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The Impact of Cassava Value Chain in Rural Communities. A Case Study of Mayukwa-Yukwa Kaoma-Western Province-Zambia

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Abstract
Cassava (Manihot esculenta crantz) also known as tapioca is the second most consumed staple food in Zambia after Maize. It is a widely grown root that is cultivated and consumed in different forms varying from eating the cassava leaves as relish, making cassava meal flour from the dry tubers, eating fresh tubers as well as baking. Furthermore, it is an important source of energy. While Cassava Value Chain is a process of production and processing of the cassava into various by-products. This study sought to establish the impact of cassava value chain in rural communities of Zambia. A case study of Mayukwayukwa Western Province Kaoma District Zambia that contribute immensely to the economic, social and environmental factors of the Zambian community, through this the study further addressed itself to four major objectives. The findings included both male and female participation cassava farming for the purpose of gender inclusion. However, Limited Infrastructure in the Refugee camps has resulted in challenges that affect productivity of the cassava production. These infrastructures include transportation networks, market facilities, and bulking storage capacities, which are essential for supporting agricultural value chains like cassava production and distribution. The study recommended there is need for designing a longitudinal study to track all the changes and trends in the cassava value chain over time, capturing seasonal variations, market fluctuations, and the impacts of interventions or external factors on production, processing, and marketing activities.

Keywords: Cassava Value Chain, Limited Infrastructure, Bulking Storage Capacities, Gender Inclusion.

1.0 Introduction

Introduction and Background of the Study

Cassava is a staple crop that most African countries cultivate as it contributes greatly to the food security and economic development. Cassava Value Chain has various stages from cultivation to processing of the end products. The value chain plays an important role that positively impacts the livelihoods of the people as well as promoting socio-economic activities. The research focuses on assessing the impact of cassava value chain in Mayukwa-yukwa Kaoma Western Province of Zambia. Carrying out the research in this rural area will show the challenges as well as the opportunities that exist in Mayukwayukwa through various agricultural practices.

The impact of the cassava value chain on rural communities globally is significant. Initiatives such as the CAVA2 project have successfully developed cassava value chains in several African countries, enabling smallholder farmers to access new markets and leading to increases in farm and non-farm assets for smallholders, additionally, Karlstrom *et al* (2016) Indicated that 'the sustainable development of the cassava value chain through the promotion of locally sourced products has the potential to generate income for farmers and create local businesses, contributing to the economic development of rural communities. Furthermore, studies have shown that the adoption of improved cassava varieties and the intensification of the cassava value chain have led to increased income, poverty reduction, and the creation of job opportunities, indicating the positive impact of the cassava value chain on rural communities.

Hence, rural households tend to shift their focus to more profitable crops. Among food staples, cassava and sweet potatoes have proven most popular'. In the early 1990's, Zambia's Root and Tuber Improvement Programme (RTIP) released the first of two waves of new cassava varieties.

Disease resistant and early maturing, the new varieties out yield conventional cassava varieties by roughly three factor such as the combination of significant productivity gains in cassava, combined with a significant increase in the farmers' cost of maize production, this propelled growth in cassava production at roughly 3.4% per year for the past decade and a half'. Chancharoenchai, and Saraithong, (2022) [4] discovered that 'Thailand, as an agricultural- abundant country, can practically encourage the use of local inputs in the manufacturing of processed food products.

1.1 Problem Statement

The problem addressed in the study is to analyze the impact of cassava value chain on rural in Zambia with its main focus being a case study of Mayukwa-Yukwa, Western Province. The research will examine the value chain which includes the production, processing, marketing and consumption as these contribute highly to the livelihoods, increase of food security and promotion of environmental sustainability. Additionally, the research will focus on the research gaps, challenges and the opportunities that are within the cassava value chain. Furthermore, the impact of Cassava production on food security and its contribution to the Zambian economy requires more in-depth analysis. As a result of the need for more extensive and integrated research to understand and improve the cassava value chain in Zambia, the researcher seeks to examine the impact of cassava value chain in rural communities a case study of Mayukwa-Yukwa Kaoma-Western Province-Zambia and provide recommendations and intervention strategies.

