

**ECONOMIC ASSESSMENT OF THE WAREHOUSE RECEIPT SYSTEM FOR
CASHEW NUT MARKETING IN MTWARA REGION, TANZANIA**

BY

JUMA YUSUPH

**A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE
REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN
AGRICULTURAL ECONOMICS OF SOKOINE UNIVERSITY OF
AGRICULTURE. MOROGORO, TANZANIA**

ABSTRACT

The study to assess the economics of the Warehouse Receipts System (WRS) for cashew nut marketing was conducted in Mtwara region, in southern Tanzania. Three districts namely: Masasi, Newala, and Nanyumbu were randomly selected. A cross sectional survey was conducted to collect primary data from 90 farmers, 30 primary cooperative societies, three bank institutions, six exporters, six processors, and three input suppliers. Secondary data were secured from CBT, TANECU, MAMCU, MDC, NDC₁ and NDC₂. Descriptive and quantitative analytical techniques were employed. The findings indicate that the profit accrued from cashew nut marketing was highest for banks followed by processors and third exporters. Primary cooperative societies ranked fourth followed by input suppliers. The last were farmers. The profitability of cashew nuts between the key players was statistically significantly different ($P < 0.05$). The socio-economic factors: age of the farmer, size of the household labour, experience in cashew nut production, distance from the cashew nut farm, and the age of cashew nut trees were the factors affecting cashew nut profitability at farmer level and were statistically significant different ($P < 0.05$). Reasons behind the fact that the farm gate price is being paid in instalments were: little (65%) government guarantee, and high interest rates charged by the banks. Constraint impairing cashew nut marketing through the WRS was lack of training on the WRS to all key players. Thus, the study recommends training on the WRS should be provided to all key players to ensure their trust in the system. Moreover, the government should increase the guarantee to 100% so that the bank can reduce the interest rates and enable farmers to raise profit from cashew nut production.

DECLARATION

I, **JUMA YUSUPH**, do hereby declare to the Senate of Sokoine University of Agriculture that this dissertation is my original work and has neither been nor being concurrently submitted for a higher degree award in any other institution.

Juma Yusuph
(MSc. Candidate)

Date

The declaration is confirmed.

Prof. Andrew E. Temu
(Supervisor)

Date

COPYRIGHT

No part of this dissertation may be reproduced, stored in any retrieval system, or transmitted in any form or by any means; electronic, mechanical, photocopying, recording or otherwise without prior written permission of the author or Sokoine University Agriculture in that behalf.

ACKNOWLEDGEMENTS

“Gratitude makes sense of our past, brings peace for today, and creates a vision for tomorrow”. First and foremost, I wish to express my profound gratitude and sincere appreciation to my supervisor Prof. A. E. Temu for his tireless guidance, suggestions and comments throughout to the completion of this study. I also appreciate my supervisor, the late Prof. G. C. Ashimogo, during the initial preparation of this study. He played a unique role in shaping the focus of the study.

I would like to acknowledge the Cashew nut Board of Tanzania for providing financial support during the field work. Thanks are also due to the member of parliament of Nanyumbu constituency Mr. D. D. Mkapa, together with his driver Mr. P. S. Matutu, for their transport support during the survey.

Furthermore, I would like to extend my appreciation to the District Commissioner of Masasi, District Executive Directors of Newala and Nanyumbu, TANECU accountant, CBT director of marketing and marketing information services, NMB Masasi and Newala branch managers, Sr. Felisiana Mrope for their assistance during the survey.

It is obvious that the study of this nature can not be completed successfully without the assistance of many individuals. Therefore, I would like to extend my gratitude to all individuals who have not been mentioned for their assistance in the course of the study.

DEDICATION

To parents: my mother Esha Bakari and my father the late Yusuph Nassoro, who put the foundation of my education, and Mr. Dunstan Daniel Mkapa, who brought me to this level.

