study specific objectives were to;(i) characterize maize value addition actors benefiting from rural electrification,(ii) identify factors limiting farmers from participating in maize value addition other than rural electrification, and (iii) assess the contribution of rural electrification towards adding value to maize. The study employed a descriptive cross-sectional research design and primary data was collected from 200 respondents. The data was analysed using SPSS version 22.0.

The study concluded that maize value addition actors who benefited from rural electrification were characterized by low level of education within average number of years in school being six; limited land with average of 4 acres, and with an average age of 38 years.

The study indicated that training, skills and experience, credit availability, market accessibility, and accessibility to materials and equipment had significant influence on farmer's ability to add value to maize. The study also indicated that rural electrification connection to maize milling centers led to higher efficiency in operations compared to non-connected milling centers. They improved quality of the value added products, efficiency in processing activities, and operated for long hours. The study recommends that, there is a need for the government to link with the donors like World Bank who have already acknowledged through their own studies that there should be a need for massive injection of funds to support the rural electrification programme. Maize value adders should be subsidized with value addition equipments at a fair price to help them sustain production of better quality value added products.Encourage the acquisition of electric maize shellers, grinders, and dryers to improve processing efficiency and reduce post-harvest losses. Establish cooperative-owned processing units powered by electricity. This collective approach can reduce costs and improve the bargaining power of smallholder farmers.

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Rural electrification is defined as the provision of electricity to areas of low demand and highly dispersed potential consumers (Abdullah and Markandya, 2021). Electricity can be supplied to such areas through small-scale auto-generation, local independent grids, or a central regional or national grid. Maize value addition refers to the processes that increase the economic value of maize through various forms of processing. This includes converting maize into food products, animal feed, biofuels, and industrial products. In developed countries, value addition has been enhanced by technological advancements and innovation in agricultural practices.

1.1.1 Historical background

Globally, over 1.4 billion people worldwide lack access to electricity and those who have access are supplied with intermittent and unreliable electric power (Abdullah and Markandya, 2021). In some studies, electrification in some rural communities is considered a driver of sustainable economic development and improvement of value addition performance in developed world (Kyriakarakos et al., 2020).

The U.S. is a global leader in maize production and value addition. The corn belt states like Iowa, Illinois, and Nebraska are known for their extensive maize processing industries (U.S. Department of Agriculture, 2023). Maize is processed into high-fructose corn syrup, ethanol, animal feed, and various food products. Ethanol production, in particular, has become a major industry, supported by government policies promoting renewable energy (Peters and Sievert, 2020)

In Australia and China, rural electrification has supported the development of maize farming in regions like New South Wales and Queensland (Ayanlade and Radeny, 2020). Electricity powers irrigation systems and machinery that improve maize yields, while also enabling the establishment of processing facilities that convert maize into animal feed and other products (Ayanlade and Radeny, 2020).

In provinces like Ontario, rural electrification has underpinned the growth of maize farming and processing industries (Tuntivate, 2021). Electricity supports the use of advanced agricultural technologies and processing equipment, helping Canadian farmers and processors to produce high-quality maize products for both domestic and international markets (Hydro One, 2022).

The world has seen significant progress in bringing electricity to remote rural areas to smoothen value addition activities (Tuntivate, 2021). Central to this has been the role of governments, especially from developed nations, where efforts have been put to help bring electricity and improve living standards of people living in rural localities through enhancing sustainable value chain and value addition performance (Tuntivate, 2021). The United States, for example, rolled out rural electrification programmes as early as 1930s as a way of improving growth rates of its suburbs and helping to create a more integrated national market (Malone and College, 2020). Similarly, it has and continues to be the intention of other governments around the world to increase the use of electricity in rural and peri-urban areas. Governments have supported the development of rural electrification programmes on their own or through partnership with private electricity utility firms as a way of providing energy to rural areas to keep rural agro-processing industries working at reasonable pace (Sachs, 2018). Despite the pivotal role that energy, particularly electricity plays in national economic development and providing services that in turn enhance social-economic development, developing countries have not achieved much when

compared to developed nations that flagged off rural electrification programmes in early years (Malone and College, 2020).

1.1.2 Theoretical background

The study uses utility maximization theory. This theory is anchored on the assumption that the decision of maize processors to add value to their products is influenced by expected utility and return, which ought to be higher if the processors add value to the products (Bentham, 2019). The utility is compensated by the consumers through patronage. Thus, maize processors will add value to their products if and only when they perceive the net benefits as a result of value addition will be greater than is the case without it (Mill, 2016). Although utility cannot be observed directly, however, the choices made by economic agents like the consumers can help in determining it.

Ultimately, the outcomes of value addition are to increase sales and profit maximization (Crimmins and Long, 2018). This in turn will translate to an expansion of the enterprise, which ultimately leads to the employment of more labor while the exported products will enhance the foreign exchange earnings of the country. Overall, the theory is considered appropriate for this study because it is able to pinpoint that the underlying factor that motivates agribusiness entrepreneurs to add value to maize products is profit (Bentham, 2019).

1.1.3 Conceptual background

Maize is a staple crop in many African countries. Value addition in maize involves processing it into various products, which can enhance food security, create jobs, and boost economic development. The process includes converting maize into flour, animal feed, and industrial products.

In Africa, the number of people living in rural communities is about 60% and majority of these rural dwellers are engaged in maize production (Sumberg et al., 2018). According to SE4ALL (2017), there are about 789 million people who do not have access to electricity and about 72% of these people are in the rural areas of Sub-Saharan Africa. The rate at which rural communities get access to electricity is slower than rural population growth (Foley, 2020), hence having the lowest electricity connection rates (World Bank, 2020). With the growing demand for energy, the United Nations Sustainable Development Goal 7 has set a target to have universal access to energy by 2030. To this end, policymakers and investors have made it a priority to make electricity accessible in developing countries (Lee et al, 2020). Other initiatives include the USAID Power Africa initiative whose aim is to increase electricity by 60 million households across Africa. Roughly 85% of these people live in rural areas and a large proportion are in Africa (ENERGIA, 2017).

In Kenya, the expansion of rural electrification through projects like the Last Mile Connectivity Project has facilitated the establishment of maize milling and processing plants in rural areas (Barnes, 2012). This has improved local food processing capabilities and created employment opportunities (World Bank, 2023). Nigeria's efforts to expand rural electrification through off-grid solutions have enabled the growth of maize processing industries in rural regions. Solar-powered milling and processing plants have been set up in several communities, improving local value addition and economic development (REA, 2023).

1.1.4 Contextual background

Maize is a staple crop in Uganda, and value addition plays a significant role in enhancing food security, creating jobs, and boosting economic development. The process involves converting maize into flour, animal feed, and other products (REA Uganda, 2023). Various community-

based initiatives have been established to add value to maize at the local level. These initiatives often involve small-scale milling operations that provide maize flour and other products to local markets, supporting rural economies (Uganda National Farmers Federation, 2023).

The integration of rural electrification and maize value addition is vital for the development of rural economies in Uganda. Reliable electricity enables the use of modern farming equipment and processing facilities, enhancing productivity and economic value (REA Uganda, 2023). For example, Mandela Millers relies on electricity to operate its maize milling and processing facilities. The availability of electricity has enabled the company to scale up its operations and improve the quality of its products, supporting local farmers and consumers (Mandela Millers, 2023).

In Uganda, limited access to electricity continues to affect the delivery of social services, constrain the development of small-scale industrial and commercial enterprises and adversely affect largescale industrial and commercial investment (GoU, 2015). To alleviate this situation, the Government of Uganda (GoU) has initiated several interventions to achieve its electricity access targets: (i) the Uganda Vision 2040 – electricity access of 80 % by 2040, (ii) the National Development Plan II, access from 14% to 30% by 2020; and (iii) the 2013-22, Rural Electrification Strategy and Plan target to increase access to electricity in rural areas from 7% to 26%. Before 2003, less than 9.7% of the total population in Uganda had access to electricity. The level of access for the urban population was 55% compared to a mere 3.3% for the rural population. To reduce the inequality, Government of Uganda developed and adopted the Rural Electrification Strategy and Plan (RESP) 1 and 2 to be implemented by the Rural Electrification Agency (REA) (REA, 2018). REA is a statutory body formed in 2003 with the responsibility of

undertaking rural electrification on behalf of Government with policy guidance from the Rural Electrification Board.

Uganda's overall electrification rate is estimated at 57%, with rural electrification coverage at approximately 26% (Uganda Bureau of Statistics, 2023). The Rural Electrification Agency (REA) reports that more than 2,500 kilometers of new power lines have been constructed in rural areas since 2013, increasing the number of rural households connected to the national grid (REA Uganda, 2023).

Since its inception, REA has extended over 10,000km of medium voltage electricity lines and 7,000 km of low voltage distribution electricity lines. Rural electricity access has increased from 3.3% in 2003 to 12% in 2016 (MoFPED, 2017).

Despite the extension of electricity lines to rural areas, the application process for connection is complicated since consumers have to visit the offices of the service providers which may be distant, it is expensive for the rural population to wire their houses using the standards stipulated by the Electricity Regulatory Authority (ERA), due to the discrepancy in the connection costs across different service territories (REA Uganda, 2023). UMEME customers have the lowest connection costs while the smaller service operators, mainly serving the rural population, are very costly (GoU, 2015). All these have limited rural household to connect electricity and use it and establishing different infrastructures necessary in adding value to maize. It is from this basis that this research was conducted to assess the effect of rural electrification on maize value addition in Mpumudde Sub-County, Lyantonde District.

1.2 Statement of the problem

Rural areas of poor countries are often at a disadvantage in terms of access to electricity. The high cost of providing this service in low populated, remote places with difficult terrain and low

consumption result in rural electricity schemes that are usually more costly to implement than urban schemes. In addition, low rural incomes can lead to problems of affordability and the long distances mean greater electricity losses and more expensive customer support and equipment maintenance (Barron and Torero, 2014). Despite this, rural electrification has been claimed to have substantial benefits, promoting production through maize processing, better health and education for households. Rural areas continue to be the home to majority of the population in Uganda and also the hub of different maize production activities (ERA, 2018). The lack of electricity supply affects close to 90% of the population (Abdullah and Markandya, 2021). Despite, the impressive gains the government has made in providing electricity to populations living in rural areas, Mpumudde Sub-county has not yet achieved the universal electricity coverage and even in areas where the rural electrification program have been rolled out fully, a section of the population have not shifted. It is projected that well planned, carefully targeted and effectively implemented rural electrification programs have the potential of opening up opportunities for low income rural communities to increase their income through maize value additions activities and thereby accelerating rural development (GoU, 2015). However, there is limited data on the impacts of rural electrification on the growth of maize value addition activities in Uganda and Mpumudde sub-county in particular. Not all the stakeholders involved in maize value addition activities are able to use electricity services for income generation activities. Consequently lacking reliable data and information about significant positive impact of electricity services on maize value addition may limit the room for entrepreneurs to choose this type of modern energy for productive value addition activities (World Bank, 2020). Moreover, lack of data and information on the linkages between electricity services and maize value addition development may have effects on national policy strategies to combat poverty as most of the rural poor depend on maize enterprises for income generation since the losses from maize

activities are high due to limited value addition activities performed by farmers. It was against the above background that the study sought to assess the effect of rural electrification on maize value addition in Mpumudde Sub-County, Lyantonde District.