1.2 General Objective

The main objective of this study is to assess the economic benefits of the cassava value chain on rural communities.

1.3 Specific Objectives

The Study was guided by the Following Objectives

1. To evaluate the social impact of the cassava value chain on rural livelihoods.
2. To investigate the environmental sustainability of the cassava value chain in rural areas.
3. To identify challenges and opportunities for small-scale farmers in the cassava value chain.
4. To analyze the role of government policies and support in promoting the cassava value chain in rural communities.

1.4 Research Questions

1. What are the stages involved in Cassava Value Chain within the selected rural community of Mayukwa-Yukwa?
2. How does the cassava value chain contribute to the economic development of rural communities in Kaoma Mayukwa-yukwa?
3. What are the social and environmental impacts of cassava value chain on rural communities of Mayukwa-yukwa in Kaoma Western Province?
4. How can the agriculture extension system enhance its positive impact on rural communities in Mayukwa-yukwa?
5. How does lack of infrastructure such as transportation, technology and storage facilities affect efficiency and effectiveness of cassava value chain in Mayukwa-yukwa
6. How do government policies and regulations impact the development of the cassava value chain?

2.0 Literature Review

2.1 Agriculture Value Chain

The term Agriculture Value Chains (AVC) refers to the set of interrelated activities involved in delivering an agricultural product from its production to the final consumer in a manner that support investments, growth, and competitiveness of the value chain actors Chen, K.Z., *et al* 2015 [5], Mofolo, L. (2018) [11], Oberholster, C., 2015 [12]. There is sufficient empirical and theoretical evidence regarding organisation, models, and relevance of AVC integration in the agriculture sector in Uganda. However, the primary focus of the majority of the AVC studies conducted in Uganda has tended to focus on other constructs of AVC other than access to finance, which none the less features prominently as an outcome of the studies. That notwithstanding, alongside markets access, finance is the most important motive and outcome of AVC integration and requires to be treated as an objective rather than incidental. This view is backed by evidence from a number of studies that examined constructs related to access to agricultural credit/finance, which provides general consensus on the fact that AVC organisation is a precursor for access to agricultural credit. Florence and Nathan (2020), Lukwiya, B.O. (2016) [10], Sebaggala, R., 2019 [14].

2.2 Analysis of the Cassava Production Function in Africa

Crop production is contingent on the availability of arable land and influenced by yields, macroeconomic uncertainties, and consumption habits; it also significantly impacts agricultural commodities' pricing. The significance of agricultural production is proportional to harvested areas, returns per hectare (yields), and output volumes. OECD (2023). The quantity produced of any crop depends on the area harvested and yield per hectare; the two factors are the drivers of any movement in agricultural output OECD (2023). In most instances, yield numbers are generated by dividing the production data by the harvested area data.

2.3 Cassava Yields in Africa

Yield levels have improved in other continents over the years compared to the situation in Africa presently. For example, in 1984, the yield in Asia fluctuated around 8 tons/ha. It was just above 16 tons/ha in India, and in Africa and South America, it was between 5 and 9 tons/ha and 10–15 tons/ha Balagopalan, *et al* (2018) [3]. However, Africa's 2020 yield of 8.6 tons/ha is below the world's average of 11.3 tons/ha. Also, it is below the average yield recorded in other top cassava-producing continents, like Asia and the Americas FAO (2023).

The average yield per hectare in countries on the continent is divergent. While some countries have been able to drive up yields per hectare, others have not significantly improved. Zambia, with an average 28 tons'/ha yield in 2020, is the African country with the highest cassava per hectare yield. From 1961 to 2013, the country's top yield was 6.32 tons/ha, achieved in 1965. However, it was able to drive up yields per hectare from 9.7 tons/ha in 2014 to a peak of 38.4 tons/ha in 2018 FAO (2023).

