

**ASSESSING THE ECONOMIC IMPACT OF AGRICULTURAL  
COOPERATIVES ON SMALLHOLDER FARMERS: A CASE OF LIVUNZU  
COOPERATIVE RICE FARMERS IN CHIKWAWA DISTRICT, MALAWI**

**THESIS**

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**MASTER OF AGRIBUSINESS STUDY PROGRAM  
FACULTY OF ANIMAL AND AGRICULTURAL SCIENCES  
UNIVERSITAS DIPONEGORO**

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As One of the Requirements for Obtaining an Agricultural Master's Degree  
In Master Program in Agribusiness, Faculty of Animal and Agricultural Sciences  
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FACULTY OF ANIMAL AND AGRICULTURAL SCIENCES  
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2023**

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## STATEMENT

I declare truthfully that the thesis report I compiled as a requirement for obtaining a Master's Degree from the Master Program in Agribusiness, is entirely my own work and has never been submitted as a fulfilment of the requirements for obtaining a Master's Degree from Diponegoro University or other universities.

As for certain parts of the thesis writing that I quoted from the work of others, the source has been clearly written in accordance with the norms, rules and ethics of scientific writing.

Hereby declare as follows:

1. Titled Thesis: **Assessing the Economic Impact of Agricultural Cooperatives on Smallholder Farmers: A case of Livunzu Rice Farmers in Chikwawa District , Malawi.**
2. I also admit that this thesis is completed because of the full guidance and support of my supervisors, **Agus Setiadi, Ph.D. and Joko Mariyono, Ph.D.**
3. If in the future it is found that all or part of this thesis is not my own work or there is plagiarism, I am willing to accept the revocation of my academic degree and other sanctions in accordance with the applicable laws and regulations.

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## PREFACE

This research report is submitted as one of the requirements for obtaining an agricultural master's degree in Master Program in Agribusiness at Diponegoro University. Research report entitled “**Assessing Economic Impact of Agriculture Cooperatives on Smallholder Farmers**” was framed under the supervision of Agus Setiadi, Ph.D. as the main guide, Joko Mariyono, Ph.D. as member of advisor.

Cooperatives have proved to be an effective way of improving farm productivity for smallholder farmers which positively affect the farming household income. However, it is on record that participation of farmers in cooperatives is very low despite the cooperative itself offering various benefits to the farmers. Therefore, this research brings more light on the economic benefits of participating in a cooperative to encourage farmers participate in cooperative and inform agriculture policy makers on the role of cooperatives on rural agriculture development.

I thank God for his grace to be awarded a scholarship by Universitas Depongoro as well as his guidance in my studies.

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Last but not least, my family and friends for the unwavering support, my Wife Devota Theresa, daughter Havilah Zinatha for the motivation to go an extra mile.

## SUMMARY

Mr. JONES KINGSDALE CHITHEKA under the supervision of AGUS SETIADI and JOKO MARYONO has worked on the thesis entitled **“Assessing the Economic Impact of Agricultural Cooperatives on Smallholder Farmers.”**

The study was conducted in Chikwawa district targeting Livunzu Cooperative rice farmers and non-member farmers within the same area. The main objective of the study is to evaluate the economic impact of agricultural cooperatives on performance of the smallholder rice farmers. The specific objectives were to analyze the effect of cooperatives on smallholder farmer’s income, assess the effect of cooperatives on profitability of smallholder rice farmers and assessment of the effect of cooperatives on commercialization drive among smallholder farmers. A total of 293 rice farming households were surveyed.

The study employed the use of descriptive statistics to describe the characteristics of the respondents and econometric models to quantify empirical results. A sample was determined by a sampling formula by Israel (2013) at a precision level of 0.05 comprising both cooperative and non-cooperative member farmers. A semi-structured questionnaire was used to collect data in a household survey. The survey was also complemented with the Key informant interviews to validate data of importance. The study employed the use of SPSS package version 28, and Stata 14 in data analysis.

The study PSM analysis showed that farmers in the cooperative had more income (total revenue from rice sells), and that cooperative membership actually improved the likelihood of rice farmers getting more for their produce. These results suggest that policies aimed at improving farmer’s participation in cooperatives are required, as it was established that most of these farmers are unable to get better prices for their rice. Additionally, being in a cooperative has been attributed to improve and increase the farmers’ benefits and

opportunities for rice commercialization. The results suggest that policies aimed at improving farmer's access to market power, and production modalities are important intervention avenues that can impact rice commercialization in the area.

## TABLE OF CONTENTS

|   |           |
|---|-----------|
| <b>LIST OF FIGURES .....</b>  | <b>ix</b> |
| <b>LIST OF TABLES .....</b>   | <b>x</b>  |
| <b>LIST OF APPENDICES .....</b>   | <b>xi</b> |
| <b>CHAPTER 1.....</b>   | <b>1</b>  |
| <b>INTRODUCTION.....</b>  | <b>1</b>  |
| <b>1.1 Background of the study.....</b>   | <b>1</b>  |
| <b>1.2 Problem Statement and Justification .....</b>                              | <b>3</b>  |
| <b>1.3 Study Objectives.....</b>  | <b>4</b>  |
| <b>1.2.1 Specific Objectives .....</b>  | <b>4</b>  |
| <b>1.2.2 Research Questions.....</b>  | <b>5</b>  |
| <b>1.3 Hypothesis.....</b>  | <b>5</b>  |
| <b>1.4 Ethical Consideration .....</b>  | <b>5</b>  |
| <b>CHAPTER II.....</b>  | <b>6</b>  |
| <b>2.1 LITERATURE REVIEW .....</b>  | <b>6</b>  |
| <b>2.1.1 Smallholder farmers’ production and marketing of farm produce. ....</b>  | <b>6</b>  |
| <b>2.1.2 Agricultural Cooperatives and Smallholder Farmer Participation .....</b> | <b>7</b>  |
| <b>2.1.3 Collective Action &amp; Profitability .....</b>                          | <b>8</b>  |
| <b>2.1.4 Rice Farming in Malawi .....</b>   | <b>9</b>  |
| <b>2.1.4.1 Rice Marketing in Chikwawa District.....</b>                           | <b>10</b> |
| <b>CHAPTER III.....</b>   | <b>12</b> |
| <b>METHODOLOGY .....</b>  | <b>12</b> |
| <b>3.1 Theoretical Framework.....</b>   | <b>12</b> |
| <b>3.1.2 Study Area .....</b>   | <b>14</b> |
| <b>3.1.3 Sampling .....</b>   | <b>14</b> |
| <b>3.1.4 Sample Size .....</b>  | <b>14</b> |
| <b>3.1.5 Data analysis.....</b>   | <b>15</b> |
| <b>3.1.6 Data Collection Methods .....</b>  | <b>19</b> |
| <b>3.1.6.1 Household Survey .....</b>   | <b>19</b> |
| <b>3.1.6.2 Key Informant Interviews.....</b>                                      | <b>20</b> |
| <b>CHAPTER IV.....</b>  | <b>20</b> |
| <b>RESULTS AND DISCUSSION .....</b>   | <b>20</b> |
| <b>4.1 Socioeconomic characteristics of surveyed respondents .....</b>            | <b>20</b> |
| <b>4.1.1 Age of respondents .....</b>   | <b>21</b> |

|   |    |
|---|----|
| 4.1.2 Gender of the respondents .....   | 22 |
| 4.1.3 Marital status of the respondents .....   | 23 |
| 4.1.4 Household size of the respondents.....  | 23 |
| 4.1.5 Educational level of the respondents .....  | 24 |
| 4.1.6 Land holding size of the respondents .....  | 24 |
| 4.1.7 Membership to Farmer groups.....  | 25 |
| 4.1.8 Main occupation/ income source .....  | 26 |
| 4.2 Influence on incomes.....   | 27 |
| 4.3 Impact on Profitability .....   | 28 |
| 4.4 Characterization of commercialization among rice farmers .....                      | 31 |
| 4.4.1 Input market participation .....  | 31 |
| 4.4.2 Output Market Participation .....   | 34 |
| 4.4.3 Market orientation among farmers.....   | 38 |
| CHAPTER V .....   | 40 |
| CONCLUSION AND RECOMMENDATIONS .....  | 40 |
| 5.1 CONCLUSION .....  | 40 |
| 5.1.1 Socio-Economic impact of cooperatives on rice farmers.....                        | 40 |
| 5.2 RECOMMENDATIONS.....  | 41 |
| REFERENCES .....  | 41 |
| APPENDICES .....  | 49 |
| Appendix1: Survey Questionnaire .....   | 49 |
| Appendix2: Socio-Demographic characteristics of respondents .....                       | 57 |
| Appendix3: Respondent’s rice production characteristics.....                            | 62 |
| Appendix 4: Propensity Score Matching Total Effects and results on Gross Revenues ..... | 68 |
| Appendix 5: Regression analysis results on Profitability influence.....                 | 68 |
| Appendix 6: Agricultural cooperatives operating in Chikwawa District in 2023 .....      | 69 |
| Appendix 7: Organogram of Livunzu Cooperative .....                                     | 70 |
| Appendix 8: Chikwawa District Map .....   | 70 |
| Appendix 9: Photos of Field Research.....   | 71 |
| BIBIOGRAPHY OF THE AUTHOR .....   | 72 |

**LIST OF FIGURES**

Figure 1: Comparison between Cooperative and non-cooperative member.....13

Figure 2: Main occupation and source of income for respondent households .....26

## LIST OF TABLES

|   |    |
|---|----|
| Table 1: Types & status of Registered Cooperatives in Malawi.....                           | 2  |
| Table 2: Socio-economic characteristics of respondents .....                                | 20 |
| Table 3: Treatment effects for cooperative & Non-cooperative rice farmers.....              | 27 |
| Table 4: Hypothesis test results for Cooperative&Non-cooperative rice farmers Income .....  | 28 |
| Table 5: Results of rice farming profitability for Cooperative & Non-cooperative farmers .. | 29 |
| Table 6: Hypothesis test results for profitability for rice Farmers .....                   | 31 |
| Table 7: Investment Costs in rice Production .....  | 32 |
| Table 8: Output, Consumed, Sold and HCI results for rice farmers.....                       | 35 |
| Table 9: Distribution of the Farmers by Household Commercialization Indices .....           | 37 |
| Table 10: Hypothesis test for Commercialisation levels .....                                | 37 |
| Table 11: Indicators of market orientation of respondents .....                             | 39 |

## LIST OF APPENDICES

|   |    |
|---|----|
| Appendix 1: Survey Questionnaire .....  | 49 |
| Appendix 2: Socio-Demographic characteristics of respondents .....                      | 57 |
| Appendix 3: Respondent's rice production characteristics.....                           | 62 |
| Appendix 4: Propensity Score Matching Total Effects and results on Gross Revenues ..... | 68 |
| Appendix 5: Regression analysis results on Profitability influence .....                | 68 |
| Appendix 6: Agricultural cooperatives operating in Chikwawa District in 2023 .....      | 69 |
| Appendix 7: Organogram of Livunzu Cooperative .....                                     | 70 |
| Appendix 8: Chikwawa District Map .....   | 70 |
| Appendix 9: Photos of Field Research.....   | 71 |

## CHAPTER 1

### INTRODUCTION

#### 1.1 Background of the study

The role of agriculture in African and specifically Malawian economy is conspicuous; it is a field that remains a priority sector for Africa. Malawi is an agriculturally dependent country on its economy, which accounts for 37% of its GDP, 80% of export earnings and employs 85% of the total population (FAOSTAT, 2014). Over 85% of the population are subsistence farmers who are limited with decreasing land holding sizes as evidenced by 70% of the smallholder farmers that cultivate on at most a 0,1 hectare of land with the average land holding size per household being 0.6 hectares of land (World bank,2016).The vast majority of smallholder farm enterprises in the rural areas of Malawi are constrained by many bio-physical and socio-economic factors in their day-to-day agriculture production activities and therefore justifies the need to facilitate the access to productive resources, capacity building and access to production funding. Agricultural cooperative is an effective way of overcoming above constraints for it enables farmers access to competitive markets for both productive inputs and outputs, encourage adoption of improved agriculture technologies, optimise produce quality and farm income which positively affect the farming household welfare (Ma et al., 2018; Wossen et al., 2017; Kumar et al.,2016).

A cooperative as a formal voluntary membership entity, that represents farmers in a given geographical area, created for the economic benefit of farmers and other groups by providing market information, widening access to inputs, services and credit, providing technical assistance and presenting value addition opportunities for farm produce (Madola, 2016). Cooperatives strengthen the economic position and widen farmer's access to markets for their produce and inputs. According to Msuta and Urassa (2015), cooperatives were introduced in the world to facilitate flow of market information between farmers and the market which helps the producers to meet the specific requirements of the produce in the modern market outlets as well as enhance access to local resources, inputs such as seeds, breeds, technical know-how and experience. Bijman and Iliopoulos revealed that cooperatives act as channels that help the farmers to collectively bargain for better prices both in the input and output markets. *NOWEFOR (2014)*, argued that cooperative plays a very important role in providing opportunities for farmer capacity building, information and

experience sharing on production and marketing techniques as well as collective bargaining in purchase of inputs and sale of farm produce. Cooperatives promotes rural development by serving as a platform for sharing resources, coordinating activities, making collective decisions and creating opportunities for value addition by widening access to inputs, funds and postharvest handling facilities (Matarazoo et al.,2020).

Cooperatives were introduced in Malawi during the colonial rule in 1940s-.The cooperative act was established in 1946 by the colonial government using a top-down approach to be instruments for government policy. The independence of Malawi in 1960s led to the deregistering of agricultural cooperatives and the state-owned enterprises got a lion's share in the smallholder farming sector. The Agricultural cooperatives were later resuscitated during the multiparty era in 1994 when the government focused on promoting cooperative development to encourage proliferation of local initiatives to enable people meet their local needs through participation in local resource use (FODS,2020-2025). The cooperative movement in Malawi sets primary cooperatives at the bottom who feed into secondary cooperatives, then national cooperative organisations/apex bodies. Currently Malawi has at least 933 registered cooperatives. The table below shows the types and status of registered cooperatives in Malawi as to 2020/2021.

**Table 1: Types & status of Registered Cooperatives in Malawi (2020/2021)**

| <b>NO</b> | <b>COOPERATIVE TYPE</b>  | <b>STATUS (NUMBER)</b> |
|-----------|--|------------------------|
| 1         | Malawi federation of cooperatives (Tertiary Cooperatives)        | 1                      |
| 2         | Cooperative unions (Secondary Cooperatives)                      | 7                      |
| 3         | Agro-based cooperative societies                                 | 459                    |
| 4         | Community savings and investment promotion cooperatives (COMSIP) | 179                    |
| 5         | Savings and Credit Cooperatives (SACCO)                          | 153                    |
| 6         | Livestock Cooperative Societies                                  | 72                     |
| 7         | Honey Cooperative Societies                                      | 17                     |
| 8         | Timber Cooperative Societies                                     | 13                     |
| 9         | Mining Cooperative Societies                                     | 11                     |
| 10        | Artisanal Cooperative societies                                  | 8                      |
| 11        | Fisheries Cooperative Societies                                  | 6                      |
| 12        | Other Cooperative Societies                                      | 7                      |
|           | <b>Total Registered Cooperatives</b>                             | <b>933</b>             |

**Source:** Farmers Organisation Development Strategy-FODS (2020-2025)

The development of cooperatives met a lot of challenges because of the unfavourable environment for private sector the country offers. Malawi experiences macroeconomic instability, the inflation rate is high which raises the cost of living. The energy sector; fuel and electricity are in short supply; skilled labour is inadequate combined with heavy land degradation due to population pressure on natural resources. As a result, the cooperatives have to thrive and survive in the environment that is risky and uncertain embedded with socio-economic and climatic shocks.

## **1.2 Problem Statement and Justification**

Chikwawa district is one of the poverty-stricken and disaster-prone areas in Malawi. The area experiences unreliable rain falls and extreme temperatures that affect crop production despite having 85% of the population as smallholder farmers. The farmers in the district grow maize, legumes and rice in wetlands as their main crop because of its suitability to the local conditions. The major drawbacks to agricultural production are lack of access to profitable market outlets, narrow access to agricultural inputs, poor decision-making skills of the timing of sale of produce to take advantage of the seasonal high prices of agricultural produce that would enable them generate good incomes. The farmers sell unprocessed rice because they do not have access to storage and milling facilities for value addition hence, they sell at lower prices to the vendors/middlemen who are at liberty to set the prices at their liking (AICC, 2017). As a result, the farmers get low incomes such that they cannot participate in day-to-day economic activities considering that rice production is their main livelihood strategy.

