

**EFFECTIVENESS OF WAREHOUSE RECEIPT SYSTEM IN ENHANCING  
COFFEE MARKETING ENVIRONMENT IN MBINGA DISTRICT, TANZANIA**



**MATEI ELIAS MAPUNDA**



**A THESIS SUBMITTED IN FULFILMENT OF THE REQUIREMENTS FOR THE  
DEGREE OF DOCTOR OF PHILOSOPHY OF THE SOKOINE UNIVERSITY OF  
AGRICULTURE. MOROGORO, TANZANIA.**

**2018**




## EXTENDED ABSTRACT

Introduction of the Warehouse Receipt System (WRS) in Tanzania was targeted at facilitating the creation of conducive marketing environment. The system was meant to enable farmers to sell their farm produce directly at auctions so as to reduce the middleperson's margins and increase farmers' incomes through price appreciation at auctions. However, the level of farmers' access to the WRS services is low and therefore effectiveness of the WRS is questionable. This study assessed the effectiveness of the WRS in creating coffee marketing environment in Mbinga District. The specific objectives were to identify factors influencing farmers' participation in WRS; to determine farmers' perceptions on the WRS achievements in facilitating provision of storage, credit, and market services; and examine effectiveness of the WRS in creation of good marketing environment and improving farm productivity. A cross-sectional research design was used, and data were gathered from 390 households using a questionnaire. Focus group discussions, and key informant interviews were used also. Quantitative data regarding factors influencing farmers' participation in the WRS marketing channel were analysed using a binary logistic regression model while qualitative data regarding farmers' perceptions of effectiveness of the WRS were analysed using thematic content analysis. In addition, the effect of agro-inputs credit through the WRS on coffee farm productivity was analysed using the Ordinary Least Squares (OLS) method. The study shows that age of respondents, access to marketing information, sex and distance from coffee farms to the Agricultural Marketing and Cooperative Societies (AMCOS) or farmers' group (FGs) centres where coffee is collected were significant factors that influenced coffee farmers' decisions to participate in the WRS. The WRS was perceived to be effective by farmers in provision of storage services and facilitation of access to agro-inputs through AMCOS and FGs. However, coffee marketing was perceived by farmers to be ineffective due to

inadequate availability of marketing information regarding coffee prices offered at auctions. Furthermore, the influence of credit in the form of agro-inputs accessed through WRS marketing channel had a significant impact on the productivity of coffee farms ( $p \leq 0.05$ ). Conclusively, farmers perceived storage and credit services to be effective, henceforth there was a general effectiveness of the WRS. The study recommends that stakeholders in coffee sector should ensure that farmers access WRS coffee marketing information transparently by facilitating institutionalisation of market information.


**DECLARATION**

I, Matei Elias Mapunda, do hereby declare to the Senate of Sokoine University of Agriculture that this Thesis is my own original work done within the period of registration and that it has neither been submitted nor being concurrently submitted in any other Institution.

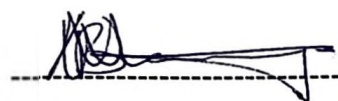
  
-----  
Matei Elias Mapunda  
(PhD Candidate)

25/07/2018  
Date

The above declaration is confirmed by;

  
-----  
Prof. David G. Mhando  
(Supervisor)

25/07/2018  
Date

  
-----  
Dr. Betty M. Waized  
(Supervisor)

25/07/2018  
Date

## **COPYRIGHT**

No part of this thesis may be reproduced, stored in any retrieval system, or transmitted in any form or by any means without prior written permission of the author or Sokoine University of Agriculture (SUA) in that behalf.

## ACKNOWLEDGEMENTS

Pursuing Doctor of Philosophy (PhD) has been among the most challenging happenings in my life. It has taken some years, which carried a mix of solitude, obstruction, hope and gratitude. None other than the authenticity of the PhD process itself carries the blame for the first two. The last two, of course, are ascribed to many people and institutions that made this tough task possible. Foremost, I wish to express my sincere gratitude to my supervisors, Prof. David G. Mhando and Dr. Betty M. Waized, for encouragement and willingness to spare their time for discussing and provision of constructive ideas. Their contribution to the completion of this thesis is priceless. May God bless them.

I am indeed grateful to my organisation. In particular, my thanks go to Dr. Mabula Kihanda, the Tanzania Institute of Accountancy (TIA) Rector for his endorsement for me to get TIA finances.

In the Department of Development Studies (DDS), College of Social Sciences and Humanities (CSSH) at Sokoine University of Agriculture (SUA), I owe thanks to many people, most and especially to Dr. Anna Sikira, for her support. Others are Prof. Kim. A. Kayunze, Prof. Justin K. Urassa and Dr. Samwel J. Kabote for their moral support. I also wish to extend my heartfelt gratitude to Dr. Mursali Milanzi of Mzumbe University for his encouragement to enroll for a PhD degree at SUA. Thanks are also to my fellow PhD students for their friendship, advice and material support in the course of study.

Finally, I acknowledge the outstanding role of my church fellowship-UWATA and my lovely wife, Mary and children Matei, Shadrack, and Ezra in my study life. Their patience, love, moral support and prayers throughout my PhD study years are priceless.

## DEDICATION

I dedicate this thesis to God, The Almighty my creator. He has been the source of my strength throughout this PhD program. I also dedicate this work to my Late Father and Mother Elias Mapunda and Tekla Ndimbo respectively who laid down the foundation of my education. To my wife Mary Mohamed who has heartened me all the way and whose encouragement has made sure that I give it all it takes to finish that which I have started. To my children Matei, Shadrack, and Ezra who have been affected in every way possible by this PhD journey. Lastly to my Sokoine University of Agriculture (SUA)'s Professors and Doctors who devoted their times to show me the right route of my PhD study. Thank you. My love for you all can never be quantified.

## TABLE OF CONTENTS

|  |             |
|--|-------------|
| <b>EXTENDED ABSTRACT.....</b>                  | <b>ii</b>   |
| <b>DECLARATION .....</b>                       | <b>iv</b>   |
| <b>COPYRIGHT .....</b>                         | <b>v</b>    |
| <b>ACKNOWLEDGEMENTS.....</b>                   | <b>vi</b>   |
| <b>DEDICATION.....</b>                         | <b>vii</b>  |
| <b>TABLE OF CONTENTS .....</b>                 | <b>viii</b> |
| <b>LIST OF TABLES.....</b>                     | <b>xii</b>  |
| <b>LIST OF FIGURES.....</b>                    | <b>xiii</b> |
| <b>LIST OF APPENDICES .....</b>                | <b>xiv</b>  |
| <b>LIST OF ABBREVIATIONS AND ACRONYMS.....</b> | <b>xv</b>   |
| <b>CHAPTER ONE.....</b>                        | <b>1</b>    |
| <b>1.0 INTRODUCTION .....</b>                  | <b>1</b>    |
| 1.1 Background Information .....               | 1           |
| 1.2 Problem Statement.....                     | 6           |
| 1.3 Justification of the Study.....            | 9           |
| 1.4 Objectives of the Study .....              | 11          |
| 1.4.1 Overall objective.....                   | 11          |
| 1.4.2 The specific objectives .....            | 11          |
| 1.4.3 Research questions.....                  | 11          |
| 1.5 Theoretical Framework .....                | 11          |
| 1.6 Conceptual Framework .....                 | 13          |
| 1.7 Organisation of the Thesis .....           | 15          |
| References.....                                | 16          |



|   |           |
|---|-----------|
| <b>CHAPTER TWO.....</b>   | <b>25</b> |
| <b>2.0 Determinants of Participation of Smallholder Coffee Farmers in Warehouse Receipt System in Mbinga District, Tanzania .....</b> | <b>25</b> |
| 2.1 Abstract .....  | 25        |
| 2.2 Introduction .....  | 26        |
| 2.3 Theoretical and Analytical Frameworks.....  | 29        |
| 2.3.1 Theoretical Framework .....   | 29        |
| 2.3.2 Analytical framework.....   | 30        |
| 2.4 Methodology .....   | 33        |
| 2.4.1 Study area .....  | 33        |
| 2.4.2 Research design, sampling and data collection methods .....   | 34        |
| 2.5 Results and Discussions .....   | 35        |
| 2.5.1 Descriptive statistics and variables for participation in WRS .....   | 35        |
| 2.5.2 Logistic regression and analysis of variables for participation in the WRS .....  | 36        |
| 2.5.2.1 Coffee marketing information and WRS participation.....   | 38        |
| 2.5.2.2 Sex of the respondents and participation in the WRS .....   | 39        |
| 2.5.2.3 Farmers' age and participation in the WRS .....   | 39        |
| 2.5.2.4 Distance to AMCOS/ Farmers' group centres and WRS participation...  | 40        |
| 2.6 Conclusion and Recommendations.....   | 41        |
| References.....   | 42        |
| <b>CHAPTER THREE.....</b>   | <b>50</b> |
| <b>3.0 Farmers' Perceptions of the Effectiveness of the Warehouse Receipt System in Mbinga District, Tanzania.....</b>                | <b>50</b> |
| 3.1 Abstract .....  | 50        |
| 3.2 Introduction .....  | 51        |
| 3.3 Theoretical Framework .....   | 56        |

|  |           |
|--|-----------|
| 3.4 Conceptual Framework .....   | 57        |
| 3.5 Methodology .....  | 60        |
| 3.5.1 The study area.....  | 60        |
| 3.5.2 Research design, sampling procedure and sample size.....                     | 61        |
| 3.5.3 Data collection .....  | 62        |
| 3.5.4 Data analysis.....   | 62        |
| 3.5.5 Model for measuring perceptions of effectiveness .....                       | 62        |
| 3.6 Results and Discussion .....   | 63        |
| 3.6.1 Farmers' perceptions of storage services through the WRS .....               | 63        |
| 3.6.2 Farmers' perception on credit accessibility through the WRS.....             | 65        |
| 3.6.3 Farmers' perception of the coffee marketing through the WRS.....             | 67        |
| 3.6.4 Information on coffee quality improvement and grades .....                   | 68        |
| 3.7 WRS Effectiveness Association Across Socio-demographic Characteristics .....   | 69        |
| 3.7.1 Perception of storage facilities.....  | 69        |
| 3.7.2 Perceptions of agro-inputs credit accessibility .....                        | 71        |
| 3.7.3 Perception of the market facilitation .....                                  | 73        |
| 3.8 Conclusions and Recommendations .....  | 75        |
| References.....  | 76        |
| <b>CHAPTER FOUR .....</b>  | <b>84</b> |
| <b>4.0 Credit Access through Warehouse Receipt System and Farm Productivity of</b> |           |
| <b>    Smallholder Coffee Farmers in Mbinga District, Tanzania.....</b>            | <b>84</b> |
| 4.1 Abstract .....   | 84        |
| 4.2 Introduction .....   | 85        |
| 4.3 Theoretical Framework .....  | 89        |
| 4.4 Methodology .....  | 90        |
| 4.4.1 The study area.....  | 90        |

|   |            |
|---|------------|
| 4.4.2 Research design, sampling and data collection methods .....                 | 90         |
| 4.4.3 Model and estimation method .....   | 91         |
| 4.5 Results and Discussion .....  | 94         |
| 4.5.1 Socio-economic characteristics of respondents .....                         | 94         |
| 4.5.2 Average coffee production, cultivated area, and labour use .....            | 96         |
| 4.5.3 Farm productivity of smallholder coffee farmer and WRS.....                 | 97         |
| 4.6 Conclusions and Recommendations .....   | 99         |
| References.....   | 100        |
| <b>CHAPTER FIVE.....</b>  | <b>109</b> |
| <b>5.0 CONCLUSIONS AND RECOMMENDATIONS .....</b>                                  | <b>109</b> |
| 5.1 Conclusions and Recommendations .....   | 109        |
| 5.1.1 Determinants of participation of smallholder coffee farmers in the WRS..... | 109        |
| 5.1.2 Farmers' perception on the effectiveness of the WRS.....                    | 109        |
| 5.1.3 Credit access through the WRS and farm productivity .....                   | 110        |
| 5.2 Contribution of the Study/Research to Knowledge .....                         | 110        |
| 5.4 Areas for Further Research .....  | 111        |
| <b>APPENDICES .....</b>   | <b>113</b> |

## LIST OF TABLES

|   |    |
|---|----|
| Table 2.1: The coffee price trends per kilogram in the auction for the past five years..... | 28 |
| Table 2.2: Definition of variables used in regression model and measurements.....           | 33 |
| Table 2.3: Descriptive Statistics of the Respondents .....                                  | 35 |
| Table 2.4: Results of Logistic Regression Model .....                                       | 37 |
| Table 3.1: Measurements of farmers' perception of the effectiveness WRS .....               | 63 |
| Table 3.2: Farmers' perception of the effectiveness of WRS services delivery .....          | 64 |
| Table 3.3: Respondent's perception on coffee storage facilities.....                        | 70 |
| Table 3.4: Agro inputs credit accessibility .....   | 72 |
| Table 3.5: Market facilitation.....   | 73 |
| Table 4.1: Description of variables used in the model .....                                 | 93 |
| Table 4.2: Socio-economic characteristics and credit accessed through the WRS.....          | 94 |
| Table 4.3: Average coffee production, cultivated area, and labour use .....                 | 97 |
| Table 4.4: Farm productivity of smallholder coffee farmer and WRS.....                      | 98 |

## LIST OF FIGURES

|   |    |
|---|----|
| Figure 1.1: Conceptual framework for WRS effectiveness in the coffee industry ..... | 15 |
| Figure 3.1: Conceptual framework for effectiveness of the WRS .....                 | 57 |

## LIST OF APPENDICES

|  |     |
|--|-----|
| Appendix 1: Sampling methods .....   | 113 |
| Appendix 2: Coffee curing statement certificate at the DAE Co. Ltd warehouse ..... | 114 |
| Appendix 3: Warehouse receipt .....  | 115 |
| Appendix 4: Auction permit receipt .....   | 116 |
| Appendix 5: Household questionnaire .....  | 117 |
| Appendix 6: Interview guide for focus group discussion .....                       | 130 |
| Appendix 7: Interview guide for key informants .....                               | 130 |
| Appendix 8: Interview guide for warehouse operators .....                          | 130 |
| Appendix 9: Interview guide for commercial banks (CRDB, NMB and MCB) .....         | 131 |
| Appendix 10: Interview guide for AMCOS and farmers' groups.....                    | 131 |
| Appendix 11: Coffee curing statement certificate.....                              | 132 |
| Appendix 12: Map of the study area .....   | 133 |

## LIST OF ABBREVIATIONS AND ACRONYMS

|         |  |
|---------|--|
| AfDB    | African Development Bank                                       |
| AGRA    | Alliance for a Green Revolution Africa                         |
| AMCOS   | Agricultural Marketing and Cooperative Societies               |
| CEDHA   | Centre for Educational Development in Health, Arusha           |
| CRDB    | Cooperative and Rural Development Bank                         |
| CSSH    | College of Social Sciences and Humanities                      |
| DAE Ltd | Dan and Associates Enterprises Limited                         |
| DAICO   | District Agricultural, Irrigation, and Cooperative Officer     |
| DDS     | Department of Development Studies                              |
| ESAANET | East and Southern Africa Agribusiness Network                  |
| FAO     | Food and Agriculture Organization of the United Nations        |
| FG      | Farmers Group  |
| FGDs    | Focus Group Discussions  |
| FYDP    | Five Year Development Plan                                     |
| GDP     | Gross Domestic Product   |
| IFAD    | International Fund for Agricultural Development                |
| KENFAP  | Kenya National Federation of Agricultural Producers            |
| MBICU   | Mbinga Cooperative Union                                       |
| MCB     | Mbinga Community Bank  |
| MCCCo   | Mbinga Coffee Curing Company                                   |
| MT      | Metric Tonnes  |
| MUCCoBS | Moshi University College of Co-operatives and Business Studies |
| NBS     | National Bureau of Statistics                                  |
| NMB     | National Microfinance Bank                                     |

|         |   |
|---------|---|
| NSGRP   | National Strategy for Growth and Reduction of Poverty |
| OET     | Organisational Effectiveness Theory                   |
| OLS     | Ordinary Least Squares                                |
| PCB     | Private Coffee Buyers                                 |
| SAEBS   | School of Agricultural Economics and Business Studies |
| SPSS    | Statistical Package for Social Science                |
| SSA     | Sub Saharan Africa                                    |
| SUA     | Sokoine University of Agriculture                     |
| TaCRI   | Tanzania Coffee Research Institute                    |
| TCB     | Tanzania Coffee Board                                 |
| TDV     | Tanzania Development Vision                           |
| TIA     | Tanzania Institute of Accountancy                     |
| TNPS    | Tanzania National Panel Survey                        |
| TNYDP   | Tanzania National Youth Development Policy            |
| TWLB    | Tanzania Warehouse Licencing Board                    |
| TZS     | Tanzanian Shillings                                   |
| UNDP    | United Nations Development Programme                  |
| UNIDO   | United Nations Industrial Development Organisation    |
| URT     | United Republic of Tanzania                           |
| USD     | United States Dollar                                  |
| WHO     | World Health Organisation                             |
| WRS     | Warehouse Receipt System                              |
| $\beta$ | Beta  |



## CHAPTER ONE

### 1.0 INTRODUCTION

#### 1.1 Background Information

Agriculture accounts for 32% of Gross Domestic Product (GDP) in Africa and is the sector which is potential for poverty reduction and job creation, particularly among vulnerable rural populations and urban dwellers with limited job opportunities (IFAD, 2015). Growth generated by agriculture in sub-Saharan Africa (SSA) is estimated to be 11 times more effective in reducing poverty than GDP growth in other sectors accounting to be a vital multiplier given that about 70% of the continent's labour force is engaged in agriculture (Cooksey, 2010; Chauvin *et al.*, 2012; IFAD, 2014; Mayaki, 2016).

In SSA, agriculture is dominated by smallholder farmers who are described as those with about 2 hectares and own only a small herd of livestock (Salami *et al.*, 2010), and they represent 80% of all farms (AGRA, 2014) and contribute up to 90% of the production in some countries (Komarek, 2010; Biteye, 2016). Smallholder agriculture continues to play a key role in African agriculture (Salami *et al.*, 2010).

In Tanzania, the agricultural sector supports livelihoods of the majority of Tanzanians; yet, it remains underdeveloped and generally vulnerable to the whims of nature. The sector provides about 66.9% of employment, accounts for about 23% of GDP, 30% of exports and 65% of inputs to the industrial sector (URT, 2016). However, the growth of agricultural sector is lagged behind, growing at only 3.4% (2014) from 2.7% (2010), a rate which is far below Five Year Development Plan I (FYDP I) target of 6% (URT, 2016). Nonetheless, there has been improvement in productivity of some of the crops

(maize, rice, and oil seeds), but there has also been a decline in some previously key cash crops (cotton, cashew-nuts, coffee and sisal to mention a few) (URT, 2016).

Coffee production increased from 41 220 MT in 2014/2015 to 59 502 MT in 2015/2016 which earned the country about USD 135 377 047 (USD 93 422 842 from Arabica coffee and USD 41 954 205 from Robusta coffee) (TCB, 2016). The smallholder farmers had a significant contribution in the coffee auction market whereby farmer groups (FGs) and Agricultural Marketing and Cooperative Societies (AMCOS) contributed about 44% and 27% of the total sold coffee respectively: Contribution from other sellers were 27% and 2% from private buyers 27%, and big farms respectively (TCB, 2016).

The growth of the agricultural sector through smallholder farmers is highly influenced by the market forces due to trade liberalisation which emerged in the 1990 (Ponte, 2004; Baffes *et al.*, 2009; Angula, 2010). Thus, suggesting that the development in coffee marketing as well as changes in the behaviour of producers should be viewed in the context of trade liberalisation (Sitko, 2012). Coffee for example, before 1990, the Tanzania Coffee Board (TCB) and the cooperative unions were responsible for its marketing. In the process, the Government provided subsidies, and cooperatives supplied agricultural inputs to coffee farmers (TCB, 2016). For instance, in Mbinga District, Mbinga Cooperative Union (MBICU) catered for coffee market as well as provision of agricultural inputs (URT, 2005; Millinga, 2009).

After the liberalisation of Tanzania's economy, the Government was forced to reduce subsidies, and market forces determined the prices of agricultural inputs as well as produce, and the private sector was left to compete with unprepared cooperative unions in coffee buying (Temu *et al.*, 2001; Ponte, 2004; Cooksey, 2010; Komba, 2011). In trade

liberalisation, the coffee market is conducted in three ways. First, the coffee is sold at a price decided by the farmer directly to private coffee buyers (PCBs), FGs or AMCOS (TCB, 2016). This practice is the most common between small farmers due to the low yields per farmer. Second, the PCBs, FGs and AMCOS once have received a significant amount of coffee they can either sell at the auction in Moshi municipality, Tanzania or export directly (Komba, 2011; TCB, 2016). Third, the top grade coffee growers are allowed to bypass the auction and are able to sell their coffee directly to the foreign roasters (TCB, 2016). This policy was created by the Coffee Board of Tanzania to allow farmers and local companies to build a long term relationship with international buyers (URT, 2005; TCB, 2016). As a result, some of cooperatives which were very weak financially for example MBICU could not survive and farmers were left at the mercy of private coffee buyers (URT, 2005).

The trade liberalisation, while previously signaled as panaceas for agricultural growth, has not resulted in sustained improvements and still smallholder farmers are facing difficulties of markets and credits accessibility for buying farm inputs in order to improve farm production and enable them in market participation (Komba, 2011). Poulton and Macarteney (2012) agree that the survival of smallholder farmers in the increasingly competitive markets depends significantly on the linkages which allow them to access a range of resources including technology, credit, farm inputs, and output markets whereby Tanzanian situation is not an exception.

Warehouse Receipt System (WRS) is a new developed marketing strategy and financing system. The WRS has a number of advantages for the agricultural sector, such as introducing agricultural products into the market in accordance with quality standards, warehousing the products in the proper conditions, maintaining product pricing during

periods of high supply, ensuring products against hazards, protecting producers from price discrimination and market risks (URT, 2005; Mullinax, 2011; IFAD, 2015). Therefore, the WRS helps to modernise and enhance the effectiveness of agricultural marketing systems and fostering output which in turn lead to high incomes for the farmers (Lacroix and Varangis, 1996; Millinga, 2009; Komba, 2011; Mhando *et al.*, 2013; IFAD, 2015).

The WRS was first used in Mesopotamia in 2400 BC (Budd, 2001). WRS has been in operation for more than 100 years in United States of America (U.S.A) and Canada, one of the reasons for its establishment was to use the securely stored goods as loan collateral and is one of the methods of assisting rural farmers in the post-harvest value chain (Cooksey, 2010; FAO, 2013). The development of the WRS in agricultural marketing systems in Africa following liberalization in the 1980s (Onumah, 2010) is gaining popular in Zambia, Uganda, Kenya and Tanzania. Therefore, as a strategy to tackle the challenges facing smallholder farmers in the coffee and other agricultural produce, in 2005 the WRS was introduced in Tanzania (URT, 2005). The objectives of inception of the WRS scheme were to meet agricultural sector challenges of low and erratic farm gate prices; Lack or inappropriate agricultural financing mechanisms; Minimal participation of smallholder farmers in the agricultural value addition chain and market of farm produce (URT, 2005; URT, 2014).

The WRS was incepted in Mbinga District in 2002 to redeem farmers from coffee market failure caused by free market, by facilitating the marketing environment and enabling farmers to sell coffee directly through auction (URT, 2014). According to Millinga (2009) WRS started in Mbinga District as a project funded by Common Fund for Commodities in coffee in 1999. The WRS covered four coffee growing regions i.e. Kilimanjaro, Arusha, Mbeya and Ruvuma. In the year 2005 this system was reinforced by the Government by

enacting the Warehouse Receipts Act and its Regulation in 2006 whereby a Tanzania Warehouse Licensing Board under the Ministry of Industry, Trade and Marketing was established (URT, 2005; Kuserwa, 2009).

Since the WRS intends to enable marketing environment, denotatively, marketing environment refers to a management process through which factors and forces that affect an organisation's/system's ability to build and maintain successful relationships with customers are coordinated based on customer needs and satisfaction (Armstrong, 2012). Operationally, marketing environment includes two levels of the environment, which are micro (internal) environment-small forces within an organisation/system that affects its ability to serve its customers such as management, operations, processes and financing and macro (external) environment-larger societal forces that affect the micro-environment such as demography, economy, technology, politics and culture (Coulter and Onumah, 2002). The study adopted both micro and macro marketing environments factors. The improvement of some variables such as collateral availability, credit, participation, market information, storage services, quality of coffee, production or productivity and price of coffee at the auction were used in assessing effectiveness of WRS.

The studies on the WRS in Tanzania have focused on both cash and food crops (URT, 2014). On food crops such as maize and paddy the studies have examined the transaction cost and extent in which the WRS can facilitate access to financial services among smallholder farmers (Kuserwa, 2009; Madulu, 2009; Millinga, 2009; Madulu, 2011; Kimaro and Towo, 2013; Mhando *et al.*, 2013). Food crops have some challenges because the WRS is focusing on the commodities that can be used as collateral by taking into account the specifics in the commodity related to storage and marketing (Cooksey, 2010). Food crops can be easily converted into cash and are fastly consumed by households



rendering some difficulties of storing in the warehouses. Some studies have been conducted on the roles and efficiency of WRS for cash crops such as cotton and cashew nut (Millao, 2011; UNIDO, 2011; Kabigi, 2012; Mtanda, 2015). Although various studies have been conducted, there is little documentation on the effectiveness of the WRS in coffee as a cash crop. The study, therefore, aimed at filling the knowledge gap by focusing on the effectiveness of WRS in service provision. WRS set objectives such as storage and market of farm produce and credit among the smallholder coffee farmers in Mbinga District. It was in such framework that the current study intended to analyse the effectiveness of WRS in coffee in Mbinga District, Tanzania with a focus on accessibility of coffee storage, credit, and market as per projected objectives of WRS in the country (URT, 2005).

## **1.2 Problem Statement**

The overview of WRS indicates that it is a global concept with a lot of experience from both developed and developing countries. Effective WRS entails meeting the main objective of its establishment (IFAD, 2015). The main objective of establishing WRS in Tanzania was to foster the efforts of the government to formalise the existing marketing systems aiming at minimising various constraints hampering effective production and marketing of the agricultural produce (URT, 2005; IFAD, 2015). The constraints include post-harvest losses, poor quality, price fluctuations, lack of reliable market information and poor finance (Cooksey, 2010; Onumah, 2010).

International experience shows that WRS plays a critical role in financing agriculture sector and stabilisation of economy. In Bulgaria for example, the financial sector lends an annual 10 to 50 million euros through WRS, depending on market prices (Bryde, 2008).

Indonesia's price fluctuation of some commodities contributes 60% towards the national inflation but WRS maintained a stable inflation rate in the country (Bryde, 2008). Onumah (2010) explained that effective WRS is very helpful in strengthening agriculture finance through capacity building. The experience of these countries suggests that effective WRS plays an important role in facilitating links between financial institutions and the agriculture sector in creation of marketing environment suitable for economic growth (Höllinger *et al.*, 2009).

In Africa, Lacroix and Varangis (1996) examined WRS in Zimbabwe. It was found that WRS can strengthen the agriculture markets of Africa, notably by increasing market transparency. Coulter and Onumah (2002) argued that an effective WRS can contribute to breaking the stumbling block of low productivity, which affects much of African Agriculture. Mor and Fernandes (2009) found that effective WRS provides a platform for the introduction of institutional innovations, particularly grading and marketing. According to Cooksey (2010), in Africa effective WRS ensures quality of farm produce stored in warehouses through storage management that assures storage losses are kept at a minimum. Mahanta (2012) stated that effective WRS can greatly facilitate financing of agriculture as it could serve as highly credible collateral for agricultural credit.

In East African countries, for example Kenya, the empirical works have confirmed that WRS is important in creating marketing environment by permitting farmers to delay sales of recently-harvested crops by providing them with credit, storage space and market information until the market has stabilized and prices have increased (KENFAP, 2011). In Uganda, Katunze *et al.* (2017) found that not all key WRS players understood the WRS, had so many expectations of the WRS, which were not met and were probably not

adequately sensitized on the operations of the WRS and that market performance is assured if specific barriers to credit are tackled.