2.4 Cassava Value Chain and Rural Livelihoods

A study conducted in Malawi by Yohane (2019) [15], titled "A value chain analysis of cassava in Malawi" Six elements of the value chain were examined these included: "the agents, roles, and links; the inputs, outputs, and activities that produce transformation; the value addition and allocation; the final product or a group of final products; the power relations and governance mechanisms; and the issues and opportunities that

are shared by all agents. Five actors' farmers/producers, middlemen or wholesalers, retailers, processors, and end consumers were identified in the study as having four significant links each. The cassava value chain was analyzed", the results revealed that 'cassava production has a great deal of potential to enhance participant wellbeing. Cassava production provided farmers with a net profit margin of 70% and provided 39% of their income. Post-harvest and by-product processing problems, as well as general production and utilization challenges, continue to exist'. Cassava as a staple crop that is wildly consumed by many countries is a significant crop that promotes nutrition values and improves the livelihoods the people thus by ensuring that the locals are able to sustain their lives.

2.5 Cassava Value Chain and Gender

A study by Azeez (2021) [1], which sought to "assess women involvement in cassava value chain among cassava processors and marketers in Afijio Local Government of Oyo States" Two – stage sampling procedure was used to select the respondents for the study. Simple descriptive statistics such as mean, frequency counts and percentages were used to analyze the socio-economic characteristics of the respondents while Likert scale descriptive analysis was used to determine the level of participation of women involving in cassava value chain and ordinary least squares multiple regression analysis was adopted to determine the factors influencing the involvement of women in cassava value chain.

'The study concluded that women in the study area usually involve in promotion, publicity, fermenting the cassava flour, price reduction and packaging. Also, educational statuses, membership of cooperative association and farm credit access affect participation of women in cassava value chain among cassava processors and marketers in Oyo State. Based on the findings of the study, it was recommended that Government to intervene in the business by making the processing and marketing of cassava friendly through an improved technology as well as provision of easily accessed credit facilities.

2.6 Research Gap

Existing studies recognize income inequality in the cassava value chains in sub-Saharan Africa. However, there are few rigorous quantitative studies that address this pressing issue in Zambia. This paper fills this knowledge gap and suggests ways to minimize income inequality in the agri-food value chain, using the example of the cassava value chain in Zambia.

3.0 Research Methodology

This chapter presents the methodologies that will be applied to meet the research questions and objectives of the study. The research aimed at comprehensively analyzing the impact of cassava value chain in rural communities of Zambia. A case study of Mayukwayukwa Western Province, Kaoma District. The methodology carefully outlines the approach, design, and techniques that will be employed to gather, analyse, and interpret data. This section provides a comprehensive overview of the research methodology, highlighting the research design, data collection methods, and analytical techniques that will be utilised.

3.1 Research Design

Research design is a framework of various research methods and techniques that are chosen by the researcher. The study will use a mixed study design. These are both descriptive and exploration designs that shall be used for this study to collect sufficient data which is required to ensure reliable conclusions are drawn. 'In the quantitative approach a descriptive survey design will be used the surveys will describe systematically and accurately the facts and characteristics of the sample and thematic area of interest. Information will be collected through one-to-one administered questionnaires. Exploration will allow for us**.**

3.2 Population of the Study

According to Bhandari (2023), 'research population refers to the entire group of individuals or objects that have certain characteristics or traits that are relevant to the research question. It is the population that the researcher wants to generalize the findings to. Bhandari, (2023), adds that 'a research population is also known as a target population or a theoretical population. It is different from a sample, which is a subset of the population that is actually studied by the researcher. A sample should be representative of the population, meaning that it should reflect the diversity and variation of the population as much as possible'. A total of 59 respondents took part in the data collection. However, these do not constitute the whole population of Mayukwayukwa.

3.3 Tools for Data Collection

For effective data collection the survey questionnaires and interview guides will be designed to addresses each study objective. This will be made possible by identifying the appropriate respondents and Key Informants with the support from our gate keepers and via probing relevant thematic areas in line with the objectives.

Checklist shall be used to collect data from the observations, structured questionnaire shall be used to collect quantitative data from the selected rural smallholder farmers, FGDs guide shall be used to collect qualitative data for enhanced triangulation of the findings. Interview guide shall also be used during key informant's interviews.

3.4 Tools for Data Analysis

This study will consist of both qualitative and quantitative research. The tools that will be used for data analysis include Statistical Software which uses statistical package for the social sciences (SPSS). R is for quantitative data analysis, the data that will be collected will be coded and interpreted into tables. While the Data that will be collected in qualitative method will be analyzed theoretically under themes and sub themes inform of frequencies and percentages.