The Chikwawa district statistics shows that less than 8 percent of the smallholder farmers in the area are cooperative or association members(SEP,2021). This indicates a gap in farmers joining cooperatives in the area despite the cooperative having many benefits to the smallholder farmers. Cooperatives enhance agriculture production and marketing as well as enables member farmers to benefit socially and economically (Kumar et al.,2018; Ma et al.,2018). The cooperative presents many benefits to the member farmers such as access to credit, collective bargaining in input and output markets, capacity building and value addition opportunities.

The failing of a cooperative lead to farmers lacking a collective voice, as a result farmer cannot access productive resources at affordable prices; therefore, many smallholder farmers remain poor and cannot influence policies that affect their well-being hence the need to have farmers joining agricultural cooperative (Msuta and Urassa, 2015).

The well-being of farmers is better promoted when organised into groups to pool their resources together, negotiate with one voice to secure good prices for their produce and minimise risks of exploitation by vendors who set prices at their liking (World Bank,2016). The organised farmers are able to facilitate access to affordable inputs and services by negotiating for bulk discounts, subsidies, input grants from the government and non-governmental organisations for improvement of productivity(FAO,2015). The access to credit and financial services widens for the organised farmers which enable them to make sound investment in their agriculture enterprises as well as advocate for their interests and influencing policy decisions by lobbying with the authorities for favourable policies, subsidies and reforms that address their needs (Oya et. al,2014).

There was an information gap that required bridging, mainly about the socio-economic role of cooperatives on smallholder rice farmers in Chikwawa district. The above problem led to the analysis of the impacts of agricultural cooperatives on Smallholder farming enterprises to establish the socio-economic benefits presented to the smallholder farmers.

### **1.3 Study Objectives**

This study evaluated the impacts of agricultural cooperatives on performance of smallholder farming rice enterprises.

#### **1.2.1 Specific Objectives**

- Analyse the effect of cooperatives on smallholder rice farmer's income.
- Assess the effect of cooperatives on profitability of smallholder rice farm enterprises.
- Assess the effect of cooperatives on the commercialisation drive among smallholder rice farmers.

### 1.2.2 Research Questions

- To what extent does cooperatives affect smallholder farmer's income?
- What is the magnitude of profitability for cooperative members?
- How does cooperatives influence commercialisation on smallholder farming?

### 1.3 Hypothesis

- There is a significant difference in farm incomes between Livunzu cooperative members and non-members.
- The Livunzu cooperative members' performance is more profitable.
- There is significant difference in farm commercialisation between Livunzu cooperative members and non-members.

### 1.4 Ethical Consideration

The research has been designed, reviewed and undertaken to ensure integrity, quality and transparency. The research staff and participants will normally be informed fully about the purpose, methods and intended possible uses of the research, what their participation in the research entails and what risks, if any, are involved. Some variation will be allowed in very specific research contexts for which detailed guidance will be provided. The confidentiality of information to be supplied by research participants and the anonymity of respondents will be respected. Research participants will take part voluntarily, free from any coercion and harm to research participants will be avoided in all instances. The independence of research will be clear, and any conflicts of interest or partiality must be explicit.

## CHAPTER II

### 2.1 LITERATURE REVIEW

#### 2.1.1 Smallholder farmers' production and marketing of farm produce.

Globally the smallholder farmers make 75 percent of the farming population while the southern Africa constitute 80 percent of the farming community. In Malawi, the smallholder farmers are dominating the agro-industry making up over 80 percent of farmers and they produce most of the food for domestic consumption. Land is a scarce resource to the smallholder farmers such that the land per capita is estimated to be 0,33 ha with 76 percent of the smallholder farmers securing less than a hectare (30 percent having less than half a hectare). The smallholder production is characterised as highly subsistent, low levels of input and low output levels (FAO, 2017). Despite the increased use of the organic fertilizer, the agriculture productivity is still very low.

The majority of smallholder farmers are in the remote areas characterised by poor road network and market infrastructures such as agriculture produce lead time holding facilities (Moyo, 2015). This leads to a rise in operational costs that originates in between the process of transferring the produce from the farm and/ or holding facility to the market (Fulton & Giannakas, 2018). The lack of market information that aids to direct farmers to a market place that offers competitive prices, required grade and standards also increase the operational costs as a result the farmers are discouraged to participate in active agriculture produce marketing (Mayala, 2019).

Market is still a big challenge to smallholder farmers in many developing countries. The agricultural produce market prices are fluctuating since the abolition of the public agricultural marketing system which offered stable market prices regulated by the government and this is affecting the profitability of smallholder farm enterprises (Chirwa, 2015). The smallholder farming enterprises have been hit hard by lack of resources since the government rarely provides subsidised farm inputs due to democratisation, liberalisation and decentralisation. Most of the credit institutions require a collateral from the resource-poor

smallholder farmers because farming is regarded as the high-risk area due to the effects of climate change (Birchall,2017).

Many smallholder farmers sell their produce to vendors or spot selling to wholesalers other than modern channels such as super markets and processing companies (Ma and Abdulai,2016). Smallholder farmers prefer selling their produce to vendors who buy the produce directly, no marketing contracts involved and the produce is bought on ad hoc basis. The smallholder farmers prefer the vendors or spot selling because of its convenience unlike the selling to super markets and processors where there is uncertainty due to one-sided decisions by the buyers and strict quality requirements as well as special requirements on use of agro-chemicals and seeds (Hao et al., 2018; Trebbin, 2014). Smallholder farmers are risk-neutral and comfortably sell where there are lower risks and the market is highly flexible.

### **2.1.2 Agricultural Cooperatives and Smallholder Farmer Participation**

Agricultural Cooperatives enable farmers access to competitive markets for both productive inputs and outputs, encourage adoption of improved agriculture technologies, optimise produce quality and enhance farm income which positively affect the farming household welfare(Ma et al.,2018;Wossen et al.,2017;Kumar et al.,2016).Study conducted by Wossen et al. (2017) in Nigeria, showed that technology adoption, acquisition of assets and improvement of household welfare are likely to increase to a cooperative member unlike a non-member. In India, Kumar et al. (2018) showed that farmers who participated in cooperatives had their milk yield improved, increase in net income per litre and enhanced food safety practices. Ma et al. (2018) conducted a study on apple farmers in China and revealed that cooperative members are likely to adopt organic soil improvement practices. Farmers use cooperatives as market channels whereby the farm produce is aggregated to be marketed all together, however, due to constraints such as low yield, poor management structure of the cooperatives and perception of the farmers; few farmers present little or no produce to be marketed collectively. According to Nilsson (2018), agricultural cooperatives facilitate collective/group action and coordination that help transactional costs cutting of input marketing and disposal of farm produce from widely dispersed producers. A well organised cooperative transacts directly with the target market other than using intermediaries

such as the rural wholesalers, assembler/brokers who may sometimes procure directly from the farmers at exploitative prices.

Membership of a cooperative is by choice and it brings along both material and immaterial benefits to the participating farmers. Farmers decide to participate in a cooperative when the benefits surpass the costs of being a member to a cooperative. In a cooperative, farmers sell their produce at good prices because of low transactional costs and the improvement in efficiency. Members of a cooperative have decision rights over the cooperative's strategic assets (Morrison,2017). The immaterial benefits refer to the inter and/or intra member social interaction, personal social networking and business relationships are developed (Matarazzo & Casarin,2020). The costs of membership to a cooperative are affiliation fees, time, energy in performing other membership responsibilities (Pascucci et al., 2013).

The studies have shown that participation of farmers in collective action has a positive effect on the poor such that the participating farmers have a high chance of being non-poor (Shultz & Adams, 2019). Madola (2016) argued that gender, age, household size, landholding size, diversification on farm activities and having a friend who is a member of a farmer organisation determines smallholder participation in cooperatives. In the study, female headed households with average age of 40 were found to actively participate; the household size of more than five people per household against the NSO (2014) 4.61 per household estimate were found to participate more; the non-members were found to have large land holding size of 2 ha on average unlike the members of cooperative. The cooperative members reported to grow different crops at a time and those that have friends or a relation belonging to a cooperative were found to have been influenced by the experience of the others benefiting from the collective action.

### **2.1.3 Collective Action & Profitability**

Collective action is a phrase used when farmers come together to perform their farming functions as a group with the aim of achieving a common goal. The group has a set of rules and regulations to enable the group attain the common goal (Nilsson,2018). Collective action can be described as an activity/action that takes place when two or more

farmers work together to achieve a common goal (Barron & Ricks,2015). The common goals could be marketing of farm produce, planting and harvesting, purchase of agriculture inputs and any other tasks that are associated with agricultural production.

Profitability of the farm enterprise is a major factor that determines the continuity of farming activities and motivates the farmers to produce more in order to increase their incomes. According to the findings of Arouna (2018), in rice production, collective action increased farmers' income by USD 148/ha. Trebbin (2014) argued that farmers negotiate for better productive inputs and outputs prices when they are organised in a group or a cooperative. This in turn improves revenue from the sales. The access to inputs and output market cuts on transactional costs and eventually farm sales margin improves (Tefera,2016).

Kyaw (2018) argued that a farmer belonging to a group has his/her membership as a social capital aspect that empowers the farmers to bargain for better prices and has an impact on farmers' participation in agriculture produce marketing. The participation in groups improves their economies of scale in information and yield markets and market information amongst the farmers (Ochieng, 2019). Different categories of farmer organisations have contributed to the improvement of smallholder farmer's revenue. In India, cooperatives have helped the farmers to cut marketing costs of grapes which generally improved the revenue from sale of grapes. Similarly, in Ethiopia, the dairy sector has been positively affected as it is making profits than before since the introduction and strengthening of collective action.

Collective action and individual farmer earnings are linked in a way that collective marketing enhances farmers bargaining power as vendors on the market who face their off-takers/buyers on the market with one voice and consistently supply the produce at the required quantities and timely (Mango et al., 2017; Arouna 2018). Therefore, the chances of selling their produce at competitive prices are widened than other individual farmers whose products are bought at exploitative prices. In this study collective action will be used to look at the main factors that will be considered to analyse the benefits that smallholder farming enterprises are getting from their membership to a farmer organisation.

#### **2.1.4 Rice Farming in Malawi**

Rice is an important food and cash crop in Malawi for it is a source of household food and income in Malawi. Rice ranks second from maize in the group of important food crops (GoM,2019). It is mainly consumed in urban areas and significantly consumed in lakeshore areas. In Malawi it is mainly grown in wetlands and irrigation schemes. Smallholder farmers grow rice in wetlands during the rainy season in an average plot size of 0.3 hectares per household. The rice production levels have been declining every year and yield per hectare significantly reducing which is affecting the supply of rice and this is increasing the need for more imported rice. Rice is considered to potentially replace tobacco as Malawi's reliable export crop but its production has been affected by many factors such as poor varieties, uncompetitive prices on the market for smallholder farmers, narrow access to input and output markets and poor agronomic practices. All these have contributed to less significant contribution of the crop to the economy at both household and country level. In 2013 rice production was two-third of the rice national demand (FEWS,2016). In the early 2000s the rice production recorded growth rates for yield, harvest area and production to be -11,79%, -5,88% and 16,9% respectively. The national consumption growth rate for rice was 8.53% with 0.97 national sufficiency and 3% imported quantities of rice consumed. Rice exports varies year to year with the export quantities declining due to high national consumption demand and low production levels that results from inadequate rain fall. For instance, in the year 2018, Malawi exported over 7000 tons of rice and earned US\$12 Million. The same year the country imported 400 tons of rice at the cost of US\$312,000. Smallholder rice productivity and consumption is very low in Malawi compare to other countries. Malawi currently produces at an average of 1500-2000kg/ha compared to Zimbabwe and Kenya with an average of 2,300 kg/ha and 4,900 kg/ha respectively. Malawi produces various varieties of paddy rice such as pussa, mtupatupa, kilombero, faya and other local varieties.

#### **2.1.4.1 Rice Marketing in Chikwawa District**

The prices of rice on the market have been sky rocketing due to the increase in demand and rise in costs of production. Smallholder farmers sell their rice to middlemen/vendors in the district because there are no organised markets for the commodity. The farmers lack postharvest facilities such as proper storage infrastructure and mills which forces the farmers to sell their produce unprocessed at lower prices to the vendors whose

offers are mostly exploitative on the farmer's end. This perpetrates the vulnerability of the smallholder farmers to exploitation since they cannot negotiate for better prices and therefore, the vendors/middlemen are at liberty to set buying prices at their liking. Chikwawa district experiences inadequate rainfall which leads to low production levels. In the 2018/2019 growing season farmers got 1800kg/ha on average compared to 2017/2018 when farmers got 2,100kg/ha and the average milled rice prices were at US\$1.06 per kilogram.

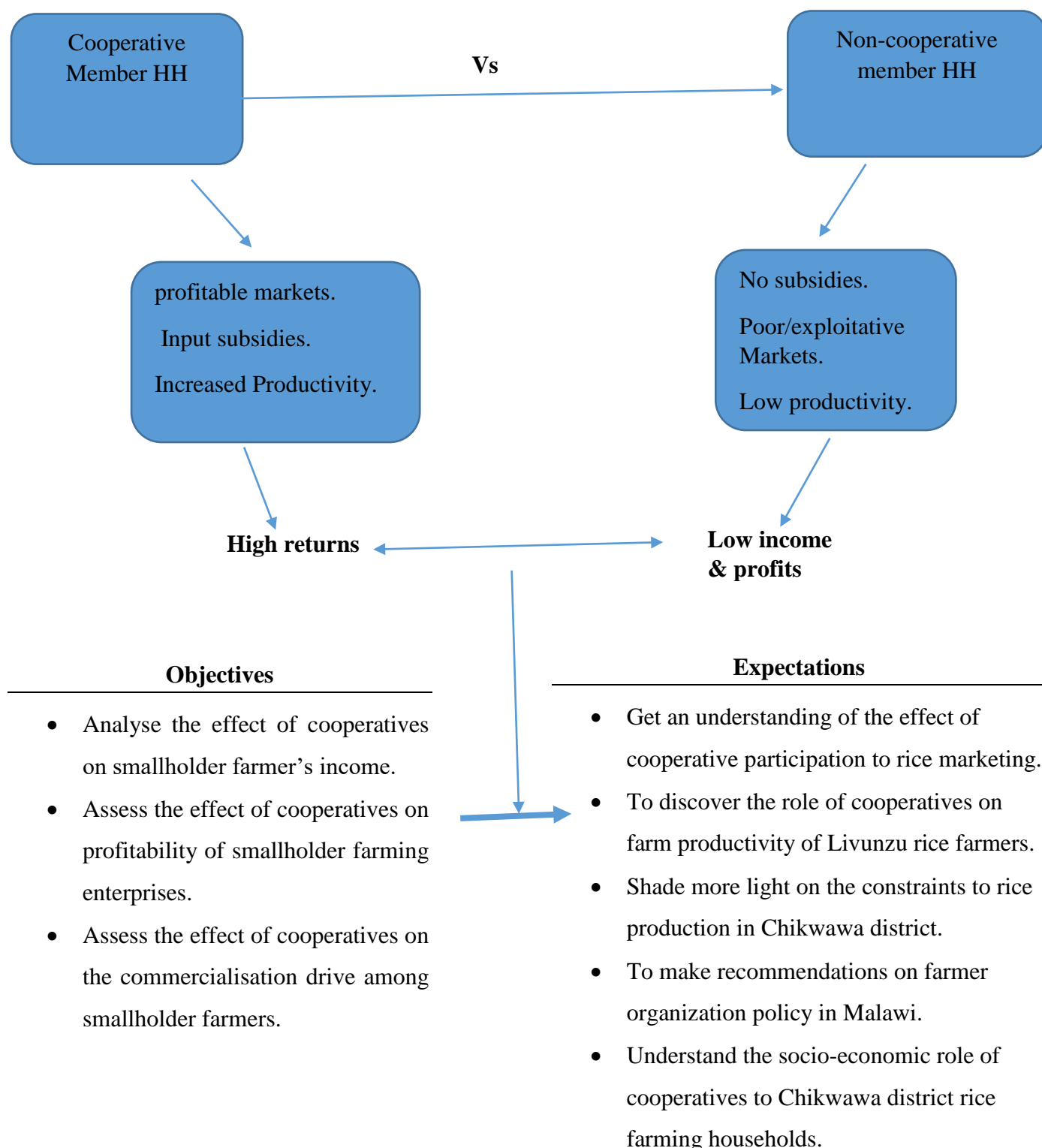
The low income from rice production has been the major drawback to the smallholder farmers. The farmers lack access to profitable market outlets and decision making skills in the timing of rice marketing are poor among the farmers such that they are unable to take advantage of seasonal prices that would enable them generate good incomes. As a result, farmers sell their rice to vendor early when the supply of the commodity is high on the market which exposes them to lower prices. The farmers sell their rice early because they desperately want to recover the money they spent on producing the commodity to ably afford basic necessities in their households. In the end the farmers cannot participate in day to day economic activities because of low income levels considering that rice production is their main livelihood strategy.