Despite the fact that WRS is meant to facilitate the creation of marketing environment, in Tanzania, the experience is quite different and that its effectiveness is questionable. Good instances, include cashewnuts farmers unrest in Newala District in 2010 due to unmet expectations of accessible credit and high price through WRS market (UNIDO, 2011); this was shortly followed by another unrest in Tandahimba District in 2012 (Kabigi, 2012). Similar finding was documented by Millao (2011) in Maswa District. In Mbinga District, whereby coffee is grown, Mhando *et al.* (2013) asserted that level of farmers accessing WRS services and improving farm production is low and that only 6.4% of the interviewed coffee farmers in Mbinga District did access and use loans provided through the WRS to buy agro-inputs. Surprisingly, a research conducted by Kimaro and Towo (2013) in Hai and Siha Districts, Tanzania found that 90.6% of the respondents were aware of WRS, and 70% used WRS as a source of credit. However, despite the use of credit through WRS, it was further revealed that maize harvest in Hai and Siha Districts decreased from an average of 2770 kg/ha in 2008 before joining WRS to 2570 kg/ha in 2012 after joining WRS. The study further found that effects of climate change and government policies that could have impacted production and access to markets were insignificant (Kimaro and Towo, 2013). Mtanda (2015) in Newala District, Tanzania determined farmers' attitude towards WRS. Using attitude index scale, found that 62.7% of the respondents had negative attitude. This means WRS was not effective in the study area.

Therefore, based on the studies conducted, it is worth examining WRS in Mbinga District, with a view of identifying factors influencing effectiveness of the WRS in improving farm



production and productivity of other farm crops such as coffee, as well as enhancement of marketing environment. Also, little is known about the factors influencing participation of the farmers, and their organisations in the WRS. Therefore, the study was set out to identify factors influencing farmers' participation in the WRS; to determine farmers' perception of the WRS operations in facilitating provision of storage, credit and market services and examine the effect of credit (agro-inputs) accessed through WRS marketing channel on coffee productivity.

The key innovation of this study lies on the fact that WRS solves financing, collateral and marketing problems of smallholder farmers. Examining effectiveness of WRS in improving farm productivity and creation of marketing environment increases the farms' income and helps with cash flow planning by providing an alternative to farmers to market their farm produce.

### **1.3 Justification of the Study**

Tanzania, like other countries in SSA, depends on agriculture as a main source of livelihoods and the economy directly or indirectly (i.e. overall growth, food security, and poverty reduction) of about 70 percent of its population in rural and urban areas (FAO, 2013). It is estimated that around 44 million hectares are suitable for agricultural production but only 10.8 million hectares equivalent to about 24% is cultivated by smallholder farmers with farm sizes ranging between 0.2 to 2.0 hectares (URT, 2016).

Smallholder farmers who occupy the majority of the agricultural land and produce most of the agricultural products predominate the agricultural sector in Tanzania (IFAD, 2015). Low farm productivity stemming from lack or inadequate access to markets, credit, agro-inputs and technology remain the long-standing challenges of the smallholder farmers

(TNPS, 2016). Naturally, smallholder farmers produce to feed their families but they also expect to gain income by selling surplus of their farm produce. When farmers make more income from the sale of their produce this leads to more development in the rural areas which ultimately impacts positively on the overall economy (TNPS, 2016). However, this kind of impact has not yet been felt-at least not on a tangible scale (TNPS, 2016).

Before and even after Tanzania's independence, agricultural marketing cooperatives for cash crop, mainly, coffee, cotton and tobacco were promoted in order to prompt production as well as farmers' negotiation power (Cooksey, 2010). The situation fundamentally changed after liberalization policies and introduction of the WRS has encouraged initiation of proactive cooperation among farmers and other players for trade in agricultural commodities (URT, 2005).

The policy relevance of this study hinges on the fact that the Government is struggling to come up with an intervention to assist smallholder farmers in enhancing their income in a market which is very dynamic and competitive. In addition, the findings of the study will inform planners, policy makers and other stakeholders about the roles they can play in facilitating and networking smallholder coffee farmers with financial institutions in order to increase crop productivity and improve their livelihoods. Moreover, this study is in line with the realization of the broad goals of Tanzania's Development Vision (TDV) 2025, and the Second Five Year Development Plan 2016/17-2020/21 (URT, 2016) that support strategies for effective WRS scheme.

## **1.4 Objectives of the Study**

### **1.4.1 Overall objective**

The overall objective of this study was to assess the effectiveness of WRS in enhancing coffee marketing in Mbinga District, Tanzania.

### **1.4.2 The specific objectives**

- i. To identify factors influencing farmers' participation in WRS marketing channel;
- ii. To determine farmers' perception of the WRS operations in facilitating provision of storage, credit and market services; and
- iii. To examine the effect of credit (agro-inputs) accessed through WRS marketing channel on coffee productivity.

### **1.4.3 Research questions**

- i. What factors influence the participation of coffee farmers in WRS marketing?
- ii. To what extent do farmers perceive that WRS has facilitated provision of storage, credit and market services?
- iii. How has access to agro-inputs through WRS influenced coffee productivity?

## **1.5 Theoretical Framework**

Literature shows that the WRS works best when there is a favourable marketing environment, with opportunities for smallholder farmers to access loans, knowledge, skills and technology suitable to revive and increase quantity and quality of crops (Kimaro and Towo, 2013). In order to ensure beneficial and fair deal to smallholder farmers, the effectiveness of WRS is expected to minimise various constraints hampering effective production and marketing of the agricultural produce (Laxois and Varangis, 1996). Basically, effective WRS is the function of degree of business actors'

transparency, production support to farmers and the ultimate accrued benefits to farmers resulting from good marketing and pricing mechanism (Cooksey, 2010). The understanding of effectiveness of WRS needed a support of theories to reflect and spotting the patterns and links in thought which emerge as a result of literature review (Hilsdon, 2006). Thus participation, farm production and effectiveness theories guided this study.

Firstly, the participation theory explains a choice for involvement in programmes from a set of mutual exclusive alternatives,  $j = 1, 2 \dots k$ , for rural people in most of the developing countries (Ajzen and Fishben, 1980; Ajzen, 2001). The theory, sometimes known as margin theory states that decision whether or not to participate in the programme is a "function of the relationship of load to the power" (Green, 2000). Load is defined as the "self and social demands by a person to maintain a minimum level of autonomy" and power is described as "resources such as abilities, possessions, position, allies, etc. which a person can command in coping with the load" (Byrka, 2009). In other words, the higher the margin between load and power, the lesser the participation in the programme (Ajzen, 2001).

The theory expounds factors and behavioral attributes that affect smallholder farmers' participation in the given programme. The attributes include expected returns and expected costs of participation, attitudes, values, and skills of people, design and other characteristics of the programme, and the legal, political, and institutional environment prevailing at the time (Green, 2000; Glasman and Dolores, 2006). The attributes of the smallholder farmer such as age, coffee market information, education level, sex, farm size and distance from coffee farms to the nearest market centres determined the level of participation in WRS.

Secondly, Organisational Effectiveness Theory (OET) asserts that what makes an organisation or a system to be effective is directly related to decision-making criteria centering on attainment of goals and employment of persuasive processes i.e. it is goal-centred (Campbell, 1977). From this theory, the level of perception depends on how the WRS operates and how a farmer is transforming the given resources into outputs. It is in the context of level of attainment of the WRS goals such as credit accessibility, storage services, and market that determine the WRS effectiveness.

Thirdly, farm production theory that outlines output per unit input supplied depends on the factor inputs used (Ellis, 1992). That means the level of output per input depends on how a farmer is transforming a given physical input into physical output. The physical input includes fertilizers, improved seeds/seedlings, pesticides obtained through WRS, while holding other factors constant (Anyaeibunam *et al.*, 2010).

The study sought to determine effectiveness of the WRS. It was essential to determine whether creation of coffee marketing environment through the WRS is a solution towards solving the problem of coffee marketing which is very dynamic and competitive under trade liberalisation regime. Therefore, referring to the users of the WRS as rational farmers (geared with satisfaction of services), the use of participation theory and farm production theories determined whether coffee farmers are truly guided by benefit guarantees which encourage confidence and participation in the system.

### **1.6 Analytical Framework**

The analytical framework, as shown in Fig. 1.1, is a narrative outline presentation of variables to be studied and hypothetical relationships between and among them. The anal

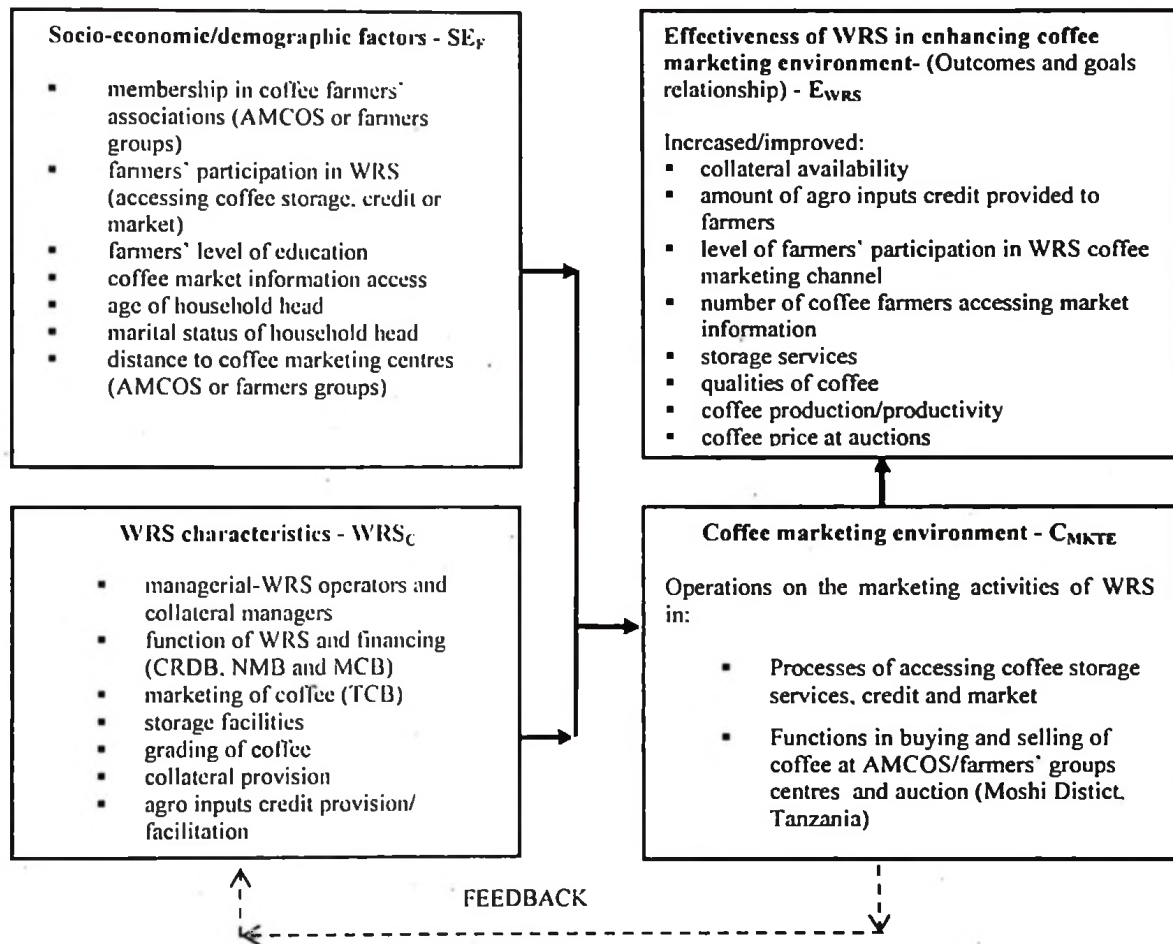
framework is based on the literature that was reviewed. The linkages are established between independent variables and the dependent variables.

In the context of this study, the WRS effectiveness is indicated by enhanced coffee marketing environment controlled by operations on the marketing activities of coffee through the WRS. It was measured in terms of improvement (outcome) towards the WRS services delivered to coffee farmers (impact). In this regard the basis of indicators was as suggested by Okoboi (2011) and Madulu (2011) namely membership, age, marital status, distance to marketing centres, education, and market information. According to the literature, effectiveness of the WRS seems to be a function of two main domains that is socio-economic and the WRS characteristics.

The arrows in a analytical framework capture relationship between socio-economic/ demographic factors and the WRS characteristics to marketing environment and WRS effectiveness (goal attainment). Farmers access the WRS services through their membership in FGs and AMCOs. At the auction in Moshi municipality, Tanzania, international buyers access FGs and AMCOs coffee from registered warehouses under the supervision of the Tanzania Coffee Board (TCB) at the auction.

It is anticipated that results of operations on the WRS at the auction of the marketing activities, storage at registered warehouse and credit will be reported back to stakeholders (shown with dash arrows in Fig. 1.1) for awareness and improvement of WRS services.





**Figure 1.1: Analytical framework for WRS effectiveness in the coffee industry**

**Source: Derived from literature details and researcher's own construct**

### 1.7 Organisation of the Thesis

This thesis is organized based on publishable manuscripts format of Sokoine University of Agriculture (SUA), where each manuscript represents its own chapter. The whole thesis is divided into five chapters. Chapter one covers the background of the study followed by statement of the problem, chapters two to five present manuscripts developed from this study.

In chapter two, manuscript one is presented which focuses on identifying determinants of smallholder coffee farmers' participation in the WRS in the area of study. The chapter identifies factors influencing smallholder coffee farmers to participate in warehouse receipt system as a starting point of analysis of effectiveness.

Manuscript two is presented in chapter three. The chapter focuses on farmers' perception of the WRS effectiveness. It captures aspects of effectiveness of WRS as perceived by smallholder farmers. On the same chapter, the effectiveness of WRS in service delivery is presented and discussed. Effectiveness of WRS was compared with traditional coffee marketing channel to show how WRS marketing channel is considered to be more effective than traditional coffee marketing channel of using private coffee buyers.

Chapter four relates to manuscript three which captures credit access through WRS and farm productivity of smallholder coffee farmers. The chapter discusses how WRS has enhanced marketing environment and smallholder farms productivity.

The overall conclusions and recommendations are presented in chapter five. The chapter draws conclusions from previous chapters and provides recommendations for policy makers, academicians, coffee farmers and further researches.

## References

AGRA (2014). Africa agriculture status report: *Climate Change and Smallholder Agriculture in Sub-Saharan Africa*. Alliance for a Green Revolution Africa (AGRA), Nairobi, Kenya. 218pp.



Ajzen, I. (2001). Perceived behaviour control, Self efficacy, Locus of control and the theory of planned behaviour. *Journal of Applied Social Psychology* 32: 1–20.

Ajzen, I. and Fishben, K. (1980). *Understanding Attitudes and Predicting Social Behaviour* Engle wood Cliffs, United States of America. 278pp.

Angula, M. N. (2010). Determinants of sustainable coffee marketing channel choice and supply response among organic and certified smallholder farmers: evidence from Uganda. A thesis for Award degree of MSc in Agriculture, Food and Resource Economics, submitted to Michigan State University, USA. 65pp.

Anyaeibunam, H., Okoye, C., Asumugha, G., Ogbona, M., Madu, T., Nwakor, N. and Ejechi, M. (2010). Labour productivity among smallholder cassava farmers in South East agro ecological zone Nigeria. *African Agricultural Resources* 5(21): 2882-2885.

Armstrong, G. (2012). *Principles of Marketing* 5<sup>th</sup> ed. NSW: Pearson Education Inc. pp. 80.

Baffes, J., Tschirley, D. and Gergely, N. (2009). Pricing systems and prices paid to growers. In: *Organization and Performance of Cotton Sectors in Africa*. Tschirley, D., Poulton, C. and Labaste, P. eds. Washington, DC, World Bank. pp. 65-72.

Besley, T. (1994). How do market failures justify interventions in rural credit markets? (English). *The World Bank Research Observer* 9(1): 27-47.

Biteye, M. (2016). 70% of Africans make a living through agriculture, and technology could transform their world. World Economic Forum on Africa 2016. The World Economic Forum on Africa Kigali, Rwanda from 11 to 13 May 2016. [<https://www.weforum.org/agenda/2016/05/70-of-africans-make-a-living-through-agriculture-and-technology-could-transform-their-world>] site visited on 24/12/2016.

Bryde, D. (2008). Perceptions of the impact of project sponsorship practices on project success. *International Journal of Project Management* 26(8): 800-809.

Budd, N. (2001). The Legal and Regulatory Framework for WRS in Commodity Distribution Credit and Hedging. Paper presented at workshop on warehouse receipts financing: making the difficult deals easier and more profitable, July 9 – 11, 2001, Amsterdam. 21pp.

Campbell, J. P. (1977). *On The Nature of Organizational Effectiveness. New Perspectives on Organizational Effectiveness*. San Francisco - London, Jossey-Bass Publishers. 55pp.

Chauvin, N. D., Mulangu, F. and Porto, G. (2012). Food Production and Consumption Trends in Sub-Saharan Africa: Prospects for the Transformation of the Agricultural Sector. Regional Bureau for Africa, United Nations Development Programme (UNDP), WP 2012-011. 74pp. [<http://www.undp.org/content/dam/rba/docs/Working%20Papers/.pdf>] site visited on 24/07/2017.

Cooksey, B. (2010). Marketing reform? The rise and fall of agricultural liberalisation in Tanzania. *Development Policy Review* 21(1): 67-91.

- Coulter, J. and Onumah, G. (2002). The Role of Warehouse Receipt Systems in Enhanced Commodity Marketing and Rural Livelihoods in Africa. *Food Policy* 27: 319-337.
- Ellis, F. (1992). *Peasant Economics: Farm Household and Agrarian Development*. Wye Studies in Agricultural and Rural Development, Cambridge University Press, UK. 122 pp.
- FAO (2013). *Review of Food and Agricultural Policies in the United Republic of Tanzania 2005-2011*. Rome: Food and Agriculture Organisation of United Nations. 222pp.
- Glasman, L. R. and Dolores, A. (2006). *Forming Attitudes That Predict Future Behavior Relation*. A meta analysis of the attitude behaviour relation University of Florida. 132(5): 778-822.
- Green, W. H. (2000). *Econometric Analysis*. New Jersey: Prentice- Hall. 67pp.
- Hilsdon, J. (2006). Re-Thinking Reflection. *The Journal of Practice Teaching in Health and Social Work* 6(1): 57-70.
- Höllinger, F. and Kiriakov, K. (2009). *The Use of Warehouse Receipt Finance in Agriculture in ECA Countries*. Technical background paper for the World Grain Forum St. Petersburg, Russian Federation. 75pp.
- IFAD (2015). *Rural Financial Services Scheme and Agriculture Marketing Systems Development Scheme*. Interim Evaluation. Tanzania. pp.10.

- Kabigi, J. (2012). CUF irked by police action to contain riots in Tanzania. [<http://in2eastafrika.net/cuf-irked-by-police-action-to-contain-riot>] site visited on 19/06/2018.
- Katunze, M., Kuteesa, A., Mijubi, T. and Mahebe, D. (2017). Uganda warehousing receipt system: Improving market performance and productivity. *Economic Policy Research Centre*. 18pp.
- Kenya National Federation of Agricultural Producers (KENFAP) (2011). *The role of Warehouse Receipt System and Financial Services in Improving Produce Marketing by Smallholder Farmers in Kenya*. KENFAP-Kenya October 2011. pp 51.
- Kimaro, P. K. and Towo, N. N. (2013). *Warehouse Receipt System: A Solution towards Smallholder Farmers Financial Constraints*. Working Papers, Department of Documentations and Publications. MUCCoBS, Moshi, Tanzania. 24pp.
- Komarek, A. (2010). The determinants of banana market commercialization in Western Uganda. *African Journal of Agricultural Research* 5(9): 775. [<http://www.academicjournals.org/AJAR>] site visited on 15/09/2015.
- Komba, L. (2011). *Market Position of Coffee Farmers in the Coffee Supply Chain: A Case Study of Mbinga, Tanzania*. Lambert Academic Publishing. CEDHA Tanzania. 76pp.
- Kuserwa, N. (2009). Tanzania Warehouse Licensing Board (TWLB). *The Warehouse Receipt System*, Tanzania. 30pp.

- Lacroix, R. and Varangis, P. (1996). Using Warehouse Receipts in Developing and Transition Economies. *Finance and Development* 33(3).
- Lyimo, A. P. (2009). *Warehouse Receipt System Rudi Experience*, ESAANET Nairobi Meeting. 17<sup>th</sup> May 2009, Nairobi Kenya. 57pp.
- Madulu, R. B. (2011). Improving access to credit for paddy farmers through warehouse receipt-based agricultural marketing system in Tanzania. *African Crop Science Journal* 10: 37-39.
- Mahanta, J. (2012). Review of warehouse receipt as an instrument for financing in India. *International Journal of Scientific and Technology Research* 1: 45.
- Mayaki, I. (2016). 3 ways to transform agriculture in Africa. World Economic Forum on Africa 2016. The World Economic Forum on Africa Kigali, Rwanda from 11 to 13 May 2016. [<https://www.weforum.org/agenda/2016/05/3-ways-to-transform-agriculture-in-africa/>] site visited on 24/01/2016.
- Mhando, D. G. and Mntambo, B. D. and Ganja, S. K. and Gongwe, A. G. (2013). Opportunities and Constraints: The Warehouse Receipt System for Production and Marketing in Mbinga District, Tanzania. *Journal of the Korean Association of African Studies* 3(9): 179-217.
- Millao, S. K. (2011). The Economics of Warehouse Receipt System: A case of Smallholder Cotton Producers in Maswa District, Shinyanga-Region. MSc Dissertation for Award of MSc Degree of Agriculture Economics at Sokoine University of Agriculture, Morogoro, Tanzania. 121pp.



- Millinga, M. (2009). Empowering farmers in Tanzania through the warehouse receipt system. *IFAD report*. Tanzania. 4pp.
- Mor, N. and Fernandes, K. (2009). Warehouse Receipt finances for farmers- A glimpse. *Commodity Insights Year book*. [[www.officedepot.com/ OfficeSupplies/ BusinessForms](http://www.officedepot.com/OfficeSupplies/BusinessForms)] site visited on 12/07/2018.
- Mtanda, A. M. (2015). A Dissertation submitted in partial fulfilment of the requirements for the Degree of Master of Arts in Rural Development of Sokoine University of Agriculture. Morogoro, Tanzania. 44pp.
- Mullinax, A. (2011). The Warehouse Receipts System: Improving Food Security in the Post-Harvest Value Chain. [<https://ruralfoodsecurity.wordpress.com/background/food-security/>] site visited on 12/07/2018.
- Okoboi, G. (2011). Improved Inputs Use, Productivity and Commercialisation in Uganda Maize Production. Thesis, for Award degree of PhD of Makerere University, Uganda. 176pp.
- Onumah, G. E. (2010). Implementing Warehouse Receipt Systems in Africa Potential and Challenges. Common market for Eastern and Southern Africa, Lilongwe, Malawi. 20pp.
- Ponte, S. (2004). The politics of ownership: Tanzanian coffee policy in the age of liberal reformism. *African Affairs* 103(413): 615-633.

- Poulton, C. and Macartney, J. (2012). Can Public–Private Partnerships Leverage Private Investment in Agricultural Value Chains in Africa? A Preliminary Review. *World Development* 40(1): 96-109.
- Salami, A., Kamara, A. B. and Brixiova, Z. (2010). *Smallholder Agriculture in East Africa: Trends, Constraints and Opportunities*. Working Papers Series No. 105 African Development Bank (AfDB), Tunis, Tunisia. 52pp.
- Sitko, N. J. and Jayne, T. S. (2012). Why are African commodity exchanges languishing? A case study of the Zambian Agricultural Commodity Exchange. *Food Policy* 37(3): 275-282.
- Tanzania National Panel Survey (TNPS) (2016). *Crop Wholesale Prices Data and Marketing*. Ministry of Industry Trade and Marketing. Dar es Salaam, Tanzania. 20pp.
- TCB (2016). Taarifa ya mkutano mkuu wa saba (7) wa wadau wa kahawa uliofanyika Morogoro, Mei 26 -27, 2016. 48 pp. [[http://www.coffeeboard.or.tz/News\\_publications/2016/2017/TAARIFA\\_YA\\_MKUTANO\\_WA\\_7\\_NCC.pdf](http://www.coffeeboard.or.tz/News_publications/2016/2017/TAARIFA_YA_MKUTANO_WA_7_NCC.pdf)] site visited on 12/01/2017.
- Temu, A. A., Winter-Nelson, A. and Garcia, P. (2001). Market liberalisation, vertical integration and price behaviour in Tanzania's coffee auction. *Development Policy Review* 19(2): 205-222.
- UNIDO (2011). Tanzania's Cashew Value Chain. *A Diagnostic Annual Report*. United Nations Industrial Development Organization, Vienna, Austria. 66pp.



URT (2005). *The Warehouse Receipt Act of 2005*. Government Printers. Dar es Salaam, Tanzania. 24pp.

URT (2014). *National Strategy for Growth and Reduction of Poverty II (NSGRP II) Annual Implementation Report, 2013/14: "Accounting for Results"*. Dar es Salaam: Ministry of Finance and Economic Affairs.

URT (2016). *National Five Year Development Plan 2016/2017-2020/2021: "Nurturing Industrialization for Economic Transformation and Human Development"*. Ministry of Finance and Planning. 293pp.



## CHAPTER TWO

### 2.0 Determinants of Participation of Smallholder Coffee Farmers in Warehouse Receipt System in Mbinga District, Tanzania

*Matei E. Mapunda<sup>1</sup>, David G. Mhando<sup>2</sup> and Betty M. Waized<sup>3</sup>*

<sup>1</sup>Tanzania Institute of Accountancy, Tanzania, E-mail: maundamatei@yahoo.com

<sup>2</sup>College of Social Sciences and Humanities, SUA, Tanzania, E-mail: david\_mhando@yahoo.com

<sup>3</sup>School of Agricultural Economics and Business Studies (SAEBS), SUA, Tanzania, E-mail: yzbetty@sua.ac.tz

#### 2.1 Abstract

Warehouse Receipt System (WRS) holds considerable opportunity sets (credit, storage space and market information until the market has stabilized and prices have increased) necessary for improving incomes and livelihoods of smallholder farmers. However, there has been little progress regarding participation of smallholder farmers in the system. This study sought to examine factors that influence smallholder coffee farmers' participation in the WRS in Mbinga District, Tanzania. The specific objective was to identify factors influencing farmers' participation in the WRS. A household survey of 390 randomly selected smallholder coffee farmers was conducted in Mbinga District, Tanzania. Data gathered through a structured questionnaire were analysed using binary logistic regression. The results show that a respondent's age, access to market information, sex and distance from coffee farms to the Agricultural Marketing and Cooperative Societies (AMCOS) or farmers' group (FG) centres influenced coffee farmers' decisions to participate in the WRS. Young farmers and those with access to coffee market information are more likely to use the WRS, while farmers whose farms were further

away from the AMCOS or FG centres were unlikely to participate in the WRS. In addition, locating of AMCOS or FG centres closer to coffee farmers could be a key to increasing farmers' participation in the WRS.

**Keywords:** Coffee participation, Warehouse Receipt System, institutionalisation, market information.

## 2.2 Introduction

Agriculture is the main industry in sub-Saharan Africa countries (SSA). However, SSA's agriculture is dominated by smallholder farmers who play a key role in African agriculture. Salami *et al.* (2010) and Biteye (2016) have reported that smallholder farmers are described as those with 2 hectares or less and they represent 90% of all farms (Salami *et al.*, 2010; Biteye, 2016). In the study area (Mbinga District) the average of coffee land holding is 1.6 hectares per household (TaCRI, 2015). This signifies that farmers are smallholder ones.

In Tanzania, agriculture provides about 66.9% of employment, accounts for about 23% of GDP, 30% of exports and 65% of inputs to the industrial sector (URT, 2016). The main exported cash crops are coffee, tea, cotton, cashews, raw tobacco, sisal and spices. Coffee is one of the important cash crops with average production ranging between 30 000 and 40 000 metric tons each year, generating average export earnings in the order of 100 million USD per annum, whereby approximately 70% is Arabica and 30% is Robusta (IFAD, 2014).

In Mbinga District, Tanzania, where the study was carried, farmers grow coffee as their cash crop and is a major source of household's income. However, some studies have

shown that the returns in the coffee sector are decreasing due to low agricultural productivity resulting from lack of access to farm inputs, extension services, credit, modern technology application, trade and marketing support and participation (Millinga, 2009; Madulu, 2011; Sitko, 2012; Mhando *et al.*, 2013).

Participation of smallholder coffee farmers in WRS is a central issue to this research paper. The word participation can be defined as the act of being involved in something (Shah *et al.*, 2008). According to Oboh and Kushwaha (2009), participation means some form of involvement of people, with similar needs and goals, in decisions affecting their lives. Since people are actively involved in the process, Lapar *et al.* (2003) argue that participation helps promote sense of ownership and control among the people. It is in light of participation definitions that this paper ought to identify factors influencing farmers' participation in WRS in order to create a sense of ownership to farmers and sustainability of coffee marketing channel.