TABLE OF CONTENTS

LIST OF APPENDICES.....x

LIST OF TABLES

Table 1: Distribution of respondents in Mtwara region by three districts.....	43
Table 2: Characteristics of the farmers.....	53
Table 3: Characteristics of the primary cooperative societies.....	56
Table 4: Characteristics of the banking institutions.....	57
Table 5: Characteristics of the exporters.....	58
Table 6: Characteristics of the processors.....	59
Table 7: Characteristics of the input suppliers.....	60
Table 8: Gross margins of the key players under the WRS.....	64
Table 9: Farmers' gross margin analysis.....	65
Table 10: Primary cooperative societies' gross margin.....	66
Table 11: Bank institutions' gross margin analysis.....	66
Table 12: Exporters' gross margin analysis.....	67
Table 13: Processors' gross margin analysis.....	68
Table 14: Input suppliers' gross margin analysis.....	68
Table 15: Multiple comparisons of GM under the WRS.....	71
Table 16: Dependent variable: Average gross margin value.....	72
Table 17: Reasons behind the farm gate price being paid in instalments.....	76
Table 18: Constraints faced by farmers.....	77
Table 19: Constraints faced by the primary cooperative societies.....	79
Table 20: Constraints faced by banking institutions.....	80
Table 21: Constraints faced by exporters.....	81
Table 22: Constraints faced by processors.....	82
Table 23: Constraints faced by input suppliers.....	83

LIST OF FIGURES

Figure 1: Primary key players21

Figure 2: Warehouse receipt system.....23

Figure 3: Conceptual framework of WRS for cashew nut marketing.....42

Figure 4: Functioning of the WRS for cashew nut marketing.....63

Figure 5: Prove of the absence of serious multicollinearity.....74

LIST OF APPENDICES

Appendix 1: Farmer's questionnaire.....97

Appendix 2: Checklists of questions.....102

LIST OF ABBREVIATIONS AND ACRONYMS

ANOVA	-	Analysis Of Variance
ATM	-	Automated Teller Machine
BoT	-	Bank of Tanzania
CATA	-	Cashew nut Authority of Tanzania
CBT	-	Cashew nut Board of Tanzania
CFC	-	Common Fund for Commodities
CMA	-	Collateral Management Agreements
CP	-	Certificate of Pledge
CRDB	-	Cooperative and Rural Development Bank
CT	-	Certificate of Title
ECGA	-	Eastern Cotton Growing Area
EWR	-	Electronic Warehouse Receipt
GM	-	Gross Margin
KNCU	-	Kilimanjaro Native Cooperative Union
LSD	-	Least Square Differences
MAFSC	-	Ministry of Agriculture Food Security and Cooperatives
MAMCU	-	Masasi Mtwara Cooperative Union
MCBA	-	Market Channel Baseline Analysis
MDC	-	Masasi District Council
MFI	-	Micro Finance Institutions
MP	-	Member of Parliament
NAC	-	National Advisory Committee
NAPB	-	National Agricultural and Products Board
NDC ₁	-	Newala District Council

NDC ₂	-	Nanyumbu District Council
NDSL	-	National Securities Depository Limited
NGO	-	Non Government Organisations
NMB	-	National Microfinance Bank
NRI	-	Natural Resource Institute
SAPB	-	Southern Agricultural Products Board
SNAL	-	Sokoine National Agricultural Library
SPSS	-	Statistical Package for Social Sciences
SRCB	-	Southern Region Cashew nut Board
TANECU	-	Tandahimba Newala Cooperative Union
TCMB	-	Tanzania Cashew nut Marketing Board
TR	-	Total Revenue
TRA	-	Tanzania Revenue Authority
TShs	-	Tanzanian Shillings
TVC	-	Total Variable Cost
UNCTAD	-	United Nations Conference on Trade
UNOPS	-	United Nations Office for Project Services
URT	-	United Republic of Tanzania
US	-	United States
USD	-	United States Dollar
WCGA	-	Western Cotton Growing Area
WR	-	Warehouse Receipt
WRS	-	Warehouse Receipt System

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information

Since 1980s, most countries over the world have liberalised agricultural markets. The outcomes of reforms in general have been rather disappointing and agricultural markets remain underdeveloped and inefficient. One way to improve agricultural marketing is to develop a regulated Warehouse Receipts System (WRS) (Coulter and Onumah, 2002).

Warehouse receipts (WR) were first used in Mesopotamia in 2400 (Budd, 2001) cited by Coulter and Onumah (2002). Port warehousing companies and freight forwarders have for long been involved in a relatively simple system, typically found in Africa, under which they offer warehouse without any regulatory authority over sight. In recent years, the local subsidiaries of international inspection companies have increased their involvement in WRS, taking advantage of opportunities created by liberalization of African commodity trade (Coulter and Onumah, 2001).