## **CHAPTER III**

### **METHODOLOGY**

#### **3.1 Theoretical Framework**

The conceptual framework illustrates that cooperative member households collectively bargain for better prices at inputs and output markets such that they enjoy huge discounts from bulk purchases of inputs and other productive resources as well as sell their agriculture produce at competitive prices. Collective marketing of the produce also enables them to reduce the transactional costs that arise from the processes in between moving the produce from the point of production to the point of sale. Cooperative members have wide access to subsidised inputs and other productive resources such as land, irrigation water and collective labour which improves farm productivity. Generally, the cooperatives have proved to strengthen local economies as well as enabled the enhancement of the farming household incomes.



**Figure 1: Comparison between Cooperative and non-cooperative member.**

### 3.1.2 Study Area

Livunzu Cooperative is located in chikwawa district, southern part of Malawi, latitude 16<sup>0</sup> and longitude 34<sup>0</sup>. The cooperative has 712 members from within 3 Traditional authority areas of Katunga, Maseya and Makhwira with a total population of 79,000 people of which 50.2% are males and 49.8% females (NSO, 2017). In the area, about 85% of the population are smallholder farmers, the rest are into fishing, piecework in the sugar industry and conservation areas. The average landholding size per household is 0.5 hectares. The area experiences distinct winter (May-September) and Summer Seasons (October-April) and the rainfall is generally unreliable and varies ranging from 967.6mm as the maximum to 170mm as the minimum. The temperature ranges from 20 to 44 degrees Celsius, maximum experienced in November and the minimum in July every year with the mean temperature usually above 20 degrees Celsius (Ngabu Met. Station, 2017). The soils are dark brown coloured at least 150cm deep, moderately well drained with fine and medium texture in the 0-30cm depth of the top soils as well as the topography with outwash and flood plain land form.

### 3.1.3 Sampling

A simple random sample was adopted for this study. The sample constituted smallholder farmers who are members of Livunzu Cooperative & non-cooperative members within the 2 traditional authority areas. The head of the farming household were the respondents or their spouse or senior boy or girl above the age of 17. These were selected because they have broad knowledge on day to day running of the farming enterprise. Each household was assigned a number that corresponded to the plot number, and then a table of random numbers was used to obtain the respondents.

### 3.1.4 Sample Size

A sample of 293 respondents was obtained by using the following formula (Israel, 2013) where  $n$  is the sample size,  $N$  is the population size and  $e$  is the level of precision. In this research, the level of precision is **0.05**.

$$n = \frac{N}{1 + N(\epsilon)^2} \quad (i)$$

### 3.1.5 Data analysis

Stephanie(2013), defined data analysis as a multi-stage process which involves cleaning, transforming and modelling data to discover information that is useful in critical decision making. The research bases his/her decisions on the findings or the information that has been generated after analysing the research data determine profitability, incomes and commercialisation drive of smallholder farming enterprises of the two groups of smallholder farmers, the cooperative and non-cooperative members. The descriptive statistics `employed the measures of central tendency to describe the characteristics of the respondents. The econometric models such as propensity score matching and regression models will be used to quantify important empirical results. T-tests were used to determine the significant differences of the cooperative and non-cooperative members' performance.

Objective number 1 analysed the incomes of Livunzu cooperative members using a net income formula and the Propensity Score Matching (PSM) models to investigate whether being a cooperative member has an effect on farmers' net income. The propensity score matching is preferred for this study because the systematic deviations are easily produced when comparing 2 groups which are cooperative and non-cooperative members. The method recognises that participation in a cooperative is a self-made choice by the farmers based on their situation. The basic conditions for whether the farmer participates in a cooperative or not differ and there is a problem of sample self-selection and if the regression estimation is carried out directly, the results are biased. The factors that affect farmer decisions on whether to participate in a cooperative or not such as gender of the household head, age, educational level, family size, number of household members in school, amount of labour force, distance to the market and distance to the cooperative office. The resampling method was employed to find a group of farmers who participate in a cooperative with similar characteristics with those who do not participate to solve the effect of sample biased estimation and observe the effect of participation in a cooperative on farmers' net income.

$$\text{Net Income} = \text{Total Revenue} - \text{Total Expenses} \quad (\text{i})$$

To find the probability of farmers participating, a propensity score was calculated using a Logit Model:

$$P(x_i) = \text{Pr}[T = 1|x_i] = \frac{\exp(x_i)}{1 + \exp(x_i)} \quad (\text{ii})$$

**T** represents the processing variable such that when T=1 the farmers are cooperative members and when the value is equal to 0, it indicates that the farmers are non-members.

**X<sub>i</sub>** represents factors that affect farmers' membership in a cooperative such as age, education, land holding size and other factors.

The propensity scores calculated indicate the probability of farmers participating in a cooperative and those who do not participate with similar values will be matched to estimate the average treatment effect (ATT) to get the effect of cooperative membership on farmer's income.

$$\text{ATT} = E[Y_1^i - Y_0^i] = E[Y_1^i - Y_0^i | T = 1] = E[Y_1^i | T = 1] - E[Y_0^i | T = 0] \quad (\text{iii})$$

$Y_1^i$  Represents the income effect of member farmers in cooperatives.

$Y_0^i$  Represents the income effect of non-member farmers.

$E[Y_1^i | T = 1]$  Represents the expectation of farmers who are cooperative members net income.

$E[Y_0^i | T = 0]$  Indicates the observable situation which is the expectation of farmers who are non-member to a cooperative on the basis of being counterfactual.

The characteristics of the two farmer groups, cooperative and non-cooperative members were obtained and the difference between the two results is the effect of cooperatives on farmers' net income.

Since different means doesn't imply causality but only systematic deviation therefore a t-test was used to show statistical difference between the 2 groups.

**Hypothesis 1:** There is a significant difference in farm incomes between Livunzu cooperative members and non-members.

Statistical hypothesis for independent t-test was:

**H<sub>0</sub> :  $\mu_1 = \mu_2$**  (There is no difference in farm incomes between Livunzu cooperative members and non-members).

**H<sub>1</sub> :  $\mu_1 \neq \mu_2$**  (There is a difference in farm incomes between Livunzu cooperative members and non-members)

Objective number 2 aimed at assessing the effect of cooperatives on profitability of the farm enterprises of the cooperative member farmers. Profitability was calculated by obtaining the difference between the total farm revenue and the production costs over the production costs to get a percentage and a multiple regression model was employed to determine the factors that influence the profitability of a smallholder farming enterprise of farmers who are cooperative members. A t-test was used to determine the significant statistical differences in profitability between the cooperative member farmers and the non-cooperative member farmers.

$$\text{Profitability} = \frac{(\text{Total Farm Revenue} - \text{Production Costs})}{\text{Production Costs}} \times 100 \quad (\text{i})$$

Empirical Model Specification:

$$\text{Profitability} = \beta_1 + \beta_2 \text{PC} + \beta_3 \text{P} + \beta_4 \text{Q} + \beta_5 \text{TR} + \mu \quad (\text{ii})$$

**PC** Represents production costs (costs of fertilisers, seeds, pesticides, labour, land lease, farm equipment depreciation).

**P** represents price of rice per kilogram.

**Q** represents the quantity of rice produced.

**TR** represents the total revenue realised from sale of rice.

**$\beta_1$**  is a constant term representing expected response of profitability when production costs(**PC**), price(**P**), quantity(**Q**) and total revenue(**TR**) are zero.

$\beta_2$  represents response of profitability for a change in a unit of production with all variables held constant.

$\beta_3$  Measures a change in value of profitability given a change in unit sales price.

$\beta_4$  represents a change in value of profitability for a unit change in production level.

$\beta_5$  Indicates percentage change in profitability for a unit change in revenue with all variables held constant.

$\mu$  is the Error term which represents the effect of variables that were omitted from the equation.

**Hypothesis 2:** The Livunzu cooperative members' farm performance is more profitable.

Statistical hypothesis for independent t-test will be:

**H<sub>0</sub> :**  $\mu > i$  ( Livunzu cooperative members' farms are unprofitable)

**H<sub>1</sub> :**  $\mu < i$  (Livunzu cooperative members' farms are profitable)

Objective number 3 employed content analysis to assess the commercialisation drive of the farmers who are cooperative members as well as non-members. Indicators of commercialisation such as the share of production sold, volume/value of production sold, share of land devoted to crops that are sold, quantity of inputs purchased and quantity/ value of hired labour was used to measure commercialisation. Household Commercialisation Index (HCI) is one of the best indicators of commercialisation used to measure commercialisation in the smallholder farming enterprises.

$$\text{Household Commercialisation Index} = \frac{\text{Gross Value of all crop sales}}{\text{Gross Value of all crop produced}} \times 100 \quad (i)$$

**Hypothesis 3:** There is significant difference in farm commercialisation between Livunzu cooperative members and non-members.

Statistical hypothesis for independent t-test was:

**H<sub>0</sub> :**  $\mu_1 = \mu_2$  (There is no difference in extent of farm commercialisation between Livunzu cooperative members and non-members)

**H<sub>1</sub> :**  $\mu_1 \neq \mu_2$  (There is a difference in extent of farm commercialisation between Livunzu cooperative members and non-members).

The data was analysed using SPSS 28, and Stata 14 application software.

### 3.1.6 Data Collection Methods

The data was collected from people within the two traditional authority areas. Household survey was conducted to collect data. Key informant interviews will also be conducted to cross check on some of the data given by the respondents during interviews.

#### 3.1.6.1 Household Survey

A household survey was conducted to the sampled households to collect data that was used to determine farm income, profitability as well as factors of commercialisation such as share of production

sold, volume/value of production sold, share of land devoted to crops that are sold, quantity of inputs purchased as well as quantity/value of hired labour. A semi-structured questionnaire was used as a tool during the survey. Individual interview were employed when collecting data on issues that have not been expressed in a group.

### **3.1.6.2 Key Informant Interviews**

Key informant interviews were used to collect data that could not be gathered in individual interviews.

## **CHAPTER IV**

### **RESULTS AND DISCUSSION**

#### **4.1 Socioeconomic characteristics of surveyed respondents**

The respondents' socioeconomic characteristics are covered in this section. The characteristics discussed include age, gender, marital status, household size, education, landholding size, and cooperative membership. Two socioeconomic factors, namely the sex of respondents and cooperative membership, were chosen as cross-cutting factors to help explain the study's findings. The sex of the respondents was chosen because of how it relates to gender and the dynamics that result from this association. On the other hand, group membership was chosen in order to make comparisons between how group membership affects the respondents' various characteristics. As a result, the study's findings have been discussed in relation to the two socioeconomic factors.

**Table 1: Socio-economic characteristics of respondents**

| Characteristics                   | Frequency  | Percentage |         |         |
|-----------------------------------|------------|------------|---------|---------|
| <b>Sex</b>                        |            |            |         |         |
| Male                              | 154        | 52.6       |         |         |
| Female                            | 139        | 47.4       |         |         |
| <b>Education level</b>            |            |            |         |         |
| Primary                           | 131        | 44.7       |         |         |
| Secondary                         | 52         | 17.7       |         |         |
| Tertiary                          | 0          | 0          |         |         |
| Adult education                   | 0          | 0          |         |         |
| None                              | 110        | 37.5       |         |         |
| <b>Marital status</b>             |            |            |         |         |
| Single                            | 14         | 4.8        |         |         |
| Married                           | 238        | 82.2       |         |         |
| Divorced                          | 2          | .7         |         |         |
| Widowed                           | 39         | 13.3       |         |         |
| <b>Membership of Cooperatives</b> |            |            |         |         |
| <b>Yes</b>                        |            |            |         |         |
| Males                             | 44         |            |         |         |
| Females                           | 90         |            |         |         |
| <b>No</b>                         |            |            |         |         |
| Males                             | 110        |            |         |         |
| Females                           | 49         |            |         |         |
|                                   | Mean value | S.D* value | Minimum | Maximum |
| Age of household head             | 46.45      | 16.18      | 20      | 90      |
| Household size                    | 4.94       | 1.86       | 2       | 10      |
| Total farm area for rice (Ha)     | 0.29       | 0.29       | 0.5     | 2       |

S.D\*= Standard Deviation

#### 4.1.1 Age of respondents

The average age of the respondents in the study, as shown in Table 2, was 46.45 which is surprising given that the country's demographic is skewed towards young people (Van der Straaten, 2020). The youngest and oldest of respondents were 20 and 90 years old. It is clear from the results above that the middle-aged group, not the younger generation, is the main customer for rice farming in the sampled study areas. Lack of access to capital, insufficient land ownership, and markets are a few of the major barriers Kebebe & Shibru (2015) identify as impeding youth participation in the agriculture sector. When considering rice farming, age is a key consideration. As older farmers have better access to resources than younger farmers, Adesope et al. (2012) claim that farmers are most productive between the ages of 42 and 50.

The ages of the household heads play a significant role in understanding decisions made about farm production and how the farm's land is used. The age of the household head can be used as a proxy for farming experience, and it is hypothesised that older people have more experience and are therefore better at making decisions (Mangisoni et al., 2019). On the one hand, this claim is considered reasonable given that the household head is younger and might not have the necessary background knowledge and experience to make wise farming decisions. The converse is not likely to be true of the proposition (Okonya & Kroschel, 2015). According to the researcher's observations, older people were more likely to dedicate more land to rice farming, which was also supported by key informant interviews ("*Most of the farmers in the cooperative are older,*" Key Informant Interview 3). Thus, the research findings support this assertion. This may also be a sign that more young people are choosing to work in occupations other than agriculture, particularly other types of employment involving the production of rice.

#### **4.1.2 Gender of the respondents**

Male respondents made up a larger portion of the sample, as shown in the data in Table 2. Overall, male respondents made up 52.6% of the sample, while female respondents made up 47.4% of the sample. The predominance of men in this study is a reflection of the low involvement of women in rice farming and lends support to earlier studies that explain these trends in Malawi. In order to grow rice, farmers need to have enough land available for crop cultivation in addition to the other agricultural activities they already pursue, such as raising livestock. The data also indicates that male headed households (MHHs) had larger landholding sizes (hectares) than female headed households (FHHs), which suggests that one of the factors contributing to FHHs' low participation in rice farming was their small land holding sizes.

This trend, according to Kurimi (2016) reflects the disparities in resource ownership and control between men and women in many African communities. The majority of women (91.5%) work in post-harvest activities like rice processing and marketing, while only a small proportion of women (35.3%) produce rice globally (FAO, 2013). Women face similar challenges that prevent them from participating in rice farming, according to the key informant interviews. "*Several women in the community, including*

*myself, are unable to afford the high labour costs associated with running the farms"*, according to a female respondent in the survey. Many African societies are patrilineal, with men holding the majority of land ownership and control (Bessette,2015). This provides men with greater incentives to make long-term investments like owning a rice farm.

#### **4.1.3 Marital status of the respondents**

According to Table 2, 82.2% of respondents were married. Respondents who were single, divorced, or widowed made up 4.8%, 0.7%, and 13.3% of the total. When men and women were separated by gender, a much higher percentage of men (81.1%) and a majority of women (72.6%) were married. According to the study, most farming decisions, including participation in rice cooperatives, are made by men. Other researchers, on the other hand, believe that married couples are better positioned to make good farming decisions because they can consult among themselves with spouses and siblings (Delali & Mingle,2015).

Agricultural enterprises, such as rice farming, are sometimes entirely dependent on family labour (Bessette,2015), and the family serves as an institution that provides agricultural labour; married households are able to garner more labour due to the increased number of productive people in the household. According to Salau et al. (2018), marital status may improve a household's access to labour for agricultural activities, resulting in increased productivity, surplus, and likelihood of selling produce. Despite the availability of family labour, the study finds no correlation between marital status and use of hired labour, suggesting that single household heads are more likely to use hired labour.

Furthermore, as observed by Nchembi and Campus (2017) married households are more likely to gain access to communal land. According to Nchembi and Campus (2017), in many African communities, married people are given priority in many social aspects such as higher social status and recognition in communal decisions over unmarried people.

#### **4.1.4 Household size of the respondents**

Related to marital status, is the household size. According to the study findings, the overall mean household size was 4.94, with the smallest household size being two and the largest being ten (Table, 2). Household size is important in many African communities because it determines how much labour a household has available for farming activities (Nchanji et al., 2020). A large household size may have a

positive impact on rice farming by providing free labour needed for better pond management, resulting in increased productivity, surplus production, and more income from the sale of surplus, and thus commercialization. Furthermore, a large household may provide an incentive for commercial rice farming because rice sales may provide an extra source of income needed to make other household and food purchases. However, as farming households become more commercialised, they increasingly rely on hired labour, with family labour focusing on supervisory and managerial tasks rather than actual farming activities, according to Larson et al., (2016).