3.5 Summary

The research provides a viable and comprehensive understanding of the effects of cassava value chain in rural communities. A case study of Mayukwa-yukwa Kaoma, Western Province Zambia. In order to achieve the intended results, the study utilized both qualitative and quantitative procedures of data collection. The research used both methods of data collection to ensure that an in depth understanding of the existing situations was accessed through acquiring all relevant information for the study. Focus group discussions were applied in order to allow the researcher acquire the intended results as language barrier played a role in gaining an insight on the impact of cassava value chain and other crops. A total of 59 respondents took part in providing the intended results for the researcher. The respondents comprised of both men and women.

4.0 Data Analysis and Discussion

Introduction

Data analysis and interpretation play pivotal roles in understanding and addressing complex socioeconomic challenges, particularly in the context of agricultural value chains in rural communities. In Zambia, where agriculture serves as the backbone of the economy and sustains livelihoods, the cassava value chain holds significant importance, especially in rural areas like Mayukwa-yukwa, Kaoma District, and Western Province. This region is characterized by its reliance on cassava cultivation, processing, and marketing as a source of income and food security for its people.

4.1 Evaluate the Social Impact of the Cassava Value Chain on Rural Livelihoods

The research has been outlined to present the social impact of the cassava value chain on rural livelihood. Many findings from the respondents were presented mostly looking at the impact that cassava value chain has on the rural livelihood. Below are the findings presented in forms of themes.

Income Generation and Poverty Reduction

In this case, most of the respondents indicated that Cassava farming significantly contributes to income generation for rural households. By participating in various stages of the cassava value chain from cultivation to processing and marketing, families can diversify their income sources. This additional income helps reduce poverty levels and improve the overall economic stability of rural communities. The cassava value chain significantly bolsters income generation in rural communities, creating a ripple effect that enhances overall economic stability. Farmers engage in cassava cultivation due to its relatively low input costs and high resilience to adverse weather conditions, ensuring a steady and reliable source of income. The income derived from cassava farming allows rural households to invest in essential services such as education, healthcare, and housing improvements, thereby elevating their quality of life.

It is clearly evidenced by the majority 70% response who agreed. 15% of the respondents disagreed while 05% of the respondents were unsure. The cassava value chain extends to processing and marketing, which opens additional income streams for rural residents. Small-scale processing enterprises transform raw cassava into various products like flour, starch, and dry chips, catering to both local and urban markets. These value-added activities not only increase the profitability of cassava but also create numerous employment opportunities, particularly for women and youth. By engaging in these processes, rural inhabitants can enhance their entrepreneurial skills and gain financial independence, further reinforcing the economic fabric of their communities.

Conclusion

Based on the findings of the researcher, below are the conclusions drawn.

- Farmers that have engaged in the cassava value chain have positively contributed to the growth of income generation in the agricultural sector thereby promoting food security at household levels and the community at large.
- Women play a significant role in cassava value chain and through this, there is focus in enhancing and improving the production of cassava and marketing strategies thus ensuring gender inclusion takes place. Therefore, more women and youth empowerment enhances the value chain.
- Through the value chain, there is an improved nutritional value and supports the needs of the locals.
- The cassava value chain also increases employments opportunities from various stages during the cultivation to processing and sale.
- Cassava as a climate resilient crop has great potential to reduce poverty levels and with stand harsh weather conditions in cases of drought

Recommendations

In view of what has been discussed the following are the recommendations.

- Improvement of Infrastructure, this includes investing in the construction of good road networks and maintaining them for proper facilitations of goods and services.
- There is need to supply more improved varieties of the cassava stems that have a high yield and early maturity rate.
- There should be increased capacity building trainings to the farmers as most of them have little knowledge about the new and improved technologies.
- Access to microfinance such as grants that will aid the farmers to purchase farming inputs and acquiring new equipment's.
- Engaging Stakeholders as it Fosters collaboration and partnership to ensure their active involvement and support throughout the research and development of the agriculture sector.
- Increasing Extension services that will improve the agricultural knowledge to the small scale farmers and provide new farming technologies.

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