In Africa experience shows that WRS is under collateralised financing and is the most common model which has been developed around local subsidiaries of international inspection companies (Onumah, 2002). The inspection company sets up Collateral Management Agreements (CMA) involving banks, borrowers and a collateral manager; which allows depositors to secure bank credit. This model rests on the credibility of the collateral manager which is the inspection company acting as a warehouse operator. There are essential guidelines and critical conditions for its success. There have also been attempts by Non Government Organization (NGO) to establish inventory credit systems for small farmers groups, this being pioneered by TechnoServe in Ghana. TechnoServe's approach brought major and immediate benefits to participating farmers. But has not

proven economically suitable, because of the small volumes of grain involved, usually much less than 1000 tonnes of maize in a single year (Kwadjo, 2000) cited by Onumah (2002).

The WRS in Tanzania was introduced as a direct outcome of two related projects that were implemented together under the Ministry of Industry, Trade and Marketing; i.e. the coffee marketing development and trade promotion, and improvement of cotton marketing and trade system in Eastern and Southern Africa. The inauguration workshop for the two projects was done in September 2000 in Arusha and the project activities started immediately. A project was signed between the then Ministry of Agriculture and Cooperatives and the United Nations Office for Project Services (UNOPS). Whereby parties agreed to implement a warehouse receipt system in Tanzania as a pilot country and use two main cash crops (coffee and cotton) as pilot crops for a period of 36 months. Common Fund for Commodities (CFC) and the Government of Tanzania with UNOPS as an Executing Agency funded the project. The Natural Resource Institute (NRI) of the United Kingdom provided technical support to the local management unit of the project. The project was governed by the National Advisory Committee (NAC) composed of representatives from the government, and the coffee and cotton sub sectors. The NAC has a mandate to look at all matters related to the development of the WRS in Tanzania to ensure the developed model will conform to the government policy of poverty reduction.

1.2 Importance of Warehouse Receipt System

The system curtails cheating on weights and measures from which disadvantaged smallholders suffer, and also reduces storage losses. It eases access to finance at all levels in the marketing chain (producer, trader and processor levels), and encourages the injection of much needed liquidity. Trade margins are reduced and seasonal price

variations are moderated to the benefit of producers and consumers. Producers and other players are able to mitigate price risks and participate in a modern and more efficient agricultural trade (both locally and in the sub-region) with certified warehouse guaranteeing contract performance. Small producers are major beneficiaries, though the balance between direct and indirect benefits accrued has to be established through practical experience (Coulter and Onumah, 2002).

Further more, the WRS is an important contribution to improved agricultural commodity trade, reducing market instability and the political risks. Through encouraging a strong and efficient private trade, it reduces the role of government in agricultural markets. Where strategic food reserves need to be maintained, the WRS makes its management more cost-effective by reducing the organisational infrastructure and funding needed, as well as reducing rent-seeking by public officials (Onumah, 2002).

1.3 An Overview of Cashew nut Marketing in Tanzania

Marketing of cashew nuts in Tanzania has gone through several stages. Until 1962 when Southern Region Cashew nut Board (SRCB) was established, cashew nut trade (local and export) was carried out by a chain of private traders and merchants, from retail to wholesalers who acted as middlemen between the growers and buyers abroad. The role of the Board by then was to oversee the overall cashew nut marketing process. A wholesale had traders in the villages and towns as representatives. It was these representatives who hired truckers to transport the crop to the wholesalers who were the apex of the trading network, who in turn exported the product to India. The local merchants were in turn contracted by buyers in India to sell a specified consignment of cashew nuts at a mutually agreed upon price (Shoo, 1997).

In 1963, the SRCB became Southern Agricultural Products Board (SAPB). The Government of Tanzania amended the cooperative societies' ordinance, the result of which cooperatives were established even where there was no demand for them. It was also under this Act that in 1964 the National Agricultural and Products Board (NAPB), was established. The aim of NAPB was to handle, among other crops, cashew nut marketing. The board immediately appointed cooperative societies as its agents (middlemen). The cooperative societies (primary and secondary) were made monopoly buying agents of the statutory crops through a single channel marketing system. In such a system, the cooperatives had even the discretion to determine the prices of cashew nuts (Chachage and Nyoni, 2001).