#### **4.1.5 Educational level of the respondents**

Table 2 shows the respondents' educational levels. In general, the findings show that the majority of respondents received formal education up to the primary or secondary school level. Overall, 44.7% had completed primary school, 17.7% had completed secondary school, and 37.5% had not completed any formal education. Education is critical in commercialising agriculture, particularly in the adoption of complex farming systems such as rice farming, which necessitates specific skills and knowledge to ensure success. Education, according to Gauchan et al., (2012) influences farmers' ability to comprehend technologies more quickly. Farmers who are more educated are more likely to seek out new information about their farming systems, exposing them to various technologies that increase their productivity. Furthermore, successful rice commercialization necessitates literacy skills for keeping track of costs, income, and profits. Giancarlo, et al., (2020) and Alemu and Dachito, (2020) confirm the positive effect of farmers' education level on their proclivity to adopt commercial agriculture.

#### **4.1.6 Land holding size of the respondents**

According to the results in Table 2, the average rice farm size among respondents was 0.29 ha (SD=0.29). Furthermore, the overall minimum and maximum land holding size was 0.2 acres and 2 hectares, respectively. The size of the farmer's farm determines the productivity of the respondents in the study. It should be noted that the study collected respondents' aggregate farm sizes in order to better understand the total land area to which respondents have access and control. Segregated by gender, the findings show a significant difference in land holding size between men and women in the study. The mean land holding size for male respondents was 0.95, while the mean land holding size for female respondents was 0.65. The independent samples t-test was used to confirm the differences between the two groups. The t-test revealed a significant difference in mean landholding size between males and females, (1.18 p=0.00). This finding also demonstrates the size gap that exists between male and female land holding sizes. Females, on the other hand, have less land. The data also shows that a significant number of people

involved in rice farming have more land, most likely because they can dedicate the land to the construction of more farms or because they have control over the land.

Land is a valuable asset in agriculture, and access to arable land is especially important in rice production. Rice farming is primarily determined by the quality and size of land available to the household—including access to water (Okonya & Kroschel, 2015). Rice commercialization is also heavily reliant on farmer access to land, as small-scale farmers must increase their output by expanding their production area. According to World Bank (2021), more than 11.65 million hectares (ha) of land in Malawi has the potential for rice farming; however, rice farmers' access to suitable land is not guaranteed. The amount of land rice farmers can access to increase rice production is influenced by environmental and policy factors. The 1965 Land Act of Malawi divides land into three categories: private, public, and customary (Zuka, 2019). Traditional Authorities (TAs) and their subordinate group village heads administer the more than 80% of all agricultural land that is classified as customary and distribute the land to people and/or families (GTZ, 1997 cited by Zuka, 2019).

However, one may or may not have access to land depending on the cultural systems used in various regions. Men (who are more prevalent in aquaculture) have better access to and control over land, which encourages their investment in developments like rice farms to increase production, in the northern region of Malawi, among the Ngoni, Tumbuka, or Ngonde, where kinship is predominately patrilineal (follows the male line) and patrilocal (women move to man's village upon marriage). However, the matrilineal and matrilocal systems used in the central and southern regions of this study (among the Chewa, Yao, or Lomwe tribes) give women more access to and control over land (Hansen et al., 2005). Such systems, in particular among rural small-scale farmers, deter men from investing in certain activities like rice farming, according to Meijer et al. (2015). According to Fyles and Madramootoo, (2016), the current effects of climate change, particularly in Sub-Saharan Africa, are limiting farmers' access to suitable land for rice farming because droughts and infrequent rainfall have an impact on watershed areas and the availability of water for production.

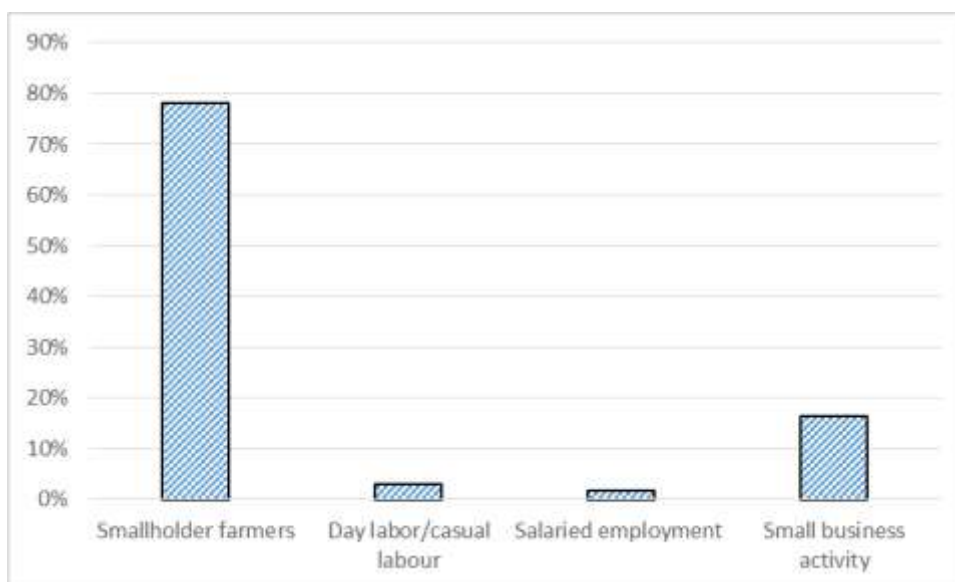
#### **4.1.7 Membership to Farmer groups**

The study also examined respondents' membership in groups. Overall, Table 2, findings demonstrate that 47.1% of respondents were not members of a cooperative at the time of the study, compared to 52.9% of respondents who were. Male respondents made up 57.6% of farmer groups, according to results disaggregated by gender, while female respondents made up 50% of the rice cooperative. However, the study did not investigate whether respondents belonged to any other farming organisations or groups. Membership in farmer groups, according to Awotide et al., (2016), has a positive

relationship with the likelihood and intensity of a farmer's commercialization, profitability, and performance. They suggested that farmer organisations improve access to information critical to production and marketing decisions. Furthermore, Martey et al. (2012) found that most farmer groups engage in group marketing, spread production transaction costs, and provide credit to their members. Collective action by farmer groups strengthens farmers' bargaining and lobbying power, as well as facilitates the acquisition of institutional solutions to some problems and coordination (Doss & Mwangi,2015).

#### 4.1.8 Main occupation/ income source

Figure 3 shows that the majority of respondents indicated that the main occupation of the household head is agriculture (smallholder farmers) (78.8%), day labor/casual labour (3.1%), salaried employment (1.7%), and small business activity (16.4%) respectively. These findings are consistent with those of Jayne et al. (2014), who found that the majority of households in rural Malawi are smallholder farmers who rely primarily on agriculture. This also suggests that other households are not solely reliant on agricultural production for a living. Ogunniyi et al., (2020) reported similar findings, indicating that the majority of farmers in the area are also engaged in other income-generating activities to provide for their families' day-to-day survival. These findings are also consistent with reports by Jayne et al., (2014) and DHS (2018), which identify vending, crop production, and casual labour as major livelihood strategies and sources of income for rural households.



**Figure 2: Main occupation and source of income for respondent households**

## 4.2 Influence on incomes

The PSM analysis in Table 3 demonstrates that cooperative membership has a substantial impact on members' revenues. Specifically, cooperative members earn MWK449,236.00 more than non-members, while the t-test indicates that non-members lose an estimated MWK443,713.70 in potential earnings. These findings suggest that cooperative membership is a key factor in the economic success of smallholder farmers. The results are consistent with previous research by Chagwiza et al. (2016) and Priscilla and Chauhan (2019), which highlights the positive impact of dairy cooperatives on income and milk yield. Without the support and resources provided by the cooperative, it is unlikely that members would be able to achieve the same level of earnings.

One reason for the lower revenues among non-members is that they sell their rice directly to consumers rather than through the cooperative. However, cooperative membership offers additional benefits such as marketing services, which can incentivize farmers to participate. Marketing is a major challenge for smallholder farmers, and the cooperative provides a reliable platform for farmers to sell their products at fair prices.

Another reason for higher incomes among cooperative members is increased access to value addition services. By participating in the cooperative, farmers can access these services and potentially earn more. In addition, cooperative membership offers access to storage facilities, which is crucial for smallholder farmers who may not have the means to store their produce. By storing their rice in the cooperative's facilities, farmers can wait for prices to increase before selling, earning more income. This is particularly important given the fluctuations in rice prices.

**Table 2: Treatment effects for Cooperative and non-cooperative rice farmers.**

| Description  | Members   | Non-members | t-test(p-value)    | ATE      | ATT    |
|--------------|-----------|-------------|--------------------|----------|--------|
| Gross income | 766270.89 | 322557.2    | -443713.7 (0.0001) | 377137.3 | 449236 |

The study aimed to test the hypothesis that there is no difference in farm incomes between Livunzu cooperative members and non-members (hypothesis 1, Table 4). However, the result of the analysis does

not support this null hypothesis, suggesting that there is indeed a relationship. Specifically, the study found that there is a significant difference in farm incomes between cooperative members and non-members. This finding confirms the importance of cooperative membership in influencing farm incomes. In other words, becoming a member of a cooperative can lead to increased farm incomes, while not being a member can have the opposite effect. This conclusion is consistent with the findings of a study by Yajamana and Singh (2022), which reported that cooperative membership improves the socio-economic aspects of farmers.

**Table 3: Hypothesis test results for cooperative and non-cooperative rice farmers income.**

| <b>Research Hypothesis</b>   | <b><math>\beta</math> values</b> | <b>P-values</b> | <b>Result</b> |
|--|----------------------------------|-----------------|---------------|
| There is no difference in farm incomes between Livunzu cooperative members and non-members | -443713.7                        | .000            | Rejected      |

### **4.3 Impact on Profitability**

In order to investigate the influence of production variables on the profitability of rice farm enterprises, a regression analysis was carried out. The analysis was conducted on the variables of profitability, production costs, selling price, amount produced, and gross revenue. Table 5 presents the results obtained from the regression analysis.

**Table 4: Results of rice farming profitability for cooperative members and non-member rice farmers**

| <b>Variables</b>                  | <b>Coefficients</b> | <b>Std. Error</b> | <b>P-<br/>Value</b> |
|-----------------------------------|---------------------|-------------------|---------------------|
| <b>(Constant)</b>                 | -80.77171           | 42.2847           | 0.057               |
| <b>PC</b>                         | -.23867             | 0.01411           | 0.000               |
| <b>P</b>                          | 1.7014              | 0.90856           | 0.000               |
| <b>Q</b>                          | .94024              | 0.57177           | 0.271               |
| <b>TR</b>                         | .05164              | 0.00517           | 0.000               |
| <b>Number of<br/>observations</b> |                     |                   | 293                 |
| <b>F (4,288)</b>                  |                     |                   | 94.06               |
| <b>Prob &gt;F</b>                 |                     |                   | 0.000               |
| <b>R-Squared</b>                  |                     |                   | 0.566               |

The results revealed that, apart from the amount produced, production costs, selling price, and gross revenue, all other variables were significant predictors of profitability. The production costs involve all the expenses incurred in cultivation of the rice crop including land preparation, planting materials, fertilizers, labour, machinery, irrigation and equipment, pests and disease management harvesting and other operations. These factors have a direct effect on the profitability of rice farming. They may vary depending on the location of the farm, cultural practices involved and economies of scale which calls for checks and optimisation of the cultivation expenses to improve profitability of rice farming (USDA, 2021). The selling price of the rice is mainly influenced by market forces of supply and demand as well as policies associated with export and import, preferences of the consumers and other factors. The fluctuation of prices hugely affects the profitability of rice such that the farmers have to always consider the trends on the market, pricing strategies and value addition to secure competitive prices (Rice Yearbook, 2021). Gross revenue increase is achieved through efficient production practices, target market analysis, integration of rice value

chain and development of strong relationship with off-takers to enable availability of reliable markets (Rice Outlook,2021). Referring to the above table, Specifically, the coefficient ( $\beta = -0.23$ ,  $P < 0.05$ ) of production costs had a significant negative relationship with profitability. This means that for every unit increase in production costs, profitability decreases by 0.23 units. In other words, rice farmers who incur higher production costs will experience a greater reduction in their profits. These findings are consistent with those of a study by Tefera (2016), which also found that production costs have a negative impact on profits. Tefera, established that production costs eat into profits, highlighting the importance of managing these costs to ensure the profitability of rice farming operations.

The coefficient ( $\beta = 1.0179$ ,  $P < 0.05$ ) of unit selling price was also found to have a significant positive relationship with profitability. This means that, all other factors being equal, rice farmers who can command a higher selling price are more likely to be profitable. Specifically, a unit increase in selling price results in a profitability increase of 1.0179 units. This finding is consistent with the results of a study by Vidal-Sanz et al.,(2014), which also found that increasing the unit price of produce can lead to higher profitability for farmers.

The coefficient ( $\beta = 0.94$ ,  $p > 0.05$ ) indicates an insignificant positive relationship between the amount produced and profitability, meaning that an increase in yield only slightly increases profitability by 0.94 units. This suggests that the cost effects of increasing inputs to boost yield may offset the benefits. In contrast, other studies, such as those by Mafongoya et al. (2016) and Atakli and Agbenyo (2020), found a highly significant relationship between yield and profitability for farmers.

The coefficient ( $\beta = 0.0005$ ,  $p < 0.05$ ) indicates a significant positive relationship between gross revenues and profitability, with a unit increase in gross revenue leading to a corresponding increase of 0.0005 units in profitability. Therefore, the more rice farmers sell, the more likely they are to make profits. This finding is consistent with the results of a study conducted by Adams et al. (2021) which also showed that total revenues have a positive impact on profitability.

As the study aimed to investigate whether cooperative membership has an impact on the profitability of smallholder farmers. The results of the t-test, indicated a significant difference in profitability, with cooperative members being more profitable than non-members. This finding suggests that cooperative membership has a positive effect on the profitability of smallholder farmers, and members experience higher profits than non-members.

Regarding hypothesis 2, the study rejects the null hypothesis that cooperative members' farms are unprofitable. The results show that cooperative members are profitable, indicating that cooperative membership has a positive impact on the profitability of smallholder farmers. These findings are consistent

with previous studies by Grant (2019), Soane et al. (2012), and Rothmann and Baumann (2014), which reported that cooperative membership significantly improves the incomes and profitability of member farmers.

Cooperative membership provides smallholder farmers with access to resources, such as inputs, credit facilities, and markets, which are essential for enhancing profitability. Additionally, cooperative membership enables members to benefit from economies of scale, lowering production costs and increasing profits.

**Table 5: Hypothesis test results for Profitability of rice farming among cooperative and non-cooperative member rice farmers.**

| <b>Research Hypothesis</b>                                 | <b>t-values</b> | <b>P- values</b> | <b>Result</b> |
|--|-----------------|------------------|---------------|
| <b>Livunzu cooperative members' farms are unprofitable</b> | 0.931           | .000             | Rejected      |

#### **4.4 Characterization of commercialization among rice farmers**

This section of the study presents the findings regarding the categorization of rice farmers based on the HCI, input and output market participation, and market orientation. The extent to which farmers participate in agricultural markets as buyers of inputs is referred to as input market participation. Second, output market participation refers to the extent to which farmers sell agricultural produce in agricultural markets. Market orientation, on the other hand, in this study referred to the extent to which farmers use market knowledge as a basis for making decisions on what to produce, how to produce, and how to market (Okoye et al., 2020; Fuetsch,(2022)).

##### **4.4.1 Input market participation**

As mentioned earlier, input market participation refers to the decision made by farmers to obtain some or all of their agricultural inputs from the market. Agricultural commercialization takes place on the input side when farmers start using purchased inputs, as defined by Liverpool-Tasie et al., (2013). In line with this definition, the study aimed to evaluate farmers' input usage as an indicator of their degree of commercialization on the input side.

To determine the farmers' use of purchased inputs, the first step was to inquire whether they had purchased any rice production inputs at all. The study's findings revealed that all of the respondents (100.0%) had purchased and or contributed funds to the market for labor, machinery, and other related inputs for rice production (as shown in Table 7). This indicates that rice farming households have a high level of participation in input markets, implying that farmers who invest in inputs, hire labor, and use machinery participate in the input market. Additionally, this shows the use of inputs that were purchased and the allocation of resources to businesses that were more marketable, which suggests a medium level of commercialization (Takeshima et al., 2017).