Tanzania piloted the WRS in 2002 purposely for coffee and cotton, and Warehouse Receipt Act was enacted in 2005 aiming at enabling groups of farmers, primary societies, and cooperative unions to access financial services and loans, and increase participation in farm production and marketing (URT, 2005). The WRS is an arrangement aimed at providing services related to storage, access to credit and marketing of farmers produce (URT, 2005). In spite of introduction of the WRS by the Government, smallholder farmers still face various problems including lack of enhanced participation in marketing channels, very limited access to short-term financing and reliable commodity market information (Millinga, 2009; Madulu, 2011; Sitko, 2012; Mhando *et al.*, 2013; Likwata and Venkatakrisnan, 2014).

Recent market analysis confirmed that the potential benefits of higher produce prices and lower input prices are effectively transmitted to smallholder farmers when market access is guaranteed (IFAD, 2010; Komba, 2011; Madulu, 2011; Mhando *et al.*, 2013). The WRS aims at facilitating farmers to participate directly at the coffee auction which reduces the role of the middleperson and increases their income (Millinga, 2009; URT, 2010; IFAD, 2011).

In Mbinga District, despite the WRS operating since 2002, the number of farmers participating in WRS as well as their awareness on the WRS operation is still very low (Millinga, 2009; URT, 2010; Komba, 2011; Mhando *et al.*, 2013). For instance, in 2012/13 about 80.6% of farmers interviewed acknowledged to observe changes in the coffee price and coffee quality improvement after the introduction of the WRS, yet the level of participation and use of WRS services was low of about 25.8% (Mhando *et al.*, 2013).

Recent data show that farmers who participate in the WRS benefit more than those who do not as prices of their farm produce are higher at auction than when sold to private buyers TaCRI (2015). For example, the price trends per kilogram of coffee in the auction for the past five years is as presented in Table 2.1 below:

**Table 2.1: The coffee price trends per kilogram in the auction for the past five years**

| Harvesting season (year) | Price (TZS) |
|--------------------------|-------------|
| 2010/2011                | 8800        |
| 2011/2012                | 9540        |
| 2012/2013                | 5545        |
| 2013/2014                | 4970        |
| 2014/2015                | 7100        |

**Source:** TaCRI (2015).

In the WRS, farmers sold coffee at an average of TZS 7191 while private coffee buyers bought at an average of TZS 1350 per kilogramme in 2010/2011 and 204/2015 (TaCRI, 2015). Therefore, WRS users had an advantage of higher price of coffee received over non users.

There is limited knowledge about factors that cause farmer's low participation as well as the overall implementation of the WRS and farmers' organisations in the WRS. This study attempts to fill this knowledge gap. The paper contributes to the knowledge on policy interventions to make smallholder coffee farmers cope with the changing market structures specifically of WRS in coffee industry in less developed country like Tanzania. The main objective was to identify determinants of smallholder coffee farmers' participation in WRS in Mbinga District, Tanzania.

## **2.3 Theoretical and Analytical Frameworks**

### **2.3.1 Theoretical Framework**

The theoretical framework of the study pivots on the participation. The theory explains a choice for participation in a programme from a set of mutual exclusive alternatives,  $j = 1, 2 \dots k$ , for rural people in most of the developing countries (Ajzen and Fishben, 1980; Ajzen, 2001). The theory, sometimes known as margin theory states that decision whether or not to participate in the programme is a "function of the relationship of load to the power" (Green, 2000). Load is defined as the "self and social demands by a person to maintain a minimum level of autonomy" and power is described as "resources such as abilities, possessions, position, allies, etc. which a person can command in coping with the load" (Byrka, 2009). In other words, the higher the margin between load and power, the lesser the participation in the programme (Ajzen, 2001).



The theory expounds factors and behavioral attributes that affect smallholder farmers' participation in the given programme. The attributes include expected returns and expected costs of participation, attitudes, values, and skills of people, design and other characteristics of the programme, and the legal, political, and institutional environment prevailing at the time (Green, 2000; Glasman and Dolores, 2006).

### 2.3.2 Analytical framework

This study relies on the attributes of the smallholder farmer of participation in WRS. The attributes include age, coffee market information, education level, sex, farm size and distance from coffee farms to the nearest market centres. The determinants of participation are qualitative decision that is based on probabilities of either choosing to participate or not (in this case, the participation of smallholder coffee farmers in WRS marketing channel). One qualitative choice model of interest in this type of decision is the logistic regression model (Green, 2000; Gujarati and Sangeetha, 2007; Onoja *et al.*, 2012).

Logistic regression is a very useful tool in predicting a categorical (usually dichotomous) variable from a set of predictor variables. It is often chosen if the predictor variables are a mix of continuous and categorical variables and/or if they are not normally distributed (Wuensch, 2006). By using the logistic regression the probability of a result being in one of two response groups (binary response) is modelled as a function of the level of one or more explanatory variables. Thus, the probability of whether or not the farmer participates in the WRS may be modelled as a function of the level of one or more independent variables. For this study, the response variable is Dummy: 1 = coffee farmers' participation in the WRS in acquiring either coffee storage and marketing or storage, credit and marketing of coffee (SCM), 0 = Otherwise.

The functional form is denoted as:

$$y = \begin{cases} 1 & \beta_0 + \beta_1 X_{ij} + \varepsilon_i > 0 \\ 0 & \text{else} \end{cases}$$

Whereby;  $y$  is the participation in WRS, thus:

$$\text{logit}(\pi) = \beta_0 + \sum_{j=1}^K \beta_j X_{ij} + \varepsilon_i \dots\dots\dots(1)$$

Whereby:  $\beta_0$  is constant,  $\beta_j$  = Coefficient of independent variables,  $X_{ij}$  = Independent variables.

Factors that influence participation are well documented in literature (Allen and Gale, 1994; Tanga *et al.*, 2000; Lapar *et al.*, 2003; Bahta and Bauer, 2007; Boughton *et al.*, 2007; Barret, 2008; Agwu *et al.*, 2012). This literature identifies a wide range of socio-economic and demographic variables that affect market participation. Thus, factors considered in the empirical model are a subset of those adopted in previous studies as per details in Table 2.2.

The study used the variables in Table 2.2 for estimations of participation. Therefore, equation (1) is further manipulated in (2) which in this study is used to interpret determinants of smallholder coffee farmers' participation in WRS.

$$\log itPPT_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \varepsilon_i \dots\dots\dots(2)$$

Whereby:

$PPT_i$  = Levels of participation in WRS

$X_1$  = Age of respondent in years

$X_2$  = Access to coffee market information

$X_3$  = Education of respondent

$X_4$  = Sex



$X_5$  = Cultivated land size

$X_6$  = Distance from coffee farms to the nearest AMCOS/ Farmers' group centres

$\varepsilon_i$  = Error term

The estimation of coefficients of logistic regression model was done using the method of maximum likelihood in STATA software. Variable descriptions ( $PPT_i$ ,  $AG_i$ ,  $MKINF_i$ ,  $EDUC_i$ ,  $SEX_i$ ,  $FSZ_i$ ,  $DWMK_i$ ) and their respective measurements are as given in Table 2.2.

**Table 2.2: Definition of variables used in regression model and measurements**

| Variable                     | Variable Description   | Variable Measurement   | Expected sign and explanation   |
|------------------------------|--|--|---|
| <b>Dependent variable</b>    |  |  |   |
| $PPT_i$                      | Levels of participation in WRS   | Dummy: 1 = Coffee farmer participate in WRS, 0 = Otherwise   | + the use of WRS services (storage, marketing, and agro inputs) increase participation in WRS   |
| <b>Independent variables</b> |  |  |   |
| $AG_i$                       | Age of respondent in years   | Dummy: 1 = age of coffee farmers $\leq 50$ years (productive aged farmers), and 0 = otherwise (less productive aged farmers) (URT, 2013)                     | +/- The coefficient of old age group is also expected to have a positive or negative sign. Older farmers are wealthier hence more likely not to use agro inputs credit. On the other hand, though wealthier, older farmers may not be keen to use WRS services (storage, marketing, and agro inputs) due to various reasons such as lack of knowledge |
| $MKINF_i$                    | Access to coffee market Information  | Dummy: 1 = yes, 0 = Otherwise  | + A farmers who have market information are expected to be good participators in WRS  |
| $EDUC_i$                     | Number of years in levels of classes                                       | Dummy: 1 = coffee farmers $\leq 7$ years of schooling (primary education educated farmers or less), 0 = otherwise (secondary and post sec. educated farmers) | + More educated persons (more years spent in schooling) in Tanzania are more likely use WRS services (storage, marketing, and agro inputs) than less educated ones  |
| $SEX_i$                      | Male or female   | A dummy variable indicating a male or female, 1 = male and 0 = Otherwise   | - The coefficient of sex of the head of the household is expected to have a negative sign for female headed households. The reason is that women have little or no access to resources such as land, and credit.  |
| $FSZ_i$                      | Cultivated land size   | Hectares   | + Coefficient is expected to have a positive sign because the bigger the hectareage the increased the agriculture production that motivates to participate in WRS   |
| $DWMK_i$                     | Distance from coffee farms to the nearest to AMCOS/ Farmers' group centres | A dummy variable 1 = residing $\leq 1$ km (near), 0 = Otherwise  | +/- the nearer to the AMCOS/ Farmers' group centres the higher the level of participation in WRS and otherwise  |

## 2.4 Methodology

### 2.4.1 Study area

The study was carried out in Mbinga District, Tanzania from May to October, 2014 (Appendix 12). The district was chosen because coffee cultivation is an important source of income of the smallholder farmers. In Mbinga District, 95% of coffee is produced by

smallholder farmers (Pike, 1938; Basehert, 1972; Itani, 1998). The other basis lies on the fact that coffee was one of the piloted crops when WRS was introduced in Tanzania in 2002 (URT, 2014).

#### **2.4.2 Research design, sampling and data collection methods**

A cross-sectional research design was used and considered appropriate because data were collected at one point in time from two different groups of respondents (FGs and AMCOS). Moreover, it was also easier and adequate to organize and relate the data collected at a single point for processing, analysis and presentation (Kothari, 2004). Quantitative data were collected using a structured questionnaire, qualitative data were collected through key informant interviews, while secondary information was obtained from published and unpublished reports.

The study population was coffee farmers. The sampling frame was farmers who were eligible to access WRS services. The eligibility was grounded on membership either in AMCOS or farmers groups. With consultation of the District Agricultural, Irrigation and Cooperative Officer (DAICO), provided register books containing names of coffee farmers who were members of 21 AMCOS and 21 farmers' groups with a total of 3900 farmers. A stratified random sampling procedure was used for selecting the respondents based on membership of the respondents. Using Yamane (1967) formula, 4 AMCOS and 4 farmers' groups were obtained from both lowland and highland coffee farmers. The formula gave a total of 390 respondents from both AMCOS and farmers' groups. Since AMCOS had more coffee farmers (2304) than farmers' groups (1596) (Appendix 1. A proportionate sampling was employed to select 390 respondents comprising of 230 households from AMCOS and 160 from farmers' groups. A selection of respondents who were heads of households was by simple random sampling of random numbers generated

in MS Excel. The 390 respondents sample is large enough than the minimum of 30 respondents recommended by Bailey (1994).

## 2.5 Results and Discussions

### 2.5.1 Descriptive statistics and variables for participation in WRS

The results of logistic model analysis presented in Tables 2.4 were prior supported by descriptive statistics analysis shown in Table 2.3.

**Table 2.3: Descriptive Statistics of the Respondents (n = 390)**

| Variable   | Variable descriptions  | %  | Mean | Std  |
|--|--|----|------|------|
| Levels of participation in WRS   | Dummy: 1 = Coffee farmers' level of participation in SCM (either in storage, credit and marketing or storage and marketing), 0 = Otherwise | 89 |      |      |
| Age of respondent in years   | Dummy: 1 = age of coffee farmers $\leq$ 50 years, 0 = otherwise  | 57 |      |      |
| Access to coffee marketing Information                                     | Dummy: 1 = yes, 0 = Otherwise  | 97 |      |      |
| Number of years in schooling   | Dummy: 1 = coffee farmers $\leq$ 7 years of schooling, 0 = otherwise   | 66 |      |      |
| Sex of respondent (male or female)   | A dummy variable indicating a male or female, 1 = male and 0 = Otherwise   | 61 |      |      |
| Farm size  | Hectares   |    | 1.3  | 1.87 |
| Distance from coffee farms to the nearest to AMCOS/ Farmers' group centres | A dummy variable 1 = less than one km, 0 = Otherwise   | 96 |      |      |

Table 2.3 shows characteristics of the study variables descriptively. The results of the study indicate that coffee farmers who participated in WRS were 89% of the study sample as shown in Table 2.3. This indicates that most coffee farmers in the sampled area were having an opportunity of participating in the WRS. Table 2.3 also shows that more than half of the respondents in the study area were equal or less than 50 years of age. In Tanzanian context, this is a youth age group (URT, 2014). This indicates that the dominance of participators in WRS were of proactive young coffee farmers. Likewise,

97% of the respondents in the study area were having an access to coffee marketing information, while the average land holding was 1.3 hectares (mean hectares of 1.3) (Table 2.3), which implies that the study was dominated by smallholder farmers. In average 97% of farmers seem to reside close to the AMCOS/FGs marketing centres. This was shown in the analysis that most of them were within the perimeter of or within 1km. Likewise, Table 2.3 shows that education level of coffee farmers which signifies that 65.5% of the respondents were equal or below seven years of schooling (primary education or less). This implies that education was not significant factor for determining participation of farmers in WRS because there was no significant difference in terms of percent as higher percent of respondents comprised of primary education level or less. The study findings show that, most of coffee farmers were males than their females counterparty who participated in WRS. This indicates that female respondents have little or no access to resources such as land, credit and extension services due to taboo and African culture related interactions between men and women (World Bank, 2005).

#### **2.5.2 Logistic regression and analysis of variables for participation in the WRS**

Table 2.4 presents model fitness for analysis of determinants of participation of smallholder farmers in WRS as well as results of the logistic regression.

**Table 2.4: Results of Logistic Regression Model (n = 390)**

| Variable  | $\beta$ Coefficients    | Std Error             | P> t  | Exp ( $\beta$ ) |
|---|-------------------------|-----------------------|-------|-----------------|
| Sex-biological nature of respondent (male or female)                          | 0.983**                 | 0.4187                | 0.019 | 2.672           |
| Age of respondent( $\leq 50$ years or otherwise)                              | 1.026***                | 0.370                 | 0.006 | 2.790           |
| Education ( $\leq 7$ years of schooling or otherwise)                         | 0.263                   | 0.362                 | 0.467 | 1.300           |
| Farm size   | 0.124                   | 0.086                 | 0.147 | 1.132           |
| Access to coffee market Information   | 2.060***                | 0.736                 | 0.005 | 7.844           |
| Distance from coffee farms to the nearest to AMCOS/<br>Farmers' group centres | 0.147***                | 0.436                 | 0.009 | 1.583           |
| Constant  | 1.916                   | 1.055                 | 0.070 | 6.792           |
| <hr/>   |                         |                       |       |                 |
|   | LR (Likelihood ratio)   | chi <sup>2</sup> (6)  | =     | 29.5700         |
|   | Prob > chi <sup>2</sup> | chi <sup>2</sup> (6)  | =     | 0.0000          |
| Log likelihood =  | -118.3477               | Pseudo R <sup>2</sup> | =     | 0.1111          |
|   | Number of observations  |                       | =     | 390             |

Dependent variable: Levels of participation in WRS

\*\* =  $P < 0.05$ , \*\*\* =  $P < 0.01$

The goodness of fit of the model was tested (Table 2.4) and indicated a Pseudo R<sup>2</sup> of 0.1111, significant at 99% level of confidence and the log likelihood is negative (-118.3477) which is an indication of excellent model fit.

The results for logistic regression analysis of the factors that influence coffee farmers' participation in the WRS are shown in Table 2.4. Participation in the WRS was influenced to a great extent by four covariates of access to market information, sex, age, and distance from coffee farms to the AMCOS or FG centres. The other two (2) covariates i.e. education and coffee cultivated land size were insignificant. The reasons for insignificant variables could be viewed in the context that about 66% of the respondents had primary education or less. According to Reimers and Klasen (2012) returns to secondary and post-secondary education is higher than primary education or less because secondary or post-secondary education gives the farmers better ability to think critically and take decisions that have positive effect on productivity in the face of other agricultural challenges such



as changing seasons, market and inadequate funds for input and hired labour. The finding supports the participation theory that a resource such as education plays an important role of participation in the WRS and its effectiveness. The higher the education, the higher the percent of participation. The other variable of cultivated land size was insignificant because Mbinga District is densely populated creating no room for expansion of coffee cultivating land (Millinga, 2009).

It should be noted that the interpretation of logistic coefficients differs from typical linear regression (Field, 2005), and hence requires more manipulation in order to analyse the impact of the independent variables on the probability of WRS participation in marketing channel. The interpretation of significant logit coefficients is as shown in sub sections 2.6.2.1 - 2.6.2.4.

#### **2.5.2.1 Coffee marketing information and WRS participation**

As regards coffee marketing information (such as input price, auction price, collateral and credit availability), the coefficient of coffee market information ( $\beta$ ) was found to be 2.060; this coefficient was highly significant at the 99% level of confidence ( $p$  value = 0.005). The interpretation of  $\beta$  can be manipulated in terms of log odds [ $\text{Exp}(\beta)$ ]. Holding all other covariates constant; the probability of smallholder coffee farmer participating in the WRS increases by 7.844 times for those who had coffee market information as compared to those who had not.

The finding of this study implies that coffee market information is a significant factor for participation of smallholder farmers in WRS in the study area. Kimaro and Towo (2013) who conducted study on maize in Babati District, Tanzania to assess the participation factors of farmers in the WRS and found that 90.6% of the surveyed farmers who had



market information participated in WRS while 9.4% did not. Likewise in this study, 94.4% of the respondents who had an access to coffee marketing information participated in the WRS (Tabel 2.3). KENFAP (2011) reported that availability of market information to farmers boosts confidence of households who are willing to market their produce. Thus, farmers who are more informed are more likely to participate in the WRS.

#### **2.5.2.2 Sex of the respondents and participation in the WRS**

The estimated coefficient for male farmer ( $\beta$ ) was 0.983. The sex coefficient was significant at the 95% level of confidence (p value = 0.019). The interpretation of  $\beta$  can be manipulated in terms of log odds [Exp ( $\beta$ )]. Holding all other covariates constant; the probability of smallholder coffee farmers to participate in WRS increases by 2.672 times for males than females. This is consistent with the fact that most communities in African societies including Tanzania are characterized by male dominance system which marginalises women in various social aspects such as education, land and wealth ownership hence make them less participative in the economic activities (Doss, 2011).

According to the findings of this study, males dominated coffee production compared to females in the District due to the nature of coffee farming, which is very tedious and needs a lot of investment in terms of agro inputs. Therefore, males have more chance of making decision of participation in the WRS. The finding is in line with Ghasia (2003) who conducted a study in cashewnut crop in Mtwara region and found that 80% of the respondents were males and 20% were females who engaged in the WRS.

#### **2.5.2.3 Farmers' age and participation in the WRS**

The estimated coefficient for age of household head ( $\beta$ ) was 1.026. The age coefficient was significant at the 99% level of confidence (p value = 0.006). The interpretation of  $\beta$

can be manipulated in terms of log odds [ $\text{Exp}(\beta)$ ]. Holding all other covariates constant, the probability of smallholder coffee farmer of participating in WRS increases by 2.790 times for young coffee farmers as compared to old ones. This entails that young coffee farmers are motivated more by the WRS compared to old ages farmers and that youth age helped improve coffee marketing over time.

The result of this study contradicts that of Cunningham *et al.* (2008) which showed that the age of the farm household head has a positive significant effect on the level of market participation. This could be the case because age of the farmer determines experience one has in a certain type of farming and marketing activities. It is argued that aged farmers (age above 50 years old) have more experience in farming and develop skills to participate in the market (Madulu, 2011; Temu *et al.*, 2001). In contrary to Cunningham *et al.* (2008), Mahelet (2007) shows that age of the household head negatively and significantly affects the degree of household commercialization participation because the household participation with decrease in age index ranges from 0% to 95% through the study area. This could arise from the fact that older heads (age above 50 years old) have limited access to market information, whereas younger heads (age of 50 years old or less) could sell a relatively large portion of their product through a better access to price information.

#### **2.5.2.4 Distance to AMCOS/ Farmers' group centres and WRS participation**

The estimated coefficient for coffee farmers residing nearby the AMCOS/Farmers' groups ( $\beta$ ) was 0.147. The coefficient was significant at the 99% level of confidence ( $p$  value = 0.009). The interpretation of  $\beta$  can be manipulated in terms of log odds [ $\text{Exp}(\beta)$ ]. Holding all other covariates constant; the probability of smallholder coffee farmer of

participating in WRS increase by 1.583 times for coffee farmers residing close to AMCOS/FGs centres as compared to coffee farmers residing far.

As a farmer lives farther from AMCOS/FGs marketing centres the less the participation in the WRS. This shows the importance of Government to intervene and facilitate operation of AMCOS or FGs services closer to the farmers. According to WHO, social services are considered as a human right and its reach should be within one kilometre from home (WHO, 2003). This finding supports the participation theory, the higher the margin between costs and benefits accrued, the lesser the participation in the programme (Ajzen, 2001). The farmers located closer to market centres experience lower transport costs and can get market information more easily (Anthony *et al.*, 2012). Moreover, Madulu (2011) argued that; farmers who are located closer to market centres are more likely to participate in WRS and market their produce compared to those who are located far away.

## **2.6 Conclusion and Recommendations**

Generally, the findings support the participation theory that decision of a farmer whether or not to participate in the WRS is geared by self and social demands by a farmer after weighing costs and benefits accrued in the process of participation. The paper determined factors influencing farmers' participation in the WRS. The results show that age of respondents, access to market information, sex and distance from coffee farms to the AMCOS or FGs centres are significant factors that influence the probabilities of coffee farmers' decisions of participating in WRS.

The results suggest that the young farmers are more likely to sell coffee through the WRS marketing channel than farmers who are old because have relatively higher educational level to explore coffee market opportunities than old ones. Farmers with access to coffee

market information are more likely to choose the WRS than farmers who have no access; and long distance from coffee farms to the AMCOS or FGs centres can encourage farmers to choose alternative market outlets within the vicinity of their households or farms.

Conclusively, stakeholders in coffee sector can support coffee farmers by focusing on facilitating female and young aged household head in the WRS participation through special programmes/packages and education. AMCOS or FGs should be facilitated to operate close to the coffee farms in order to reduce the distance in accessing the WRS services. Among others, facilitation of institutionalisation of coffee market information services is recommended to enhance coffee marketing environment and increase number of participants in the WRS.

## References

- Adong, A., Mwaura, F. and Okoboi, G. (2012). What factors affect membership to farmer groups in Uganda. [<http://ageconsearch.umn.edu/bitstream/126774/2/AdongWCover.pdf>] site visited on 20/11/2015.
- Agwu, N. M., Anyanuzi, C. I. and Mendie, E. I. (2013). Socio-economic determinants of commercialisation among smallholder farmers in Abia, Nzaria. *Greener Journal of Agricultural Sciences* 2(8): 392-397.
- Ajzen, I. (2001). Perceived behaviour control, Self-efficacy, Locus of control and the theory of planned behaviour. *Journal of Applied Social Psychology* 32: 1-20.
- Ajzen, I. and Fishben, K. (1980). *Understanding Attitudes and Predicting Social Behaviour* Engle wood Cliffs. United States of America. 278pp.

- Allen, F. and Gale, D. (1994). Limited market participation and volatility of asset prices. *American Economic Review* 84: 933-955.
- Anthony, O., Usoroh, O. O., Adieme, D. T. and Deedam, N. J. (2012). Determinants of Market Participation in Nigerian Small-Scale Fishery Sector: Evidence from Niger Delta Region. *The Journal of Sustainable Development* 9(1): 69-84.
- Antony, C., Gelson, T. and Mary, L. (2012). Smallholder Farmers Participation in Livestock Markets. The Case of Zambian Farmers. Working Paper No. 48 66. Indaba Agricultural Policy Research Institute (IAPRI) Lusaka, Zambia. 38pp.
- Bahta, S. T. and Bauer, S. (2007). Analysis of the determinants of market participation within the South African small-scale livestock sector. Tropentag Paper, Tropentag, October 9-11, 2007, Witzenhausen: Utilisation of diversity in land use systems: Sustainable and organic approaches to meet human needs. 8pp.
- Bailey, K. D. (1994). *Methods of Social Research* (4<sup>th</sup> edition). The Free Press, New York. 345pp.
- Barrett, C. (2008). Smallholder Market Participation: Concepts and evidence from Eastern and Southern Africa. *Food Policy* 33: 299-317.
- Basehert, H. (1972). Traditional History and Political Change among the Matengo of Tanzania. *Journal of the International African Institute* XLII (2): 87-97.
- Biteye, M. (2016). 70% of Africans make a living through agriculture, and technology could transform their world. World Economic Forum on Africa 2016. The World Economic Forum on Africa Kigali, Rwanda from 11 to 13 May 2016.

[<https://www.weforum.org/agenda/2016/05/70-of-africans-make-a-living-through-agriculture-and-technology-could-transform-their-world>] site visited on 24/12/2016.

Boughton, D., Mather, D., Barrett, C. B., Benfica, R., Abdula, B., Tschirley, D. and Cunguara, B. (2007). Market Participation by Rural Households in a Low-Income Country: An Asset-Based Approach Applied to Mozambique [[http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1846745](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1846745)] site visited on 09/11/2015.

Byrka, K. (2009). *Attitude-behaviour Consistency Campbell's Paradigm in Environmental and Health Domains*. University of Technology Library. 57pp.

Cunningham, L. T., Brown, B. W., Anderson, K. B. and Tostao, E. (2008). Gender differences in marketing styles. *CSA of Ethiopia, Annual Agricultural Sample Survey Reports from 2003/4-2010/11*.

Doss, C. (2011). The Role of Women in Agriculture. *Agricultural Development Economics* 2(11): 1-48.

Field, A. (2005). *Discovering Statistics Using SPSS*. London, SAGE publishers. 821pp.

Ghasia, H. A. (2003). An assessment of institution factors affecting cashew nuts marketing in Mtwara region. Dissertation for Award of MA Rural Development Degree at Sokoine University of Agriculture, Morogoro, Tanzania. 112pp.



- Glasman, L. R. and Dolores, A. (2006). Forming attitudes that predict future behaviour. University of Florida. *A Meta-Analysis of the Attitude Behaviour Relation* 132(5): 778-822.
- Green, W. H. (2000). *Econometric Analysis*. New Jersey: Prentice- Hall. 67pp.
- Gujarati, D. and Sangeetha, N. (2007). *Basic Econometrics*. 4<sup>th</sup> Edition, Tata McGraw-Hill, New Delhi. 1072pp.
- IFAD (2010). *Mozambique Country Programme Evaluation: Improving the Market Participation of Smallholders and Artisanal Fishers*. Mozambique. 14pp.
- IFAD (2011). A framework for linking small farmers to markets. IFAD and the United Republic of Tanzania Prime Minister's Office (2010). Agricultural Marketing Systems Development Scheme. *Completion Report*. pp15-31.
- IFAD (2014). A framework for Linking Small Farmers to Markets IFAD and the United Republic of Tanzania Prime Minister's Office (2014). Agricultural Marketing Systems Development Scheme. *Completion Report*. 5pp.
- Itani, J. (1998). Evaluation of an indigenous farming system in the Matengo Highlands, Tanzania, and its sustainability, *African Study Monographs* 19: 55-68.
- Kimaro, P. K. and Towo, N. N. (2013). Warehouse Receipt System: A Solution towards Smallholder Farmers Financial Constraints. Working Papers, Department of Documentations and Publications. MUCCoBS, Moshi, Tanzania. 24pp.



- Komba, L. (2011). *Market Position of Coffee Farmers in the Coffee Supply Chain: A Case Study of Mbinga, Tanzania*. Lambert Academic Publishing. 76pp.
- Kothari, C. R. (2004). *Research Methodology, Methods and Techniques*. New Age International Publisher, New Delhi, India. 410pp.
- Lapar, M. L., Holloway, G. and Ehui, S. (2003). Policy options promoting market participation among smallholder livestock producers: A case study from the Philippines. *Food Policy* 28: 187-211.
- Likwata, M. Y. and Venkatakrishnan, V. (2014). Performance of agricultural marketing cooperative societies in cashew nut production and marketing in Masasi district, Mtwara Region, Tanzania. *IRACSTO International Journal of Research in Management and Technology* 4(5): 282-293.
- Madulu, R. B. (2011). Improving access to credit for paddy farmers through warehouse receipt-based agricultural marketing system in Tanzania. *African Crop Science Journal* 10: 37-39.
- Mahelet, G. F. (2007). Factors affecting Commercialization of Small holder Farmers in Ethiopia. *International Food Research Journal* 23(4): 1797-1807.
- Mhando, D. G., Mntambo, B. D., Ganja, S. K. and Gongwe, A. G. (2013). Opportunities and constraints: The Warehouse receipt system for production and marketing in Mbinga District, Tanzania. *Journal of the Korean Association of African Studies* 3(9): 179-217.