Thus, from 1964, the cashew nut marketing system was organised as a pyramidal three-tier system with primary cooperatives at the bottom, the secondary cooperative societies in the middle and the NAPB at the top. After the NAPB has collected cashew nuts, it sold it at auctions in Dar es salaam. These auctions were attended by buyers from India or by their representatives based in Dar es salaam. Each auction attracted between 20 and 25 buyers. The buyers were required to pay 50% of their purchases direct at the auction; the remainder was to be paid up on shipment. The General Superintendents supervised shipment and performed quality control (Chachage and Nyoni, 2001).

By 1965, it was noted that the cooperatives were inefficient, corrupt and undemocratic in nature, and the farmers had lost control of them. This was the time when cashew nut marketing was being done under compulsory marketing order (URT, 1987).

In 1974, the NAPB's trading activities in cashew nuts were transferred to a newly established parastatal called the Cashew nut Authority of Tanzania (CATA). The

cooperative societies continued to act as primary buyers during an interim period, until 1976, when cooperative unions and societies were abolished (Chachage and Nyoni, 2001).

After the cooperative unions ceased to exist in 1976, a two-tier system was established consisting of villages officially called Multipurpose Cooperative Societies and CATA. CATA sought overdrafts for the purchase of cashew nuts and distributed money to the village Government. At the village level, local people employed by CATA purchased cashew nuts. Farmers were paid on the basis of weight and grade. The raw cashew nuts were stored in the village godown until they were collected by trucks and transported to CATA's main stores in Dar es salaam and Mtwara for either direct export, or to processing factories. The system of payment by weight and grade and the storage in village godowns was much as it had been previously and as it is done today. At the end of the season a levy was paid directly into each village's development fund. The levy was based on the amount of cashew nuts purchased during the season (Chachage and Nyoni, 2001).

Unlike NAPB, CATA did not sell cashew nuts at auctions. During the early years when there was no processing capability, CATA sold exclusively to the State Trading Corporation of India. This organization distributed the cashew nuts according to its own formula to the 200 or more processing factories in the Cochin area of Southern India (URT, 1987).

Following annual tenders for transport invited by CATA, raw cashew nuts were transported by trucks belonging to the Regional Transport Companies, to District Development Corporations and to private owners. CATA experienced considerable transport problems, which contributed to frequent delays in collecting cashew nuts from the villages. These was due to problems of acquiring funds to purchase crops since it

already owed the bank a lot of money due to fraud and embezzlement, this included ghost purchases, cash thefts by even village leaders, cashew nut thefts, diversion of funds to other activities, and high overhead costs (Chachage and Nyoni, 2001).

A fundamental difference between the purchasing by CATA as opposed to purchasing by the unions, was that CATA had no authority over the villages, beyond that which was exercised by its, paid, purchasing agents in the village. Upon insistence by the authorities, CATA was often forced to hand money over to village Governments. The actual responsibility for the money was diffused and embezzlement was frequent. Finally, there have been reports of instances of arbitrary misbehaviour, at a person's level by CATA's village employees, exploiting a perceived position of power. Finally it ended up in deferring payments to farmers or sometimes completely failing to pay them (Chachage and Nyoni, 2001).

In 1985, CATA was replaced by Tanzania Cashew nut Marketing Board (TCMB), whereby the purchasing of raw cashew nuts became again the responsibility of the cooperative unions through their respective primary societies (i.e. three-tier marketing system). The TCMB assumed the task of buying cashew nut from unions, processing, and exporting raw and processed cashew nuts. The board by then did external marketing by requesting tenders (usually by telex) for specific consignment (given specific grades and geographical origin of the cashew nuts) from a limited number of companies (Chachage and Nyoni, 2001).

By then, the system was also characterized by low prices and late payment of farmers due to the inefficient and poor financial status of the cooperatives. Consequently, there were times when only 80% of the crop was purchased in those years when production itself was

still low. Another factor that depressed the producer prices were the district cess under which cashew nut was subjected with the reintroduction of the local Governments since early 1980s. Consequently, some farmers withdrew from harvesting cashew nuts and concentrated more on non-controlled crops or those, which could fetch higher prices in the non-official markets (Chachage and Nyoni, 2001).