**Table 6: Investment Cost in rice Production**

| <b>Cooperative membership</b>   | <b>Mean Costs (MWK)</b> |                 | <b>p-value</b> |
|---|-------------------------|-----------------|----------------|
|   | <b>Yes</b>              | <b>No</b>       |                |
| Cost of land/farm hire  | 19,200.00 (30)          | 10,000.00 (3)   | .002           |
| Land preparation costs (Ploughing, Harrowing, Ridging), seed; planting (Transport to the field, labour for planting, nursery preparation) | 80,382.84 (134)         | 57,194.97 (159) | .035           |
| Expenditure on fertilizers(Basal and Top dressing) and fertilizer application(Transport to field, labour)                                 | 87,544.78 (134)         | 39,069.00 (159) | .000           |
| Expenditure on weed control(herbicides, labour, hand weeding, transport to field)   | 8,649.25 (134)          | 11,818.47 (157) | .152           |
| Expenditure on pests & disease control(Bird Scaring, pesticides, labour)  | 852.24 (134)            | 830.19 (159)    | .924           |
| Irrigation costs(water, labour for irrigation)  | 6,111.94 (134)          | 3,345.91 (159)  | .000           |
| Harvesting costs (Cutting, Threshing & winnowing, transport from the field)? (magnitude)  | 59,705.22 (134)         | 30,279.89 (159) | .000           |
| Storage costs(Bags, dusting, application labour, stacking labour)   | 24,920.15 (134)         | 6,045.91 (159)  | .000           |
| Transport costs to the market   | 10,839.55 (134)         | 1,971.23 (146)  | .001           |

Table 17, shows the mean costs (in MWK) for various inputs and activities in rice production, comparing between the cooperative members and non-members. The results indicate that cooperative members have significantly higher costs than non-members for land/farm hire (MWK 19,200; MWK 10,000,  $p=.002$ ), land preparation costs, seed, and planting (MWK 80,382.84; MWK 57,194.97,  $p=.035$ ), expenditure on fertilizers and fertilizer application (MWK 87,544.78; MWK 39,069.00,  $p=.000$ ), irrigation costs (MWK 6,111.94; MWK 3,345.91,  $p=.000$ ), harvesting costs (MWK 59,705.22; MWK 30,279.89,  $p=.000$ ), transport costs to the market (MWK 10,839.55; MWK 1,971.23,  $p=.001$ ).and storage costs (MWK 24,920.15; MWK 6,045.91,  $p=.000$ ). On the other hand, it is also observed that non-members spend more

on weed control (MWK 11,818.47; MWK 8,649.25,  $p=.152$ ). However, there is no significant difference between cooperative members and non-members in expenditure on pest and disease control (MWK 830.19; MWK 852.24,  $p=.924$ ) and on weed control.

The results suggest that cooperative membership can increase the costs of various inputs and activities in rice production, such as land preparation, fertilizers, irrigation, harvesting, and storage. This could be due to various factors, such as access to credit, information, and services. The cooperative members may have better access to inputs and services that can improve their productivity and profitability, such as quality seeds, fertilizers, and irrigation systems.

Furthermore, based on the results, it is suggested that cooperative membership can increase commercialization and participation in input use. Moreover, the increased commercialization and participation in input use observed among cooperative members in this study aligns with the literature that suggests that cooperatives can facilitate farmers' market access and participation (FAO,2015). The higher transportation costs incurred by cooperative members may be an indication of their increased market participation and willingness to sell their produce commercially (Jin et al.,2017). Additionally, cooperative members may have better access to inputs, such as fertilizers and irrigation, which can increase their productivity and profitability (Ejeta & Mulugeta, 2018; Mithöfer et al., 2020).

The results also suggest that there are cost advantages to cooperative membership, particularly in terms of land preparation, fertilizers, irrigation, harvesting, and storage. However, further research is needed to explore the mechanisms behind these differences and to identify strategies to increase the participation of smallholder farmers in cooperatives.

#### **4.4.2 Output Market Participation**

Participation in the output market is when farmers choose to sell some or all of their produce on the market. The vast majority of study participants admitted to selling some of their harvested rice. Overall, this shows that rice farmers are actively participating in the output market. This demonstrates how rice

farmers can make money from the sale of the rice they grow. This is consistent with research by World Bank (2016) who found that rural rice farmers prefer to sell their harvest rather than use it for domestic consumption. In some cases, farmers are compelled to sell their rice because of local demand, and in other cases they do so to generate income. The study results also show a high percentage of market participation by rice farmers (99.3%), who reported selling their rice harvest (Table, 8). According to the study, however, some farmers did not sell their harvest, citing reasons such as insufficient harvest, preference for household consumption, or lack of interest in taking the rice harvest to the markets. This trend was more common in areas farther from local/central district markets. These findings are consistent with previous studies by Omiti et al., (2017), which suggest that farmers who do not produce a surplus are more likely to prioritize household consumption over market supply.

**Table 7: Output, Rice Consumed, Sold and HCI results for rice farmers**

| Description                  | Group membership |                |        |                |
|------------------------------|------------------|----------------|--------|----------------|
|                              | Yes              |                | No     |                |
|                              | Mean             | Std. Deviation | Mean   | Std. Deviation |
| <b>Total harvested (MWK)</b> | 1527.64          | 1569.87        | 75.79  | ,741.92        |
| <b>Total consumed (MWK)</b>  | 264.81           | 306.75         | 207.84 | 581.56         |
| <b>Total sold (MWK)</b>      | 1262.83          | 1466.58        | 767.95 | 756.89         |
| <b>HCI</b>                   | 0.82             | 0.63           | 0.72   | 0.35           |

To further explore farmers' participation in output markets, the study looked at market accessibility and its impact on pricing. The findings indicated that farmers faced transportation challenges and lacked access to certain markets, which affected the prices they received for their rice. This aligns with the study's observations on the average price of rice sold by farmers, which varied greatly, with a maximum price of MWK1,200.00 and an average price of MWK417.00 per kg. Additionally, the study found that cooperative members received a higher average price than non-members, with means of 1262.83 and 767.95 respectively. Further analysis of the data showed a significant relationship ( $r=.833$ ,  $p=0.05$ ) between the market where rice was sold and the price received by farmers, indicating that market access plays a crucial role in determining the prices at which farmers can sell their rice.

Out of the 293 respondents, 235 stated that they had access to value addition. However, this could potentially act as a deterrent to smallholder commercialization as farmers may see lower returns on their investment. Despite this, the study found that the majority of farmers still sold unprocessed rice, indicating that they were able to sell their produce without processing. This could be due to several reasons, such as a lack of access to cooperatives or farmers' preference to sell their rice due to high demand, leading them to see no need to invest time and money in processing when the market was readily available.

To determine the level of commercialization among rice farmers, the study used the Household Commercialization Index (HCI) (Table 8 and 9). The HCI was calculated based on the percentage of output sold, with a higher index value indicating more output sold and a higher level of commercialization. Conversely, a value of zero indicated a completely subsistence-oriented household. The study's findings indicated that respondents had an average HCI of 0.76, indicating that 76% of the rice harvested was sold. This was consistent with the definition of commercialization by Haggblade & Diallo (2017), who identified households with an index value of 0.5 or higher as commercially oriented, while those with lower or no sales were subsistence oriented. Additionally, Benin & Sauer (2017) stated that commercial farmers sell more than 75% of their produce. To calculate the HCI, the study used the ratio of the gross value of all produce sold to the gross value of total produce, following the recommendation of Strasberg et al. (1999) cited in Agwu et al. (2013). The HCI was calculated for each respondent using this formula, and a mean HCI was obtained.

The study conducted further analysis to distinguish farmer group members from non-members and revealed only a minor difference in their mean HCI. Table 8 shows that respondents who were not cooperative members had a lower mean HCI of 0.72 compared to 0.82 in the membership group, indicating that cooperative members are more likely to sell more of their output than non-members. These findings do not agree with Sugden's (2021) finding that non-group members sold more vegetables than group members. Nonetheless, these results demonstrate that farmer's market participation is high, and their levels of commercialization are relatively close to high, fitting the semi-commercial system level of market orientation (Haggblade & Diallo, 2017).

Table 9 displays the distribution of rice farmers based on their household commercialization indices. It is important to note that the maximum commercialization index achievable is 1 (100%) if the farmers do not consume or give rice as a gift. The range of rice farmers' household commercialization indices was from 0% to 100%. Households with 0 HCI accounted for 2.37% of the total (n=7), indicating that they grow rice primarily for domestic use (food, storage, or gifts). The group with HCIs ranging from 0.1 to 0.769 accounted for 42.32% of the households, while 45.7% had an HCI greater than or equal to the

average. The average HCI of 76.9% indicates that rice farmers still have a 23% (100 - 76.9%) gap to achieve full commercialization in rice production. This implies that approximately 23.1% of rice produced by farming households is consumed by the farming households, while the remainder (76.9%) is oriented towards the market for the general public via market forces.

**Table 8: Distribution of the Farmers by Household Commercialization Indices**

| HCI                 | Frequency | Percentage |
|---------------------|-----------|------------|
| 0                   | 7         | 2.38       |
| 0.1-76.9            | 124       | 42.32      |
| 77-90               | 130       | 44.36      |
| >91                 | 32        | 10.92      |
| <b>Sample total</b> | 293       |            |

The t-test results showed that there was no significant difference in HCI between cooperative members and non-members ( $t=0.61$ ,  $p=0.823$ ), indicating that they have similar levels of human capital investment. However, this finding emphasizes the significant commercialization gap that exists between cooperative members and non-members.

Contrary to hypothesis 3, Table 10 results revealed a significant difference in household commercialization between cooperative members and non-members. The study rejected the null hypothesis and showed that cooperative members have a significantly higher level of household commercialization than non-members. This finding is consistent with other studies that have reported a significant influence of membership in farmer groups on commercialization. For instance, Chinkhata's (2020) study found a significant difference in the commercialization of fish farmers due to membership in farmer groups.

**Table 9: Hypothesis test results for commercialisation between cooperative and non-cooperative rice farmers.**

| <b>Research Hypothesis</b>  | <b>t-values</b> | <b>P-values</b> | <b>Result</b> |
|---|-----------------|-----------------|---------------|
| <b>There is no difference in extent of farm commercialisation between Livunzu cooperative members and non-members</b> | 0.931           | .003            | Rejected      |

#### 4.4.3 Market orientation among farmers

Market orientation, which refers to a farmer's reliance on market information to make production and marketing decisions, was used as a proxy for smallholder commercialization in this study. By using market orientation, the study was able to address issues like distress sales that may not have been possible if only market participation was considered. To assess market orientation, the study identified five indicators based on recommendations from previous studies, including purposeful production for the market, profit consciousness, business planning, investment in production-enhancing technologies, and strong formal links with other value chain actors.

Table 11 showed that rice production was the main crop among respondents, with 52.9% of them engaged in rice farming as their primary crop. This finding suggests that at least half of the farmers engaged in rice farming are commercially oriented. However, the majority of rice farmers were found to be subsistence farmers, which is classified as one of the farming systems based on market orientation. According to Benin and Sauer (2017), subsistence farmers aim to produce for household self-sufficiency or consumption, while semi-commercial and commercial farmers are more market-oriented.

To determine whether farmers take a business approach to production, the study assessed their profit calculation, record keeping, and use of hired labour, among other factors. Table 11 presents the results of this analysis, which showed that farmers who were commercially oriented were more likely to use business practices in their production processes. Specifically, 88.8% and 97% of cooperative members with rice as their primary crop calculated profit and used hired labour, respectively, compared to only 2.5% of non-cooperative members who kept records. The study also found that both cooperative and non-cooperative members had access to value addition facilities, with higher percentages observed among cooperative members. These findings suggest that farmers who engage in rice farming, regardless of membership status in the cooperative, demonstrate elements of business practice and specialize in rice

production. This indicates that farmers are making efforts to better orient themselves to the market through the use of market information, and the system is semi-commercialized. As noted by the Haggblade & Diallo (2017), se findings indicate that farmers' market participation is relatively high. The farmers market participation allows the farmers connect directly with the consumers, bypassing intermediaries and gaining greater control over the marketing process(Boudreau et al.,2017). The farmers have a platform where they directly interact with consumers, build relationships and establish trust which facilitates the sharing of information about farming practices, varieties and answer questions, enhance the buyer confidence in their rice produce In high market participation, farmers are able to capture a large share of the retail price as they are selling direct to the consumers, eliminating the middlemen and negotiate prices that reflect the true value of their rice produce(USDA,2013).The direct interaction with the consumers enable the farmers to get feedback from the consumers about their produce directly, enabling them to gauge preferences, understand the market needs and improve their produce accordingly.

**Table 10: Indicators of market orientation of respondents**

|                                     | <b>Members</b> |        | <b>Non members</b> |        |
|-------------------------------------|----------------|--------|--------------------|--------|
| <b>Rice is main crop</b>            | 47.1%          |        | 52.9%              |        |
| <b>Market orientation indicator</b> | Yes (%)        | No (%) | Yes (%)            | No (%) |
| <b>Profit calculation</b>           | 88.8           | 11.19  | 33.96              | 66.03  |
| <b>Value addition access</b>        | 100            | 0      | 63.52              | 36.47  |
| <b>Storage facility access</b>      | 82.08          | 17.91  | 8.17               | 91.82  |
| <b>Record keeping</b>               | 59.70          | 40.29  | 2.51               | 97.48  |
| <b>Use of Hired labour</b>          | 97.01          | 1.49   | 53.45              | 25.15  |

## **CHAPTER V**

### **CONCLUSION AND RECOMMENDATIONS**

#### **5.1 CONCLUSION**

This study sought to assess the economic impact contribution of agricultural cooperatives on smallholder farmers: a case of Livunzu cooperative rice farmers in Chikwawa District, Malawi. The study combined quantitative and qualitative data collection and analysis methods. Quantitative data were collected through semi-structured questionnaires administered to cooperative members and non-members from studied area, while qualitative data were collected using face-to-face interviews with key informants. This chapter presents the conclusions and the recommendations arising from the findings of the study objectives.

##### **5.1.1 Socio-Economic impact of cooperatives on rice farmers**

The study found that farmer organizations provide economic benefits to their members, the study examined socio-economic outcomes including gross incomes, profitability, and HCI, using data survey of 293 rice farming households. The study used the PSM-a treatment effects model to account for potential selection bias that arises from the fact that cooperative members and non-members are systematically different in terms of both observable and unobservable factors. Additionally, the study also utilized the t-test to establish differences between the groups.

The study's empirical results revealed that cooperative membership had a significant impact on rice farmers' incomes. According to the ATT estimations, being a cooperative member meant earning an average income of MWK449,236.00 higher than non-members. Additionally, a t-test analysis showed that member rice farmers earned MWK443,713.70 more than non-members.

Regarding incomes, the study found a significant difference between cooperative members and non-members. Furthermore, a significant gap in profitability was also established between the two groups. The findings also indicated a significant difference between the two groups in their HCI levels. Therefore, based on the observations, all three hypotheses under consideration were rejected since the findings did not support them.

According to the study's findings, the formation of cooperative groups is crucial for the commercialization of rice farming among its members. This is because at least half of the group's members

report having better access to input and output markets and a better understanding of the market. The study found that a significant proportion of farmers sell their rice inadvertently rather than on purpose, and their level of sales exceeds the cut-off that identifies farmers operating under semi-commercial systems. However, farmers did not invest much money into purchasing commercial inputs from markets and had low participation in the input market. Nevertheless, the study also demonstrates that farmers exhibit semi-commercialization level characteristics, as evidenced by their use of purchased inputs and hired labour, which confirms their participation in the input market. Furthermore, the study shows that farmers' participation in the market classifies them as semi-commercial system level, as they demonstrate traits such as using market data and calculating profit, among other things.

Overall, the study shows that smallholder rice farmers gain from cooperatives, and the growth of cooperative organizations is advantageous for them. It encourages an improvement in the socioeconomic status of the farmers on some indicators. Therefore, future public support and guidance for agricultural cooperatives are warranted. In practice, it is best to encourage the growth of such organizations.

## **5.2 RECOMMENDATIONS**

The study therefore makes the following recommendations

- 1- Government and development partner NGOs should support the rice farmers who are already participating in cooperatives to improve their rice farming operations towards more commercialization. This will assist the farmers to gain advantage of governance structures, market power, and production modalities.
- 2- Government and development partner NGOs should assist in the improvement of the rice value chain, in particular focusing on strengthening the input markets.
- 3- Government and development partner NGOs should provide rice farmers with more business-oriented training to improve entrepreneurial mindsets.
- 4- Further research should be conducted to find out the determinants of market participation in the input and output markets of rice products and resources.