- Millinga, M. (2009). Empowering farmers in Tanzania through the warehouse receipt system. *IFAD report*. Tanzania. 4pp.
- Oboh, V. U. and Kushwaha, S. (2009). Socio-economic determinants of farmers' loan size in Benue state, Nigeria. *Journal of Applied Sciences Research* 5(4): 354-358.
- Pike, A. H. (1938). Soil conservation amongst Matengo tribe. *Tanganyika Notes and Records* 6: 79-81.
- Reimers, M. and Klasen, S. (2012). Revisiting the Role of Education for Agricultural Productivity. *American Journal of Agricultural Economics* 95(1): 131-152.
- Salami, A., Kamara, A. B. and Brixiova, Z. (2010). Smallholder Agriculture in East Africa: Trends, Constraints and Opportunities. Working Papers Series No. 105 African Development Bank (AfDB), Tunis, Tunisia. 52pp.
- Shah, S. B., Hashmi, A. and Bukhari, A. (2008). Determination of credit programme participation and socioeconomic characteristics of beneficiaries: Evidence from Sargodha. *The Pakistan Institute of Development Economics* 47(4): 947.
- Sitko, N. J. and Jayne, T. S. (2012). Why are African commodity exchanges languishing? A case study of the Zambian Agricultural Commodity Exchange. *Food Policy, Elsevier* 37(3): 275-282.
- Tanga, F. K., Jabbar, M. A. and Shapario, B. I. (2000). *Gender Roles and Child Nutrition in Livestock Production System in Developing Countries: A Critical Review*. Socioeconomics and policy research paper 27. ILRI, Nairobi Kenya. pp 64.

Tanzania Coffee Research Institute (TaCRI) (2015). Research for development. *Annual Report for 2015*. 23pp.

Temu, A. A., Winter-Nelson, A. and Garcia, P. (2001). Market liberalisation, vertical integration and price behaviour in Tanzania's coffee auction. *Development Policy Review* 19(2): 205-222.

United Republic of Tanzania (2013). *Population Distribution by Age and Sex. 2012 Population and Housing Census (PHC)*. National Bureau of Statistics, Ministry of Finance, Dar es Salaam and Office of Chief Government Statistician President's Office, Finance, Economy and Development Planning Zanzibar. 92pp.

URT (2005). *The Warehouse Receipt Act of 2005*. Government Printers. Dar es Salaam, Tanzania. 24pp.

URT (2010). *National Strategy for Growth and Reduction of Poverty II NSGRP II*, Dar es Salaam: Ministry of Finance and Economic Affairs. 123pp.

URT (2014). *National strategy for Growth and Reduction of Poverty II (NSGRP II) Annual Implementation Report, 2013/14: Accounting for Results*. Dar es Salaam: Ministry of Finance and Economic Affairs. Dar es Salaam, Tanzania. 114pp.

URT (2016). National Five Year Development Plan 2016/2017-2020/2021: *Nurturing Industrialization for Economic Transformation and Human Development*. Ministry of Finance and Planning. 293pp.

WHO (2003). *The Right to Social Services*. WHO Library Cataloguing-in-Publication Data. Geneva. 44pp.

World Bank (2005). Gender and 'shared growth' in sub-Saharan Africa. Briefing notes on critical gender issues in sub-Saharan Africa 2005-1. Washington DC: World Bank. Available at [<http://siteresources.worldbank.org/EXTABOUTUS/Resources/GenderGrowth.pdf>] site visited on 15/07/2017.

Wuensch, K. L. (2006). Curvilinear regression. In: Salkind, N. J. (Ed.), *Encyclopaedia of Measurement and Statistics*. Thousand Oaks, CA: Sage. pp 211-215.

Yamane, T. (1967). *Statistics: An Introductory Analysis*, 2<sup>nd</sup> Edition., New York: Harper and Row. 38pp.

### CHAPTER THREE

#### 3.0 Farmers' Perceptions of the Effectiveness of the Warehouse Receipt System in Mbinga District, Tanzania

Matei E. Mapunda<sup>1</sup>, David G. Mhando<sup>2</sup> and Betty M. Waized<sup>3</sup>

<sup>1</sup>Tanzania Institute of Accountancy, Tanzania, E-mail: maundamatei@yahoo.com

<sup>2</sup>College of Social Sciences and Humanities, SUA, Tanzania, E-mail: david\_mhando@yahoo.com

<sup>3</sup>School of Agricultural Economics and Business Studies (SAEBS), SUA, Tanzania, E-mail: yzbetty@sua.ac.tz

##### 3.1 Abstract

Although small, coffee marketing through private buyers is becoming increasingly important instead of Agricultural Marketing and Cooperative Societies (AMCOS) or Farmers' Groups (FGs) whereby farmers use Warehouse Receipt System (WRS) as a marketing channel. This study sets out to determine farmers' perception on the WRS achievements in facilitating provision of storage, credit and market services. The study was conducted in Mbinga District, Tanzania. A cross-sectional research design was used, and data were collected using a questionnaire from 390 farmers from AMCOS and FGs members selected using a multi-stage random sampling technique. Descriptive statistics and thematic content analysis were used to examine farmers' perception of effectiveness of WRS. Farmers felt that the WRS was effective in storage services provision and facilitation of credit accessibility, however, coffee marketing was perceived to be ineffective. Furthermore, lack of information regarding coffee auction prices disposed farmers to the conclusion that they are not part of the system. It was evident that farmers in the study area lack adequate knowledge on the facilitation role of the WRS in coffee

marketing. Stakeholders in the coffee sector in the study area can enhance the WRS effectiveness through improving farmers access to coffee marketing information and increase transparency of the operations of the WRS.

**Keywords:** *Perception, Effectiveness, Warehouse Receipt System, Mbinga District*

### 3.2 Introduction

In an increasing competitive environment, it is difficult for a system to survive unless it improves its overall effectiveness i.e. at all levels of the system. The WRS is a newly marketing system in agriculture, its effectiveness is very important for the growth of agricultural sector. Considering its great significance, assessment of the effectiveness of the WRS, in most cases, has focused on farmers' improvement in terms of production, inputs, yield, income, and standard of living (Cooksey, 2010; Likwata and Venkatakrishnan, 2014). Once these variables decrease or remain unchanged relative to the original state, WRS is regarded as ineffective (Komba, 2011). However, the perception of farmers on the effectiveness of the WRS cannot be overlooked as this may be a reason for success or failure of the programme. For example, in 2010, KENFAP (2011) conducted a study with the aim of assessing the effectiveness of the WRS in Kenya. The study revealed that large scale farmers and traders had increased their income by 90% with some degree of increase of income of smallholders in groups by 10%, thus concluded that WRS was effective although smallholder farmers were the minority. The study in Kenya measured effectiveness of the WRS from the angle of income improvement, but lacked the smallholder farmers' views on how they perceived its effectiveness.

In principle, the WRS is an arrangement aimed at providing services to farmers related to storage, access to credit and marketing (Onumah, 2012). The WRS allows farmers to extend sales period of their products while waiting for the crop prices to appreciate. The system is meant to create a negotiation environment favourable to farmers to achieve a win-win situation in relation to transactions between sellers and buyers (Lacroix and Varangis, 1996; Millinga, 2009; Komba, 2011; IFAD, 2014). The central issue of assessment in this paper is the effectiveness of the WRS in terms of its service delivery mechanism and satisfaction level of farmers in storage of farm produce, marketing and credit provision.

In Mbinga District, coffee buyers include the AMCOS, FGs and Private Coffee Buyers (PCB). Thus, since the Tanzania's inception of the WRS system in 2002, Mbinga District was one of the piloted districts to use WRS as a marketing strategy for coffee. The strategy aimed at improving coffee quality by providing storage services, credit and appreciate price at the auction (URT, 2005). Some studies have been carried out to analyse the effectiveness of WRS. For example, in 2012/13, about 80.6% of farmers interviewed acknowledged to observe an improvement in the quality of coffee after the introduction of the WRS; yet the level of participation and use of the WRS is questionable. PCBs purchased almost 75% of all coffee produced in Mbinga District in 2011/2012 season (Mhando *et al.*, 2013). This evidence is supported by TaCRI (2015) that in the coffee harvesting seasons of 2012/2013, 2013/2014 and 2014/2015, the trend of PCBs to purchase coffee was increasing to 27%, 33% and 41% respectively of all coffee purchased in Mbinga District. The increasing trends of coffee purchased in Mbinga District by PCBs instead of AMCOS or FGs prompted the study on the effectiveness of WRS from the angle of coffee farmers' perception. The focus being on how smallholder



coffee farmers in Mbinga District perceive effectiveness of the WRS in terms of its benefits and constraints towards the availability of credit, storage and marketing of coffee.

A number of criteria have been used for measuring effectiveness including productivity, efficiency, profitability, growth, goal consensus, commitment to organization, ethical values, quality of goods and services, morale of the employees, absenteeism and turnover, pay, supervision, job satisfaction, participation in decision making, stability *e.t.c.* (Mitchell, 2002; Mufeed, 2006; Malik *et al.*, 2011). Efforts have been made by some researchers including Mishra and Dhar (1999); Mufeed (2006) and others to determine the variables of effectiveness. Denison (1990) in his book "Corporate Culture and Effectiveness" has focused on four concepts that describe effectiveness of a programme including: (a) the involvement of members; (b) adaptability to respond to new circumstances while still retaining its basic character; (c) a consistency and clearly defined goals; (d) a clear mission providing direction and meaning. The four concepts are later integrated to comprise the effectiveness model. This paper uses the goal consensus for measurement of effectiveness of the WRS as perceived by farmers because as it provides an insight to the individual farmer to ascertain the extent of perceived effectiveness of WRS by focusing on goal attainment, process and the contributing factors.

Coulter and Onumah (2001) argue that instead of measuring the final outcome, the process should be examined basing on perceptions of stakeholders. The sociological perspectives of development point out direct linkages between perceptions and actual economic manifestations. Once the stakeholders exhibit positive changes in their perception, the actual economic manifestation is not far from appearing (Poulton *et al.*, 2010). Perception from the angle of stakeholders also advocates a sense of ownership

among the beneficiaries, which is an important pre-requisite for effectiveness of any organisation (Edeghon *et al.*, 2008). Perception thus serves two purposes: as a proxy indicator of potential rural development outcome and as a source of information on how the sense of ownership can be advocated towards sustainability. IFAD (2011) argues that the desired development targets can hardly be realized if the target beneficiaries' perceptions are not congruent with those of the implementers. The results of the study may also be extended across the country to compare and generate broader policy coordination to help identify specific types of interventions that are suited for a given community so that resources which are scarce are efficiently utilised. Therefore, the objective of this paper is to determine farmers' perceptions on the WRS achievements in facilitating provision of storage, credit and market services. It determines the effectiveness of the WRS indirectly in terms of how it is perceived by smallholder farmers.

Literature offers a wide range of viewpoints about perception; for example, Kyriakides *et al.* (2000) define perception as the way people regard something and their beliefs about what it is like. Perception is a function of motives of acquiring something in question (Barsalou, 1991; Olson and Reynolds, 1983). Rosch *et al.* (1976) define perception as the way people naturally categorise objects they see to make sense of them. In the context of this paper, perception represents farmers' views on services facilitated through WRS. The farmers' perception of the WRS is a result of improvement of services such as storage, access to credit and coffee marketing offered through the WRS as compared to the conventional system. Moreover, perception, as a bedrock of adoption, is contingent upon personal, socio-economic, socio-cultural and socio-political factors (Babasanya *et al.*, 2013). They stress that availability of credit, compatibility of existing technology with improved ones, suitability to farmers' circumstances and needs, and financial benefits do

influence perception, adoption and ultimately leading to effectiveness of any agricultural programme.

Effectiveness has a broad and often vague definition, so much so that most sources explain the concept rather than defining it. Conceptually, effectiveness is basically about the ability of an organisation to meet its set goals and objectives given the resources at its disposal (Connolly *et al.*, 1980). According to Fraser (1994), effectiveness is a measure of the match between stated goals and their achievement. Referring to this study, quality in the WRS delivery services (credit, storage and market) cannot only be a question of achievements of 'outputs', but must also involve judgements about the goals (part of 'inputs'). Erlendsson (2002) argues that effectiveness is the extent to which objectives are met ('doing the right things'). Wojtczak (2002) contends that effectiveness is a measure of the extent to which a specific intervention, procedure, or service, when deployed in the field in routine circumstances, does what it is intended to do for a specified population. Modified from Erlendsson (2002), in the context of the WRS, perception is a measure of attributes that qualify effectiveness of the WRS services such as credit, storage and market. Therefore, effectiveness means how successfully is the WRS in achieving the goals, it intends to achieve (accessibility of market, storage and credit).

'Goals' achievement contributes towards reducing the dimension of a problem or improving an unsatisfactory situation of farmers. If the perceived service falls below the expected service level, farmers are dissatisfied, and if the perceived service qualities tally with the expected level, farmers become satisfied. Such attributes include improvement in timely loan provision, coffee quality (coffee moisture content and grades), participation in auction, price appreciation and prudent payment of sold coffee relative to conventional system.

### 3.3 Theoretical Framework

Organisational effectiveness theory (OET) has been applied in the field of organisational development (Rojas, 2000). Based on the concept that the WRS is an organisation, the analysis of perception on its effectiveness, facilitative role and services delivery to smallholder coffee farmers was done in view of the OET. The OET is also called organisational “success” or “worth” and mainly refers to achievement of goals (Georgopoulos and Tannenbaum, 1957).

An organisation is defined as a consciously coordinated social unit, composed of two or more people that functions on a relatively continuous basis to achieve common goals (Lewin and Minton, 1986). An organisation can also be seen as a system of roles and stream of activities designed to accomplish shared purpose (Zairi and Jarrar, 2001). However, in the framework of this paper, the WRS is viewed as an organisation intended to achieve some goals such as farmers’ access to credit, storage services availability, market participation, and increase in farm productivity and income (URT, 2005).

The OET asserts that what makes an organisation or a system to be effective is directly related to its decision-making criteria centering on attainment of goals and employment of persuasive processes i.e. it is a goal-centred one (Campbell, 1977). Rational perspectives emphasize goal attainment and focus on process of attaining output variables such as quality, productivity, and efficiency. Process is an assessment of conformity of a given objective that can be observed from output performance (Karl, 1979). In this paper effectiveness is measured in terms of accomplishment of expected outcomes (Campbell, 1977; March *et al.*, 1977; Karl, 1979). The focus is on the achievement of WRS goals such as credit accessibility, storage services, and market (URT, 2005). From this theory, the level of perception depends on how the WRS operates and how a farmer is

transforming the given resources into outputs. It is in the context of level of attainment of the WRS goals that determine the WRS effectiveness.

### 3.4 Conceptual Framework

Smallholder farmers' perceptions of performance of WRS is associated with improved coffee market price, access to agro-inputs credit, and participation of farmers in the WRS coffee marketing e.g. auction. Effectiveness is enhanced by improvement of attributes (drivers) in accessibility of storage, credit and marketing services under the influence of socio-demographic characteristics (sex, age, marital status, and education level), policies, and regulations as shown in Fig. 3.1 below.

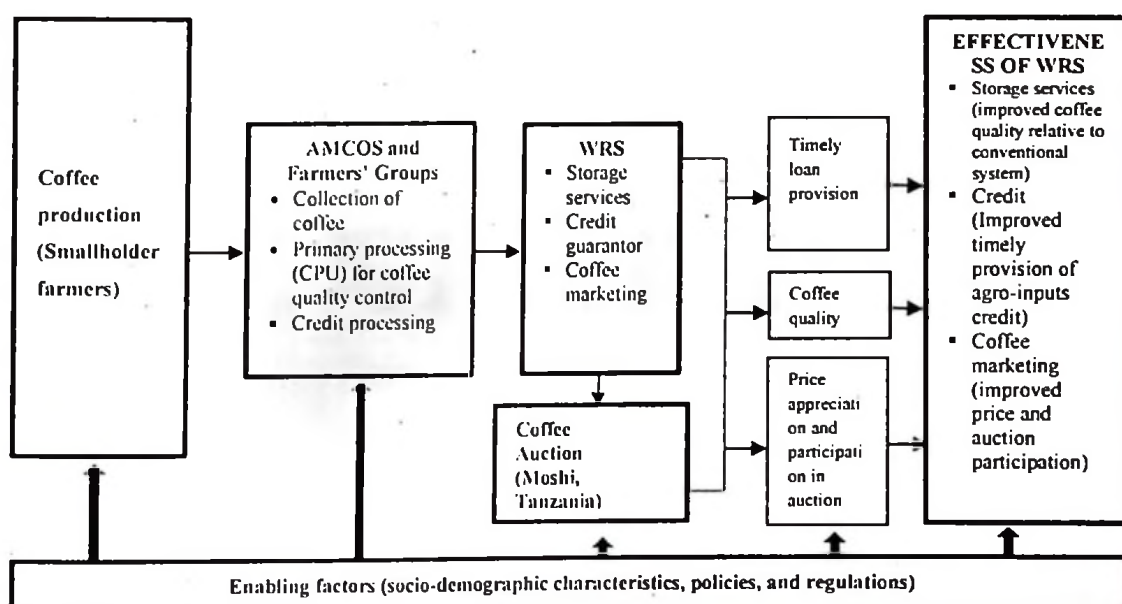


Figure 3.1: Conceptual framework for effectiveness of the WRS

The Conceptual Framework (Fig. 3.1) illustrates indicators of effectiveness of the WRS in coffee industry. It traces the movement of coffee from the farmer to the auction. The framework develops an understanding of the effectiveness of the WRS. It explains perceptions of farmers with regards to improved coffee quality, timely provision of agro-inputs credit, price and auction participation. The WRS services include storage, agro



inputs and marketing of coffee. The framework incorporates five elements of analysis: coffee production, AMCOS and FGs, WRS services, coffee auction and improved services of coffee storage, credit access, and marketing after introduction of the WRS. At the village level, perceived effectiveness of the WRS can be influenced by such factors as managerial ability, access to financial sources, storage services, market, technological and information resources, the institutional environment and political influence (Coulter and Onumah, 2001; Babasanya *et al.*, 2013). However, in this study it is suggested that improvement in accessibility of credit, storage services and facilitation of marketing of coffee through WRS are the drives of enhancement of effectiveness of the WRS services provision.

AMCOS or FGs centres undertake primary processing of coffee using central pulping machines (CPUs) and then the pulped parchment coffee is dried on a wire mesh. The processing is meant to improve the coffee quality in order to meet standards of storage in registered warehouses and marketing. The farmers could either choose between selling the coffee to private buyers (PCBs), or to farmers' associations (AMCOS or FGs). Some farmers opt to sell their coffee to PCBs due to flexibility and ability of subjecting to daily fluctuations of market prices resulting from changes in the world coffee price. AMCOS and FGs cannot change the purchasing prices without permission from their members. As soon as farmers sell their coffee to PCBs they lose the ownership contrary to when they sell through AMCOS or FGs. PCBs, AMCOS or FGs transport for storage of their coffee to registered warehouses for storage and secondary processing. Secondary curing factories are operated and managed by cooperatives or by private companies. The warehouse operators offer a warehouse receipt to assure depositors on their ownership of stored coffee. After storing their coffee in registered warehouses, both PCBs and AMCOS or FGs use the stored coffee as collateral to get loans from commercial banks.

In Mbinga District, the registered warehouses act as collateral guarantors that include Mbinga Coffee Curing Company (MCCCCo Ltd) (a warehouse owned by Government through co-operatives), TUTUNZE KAHAWA Ltd and the DAE Ltd warehouses (privately owned). Coffee stored in the warehouse is sampled, tested and blended based on instructions from Tanzania Coffee Board (TCB). After quality assessment, samples are transported to the Moshi Coffee Auction in Kilimanjaro Region in Northern Tanzania. Auctioning is organised by TCB and participated by PCBs and representatives from AMCOS and FGs. Therefore, based on the conceptual framework, variables for assessing perception of effectiveness of the WRS include credit access, storage facilities and marketing that were geared to improve market price, access to agro-inputs credit, and participation of farmers in marketing (auctioning).

Socio-demographic characteristics, policies, and regulations describe efforts to create change via legal avenues, which include legislation, liability, enforcement activity, and deregulation policy instruments. Socio-demographic characteristics of the respondents have expected behaviour as follows: (a) According NBS (2003) active working age group is from 18 to 50 years old and youth group ranges from 18-45 years old. In these groups it is expected to have positive opinions on any new profitable programme introduced to them. The reason is that the youth and active working age farmers tend to be willing to adopt to the newly established agricultural systems contributing towards effectiveness of the system (b) sex, female head of the household is expected to behave negatively (Lacroix and Varangis, 1996). The reason is that women have little or no access to resources such as land, credit and extension services which tend to lower their participation in the WRS (KENFAP, 2011), (c) education level; formal education of household head is expected to affect positively effectiveness since the higher the education (above primary level education) the higher the ability of a farmer to acquire,



synthesize and utilize information which will lead to better use of WRS services (Onumah, 2012), (d) marital status, married couple household heads are expected to be highly motivated to use WRS compared to other status. The reason is that married couples are more responsible in the family warranting improvement in agricultural marketing system in order to earn more income to support their families (Millinga, 2009).

Legislative instruments involve the Warehouse Receipts Act No. 10 of 2005. With its mission of regulating and promoting the WRS that ensures a fair and sustainable accessibility to formal credit and commodity marketing systems, is expected to be met by performing its functions of licensing the warehouse business, warehouse operators and inspectors and by administering the system in general. The WRS Act and regulations are enacted and passed by the government to create a legal mandate for change aiming to induce socially responsible behaviour by establishing legal liability for certain activities such as non-compliance with WRS laws and regulations, within socio-demographic characteristics of farmers. The system has thus to be continuously improved over time if it is to be perceived effective and sustainable in the face of the frequently changing international trade environment for coffee.

### **3.5 Methodology**

#### **3.5.1 The study area**

The study was carried out in Mbinga District, Tanzania from May to October, 2014. The District was selected because it is one of the first piloted districts to implement the WRS programme in the year 2002. Furthermore, Mbinga District is among the top Arabica coffee producing areas in Tanzania (TaCRI, 2015). The three main Arabica coffee growing areas are Mbozi District in Songwe Region, North/Kilimanjaro in Kilimanjaro Region and the Matengo Highlands Mbinga District in Ruvuma Region. Mbinga District

ranks the second largest producer of coffee in Tanzania (TaCRI, 2015). Thus, it was expected that, for more than a decade of WRS operation, farmers would have gathered valuable information and experience on the system (WRS) with regard to services offered and practices.

### **3.5.2 Research design, sampling procedure and sample size**

A cross-sectional research design was used and was considered appropriate because it allowed data to be collected at one point in time from a pool of participants with varied characteristics and demographics such as age, gender, income, education, to mention a few (Olaitan, 2006).

The target population included coffee farmers and sampling frame was all users of WRS. The District Agricultural, Irrigation and Cooperative Officer (DAICO), provided register books containing names of users of WRS who were members of either 21 AMCOS or 21 FGs in Mbinga District. Using Yamane (1967) formula, 4 AMCOS and 4 FGs were obtained from both lowland and highlands of Matengo in Mbinga District. The formula gave a total of 390 respondents from both AMCOS and FGs. Since AMCOS had more coffee farmers (2304) than FGs (1596) (Appendix 1). Proportionate stratified random sampling technique was employed to select 390 respondents comprising of 230 households from AMCOS and 160 from FGs using simple random sampling of numbers generated in MS Excel. The 390 respondents sample is large enough than the minimum of 30 respondents recommended by Bailey (1998).

To supplement data, focus group discussions (FGDs) and key informant interviews were used. The sampling of FGD and key informants was done purposively based on farmers who were engaged in coffee production and using WRS services. By proportionate, an

FGD had eleven members who comprised men and women. This number is supported by Saunders *et al.* (2007), that a typical FGD involves six to 12 participants depending on interviewer skills and subject matter. Key informants included village leaders, elders, AMCOS and FGs leaders.

### **3.5.3 Data collection**

Data collection methods included household survey, FGDs, and key informant interviews. Data collected addressed respondents' perception on their satisfaction regarding the WRS services. For this purpose organisational effectiveness scale developed by Malik *et al.* (2011) was used. The questionnaire which used a 3-level scale (good, moderate and poor) was filled in through interviews with the respondents.

### **3.5.4 Data analysis**

Farmers' perception of the effectiveness of the WRS in provision of services was analysed using relative frequencies, and perceptions from participants of FGD were subjected to thematic content analysis. The perception by farmers of the effectiveness of the WRS services delivery provided a subjective judgment of the overall three dimensions that is credit access, storage facilities, and marketing of coffee through WRS.

### **3.5.5 Model for measuring perceptions of effectiveness**

In literature, measures of perceptions of effectiveness use both qualitative and quantitative approaches. Bowling (2002), when studying perception and the need to know how to judge the value of satisfaction, used scaled fixed choice response formats (good, moderate and poor). The relative frequency and content analysis were applied to supplement each other in analysis. Similar studies such as that of Mufeed (2006), Malik *et al.* (2011), Walton and Dawson (2001), Zairi and Jarrar (2001), Lewin and Minton (1986) and

Lacroix and Varangis (1996) used alike approaches for measuring perceptions of effectiveness of stakeholders. This study, therefore, focused on goal consensus and the factors contributing it as indicated in Table 3.1.

**Table 3.1: Measurements of farmers' perception of the effectiveness WRS**

| Variable            | Variable description                            | Indicators of effectiveness of WRS  | Level of perception |
|---------------------|---|---|---------------------|
| Farm inputs credit  | The credit accessibility through WRS            | Timely provision of agro-inputs credit before the cropping season starts  | 1 - Poor;           |
| Storage facilities  | Accessibility of storage services through WRS   | Improved coffee quality relative to non-users of WRS  | 2 - Moderate;       |
| Marketing of coffee | Facilitation of marketing of coffee through WRS | Coffee price appreciation relative to private coffee buyers and auction participation of farmers by representatives | 3 - Good            |

Farmers were asked to express their opinions on effectiveness of WRS in terms of effective indicators of timely provision of agro-inputs, improved coffee quality, and coffee price appreciation, and participation in auction. The expressions were from poor to good. Highest percent score expressed the dominated level of effectiveness of the WRS.

### 3.6 Results and Discussion

#### 3.6.1 Farmers' perceptions of storage services through the WRS

As argued by Kim *et al.* (2012) and Prajogo *et al.* (2012), perception is a subject of satisfaction level in respect of focus on the goals set. One of the objectives of the WRS is to provide accessibility of storage services and facilities to farmers. In storage services, the perception assessment was mainly centred on satisfaction level of quality of coffee and the WRS coffee storage services. Table 3.2 summarises the results of effectiveness of the WRS with regard to storage services through the WRS along with other variables such as agro-inputs and marketing.

**Table 3.2: Farmers' perception of the effectiveness of WRS services delivery**  
(n = 390)

| WRS Effectiveness Indicator                   | Degree of effectiveness |      |          |      |      |      |
|---|-------------------------|------|----------|------|------|------|
|   | Good                    |      | Moderate |      | Poor |      |
|   | n                       | %    | n        | %    | n    | %    |
| Accessibility of storage services through WRS | 342                     | 87.7 | 48       | 12.3 | 0    | 0.0  |
| Farm inputs credit accessibility through WRS  | 291                     | 74.6 | 98       | 25.1 | 1    | 0.3  |
| Coffee marketing through WRS                  | 5                       | 1.3  | 29       | 7.4  | 356  | 91.3 |

**Note:** n is absolute frequency and % is percent

The storage service was perceived to be good by 87.7% of the respondents, while moderate was perceived by 12.3% of the respondents and none of the respondents perceived storage service to be poor (Table 3.2). This good perception could be viewed in another way that it was a legal requirement to the farmers to store coffee in registered warehouses in order to use the WRS services (ACT, 2005). Although not compulsory, the practice of storing coffee in registered warehouses has become mandatory by default if a farmer needs to access a loan through the WRS whereby the stored goods become a collateral. Agro inputs credit through WRS are not offered to individual farmers, but rather to their AMCOS and FGs. Registered warehouses served financial institutions as a collateral bearer in case farmers defaulted in loan repayment.