In 1991/92, the Government of Tanzania began to liberalize cashew nut marketing by introduction of the agency system in the export of the crop. In fact, it was the first traditional export crop to be liberalized. Private traders were allowed to buy cashew nuts and to export, and they were allowed by the Bank of Tanzania to retain 10% of the foreign currency with processed cashew nuts, retention of foreign currency was set at 50% legal formalities and proper operational procedures were formalized in 1994. Since then, agricultural exports were subject to 100% retention (Chachage and Nyoni, 2001).

In 1993, Tanzania Cashew nut Marketing Board became Cashew nut Board of Tanzania (CBT). With liberalization, CBT was transformed into a regulatory body, with the aim of ensuring that grading regulations, buying procedures, processing guidelines, export procedures and general marketing guidelines are adhered to by the various actors in the industry. The board also set itself a task of announcing an indicative price every season, an aspect, which was meant to ensure that the producer did not get paid an unfair price. At the same time regional authorities improved payment of taxes and compulsory contributions in the first year of liberalization of the crop (Chachage and Nyoni, 2001).

Since then, cashew nut marketing has been under market liberalization till 2007/08 when the Government introduced WRS for cashew nut marketing in Mtwara region, after some success was obtained in other crops like maize, cotton, rice and coffee (Mwangu, 2007).

Cashew nut farmers are mandated to sell through primary cooperative societies and selling outside this system is illegal (black market) (CBT, 2008b).

The WRS was introduced to address the cheating done by private buyers and middlemen to cashew nut farmers for several years. For example in the 2006/07 season, some of the private buyers and middlemen boycotted buying cashew nuts because they were not comfortable with the indicative price set by the Government. And the few who decided to buy did so at very low prices (i.e. TShs 200 per kilogram) which starved and rendered most farmers hopeless to a point of abandoning the crop seeking for other alternatives to earn a living (Mwangu, 2007).

The aim of this study was to provide insights on the economic assessment of the WRS to all cashew nut key players; to contribute to the ongoing discussion on constraints that are faced by each key player under the WRS; to investigate reasons behind the mode of payment set under WRS; and finally, to suggest possible solutions that would improve the WRS for cashew nut marketing in Mtwara region, Tanzania.

1.4 Potential Users of the Study

The WRS for cashew nut marketing in Mtwara region consists of six major players: farmers; primary cooperative societies; banking institutions; processing firms; exporters; and, input suppliers. Other players include: CBT; secondary cooperative societies; and, regional warehouses. Currently the system is being financed by the National Microfinance Bank (NMB) which is serving over 115 primary cooperative societies in the region. All cashew nut farmers are registered into their respective primary cooperative societies whereby selling outside the system is strictly prohibited. Thus, the study results are useful to all key players under the WRS for cashew nut marketing, CBT and policy makers.

1.5 Problem Statement and Justification

The introduction of WRS for financing cashew nut marketing from Mtwara region has increased the hope of farmers to produce more cashew nuts (Reporter, 2008). As a result of WRS, Mtwara region accounted for more than 58.34% of total cashew nut export in Tanzania in 2007/08 production year (CBT, 2008a). The export volume of cashew nuts went up, reaching 58 278 tonnes compared to 54 005.988 tonnes in 2006/07 (CBT, 2008b).

According to the Bank of Tanzania (BoT), February 2008 economic review, the hefty increase in cashew nut export was for the most part responsible for raising the total value of traditional exports by 8.7% to USD 54.7 million.

However, despite of this generalized improved performance, no study has been done on an economic assessment of the WRS for cashew nut marketing in Mtwara region. The profit margin accrued by each key player under the WRS was not known. Who gains and who losses in this system, is it the farmer, primary cooperative, input supplier, bank institution, exporter, or processor? Why the farm gate price is paid in instalments? Is it because of the big volume of cashew nuts produced by Mtwara region compared to other regions, little (65%) guarantee from the government, lack of cashew nut marketing financing facilities, high interest rate on bank loan, lack of trust to primary cooperative societies? In its first year of operation, the first instalment was 60% cash on the delivery of cashew nuts to the primary cooperative, and second instalment (i.e. 40%) was made once cashew nut was sold at closed bid auctions. The bonus payment was made after the deduction of marketing costs from the cashew nut sales.