1.3 Objective of the study

1.3.1General objective

To assess the effect of rural electrification on maize value addition in Mpumudde Sub-County, Lyantonde District

1.3.2 Specific Objective

(i)To characterize maize value addition actors benefiting from rural electrification in Mpumudde Sub-County, Lyantonde District

(ii) To identify factors limiting farmers from participating in maize value addition other than electrification in Mpumudde Sub-County, Lyantonde District.

(iii) To assess the contribution of rural electrification towards adding value to maize in Mpumudde Sub-County, Lyantonde District

1.4 Research question

(i) What are the characteristics of maize value addition actors benefiting from rural electrification?

(ii) What are the factors limiting farmers from participating in maize value addition other than electrification in Mpumudde Sub-County, Lyantonde District?

(iii) What is the contribution of rural electrification towards adding value to maize in Mpumudde Sub-County, Lyantonde District?

1.5 Scope of the study

1.5.1 Geographical scope

The study was conducted in Mpumudde Sub-County, Lyantonde District.

1.5.2 Content scope

The study was focused on assessing the effect of rural electrification on maize value addition in Mpumudde Sub-County, Lyantonde District. It was limited to; (i) characterizing maize value addition actors benefiting from rural electrification in Mpumudde Sub-County, Lyantonde District, (ii) identifying factors limiting farmers from participating in maize value addition other than electrification and, (iii) contribution of rural electrification towards adding value to maize.

1.5.2 Time scope

The study based on a ten year time frame (2012-2022). It is the time when the government was implementing rural electrification programme in the area in order to encourage farmers to add value to their produce and enhance household incomes.

1.6 Significance of the study

This study will help decision makers and donors to improve the implementation of rural electrification program as it might have impact to developing countries especially Uganda. The existing evidence linking rural electrification to growth and expansion of agro-processing firms/businesses will be enhanced. This study can therefore, shed more light on the productive role of rural electrification and thereafter providing the foundation for developing policies, for rural planning and development initiatives.

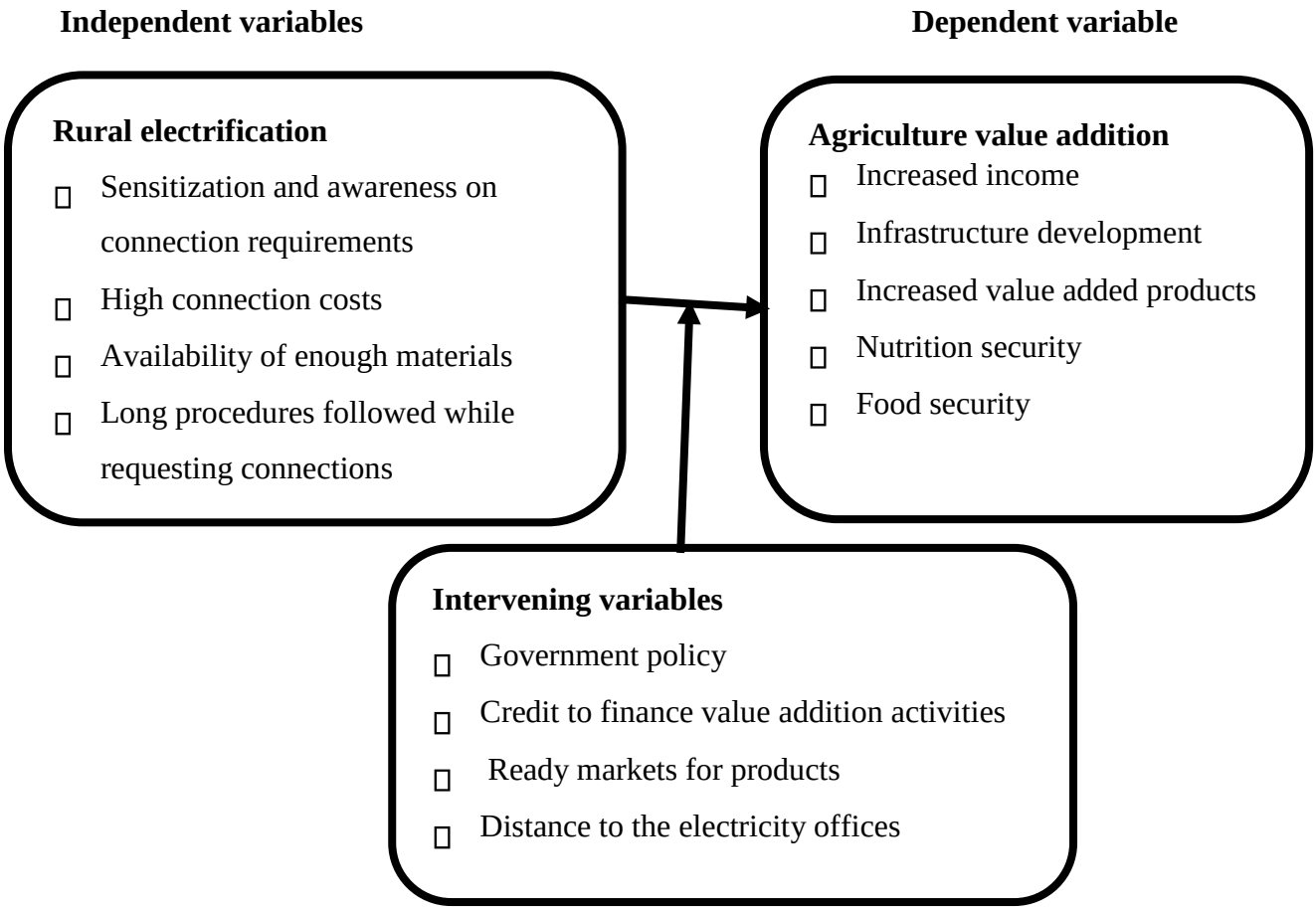
A detailed evaluation of the impacts of rural electrification program in Mpumudde Sub-County will therefore play integral role in the provision of reliable data and trends in maize value addition enterprise and electricity use. Since Mpumudde Sub-county is a beneficiary of the rural electrification program, the study will assess the impact that the scheme for rural electrification has had on maize value addition development and income generating activities.

Value addition in maize increases food security by reducing post-harvest losses and providing diverse maize-based products to the local population.

Rural electrification facilitates economic growth by attracting investment, creating job opportunities, and improving productivity in various sectors, including agriculture and industry. Maize value addition activities create additional income streams for farmers and agro-processing entrepreneurs, contributing to poverty reduction and economic empowerment. Access to electricity enables farmers to adopt modern farming techniques and technologies, leading to increased agricultural productivity and efficiency. Electrification opens up opportunities for diversifying income sources through non-agricultural activities such as agro-processing and value addition. Engagement in value addition activities provides community members with valuable skills in agro-processing, entrepreneurship, and business management.

1.7 Conceptual frame work

According to Paterson et al. (2009), a conceptual framework is defined as a coherent set of concepts, beliefs, values, propositions, assumptions, hypotheses, and principles. A conceptual framework is an analytical tool with several variations and contexts. It is used to make conceptual distinctions and organize ideas. The conceptual framework below was based on a three factor model independent variable, dependent variable and intervening variable as mentioned below;



Source; Researcher's own, 2023

The conceptual framework above shows the relationship the independent variable has on other variables for example rural electrification as indicated by sensitization of consumers in rural areas on the requirements for connection, connection costs and availability of enough materials and dependent variables (maize value addition). For example, the high costs required in connecting and installation of different electricity appliances and infrastructure to households and maize processing industries discourages farmers and processors to use electricity despite its existence in the area. Similarly, long and undefined procedures to be followed while initiating the connection process also discourages most of the stakeholders to be connected to electricity, which affects smooth running of, value addition activities. The intervening variables especially

government policy, ready markets, access to skilled personnel to connect and distance to the regional or district electricity offices also effects the level of maize value addition. For instance most of regional and district electricity distribution offices are located in main town which are far away from most rural areas and this discourages most of the rural farmers to get connected and get involved in maize value addition activities.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter presents the literature on rural electrification and maize value addition. This has been generated from journal articles, published and unpublished thesis, abstracts, textbooks, websites and internet. The literature has been organized in accordance to the specific objectives of the study.

2.1 Socio-economic characteristics of maize value addition actors benefiting from rural electrification

Size of land owned by the household in terms of acres is another independent continuous variable measured in acres and its equivalent value in Uganda shillings if it was sold at the current market value (Ray, 2021). This variable explains the monetary value of maize farmers' not only the land being pledged as security but total land owned. It is expected that the more sufficient land size maize farmer accumulates, the more access to agricultural credit from financial institution (Ray, 2021). This is because big land enables maize farmers to meet the collateral requirements of the bank as well as supporting engaging in multiple enterprises through diversification. Therefore, it is hypothesized that farmers with sufficient valuable land have more access to agricultural credit from financial institution to finance production activities than counterparts with few acres of land (Babu *et al.,* 2015).

The study by Gold *et al.,* (2019) reported that average age of the household heads was 48 years which meant that the majority of the maize farmers fell in the productive age group. Gold et al, (2019) observe that over the past 20 to 50 years, maize has replaced millet as the key staple in

much of south-western Uganda. Therefore, the low average age of maize producers suggested that the region adopted maize production late compared to the other areas.

Education is very vital for boosting the productivity of the human factor and making people more aware of opportunities for earning a living (Okurut et al, 2022). The average level of education attained by the household head in years was approximately seven and it was highest in the central region, with eastern having the lowest but slightly lower than that in the study area (Okurut et al., 2022). The difference in the mean level of education attained by the household head was significant across the areas. The difference in education levels of the farmers could be attributed to the geographical locations of the areas, the central region which is closer to the capital has better access to education and other social services compared to the other areas (Babu *et al.,* 2015). This suggests that the majority of the farmers had the necessary education to process information on improved technologies instrumental for increasing maize productivity.

A study by Nagele (2018) revealed household size is the most important source of labour available to a given household for farm work. Results showed a significant difference in the mean size of the households across the three study regions (Dinkelman 2021). Considering the labour intensive nature of maize agronomic practices like mulching, manure application and weeding, households with large families are more likely to perform such production technologies effectively and on time.