## **REFERENCES**

- Adams, F., Wongnaa, C. A., & Coleman, E. (2021). Profitability and choice of marketing outlets: evidence from Ghana's tomato production. *Journal of Agribusiness in Developing and Emerging Economies*, 11(3), 296-312.
- African Institute of corporate Citizenship-AICC (2016). *Malawi Rice Outlook*.
- Agwu, N. M., Anyanwu, C. I., & Mendie, E. I. (2013). Socio-economic determinants of commercialization among smallholder farmers in Abia State, Nigeria (No. 309-2016-5233).
- Arouna, A. (2018). Assessing the impact of collective marketing of paddy Rice in Innovation Platforms by Smallholder Producers in Benin. In *Rice Crop-Current Development*. Intechopen.
- Atakli, B. A., & Agbenyo, W. (2020). Nexus between financial inclusion, gender and agriculture productivity in Ghana. *Theoretical Economics Letters*, 10(03), 545.
- Awotide, B. A., Karimov, A. A., & Diagne, A. (2016). Agricultural technology adoption, commercialization and smallholder rice farmers' welfare in rural Nigeria. *Agricultural and Food Economics*, 4, 1-24.
- Barron, J., & Ricks, J. 2015. "Local Institutions, Cooperation, and the Collective action problem: Evidence from rural development programs in Nicaragua. ." *World Development*, 74, . 353-365.
- Benin, S., & Sauer, J. 2017. " Trends in Agricultural Commercialisation in Africa: Results from Household Surveys in Six Countries. ." *World Development*, 96, 348-363.
- Bessette, G. 2015. "Youth and Land: Generational Succession and land rights in rural communities. ." *Focus on Land in Africa*, 65.
- Bijman, J. Illiopoulos. (2014). Farmers' cooperatives in the EU. Policies, strategies, and organization, *Annals of Public and Cooperative Economics*. 85,, 497-508.
- Birchall, J. 2017. " Cooperatives, Collectives and Commons: alternative ways of organising, producing and distributing. ." *Journal of Entrepreneurial and Organisational Diversity*, 6(1), 1-16.
- Boudreau, M., Broussard, S., & Rikard, E. 2017. "The role of local farmers' Markets in Sustainable Agriculture Development. ." *Journal of Environmental Sustainability*. 6(1), . DOI:10.14448/jes.01.0002. 23-37.
- Chagwiza, C., Muradian, R., & Ruben, R. (2016). Cooperative membership and dairy performance among smallholders in Ethiopia. *Food policy*, 59, 165-173. `

- Chirwa E., Dorward A., Kachule R., Kumwenda I., Kydd J., Poole N., Poulton C., Stolckbridge M. (2015). Farmer organisations for market access: Principles for policy and practice. DFID Report.
- Delali, G. K., & Mingle, J. A. A. 2015. " Youth Participation in Agriculture in the Hohoe municipality of Ghana: Challenges and prospects. ." *Journal of development and Agriculture Economics*, 7(8) 296-304.
- Doss, C. R., & Mwangi, W. 2015. " The role of collective action in enhancing farmers' access to credit: Empirical evidence from Tanzania. ." *World Development*, 74,. 397-407.
- Ejeta, M., & Mulugeta, T. (2018). Agricultural cooperatives and farmers' livelihoods in Ethiopia: A review. *Cogent Food & Agriculture*, 4(1), 1-15.
- FAO. (2013). Strengthening organizations and collective action in Rice production. A way forward in implementing the international guidelines for securing sustainable small-scale rice farming,. FAO Workshop 18–20 March 2013, Rome, Italy.
- FAO. (2014). Assessing the policy environment for cash crops in Malawi: What could hinder the achievement of National Export Strategy Objectives? Rome.
- FAO. (2017). Assessing the policy environment for cash crops in Malawi: What could hinder the achievement of the National Export Strategy objectives? . Rome.
- FEWS-Net. (2016). Malawi Food Security Status.
- Financial Access for Rural Markets and Smallholder Enterprise programme (FARMSE). (2017). Design completion report for Malawi.
- Food & Agriculture Organisation of the United Nations (FAO) 2015. " Farmer Organisation for Resource Management and Market Access. ." Retrieved from <http://www.fao.org/3/a-i4479e.pdf>.
- Fuetsch, E. (2022). Innovation in family farms: the roles of the market, the family, and farm performance. *Journal of Small Business Strategy*, 32(2), 83-103.
- Fulton, M., & Giannakas, K. 2018. " Cooperatives, Competition, and Product quality." *Journal of agricultural and Food Industrial organisation*, 16(10) 1-14.
- Fyles, H., & Madramootoo, C. (2016). Key drivers of food insecurity. In *Emerging technologies for promoting food security* (pp. 1-19). Woodhead Publishing.
- Giancarlo, B., Gianmarco, C., Corsi, A., Marilisa, L., & Mazzarino, S. (2020). The « Pergola Valdostana and Heroic Viticulture in aosta valley (italy): A Case Study on a Traditional Wine-growing system. *Annales. Series Historia et Sociologia*, 30(1), 99-112.

- GoM (Government of Malawi), Ministry of Trade. Farmer Organisation development Strategy (FODS) (2020-2025).
- GoM (Government of Malawi). 2019. National Food and Nutrition Security Forecast. . Bulletin No.12/16 Volume 1. .
- Haggblade, S., & Diallo, B. 2017. " Agricultural Commercialisation and Food Security: Linkages and Pathways. ." *Food Security*, 9(5),. 945-960.
- Hao J., Bijman J., Garden B. C., Heerink N., Heijman W., Huo X., (2018) Cooperative membership and farmers' choice of marketing channels – Evidence from apple Wagenin, Netherlands.
- Jayne, T.S., Chamberlain, J., & Headey, D.D. 2014. " Land Pressures, the evolution of farming systems, and development strategies in Africa: Food Policy." *Food Policy* 48 1-17.
- Jin, S., Huang, J., Yang, Q., Rozelle, S., & Zhang, Y. 2017. "The depth of China's Rural Agrarian Transition: Causes and Implications. ." *Food Policy*, 69, . 26-39.
- Kebebe, E., & Shibru, A. 2015. "Determinants of youth participation in agriculture production in Eastern Africa: Evidence from Ethiopia. ." *Journal of rural studies*, 42, 23-32.
- Kirimi, P. M. (2016). Factors influencing fish farming projects: a case of central Imenti constituency, Meru county, Kenya (Doctoral dissertation, University of Nairobi).
- Kumar, A., Saroj, S., Joshi, P., & Takeshima, H. (2018). Does cooperative membership improve household welfare? Evidence from a panel data analysis of smallholder dairy farmers in Bihar, India. . *Food Policy* 75, 24–36.
- Kyaw N. N., Soojung A., Sang H.L (2018). Analysis of the Factors Influencing Market Participation among Smallholder Rice Farmers in Magway Region, Central Dry Zone of Myanmar. *Sustainability* 10(12), 4441.
- Larson, D. F., Muraoka, R., & Otsuka, K. (2016). Why African rural development strategies must depend on small farms. *Global Food Security*, 10, 39-51.
- Liverpool-tasie, L. S., & Readon, T. 2017. " Seed and Fertilizer Subsidies and Smallholder Commercialisation in Nigeria. ." *Food Policy*, 67, 41-51.
- Matarazzo, L., & Casarin, F. 2020. " Cooperatives for Sustainable local development: A social innovation approach. ." *International Journal of sociology and social Policy*, 40(9/10),. 1139-1156.
- Ma W., Abdulai A . (2016). Does cooperative membership improve household welfare? Evidence from apple farmers in China. , *Food Policy*. 58., 94-102.

- Ma W., Renwick A., Yuan P., Ratna N. (2018). Ma W. Agricultural cooperative membership and technical efficiency of apple farmers in China: An analysis accounting for selectivity bias. New Zealand: Department of Global Value Chains and Trade, Faculty of Agribusiness and Commerce, Lincoln University.
- Madola M.V (2016). Determinants of participation in farmer organisation among smallholder farmers in Malawi. Regional Universities Forum for Capacity Building in Agriculture, P.O.Box 16811, Wandegaya, Kampala, Uganda., 122-129.
- Mafongoya, P., Rusinamhodzi, L., Siziba, S., Thierfelder, C., Mvumi, B. M., Nhau, B., ... & Chivenge, P. (2016). Maize productivity and profitability in conservation agriculture systems across agro-ecological regions in Zimbabwe: a review of knowledge and practice. *Agriculture, ecosystems & environment*, 220, 211-225.
- Makiyoni Kingsley. (2020). The role of cooperatives in Agribusiness sustainability. CDF Malawi.
- Mangisoni, J.H., Chigowo, M., and Katengeza, S. (2019). Determinants of adoption of rainwater-harvesting technologies in a rain shadow area of southern Malawi. *African Journal of Agricultural and Resource Economics* Volume 14 Number 2 pages 106-119
- Mango, N., Makate, C., Tamene, L., Mponela, P. 2017. Awareness and Southern Africa. *International Soil and Water Conservation Research*, 5(2), 122-129.
- Martey, E., Al-Hassan, R. M., & Kuwornu, J. K. (2012). Commercialization of smallholder agriculture in Ghana: A Tobit regression analysis. *African Journal of Agricultural Research*, 7(14), 2131-2141.
- Mayala N.M. (2019). Factors Influencing Participation of Smallholder Farmers in Livestock Markets in Mbulu and Bariadi Districts, Tanzania. *East African Journal of Social and Applied Sciences*.
- Meijer, S. S., Sileshi, G. W., Kundhlande, G., Catacutan, D., & Nieuwenhuis, M. (2015). The role of gender and kinship structure in household decision-making for agriculture and tree planting in Malawi. *Journal of Gender, Agriculture and Food Security (Agri-Gender)*, 1(302-2016-4750), 54-76.

- Mithöfer, D., Waibel, H., & Snijders, T. A. (2020). Smallholder farmer's access to agricultural services: The role of cooperatives and farmers' organizations in Burkina Faso. *World Development*, 126, 104712.
- Morrison, T. 2017. " Co-operatives and employee Ownership: A Better Way. In *Humanistic Management in practice* (pp. ). ." Springer, Cham. 197-220.
- Moyo A. B. (2015). Policies for agricultural productivity growth and poverty reduction in rural Malawi. .
- Msuta G., Urassa. A. (2015). Role of Cooperatives in sustainance of livelihoods of rural people:The case of Ngorongoro District in Tanzania.
- Nchanji, E. B., Collins, O. A., Katungi, E., Nduguru, A., Kabungo, C., Njuguna, E. M., & Ojiewo, C. O. (2020). What does gender yield gap tell us about smallholder farming in developing countries?. *Sustainability*, 13(1), 77.
- Nchembi, N. S., & CAMPUS, B. (2017). Factors influencing the use of improved maize seed technology in Kilosa district in Tanzania. Lilongwe University of Agriculture and Natural Resources, Tanzania.
- Nilsson, J., & Nilsson, F. 2018. "Cooperative learning and team performance. ." *Small Group Research*, 49(1),. 72-97.
- Ngabu Meteorological Station, (2017). Weather Focusts.
- NOWEFOR. (2014). Annual Naturative Report of North West Farmers Organisation. Bamenda P.15.
- NSO.(National Statistical office) .2014. Integrated Household Panel Survey. Household Socio-Economic Characteristics Report.
- Ochieng D. O., Botha R., Baulch B. (2019). structure,conduct and performance of maize markets in Malawi. MaSSP working paper 29,;international food policy research institute.
- Ogunniyi, A., Mekonnen, D. A., & Wossen, T. 2020. " Farmers' income diversification and rural transformation in Africa: Evidence from Ethiopia, Kenya, and Nigeria." *World Development*. ,126,104713.
- Okonya, J. S., & Kroschel, J. 2015. " A cross-sectional study of socio-cultural factors affecting participation of smallholder farmers in plant health management in uganda. ." *Agriculture & food Security*, 4(1),20.
- Okoye, A. C., Mbanasor, J. A., & Okoye, B. C. (2020). Market-Oriented or Not: A Gender Situation Analyses of Small Holder Sweet potato Farmers in South East Nigeria. *International Journal of Agricultural Management and Development*, 10(1), 87-100.

- Omiti, J., Otieno, D., & McCullough, E. 2017. " Impact of agriculture commercialisation on rural household welfare in Kenya. ." *Journal of Agricultural Economics*, 68(2), . 493-517.
- Oya, C., & Berdegue, J. 2014. " Rural Wage Employment in Developing Countries." *Theory, Evidence and policy*. Routledge.
- Pascucci S., Bijman J., Omta O. (2013). *Decomposing the Member Relationship in Agricultural Cooperatives: Implications for Commitment*. *Agribusiness* 29(1).
- Priscilla, L., & Chauhan, A. K. (2019). Economic impact of cooperative membership on dairy farmers in Manipur: a propensity score matching approach. *Agricultural Economics Research Review*, 32(1), 117-123.
- Rabbi, F., Ahamad, R., Ali, S., Chandio, A. A., Ahmad, W., Ilyas, A., & Din, I. U. (2019). Determinants of commercialization and its impact on the welfare of smallholder rice farmers by using Heckman's two-stage approach. *Journal of the Saudi Society of Agricultural Sciences*, 18(2), 224-233.
- Royer A., Bijman J., Blitzer V.N . (2016). Linking smallholder farmers to high quality food chains: Appraising institutional arrangements, in J. Bijman and V. Bitzer eds., *Quality and innovation in food chains: Lessons and insights from Africa*. Wageningen : Wageningen Academic Publishers.
- Salau S., Omotesho O., Muhammad-Lawal A., (2018) *Agricultural Commercialization, Fertilizer Use and Non-Farm Employment: What Options for Smallholder Farmers in Nigeria?* World Bank, Agriculture, Nigeria, 2: University of Ilorin, Department of Agricultural Economics and Farm Management, Nigeria
- Silverman, D. (2005). *Doing Qualitative Research* (second Ed.). London. Thousand oaks. New Delhi: SAGE Publications.
- Schultz, C. J., & Adams, K.M. 2019. "Worker Cooperatives and Local Economic Development: A Community wealth Building Framework. ." *Economic Development Quarterly*, 33(4), 343-356.
- Stephanie, W. (2013). *Qualitative Research in Healthcare*. .
- Sugden, F., Agarwal, B., Leder, S., Saikia, P., Raut, M., Kumar, A., & Ray, D. (2021). Experiments in farmers' collectives in Eastern India and Nepal: Process, benefits, and challenges. *Journal of Agrarian Change*, 21(1), 90-121.
- Takeshima, H., & Hatzenbuehler, P.L. 2017. " Public investment in and for agriculture: An Emperical contribution to SDG2. ." *World Development*, 9,. 115-126.

- Tefera D.A., Bijman J., Singerland M. (2016). Smallholder Integration into the changing value chains:a study of emerging malt barley industry in Ethiopia. IBM Working paper,Wageningen.
- Trebbin A . (2014). Linking small farmers to modern retail through producer organizations—experiences with producer companies in India. . Food Policy 45, 35–44,
- United States Department of Agriculture(USDA), Economic Research Service. 2021. " "Rice Outlook". ." Source: <https://www.ers.usda.gov/topics/crops/rice/rice-outlook/>.
- United States Department of Agriculture(USDA), Economic Research Service. 2021. " "Rice Yearbook". ." Source: <https://www.ers.usda.gov/webdocs/publications/99790/riceyearbook2021.pdf>.
- United states Department of Agriculture(USDA), Economic Research Service. 2021. " "Farm Production Expenditures". ." Source: <https://www.ers.usda.gov/topics/farm-economy/farm-sector-income-finances/farm-production-expenditures/>.
- Vidal-Sanz, J. M., Estaban-Bravo, M., and Martinez-de-Albeniz, V. 2014. "Price Elasticity and Profitability. Examining the relationship between price elasticity and profitability."
- Van der Straaten, J. (2020). Identification for Development It Is Not: ‘Inclusive and Trusted Digital ID Can Unlock Opportunities for the World’s Most Vulnerable.’-a Review. Available at SSRN 3742736.
- World Bank. 2016. " Farmer Organisations for Market access." Retrieved from <https://openknowledge.worldbank.org/handle/10986/24108>.
- Wossen, T. Abdoulaye T., Alene A.,Haile M.G., Feleke S.,Olanrewaju A., Manyong V. (2017). Impacts of extension access and cooperative membership on technology adoption and household welfare. . Journal of Rural Studies., 54-223.
- Yajamanya, R. V., & Singh, N. K. (2022). Analytical Study on the Cost and Returns on Milk Production of Members and Non-Members OF Jaipur Dugdh Utpadak Sahakari Sangh Limited, Rajasthan. Journal of Positive School Psychology, 694-704.
- Zuka, S. P. (2019). Customary Land titling and inter-generational wealth transfer in Malawi: Will secondary Land rights holders maintain their Land rights? Land Use Policy, 81, 680-688.