Thus the study was aiming at answering the above questions so as to come up with an economically more efficient way of using the WRS for cashew nut marketing in Mtwara region.

1.6 Study Objectives

1.6.1 General objective

The general objective was to undertake an economic assessment of the WRS for cashew nut marketing in Mtwara region.

1.6.2 Specific objectives

- (i) To determine the gross margin of cashew nut earned by each key player under the WRS.
- (ii) To identify socio-economic factors affecting cashew nut profitability at the farmer level under the WRS.
- (iii) To describe reasons behind the fact that the farm gate price is being paid to be paid in instalments under the WRS.
- (iv) To identify constraints impairing cashew nut marketing through the WRS.

1.6.3 Hypotheses

- (i) There is no significant difference across the Gross Margins (GM) earned by the key players under the WRS.
- (ii) Socio-economic factors: age of the farmer, household labour size, experience in cashew nut production, cashew nut farm distance from home, and age of cashew nut trees do not significantly affect cashew nut profitability at the farmer level under the WRS.

- (iii) Little (65%) Government guarantee, and high interest rates charged by the bank are not significant reasons behind the fact that the farm gate price is being paid in instalments under the WRS.
- (iv) Lack of training on WRS before its inception, lack of warehouses, and poor infrastructures are not significant constraints impairing cashew nut marketing through the WRS.

1.7 Organization of the Report

This study is organised into five chapters. Chapter one presents an introduction and a background of the WRS, and cashew nut marketing in Tanzania. It also includes the problem statement, objectives and hypotheses of the study. Chapter two presents the literature review on WRS. While chapter three details the methodology used in the study. Chapter four presents the major findings of the study, and chapter five has the conclusion and recommendations.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Warehouse Receipt

WR is defined as a document issued by warehouse operator as evidence that specified commodities of stated quantity and quality have been deposited at a particular location by a named depositor (Coulter and Onumah, 2002). The receipt may be transferable, allowing transfer to a new holder or a lender (where the stored commodity is pledged as security for a loan) or a trade counter-party-which entitles the holder to take delivery of the commodity upon presentation of the WR at the warehouse (Coulter and Onumah, 2002).

An ideal WR contains: the location of the warehouse where goods are stored; the date of issue of the receipt; the serial number of the receipt; a statement whether the goods received will be delivered to the bearer or to a specified person's order; a short description of the goods or of the packages containing them; the registered signature of the authorised warehouse operator; the nature and fact of ownership of the goods, whether solely or jointly or commonly owned with others; and a statement as to the amount of advances made and of liabilities incurred (URT, 2005).

According to Mark (2000) there are four types of WR namely negotiable WR, non negotiable WR, collateral WR, and trust WR.

2.1.1 Negotiable warehouse receipt

According to Mark (2002) a negotiable WR is a receipt, which states that the agricultural commodity or a non-agricultural commodity referred to, will be delivered to the bearer or on the order of any person named on such receipt. This type of receipt may be either insured or uninsured, and either a "bearer" or "order" type of receipt. Bearer receipts can

be negotiated, passed from hand to hand without endorsement, whilst order receipts are negotiated, passed from hand to hand by Government's endorsement (Mark, 2002).

2.1.2 Non-negotiable warehouse receipt

Non-negotiable WR is a receipt, stated that, the agricultural commodity or non-agricultural commodity referred to is to be delivered to a named party and may be either insured or uninsured. The receipt cannot be negotiated, but can be transferred by assignment. Assignment is the transfer of rights from one party to another. This is usually a written contract. The transferee should immediately notify the warehouse operator of the transfer and obtain a new non-negotiable WR (Mark, 2002). In case of a forwarded commodity, a non-negotiable WR should be issued when a warehouse receives forwarded commodity (Garcia, 2006).

2.1.3 Collateral warehouse receipt

Collateral WR is a receipt issued by a warehouse operator to himself or herself to enable him/her to use company-owned commodity in store as loan collateral (Mark, 2002). Under collateral WR, the quantity and quality of company-owned commodity must be sufficient at the time the collateral receipts are issued. Collateral warehouse receipts are an obligation and must be recorded under warehouse obligations. WR used as collateral must be issued to the warehouse operator and endorsed over to the lender (Mark, 2002).