Gender; It is reported that females are more constrained to access agricultural credit to fund production innovations that improve agricultural production than males because they lack control over economic resources and the nature of their economic activity (Katungi *et al.,* 2017). Therefore, it is hypothesized that female maize farmers are more constrained to access agricultural credit than their male counterparts.

Marital status; the study by Tushemereirwe *et al.*, (2018) reported that marital status determine whether it influences maize farmers' production and income security. The author explained that married persons are more likely to engage in production than their unmarried counterparts because the married people need to meet food security for their household members (Lyder, 2020). This is attributed to the fact that maize farmers who are married have access to cheap family labour which reduces costs to boost profitability (Tushemereirwe *et al.,* 2018). Therefore, it is hypothesized that maize farmers who are married have more access to production related training than those unmarried. It is further assumed that the married tend to have fixed addresses, and are committed to their families which reduce their mobility to distant places (Barnes and Samad, 2020).

2.2 Factors limiting farmers from participating in maize value addition other than electrification

Electricity shortages and load shading: One cannot talk about value addition without considering the central and crucial role energy plays (Abdullah *et al.,* 2015). Uganda's cost of electricity versus affordability is skewed. At UGX 651 per kWh8 (19.2 US Cents) without tax, a Ugandan processor would have a challenge competing with a counterpart say from Ethiopia where the average rate is 7 US Cents. The unreliable power supply affects the value addition process immensely. There are cases in the countryside where electricity is unavailable for days without end. Such occurrences have forced processors to resort to the more expensive fossil fuel alternatives (Abdullah *et al.,* 2015).

Inconsistent Supply Capacity: When adding value to produce, one of the goals is to ensure that the product is readily available on the market for consumers to purchase. In Uganda, one of the biggest challenges is to have a steady supply of some categories of products (Akata and

Kalyoncu, 2019). The seasonal nature of our farming, coupled by most primary producers being farmers, production is in small quantities or even when substantial, their poor storage conditions dictate that they dispose off their products with immediate effect. This can create a challenge to other value chain players who are then expected to invest in storage facilities so as to cater for off-season product supply (Akata and Kalyoncu, 2019).

The study established that access to credit and extension services, distance to the market, marketable surplus, group membership and total quantity produced significantly and positively influenced value addition (Orinda *et al*., 2017). The study noted that farmers in groups exchange ideas/information, achieve economies of scale, incur less costs and ensures collective production, marketing and training thus increasing probability of practicing value addition (Tura et al., 2020). On the distance, the study noted that farmers who are far away from the market outlets were more likely to add value and vice versa due to the fact that better prices are found in far markets and also the fact that maize are bulky and perishable and the only way to reduce transport cost is to process (Orinda et al., 2017). On the other hand the study found that household size, access to off-farm income and land size negatively influenced adoption of value addition activities. They found that larger households consumes more of what is produced hence less is available for value addition and subsequently for sale (Tura et al., 2020).

The uncertainties regarding land tenure and the inadequate access to land have been a critical challenge affecting value addition to maize production in East Africa (Adeleke et al., 2020). These problems can be examined from different perspectives. The constraints related to the tenure system, such as insecurity of land tenure, unequal access to land, lack of a mechanism to transfer rights and consolidate plots, have resulted in underdeveloped agriculture, high landlessness, food insecurity, and degraded natural resource. Furthermore, the available land in

East Africa is overly subdivided into small and uneconomic units, resulting generally in fragmented production systems and low productivity. In fact, the farm sizes range from as low as about 1ha per household in Ethiopia and 2.0 ha in Tanzania and 2.5ha in Uganda and Kenya (Adeleke et al., 2020).

Lack of storage facilities: Storage of produce, processed or unprocessed maize is one of the biggest nightmares faced by those involved in value addition and marketing. All sorts of vermin exist that tend to partake of the produce (World Bank, 2020). In other cases, the products are so sensitive to the environmental conditions that one has to take extra care to ensure that they do not make losses. A poor decision on storage combined with lengthy storage period could easily expose farmers to total market losses in case the store is not in good conditions (Adeleke et al., 2020).

Transportation issues: Uganda is plagued by a poor transport network. While the road network seems to be in place reaching most of the habitable locations, there is a problem of its quality (Bano *et al.*, 2019). The state of many countryside roads is so heartbreaking that it could take 3 hours for a journey that would ordinarily last 30 minutes. Due to the poor state of these roads, vehicle breakdowns are rampant and this increases the cost of doing business for the middlemen. Depending on the maize product farmers are dealing in, such transport bottlenecks could lock out entire communities of farmers from value addition and market opportunities (Dahmardeh, 2013).

Poor infrastructure: Inadequate infrastructure inform of storage facilities, transport and irrigation equipment has made farming unprofitable for the maize farmers (Dias, 2020). The road system which is the most important for market development in terms of the distribution of inputs and outputs to and from farms is the biggest infrastructural bottleneck facing maize production in Uganda. Most of the roads are marrum and become impassible during the rainy season. This not

only creates food shortages in the urban areas but also results in economic losses especially for perishable produce (Colavolpe and Alberto, 2014). This is one of the factors that deny farmers the opportunity to reap from the high food prices in urban areas. Similarly, lack of storage facilities is another factor indirectly undermining the use of production inputs like fertilizers that boost production (Colavolpe and Alberto, 2014).

Underdeveloped rural roads and other key physical infrastructure have led to high transport costs for agricultural products to the market as well as farm inputs reducing farmers' competitiveness. In addition, electricity is not available in many rural parts of the country and is also very expensive, lack of storage and processing facilities constrains marketability of perishable goods such as dairy products, fish, fruits, and vegetables (Katongole *et al.*, 2021).

Lack of market information: Rural producers, and especially maize farmers, have little information about the market demand, which is costly to obtain (Li and Hu, 2014). They may gather information through contact with other actors in the commodity chain, but the accuracy of this information is not certified since those actors might be exhibiting "opportunities behavior" (Ng'etich *et al.*, 2013). Maize farmers lack information about product prices at the local level, about quality requirements, about the best places and times to sell their products, and about potential buyers. This, in turn, reduces their ability to trade their products efficiently and to derive the full benefit from the marketable part of their production. Market information is vital to market participation behavior of maize farmers.

Market information allows farmers to make informed marketing decisions that are related to supplying necessary goods, searching for potential buyers, negotiating, enforcing contracts and monitoring (Uddin *et al.*, 2020). Necessary information includes information on consumer preferences, quantity demanded, prices, product quality, market requirements and opportunities

(Mamiro and Mamiro, 2021). The source of market information is important because it determines the accuracy of the information. According to Uddin *et al.,* (2020), maize farmers have difficulties in accessing market information, exposing them to a marketing disadvantage. Maize farmers normally rely on informal networks (traders, friends, and relatives) for market information due to weak public information systems (Singh and Singh, 2012). However, such individuals may not have up to date and reliable market information, making the usefulness of the information doubtful.

Lack of proper storage facilities: The ability to deliver a quality product to the market and ultimately to the consumer commands buyer attention and gives the grower a competitive edge (Fanadzo *et al.,* 2010). Proper post-harvest handling and storage contribute to ensuring quality maintenance for perishable agricultural produce (Kumar *et al.,* 2014). Moreover, agricultural commodities have to be harvested at a specific point in time but are consumed year-round, thus necessitating proper storage facilities (Kumar *et al.,* 2014). Therefore, if crops are to be available for consumption throughout the year, proper storage facilities have to be implemented by both farmers and traders. Households with proper storage facilities do not need to market their produce immediately after harvest when prices tend to be low (Katongole *et al.,* 2012). They can store their produce and sell when prices are higher. However, most maize farmers do not own adequate storage infrastructure and end up selling their produce soon after harvest to cater for household needs (Tonini et al., 2022). Maize farmers often rely on open-air storage due to lack of storage facilities.

Lack of market transport services: It is difficult to transport produce to the market in time (produce spoilage and losses) if there is no reliable private form of transport available (Gebremichael. and Raro, 2014). In addition, unavailability of reliable transport will increase

transport costs, which in turn increases transaction costs amongst maize farmers. In developing countries, most maize farmers usually pack their goods in sacks, which are then transported to market places using public transport (Dias, 2020). Some farmers use their own vehicles to get to the market centers. Bhatti *et al.,* (2017) pointed out that farmers with their own means of transport are able to move around in search of more rewarding markets.

Okello (2019) have argued that value addition in rural agriculture should be enhanced in order to promote market oriented maize agriculture in the developing countries. There is need to finance value addition to agricultural output, and agribusiness has been identified as the best avenue to channel credit into agriculture, and hence promote value addition (Stanton, 2020). Several other important factors impact global agri-food industry like growing trade of processed foods, changing consumer needs, rising disposable income, improved diets in many areas, industry consolidation, and increasing food demand in developing countries (Kohl, 2021). Namwata (2020) noted that the low prices are received by Irish potato farmers in Tanzania due to limited opportunities for access to markets for frozen chips and fresh Maize. Maganga *et al.,* (2012) found that maize are highly perishable and farmers need adequate and good storage facilities to avoid losses.

Rono et al. (2016) conducted study in Kenya to determine factors affecting value addition in Maize. The study found that farmers who produced more were more likely to carry out value addition activities and vice versa. Ndegwa *et al.,* (2020) found that group members help farmers access to credit facilities that subsequently stimulate value addition activities. Oluoch *et al.,* (2016) employed multiple-regression model in evaluation of effects of value addition in maize on farmer's income in Homabay County, Kenya. The study found that, the more value a farmer added to raw tuber, the better the income obtained from the market. The study also noted that

farmer marketing groups had a stronger bargaining power in the market compared to farmers selling individually.

Credit access affects the participation in value addition of maize at one percent level of significance. Access to a credit market offers farm households the opportunity to obtain the resources necessary to adopt agricultural technologies (Makhura *et al*., 2021). Access to credit, by helping farmers and processing centres to finance the acquisition of value addition equipment could enhance adoption and continued use of the value addition technology. This is expected as farming households rarely have sufficient means to buy value addition equipment and other associated components, magnifying the importance of credit (Makhura *et al*., 2021). However, access to credit by itself is not enough and should be provided in such ways that clients will be able to repay in time without staying indebted for long, thus ending up abandoning the livelihood improving technology (Mwabu, 2018).

2.3 The contribution of rural electrification towards adding value to maize

Rural electrification is an essential tool in improving farmer's livelihood as it creates and expands economic activities and social services (Lahimer et al., 2013). Rural electrification supports the development of agricultural activities (Oluwatofunmi and Pappis, 2019). Stability of electricity in rural communities is paramount in improving agroprocessing leading to enahanced household income, thus contributing to Sustainable Development Goals (SDGs) (Laura, et al., 2019). Rural electrification is one of most essential strategies for improving economic growth, social development and farmer's livelihoods. It improves rural communities' security, trade, health care delivery, housing and infrastructure, agricultural operations and industrial development. It increases the use of electric appliances and creates new employment opportunities.