In the FGDs, it was reported that privately owned warehouses (TUTUNZE KAHAWA Ltd and DAE Ltd) were highly preferred by farmers relative to Government owned ones because the privately owned warehouses were equipped with modern facilities. Equipping warehouses with modern facilities serves to reduce curing losses and is necessary for moisture control needed for coffee quality maintenance. The coffee beans moisture contents should be kept around 10-12.5% mc on a dry weight basis (Kim *et al.*, 2012). When coffee farmers from Kimuli AMCOS were asked about reasons for their preference of private against Government registered warehouses, they responded as follows:



*“In the past we used to access storage services from Government-owned registered warehouse Mbinga Coffee Curing Company (MCCCo Ltd) and coffee grades were low between B and AF at the auction. When tried to use private owned warehouses such as TUTUNZE KAHAWA Ltd and DAE Ltd, our coffee quality improved and was graded high between “AA” and “C”. This is because of differences in quality of storage facilities in the warehouses”.*

The price at the auction varies with grades i.e. the higher the grade the higher the price. Most of the curing factories are also registered warehouses. Therefore, they not only offer coffee storage services to farmers, but also dry, clean and grade coffee according to established standards, and hold coffee until they wish to sell. The above quotation implies that modern storage and processing facilities are vital in improving the quality of coffee necessary for better prices in the auction and that most of the curing factory are also registered warehouses. Better prices in the auction implies improvement of households' well-being in terms of income. This suggests that the public owned warehouses could use more investment to improve the facilities and service delivery if they are to be preferred equally as the privately owned warehouses.

### **3.6.2 Farmers' perception on credit accessibility through the WRS**

A key component to the improvement of farming is to increase access to financial services to farmers, including agro inputs credit. About three quarters (74.6%) of the respondents perceived the effectiveness of the WRS in improving access to agro-inputs credit using collateral provided through WRS to be good, while 25.1% and 0.3% perceived it to be moderate and poor respectively (Table 3.2). Although credit to purchase farm inputs was accessible, some farmers were dissatisfied with the way credit is provided by commercial banks through WRS. Disbursements made in phases by Banks through WRS brought

confusion to some farmers if they were agro inputs credit or part of payments of price of coffee offered at the auction after selling their coffee. During an FGD at Luwaita AMCOS, it was commented:

*"We neither know the cost of agro-input credit received nor the price of coffee at the auction. This is October and we have not received any payment yet with regards to our coffee sold to our Luwaita AMCOS in August this year. No information is available as when we will be paid our money. The prices of agro-input credit when disbursement dates are due have not been revealed to us by our AMCOS leaders. Although we have heard that we shall be paid in phases, what we need is information on when our money will be paid and not the modalities on how/why commercial banks disburse in phases"*

The above raises two major issues. First, even though the WRS has been operating in Mbinga for over 10 years, most farmers have very limited understanding of how it operates. The scenario led to their failure to realise whether they were selling on credit or storing their produce to await better prices or the AMCOS or FGs were still collecting the produce to meet the required tonnage. Other studies have shown that the availability of credit can help in enhancing the use of agro-inputs (Mishra, 1994), adoption of modern technologies (Rajeev and Dev, 1998) and improving net returns per unit area and generating more capital stock at farms (Baba *et al.*, 2014).

With limited understanding of WRS, it is not surprising that the farmers could not tell if the payment from the bank was a loan or payment for the produce they had sold. Secondly, it is clear that the information flow from the management of the warehouses and the AMCOS was significantly hampered to the extent that the participants in the WRS knew very little of what was happening.



### 3.6.3 Farmers' perception of the coffee marketing through the WRS

The study found that 91.3% of the respondents perceived the coffee marketing through WRS to be poor, while good and moderate was perceived by 1.3% and 7.4% of the respondents respectively (Table 3.2). The market position of coffee is threatened by the requirements of external market forces that farmers cannot influence as a result of liberalisation and an uncontrolled environment, thus, coffee marketing has become chaotic (Cooksey, 2011; Komba, 2011). The farmers' poor perception of the WRS in coffee marketing is of concern as it constitutes one of strong pillars of effectiveness of the WRS. During the FGD at Matiri village in the lowland zone, farmers pointed out the reason for poor coffee marketing by arguing as follows:

*"As farmers, we lack information on how coffee marketing is organised. We have heard that our coffee is sold at the auction and a few of us, if any, are aware of the system. When we ask our leaders about the system, some hide information concerning auction prices. We have heard too that we are being sabotaged by our leaders that they are increasing agro input credit prices at their own discretion in order to earn dirty money. We demand transparency on information regarding prices at the auction as well as agro-input credits' prices"*

The FGDs remarks are consistent with findings by Poulton *et al.* (2010) who reported that lack of organised market and farmers' participation creates a non-effective platform for sharing information and desired community development. The farmers' poor perception of coffee marketing services portrays a need for the WRS facilitators to improve sensitisation in the WRS marketing channel, so that farmers could be more enlightened on how the system (WRS) works.

When the AMCOS and FGs leaders were consulted on the issue of complaints of farmers they responded as below:

*“WRS activities are done under the supervision of the government machinery, so AMCOS and FGs leaders were not directly accountable to farmers.*

The response of AMCOS and FGs leaders was not satisfactory. In practice WRS activities are done under the supervision of the government machinery with involvement of AMCOS members and leaders. That is why a majority of the members complained about lack of the WRS information. Information about suitable warehouses, market, inputs and credit availability were useful to farmers. Farmers needed information to increase production with the aim of profit maximization.

#### **3.6.4 Information on coffee quality improvement and grades**

When warehouse operators were interviewed, it was noted that all necessary documents and information with regard to the WRS are given to the AMCOS and FGs. With evidence, it was revealed that coffee quality improved, and the coffee was graded high (Appendix 11). The storage and auction permits are issued to AMCOS and FGs for the sake of documentation and communicating to their members (Appendix 2, 3 and 4).

This is an indication that the WRS proceedings are documented and communicated to AMCOS and FGs leaders. The above suggest existence of transparency on information regarding prices at the auction as well as agro-input credit's prices to AMCOS and FGs. Transparency is a ferrying boat towards effectiveness of WRS.

It was expected that each AMCOS and FG would have well-educated leaders experienced in the cooperative, finance and business activities. In the four AMCOS and four FGs

visited, two of them had leaders who attained secondary school education and knowledge related to WRS activities. Unfortunately, only a few leaders had attended training on WRS activities. Leaders are key actors in planning of business of AMCOS and FGs. The lack of appropriate education for these leaders may have resulted in conducting unprofitable businesses as most of these services were delivered without proper knowledge on how to supervise them. Therefore, engaging qualified and properly trained leaders may lead to effectiveness of the WRS in its execution.

### **3.7 WRS Effectiveness Association Across Socio-demographic Characteristics**

The overall results show that storage services were effective (87.7%) as well as agro-inputs credit accessibility (74.6%). However, coffee marketing through the WRS was ineffective (91.3%) (Table 3.2). The perception varied across socio-demographic characteristics of farmers. The state of perception of the effectiveness of the WRS services depends on a number of both psychological and physical variables across socio-demographic characteristics guided by satisfaction, needs and expectations fulfilled to farmers (Tables 3.3, 3.4 and 3.5).

#### **3.7.1 Perception of storage facilities**

The level of satisfaction across socio-demographic groups focused on farmers' satisfaction with respect to improvement of coffee quality relative to non-users of the WRS. This was a key outcome measure of the effectiveness in storage facilities. Table 3.3 shows storage facilities by socio-demographic characteristics.

**Table 3.3: Respondent's perception on coffee storage facilities (n = 390)**

| Socio-demographic characteristics |                     | Perception |      |              |       |          |     | Total (n) |
|-----------------------------------|---------------------|------------|------|--------------|-------|----------|-----|-----------|
|                                   |                     | Good (n)   | %    | Moderate (n) | %     | Poor (n) | %   |           |
| <b>Sex</b>                        | Female              | 60         | 82.2 | 13           | 17.8  | 0        | 0.0 | 73        |
|                                   | Male                | 282        | 89.0 | 35           | 11.0  | 0        | 0.0 | 317       |
| <b>Age groups (years)</b>         | 18-45               | 59         | 93.7 | 4            | 6.3   | 0        | 0.0 | 63        |
|                                   | 45-50               | 243        | 87.4 | 35           | 12.6  | 0        | 0.0 | 278       |
|                                   | > 50                | 40         | 81.6 | 9            | 18.4  | 0        | 0.0 | 49        |
| <b>Marital status</b>             | Married             | 313        | 88.4 | 41           | 11.6  | 0        | 0.0 | 354       |
|                                   | Divorced            | 0          | 0.0  | 1            | 100.0 | 0        | 0.0 | 1         |
|                                   | Separated           | 4          | 80.0 | 1            | 20.0  | 0        | 0.0 | 5         |
|                                   | Widow/widower       | 15         | 75.0 | 5            | 25.0  | 0        | 0.0 | 20        |
| <b>Education levels</b>           | Single              | 9          | 90.0 | 1            | 10.0  | 0        | 0.0 | 10        |
|                                   | Informal education  | 4          | 50.0 | 4            | 50.0  | 0        | 0.0 | 8         |
|                                   | Primary education   | 223        | 89.6 | 26           | 10.4  | 0        | 0.0 | 249       |
|                                   | Secondary education | 112        | 86.2 | 18           | 13.8  | 0        | 0.0 | 130       |
|                                   | College/University  | 3          | 100  | 0            | 0.0   | 0        | 0.0 | 3         |

Note: n is absolute frequency and % is percent

There were observed variations across socio-demographic characteristics regarding the coffee storage services offered to farmers by registered warehouses as shown in Table 3.3. Across sex, 82.2% of the female, and 89% of male respondents perceived the availability and provision of storage services as good. Moreover, across various age groups, 93.7% of the respondents between 18-45 years old felt that availability and provision of storage services was good, but, the rest of the age groups felt good ranged between 81.6% and 87.4% of respondents. In marital status, three quarters and above of married, separated, single and widow/widower respondents perceived the availability and provision of storage services to be good. Nevertheless, none of divorced respondents perceived the service to be good. In addition, half of the respondents who had informal education and above 86.2% of formal educated respondents perceived the availability and provision of storage services to be good.

The findings suggest that majority of the respondents were coming from the productive age groups (18-50 years old), shading some light on the prosperity of coffee farming due to their productive workforce needed in farming. This result is justified by the assertion of

the Tanzania National Youth Development Policy (TNYDP) of 2007 that the age group between 18 and 50 years is a productive age group. Moreover, the good perception was dominated by the educated class and mostly by those fortified with formal education (primary school education and above) signifying improvement of coffee farming in Mbinga District. The result compares favourably with findings by Adejo *et al.* (2012) who observed that the level of education of a farmer, to a large extent, determines the strategies which he/she may use in storage of farm produce in order to maintain its quality. This is an indication that storage services provided through WRS ought to be given more attention and adequate resources needed so that WRS can perform better in coffee quality control, so as to improve price and coffee output.

### **3.7.2 Perceptions of agro-inputs credit accessibility**

Although coffee pricing has continued to depend on the world market, the introduction of the WRS has opened an opportunity for farmers to store their coffee in the warehouses. The stored coffee enabled farmers to use it as collateral to get the much-needed credit to help the stability of liquidity supply and improvement of coffee market prices. Timely provision of agro-inputs credit before the cropping season starts was a measure of effectiveness (Table 3.4).

**Table 3.4: Agro inputs credit accessibility (n = 390)**

| Socio-demographic characteristics |                         | Perception  |       |                 |      |             |     | Total<br>(n) |
|-----------------------------------|-------------------------|-------------|-------|-----------------|------|-------------|-----|--------------|
|                                   |                         | Good<br>(n) | %     | Moderate<br>(n) | %    | Poor<br>(n) | %   |              |
| <b>Sex</b>                        | Female                  | 55          | 75.3  | 18              | 24.7 | 0           | 0.0 | 73           |
|                                   | Male                    | 236         | 74.5  | 80              | 25.3 | 1           | 0.3 | 317          |
| <b>Age groups<br/>(years)</b>     | 18-45                   | 46          | 73.0  | 17              | 27.0 | 0           | 0.0 | 63           |
|                                   | 45-50                   | 203         | 73.0  | 74              | 26.6 | 1           | 0.4 | 278          |
|                                   | > 50                    | 42          | 85.7  | 7               | 14.3 | 0           | 0.0 | 49           |
| <b>Marital status</b>             | Married                 | 260         | 73.4  | 93              | 26.3 | 1           | 0.3 | 354          |
|                                   | Divorced                | 1           | 100.0 | 0               | 0.0  | 0           | 0.0 | 1            |
|                                   | Separated               | 4           | 80.0  | 1               | 20.0 | 0           | 0.0 | 5            |
|                                   | Widow/widower           | 16          | 80.0  | 4               | 20.0 | 0           | 0.0 | 20           |
|                                   | Single                  | 10          | 100.0 | 0               | 0.0  | 0           | 0.0 | 10           |
| <b>Education<br/>levels</b>       | Non-formal<br>education | 8           | 100.0 | 0               | 0.0  | 0           | 0.0 | 8            |
|                                   | Primary education       | 178         | 71.5  | 70              | 28.1 | 1           | 0.4 | 249          |
|                                   | Secondary<br>education  | 103         | 79.2  | 27              | 13.8 | 0           | 0.0 | 130          |
|                                   | College/University      | 2           | 66.7  | 1               | 33.3 | 0           | 0.0 | 3            |

Note: n is absolute frequency and % is percent

Across sex, three quarters of both male and female respondents perceived accessibility of agro inputs credit as good. Across various age groups, 73% and above of the respondents in all age groups felt that the accessibility of agro-inputs credit was good. With respect to marital status, above 73% of married, separated, single, divorced and widow/widower respondents perceived the accessibility of agro inputs credit to be good. In addition, over 66% of respondents who had informal and formal education perceived the accessibility of agro inputs credit to be good (Table 3.4). This is an optimistic sign that the good perception was supported by coffee farmers by about three quarters of respondents across socio-demographic groups. Varangis (1996) has reported that the use of farm produce stored in the warehouse as collateral in agro-input credit provision through WRS improve farm income and smooth domestic prices. It provides an instrument to farmers to spread sales throughout the crop year and gradually reduce the role of government in agricultural commercialization. Therefore, empowerment of coffee farmers through agro inputs credit provision is hoped to bring some changes in coffee farming in Mbinga District.



### 3.7.3 Perception of the market facilitation

Through the WRS, farmers have storage facilities provided in the registered warehouses that they can sell with a good profit margin once the market price improves. Once farmers are well informed of movements in the market and they are able to access market information rapidly, they can wait to sell at the right time for the better prices. The challenge that the system faces is that it works only when farmers can see future prices making it worthwhile. Thus development of the WRS offers both advantages and also potential pitfalls. Coffee price appreciation relative to private coffee buyers and auction participation of farmers by representatives measured effectiveness. The results regarding perception of respondents in relation to marketing results were as summarised in Table 3.5.

**Table 3.5: Market facilitation (n = 390)**

| Socio-demographic characteristics |                      | Perception  |     |                 |      |             |       | Total |
|-----------------------------------|----------------------|-------------|-----|-----------------|------|-------------|-------|-------|
|                                   |                      | Good<br>(n) | %   | Moderate<br>(n) | %    | Poor<br>(n) | %     |       |
| <b>Sex</b>                        | Female               | 0           | 0.0 | 4               | 5.5  | 69          | 94.5  | 73    |
|                                   | Male                 | 5           | 1.6 | 25              | 7.9  | 287         | 90.5  | 317   |
| <b>Age groups<br/>(years)</b>     | 18-30                | 0           | 0.0 | 1               | 1.6  | 62          | 98.4  | 63    |
|                                   | 31-50                | 4           | 1.4 | 21              | 7.6  | 253         | 91.0  | 278   |
|                                   | > 50                 | 1           | 2.0 | 7               | 14.3 | 41          | 83.7  | 49    |
| <b>Marital<br/>status</b>         | Married              | 5           | 1.4 | 26              | 7.3  | 323         | 91.3  | 354   |
|                                   | Divorced             | 0           | 0.0 | 0               | 0.0  | 1           | 100.0 | 1     |
|                                   | Separated            | 0           | 0.0 | 0               | 0.0  | 5           | 100.0 | 5     |
|                                   | Widow/widower        | 0           | 0.0 | 2               | 10.0 | 18          | 90.0  | 20    |
|                                   | Single               | 0           | 0.0 | 1               | 10.0 | 9           | 90.0  | 10    |
| <b>Education<br/>levels</b>       | Non-formal education | 0           | 0.0 | 3               | 37.5 | 5           | 62.5  | 8     |
|                                   | Primary education    | 5           | 2.0 | 18              | 7.2  | 226         | 90.8  | 249   |
|                                   | Secondary education  | 0           | 0.0 | 8               | 6.2  | 122         | 93.8  | 130   |
|                                   | College/University   | 0           | 0.0 | 0               | 0.0  | 3           | 100.0 | 3     |

**Note:** n is absolute frequency and % is percent

Across sex, over 90% of the female and male respondents perceived market facilitation as poor. Furthermore, across age groups, above 83% of the respondents in all age groups felt that the market facilitation was poor. Across marital statuses, above 90% of married, separated, single, divorced and widow/widower respondents perceived market facilitation



to be poor. In addition, above 62% of the respondents who had informal and above 90% of formal education perceived the market facilitation as poor (Table 3.5). The findings imply that market service through WRS in Mbinga District, is the one that reaches out most non-effectively to the majority of the respondents to fulfil their information needs.

Regarding coffee marketing practices, during an FGD at Buruma FG the response was as follows:

*“There is unfair practice of financial institutions dealing with WRS (e.g. NMB, CRDB, and MCB). For example, in 2012/2013 coffee production season the PCBs colluded with some bank officers to delay loan provision to AMCOS and FGs but fast tracked loans provision to PCB. Hence, the PCBs dominated the coffee market and purchased coffee earlier at lower flat rate prices of TZS 600 per kilogram without consideration of coffee grades. The AMCOS and FGs were ready to buy coffee at TZS 1400 per kilogram (projected price) but came late in the market”.*

When the commercial banks such as NMB, CRDB and MCB were asked to respond on the issue of an allegation of farmers they replied as follows:

*“The AMCOS or FGs always delay to complete the application forms and attachment of relevant documents including minutes of their meetings with members of their organisations. They convene meetings late and do not act on time contrary to private buyers who act fast and meet deadlines. The moment they lodge applications within 7 days of working days they receive their loans. Therefore, such allegation do not bear any truth”.*

This scenario meant creation of liquidity constraints and delays of purchase of coffee by AMCOS and FGs through the WRS. This situation leads to chaos among farmers who were using WRS as their marketing channel. It is an outright fact that introduction of the

WRS has increased the variety of actors who access credit on a competitive basis as well as market for coffee. PCBs, FGs and AMCOS participate in purchase of coffee from farmers thus, creating competition, which is important for effectiveness of the WRS. Hence, although FGs and AMCOS through the WRS help farmers to pool their resources together in order to have access to coffee marketing and to have insights in their marketing issues including price at the auction, ineffectiveness of the WRS in market facilitation calls for some Government intervention in the system.

### **3.8 Conclusions and Recommendations**

In general, the findings validate the organisational effectiveness theory that effectiveness is directly related to attainment of goals. The WRS goals are credit accessibility, storage services, and market that determine the WRS effectiveness.

From the findings, the WRS was perceived to be effective in provision of storage services and facilitation of agro-input through AMCOS and FGs. However, coffee marketing was found to be ineffective. The poor perception on market facilitation creates some questions on the WRS effectiveness regarding information transparencies. It is concluded that farmers in the study area lack adequate knowledge regarding facilitation role of the WRS in coffee marketing. The lack of information with regard to coffee auction prices exposes farmers to feel that they are not part of the system and that they are segregated.

Based on the study's findings and conclusions it is recommended that stakeholders in coffee sector should ensure that farmers access coffee marketing information transparently so as to enhance effectiveness of the warehouse receipt system in its market facilitation role. They should strengthen farmers' organisations (AMCOSs and FGs) through an increase in information about the WRS functionality and farmers'

organisations key position and role in enhancing the effectiveness of WRS services delivery mechanism as a whole. For more effectiveness of the WRS, stakeholders should create enabling environment of opening more opportunities for loans and disbursement. The procedure of advancing loan should be made simple, so that more farmers can be benefited from it and in time availability of credit should be ensured for timely purchase of the required inputs. In this way more and more farmers will be benefited from the fruit of the credit advanced through WRS to the farmers. The net result of this could be farmers' ownership of the system (WRS) and its long-term sustainability.

## References

- Adejo, P. E., Okwu, O. J. and Ibrahim, M. K. (2012). Challenges and Prospects of Privatization of Agricultural Extension Service Delivery in Nigeria. *Journal of Agricultural Extension and Rural Development* 4(3): 63-68.
- Baba, S. H., Wani, M. H, Wani, S. A., Zargar, B. A. and Qammer, N. A. (2014). Institutional credit to mountain agriculture: Issues of structural changes and impact in Jammu and Kashmir. *Agricultural Economics Research Review* 27: 111-122.
- Babasanya, B., Oladele, O. G. and Odide, O. O. (2013). Farmers' Perception and Knowledge need for Adoption of new cassava cultivars in Igabi, Kaduna State. *Journal of Biology, Agriculture and Healthcare* 3(2): 45-52.
- Bailey, D. K. (1998). *Methods of Social Science Research*. The Free Press Collier Macmillan Publisher, London. 478pp.

- Barsalou, L. W. (1991). Deriving categories to achieve goals. *The Psychology of Learning and Motivation* 27: 1-64.
- Bowling, A. (2002). *Research Methods in Health: Investigating Health and Health Services*. (2<sup>nd</sup> ed.). Open University Press: Buckingham. 479pp.
- Campbell, J. P. (1977). *On The Nature of Organizational Effectiveness: New Perspectives On Organizational Effectiveness*. San Francisco - London, Jossey-Bass Publishers. 55pp.
- Connolly, T., Colon, E. M. and Deutch, S. J. (1980). Organizational effectiveness: A multiple constituency approach. *Academy of Management Review* 5: 211-218.
- Cooksey, B. (2010). Marketing reform? The rise and fall of agricultural liberalisation in Tanzania. *Development Policy Review* 21(1): 67-91.
- Coulter, J. and Onumah, G. (2001). The Impact of Government Policy and Regulation on the Effectiveness of Warehouse Receipt Systems: The Case of Africa”, Study presented at Workshop on Warehouse Receipt Financing: making the difficult deals easier and more profitable, Amsterdam, July 9-11, 2001.
- Denison, D. R. (1990). *Corporate Culture and Organizational Effectiveness*. Wiley series on Organizational Assessment and Change, Oxford, England. 267 pp.
- Edeghon, C. O., Ajayi, M. T. and Ugboya, T. O. (2008). Awareness and Use of Sustainable Agricultural Practices by Arabic Group Farmers in IkpobaOkha Local Government Area of Edo State, Nigeria. *Journal of Sustainable Development in Agriculture and Environment* 3(2): 55-63.

- Erlendsson, J. (2002). *Value for Money Studies in Higher Education* 18(123): 251 - 267  
[[http://www.hi.is/~joner/eaps/wh\\_vfmhe.htm](http://www.hi.is/~joner/eaps/wh_vfmhe.htm)] site visited on 21/06/2016.
- Fraser, M. (1994). Quality in higher education: an international perspective' In: *What is Quality in Higher Education?* Green, D. (Ed.), 1994. 104pp.
- Georgopoulos, B. S. and Tannenbaum, A. S. (1957). A study of organizational effectiveness. *American Sociological Review* 22(5): 534-540.
- IFAD (2011). A framework for linking small farmers to markets IFAD and The United Republic of Tanzania Prime Minister's Office (2010). Agricultural Marketing Systems Development Scheme. *Completion Report*. pp15-31.
- IFAD (2014). A framework for linking small farmers to markets IFAD and The United Republic of Tanzania Prime Minister's Office (2014). Agricultural Marketing Systems Development Scheme. *Completion Report*. 5pp.
- Karl, E. W. (1979). *The Social Psychology of Organizing*, (2<sup>nd</sup> Edition). McGraw-Hill. Paperback Publisher. 294pp.
- Kenya National Federation of Agricultural Producers (KENFAP) (2011). *The Role of Warehouse Receipt System and Financial Services in Improving Produce Marketing by Smallholder Farmers in Kenya*. KENFAP-Kenya October 2011. pp 51.
- Kim, D. Y., Kumar, V. and Kumar, U. (2012). Relationship between coffee quality management practices and innovation. *Journal of Operations Management* (30): 295-315.

Komba, L. (2011). *Market Position of Coffee Farmers in the Coffee Supply Chain: A Case Study of Mbinga, Tanzania*. Lambert Academic Publishing, ISBN 3844308636, 9783844308631. 76pp.

Kyriakides, L., Campbell, R. J. and Gagatsis, A. (2000). The Significance of the Classroom Effective Primary Schools: An Application of Creemers' Comprehensive Model of Educational Effectiveness. *School Effectiveness and School Improvement* 11(4): 501-529.

Lacroix, R. and Varangis, P. (1996). Using Warehouse Receipts in Developing and Transition Economies. *Finance and Development* 33(3): 45-89.

Lewin, A. Y. and Minton, J. W. (1986). Determining organizational effectiveness: Another look, and an agenda for research. *Management Science* 32(5): 514-538.

Likwata, M. Y. and Venkatakrishnan, V. (2014). Performance of agricultural marketing cooperative societies in cashew nut production and marketing in Masasi district, Mtwara Region, Tanzania. *IRACSTO International Journal of Research in Management and Technology* 4(5): 282-293.

Malik, M. E., Ghafoor, M. M. and Naseer, S. (2011). Organizational Effectiveness: A Case Study of Telecommunication and Banking Sector of Pakistan. *Far East Journal of Psychology and Business* 2(1): 37-48.

March, J. G. and Sutton, R. I. (1997). Organizational performance as a dependent variable. *Organization Science* 8(6): 688-706.



- Mhando, D. G., Mntambo, B. D., Ganja, S. K. and Gongwe, A. G. (2013). Opportunities and constraints: The Warehouse receipt system for production and marketing in Mbinga District, Tanzania. *Journal of the Korean Association of African Studies* 39: 179-217.
- Millinga, M. (2009). Empowering farmers in Tanzania through the warehouse receipt system. *IFAD report*. Tanzania. 4pp.
- Mishra, P. K. (1994) Crop insurance and crop credit: Impact of the comprehensive crop insurance scheme on cooperative credit in Gujarat. *Journal of International Development* 6(5): 529-568.
- Mitchell, H. (2002). *Strategic Worth of Human Resources: Driving Organizational Performance*. Universalia. pp1-7.
- Mufeed, S. A. (2006). Enhancing Educational Institutions Effectiveness through HRD climate: An Empirical Study, *Management and Change* 10(2): 25-64.
- National Bureau of Statistics (2003). Population and Housing Census 2002. Dar es Salaam: NBS. [<http://www.tanzania.go.tz/census>] site visite on 10/08/2017.
- Olaitan, M. A. (2006). Finance for small and medium enterprises: Nigeria's agricultural credit guarantee scheme fund. *Journal of International Farm Management* 3(2): 1-9.
- Olson, J. C. and Reynolds, T. J. (1983). *Understanding Consumers' Cognitive Structures: Implications for Advertising Strategy*. In; *Advertising and Consumer Psychology*



*Lexington*, Percy, L. and Woodside, A. G. (Eds.), MA: Lexington Books. pp77-90.

Onumah, G. E. (2012). Warehouse Receipts and Securitisation in Agricultural Finance to Promote Lending to Smallholder Farmers in Africa: Potential Benefits and Legal/Regulatory Issues. *Uniform Law Review-Revue de droit uniforme* 17(102): 351 - 367. [<http://dx.doi.org/10.1093/ulr/17.102.351>] site visited on 31/01/2016.

Poulton, C., Dorward, A. and Kydd, J. (2010). The Future of Small Farms: New Directions for Services, Institutions and Intermediation. *World Development, Elsevier* 38(10): 1413-1428.

Prajogo, D., Chowdhury, M., Yeung, A. C. L. and Cheng, T. C. E. (2012). The relationship between supplier management and firm's operational performance: A multi-dimensional perspective. *International Journal of Production Economics* 1(36): 123-130.

Rajeev, M. and Dev, S. (1998) Institutional and noninstitutional credit in agriculture: Case study of Hugli district of West Bengal. *Economic and Political Weekly* 33(47): 2997-3002.

Research and Analysis Working Group (RAWG) (2005). *Poverty and Human Development Report 2005*. Dar es Salaam: Mkuki na Nyota Publishers. [[http://www.repoa.or.tz/documents\\_storage/PHDR\\_2005.pdf](http://www.repoa.or.tz/documents_storage/PHDR_2005.pdf)] site visited on 09/09/2017.