## APPENDICES

**Appendix1: Survey Questionnaire**

## Respondent Consent

Hello, i am Jones Kingsdale Chitheka, a Master of Agribusiness student of Deponegoro University in Indonesia, I am researching on the research topic "Economic Impact of Cooperative on smallholder farmers producing rice at Livunzu EPA Cooperative in Chikwawa".

**Is it okay to ask you questions?**

Yes

No

**General Questions**

**What is the name of the household head?**

**What Traditional authority are you from?**

TA Katunga

TA Makhwira

**What village do you come from?**

**Gender of the household head?**

Male

Female

Other (please specify)

**Age group of the household head?**

**What is the marital status of the household head?**

- Single
- Married
- Divorced
- Widowed

**The highest level of education of the household head?**

- Tertiary level
- Secondary level
- Primary level
- Illiterate

**Number of household members?**

**Number of household members in school?**

**Do you belong to a cooperative?**

- Yes
- No

**If yes, why did you join a cooperative?**

- Access to Subsidies
- Access to loans/Grants
- Access to good markets
- Irrigation facility
- Value addition opportunities
- Joined others
- Other (please specify)

**What are the benefits you get from the cooperative?**

- Subsidies
- Grants/loans
- Extension advice
- Irrigation facility
- Good Markets
- Value addition opportunities
- Other (please specify)

**Do you own farm land?**

- I own the farm land
- I rent the farm land
- I neither rent nor own the land
- Other (please specify)

**If rented, how much fee do you pay annually?**

**Whats the land size for your household?**

- Less than a ha
- Between 1 to 2ha
- at most 3ha
- at least 3ha

**Do you produce rice as the main crop?**

- Yes
- No
- Somehow

**How much of the land is committed to rice production?**

**What other crops do you produce?**

- Pulses
- Vegetables
- Fruits
- Maize
- Other (please specify)

**How many kilograms of rice did you produce in the previous growing season?**

**How many kilograms did you offer for sale?**

**What was the unit selling price?**

**What is your main income source?**

- Day labour/casual labour
- Salaried worker
- Small trading activities
- Agriculture
- Other (please specify)

**What is the total annual household expenditure?**

**Do you use any farm machinery/equipment ?**

- Yes
- No
- Sometimes

**If yes/sometimes, what farm machinery or equipment do you use?**

**At how much did you buy it/hire fee?**

**When was it purchased?**

**Do you use hired labour on your farm?**

- Yes
- No
- Sometimes

**In the previous growing season, how much did you spend on fertilizers for rice only?**

**How much did you spend on herbicides for rice only?**

**How much did you spend on seed for rice only?**

**How much did you spend on pesticides for rice only?**

**Other expenses e.g rentals, machinery /equipment hire e.t.c?**

**Did you plant your rice in good time?**

- Yes
- No
- I dont know

**How many times do you grow rice per year?**

- Once
- Twice
- Thrice
- Other (please specify)

**How many times do you carry out weeding on your rice farm?**

- Once
- Twice
- Rarely
- I use herbicides
- I dont weed my field

**How many times do you apply fertilizers in a growing cycle on rice field only?**

- Once
- Twice
- I dont use fertilizers

**How do you control pests and diseases in your rice field?**

- I apply pesticides
- Physical control
- Mechanical control
- Integrated management
- Other (please specify)

**In the previous season did you harvest your rice on time?**

- Yes
- No
- I dont know

**Do you have access to storage facility for your rice?**

- Yes
- No
- Sometimes

**Is your rice properly dried before storage?**

- Yes
- No
- Im not sure

**How do you transport your rice produce from the farm?**

- Carry on the head
- Pushbikes
- Ox-cart
- Hire a vehicle
- Cooperative provides transport
- Sale on the farm

**Do you have access to value addition facility for rice?**

- All the time
- Sometimes
- No access

**How far is the market from your home?**

- Less than a Kilometer
- Between 1 to 3 kilometers
- At most 7 kilometer
- At least 10 kilometers

**How far are cooperative offices from your home?**

- Less than a kilometer
- About 1 to 3 Kilometers
- At most 7 Kilometers
- At least 10 Kilometers

**Do you keep farm records for rice?**

- Yes
- No

**What records do you keep?**

- Yield
- Inputs
- Dates of farm operations
- Income
- Expense receipts
- Invoices
- Bank statements
- weather(rainfall, wind e.t.c)
- Other (please specify)

**Do you calculate your profits from rice after sale of produce?**

- Yes
- No

## Appendix2: Socio-Demographic characteristics of respondents

### What Traditional authority are you from?

|       |             | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------------|-----------|---------|---------------|--------------------|
| Valid |             | 52        | 17.7    | 17.7          | 17.7               |
|       | TA Makhwira | 237       | 80.9    | 80.9          | 98.6               |
|       | TA Katunga  | 4         | 1.4     | 1.4           | 100.0              |
|       | Total       | 293       | 100.0   | 100.0         |                    |

### What village do you come from?

|       |                        | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|------------------------|-----------|---------|---------------|--------------------|
| Valid | Chagalang'anda         | 137       | 46.8    | 46.8          | 46.8               |
|       | Kubalalika             | 3         | 1.0     | 1.0           | 47.8               |
|       | Kwataine               | 4         | 1.4     | 1.4           | 49.1               |
|       | Maida                  | 2         | .7      | .7            | 49.8               |
|       | Maseya-kwataine        | 2         | .7      | .7            | 50.5               |
|       | Maseya-Kwataine        | 36        | 12.3    | 12.3          | 62.8               |
|       | Maseya-Maide           | 6         | 2.0     | 2.0           | 64.8               |
|       | Maseya-Ndapema         | 2         | .7      | .7            | 65.5               |
|       | Maseya-ndapima         | 2         | .7      | .7            | 66.2               |
|       | Maseya-Nkhondo ya lero | 2         | .7      | .7            | 66.9               |
|       | Maseya-Samu            | 4         | 1.4     | 1.4           | 68.3               |
|       | Mmodzi                 | 3         | 1.0     | 1.0           | 69.3               |
|       | Mwiza                  | 6         | 2.0     | 2.0           | 71.3               |
|       | Samu                   | 2         | .7      | .7            | 72.0               |
|       | Ulaya                  | 82        | 28.0    | 28.0          | 100.0              |
|       | Total                  | 293       | 100.0   | 100.0         |                    |

### Gender of the household head?

|       |        | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|--------|-----------|---------|---------------|--------------------|
| Valid | Female | 152       | 51.9    | 51.9          | 51.9               |
|       | Male   | 141       | 48.1    | 48.1          | 100.0              |
|       | Total  | 293       | 100.0   | 100.0         |                    |

### What is the marital status of the household head?

|       |          | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|----------|-----------|---------|---------------|--------------------|
| Valid |          | 13        | 4.4     | 4.4           | 4.4                |
|       | Single   | 15        | 5.1     | 5.1           | 9.6                |
|       | Married  | 214       | 73.0    | 73.0          | 82.6               |
|       | Divorced | 5         | 1.7     | 1.7           | 84.3               |
|       | Widowed  | 46        | 15.7    | 15.7          | 100.0              |
|       | Total    | 293       | 100.0   | 100.0         |                    |

### The highest level of education of the household head?

|       |                 | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-----------------|-----------|---------|---------------|--------------------|
| Valid | Secondary level | 53        | 18.1    | 18.1          | 18.1               |
|       | Primary level   | 138       | 47.1    | 47.1          | 65.2               |
|       | Illiterate      | 102       | 34.8    | 34.8          | 100.0              |
|       | Total           | 293       | 100.0   | 100.0         |                    |

### Number of household members?

|       |       | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------|-----------|---------|---------------|--------------------|
| Valid | 2     | 10        | 3.4     | 3.4           | 3.4                |
|       | 3     | 38        | 13.0    | 13.0          | 16.4               |
|       | 4     | 72        | 24.6    | 24.6          | 41.0               |
|       | 5     | 57        | 19.5    | 19.5          | 60.4               |
|       | 6     | 25        | 8.5     | 8.5           | 68.9               |
|       | 7     | 54        | 18.4    | 18.4          | 87.4               |
|       | 8     | 31        | 10.6    | 10.6          | 98.0               |
|       | 9     | 3         | 1.0     | 1.0           | 99.0               |
|       | 10    | 3         | 1.0     | 1.0           | 100.0              |
|       | Total | 293       | 100.0   | 100.0         |                    |

### Number of household members in school?

|       |   | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|---|-----------|---------|---------------|--------------------|
| Valid | 0 | 21        | 7.2     | 7.2           | 7.2                |
|       | 1 | 66        | 22.5    | 22.5          | 29.7               |
|       | 2 | 83        | 28.3    | 28.3          | 58.0               |
|       | 3 | 89        | 30.4    | 30.4          | 88.4               |
|       | 4 | 9         | 3.1     | 3.1           | 91.5               |
|       | 5 | 20        | 6.8     | 6.8           | 98.3               |

|       |     |       |       |       |
|-------|-----|-------|-------|-------|
| 6     | 3   | 1.0   | 1.0   | 99.3  |
| 7     | 2   | .7    | .7    | 100.0 |
| Total | 293 | 100.0 | 100.0 |       |

### Do you belong to a cooperative?

|       |       | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------|-----------|---------|---------------|--------------------|
| Valid | No    | 159       | 54.3    | 54.3          | 54.3               |
|       | Yes   | 134       | 45.7    | 45.7          | 100.0              |
|       | Total | 293       | 100.0   | 100.0         |                    |

### If yes, why did you join a cooperative?

|       |                              | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|------------------------------|-----------|---------|---------------|--------------------|
| Valid |                              | 121       | 41.3    | 41.3          | 41.3               |
|       | Access to Subsidies          | 44        | 15.0    | 15.0          | 56.3               |
|       | Access to loans/Grants       | 2         | .7      | .7            | 57.0               |
|       | Access to good markets       | 56        | 19.1    | 19.1          | 76.1               |
|       | Value addition opportunities | 12        | 4.1     | 4.1           | 80.2               |
|       | Joined others                | 20        | 6.8     | 6.8           | 87.0               |
|       | Other                        | 38        | 13.0    | 13.0          | 100.0              |
|       | Total                        | 293       | 100.0   | 100.0         |                    |

### If yes, why did you join a cooperative? (Other (please specify)) - specify

|       |                              | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|------------------------------|-----------|---------|---------------|--------------------|
| Valid |                              | 212       | 72.4    | 72.4          | 72.4               |
|       | Access to Subsidies          | 15        | 5.1     | 5.1           | 77.5               |
|       | Access to loans/Grants       | 3         | 1.0     | 1.0           | 78.5               |
|       | Access to good markets       | 52        | 17.7    | 17.7          | 96.2               |
|       | Value addition opportunities | 11        | 3.8     | 3.8           | 100.0              |
|       | Total                        | 293       | 100.0   | 100.0         |                    |

**If yes, why did you join a cooperative? (Other (please specify)) - specify**

|       |                              | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|------------------------------|-----------|---------|---------------|--------------------|
| Valid |                              | 241       | 82.3    | 82.3          | 82.3               |
|       | Access to Subsidies          | 12        | 4.1     | 4.1           | 86.3               |
|       | Access to loans/Grants       | 21        | 7.2     | 7.2           | 93.5               |
|       | Access to good markets       | 9         | 3.1     | 3.1           | 96.6               |
|       | Irrigation facility          | 3         | 1.0     | 1.0           | 97.6               |
|       | Value addition opportunities | 3         | 1.0     | 1.0           | 98.6               |
|       | Joined others                | 4         | 1.4     | 1.4           | 100.0              |
|       | Total                        | 293       | 100.0   | 100.0         |                    |

**Whats the land size for your household?**

|       |                  | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|------------------|-----------|---------|---------------|--------------------|
| Valid | Less than a Ha   | 266       | 90.8    | 90.8          | 90.8               |
|       | Between 1 to 2Ha | 24        | 8.2     | 8.2           | 99.0               |
|       | At most 3Ha      | 2         | .7      | .7            | 99.7               |
|       | At least 3Ha     | 1         | .3      | .3            | 100.0              |
|       | Total            | 293       | 100.0   | 100.0         |                    |

**Do you produce rice as the main crop?**

|       |         | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|---------|-----------|---------|---------------|--------------------|
| Valid | No      | 4         | 1.4     | 1.4           | 1.4                |
|       | Yes     | 282       | 96.2    | 96.2          | 97.6               |
|       | Somehow | 7         | 2.4     | 2.4           | 100.0              |
|       | Total   | 293       | 100.0   | 100.0         |                    |

### How much of the land is committed to rice production? (magnitude)

|       |       | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------|-----------|---------|---------------|--------------------|
| Valid | .05   | 13        | 4.4     | 4.4           | 4.4                |
|       | .10   | 74        | 25.3    | 25.3          | 29.7               |
|       | .15   | 12        | 4.1     | 4.1           | 33.8               |
|       | .20   | 91        | 31.1    | 31.1          | 64.8               |
|       | .25   | 2         | .7      | .7            | 65.5               |
|       | .30   | 8         | 2.7     | 2.7           | 68.3               |
|       | .35   | 12        | 4.1     | 4.1           | 72.4               |
|       | .40   | 48        | 16.4    | 16.4          | 88.7               |
|       | .50   | 4         | 1.4     | 1.4           | 90.1               |
|       | .60   | 6         | 2.0     | 2.0           | 92.2               |
|       | .70   | 3         | 1.0     | 1.0           | 93.2               |
|       | 1.00  | 5         | 1.7     | 1.7           | 94.9               |
|       | 1.20  | 13        | 4.4     | 4.4           | 99.3               |
|       | 2.00  | 2         | .7      | .7            | 100.0              |
|       | Total | 293       | 100.0   | 100.0         |                    |

### What other crops do you produce?

|       |            | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|------------|-----------|---------|---------------|--------------------|
| Valid | 0          | 4         | 1.4     | 1.4           | 1.4                |
|       | Pulses     | 59        | 20.1    | 20.1          | 21.5               |
|       | Vegetables | 2         | .7      | .7            | 22.2               |
|       | Maize      | 149       | 50.9    | 50.9          | 73.0               |
|       | Other      | 79        | 27.0    | 27.0          | 100.0              |
|       | Total      | 293       | 100.0   | 100.0         |                    |

### What other crops do you produce? (Other (please specify)) - specify

|       |              | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|--------------|-----------|---------|---------------|--------------------|
| Valid |              | 118       | 40.3    | 40.3          | 40.3               |
|       | Sweet potato | 142       | 48.5    | 48.5          | 88.7               |
|       | Sesame       | 4         | 1.4     | 1.4           | 90.1               |
|       | 2, s.potato  | 3         | 1.0     | 1.0           | 91.1               |
|       | s.potato     | 26        | 8.9     | 8.9           | 100.0              |
|       | Total        | 293       | 100.0   | 100.0         |                    |

### What is your main income source?

|       |                             | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-----------------------------|-----------|---------|---------------|--------------------|
| Valid | Agriculture                 | 228       | 77.8    | 77.8          | 77.8               |
|       | 4, Day labour/casual labour | 9         | 3.1     | 3.1           | 80.9               |
|       | 4, Other (please specify)   | 3         | 1.0     | 1.0           | 81.9               |
|       | 4, Salaried worker          | 5         | 1.7     | 1.7           | 83.6               |
|       | 4, Small trading activities | 43        | 14.7    | 14.7          | 98.3               |
|       | Small trading activities, 4 | 5         | 1.7     | 1.7           | 100.0              |
|       | Total                       | 293       | 100.0   | 100.0         |                    |

### Appendix3: Respondent's rice production characteristics

#### Do you have access to storage facility for your rice?

|       |       | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------|-----------|---------|---------------|--------------------|
| Valid | No    | 170       | 58.0    | 58.0          | 58.0               |
|       | Yes   | 123       | 42.0    | 42.0          | 100.0              |
|       | Total | 293       | 100.0   | 100.0         |                    |

#### How do you transport your rice produce from the farm?

|       |                   | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------------------|-----------|---------|---------------|--------------------|
| Valid | Carry on the head | 50        | 17.1    | 17.1          | 17.1               |
|       | Pushbikes         | 35        | 11.9    | 11.9          | 29.0               |
|       | Ox-cart           | 167       | 57.0    | 57.0          | 86.0               |
|       | Hire a vehicle    | 41        | 14.0    | 14.0          | 100.0              |
|       | Total             | 293       | 100.0   | 100.0         |                    |

### Do you have access to value addition facility for rice?

|       |              | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|--------------|-----------|---------|---------------|--------------------|
| Valid | All the time | 110       | 37.5    | 37.5          | 37.5               |
|       | Sometimes    | 125       | 42.7    | 42.7          | 80.2               |
|       | No access    | 58        | 19.8    | 19.8          | 100.0              |
|       | Total        | 293       | 100.0   | 100.0         |                    |