Rural electrification in Bolivia resulted in significant improvements and growth of various income generating activities in rural areas such as cottage industries including, maize milling, which process and sell maize flour. These revenue producing services increased family income and enhanced the rural livelihood (Vela-Cobos et al., 2021). In his study on rural electrification expansion and its role in shaping maize and food security in India, Ray (2021) found that Indian rural electrification served maize farmers through irrigation scheme. In addition, rural electrification enhanced farmer's income in Indian rural communities.

In South Africa, rural electrification played a vital role in stimulating the economic growth in rural areas by creating and increasing agro-processing activities both at the household level and at the community level (Dinkelman, 2021). It improved women participation in income generating activities whereby women started working outside their homes and joined the formal and informal labor force (Dinkelman, 2021). There was also a shift in the use of wood as a source of energy to electricity for both cooking and lighting. The rural electrification in the country resulted in people's migration to areas with electricity for the purpose of looking for a jobs or establishing businesses (Dasso and Fernandez, 2020).

In Sub-Saharan Africa, most of the agricultural value addition activities take place in the rural communities and it continues to be the major source of livelihood in such communities (Ayanlade and Radeny, 2020). According to Namara et al. (2020), there are about 1 billion people who live on less than $1 a day and 850 million rural poor are primarily engaged in maize production. Some studies have found that rural electrification results in long-lasting positive effects on rural communities (Kyriakarakos et al, 2020). A systematic review by Knox et al., (2018) found that rural electrification stimulates agricultural value added product output and has the tendency of increasing employment. In most developing countries, maize is "an engine for

economic growth" (Sumberg et al., 2018), employs a large proportion of labour force and in some cases contributes a higher share to the country's employment and Gross Domestic Product (GDP).

In getting the correct trend of businesses rising due to connection, the study by Freedom (2019) sought to establish the products that have resulted into value addition due to electricity uptake or power connection in rural settings. Examples of value addition include, milk packaging and refrigeration where previously only hawked milk was available, maize milling and packaging of flour where initially, the diesel grinders only produced a few bags of flour for immediate use than previously before rural electrification program (Freedom, 2019).

Rural Electricity alone may not be able to create all the conditions for economic growth, but it is obviously essential for basic human needs and economic activity among a large number of rural households (IEA, 2018). In theory, access to electricity can improve socio-economic conditions in developing countries through its influence on key components of poverty, namely health, education, income and environment (Kanagawa and Nakata, 2018). Concerning rural areas, Khandker et al., (2019) claim that lack of access to energy and more precisely rural electrification is one of the major impediments to rural development. Chaurey et al., (2019) argue that a strong correlation exists between rural poverty and access to electricity because electricity is a prerequisite for productive activities. In addition to improving productivity by giving access to more efficient means of production, access to an electrical grid and better electricity services could also lead to household time savings and allow them to work more hours by increasing their access to markets (Bernard and Torero, 2021). Rural electrification programs seem to be crucial to improve living conditions and promote development; however, there is also a need for evaluation of such programs' impacts to determine whether or not interventions are relevant and

cost effective (Bernard and Torero, 2021). Rural electrification with the use of renewable energies or hybrid systems improves individual quality of life, facilitates community services such as health and education (consumption use) and enables business entities to carry out professional activities, enhance agro-processing activities (productive use) for rural populations (Khandker et al., 2019). Value addition is important for a number of reasons. For instance, it reduces post-harvest losses of agricultural produce. Post-harvest losses in maize, cassava, rice, and yam in South Africa in 2017 amounted to about 35%, 34.6%, 6.9% and 24.4% respectively (Mhazo et. al., 2018) as a result of ineffective food processing technologies, among other causes. According to the Ministry of Food and Maize, only 5 percent of food products harvested in Ghana are processed. Therefore, from a health and nutrition perspective, agro-processing has the potential to increase nutritional value, and it could also increase food security in the country, through a reduction in food spoilage and wastage (Tonini et al., 2022). Processed foods also enjoy greater price stability on the world market and may therefore increase market opportunities for exports, contributing to income securities particularly in rural communities which are mostly engaged in farming (Tonini et al., 2022). The development of the agro-processing industry may also promote employment generation, and contribute to enterprise development, diversification of rural economies, and import substitution, among opportunities. According to Tonini et al., (2022), agro-processing is the most important subsector of the manufacturing sector, with food and beverages representing the largest component of processed commodities.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0. Introduction

This chapter consisted of the research design, area of study, study population, sample size determination, sampling technique, data collection methods and instruments, data quality control, ethical considerations and data analysis

3.1. Study Area

The study was conducted in Mpumudde Sub county, Lyantonde district in Uganda. Lyantonde is located in the South-western region of Uganda lying between latitude 0^0 S and 0.5^0S Longitude of 31.1^0 E and 31.3^0 E. Lyantonde borders Rakai District in the South, Masaka in the East, Kiruhura in the West and Sembabule in the Northeast. The District headquarters are in Lyantonde Town Council. The distance from Kampala, the National capital city is of 193 Kilometres.The District had a total households 0f 20,839, total population of 94,841 people according to the 2014 population census of whom 46,906 and 47,936 were males and females respectively (UBOS report 2016). Lyantonde has an area of about 864.62 square Kilometres**.**

3.2. Research design

The study adopted a descriptive cross-sectional survey to assess relationship between rural electrification and value addition. Mugenda and Mugenda (2003), defines survey as an attempt to collect data from members of a population in order to determine the current status of that population with respect to one or more variables. The design was deemed appropriate in that it helped the researcher to gather information across a large population with the aim of describing events as they happen at a single point in time. The design adopted both quantitative and

qualitative approaches for data collection. These approaches made it possible to investigate the phenomenon in the area.

3.3. Study population

The study targeted farmers who do value addition, agricultural service providers and community stakeholders. Farmers were considered for their involvement in agricultural production, processing, and marketability. Agricultural service providers were considered for their technical knowledge, advisory services, and community stakeholders were considered because they take part in policy implementation.

3.4. Sample determination and size

From the UBOS report (2015) value chain actors make 16% of the total population in maize value chain in Lyantonde district. It was from this percentage that the researcher drew the sample size was obtained using the standard statistical formula as described by Anokye (2020) at 95% confidence interval and 5% error term as follows:

$n = Z_{\alpha/2}Pq/d^2$ where $N > 10{,}000$.

$n = 1.96^2 \times 0.16 \times 0.84/0.05^2$

$= 3.8416 \times 0.16 \times 0.84/0.0025$

$= 0.\ 5163/0.0025$

$n = 206$ respondents

n - The sample size, d -Degree of accuracy 0.05, p - estimated number of value chain actors 16% (0.16), q - Non-value chain actors 84% (0.84), α -0.05 (level of significance)

3.5. Sampling Procedure and technique

The study employed purposive sampling and stratified random sampling criteria in the selection of respondents across the district. Purposive technique was used on farmers and while stratified sampling involved the division of a population into stratum or groups. In this case, value chain actors were divided into groups based on shared characteristics. The formed groups included farmers and processors. It was from each group that a target sample was drawn using a systematic probability sampling technique. Random numbers were used to attain the required number of respondents from each group. Non-probability (simple) random method was used to select key informants like agricultural service providers.

3.6. Research instruments

The study used self-administered questionnaires with (closed and open-ended questions), interview guide and observation method to collect primary data.

3.6.1 Questionnaires

A structured questionnaire with both (closed and open-ended questions) was designed and then used to collect data from farmers and processors. This method allowed a selected number of respondents to answer questions related to the study phenomenon. The questions to be answered in the questionnaire were in line with the study objectives. The questionnaires were administered by the researcher himself. Primary data was captured on;

- Socio-demographic characteristics like sex, age, education level, income status, source of income, landholdings and among others.
- Factors limiting farmers from participating in value addition other than rural electrification.
- The contribution of rural electrification on adding value to maize

3.6.2 Interview guide

An interview guide involved the presentation of oral verbal stimuli and replied in terms of oral verbal responses. Oral personal interviews that involved a face to face contact or conversation using an interview guide were used to capture opinions and views from key informants. Interviews helped in capturing supplementary information on the subject under investigation. Interviews also helped to generate first hand and reliable data. For the respondents who did not give immediate feedback, adequate probing was used to establish the specific information regarding the study phenomenon.

3.7. Quality Control Methods

3.7.1 Content Validity of Instruments

According to Polit and Hungler (2015), validity refers to "the degree to which the instrument measures what it is supposed to be measuring". Validity was ensured by examining the instruments. Before administering the questionnaires to the farmers, they were first examined by competent researcher with wide experience in the subject matter. They were then scrutinized by the supervisor. This was ensured that the terms used in the questionnaire was precisely defined and properly understood. The instruments were pilot tested on a population of 10 farmers who tried to add value to their products.

3.7.2 Reliability of Instruments

Reliability refers to the degree at which the instrument consistently brings out similar results of what it is measuring (Westercamp, 2013). A number of measures were taken during fieldwork, subsequent analysis and conclusion process in order to ensure the quality of the instrument. Before the actual collection of data, instruments were pre-tested on 20 respondents across the Mpumudde sub-county to determine the reliability and these respondents were not part of the

sample population. The reliability of the questionnaires in relation to the consistency of the respondents' answers was computed using the Cronbach's Alpha Coefficient of over 0.70 was computed.

3.8. Ethical considerations

The proposal was approved by Bishop Stuart University Research Ethics Committee.

Free and informed consent of each individual participant was obtained at the start of the study. Respondents read an informed consent form explaining; the purpose of the study, what participation in the study involved how confidentiality and anonymity would be maintained, and the right to refuse to participate in the study or to withdraw from the study without any penalty, the benefits, and risks of participating in the study. Personal/sensitive issues were only captured when a good relationship was established with the respondent. Respondents' culture was respected during the data collection process. Confidentiality and anonymity was maintained by the use of code numbers on the questionnaire other than names.

3.9. Data analysis

Data was analyzed using the two principal methods which are; qualitative and quantitative.

3.9.1 Qualitative data analysis

The qualitative data was collected through the use of both open-ended questions and interview guide. Qualitative responses captured were arranged under themes. This was done to search for the relationship between various codes. To avoid value judgment and/or bias, the collected data was analyzed by first cross-checking and cleaning it up.

3.9.2 Quantitative data analysis

Quantitative data from questionnaires was collaborated during data analysis. Data collected was coded, entered and cleaned using the excel computer program which was later exported to

Statistical Package for Social scientists (SPSS), Version 21.0 for analysis. Both descriptive and inferential statistics were generated and used in interpreting results. Continuous variables were analyzed using mean, and standard deviation while frequencies and percentages were applied on categorical variables. Multivariate analysis using correlations and regression statistics were performed to assess the possible associations between variables and significant relations with the dependent variables. Data output for socio-demographic characteristics of respondents was presented in form of pie-charts and graphs.