- Rojas, R. R. (2000). A review of models for measuring organizational effectiveness among for-profit and nonprofit organizations. *Non-profit Management and Leadership* 11(1): 97-104.
- Rosch, E., Mervis, C. B., Gray, W. D., Johnson, D. M. and Boyesbraem, P. (1976). Basic objects in natural categories. *Cognitive Psychology* 8(3): 382-439.
- Saunders, M., Lewis, P. and Thornhill, A. (2007). *Research Methods for Business Students* 4<sup>th</sup> ed. Harlow, England: FT Prentice Hall. 112pp.
- Tanzania Coffee Research Institute (TaCRI) (2015). Research for development. *Annual Report for 2015*. 23pp.
- URT (2007). Tanzania National Youth Development Policy (TNYDP), Ministry of Labour, Employment and Youth Development, Dar es salaam. 14pp.
- URT (2005). *The Warehouse Receipt Act of 2005*. Government Printers. Dar es Salaam, Tanzania. 24pp.
- Walton, E. and Dawson, S. (2001). Managers' perceptions of criteria of organizational effectiveness. *Journal of Management Studies* 38(2): 173-199.
- Wojtczak, A. (2002). Glossary of Medical Education Terms [<http://www.iime.org/glossary.htm>] site visited on 27/06/2016.
- Yamane, T. (1967). *Statistics: An Introductory Analysis*, 2<sup>nd</sup> Ed., New York: Harper and Row. 38pp.

Zairi, M. and Jarrar, Y. F. (2001). Measuring organizational effectiveness in the NHS: Management style and structure best practices. *Total Quality Management* 12(7/8): 882-889.

## CHAPTER FOUR

### 4.0 Credit Access through Warehouse Receipt System and Farm Productivity of Smallholder Coffee Farmers in Mbinga District, Tanzania

Matei E. Mapunda<sup>1</sup>, David G. Mhando<sup>2</sup> and Betty M. Waized<sup>3</sup>

<sup>1</sup>Tanzania Institute of Accountancy, Tanzania, E-mail: maundamatei@yahoo.com

<sup>2</sup>College of Social Sciences and Humanities, SUA, Tanzania, E-mail: david\_mhando@yahoo.com

<sup>3</sup>School of Agricultural Economics and Business Studies (SAEBS), SUA, Tanzania, E-mail: yzbetty@sua.ac.tz

#### 4.1 Abstract

A majority of smallholder farmers in Tanzania lack collateral to qualify for credit from formal financial institutions, which could have enabled them secure their living and store their crops until prices stability in the market. Smallholder farmers who own property such as houses, livestock, farms, home furniture, etc. still lack trust of formal financial institutions for credit due to lack of formalisation of their properties. The Warehouse Receipt System (WRS) offers an opportunity to smallholder farmers by providing collateral guarantees to financial institutions to provide credit for agro inputs through their crops stored at the WRS. The objective of this paper was to examine the contribution of agro-inputs credit accessed through WRS on coffee farms productivity in Mbinga District, Tanzania. The paper is based on primary data which were collected through a household survey from a sample of 390 smallholder coffee farmers. The study was conducted in Mbinga District, Tanzania from May to October 2014. Ordinary Least Squares (OLS) was used to examine the impact of WRS agro-credit on coffee yield. Study results show that credit accessed through WRS had a significant ( $p \leq 0.05$ ) and positive influence on coffee

yield. Moreover, sex, years of schooling, and extension services had a significant effect on coffee yields. The results suggest that intervention policies are needed in order to enable more farmers to access the WRS services, extension services, education and increasing women's participation in WRS increases coffee production and positively contributing to increase of coffee yield in the study area.

**Keywords:** Farm productivity, warehouse receipt system, agro-input credit, coffee marketing

#### 4.2 Introduction

Agriculture plays an important role in the livelihoods of the majority of farmers in developing countries, Tanzania included; improved farm productivity remains an important goal in increasing income of farmers (URT, 2005). Farm productivity can either be improved through increase in output and inputs, with output increasing proportionately more than inputs, increases in output while inputs remain the same or decrease, or decrease in inputs while outputs remain the same (Olubiyo *et al.*, 2009). The use of inputs for the purpose of expanding outputs includes raising both the quality and quantity of inputs such as high yielding seed varieties, fertilizers, pesticides and improvement of productive land (Ajibola *et al.*, 2011).

The use of inputs for the purpose of expanding outputs is hampered by credit accessibility constraints imposed by financial institutions to farmers. Lack of access to credit is a challenge for many smallholder farmers in sub-Saharan Africa (SSA) to expand their production levels because most farmers cannot meet the minimum requirements of being creditworthy from financial institutions (Cooksey, 2010). Therefore, they are excluded from the formal credit market (Onumah, 2010). Since WRS provides an opportunity

among farmers of accessing credit, this paper forms a base of informing stakeholders on the worthiness of agro inputs credit through the WRS in order to intervene for the betterment of farmers and the agricultural sector at large.

Access to credit and its use may affect farm productivity as farmers facing farm capital constraints would tend to use lower levels of agro-inputs in their production activities compared to those not constrained (Feder *et al.*, 1989; Petrick, 2004). Improved access to credit may therefore facilitate optimal input use and have a major impact on farm productivity as credit allows farmers to satisfy their cash needs induced by the farm production cycle and consumption requirements (Boucher *et al.*, 2009). Moreover, factors such as socio-demographic characteristics of farmers, pre-existing household resource endowment, and the surrounding physical, social and economic environment are considered to be significant in determining farm productivity (Nto and Mbanasor, 2011).

In acknowledging significance of credit in farm productivity and success of individual farmers, various actors like government and financial institutions of developing countries need to advocate the importance of accessing credit by smallholder farmers. Smallholder farmers are described as those with 2 hectares or less, they represent 80% of all farmers and contribute up to 90% of the production in some countries (Komarek, 2010). On the other hand, credit is a legal contract whereby one party receives resources or wealth from another party and promises to repay on a future date together with interest, whereby resources provided may be financial, goods or services (Simkovic, 2016). Others have defined credit as the ability of a customer to obtain goods or services before payment, based on the trust that payment will be made in the future (Guirking and Boucher, 2008; Abate and Orr, 2011). Credit in the context of this paper refers to finance or basic farming



necessities or requirements such as seed, pesticides and fertilizer (agro-inputs) that are given to farmers on loan basis.

Farm productivity refers to the output produced by a given level of input: It can also be stated as the ratio of the value of total farm output to the value of total input used in farm production (Chen, 2006; Ramaila *et al.*, 2011; Banker *et al.*, 2012). However, the average yield per hectare, which is commonly expressed in tons per hectare (t/ha) is the most frequent measure of farm productivity (Wiebe *et al.*, 2001). Measure of productivity can be partial or total (Ajibola, 2011). In theory total productivity is more useful for assessing performance of all inputs at once while partial productivity is useful in assessing worthiness of employing an additional unit of input (Ramaila *et al.*, 2011). Thus, this study employed partial productivity for assessing the effect of each input in coffee farm productivity.

Although credit plays an important role in improving farm productivity, the lending policy of many financial institutions requires legally formalised physical assets to act as collateral to guarantee the credit (Onumah, 2012). Therefore, institutions such as banks are always unwilling to lend money to farmers because of the high risk involved in farming (Cooksey, 2010). In many developing countries, Tanzania included, farmers' assets are owned informally and thus creating difficulties to use as collateral for credit application from financial institutions (Kwadjo, 2000; Coulter and Onumah, 2002; Cooksey, 2010). This situation forces farmers to sell their produce immediately after harvest, and in most cases at lower prices (due to financial constraints) of which access to credit would have assisted to meet their financial needs (Poulton *et al.*, 2010; IFAD, 2014). In principle, credit is an input used in production as well as a facilitator of the effectiveness of other production inputs (Madulu, 2011; Onumah, 2012). Improved access

to credit may therefore facilitate optimal input use, leading to significant improvement in farm productivity. The realisation of importance of credit has necessitated the GoT to introduce the WRS, whereby in 2005, the Tanzanian parliament enacted the WRS Act of 2005 (URT, 2005). Since then the WRS has been considered as one of the ways used to channel credit to smallholder farmers, which allows the use of stocks as collateral for credit access (URT, 2005; Onumah, 2010; KENFAP, 2011).

The WRS is an arrangement aimed at providing services related to storage, access of credit and marketing of farmers' produce (URT, 2005). It allows farmers to extend the sales period of their produce while waiting for the crop prices to appreciate (URT, 2005; Komba, 2011). The system is meant to create a negotiation environment to farmers for forward markets forecast after having essential information needed to achieve win-win transactions between sellers and buyers (Lacroix and Varangis, 1996; Millinga, 2009; Komba, 2011; IFAD, 2014). A warehouse receipt (WR) is a document issued by warehouse operators to act as evidence that a specified commodity of a stated quantity and quality has been deposited at a particular location (s) by a named depositor (s) (Coulter *et al.*, 2000). A depositor may be a producer, farmers' organisation, trader, exporter, processor or any individual or corporate body (Onumah, 2010). The receipt may be transferable, allowing transfer to a new holder a lender (where the stored commodity is pledged as security for a loan) or trade counter-party which entitles the holder to take delivery of the commodity upon presentation of the warehouse receipt at the warehouse (Onumah, 2003).

Despite the fact that the WRS is considered an important element in reducing constraints facing farmers in accessing agro-inputs through provision of security for accessing credit by smallholder farmers, yet research findings show that farmers have some positive and

negative perceptions towards WRS. For instance, Mtanda (2015) claims that about 63% of cashewnut farmers in Tandahimba District, Mtwara Region in Tanzania had a negative perception towards the WRS. Similarly in Newala District, Mtwara Region in Tanzania it was found that 67.9% of the farmers showed discontent with the contribution of WRS towards crop production and productivity for their farms (UNIDO, 2011). The major reason was dishonest among WRS staff. However, a study conducted by Komba (2011) in Mbinga District revealed that after the introduction of the WRS there was an increase in output in coffee production from 9000 metric tons in 2011/12 to 12 000 metric tons in 2014/15. However, Komba's (2011) findings did not tell exactly if accessing credit through the WRS for agro-inputs had contributed to a significant increase in coffee yields. Also, studies by Mtanda (2015) and UNIDO (2011) did not investigate the WRS agro-inputs credit access effects on cashewnut yields or an impact on farm production and productivity. Hence, there is little or inadequate information regarding the effect(s) of credit access through WRS on crop production and productivity. Therefore, this study was conducted to fill this knowledge gap by investigating the effect of agro-input credit access through the WRS on farm production and productivity of smallholder coffee farmers in Mbinga District.

#### **4.3 Theoretical Framework**

The study used the theory of farm production to understand how agro-inputs credit influences farm productivity. The theory asserts that output per unit input supplied depends on the factor inputs used (financial and human inputs) (Ellis, 1992). The human input is a function of demographic characteristics e.g. age, education level, household size, sex and the use of irrigation system in farming (Ajibola *et al.*, 2011). The farm inputs include capital (credit to purchase seeds, fertiliser and pesticides), labour and land (farm size); whereby credit raises productivity by increasing the ability to purchase agro-inputs;

education, labour, extension services, age, household size, the use of irrigation system and sex significantly affect production performance either positively or negatively (Anyaegebunam *et al.*, 2010). The theory portrays that farmers who use inputs depending on the quality and quantity are expected to have higher output and hence higher productivity than those who do not.

#### **4.4 Methodology**

##### **4.4.1 The study area**

This study was conducted in Mbinga District, Ruvuma Region in the Southern part of Tanzania from May to October, 2014 (Appendix 12). The area was selected for the reason that the WRS services were accessed by farmers through membership to Agricultural and Marketing Cooperative Societies (AMCOS) or farmers' groups (FGs). In Mbinga District, 95% of coffee is produced by smallholder farmers (Basehert, 1972; Itani, 1998), this forms one of basis for selecting the district for study. The major source of income of the indigenous people who are smallholder farmers in the district is coffee and farmers access WRS services through membership in AMCOS or FGs. Therefore, the study area provided a suitable place for studying the WRS and farm productivity of smallholder farmers.

##### **4.4.2 Research design, sampling and data collection methods**

A cross-sectional research design was used and was considered appropriate because of the nature of information required for this study, by allowing data to be collected at one point in time from different groups of respondents. Moreover, it was also easier and adequate to organize and relate the data collected at a single point for processing, analysis and presentation (Olaitan *et al.*, 2000).

The target population was coffee farmers in Mbinga District. The sampling frame was all coffee farmers users of the WRS services. The selection of respondents was based on a cluster sampling of two zones (Matengo highlands and the lowlands). Using a simple random sampling of numbers generated in MS Excel, proportionally, a total of 390 respondents from AMCOS (230) and FGs (160) from each zone were randomly selected from a register provided by the District Agricultural, Irrigation and Cooperative Officer (DAICO). The Yamane (1967) formula gave, 4 AMCOS and 4 FGs from 21 AMCOS and 21 FGs registered in the district (Appendix 1). Since AMCOS had more coffee farmers (2304) than FGs (1596) (Appendix 1).

#### 4.4.3 Model and estimation method

In literature there are numerous measurement of agricultural farm productivity. In this study farm productivity was calculated by computing a ratio of output produced per farm size cultivated by a farmer. The Cobb-Douglas production function (Cobb and Douglas, 1928) was used to study the effects of credit access through the WRS and farm productivity of smallholder coffee farmers in Mbinga District. Similar empirical studies such as that of Carter (1989), Banker *et al.* (2012) and Malate *et al.* (2013) used similar function form specified as shown below.

$$Y_i = T_i L_i^\beta W_i^\alpha e^{\eta_i} \dots\dots\dots(1)$$

Where,  $Y_i$ = total coffee production measured in kilograms;  $L_i$ = cultivated area under coffee in hectares;  $W_i$ = number of labour used in coffee production;  $T_i$ = total factor productivity expressing efficiency of household in transforming farming inputs into coffee;  $\alpha$  and  $\beta$  are unknown parameters to be estimated and  $\eta_i$ = error term and  $\eta_i \sim \text{iid } N(0, \sigma^2)$ .

Dividing by equation (1) by  $L_i$  and applying natural logarithm the expression become as shown in equation (2).

$$\ln\left(\frac{Y_i}{L_i}\right) = \ln T_i + (\alpha + \beta - 1)\ln L_i + \alpha \ln\left(\frac{W_i}{L_i}\right) + \eta_i \dots \dots \dots (2)$$

Since household specific characteristics affects output through efficiency of them transforming agricultural inputs to outputs therefore the total factor production was estimated as shown in equation (3).

$$\ln T_i = \gamma_0 + \sum_{j=1}^J \gamma_j \varphi_{ij} + \varepsilon_i \dots \dots \dots (3)$$

Where,  $\varphi_{ij}$ = household characteristics affecting total factor productivity,  $\gamma_i$ = unknown parameters to be estimated and  $\varepsilon_i$ = disturbance term and  $\varepsilon_i \sim \text{iid } N(0, \sigma^2)$ .

Combining equation (2) and (3), equation (4) is obtained which is linear in parameters and can be estimated using Ordinary Least Squares (OLS) (Pallant, 2007; Gujarati and Sangeetha, 2007).

$$\ln \frac{Y_i}{L_i} = \gamma_0 + \sum_{j=1}^J \gamma_j \varphi_{ij} + \ln T_i + (\alpha + \beta - 1)\ln L_i + \alpha \ln \frac{W_i}{L_i} + \mu_i \dots \dots \dots (4)$$

Where,  $\mu_i = \eta_i + \varepsilon_i$  and  $\mu_i \sim \text{iid } N(0, \sigma^2)$  and  $\sum_{j=1}^J \gamma_j \varphi_{ij} = \gamma_1 \varphi_{1i} + \gamma_2 \varphi_{2i} + \gamma_3 \varphi_{3i} + \gamma_4 \varphi_{4i} + \gamma_5 \varphi_{5i}$  and  $\varphi_{1i}$  = a dummy variable of farmer receiving credit through the WRS (1= yes; 0 = no) ;  $\varphi_{2i}$ = farmer's age in years;  $\varphi_{3i}$  = a dummy variable of farmer's sex (1= male, 0 = female);  $\varphi_{4i}$  = a dummy variable of farmer receiving extension service (1= yes, 0= no) and  $\varphi_{5i}$  = a dummy variable of farmer using irrigation (1= yes, 0 = no).



Disription of the variables used in the model for regression analysis are presented in

Table 4.1.

**Table 4.1: Description of variables used in the model**

| Variables  | Description  | Expected Sign |
|--|--|---------------|
| <b>Dependent Variable</b>                                  |  |               |
| Yield  | $\frac{Y_i}{L_i}$ Coffee production in kilograms per hectare                 |               |
| <b>Explanatory Variables</b>                               |  |               |
| Household receiving credit through the WRS (1= Yes, 0= No) | $\varphi_1$ Dummy variable for household receiving credit through the WRS    | +             |
| Household head years of schooling                          | $\varphi_2$ Number of years spend in formal education                        | +             |
| Household head age   | $\varphi_3$ Number of years of head of household                             | +             |
| Household head sex (1=Male, 0= Female)                     | $\varphi_4$ Dummy variable for indicating sex of the head of household       | +             |
| Household using irrigation (1= Yes, 0= No)                 | $\varphi_5$ Dummy variable for household using irrigation to the coffee farm | +             |
| Household had extension service (1= Yes, 0= No)            | $\varphi_6$ Dummy variable for household receiving extension service         | +             |
| Household coffee cultivated area                           | $L_i$ Number of hectares under coffee cultivation                            | +             |
| Household labour per coffee cultivated area                | $\frac{W_i}{L_i}$ Number of labour used per hectare of coffee                | -             |

Coefficient of a dummy variable receiving credit through the WRS is expected to have a positive sign since credit from WRS enables farmers to acquire yield through enhanced agro-inputs. Coefficient of household head education is expected to have a positive sign since the higher the education the higher the ability of a farmer to acquire, synthesize and utilize information which will lead to better use of agro-inputs. Coefficient of household age is expected to have a positive sign because as age increases a farmer accumulates more knowledge and skills which affect productivity positively. Coefficient of sex is expected to have a positive sign because in African societies men are privileged when it comes to access of information, capital, land and other resources while women are marginalized on those areas (Abdul *et al.*, 2010 ). The coefficients of coffee cultivated area and labour per hectare are expected to be positive. The positive sign are due to timely credit services available to AMCOS and FGs members, the confidence of members on

lending agencies, accessibility of loans, and agro-inputs stimulate production (Karunakaran and Mekonnen, 2013; Mengistu, 2015).

## 4.5 Results and Discussion

### 4.5.1 Socio-economic characteristics of respondents

The socio-economic characteristics of respondents' results are as presented in Table 4.2.

**Table 4.2: Socio-economic characteristics and credit accessed through the WRS**

| Variable                           |                    | Percentage of farmers accessed agro-input credit through the WRS |             | Total | P-value |
|------------------------------------|--------------------|--|-------------|-------|---------|
|                                    |                    | No (n=187)   | Yes (n=203) |       |         |
| HH head sex                        | Female             | 9.2  | 9.2         | 18.5  | 0.399   |
|                                    | Male               | 38.7   | 42.8        | 81.5  |         |
| HH head age                        | 50 years and above | 12.6   | 16.4        | 29.0  | 0.247   |
|                                    | Less than 50 years | 35.4   | 35.6        | 71.0  |         |
| HH received extension              | No                 | 29.0   | 22.3        | 51.3  | 0.010   |
|                                    | Yes                | 19.0   | 29.7        | 48.7  |         |
| HH used irrigation                 | No                 | 47.4   | 36.4        | 83.8  | 0.000   |
|                                    | Yes                | 0.5  | 15.6        | 16.2  |         |
| HH head with primary school        | Yes                | 31.5   | 29.2        | 60.8  | 0.052   |
| HH head with secondary school      | Yes                | 14.4   | 20.8        | 35.1  | 0.040   |
| HH head with post-secondary school | Yes                | 1.0  | 1.5         | 2.6   | 0.010   |
| HH head with no-formal education   | Yes                | 1.0  | 0.5         | 1.5   | 0.305   |

The results in Table 4.2 show that 81.5% of the respondents were male headed households and only 18.5% were female headed ones. The difference was attributed by the fact that Mbinga District is a patrilineal society (Baseheart, 1972). With regards to sex, results indicated that in the study area there was no significant difference within sex group between those who accessed agro-input credit through the WRS and those who did not.

This implies that accessing agro-input credit through WRS is not gender sensitive and that WRS offers equal opportunities to both males and females promising prosperity of the system and enhancement of increased coffee production. This finding is contrary to Doss (2011) who argued that opportunities of farm production facilitations including credit for communities in African societies including Tanzania are characterised by male dominance system due to taboos that marginalize women, which make them less productive in the end.

Regarding the age of household head study results show that 71.0% of the respondents were less than 50 years of age while 29% were 50 years and above, however, there was no statistical difference between farmers who received agro-input credit through the WRS and those who did not by age. Implying age is not a determining factor for accessing agro-input credit through WRS. Nonetheless, the WRS was dominated by productive age group farmers (50 years of age or less). URT (2007) describes the age group between 18 and 50 years as a productive age group. This means effective WRS could trigger high coffee production in coffee industry as at present the results have shown that across age groups the dominance of coffee production was of productive age group.

Based on education of the respondents, results in Table 4.2 show that about 61% of the respondents had primary school education, 35% had secondary education, and about 3% had post-secondary education while about only 2% did not have any formal education. Hence, the majority of the respondents had formal education, and within formal education groups there was statistical significant difference between those who accessed agro-input credit through the WRS and those who did not. This result of education level in relation to the WRS implies that farmers with more formal education tended to be more aware of WRS services such as credit, storage, and market unlike farmers with less. Although it is a

fact that the effects of education take time to be revealed in a society it is also a fact that productive households tend to have more people with formal education (Temu *et al.*, 2005). Therefore, due to that, it is expected that farmers with formal education will be more productive than households without it.

Results show further that, about 49% of the respondents had access to extension services, while 51% of the respondents did not; and between the two groups there is statistical significant difference. That infers that access to agro-input credit should move in unison with provision of extension services to the farmers so as to promote the agricultural production in terms of technology dissemination (new varieties, input use, farm implements and technical knowhow) (Temu *et al.*, 2011). It advocates further the importance of improving the extension service department in the district. Moreover, 16% of the respondents were irrigating their crop, about 84% did not practice irrigation on their farms; and inferential statistics indicated that there is no statistical significant difference between those farmers who accessed agro-input credit through the WRS and those who did not. This suggests that agro-input credit brought insignificant contribution to the improvement of irrigation scheme in the district. In order to improve coffee production and the fact that irrigation scheme is a capital intensive (Itani, 1998) and farmers who accessed agro-input credit through WRS were less than a quarter of the respondents (16%), it raises a concern of having a special credit system through the WRS for irrigation scheme.

#### **4.5.2 Average coffee production, cultivated area, and labour use**

Results on Table 4.3 show coffee production among farmers who were using the WRS and those not.

**Table 4.3: Average coffee production, cultivated area, and labour use**

| Variable   | Used agro-input credit through WRS (n=203) |       | Did not use agro-input credit through WRS (n= 187) |       | p-value |
|--|--|-------|--|-------|---------|
|  | Mean                                       | SD    | Mean   | SD    |         |
| Average total coffee harvested (kg/season/hectare) | 534.8                                      | 155.8 | 485.6  | 148.0 | 0.002   |
| Average coffee harvested (kg/hectare)              | 244.3                                      | 195.6 | 201.7  | 149.8 | 0.017   |
| Area cultivated for coffee (hectares)              | 3.0  | 2.0   | 3.0  | 1.9   | 0.991   |
| Labour used in coffee farm (mandays)               | 104.2                                      | 83.0  | 98.9   | 76.4  | 0.698   |

The results in Table 4.3 show that the average coffee production in a season was about 535 kg and 486 kg for the respondents who used the credit through WRS and those who did not respectively. In addition, harvested coffee per hectare ranged from approximately 202 kg to 244 kg for those respondents who did not use agro-input credit through the WRS and those respondents who used it respectively. Independent t-test statistics showed that in both cases there is significant difference in coffee production between respondents who used agro-input credit through the WRS and those who did not. Also, the findings show that there were no significant differences in coffee cultivated area as well as total labour used in coffee production between those who were using agro-input credit accessed through the WRS and those who were not. The findings advocate to the Mbinga District Agriculture, Irrigation and Cooperative Officer (DAICO) to strengthen the use of WRS services such as agro-input credit to help farmers increase coffee production. The average productivity was great about 244 kg/ha to farmers who used agro-input credit through the WRS relative to non users whose productivity was 202 kg/ha. This finding supports the theory of farm production that the use of agro-inputs increases output per unit of land depending on the input quality and quantity (Banker *et al.*, 2012).

#### **4.5.3 Farm productivity of smallholder coffee farmer and WRS**

The results of the regression equation are presented on Table 4.4.

**Table 4.4: Farm productivity of smallholder coffee farmer and WRS**

| Variables  | Coefficients | $P >  t $ |
|--|--------------|-----------|
| Household receiving credit through WRS (1 = Yes, 0 = No) | 0.104521     | 0.012     |
| Household head years of schooling                        | 0.015303     | 0.018     |
| Household head age                                       | -0.002400    | 0.255     |
| Household sex (1 = Male, 0 = Female)                     | -0.118150    | 0.019     |
| Household coffee cultivated area                         | -0.745439    | 0.000     |
| Household labour per coffee cultivated area              | 0.198606     | 0.000     |
| Household using irrigation (1 = Yes, 0 = No)             | 0.000003     | 0.999     |
| Household had extension service (1 = Yes, 0 = No)        | 0.136724     | 0.001     |
| Constant term  | 5.481695     | 0.000     |
| $n$  |              | 390       |
| F (8,381)  |              | 118.43    |
| Prob > F   |              | 0.000     |
| R-squared  |              | 0.7132    |

The R-squared of 0.7132 shows that the regression model explained about 71% of the variation of the response data. The F-statistic with p-value = 0.000 implies that the coefficients of explanatory variables were jointly not equal to zero.

The coefficient of the farmer receiving credit through the WRS was positive and highly significant. Holding all other factors that influence coffee yield constant, coffee farmers who received agro-input credit through the WRS had a yield of about 11% higher compared to those who did not. The output increased at a greater proportionate for farmers accessed agro-input credit through the WRS than for those who did not. The WRS agro-inputs credit brought a significant increase in the coffee farm productivity. The results are in line with the findings reported earlier by Rosari *et al.* (2013) that a unit increase in credit used in farm production as an input resulted in 2.90 units increase in output. Moreover, Kayunze *et al.* (2011) argue access to credit promotes agricultural productivity and subsequently reduce poverty and increase their well being. This indicates that the use of WRS agro-input credit increases yield to coffee farmers.



The results further show that a male headed household had about 12% yield lower than that of a female headed household which is contrary to what was expected. The reason is Matengo tribe in Mbinga District is a patrilineal one and women are fully engaged in agriculture relative to men. The argument is supported by Kayunze *et al.* (2011) they urged that in Tanzania, female smallholders dominate production in the agricultural sector; and therefore are important drivers of economic growth and poverty reduction. Suggesting empowering women in ownership of land in agriculture would lead to the growth of coffee production through WRS. The coefficient of years of schooling (education level) of the head of household had a significant positive effect on yield whereby an additional year of schooling (level of education) increased yield by about 2%. The coefficient of household having access to extension services had a significant positive relationship with yield whereby household that had access to extension services registered about 14% more yield compared to those households with no access to extension services. The findings indicate that technological innovations such as improved seeds, use of fertilisers and other important novelties if adopted by farmers may trigger the coffee farm productivity in the district.

The coefficients of coffee cultivated area and farm labour estimate exhibit decreasing return to scale. A percentage increase in coffee cultivated area and labour leads to 0.3% increase in coffee production. This suggests that under given household sizes farmers could not increase coffee production by expanding their farm sizes. This suggestion is practical in Mbinga District due to scarcity of land (Itani, 1998).

#### **4.6 Conclusions and Recommendations**

The theory of farm production was supported in this paper. The theory propounds that farmers who use inputs are expected to have higher output and hence higher productivity than those who do not based on their demographic characteristics.

Conclusively, the influence of credit in the form of agro inputs accessed through the WRS was significant. Other variables such as sex, farm size, education, labour, and extension services had significant impact on coffee farms productivity. However, age and irrigation had insignificant impact. The significant variables call for more WRS improvement in order to increase coffee farms productivity.