### How far is the market from your home?

|       |                           | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|---------------------------|-----------|---------|---------------|--------------------|
| Valid | Less than a Kilometer     | 228       | 77.8    | 77.8          | 77.8               |
|       | Between 1 to 3 Kilometers | 56        | 19.1    | 19.1          | 96.9               |
|       | At most 7 kilometers      | 2         | .7      | .7            | 97.6               |
|       | At least 10 kilometers    | 7         | 2.4     | 2.4           | 100.0              |
|       | Total                     | 293       | 100.0   | 100.0         |                    |

### How far are cooperative offices from your home?

|       |                        | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|------------------------|-----------|---------|---------------|--------------------|
| Valid |                        | 6         | 2.0     | 2.0           | 2.0                |
|       | Less than a Kilometer  | 231       | 78.8    | 78.8          | 80.9               |
|       | At most 7 kilometers   | 11        | 3.8     | 3.8           | 84.6               |
|       | At least 10 kilometers | 45        | 15.4    | 15.4          | 100.0              |
|       | Total                  | 293       | 100.0   | 100.0         |                    |

### Do you keep farm records for rice?

|       |       | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------|-----------|---------|---------------|--------------------|
| Valid | No    | 209       | 71.3    | 71.3          | 71.3               |
|       | Yes   | 84        | 28.7    | 28.7          | 100.0              |
|       | Total | 293       | 100.0   | 100.0         |                    |

### What records do you keep?

|                          | Frequency | Percent | Valid Percent | Cumulative Percent |
|--------------------------|-----------|---------|---------------|--------------------|
| Valid                    | 202       | 68.9    | 68.9          | 68.9               |
| Yield                    | 43        | 14.7    | 14.7          | 83.6               |
| Inputs                   | 18        | 6.1     | 6.1           | 89.8               |
| Dates of farm operations | 8         | 2.7     | 2.7           | 92.5               |
| Income                   | 3         | 1.0     | 1.0           | 93.5               |
| Expense receipts         | 4         | 1.4     | 1.4           | 94.9               |
| Invoices                 | 2         | .7      | .7            | 95.6               |
| Weather(Rain,wind.etc )  | 1         | .3      | .3            | 95.9               |
| Yield, Income, Inputs    | 12        | 4.1     | 4.1           | 100.0              |
| Total                    | 293       | 100.0   | 100.0         |                    |

### What records do you keep?

|                          | Frequency | Percent | Valid Percent | Cumulative Percent |
|--------------------------|-----------|---------|---------------|--------------------|
| Valid                    | 216       | 73.7    | 73.7          | 73.7               |
| Yield                    | 16        | 5.5     | 5.5           | 79.2               |
| Inputs                   | 35        | 11.9    | 11.9          | 91.1               |
| Dates of farm operations | 16        | 5.5     | 5.5           | 96.6               |
| Income                   | 3         | 1.0     | 1.0           | 97.6               |
| Expense receipts         | 1         | .3      | .3            | 98.0               |
| Invoices                 | 3         | 1.0     | 1.0           | 99.0               |
| Weather(Rain,wind.etc )  | 3         | 1.0     | 1.0           | 100.0              |
| Total                    | 293       | 100.0   | 100.0         |                    |

### What records do you keep?

|       |                          | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|--------------------------|-----------|---------|---------------|--------------------|
| Valid |                          | 237       | 80.9    | 80.9          | 80.9               |
|       | Yield                    | 9         | 3.1     | 3.1           | 84.0               |
|       | Inputs                   | 15        | 5.1     | 5.1           | 89.1               |
|       | Dates of farm operations | 19        | 6.5     | 6.5           | 95.6               |
|       | Income                   | 4         | 1.4     | 1.4           | 96.9               |
|       | Expense receipts         | 5         | 1.7     | 1.7           | 98.6               |
|       | Invoices                 | 1         | .3      | .3            | 99.0               |
|       | Weather(Rain,wind.etc )  | 3         | 1.0     | 1.0           | 100.0              |
|       | Total                    | 293       | 100.0   | 100.0         |                    |

### What records do you keep?

|       |                          | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|--------------------------|-----------|---------|---------------|--------------------|
| Valid |                          | 274       | 93.5    | 93.5          | 93.5               |
|       | Yield                    | 3         | 1.0     | 1.0           | 94.5               |
|       | Inputs                   | 3         | 1.0     | 1.0           | 95.6               |
|       | Dates of farm operations | 4         | 1.4     | 1.4           | 96.9               |
|       | Income                   | 6         | 2.0     | 2.0           | 99.0               |
|       | Expense receipts         | 1         | .3      | .3            | 99.3               |
|       | Invoices                 | 1         | .3      | .3            | 99.7               |
|       | Weather(Rain,wind.etc )  | 1         | .3      | .3            | 100.0              |
|       | Total                    | 293       | 100.0   | 100.0         |                    |

### Do you calculate your profits from rice after sale of produce?

|       |       | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------|-----------|---------|---------------|--------------------|
| Valid | No    | 120       | 41.0    | 41.0          | 41.0               |
|       | Yes   | 173       | 59.0    | 59.0          | 100.0              |
|       | Total | 293       | 100.0   | 100.0         |                    |

### Group Statistics

|   | Do you belong to a cooperative? | N   | Mean      | Std. Deviation | Std. Error Mean |
|---|---------------------------------|-----|-----------|----------------|-----------------|
| If rented, how much fee do you pay annually? (magnitude)  | Yes                             | 42  | 130714.29 | 125817.189     | 19414.014       |
|   | No                              | 15  | 129200.00 | 144420.616     | 37289.243       |
| Age group of the household head?  | Yes                             | 134 | 45.21     | 16.606         | 1.435           |
|   | No                              | 159 | 47.50     | 15.796         | 1.253           |
| In the previous growing season, what were the land preparation(Ploughing , Harrowing, Ridging), seed & planting (Transport to the field,labour for planting,nursery preparation) costs for rice only? (magnitude) | Yes                             | 134 | 80382.84  | 105739.099     | 9134.467        |
|   | No                              | 159 | 57194.97  | 75271.322      | 5969.404        |
| How much did you spend on fertilizers(Basal & Top dressing) and fertilizer application(Transport to field,labour)? (magnitude)  | Yes                             | 134 | 87544.78  | 114751.422     | 9913.013        |
|   | No                              | 159 | 39069.18  | 57482.371      | 4558.649        |
| How much did you spend on weed control(herbicides, labour, hand weeding, transport to field) for rice only? (magnitude)   | Yes                             | 134 | 8649.25   | 8861.514       | 765.518         |
|   | No                              | 157 | 11818.47  | 25864.052      | 2064.176        |
| How much did you spend on pests & disease control(Bird Scaring, pesticides, labour) for rice only? (magnitude)  | Yes                             | 134 | 852.24    | 1972.393       | 170.389         |
|   | No                              | 159 | 830.19    | 1992.732       | 158.034         |
| what are the irrigation costs(water,labour for irrigation) for rice only? (magnitude)   | Yes                             | 134 | 6111.94   | 6463.792       | 558.387         |
|   | No                              | 159 | 3345.91   | 2607.165       | 206.762         |
| How much were the harvesting costs(Cutting,   | Yes                             | 134 | 59705.22  | 74284.997      | 6417.246        |
|   | No                              | 159 | 30279.89  | 48865.514      | 3875.287        |

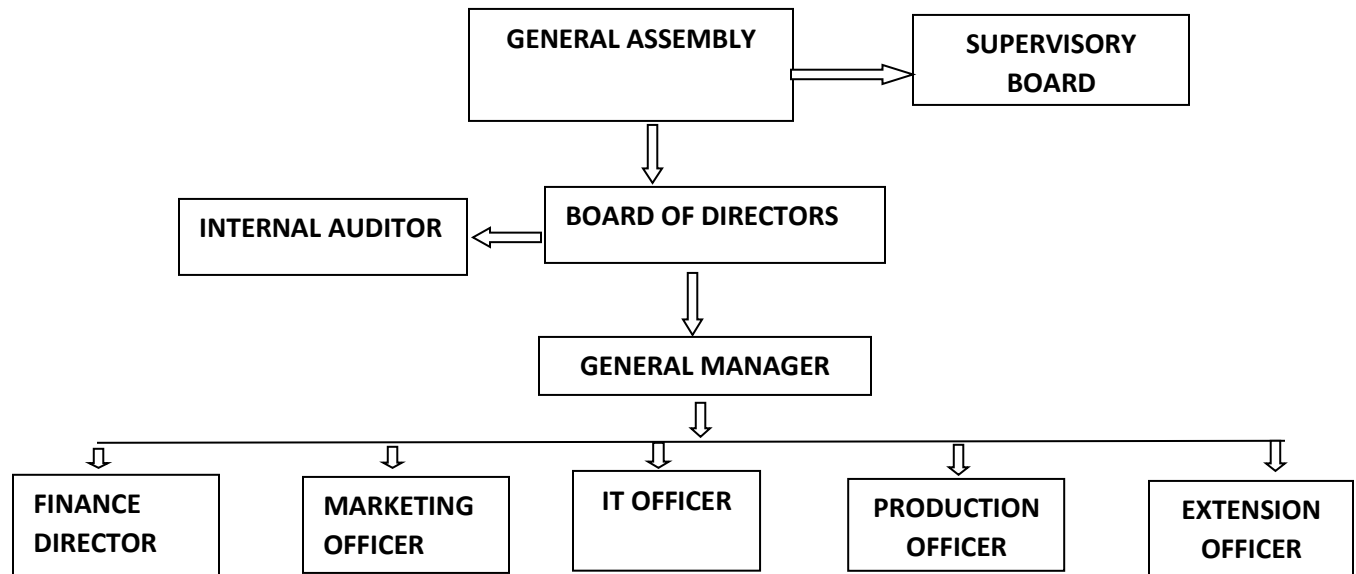
|   |     |     |                 |                   |                  |
|---|-----|-----|-----------------|-------------------|------------------|
| Threshing & winnowing, transport from the field)? (magnitude)                                     |     |     |                 |                   |                  |
| How much were the storage costs (Bags, dusting, application labour, stacking labour)? (magnitude) | Yes | 134 | 24920.15        | 46436.012         | 4011.460         |
|   | No  | 159 | 6045.91         | 5370.819          | 425.934          |
| How much were transport costs to the market? (magnitude)  | Yes | 134 | 10389.55        | 26715.579         | 2307.874         |
|   | No  | 146 | 1971.23         | 6869.914          | 568.558          |
| Production cost   | Yes | 134 | 272405.22<br>39 | 344186.506<br>00  | 29733.1855<br>0  |
|   | No  | 159 | 148624.54<br>72 | 199826.702<br>37  | 15847.2883<br>2  |
| Gross revenues  | Yes | 134 | 766270.89<br>55 | 1353628.52<br>968 | 116935.694<br>68 |
|   | No  | 159 | 322557.23<br>27 | 462059.640<br>34  | 36643.7130<br>5  |
| Gross value   | Yes | 134 | 894400.16<br>42 | 1464550.68<br>407 | 126517.909<br>36 |
|   | No  | 159 | 474729.91<br>19 | 585727.936<br>99  | 46451.2469<br>2  |
| HCI   | Yes | 134 | .8269           | .63977            | .05527           |
|   | No  | 159 | .7217           | .35672            | .02829           |
| How many kilograms of rice did you produce in the previous growing season? (magnitude)            | Yes | 134 | 1527.65         | 1569.878          | 135.617          |
|   | No  | 159 | 975.80          | 741.924           | 58.838           |
| How many kilograms did you offer for sale? (magnitude)  | Yes | 134 | 1262.84         | 1466.589          | 126.694          |
|   | No  | 159 | 767.96          | 756.891           | 60.025           |
| What was the unit selling price? (magnitude)  | Yes | 134 | 438.36          | 201.268           | 17.387           |
|   | No  | 159 | 399.40          | 267.100           | 21.182           |
| At how much did you buy it/hire fee? (magnitude)  | Yes | 30  | 19200.00        | 14646.172         | 2674.013         |
|   | No  | 3   | 10000.00        | .000              | .000             |
| What is the total annual household expenditure? (magnitude)                                       | Yes | 134 | 533268.66       | 597152.393        | 51586.110        |
|   | No  | 159 | 286389.94       | 177243.768        | 14056.345        |
| How much of the land  | Yes | 134 | .3403           | .32839            | .02837           |



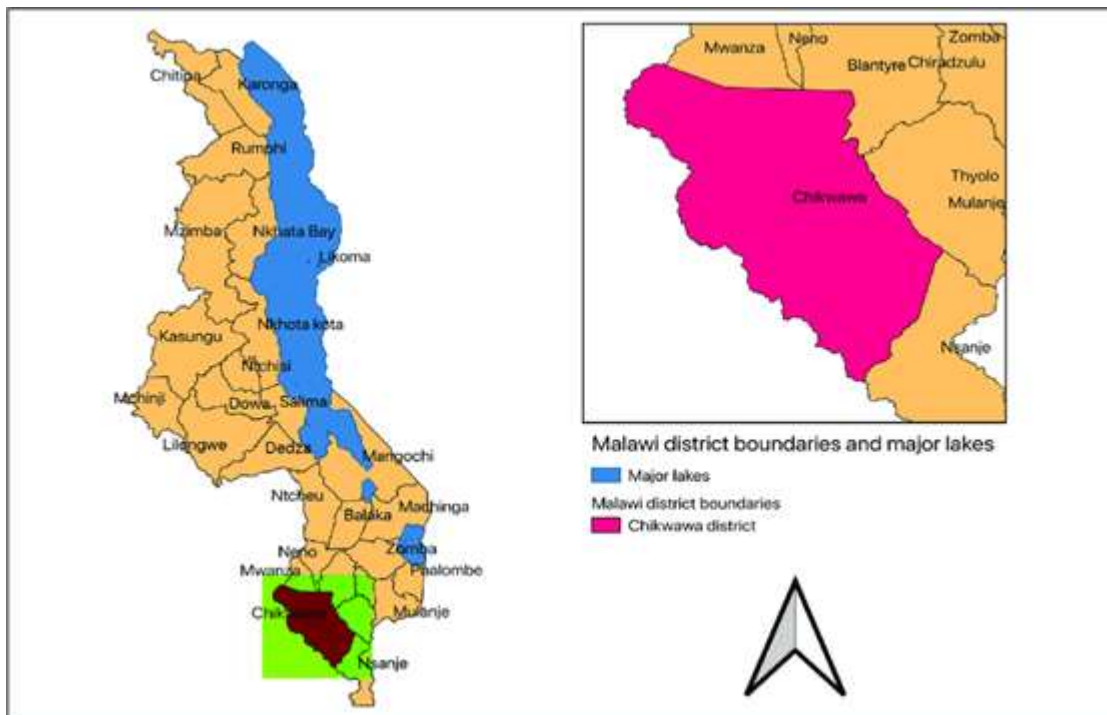
**Appendix 6: Agricultural cooperatives operating in Chikwawa District in 2023.**

| <b>NO</b> | <b>COOPERATIVE NAME</b>                  |
|-----------|--|
| 1         | Nkhate Rice Producers & Marketing        |
| 2         | Masenjere Juice Cooperative              |
| 3         | Kachere Juice Cooperative                |
| 4         | Livunzu Cooperative society              |
| 5         | Tinyade Cooperative                      |
| 6         | Miseu Folo Livestock Cooperative         |
| 7         | Linga Cotton Cooperative                 |
| 8         | Mitole Cotton Cooperative                |
| 9         | Minyali Cooperative                      |
| 10        | Nkombezi Cooperative                     |
| 11        | Tsapa women Cooperative                  |
| 12        | Dolo Livestock cooperative               |
| 13        | Mwaphatabasa Agro-processing Cooperative |
| 14        | Phata sugarcane outgrowers Cooperative   |

## Appendix 7: Organogram of Livunzu Cooperative



## Appendix 8: Chikwawa District Map



## Appendix 9: Photos of Field Research



A visit to a rice farmer's house for an interview during household survey.



A rice nursery for the farmers in the rice scheme.



Farmers and traders at a rice mill at Livunzu EPA.

## **BIBIOGRAPHY OF THE AUTHOR**



Jones Kingsdale Chitheka was born on 5<sup>th</sup> August, 1990 in Blantyre District, Southern Region of Malawi. He enrolled at Depongoro University, Semarang in August, 2021 to study a Master of Agribusiness at the faculty of Animal and Agricultural Sciences. Previously he attended the University of Malawi, College of Agriculture where he was awarded a Bachelor's Degree in Horticulture. The author is Christian from Pentecostal church and is blessed with a wife, Devota Tereza and a daughter, Havilah Zinatha.