3.9.3 Analysis per objective

Objective one which was to characterize maize value actors benefiting from rural electrification in form of income as a strong benefit among households using electricity, descriptive statistics were analyzed.

Objective two which was to analyse the factors limiting farmers from participation in maize value addition was achieved using the logistic model. Thus, the dependent variable (is dichotomous 1 for those affected by the factors and 0 for those not affected). This study employed a generalized binary logistic model.

Objective three which was to assess the contribution of rural electrification on adding value to maize was achieved by use of linear regression model. In this case, income was considered as the dependent variable while rural electrification was independent variables. The model was specified as

$$Y= \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \ldots\ldots\ldots\ldots\ldots\ldots u.$$

Where: Y= Income from value added product as a result of using electricity, β_0 = constant, βi = estimated coefficients of the explanatory variables, Xi = explanatory variables, and μ_i = disturbance term.

CHAPTER FOUR

ANALYSIS, INTERPRETATION AND PRESENTATION OF FINDINGS

4.1 Introduction

The main objective of the study was to assess the effect of rural electrification on maize value addition in Mpumudde sub-county, Lyantonde district. The chapter is arranged in thematic form starting with the demographic characteristics followed by individual variables and finally the interpretations of the results/findings.

4.2 Response rate

The study, targeted 206 respondents. Observed results in figure 4.1 showed that a response rate of 97% with 200 respondents who responded was achieved with 3% (6 respondents) of the targeted sample not responding. The response rate was quite high as statistical scholars including Nachmias and Nachmias (2006) as well as Kothari (2004) have recommended a response rate of at least 51% in an open study.

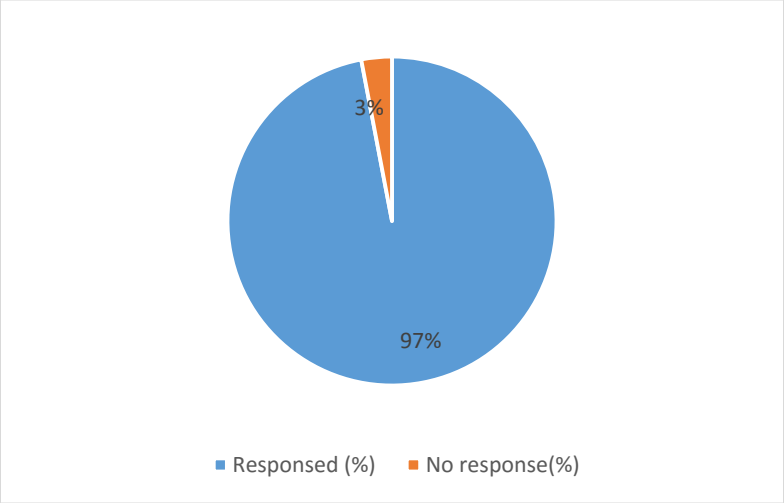


Figure 4.1: Rate of response from sampled population

4.3 Respondent's demographic characteristics

4.3.1 Gender of respondents

Respondents during survey were asked their gender form of sex, responses were captured and presented in figure 4.2 below;

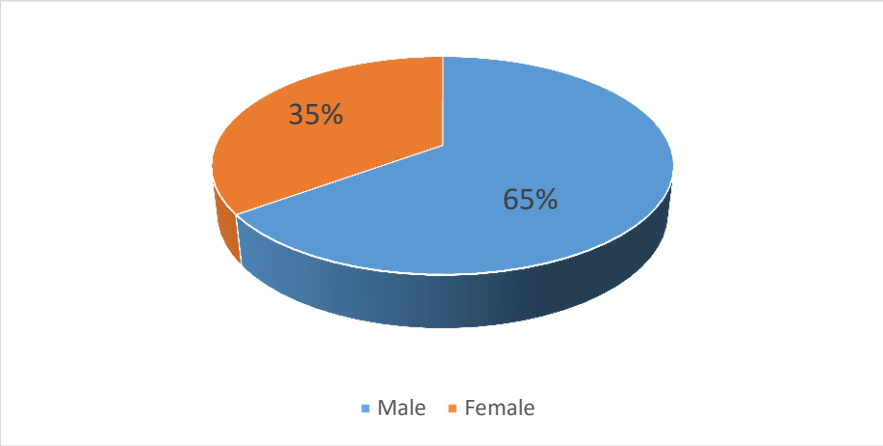


Figure 4.2: Gender of respondents

As shown in figure 4.2 above, 65% of the respondents were males and 35% were female. The dominance of males in the study meant that electrification and maize value addition had hectic work which could not be done by females. However, the results implied that the study did not suffer from gender bias.

4.3.2 Age, education level in years and size of the land under maize production

Respondents during survey were further asked their age, education level in years and size of the land under maize production, responses were captured, analysed and presented in table 4.1 below;

Table 4.1: Descriptive Statistics on age, education level and size of land under maize production

	Minimum	Maximum	Mean	Std. Deviation
Age in years	18	75	38.54	13.313
Educational in years	0	19	6.40	4.638
Size of your farm	1.0	17	4.23	3.7723

Source; field data, 2023

According to the findings in table 4.2 above, Average age distribution among respondents was 38 years with the youngest respondent aged 18 and the oldest 75 years. Average number of years in school were 6 with a minimum of 0 and a maximum of 19. Majority of the respondents had spent between 1 – 6 years in school. Respondents had an average landholding of 4.23 acres with a minimum holdings of an acre and a maximum of 17 acres.

4.3.3 Marital status

Respondents were also asked their marital status, responses were also captured and presented in figure 4.3 below;

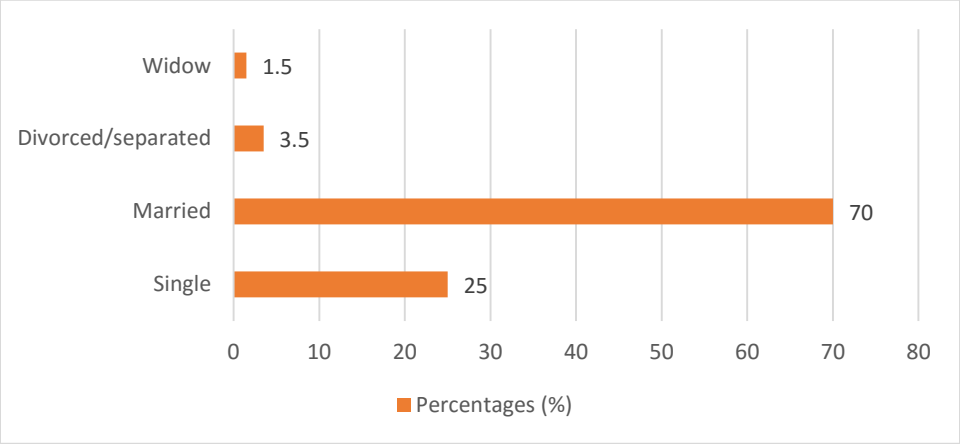


Figure 4.3: Marital status

Source: Field data, 2023

According to the findings in figure 4.3 above, it was revealed that 70% of respondents were married, 25% were single, 3.5% had separated/divorced and 1.5% were widowed.

4.4 Products got out of maize after value addition

Respondents were asked the products obtained from maize after value addition, some responses were captured and presented in the figure 4.4 below;

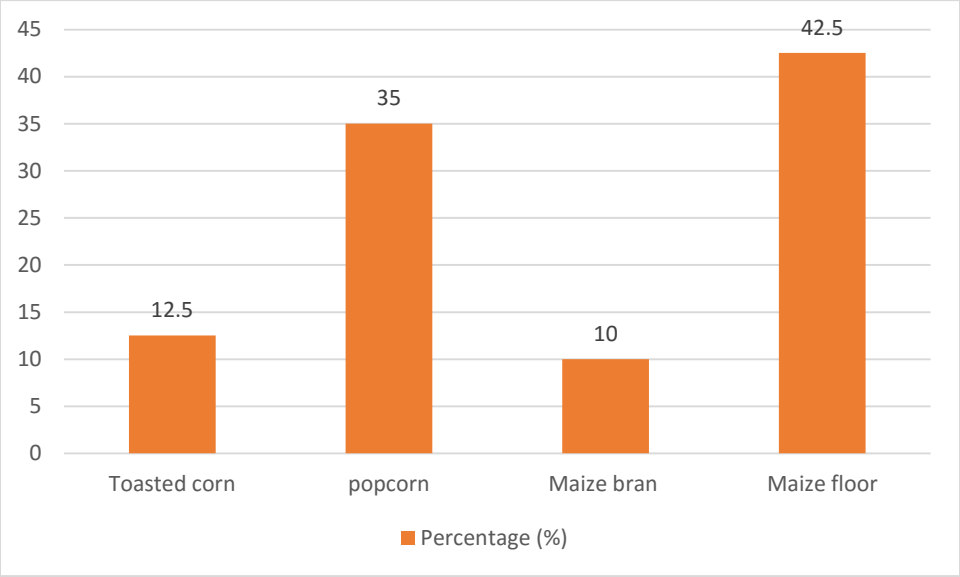


Figure 4.4: percentage distribution of value added products from maize grains

Source: Field data, 2023

According to the figure 4.4 above, it was revealed that majority of respondents 42.5% produced maize flour out of maize grains, 35% revealed popcorn, 10% revealed maze bran and the least number of respondents 12.5% revealed toasted corn.

4.5 Factors limiting farmers from participating in maize value addition other than rural electrification

Table 4.2: Regression output for factors limiting farmers from participating in maize value addition other than rural electrification

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	18.812	1.763		9.905	.000
Limited training on value addition	2.027	1.033	.138	1.772	.027
Skills and experience	2.011	1.002	.149	2.678	.021
Level of education	-.068	.051	-.114	-.741	.312
Credit services/financing	3.045	1.164	.200	-2.128	.003
Storage facilities	-.183	.221	-.114	-.710	.261
Market availability	3.102	1.048	.177	1.896	.026
Materials and equipments to use	2.228	1.187	.146	1.092	.029

Regression results indicate factors limiting farmers from participating in maize value addition other than electrification were presented in Table 4.3 above. Some of the factors were found to be statistically significant and others were non-significant.

The significant factors included; limited training on value addition was significant at (p=.027). This factor had a significant influence on limiting farmer's participation by 2 limited chances. Skills and experience was seen as significant factor in limiting farmer's participation in maize value addition at (p=.021), with 2 limited chances. Credit services/financing was seen significant in limiting farmer's participation in maize value addition at (p=.003), with 3.045 limited chances. Market availability was seen significant in limiting farmer's participation at (p=.026) by 3 limited chances. Materials and equipments to use were seen significant in limiting farmers from participating in maize value addition at (p= .029) by 2 limited chances.