The following recommendations are suggested to the stakeholders in coffee sector for improving coffee productivity through the WRS: (1) Creation of an enabling environment for the WRS to work better relative to the current one, (2) Strengthening the availability of agro-inputs credit through the WRS in order to increase coffee production. It is advised to strengthen the financial intermediaries for that matter, (3) Putting more efforts to support extension services so as to enable farmers get equipped with new innovation if any in coffee farming. This move will increase farm production and improve the income of farmers. Intervention policies that will increase participation of women in coffee production will positively contribute to coffee farm yield in the study area. Moreover, since credit was significant and the objective of the paper was to examine the effect of credit on the coffee farm productivity, more research is needed to include panel data to study trend and broad outlook of the matter.

## References

- Abate, T. and Orr, A. (2011). Fremont Investment and Loan. *Journal of Development Economics* 14:13-40.
- Abdul, B., Salami, A. and Kamara, B. (2010). Smallholder Agriculture in East Africa, Trends, Constraints and Opportunities. Working Papers Series No 105. African Development Bank, Tunis, Tunisia. 52pp.

- Ajibola, K., Kuku, O. and Liverpool, L. (2011). *A Review of Literature on Agricultural Productivity, Social Capital and Food Security in Nigeria*. International Food Policy Research Institute. Abuja. 54pp.
- Anyaegbunam, H., Okoye, C., Asumugha, G., Ogbona, M., Madu, T., Nwakor, N. and Ejechi, M. (2010). Labour productivity among smallholder cassava farmers in South East agro ecological zone Nigeria. *African Agricultural Resources* 5(21): 2882-2885.
- Banker, R. D., Datar, S. M. and Kaplan, R. S. (2012). Productivity measurement and management accounting. *Journal of Accounting, Auditing and Finance* 5: 528-554.
- Baseheart, H. (1972). Traditional History and political change among the Matengo of Tanzania. *Africa* 42: 87-97.
- Boucher, S. R., Guirkinge, C. and Trivelli, C. (2009). Direct elicitation of credit constraints: Conceptual and practical issues with an application to Peruvian agriculture. *Economic Development and Cultural Change* 57(4): 609-640.
- Carter, M. R. (1989). The impact of credit on peasant productivity and differentiation in Nicaragua. *Journal of Development Economics* 31(1): 13-36.
- Chen, W. (2006). Productivity Growth, Technical Progress and Efficiency Change in Chinese Agriculture: 1990-2003. *Journal of China Rural Survey* 1: 18-23.

- Cobb, C. W. and Douglas, P. H. (1928). A theory of production. *American Economic Review* 18(1): 139-165.
- Cooksey, B. (2010). Marketing reform? The rise and fall of agricultural liberalisation in Tanzania. *Development Policy Review* 21(1): 67-91.
- Coulter, J. P. and Onumah, G. E. (2002). The role of warehouse receipt systems in enhanced commodity marketing and rural livelihoods in Africa. *Food Policy* 27(4): 319-337.
- Coulter, J., Sondhi, J. and Boxall, R. (2000). *The Economics of Warehousing in Sub-Saharan Africa*. African Review of Money, Finance and Banking. pp97-114.
- Doss, C. (2011). The Role of Women in Agriculture. *Agricultural Development Economics* 2(11): 1-48.
- Ellis, F. (1992). *Peasant Economics: Farm Household and Agrarian Development*. Wye Studies in Agricultural and Rural Development. Cambridge University Press, UK. 122pp.
- Feder, G., Lau, L. J., Lin, J. Y. and Luo, X. (1990). The Relationship between credit and productivity in Chinese agriculture: A microeconomic model of disequilibrium. *American Journal of Agricultural Economics* 72(5): 1151-1157.
- Feder, G., Lau, L. J., Lin, J. Y. and Xiaopeng, L. (1989). Agricultural credit and farm performance in China. *Journal of Comparative Economics* 13(4): 508-526.

- Guirkinger, C. and Boucher, S. (2008). Credit constraints and productivity in Peruvian agriculture. *Agricultural Economics* 39(3): 295-308.
- Gujarati, D. and Sangeetha, N. (2007). *Basic Econometrics*. 4<sup>th</sup> Edition, Tata McGraw-Hill, New Delhi. 1072pp.
- IFAD (2014). A framework for Linking Small Farmers to Markets IFAD and The United Republic of Tanzania Prime Minister's Office (2014). Agricultural Marketing Systems Development Scheme. *Completion Report*. 5pp.
- Itani, J. (1998). Evaluation of an indigenous farming system in the Matengo Highlands, Tanzania, and its sustainability. *African Study Monographs* 19: 55-68.
- Karunakaran, R. and Mekonnen, A. (2013). Study on the economic contributions of coffee cooperatives in Yirgacheffe Woreda, Gedeo Zone, Snnpr, Ethiopia. *International Journal of Commerce Management Research* 1: 2.
- Kayunze, K. A., Maro, F. and Mashindano, O. (2011). Agricultural growth and poverty reduction in Tanzania 2000-2010. Working Paper No. 2. Where has agriculture worked for the poor and what can we learn from this? 40pp.
- KENFAP (2011). *The role of Warehouse Receipt System and Financial Services in Improving Produce Marketing by Smallholder Farmers in Kenya*. KENFAP. Kenya. 52pp.

- Komarek, A. (2010). The determinants of banana market commercialization in Western Uganda. *African Journal of Agricultural Research* 5(9): 775.  
[<http://www.academicjournals.org/AJAR>] site visited on 15/09/2015.
- Komba, L. (2011). *Market Position of Coffee Farmers in the Coffee Supply Chain: A Case Paper of Mbingu, Tanzania*. Lambert Academic Publishing, ISBN 3844308636, 9783844308631. 76pp.
- Kwadjo, G. T. M. (2000). Inventory Credit: A Financial Product in Ghana. Paper presented at Conference on Advancing microfinance in rural West Africa, Bamako, February 22-25, 2000.
- Lacroix, R. and Varangis, P. (1996). Using Warehouse Receipts in Developing and Transition Economies *Finance and Development* 33(3).
- Madulu, R. B. (2011). Improving access to credit for paddy farmers through warehouse receipt-based agricultural marketing system in Tanzania. *African Crop Science Journal* 10: 37-39.
- Malate, A., Mlay, G. and Zavale, H. (2013). Determinant of Labour Productivity for Smallholder Maize Production in Mozambique. *Eastern and Southern Africa Journal of Agricultural Economics and Development* 10: 81-100.
- Mengistu, M. M. (2015). Assessing the performances of coffee marketing cooperatives in yirgacheffe woreda, geddo zone, snpr, Ethiopia. *International Journal of Community Cooperative Study* 3(3): 30-43.



- Millinga, M. (2009). *Empowering farmers in Tanzania through the warehouse receipt system*. IFAD report. Tanzania. 4pp.
- Mtanda, A. M. (2015). Farmers' attitude towards Warehouse Receipt System in Newala District, Tanzania. Dissertation for Award of Master Degree at Sokoine University of Agriculture, Morogoro, Tanzania. 36pp.
- Nto, P. O. and Mbanasor, J. A. (2011). Productivity in agribusiness firms and its determinants in Abia State, Nigeria. *Journal of Economics and International Finance* 3(12): 662-668.
- Olaitan, M. A. (2006). Finance for small and medium enterprises: Nigeria's agricultural credit guarantee scheme fund. *Journal of International Farm Management* 3(2): 1-9.
- Olubiyo, S. O., Hill, G. P. and Webster, J. P. (2009). Econometric Analysis of the Impact of Agricultural Insurance on Farming Systems in the Middle Belt, Nigeria. *African Journal of Food Agriculture Nutrition and Development* 9(6): 1406-1418.
- Onumah, G. (2003). Improving Access to Rural Finance through Regulated Warehouse Receipt Systems in Africa. Paper Presented At Conference on "Paving the Way Forward for Rural Finance: An International Conference on Best Practices, Washington, 2-4 June.

- Onumah, G. (2010). Implementing Warehouse Receipt Systems in Africa Potential and Challenges. Paper prepared for the Fourth African Agricultural Markets Program Policy Symposium, organized by the Alliance for Commodity Trade in Eastern and Southern Africa (ACTESA) of the Common Market for Eastern and Southern Africa (COMESA), Lilongwe, Malawi, September 6-7, 2010. 20pp.
- Onumah, G. E. (2012). Warehouse Receipts and Securitisation in Agricultural Finance to Promote Lending to Smallholder Farmers in Africa: Potential Benefits and Legal/Regulatory Issues. *Uniform Law Review-Revue de droit uniforme* 17(1-2): 351– 367. [<http://dx.doi.org/10.1093/ulr/17.1-2.351>] site visited on 31/06/2016.
- Pallant, J. (2007). *Survival Manual: A Step by Step Guide to Data Analysis SPSS for Windows*, 3<sup>rd</sup> edition. New York. pp34-42.
- Petrack, M. (2004). Farm investment, credit rationing, and governmentally promoted credit access in Poland: A cross-sectional analysis. *Food Policy* 29(3): 275-294.
- Poulton, C., Dorward, A. and Kydd, J. (2010). The Future of Small Farms: New Directions for Services, Institutions, and Intermediation. *World Development, Elsevier* 38(10): 1413-1428.
- Ramaila, M., Mahlangu, S. and Toit, D. (2011). *Agricultural Productivity in South Africa: Literature Review*. Department of Agriculture, Forestry and Fisheries. South Africa. 27pp.

- Rosari, B., Sinaga, B., Kusnadi, N. and Sawit, M. H. (2013). The impact of Credit and Capital Supports on Economic Behavior of Farm Households: A Household Economic Approach. *International Journal of Food and Agricultural Economics* 19(2): 81-90.
- Simkovic, M. (2016). What Can We Learn from Credit Markets?. *Proceedings of the 93<sup>rd</sup> Annual Meeting of the American Law Institute*. Washinton DC. 38pp.
- Temu, A., Manyama, A., Mgeni, C., Langyintuo, A. and Waized, B. (2011). *Characterization of Maize Producing Households in Manyoni and Chamwino Districts in Tanzania*. The International Maize and Wheat Improvement Center. Nairobi. 22pp.
- Temu, A., Nyange, D., Mattee, A. and Kashasha, L. (2005). Assessing rural services, infrastructure and their impact on agricultural production, marketing and food security in Tanzania: Tanzania Development Gateway. [[http://www.tanzaniagateway.org/docs/AssessingRuralServicesandInfrastructureonAgriculturalProduction\\_Tanzania.pdf](http://www.tanzaniagateway.org/docs/AssessingRuralServicesandInfrastructureonAgriculturalProduction_Tanzania.pdf)] site visited on 27/2/2017.
- UNIDO (2011). *Tanzania's Cashew Value Chain*. A diagnostic annual report, United Nations Industrial Development Organization, Vienna, Austria. 66pp.
- United Republic of Tanzania (2007). Tanzania National Youth Development Policy (TNYDP), Ministry of Labour, Employment and Youth Development, Dar es Salaam. 14pp.

URT (2005). *The Warehouse Receipt Act of 2005*. Government Printers. Dar es Salaam, Tanzania. 24pp.

Wiebe, K. D., Soule, M. J. and Schimmelpfennig, D. (2001). Agricultural Productivity for Sustainable Food Security in Sub-Saharan Africa. In: *Agricultural Investment and Productivity in Developing Countries*. Zepeda, L. (ed), FAO, Rome. 29pp.

Yamane, T. (1967). *Statistics. An Introductory Analysis*. 2<sup>nd</sup> Edition, Harper and Row, New York. 38pp.

## **CHAPTER FIVE**

### **5.0 CONCLUSIONS AND RECOMMENDATIONS**

The general objective of the study was to assess the effectiveness of the warehouse receipt system (WRS) in enhancing coffee marketing environment in Mbinga District, Tanzania. This chapter presents the conclusions and recommendations highlighting the policy implications, theoretical reflections, contribution of the study/research to knowledge and proposition of areas for further research.

#### **5.1 Conclusions and Recommendations**

##### **5.1.1 Determinants of participation of smallholder coffee farmers in the WRS**

On the factors influencing farmers decision to participate in the WRS, it was found that young male farmers whose farms were located more closer to agricultural and marketing cooperative (AMCOS) or farmers' group (FG) centres were more likely to participate in the WRS. It can be construed that, in order to have a wider smallholder farmers participation in the WRS, more efforts should be directed to influence farmers with limited access to market information, women and older famers decision to participate. Locating AMCOS and FG centres close to farms will add a positive impact on their decision to participate.

##### **5.1.2 Farmers' perception on the effectiveness of the WRS**

The AMCOS or FGs members who were well informed about the WRS coffee marketing channel had access to storage and agro-input services felt the WRS to be effective. It can be concluded that for more effectiveness of WRS, the facilitation role of the WRS to farmers in coffee marketing channel as well as information with regard to coffee auction

prices should be enhanced. Improving coffee marketing information transparency will influence effectiveness of the WRS.

### **5.1.3 Credit access through the WRS and farm productivity**

The female farmers with formal education received agro-input credit through WRS and extension services which significantly increased their farm productivity. It can be inferred that, in order to increase more farm productivity, male farmers should be encouraged to access agro-input credit and through extension services should improve farm productivity without expansion of their farms due to land scarcity. Creation of enabling environment of availability of agro-inputs credit through the WRS and extension services to farmers will improve coffee production and quality.

## **5.2 Contribution of the Study/Research to Knowledge**

The contribution of the study to the body of knowledge lies on the fact that it provides empirical information on the effectiveness of the WRS. The WRS tackles the challenges facing smallholder farmers of low and unpredictable farm gate prices, lack or inappropriate agricultural financing mechanisms and agro-input credit and minimum participation of smallholder farmers in the agricultural market in a cash crop setting. While other studies have given a glimpse on the effectiveness of WRS on food crops, the effectiveness of WRS can be hugely underestimated in such setting due to the nature of the food crop allowing multiple channels (plus the direct consumption) that largely contribute to default by members on the repayment of input loans. The coffee (cash crop) in this case, is to a large extent not directly edible and the marketing channels are limited causing a different behaviour on the producers. The WRS is thus found to perform different under different crops depending on the set of available market channels and alternative uses of the crop in question.



The study further offers theoretical information of support on the most applicable participation, organisational effectiveness, and farm production theories in the study area. Specifically, it advances to support the theory of organisational effectiveness which is a goal fulfilment theory that involves process such as participation of members in the organisation. This study established that a mere presence of the WRS goal without self and social demands by a farmer can lead to fictional fulfilment of the goal and subsequently farmers behave in line with alternative market channels. Linking to this study, it implies that the mere presence of the warehouse receipt system functioning in the agricultural sector without good information about its goals leads to non participation of farmers. Moreover, increased attention to the warehouse receipt system by all stakeholders participating in the system results in increased information to view similarity between the most profitable marketing channel such as warehouse receipt system and other relatively unhealthy channels in the choice set. This allows farmers to choose the most paying marketing channel in the agricultural sector. Thus, this research provides theoretical contribution to the effectiveness theory, which is a goal-centred theory by advancing our understanding of the process by which factors associated with the decision context that involve farmers' participation can lead to goal fulfilment and subsequently, impact farmers' choices.

#### **5.4 Areas for Further Research**

The study recommends the following areas for further research.

- (i) This study was based on a cross-sectional design whereby data was collected at one point in time. Analysis based on cross-sectional data has some limitations, such as lack of capability to track the dynamics of producer performance over time. It would be important to undertake a WRS panel-data analysis in the future.

- (ii) The focus of the study was coffee; it would be good to conduct similar studies on other cash crops such as cotton and mixed use such as maize, paddy to see how the alternative options available for a crop influence effectiveness of WRS. It is also possible to include more than one crop in the analysis, that is multi-commodity analysis is suggested as realistic in smallholder farming. The focus should be on crops that use the WRS as a means of marketing stabiliser.
- (iii) In the near-future, however, it would be important to conduct similar studies in other districts where the WRS is practised in order to make comparisons.
- (iv) Although this thesis has demonstrated that the WRS is effective, there is a need to investigate farmers' economic risks associated with price fluctuations in the world market prices of coffee. This should also include examining existing practices of risk management so as to manage specific risks associated with WRS marketing channel.

## APPENDICES

## Appendix 1: Sampling methods

| Sample members  | Population   | Number of respondents | Sampling method  |
|---|--------------|-----------------------|--|
| Highland area AMCOS   | 12           | 1 AMCOS               | <p>The sample was randomly picked from the villages in low and high land zones using a table of random numbers generated in excel. The sample size used formulae as below.</p> <p>1. Sample size formula<br/> <math>n = N(1 + Ne^2)^{-1}</math><br/>           Where: n = sample size, N = population, e = an error (e = 0.05)</p> <p>2. Sample ratio formula<br/> <math>n^* = p_i \cdot n</math>, Where: <math>n^*</math> = sample size in AMCOS or farmers' groups, <math>p_i</math> = proportion of the number of respondents in the target population (i.e. population in AMCOS or farmers' group/ total population)</p> |
| Lowland area AMCOS  | 9            | 1 AMCOS               |  |
| Highland area Farmers' Group  | 8            | 1 F. GROUP            |  |
| Lowland area Farmers' Group   | 13           | 1 F. GROUP            |  |
| Highland area farmers from AMCOS  | 1,245        | 125 farmers           |  |
| Lowland area farmers from AMCOS   | 1,059        | 106 farmers           |  |
| Highland area farmers from Farmers' Group   | 833          | 83 farmers            |  |
| Lowland area farmers from Farmers' Group  | 763          | 76 farmers            |  |
| Farmers who are members of AMCOS who accessed agro inputs using income from other sources                               | 1,097        | 110                   |  |
| Farmers who are members of farmers' groups who accessed agro inputs using income from other sources                     | 762          | 76                    |  |
| Farmers who are members of AMCOS who accessed agro inputs through WRS credit system                                     | 1,496        | 150                   |  |
| Farmers who are members of farmers' groups who accessed agro inputs through WRS credit system                           | 1,033        | 103                   |  |
| Farmers who were in both groups i.e. accessed agro inputs through WRS credit system and using income from other sources | 491          | 49                    |  |
| <b>Total number of respondents (farmers)</b>  | <b>3,900</b> | <b>390 farmers</b>    |  |

Source: Yamane (1967)

## Appendix 2: Coffee curing statement certificate at the DAE Co. Ltd warehouse

P O BOX 127  
MIDINGACURING STATEMENT  
(SEASON 2013/2014)

NAME MAHENGE AMGOS (CRDB BANK - PLC)

DATE 10/11/2013  
OUTTURN NO.100/1425ESTATE STACK NO.02  
FLO CERTIFIED COFFEE

CLASS 5

| Receipt No. | No. of Bags | Net Weight(kg) | Grade | Remarks |
|-------------|-------------|----------------|-------|---------|
|             |             |                |       |         |
| G/TOTAL     | 2,341       | 114,668        | CPU   |         |

| Grade   | Bags  | Kgs    | Pocket | Kgs    | % of Total | Bulk No. | Salc No. |
|---------|-------|--------|--------|--------|------------|----------|----------|
| PS      | 100   | 5 000  | 53     | 5 053  | 6.42       |          |          |
| AAA     |       |        |        |        |            |          |          |
| AA      | 690   | 41,400 | 41     | 41,411 | 43.97      |          |          |
| A       | 145   | 26,700 | 32     | 26,732 | 28.36      |          |          |
| B       | 222   | 13,320 | 27     | 13,347 | 14.16      |          |          |
| C       | 82    | 4,920  | 34     | 4,954  | 5.20       |          |          |
| E       |       |        |        |        |            |          |          |
| AF      | 9     | 510    | 20     | 560    | 0.59       |          |          |
| TT      | 6     | 360    | 10     | 370    | 0.39       |          |          |
| F       | 13    | 780    | 10     | 780    | 0.84       |          |          |
| HP      |       |        |        |        |            |          |          |
| TEX     |       |        |        |        |            |          |          |
| UG      |       |        |        |        |            |          |          |
| Samples |       |        |        | 8      | 0.01       |          |          |
| TOTAL   | 1,567 | 94,020 | 227    | 94,255 | 100.00     |          |          |

17.80% LOSS IN CURING

Average Moisture Content

10%

Curing, Bulking, etc

Collateral Fee

Sisal Export Bags Used

Handpicking

114,964 kgs @ 0.065

=

USD

7,472.66

USD

USD

41 bags @ 1.86

=

USD

76.26

USD

SUB TOTAL

USD

7,548.92

VAT 18%

USD

1,358.81

GRAND TOTAL

USD


8,907.73

FINANCE &amp; ADMN. MANAGER

PRODUCTION MANAGER

PREPARED BY  
STATISTICIAN

## Appendix 3: Warehouse receipt

| WAREHOUSE RECEIPT<br>(Warehouse Receipt Act No. 10 of 2005)  |   | Certificate of Title<br>(Copy) |              |
|--|---|--------------------------------|--------------|
|                     |   | Date of issue                  | 24.8.13      |
|  |   | Warehouse No.                  | 03           |
|  |   | Receipt No. WRN                | 033301       |
| By this Warehouse Receipt it is confirmed that the Warehouse <u>MBINGA GEEFF CURING Co. LTD</u>      |   |                                |              |
| Located in <u>MBINGA</u> <u>Box 127.</u>   |   |                                |              |
| Received for storing from <u>MKUMBI GROUP, Box 10, MBINGA.</u>                                       |   |                                |              |
| Goods with the following descriptions:   |   |                                |              |
| Type(s) and Origin of the Goods  | Physical Weight (kg)                              | Net Weight (kg)                | Moisture (%) |
| <u>COFFEE</u>  | <u>161</u>  | <u>161</u>                     | <u>10.0</u>  |
| Physical Weight in words   | <u>ONE THOUSAND SIX HUNDRED THIRTEEN KGS ONLY</u> |                                |              |
| 1. The Goods are fully insured according to Insurance Policy No. <u>IGF 32C</u> at <u>3.7.2013</u>   |   |                                |              |
| 2. The Nature and Facts of Ownership of the Goods <u>JOINTLY</u>                                     |   |                                |              |
| 3. Warehouse Operator hereby undertakes to store the Goods.  |   |                                |              |
| (i) In quality and quantity as above mentioned until <u>31.03.2014</u>                               |   |                                |              |
| (ii) With no financial interest in the goods covered by this receipt except a lien on the goods      |   |                                |              |
| (iii) For a fee of Tsh. _____ as lien for _____  |   |                                |              |
| 4. The Holder of this Warehouse Receipt hereby undertakes:   |   |                                |              |
| (i) To pay the Warehouse Operator the specified fee as lien  |   |                                |              |
| (ii) To inform the Warehouse Operator of any advances or liabilities incurred by use of this receipt |   |                                |              |
| Depositor's Signature <u>PRIMO KAPINDU</u>   |   | Stamp <u>[Signature]</u>       |              |
| Authorized person to the Warehouse <u>[Signature]</u>  |   | Stamp <u>[Signature]</u>       |              |

## Appendix 4: Auction permit receipt



No. TCB/ASP/13/083

(Established Act of Parliament of the United Republic of Tanzania: The Coffee Industry Act, 23 of 2001)

**KIBALI CHA KUUZA KAHAWA MNADANI**

MKUMBI GROUP  
S. L. P. 10,  
MBINGA

Kibali hiki kimetolewa kwa mtajwa hapo juu kuruhusiwa kuleta kahawa safi luzwa kwenye minada ya kitalfa, msimu 2013/2014.

Kadiri ya masharti yaliyopo nyuma ya kibali hiki na kwa kuzingatia sheria ya kahawa Na.23 ya mwaka 2001.

Kimetolewa Tarehe: 30 Julai, 2013

Kitalsha Tarehe: 31 Machi, 2014

Saini.....

**MKURUGENZI MKUU**

**TANZANIA COFFEE BOARD**  
DIRECTOR GENERAL

Tarehe.....

30<sup>th</sup> July 2013



## Appendix 5: Household questionnaire

### Questionnaire for assessing effectiveness of warehouse receipt system in enhancing coffee marketing environment in Mbinga District, Tanzania

I'm currently doing a study on the effectiveness of warehouse receipt system in enhancing coffee marketing environment and improvement of coffee production of a farmer. You have been randomly selected to participate in this study which is voluntary and answers provided by a respondent will not be assessed in terms of being wrong or correct. The information collected will only be used for the purpose of the study and not otherwise.

#### Section A: General information

1. Questionnaire No:.....
2. Date of Interview:.....
3. Name of Enumerator/Interviewer.....
4. Name of Respondent/ Interviewee.....
5. Ward:.....
6. Village:.....

#### Section B: Household profile

7. Is the respondent male or female (do not ask just tick) 0 = Female [ ], 1 = Male [ ]
8. Age of the respondent.....(in years)
9. Is the respondent the head of the household? (Tick) 1 = Yes [ ], 0 = No [ ]
10. How many are you in the family. By this we mean, how many people eat and sleep in this household? (household size) .....(Number)
11. How many meals do your family take per day? (tick)

|        |  |         |  |         |  |
|--------|--|---------|--|---------|--|
| 1 meal |  | 2 meals |  | 3 meals |  |
|--------|--|---------|--|---------|--|

12. Education of the respondent (years spent in school) (Tick)

- (a) 0 year = Informal education ☐
- (b) 1-7 years = primary school education ☐
- (c) 8-11 years = Ordinary level secondary school education ☐
- (d) 12-13 years = Advanced level secondary school education/post-ordinary level secondary school education certificate level training ☐
- (e) 14-15 years = Diploma ☐
- (f) 16-above = Degree or equivalent level ☐

13. What is the present marital status of the respondent? (tick)

- (a) Married.....1 ☐
- (b) Divorced.....2 ☐
- (c) Separated .....3 ☐
- (d) Widow or widower.....4 ☐
- (e) Single.....5 ☐

14. Do you cultivate coffee? (Tick) 1= Yes [ ], 0 =No [ ] if the answer is "yes" then answer question 13.

15. What is the coffee farm size and amount of coffee harvested?

| Years                    | 2011/2012 | 2012/2013 | Average harvest per hectare<br>(calculated) |
|--------------------------|-----------|-----------|---|
| Hectare cultivated       |           |           |   |
| Coffee harvested<br>(kg) |           |           |   |

**Note:** Average yearly harvest per hectare of coffee is 650 kg of green bean. However, it is possible that this could range between 500 kg to 1000 kg.

16. In coffee farming do you use irrigation system throughout the year? (Tick)

1= Yes [ ], 0 =No [ ]

17. As a coffee farmer do you receive extension services from Mbinga District, Agricultural, Irrigation and Cooperative Office? (Tick) 1= Yes [ ], 0 = No [ ]

18. In coffee farming; what are the peak months that involve a household to have all day time attendance in the coffee farms? From .....to..... Total days.....

**Section C: WRS characteristics and active participation of farmers in WRS coffee marketing channel**

19. Is the respondent a member of any of farmers' organisations (AMCOS, or farmers' groups)?

|    | Variable                         | (Tick) |
|----|----------------------------------|--------|
| 1. | AMCOS                            |        |
| 2. | Farmers' group                   |        |
| 3. | Neither AMCOS nor Farmers' group |        |

20. If the answer in question 17 is "a member of any of farmers' organisation", when did you join the farmers' organisations (AMCOS, or farmers' groups)? (*Delete any inapplicable farmers' organisation*).....(year)

21. Mention the benefits of being a member in farmers' organisations (AMCOS, farmers groups) ? Delete inapplicable association (Tick)

|    |                        |  |    |                                    |  |
|----|------------------------|--|----|------------------------------------|--|
| a. | Easy to market coffee  |  | d. | Easy to negotiate for better price |  |
| b. | Easy to acquire inputs |  | e. | Able to store coffee               |  |
| c. | Easy to acquire credit |  | f. | Others (specify).....              |  |

22. Do you know WRS? 1= Yes [ ], 0 =No [ ] if the answer is "yes" then answer question 21.

23. If the answer in question 21 is "yes" how did you know WRS? Through

|    | Variable  | (Tick) |
|----|---|--------|
| a. | Farmers' organisation (AMCOS, Farmers' group, SACCOS) |        |
| b. | Newspapers  |        |
| c. | Radio   |        |
| d. | Television  |        |
| d. | Friends/neighbours/meetings                           |        |
| e. | Others (please specify.....)                          |        |

24. When did you start using WRS channel in marketing your coffee?.....year

25. Are you still using WRS in marketing your coffee? (Tick)

|   |     |  |
|---|-----|--|
| 1 | Yes |  |
| 0 | No  |  |

26. If the answer in question 23 above is "YES" What are the benefits of using WRS?

(tick) 1. Marketing ☐ 2. Credit Access ☐ 3. Access to farm inputs ☐ 4. Income ☐

27. If the answer in question 23 above is "NO" when did you stop using it.....(year)?

28. If the answer in question 23 above is "NO" What are the problems or disadvantages of using WRS? (Tick) 1. Competition of coffee price between AMCOS and individual buyers ☐ 2. Delay of coffee payments from AMCOS ☐ 3. Limited capital to AMCOS ☐

29. Do you intend to reuse WRS? (Tick)

|   |     |  |
|---|-----|--|
| 1 | Yes |  |
| 2 | No  |  |

30. If the answer in question 24 above is "YES" Why and in which ways the WRS could be improved (a) Why do need to re-use WRS?.....