Level of education and storage facilities were seen non-significant at 5% level of significance. This meant that even farmers who had no formal education were able to use electricity to add value to the maize as well as those without enough storage facilities.

4.5.1 How government tried to help farmers to participate in maize value addition

Farmers were asked how they were helped to participate in maize value addition; responses were captured and indicated in table 4.4;

Table 4.3: How government tried to help farmers to participate in maize value addition

		Frequency	Percent	Cumulative Percent
Valid	Extension training	60	30	30
	Rural market establishment centres	45	22.5	52.5
	Provision of drought tolerant maize varieties	25	12.5	65
	Rehabilitation of rural feeder roads	50	25	90
	Subsidization of equipments at fair price	20	10	100
	Total	200	100.0	

Table 4.4 above shows that majority 30% of the farmers revealed that the government had helped them with constant training services on how best they can add value to their maize grains, 22.5% revealed rural market establishment centres, 25% revealed rehabilitation of rural feeder roads, 12.5% provision of drought resistant maize varieties while 10% revealed subsidization of equipments at fair price.

4.6 The contribution of rural electrification towards adding value to maize in Mpumudde sub-county

Respondents during survey were asked whether there could be some other roles of rural electrification other than using it during value addition; responses were captured and indicated in table 4.5 below;

Table 4.4: Whether there could be some other roles of rural electrification other than using it during value addition

Response	Frequency	Percentage	Cumulative percentage
Yes	200	100	100
No	00	00	100
Total	200	100	

According to study results in table 4.5, majority of respondents 100% revealed that there were other roles of rural electrification other than using it during value addition and neither of the respondents disagreed with the statement.

Table 4.5: Other roles of rural electrification other than using it during maize value addition

Roles of rural electrification	N	Minimum	Maximum	Mean	Std. Deviation
Used for lighting in homes	200	8	120	46.42	27.202
Used in salons during shaving and hair dressing	200	5	370	77.65	60.018
Refrigeration	200	2	45	15.62	8.230
Used for welding	200	5	48	17.34	9.113
Used for cooking	200	2	12	4.45	0.988

Results in table 4.6 presented a highest mean of 77.65, which showed that electricity is strongly used in salons during shavingand hair dressing, followed by a mean of 46.42 that implied that electricity is mostly used for lighting homes. This was closely followed by mean of 17.34 which showed that electricity is used welding, another strong role had a mean of 15.62 which showed that electricity is for refrigeration in different small scale medium enterprises like bars/pub,

restaurants, retail shops and among others. Electricity has played pivotal role in helping rural households to cook and boil their water and milk and this presented a mean of 4.45.

Respondents were further asked on how rural electrification contributed towards adding value to maize; responses were captured, analaysed and presented in table 4.7.

Table 4.6: Contribution of rural electrification towards adding value to maize grains

Contributions	**Chi-square** (x^2)	Df	**Asymp. Sig. (p=0.05)**
Growth of various milling centres	3.114	2	0.011
Sustainability of quality value added products	2.881	3	0.001
Efficiency in processing activities	0.891	2	0.010
Electricity has enabled milling enterprises to operate for more hours	3.012	4	0.001
Production of more value added products	2.004	2	0.004

A test of chi-square was established to ascertain that the increase in maize value addition was because of rural electrification and not mere chance. The aim of a chi-square test according to Kothari (2004) is to establish that a relationship between two events is not by chance but by the forces between those events. Using Pearson's chi-square test with a 95% confidence level, the results with Asymptotic significance less than 0.05 are the ones to indicate a strong relationship while those equal to or greater than 0.05 are rejected as being not related.

To further confirm, the rural electrification and maize value addition relationship, a chi-square test was carried out to confirm that the relationship between the study variables. Results as indicated in table 4.7 show that all the rural electrification had low asymptotic significance values close to zero and hence an indication that the value addition was not due to chance but

strongly related to a level of 95% confidence on the connection to the electricity in rural areas. It is therefore safe to conclude that rural electrification had a great influence on maize value addition in Mpumudde Sub-county, Lyantonde district. The chi-square results are given below;

Growth of various milling centres (x^2 = 3.114, p=0.011), Sustainability of quality value added products (x^2 = 2.881, p=0.001), efficiency in processing activities (x^2 = 0.891, p= 0.010), enabled milling enterprises to operate for more hours (x^2 = 3.012, p=0.001) and production of more value added products (x^2 = 2.004, p=0.004).

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the discussion of major findings, conclusions and recommendations in line with the study objectives. This chapter further recommends areas for further research**.**

5.2 Discussion of findings

5.2.1 Characterize maize value addition actors benefiting from rural electrification in Mpumudde Sub-County, Lyantonde District

The study findings revealed that majority of farmers participating in maize value addition were males (65%) and 35% were females. The dominance of males in the study meant that electrification and maize value addition had hectic activities which could not be done by females. It is further reported that females were more constrained to access agricultural credit to buy value addition equipments, such as milling machines and machines to produce popcorn. This finding was in agreement with Katungi *et al.,* (2017) who reported that males have easy access to credit due to having access and control over productive resources which act as collateral unlike female counterparts. Therefore, it is hypothesized that female maize farmers were more constrained to access agricultural credit than their male counterparts.

Marital status influences maize farmers' production and income security. Tushemereirwe *et al.,* (2018) explained that married farmers were more likely to engage in production than their unmarried counterparts due to need to meet food and income security (Lyder, 2020). This was attributed to the fact that maize farmers who are married have access to cheap family labour which reduced costs of hired labour. Maize farmers who were married and had more access to production related training than those unmarried. Further assumed that married people tended to

have fixed addresses, and were committed to their families thus it was easier to recover any credit given to them (Barnes and Samad, 2020).

It was established that 70% of respondents were married, 25% were single, 3.5% had separated/divorced and 1.5% were widowed. The dominance of married couples implied that value addition was done to improve on their household income to help them to pay their children school fees as well as enhancing shelf life of their food to enable them to pass through the periods of scarcity. This finding concurred with Tushemereirwe *et al.,* (2018) who in her study reported that married farmers were more likely to have engaged in production than their unmarried counterparts because married needed to meet food security and needs of household members. The same author explained that maize farmers who are married have access to cheap family labour which reduced costs of hired labor which was often expensive. Considering the labour intensive nature of maize agronomic practices like mulching, manure application and weeding, households with large families were more likely to perform such production activities more effectively and on time.

The study findings indicated that respondents had an average landholding of 4.23 acres with a minimum holdings of an acre and a maximum of 17 acres. Respondents further revealed that the size of land explained that the monetary value if used as collateral to access credit from financial institution. The more land maize farmer possesses the more access to agricultural credit from financial institutions. This finding concurred with Babu *et al.,* (2015) who in their study reported that big land enabled maize farmers to meet the collateral requirements of the bank as well as supporting engaging in multiple enterprises through diversification. Farmers with sufficient valuable land had more access to agricultural credit from financial institution to finance maize production activities than counterparts with less land.

The study findings indicated that average number of years in school were 6 with a minimum of 0 and a maximum of 19. Majority of the respondents had spent between 1 – 6 years in school. The results meant that majority of the maize value actors were not highly educated and this limited the number of participants in value addition since high level of education enhances decision making. This finding could be compared with Okurut et al., (2022) who in their study reported that education was very vital for boosting the productivity of the human factor and enhancing awareness of better opportunities. The difference in education levels of the farmers could be attributed to the geographical locations of the areas for example the central region in Uganda which is closer to the capital has better access to education and other social services compared to the other areas of the country.

5.2.2 Factors limiting farmers from participating in maize value addition other than electrification in Mpumudde Sub-county, Lyantonde district

The study results established that market availability was seen significant in limiting farmer's participation at (p=.026) by 3 limited chances. Rural producers, and especially maize farmers, have little information about the market demand, which is costly to obtain and also limited accessibility of markets to absorb value added products at local levels. Different players in maize value addition gathered information through contact with other actors in the commodity value chain, but the accuracy of this information was not certified since those actors might be exhibiting "opportunities behavior". Maize farmers lacked information about product prices at the local level, about quality requirements, about the best places, times to sell their products, and about potential buyers. This finding was consistent with Uddin *et al., (*2020) who in their study explained that market information allowed farmers to make informed marketing decisions that were related to supplying necessary goods, searching for potential buyers, negotiating, enforcing contracts and monitoring. The same authors reported that maize farmers had difficulties in

accessing market information, exposing them to a marketing disadvantage. Maize farmers normally relied on informal networks (traders, friends, and relatives) for market information due to weak public information systems. However, such individuals often did not have up to date and reliable market information, making the usefulness of the information doubtful.

The study findings revealed that limited training on value addition was significant at 5% of level significance. This factor had a significant influence on limiting farmer's participation by 2 limited chances. Respondents further explained that training services on value addition were limited due to limited number of extension agents in the district compared to large number of farmers who needed training and therefore agents would not reach all the rural areas to offer training services. This finding could be compared with Tura et al., (2020) who in their study reported that farmers in groups exchange ideas/information, achieve economies of scale, incur less costs and ensures collective production, marketing and training thus increasing probability of practicing value addition.

It was established that storage facilities was seen as non-significant at 5% level of significance. Respondents further explained that their storage facilities were so limited and of poorly setup which were susceptible to rodents which destroy their products. This had affected their quality of stored products. This finding was in line with Adeleke et al., (2020) who in their study reported that the quality of stores renders all sorts of vermin that destroy farmer's produce. The same authors also explained that the products are so sensitive to the environmental conditions that one had to take extra care to avoid post-harvest losses. They also stated that poor decision on storage facility combined with lengthy storage periods could easily expose farmers to total marketing losses in case of high postharvest losses.

5.2.3 The contribution of rural electrification towards adding value to maize in Mpumudde Sub-county, Lyantonde district

The study findings revealed that rural electrification has enhanced efficiency in processing activities and was therefore significant at (p= 0.010). Respondents further explained that activities had been running smoothly due to stable power supply to the processing centres. This finding could be compared with Dinkelman, (2021) whose study in South Africa, revealed that rural electrification played a vital role in stimulating the economic growth in rural areas by creating and increasing agro-processing activities both at the household level and at the community level. The same author revealed that rural electrification improved women participation in income generating activities particularly value added activities whereby women started working outside their homes and joined the formal labor force.

The study results revealed that rural electrification led to growth of various milling centres. This was seen significant at $p<0.05$. Respondents further reported that milling centres used to be operated at small scale but due to access to electricity, the milling centres were expanded and operated at large scale level. The study finding could be compared with that of Freedom (2019) who revealed that existence of electricity. Stimulated businesses that also included value addition of agricultural produce.