(b) In which ways could the WRS be improved? (Tick) 1. Access to credit ☐

2. Access to farm inputs ☐

31. What are the main service (s) does WRS provide? (Tick)

|   |                       |  |   |                              |  |   |                               |  |
|---|-----------------------|--|---|------------------------------|--|---|-------------------------------|--|
| 1 | Storage facility      |  | 2 | Collateral provision         |  | 3 | Access to farm input services |  |
| 4 | Access to Credit      |  | 5 | Access to Market             |  | 6 | Others (Specify)              |  |
| 7 | Price risk mitigation |  | 8 | Access to market information |  |   |                               |  |

32. If the answer in question 20 is "yes" how did you use WRS? (Multiple answers are allowed)

|    | Variable  | (Tick) |
|----|---|--------|
| 1. | To get collateral for obtaining credit from banks |        |
| 2. | To sell coffee                                    |        |
| 3. | To obtain farm inputs                             |        |
| 4. | To access coffee market information               |        |
| 5. | None of the above (explain.....)                  |        |

33. How would you rate the performance of WRS in the following areas (Please tick)

|      |              | Neutral/<br>no<br>opinion<br>(1) | Never<br>satisfied<br>(2) | Not<br>usually<br>satisfied<br>(3) | Usually<br>satisfied<br>(4) | Always<br>satisfied (5) |
|------|--------------|----------------------------------|---------------------------|------------------------------------|-----------------------------|-------------------------|
| QNI. | Marketing of |                                  |                           |                                    |                             |                         |

|      |  |  |  |  |  |  |
|------|--|--|--|--|--|--|
|      | coffee?  |  |  |  |  |  |
| QN 2 | Negotiating for better price of coffee in auction? |  |  |  |  |  |
| QN 3 | Access to farm inputs?                             |  |  |  |  |  |
| QN 4 | Acquiring credit?                                  |  |  |  |  |  |
| QN 5 | Storage of coffee?                                 |  |  |  |  |  |
| QN 6 | Farmers' participation                             |  |  |  |  |  |

34. Which marketing channel did you use? (Tick)

| Marketing Channel used   | Years     |           |
|--|-----------|-----------|
|  | 2011/2012 | 2012/2013 |
| (1) AMCOS through Warehouse receipt system (WRS)                                     |           |           |
| (2) Farmers' group through Warehouse receipt system (WRS)                            |           |           |
| (3) Existing/conventional /traditional (through traders, local brokers or middlemen) |           |           |
| (4) Others (mention).....  |           |           |

35. How do you select a channel to sell your coffee? By observing on how (Tick)

|    |  |  |    |  |  |
|----|--|--|----|--|--|
| 1. | Easy to get collateral for bank credit application |  | 5. | Easy to participate in coffee market chain |  |
| 2. | Best coffee price is offered to the farmers        |  | 6. | Easy to obtain coffee market information   |  |
| 3. | Easy to get farm inputs                            |  | 7. | Easy to get coffee storage facilities      |  |
| 4. | Others (specify).....                              |  |    |  |  |

36. If the answer in question 29 was marketing channel of AMCOS or Farmers' group through WRS. What motivated you to use WRS? Multiple answers are allowed (Tick)

|  |   |   |   |
|--|---|---|---|
| 1. <input type="checkbox"/> Storage facilities | 2. <input type="checkbox"/> Collateral availability | 3. <input type="checkbox"/> Credit access                 | 4. <input type="checkbox"/> Farm input services |
| 5. <input type="checkbox"/> Market information | 6. <input type="checkbox"/> Price risk mitigation   | 7. <input type="checkbox"/> None of the mentioned reasons |   |
| (Explain).....                                 |   |   |   |



37. How much of the coffee was sold through each of the channels mentioned in Qn. 29

| Coffee sold in marketing Channel of:                                      | 2011/2012           |  | 2012/2013           |  |
|---|---------------------|--|---------------------|--|
|   | Coffee sold in (kg) | Ratio of coffee (Sold/harvested) (refer data in Qn 14) | Coffee sold in (kg) | Ratio of coffee (Sold/harvested) (refer data in Qn 14) |
| (QN 1) AMCOS through Warehouse receipt system (WRS)                       |                     |  |                     |  |
| (QN 2) Farmers' group through Warehouse receipt system (WRS)              |                     |  |                     |  |
| (QN 3) Existing/traditional (through traders, local brokers or middlemen) |                     |  |                     |  |
| Others (mention)  |                     |  |                     |  |
| <b>Total</b>  |                     |  |                     |  |

38. What was the average price of coffee per kilogramme offered in the marketing channel of?

| Marketing Channel   | Season-2011/2012 |                               | Season-2012/2013 |                               |
|---|------------------|-------------------------------|------------------|-------------------------------|
|   | Price per kg     | Revenue (price x coffee sold) | Price per kg     | Revenue (price x coffee sold) |
| (a) AMCOS through Warehouse receipt system (WRS)                      |                  |                               |                  |                               |
| (b) Farmers' group through Warehouse receipt system (WRS)             |                  |                               |                  |                               |
| (c) Conventional system (through traders, local brokers or middlemen) |                  |                               |                  |                               |
| Others (mention).....   |                  |                               |                  |                               |
| <b>Total revenue</b>  |                  |                               |                  |                               |



39. Do you get information on the coffee auction price per kg in a particular coffee harvesting zone? 1= Yes [ ], 0 =No [ ] if the answer is “yes” then answer question 35.

40. What was the average price of coffee per kilogramme at the auction?

| Season-2011/2012 |  | Season-2012/2013 |  |
|------------------|--|------------------|--|
| Price per kg     |  | Price per kg     |  |

41. When do you sell your coffee? (Tick)

- i. Before harvesting [ ]
- ii. Immediately after harvest [ ]
- iii. You wait for higher price [ ]
- iv. You already had a deal before harvest [ ]

42. If you sell your coffee before harvest, where do you sell it? 1. AMCOS

2. Farmers' group 3. Private buyers

43. Have you heard about *magoma system* in coffee selling? 1= Yes [ ], 0 =No [ ] if the answer is “yes” then answer question 39

44. Does *magoma system* still exist in your village? 1= Yes [ ], 0 =No [ ] if the answer is “yes” then answer question 43

45. What are the major reasons of using *magoma system* in coffee selling?

.....

46. Do you grade your coffee? 1=Yes [ ] 0 = No [ ]

47. If yes, what are the criteria for grading? (Tick)

- i. Moisture Contents (For storage.....%).....[ ]
- ii. Cleanness (foreign materials-stones) .....[ ]
- iii. Variety .....[ ]
- iv. Others (Specify).....[ ]

48. Which marketing channel in question 32 above demands grading of the coffee? (Tick)

|  |  |
|--|--|
| (1) AMCOS through Warehouse receipt system (WRS)                       |  |
| (2) Farmers' group through Warehouse receipt system (WRS)              |  |
| (3) Existing/traditional (through traders, local brokers or middlemen) |  |

49. Which Marketing channel do you prefer? (Tick)

|  |  |
|--|--|
| (1) AMCOS through Warehouse receipt system (WRS)                       |  |
| (2) Farmers' group through Warehouse receipt system (WRS)              |  |
| (3) Existing/traditional (through traders, local brokers or middlemen) |  |
| (4) Others (mention)   |  |

50. Why do you prefer to sell your coffee through the marketing channel chosen in question 32 above?

| Reasons                          | Ranking (1, 2, 3, 4 and 5) |
|----------------------------------|----------------------------|
| Higher price                     |                            |
| Can bargain for price            |                            |
| Acquire credits                  |                            |
| Can store coffee for later sales |                            |
| Others (mention).....            |                            |

51. Why are you not satisfied with the marketing channel you have not chosen/preferred in question 32 above? Give reasons (Tick) (Multiple answers are allowed)

|   |  |
|---|--|
| Removing many instalments system of payments          |  |
| Timely availability of collateral and credit          |  |
|   |  |
| Early payments  |  |
| Education to farmers about the system                 |  |
| Accountability of CBT, AMCOSs, Farmers Groups leaders |  |
| Timely availability of inputs                         |  |

52. Is the current market price of coffee for season 2013/2014 known? (Put response)

1=Yes, 0=No

|  |  |
|--|--|
| (a) AMCOS through Warehouse receipt system (WRS)                                     |  |
| (b) Farmers' group through Warehouse receipt system (WRS)                            |  |
| (c) Existing/conventional /traditional (through traders, local brokers or middlemen) |  |
| (d) Others (specify).....  |  |

53. Is the current world market price of coffee for 2013/2014 season known? (Tick)

1=Yes [ ] 0 = No [ ]

54. If the answer in question 48 is "yes" How long in advance had you known the coffee prices in the market? .....Days/Months

55. If the answer in question 48 is "no" What could the reasons:

|    | variable   | (Tick) |
|----|--|--------|
| a. | Lack of Farmers' associations (AMCOS, Farmers' group, SACCOS) meetings |        |
| b. | Lack of newspapers   |        |
| c. | Other reasons (explain.....)   |        |

56. Where do you get coffee market information? (Tick)

|   |                                |  |   |   |  |   |  |  |
|---|--------------------------------|--|---|---|--|---|--|--|
| 1 | Friends, Family and neighbours |  | 3 | Farmers' associations (AMCO/Farmers' group) |  | 5 | Banks providing loans (CRDB, NMB, MCB) |  |
| 2 | Government agencies            |  | 4 | WRS Warehouse operators                     |  | 6 | Others (Specify).....                  |  |

57. What market information do you get? (Tick)

|   |        |  |   |                      |  |   |                       |  |
|---|--------|--|---|----------------------|--|---|-----------------------|--|
| 1 | credit |  | 3 | price                |  | 5 | Others (Specify)..... |  |
| 2 | input  |  | 4 | Where to sell coffee |  |   |                       |  |

58. Which theme do you consider most important in market information? (Rank i.e 1, 2, 3 etc)

|                      | Rank |                              | Rank |                       | Rank |
|----------------------|------|------------------------------|------|-----------------------|------|
| Selling price        |      | Place to purchase input      |      | Others (Specify)..... |      |
| Place to sell coffee |      | Place to acquire credit/loan |      |                       |      |

59. How do you contact the buyers? (Tick)

|     |  |  |    |                          |  |
|-----|--|--|----|--------------------------|--|
| i   | Visiting Warehouse/Warehouse operators |  | ii | Banks (CRDB, NMB OR MCB) |  |
| iii | Visiting coffee milling/curing centres |  | iv | Others (Specify).....    |  |

60. Did you know who will buy your before the coffee is harvested in (2011/2012 or 2012/2013)? (Tick)

|     | Years (Season) |           |
|-----|----------------|-----------|
|     | 2011/2012      | 2012/2013 |
| Yes |                |           |
| No  |                |           |

61. Do you normally store your coffee in WRS warehouse for later sales in the season? (Tick)

|     |  |
|-----|--|
| Yes |  |
| No  |  |

62. If the answer in question 54 is "yes" where do you store your coffee? (Tick)

|                       |  |
|-----------------------|--|
| Warehouse/Hired store |  |
| Own store             |  |
| Others (specify)..... |  |

63. How long did you store the coffee in WRS warehouse for?

|           |             |
|-----------|-------------|
| 2011/2012 | .....months |
| 2012/2013 | .....months |

#### Section D: WRS impacts in coffee marketing environment

64. Access your perception on WRS services delivery (tick)

|   | Variable                                  | Good | Moderate | Poor |
|---|---|------|----------|------|
|   |   | 1    | 2        | 3    |
| A | Availability of coffee storage facilities |      |          |      |
| B | Farm inputs credit                        |      |          |      |
| C | Marketing of coffee                       |      |          |      |

65. What are the usefulness of the WRS? (tick)

|   |  |  |
|---|--|--|
| A | Availability of coffee storage facilities  |  |
| B | Farmers' provision of collateral to apply for credit from financial institutions (NMB, CRDB, MCB and SACCOS) |  |
| C | Linkages of farmers with financial institutions (NMB, CRDB, MCB and SACCOS) on credit accessibility          |  |
| D | Formal coffee marketing system (market channel)  |  |
| E | Participation in coffee auction  |  |
| F | Collateral availability  |  |
| G | Farm inputs accessibility  |  |
| H | Increase in coffee production  |  |
| I | Improved coffee price  |  |
| J | Improved income  |  |
| K | Improved farming input/Technology  |  |
| L | Access to storage facility   |  |
| M | Others (specify).....  |  |

66. Access your perception on WRS services delivery

|   |   | Good | Moderate | Poor |
|---|---|------|----------|------|
|   |   | 1    | 2        | 3    |
| A | Availability of coffee storage facilities |      |          |      |
| B | Farm inputs credit                        |      |          |      |
| C | Marketing of coffee                       |      |          |      |



67. What are the reasons for underperformances of the WRS? (Tick) 1=Yes, 0=No. Give explanations regarding your response in (QN10)

|       |   |  |
|-------|---|--|
| QN 1  | Non availability of coffee storage facilities   |  |
| QN 2  | Non farmers' demand/need for collateral to apply for credit from financial institutions (NMB, CRDB, MCB and SACCOS) |  |
| QN 3  | Non linkages of farmers with financial institutions (NMB, CRDB, MCB and SACCOS) on credit accessibility             |  |
| QN 4  | Non formal coffee market information systems  |  |
| QN 5  | Non participation in coffee auction   |  |
| QN 6  | Non collateral availability   |  |
| QN 7  | Non-farm inputs accessibility   |  |
| QN 8  | No increase in coffee production  |  |
| QN 9  | Non improved coffee price   |  |
| QN 10 | Non improved income   |  |
| QN 11 | Non access to credit  |  |
| QN 13 | Non improved farming input/Technology   |  |
| QN 14 | Non access to storage facilities  |  |
| QN 15 | Others (specify).....   |  |

#### Section E: Effects of WRS on enhancing credit access among coffee farmers

68. Did you really have a need of getting collateral from WRS for loan application to financial institutions?

| Years (Season) |     |           |           |
|----------------|-----|-----------|-----------|
|                |     | 2011/2012 | 2012/2013 |
| 1              | Yes |           |           |
| 2              | No  |           |           |

69. Did you apply for farm inputs credit for the past two harvesting seasons-2011/2012, 2012/2013 or both seasons? If the answer is "YES" go to question 68 and if "NO" go to question 63

| Years (Season) |     |           |           |
|----------------|-----|-----------|-----------|
|                |     | 2011/2012 | 2012/2013 |
| 1              | Yes |           |           |
| 2              | No  |           |           |

70. If the answer in question 67 is "YES", did you receive farm inputs credit/loan? (Tick)

| Years (Season) |           |           |
|----------------|-----------|-----------|
|                | 2011/2012 | 2012/2013 |
| Yes            |           |           |
| No             |           |           |

71. If the answer in question 68 is "YES", please fill or tick in the following information.

| Season    | WRS agro inputs credit through |                 | Monetary value of agro inputs (Amount of agro inputs received * sellers' price) |             |             |              |  |
|-----------|--------------------------------|-----------------|---|-------------|-------------|--------------|--|
|           | AMCOS                          | Farmers' groups | Through WRS by AMCOS and farmers' groups  |             |             | Total (Tshs) | Other sources                                |
|           |                                |                 | Fertilisers (bags)  | Fungi cides | pesti cides |              |  |
| 2011/2012 |                                |                 |   |             |             |              | Fertilisers =<br>Fungicides=<br>Pesticides = |
| 2012/2013 |                                |                 |   |             |             |              |  |

72. If the respondent answered question 69, what was the repayment procedure? (Tick)

| 2011/2012 |         |  |   | 2012/2013 |  |   |                       |
|-----------|---------|--|---|-----------|--|---|-----------------------|
| 1         | In cash |  | 2 | In Kind   |  | 3 | Others (Specify)..... |

73. What is the distance from your area of residence to the credit provision institution?

.....km

74. If you did not apply for credit what were the main reasons? (Tick)

| Years (Season) |                                    |                 |      |                 |      |
|----------------|------------------------------------|-----------------|------|-----------------|------|
|                |                                    | QN<br>2011/2012 | Tick | QN<br>2012/2013 | Tick |
| 1              | Not aware of credit availability   |                 |      |                 |      |
| 2              | Lack of credit facilities          |                 |      |                 |      |
| 3              | High amount of loan repaid         |                 |      |                 |      |
| 4              | Low income rate obtained from crop |                 |      |                 |      |
| 5              | High risk                          |                 |      |                 |      |
| 6              | Long distance to credit facilities |                 |      |                 |      |
| 7              | Others (Specify)                   |                 |      |                 |      |

75. Was there any increase in coffee yield after borrowing from the bank through WRS compared to before borrowing? (tick)

|     |  |    |  |
|-----|--|----|--|
| Yes |  | No |  |
|-----|--|----|--|

76. Since you joined the WRS, how many times have you borrowed from bank through WRS?



77. What are your opinions on improving WRS in general?.....

|  |  |
|--|--|
| Removing many instalments system of payments                     |  |
| Timely availability of collateral and credit                     |  |
| Early payments   |  |
| Education to farmers about the system                            |  |
| Accountability of CBT, AMCOSs, Farmers Groups leaders            |  |
| Timely availability of inputs                                    |  |
| Active participation of AMCOSs leaders in the auctioning process |  |

78. Opinions on the use of income accrued from the selling of coffee

|   |  |
|---|--|
| Used for education of children                        |  |
| Used to develop income earning projects               |  |
| Marriage of new wives (polygamy)                      |  |
| Improving houses                                      |  |
| Buying cars/motorcycles or bicycles                   |  |
| Purchase of farm inputs (fertilizers, pesticides etc) |  |

*THANK YOU FOR YOUR COOPERATION*

**Appendix 6: Interview guide for focus group discussion**

| S/N   | Community initiate process for coffee marketing channels and WRS   |
|---|--|
| 1   | Evolution of coffee marketing channels and processes involved  |
| 2   | Does WRS operate differently from the past existed system?   |
| 3   | Importance of WRS from community point of view   |
| 4   | Indicators of effectiveness of WRS in enhancing coffee marketing   |
| 5   | Whether there was sufficient preparation of community members (coffee farmers) to make them ready to receive WRS as enhancement tool in coffee marketing |
| 6   | Whether there was a road map set by stakeholder in WRS operation in facilitating coffee marketing environment  |
| 7   | Elements to be considered in the plan for WRS operations and link with coffee marketing enhancement  |
| <b>Degree of community participation in WRS and coffee marketing channels</b> |  |
| 8   | If at all there is active participation of coffee farmers in WRS and coffee marketing channel  |
| 9   | If there is a habit of coffee farmers to seek and share information and knowledge on WRS and coffee marketing channel                                    |
| 10  | Establish linkage between WRS and coffee marketing channel   |
| 11  | Proportion of community contribution in WRS and marketing channel  |
| 12  |  |
| <b>Effectiveness of WRS in enhancing coffee marketing environment</b>         |  |
| 13  | Willingness of community to participate in WRS and coffee marketing channel  |
| 14  | Degree of enforcement of laws and regulations regarding WRS  |
| 15  | Degree of success and challenges with regard to WRS goal attainment (collateral, credit, and coffee market participation)                                |

**Appendix 7: Interview guide for key informants**

| S/N | Community definition of WRS, benefits, challenges and perception   |
|-----|--|
| 1   | Indicators of WRS effectiveness  |
| 2   | Importance of WRS  |
| 3   | Practical evidence of effectiveness of WRS   |
| 4   | Consequences experienced by coffee farmers community as a result of WRS operations and function in the area of study |
| 5   | Current status of WRS in facilitating credit, storage and marketing  |
| 6   | Adverse effects due to non-enhancement of WRS in coffee marketing  |

**Appendix 8: Interview guide for warehouse operators**

| S/N | Community definition of WRS, benefits, challenges and perception   |
|-----|--|
| 1   | Main services that warehouses provide  |
| 2   | How warehouses facilitate credit accessibility?  |
| 3   | What relationships exist among coffee farmers, warehouses and commercial banks in facilitating coffee marketing? |
| 1   | Indicators of WRS effectiveness from warehouse operators' view point   |
| 2   | Importance of warehouses   |
| 3   | Practical evidence of effectiveness of WRS from warehouse operators' view  |

|   |  |
|---|--|
|   | point  |
| 4 | Consequences experienced by coffee farmers community as a result of warehouse operations and function in the area of study |
| 5 | Current status of warehouses in facilitating marketing of coffee   |

#### Appendix 9: Interview guide for commercial banks (CRDB, NMB and MCB)

| S/N                         | Provision of credit to coffee farmers  |
|-----------------------------|--|
| 1                           | How do commercial banks provide loans/credits to farmers?  |
| 2                           | What are the interest rates and variations amongst banks?  |
| 3                           | What types of collateral are accepted for credit provision to coffee farmers?                          |
| 4                           | Do coffee farmers repay the loan? What are the risks associated with loan provision to coffee farmers? |
| <b>Credit accessibility</b> |  |
| 5                           | Means by which the coffee farmers obtain credit  |
| 6                           | Attributes that enable some coffee farmers to access financial credit?                                 |
| 7                           | Categories of people who are eligible to access financial credit                                       |
| 8                           | Effectiveness of WRS from commercial bank's view point   |

#### Appendix 10: Interview guide for AMCOS and farmers' groups

| S/N                          | General awareness about warehouse receipt system  |
|------------------------------|---|
| 1                            | Meaning of warehouse receipt system according to the discussants' understanding               |
| 2                            | Factors for a household to participate in warehouse receipt system in area of the discussants |
| <b>Marketing environment</b> |   |
| 7                            | Factors influencing marketing environment   |
| 8                            | How is the traditional coffee marketing system operating?                                     |
| 9                            | What are the major marketing problems in coffee industry?                                     |
| 10                           | Does WRS operate differently from traditional coffee marketing system?                        |
| 11                           | What are the benefits/disadvantages of using WRS?   |
|                              | Do you think WRS can create a marketing environment to solve poor coffee price? How?          |
| <b>Credit accessibility</b>  |   |
| 12                           | Means by which the coffee farmers obtain credit   |
| 13                           | Attributes that enable some coffee farmers to access financial credit?                        |
| 14                           | Categories of people who are eligible to access financial credit                              |

## Appendix 11: Coffee curing statement certificate

P O BOX 127  
MBINGACURING STATEMENT  
(SEASON 2013/2014)NAME: MAHENGE AMCOS (CRDB BANK - PLC)  
ESTATE: STACK NO.02DATE 16/11/2013  
OUTTURN: NO.109/1425

FLO CERTIFIED COFFEE

CLASS 5

| Receipt No. | No. of Bags | Net Weight(kg) | Grade | Remarks |
|-------------|-------------|----------------|-------|---------|
|             |             |                |       |         |
| G/TOTAL     | 2,341       | 114,668        | CPU   |         |

| Grade   | Bags  | Kgs    | Pocket | Kgs    | % of Total | Bulk No. | Sale No. |
|---------|-------|--------|--------|--------|------------|----------|----------|
| PB      | 100   | 6 000  | 53     | 6 053  | 6.42       |          |          |
| AAA     |       |        |        |        |            |          |          |
| AA      | 690   | 41,400 | 41     | 41,441 | 43.97      |          |          |
| A       | 445   | 26,700 | 32     | 26,732 | 28.36      |          |          |
| B       | 222   | 13,320 | 27     | 13,347 | 14.16      |          |          |
| C       | 82    | 4,920  | 34     | 4,954  | 5.26       |          |          |
| E       |       |        |        |        |            |          |          |
| AF      | 9     | 540    | 20     | 560    | 0.59       |          |          |
| TT      | 6     | 360    | 10     | 370    | 0.39       |          |          |
| F       | 13    | 780    | 10     | 790    | 0.84       |          |          |
| HP      |       |        |        |        |            |          |          |
| TEX     |       |        |        |        |            |          |          |
| UG      |       |        |        |        |            |          |          |
| Samples |       |        |        | 8      | 0.01       |          |          |
| TOTAL   | 1,567 | 94,020 | 227    | 94,255 | 100.00     |          |          |

17.80% LOSS IN CURING

Average Moisture Content 10%

Curing, Bulking, etc  
Collateral Fee  
Sisal Export Bags Used  
Handpicking

|                     |   |     |          |
|---------------------|---|-----|----------|
| 114,964 kgs @ 0.065 | = | USD | 7,472.66 |
|                     |   | USD |          |
|                     |   | USD |          |
| 41 bags @ 1.86      | = | USD | 76.26    |
| SUB TOTAL           |   | USD | 7,548.92 |
| VAT 18%             |   | USD | 1,358.81 |
| GRAND TOTAL         |   | USD | 8,907.73 |

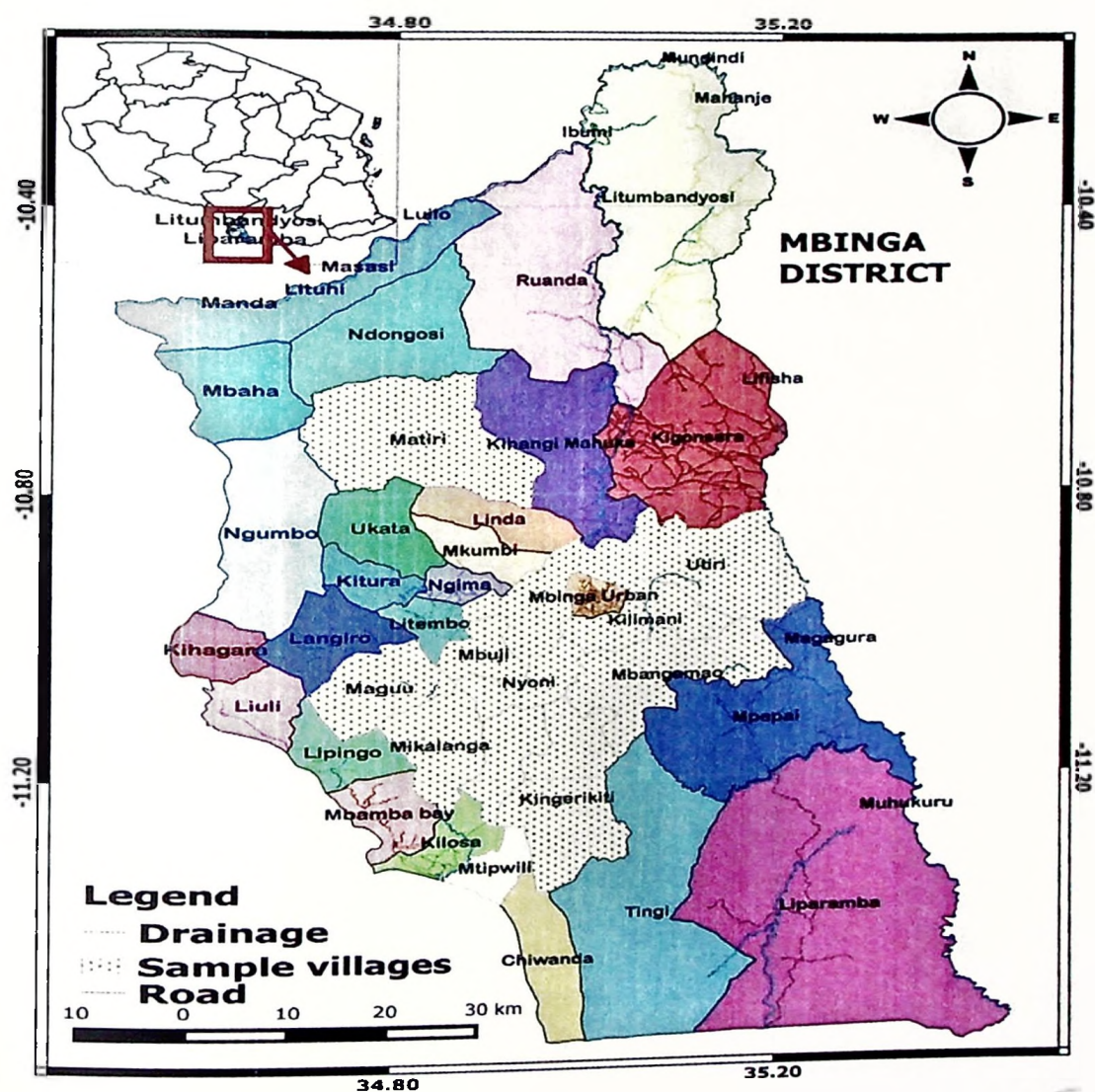
FINANCE &amp; ADMN. MANAGER

PRODUCTION MANAGER

PREPARED BY  
STATISTICIAN



Appendix 12: Map of the study area



SPE  
 HD9199  
 A2  
 M36  
 2018