The study results revealed that sustainability of quality value added products as a result of rural electrification had improved household income in Mpumudde sub-county, Lyantonde district. Sustainability of quality products required an additional price on the product which in turn led to enhanced household income. This finding was comparable to that of Vela-Cobos et al., (2021), who in their study in Bolivia resulted into significant improvements and growth of various income generating activities in rural areas such as cottage industries, maize milling centres which

sell maize flour. The same authors reported that revenue producing services increased family income and enhanced the rural livelihood. In their study on rural electrification expansion played a pivotal role in shaping maize and food security at household level.

The study results revealed that rural electrification enabled milling enterprises to operate for more hours. Farmers explained that this was because there stability of power in rural setting and the unit costs are so friendly. This finding was in line with Bernard and Torero, (2021) who reported that access to an electrical grid and better electricity services could also lead to household time savings and allow them to work more hours by increasing their access to markets.

5.3 Study conclusion

Maize value addition actors who benefited from rural electrification are characterized by low level of education, limited size of land (average of 4 acres) and are limited in productive average age of 38 years.

Other than rural electrification, factors that include, limited training, lack of skills and experience, lack of financial services in form of credit, poor market accessand lack of improved technologies deter farmers from adding value to maize grains

Maize milling centres connected to run rural electrification are more efficient in their operations than the non-connected milling centers

5.4 Study recommendations

Maize value addition actors should invest in modern processing technologies that require reliable electricity. This includes high-efficiency milling machines, automated packaging systems, and quality control equipment.

To maximize the benefits of rural electrification, maize processors should develop integrated value chains. This involves establishing strong linkages with maize farmers, ensuring a steady supply of raw materials, and creating value-added products such as maize flour, animal feed, and biofuels. Integrated value chains enhance overall efficiency and profitability.

Actors in the maize value chain can further benefit by incorporating renewable energy solutions such as solar power for their operations. This is particularly useful in areas where grid electricity is still unreliable or unavailable.

There is a need to establish microfinance institutions and credit programs tailored to the needs of small-scale farmers. These programs should offer low-interest loans, flexible repayment terms, and financial literacy training to help maize famers invest in value addition.

Develop and implement market information systems that provide real-time data on market prices, demand, and supply trends to solve the problem of limited access to markets that hinder farmers from selling their maize products at competitive prices.

Improve rural transport infrastructure, such as roads and bridges, to reduce transportation costs and facilitate easier access to markets.

Invest in modern electric-powered milling facilities. These facilities can produce higher-quality maize flour and other products more efficiently than traditional methods.

Encourage the acquisition of electric maize shellers, grinders, and dryers to improve processing efficiency and reduce post-harvest losses.

Establish cooperative-owned processing units powered by electricity. This collective approach can reduce costs and improve the bargaining power of smallholder farmers.

5.5 Areas for Further Research

There is need to have a further study in the development of agribusiness small and medium enterprises in wider rural area not just around rural town environment in Lyantonde district.

Another area of recommended study is the use of multiple stakeholders instead of using only the SMEs to make recommendations on the rural electrification program.

Further research should be done on contribution of rural electrification in improving people's livelihood in rural setting in Lyantonde district and other areas of Uganda.

REFERENCES

Abdullah, S and Markandyab, A. (2021). Rural Electrification Programmes in Kenya: Policy Conclusions from a Valuation Study. Energy for Sustainable Development, 16 (1), 103–110.

Ayaburi, J., Bazilian, M., Kincer, J., and Moss, T. (2020). Measuring Reasonably Reliable Access to Electricity Services. The Electricity Journal: Vol 33 Page 1-7. Accessed 23rd January 2021 at: Www.Els evier .Com/Locate/Tej

Ayanlade, L and Radeny, D, (2020). Electricity Model for China -Insights and Implications of Energy Policies. KTH Royal Institute of Technology Department of Energy Technology.

Babu, H.A, (2020). "Rural Electrification in India: Economic and Institutional Aspects of Renewables." EPRG Working Paper 07/30, Electricity Policy Research Group, University of Cambridge, Cambridge, UK.

Barnes, D. F. (2012). The Challenge of Rural Electrification: Strategies for Developing Countries. New York: Routledge.

Barnes, S and Samad, U.E, (2020). Energy Services for Sustainable Development in Rural Areas in Asia and the Pacific: Policy and Practice. New York: United Nations Publications.

Barnes, T and Samad, U, (2020). Electricity Access in Sub_Saharan Africa: Uptake, Reliability, and Complementary Factors for Economic Impact. International Bank for Reconstruction and Development/The World Bank: Washington, DC, USA.

Barron, M and Torero, M (2014). Household Electrification: Short_Term Effects with Long_Term Implications', mimeo, Department of Agricultural and Resource Economics, University of California, Berkeley.

Bentham J (2019). An introduction to the principles of morals and legislation. Oxford: Clarendon. Chakravorty, U, Kyle, E, and Majah-Leah, R. (2019). "Lighting Up the Last Mile: The Benefits and Costs of Extending Electricity to the Rural Poor." Discussion Paper 16-22, Resources for the Future, Washington, DC.

Crimmins JE and Long DG (2018) Encyclopedia of utilitarianism. London and New York: Continuum International Publishing Group.

Dinkelman, T. (2021). The effects of rural electrification on employment: New evidence from South Africa. American Economic Review, 101(7), 3078-3108.

Emerick, U and Ravago, I.U, (2018). Technology for Product Diversification and Value Added Items of Tea. Proceedings of 34th Tocklai Conference, 2017. Tea Research Association, Tocklai Experimental Station, Jorhat, Assam, 63-69.

ENERGIA (2017): Energy access and gender equality, what we know so far and knowledge gaps.

Gender + Energy Research Programme.

FAO (2017). Review of the Challenges and Opportunities for Rural Infrastructure and Agro-Industries Development in the Asia – Pacific Region; Reviewed by Alastair Hicks.

FAO (2022). Part III: The Agro-processing Industry and Economic Development.

Foley, H.E, (2020). Measuring Reasonably Reliable Access to Electricity Services in Sub-Saharan Africa. The Electricity Journal: Vol 33 Page 1-7.

Gerald M., Lewis M. And Yeukai M. (2018). The Significance of Rural Electrification in

Zimbabwe: A Case Study of Mudzi District, East Province, Zimbabwe. Journal of Public Policy: Vol. 3(2).

GoU, 2015. Second National Development Plan (NDPII) 2015/16-2019/20.

India, Bureau of Census, (2017). "Power Supply to Maize, Haryana Case Study, vol. 2." Report 22171-IN, Energy Sector Unit, South Asia Regional Office, Washington, DC.

Kachru, R. P. (2020). Agro-Processing Industries in India: Growth, Status and Prospects. Director General (Process Engineering), Indian Council of Agricultural Research, New Delhi.

Khandker, S., Barnes, D., and Samad, H. (2020). The Welfare Impacts of Rural Electrification in Bangladesh. The Energy Journal: Vol. 33, No. 1, pp. 187-206. Published By: International Association for Energy Economics.

Kihwele, U.A, (2018). Rural Development Strategies in Developing Countries. New Delhi: Sarup and Sons.

Kyriakarakos, A, Louw, A, Geyser, M and Troskie, G, (2020). The South African Agro-processing Sector and value addition improvement. Overview. Agro- processing Customised Sector Programme. Kwazulu Natal Trade and Investment Faire and Conference, Durban Exhibition Centre.

Layder D. (2018). Understanding Social Theory. New York: Sage.

Lozano, L., and Taboada, E. (2021). The Power of Electricity: How Effective Is It in Promoting Sustainable Development in Rural Off-Grid Islands in the Philippines? Journal of Energies: Vol 14, 2705. Accessed 25th March 2021.

Malone, M.M and College, A.E, (2020). Promoting Sustainable Development in Germany through

Rural Women's Participation in Decision-Making about Renewable Energy Law and Policy. Germany: Berlin Institute of Technology.

Mhazo, T, Anoop S, and Karsten N, (2018). The Status of the Agro Processing Industry in Zimbabwe with Particular Reference to Small and Medium Enterprises; University of Zimbabwe.

Mill JS (2016) Utilitarianism. Roger Crisp (ed.). Oxford: Oxford University Press.

Ministry of Finance, Planning and Economic Development, Approved Estimates of Revenue and Expenditure FYs 2013/14 – FY 2016/17.

Muchapondwa, E., Jeuland, M and Shimeles, A. (2021). Addressing the Challenges of Sustainable Electrification in Africa through Comprehensive Impact Evaluations. Nairobi: African Economic Research Consortium.

Peters, J., and Sievert, M. (2020). On-grid and Off-grid Rural Electrification–Impacts and Cost Considerations Revisited. Revue deconomie du developpement, 23(3), 85-104.

Quartey, F and Darkwa, U.E, (2019). Socio-Economic Impacts of Rural Electrification in Germany – An Ex-ante Assessment of GTZ Activities. RWI Materialien 60, Essen, Germany.

Ray, S. (2021). Rural Electrification Expansion and its Role in Shaping Maize and Food Security in India. Stanford University.

REA, Rural Electrification Strategy and Plan 2, 2013-2022.

Rural Electrification Authority. (2018). Rural Electrification Authority Set to Electrify all Secondary Schools in the Country by 31 January 2018. Retrieved February 26, 2018.

Sachs, J. (2018). Investing in Development:A Practical Plan to Achieve the Millennium Development Goals. Overview. New York: Earthscan.

Sumberg, E.T, Hartvigsson, E., Pachauri, S., Colombo, E. (2019). Electricity access and rural development: Review of complex socio_economic dynamics and casual diagrams for more appropriate energy modelling. Energy Sustainability and Development: Vol 43, page 203– 223.

Sustainable Energy for All (SE4ALL) initiative report (2017). Energy Access and Use Situation Survey II in Tanzania Mainland 2016/2017. Rural Energy Agency.

Tonini, F., Sanvito, F., Colombelli, F., Colombo, E. (2022). Improving Sustainable Access to Electricity in Rural Tanzania: A System Dynamics Approach to the Matembwe Village. Journal of energies: Vol (15), 1902.

Torero, M, (2020). The Impact of Rural Electrification: Challenges and Ways Forward. Revue D'économie du Développement, 3(3), 55-83. https://d oi.org/ 10.3917/edd.293.0055.

World Bank, (2020). Tracking SDG 7: The Energy Progress Report. World Bank, Washington DC

APPENDICES

Appendix 1: Study Work plan

S/N	Task	Time frame (month/year)	Responsible person
1	Research Concept and presentation.	May, 2022	Student
2	Proposal write up and presentation	June-September 2022	Student
3	Submission of the proposal to REC	September, 2023	Student
4	Review of the proposal by REC	September, 2023	
5	Hiring of research assistants	October, 2023	
6	Field data collection	October, 2023	Student, research assistants
7	Data analysis and report writing	November, 2023	Student
8	Presentation of first draft report	November, 2023	Student
9	Handing in of the Final report	November, 2023	Student
11	Publishing of outcomes	December, 2023	Student

Appendix 11: Research budget

Items to use during research process	Quantity	Unit cost/item (shs)	Total Amount (UGX)
Typing, Printing and photocopying	…	240,000	240,000
Research assistants for data collection	4	100,000	400,000
Transport to the field (too and flow)	Three times	40,000	120,000
Binding	3 copies	20,000	60,000
Feeding research assistants	4	20,000	80,000
Accommodation for research assistants	4	25000	100,000
Compensation for participants	206	5000	1030,000
Contingency	…..	…	400,000
Total			**2,430,000**

Appendix 111: Questionnaire for respondents

Dear sir/madam

I am **Ssegilinya Sulaiman,** a student of Bishop Stuart University carrying out a study titled "**Rural Electrification and Maize Value Addition in Mpumudde Sub-County, Lyantonde district**". This study is part of the requirements for my course and is for academic purposes only, the answers that you provide will be treated with utmost confidentiality, please co-operate by providing the correct information only

SECTION A: Characteristics of respondent

Instructions

Tick the appropriate answer in the box and fill in the blank space where applicable

Telephone number (Optional)…….……

Name of the respondent (optional)**.....**

Parish/ward..... Village……..……

1. Gender

a. Female ( ) b. Male ( )

2. **Age in years…….**

3. What is the highest level of education in years……

4. Marital status

a. Single ( ) b. Married ( ) c. Divorces/separated ( ) d. Widow ( )

6. Do you own the land you cultivate on maize that add value?

a. Yes ( ) b. No ( )

7. What is your total farm size under maize production? …….

8. How did you acquire that land?

a. Inheritance ( ) b. Purchase ( ) c. Communal ( ) d. Others……

9. What products do you get out of maize after value addition?

a. Maize flour b. Maize bran c. Corn bread

d. Corn syrup e. any other specify…….

Section B: Factors limiting farmers from participating in maize value addition other than electrification in Mpumudde Sub-County, Lyantonde district

10. Could there be factors limiting farmers from participating in maize value addition other than electrification?

a. Yes ( ) b. No ( )

11. If yes, mention the factors?

a. Level of education ( ) b. Skills and experience ( )

c. Credit services/financing ( ) d. Materials and equipments to use ( )

e. Storage facilities ( ) f. limited training on value addition ( )

g. any other specify……..

……

12. If no, why?

……..

……..

13. How has government helped you in trying to resolve this?

……

……

……

Section C: The contribution of rural electrification towards adding value to maize in Mpumudde sub-county

14. Could there be some other roles of rural electrification other than using it during value addition?

a. Yes ( ) b. No ( )

15. If yes, mention them?

a. Used for lighting in homes ( ) b. Used in salons during shaving ( )

c. Used for cooking ( ) d. Refrigeration ( )

e. Any other (specify)…….

……

16. If no, why?.....

……

17. How has rural electrification contributed towards adding value to maize?

a. It increases the use of electric appliances

b. Increased employment especially in marketing

c. Improvements and growth of various milling centres

d. Enhances sustainability of quality products

e. Any other (specify)…….

Ekyipapura kyebibuzo byomuhurikyiza

Ahari omwani/omukyara

Nibanyeta **SSegilinya Sulaiman**, omwegyi witendekyero rya Bishop Stuart University ninkyondoza ahamashanyarazi gwo'mukyaro nana okwongyera omutindo omubikyori omu gomborora eya Mpumudde, Lyantonde disiturikiti

. Okukyondoza oku nikyimwe ahabirikwetagyisa kufuna obwegyese bwangye, kandi ebimuragarukemu ninza kubibika kebihama, reka tukwatanise obwe orikugarukamu ebihikyire byonka.

Ekyicweka kyokubanza (A): Ebirikukukwataho Ebyokugyenderwaho

Kyebera omukabokusi ekyihikyire oyizuze omumyanya ekuhirwe ehikyirayetagyise

Enamba yesimu (kworakunde)…….……

Eizina ryawe (kworakunde)…….……

Omuruka..... **Ekyaro**……..……

1. Obuhangwa bwawe

a. Omukazi/omwishikyi ( ) b. Omushaija/omwojo ( )

Emyaka…….

Gamba obwegyese bwawe omumyaka?.....

4. Obyobushwere

a. Tinkashwerwaga ( ) b. Nshwirwe/Nshwire ( ) c. Nkatana nomukazi/omushaija

d. Nkaferwa omushaija/omukazi ( )

5. Eitaka eryokuhingamo ebikyori neryawe?

a. Yego ( ) b. Ingaha ( )

6. Waba noyikyiriza, okaritunga ota?

a. Neryensikyirano ( ) b. Nkarigura ( ) c.

Kalandalanda ( ) d. Ebindi bigambe

nabyo……

7. Noyihamukyi omubikyori wamara kubyongyeramu omutindo?

a. Esaano yobukyori ( ) b. Emere yamatungo ( ) c. Obugati ( )
d. Omubazi gwamaizi ( ) e. Ebindi

bigambe……

Ekyicweka kyakabiri (A): Ebikuremesa abahingyi kwejumbira omukuteka omutindo omubikyori omu gomborora ya Mpumudde, Lyantonde disiturikiti 8. Hariho ebikukuremesa kwejumbira omukuteka omutindo omubikyori?

a. Yego ( ) b. Ingaha ( )

9. Waaba nookyikyiriza, hereza emiringo egyo.

a) Obwegyese ( ) b) Obukugu omukyintu ( )

c) Okwehora ( ) d) Ebintu ebyokukozesa ( )

Ahakubiika f) Okushomesibwa kukye ahakwongyera omutindo omubikyori ( )

Ebindi bitekeho……

……

Waba otakwikyiriza, gamba eshonga…….

……..

Gavumenti etaireho maani ki omu kugamba aha miringo egyi? ……

……..

……

Ekyicweka kyakashatu (C): oku amashanyarazi gwo'mukyaro gayambire omukwongyera omutindo gwe bikyori omu gomborora ya Mpumudde, Lyantonde disiturikiti

12. Hariho endijo emigasho eyamashanyarazi gwo'mukyaro oyihireho okwongyera ahamutindo gwebikyori?

a. Yego ( ) b. Ingaha ( )

13. Waaba nookyikyiriza, gyigambe……..

okugamurikyisa omumaka ( )

kugakwozesa omu saruni bakutega ( )

Kugatekyesa ( )

Okufukyisa ebyokunywa ( )

Ebindi biteho…….

…….

Waba otakwikyirizana nekya namba eikumi nishatu, gamba eshonga?

…….

…….

Amashanyarazi gwo’mukyaro gayambirekyi omukuteka omutindo ahabikyori

Nigongyera amaani ebindi ebikwozebwa kwongyera omutindo aha bikyori ( )

Gwongyeire obwingyi bwemirimo kurabira omukuguza ebikuruga omubikyori ( )

gwongyeire ahakukurakurana kwemyanya eyibakuseramu ebikyori ( )

Gwongire akutaburabura kwebitirwemu omutindo ( )

Ebindi (biteho)…….

17. Hariho ekyindi ekyorikwenda kugamba ahakukyondoza oku?

……
……..

Orupapura rwebibuzo byomuwurikiriza

Eri Omwami/Omukyara

Bampita **SSegilinya Sulaiman**, omuyizi wetendekero rya Bishop Stuart University nonyerenza kugeri yamasarazi gomukyaro ngabawegakozesebwa mukogera mutindo mu kasori nebibirara bye gakora mu Gomborora ye Mpumudde mu Lyantonde disiturikiti..

Ekintund ekisonka (A): Ebikukwatako Ebigenderwako

Kebera mukabokusi ekitufu ojuze mubifo wekisanide

Enamba yesimu (bwonaba oyagade)…….……

Erinya ryo (bwoba oyagande)…….……

Omuruka..... **Ekyaro**……..……

1. Obuwangwa bwo

a. Omukyara/omuwara ( ) b. Omusaja/omurenzi ( )

Emyaka…….

Yogera ebyegyigiriza byo?.....

4. Obyobufumbo

a. Sifubirwako ( ) b. Ndimufumbo ( ) c. Ntwayawukana

d. Naferwa omusaja/omukazi ( )

5. Etaka ryokurimamu kasori riryo?

a. Ye ( ) b. Nenda ( )

6. Bwoba okiriza, warifuna otya?

a. Ryasikirano ( ) b. Narigura ( ) c. Ebirara byogere

nabyo……

7. Ogyamuki mukasori bwomara kwogeramu omutindo?

a. Esaano yakasori ( ) b. Emere yebisoro ( ) c. Obugati ( )

d. Edegara ryamazi ( ) e. Ebirara byogere

……

Ekitundu kyakubiri (A): Ebiremesa abarimi kujumbira mukuteka omutindo mukasori mu Gomborora ye Mpumudde, Lyantonde disiturikiti

8. Wariwo ebiremesa kujumbira mukusawo omutindo mukasori?

a. Ye ( ) b. Nenda ( )

9. Bwoba okiriza, wereza egeri eyo.

a) Ebyegyigiriza ( ) b) Obukungu mwekyo ( )

c) Okwewora ( ) d) Ebintu ebikozesebwa ( )

Kukutereka f) Okusomesebwa ku kongera omutindo mukasori ( )

Ebirara bise wano……

……

Bwoba tokiriza yogera esonga…….

……..

Gavumenti yasawo maanyi ki mu kwogera ku ngeri eno? ……

……..

……

Ekitundu kyakusatu (C): ku amasanyarazi gomukyaro gayambye mukongera omutindo gwa kasori mu Gomborora ye Mpumudde, Lyantonde disiturikiti

12. Wriwo emirara emigaso eyamasanyarazi gomukyaro nga ojenko okwongera kumutindo gwakasori?

a. Ye ( ) b. Nenda ( )

13. Boba ogikirinza, gyogere……..

Okuwa ekitagara mumaka ( )

kugakozesa omu saruni nga batega eviri ( )

Kufumbisa ( )

Okunyogeza ebyokunwa ( )

Ebirara bisewano…….

…….

Byoba otakiriziganya nekya namba kumi nasatu,yogera esonga?

…….

…….

Amasanyarazi gwo'mukyaro gayambyeki mukuteka omutindo kukasori?

Gongora amaanyi mubirara ebikozesebwa kwongera omutindo kukasori ( )

Gwayogendeko obungi bwemirimo kurabira omukutunda ebiva mukasori ( )

gongende kukurakurana kubifo byebaseramu kasori ( )

gongende okutaburabura kwebirimu omutindo ( )

Ebirara (bisewano)…….

17. Wariwo ekirara kyoyagara kwogera kukunonyereza kwekyo?

……
……..