2.1.4 Trust warehouse receipt

Trust receipt is an instrument issued by the warehouse operator to replace a WR during the transition period when a previously stored product is being prepared or loaded for delivery (Mark, 2002).

2.2 Depositor

The depositor is any person who deposits a commodity in a warehouse for storage, handling or shipment, or who is the owner or legal holder of an outstanding WR, or who is lawfully entitled to possession of the commodity (URT, 2005). The depositor may be a producer, farmer, exporter, processor or indeed any individual or body corporate (Coulter and Onumah, 2002).

2.3 Warehouse Operator

Warehouse operator is any person engaged in the business of operating a warehouse for receiving, storing, shipping or handling of commodities for compensation and includes the agent or employee the scope of whose actual or apparent authority renders such person to exercise rights or become liable under the Act (URT, 2005). The warehouse operator holds the stored commodity by way of safe custody; implying he is legally liable to make good any value lost through theft or damage by fire and other catastrophes but has no legal or beneficial interest in it (Coulter and Onumah, 2002).

2.4 Warehouse

Warehouse is any building, structure or other protected enclosure approved by the warehouse licensing board to be used or useable, for the storage or conditioning of commodities or buildings used in relation thereof or including operation of the warehouse (URT, 2005).

According to the Bamako report (2000), warehouses operate in a number of ways. Each type of warehouse provides the customer with a different range of security and services. The five basic types of warehouses are:-

2.4.1 Public warehouses

Public warehouses are open to anyone on a non-qualifying basis. Any person who brings in agricultural goods may store them in a public warehouse. A public warehouse is operated by a warehouseman, who stores commodities for third parties for a set fee. As the warehouseman does not obtain title to the commodities stored but only retains possession, it is easy to prove that bailment exists.

2.4.2 Field warehouses

Field warehouses, an operator manages a warehouse on the premises of another business. This occurs in industries such as milling or cotton spinning where the industry finances the acquisition of raw materials, while someone else controls the stock for the bank.

2.4.3 Dual key warehouses

Dual key warehouses provide secure storage as both the bank and the depositor have control over the warehouse. Both parties hold keys to the storage facility, and both keys must be presented to access the facility.

2.4.4 Self-managed warehouses

Self-managed or single-key warehouses provide depositors with complete control over their goods at the storage facility. Typically, a bank or Micro-Finance Institution (MFI) provides some supervision.

2.4.5 Trading warehouses

Trading warehouses, the warehouse operator trades the stored commodity on the depositor's behalf. This may seem to be a conflict of interest for the warehouse operator, but these facilities have operated successfully in North America for many years.

2.5 Models of the Warehouse Receipt System

2.5.1 The regulated warehouse-company model

According to Coulter and Norvell (1998), warehouse companies are crop merchants, trading companies and farmers' cooperatives, registered with and overseen by government agricultural authorities. By law, they are required to open up their stores to third parties, be farmers or other trading companies (Onumah, 2003). The Government also establishes an official grading system and a state or a state-licensed inspection company certifies the quality and grades of crop handled by warehouse operators. Warehouse companies are normally close to the farmers they serve, and buy from them, offering a variety of contracts that may be hedged on futures and options markets (when such facilities are available). Negotiable warehouse receipts may also be used as delivery mechanisms in commodity exchanges. To be licensed, warehouse companies must satisfy net-worth and professional requirements, they must be regularly inspected and submit audited accounts. Stocks must be insured, and the warehouse performance has to be under written. This is normally achieved by requiring companies to purchase bonds, or by requiring the entire industry to subscribe to an indemnity fund (Coulter and Onumah, 2002).

The regulated warehouse company model has major financial and practical advantages over other models. It involves existing trading companies, and thereby gives it maximum geographical coverage. Local warehouse companies are well placed to develop close relationships with the farming community, and this helps create successful input supply and marketing arrangements, free of the default culture that is having such an adverse effect on African agriculture. As trading companies, they generate a larger turnover than they could through storage alone, and this reduces the costs of their services. The general warehousing company, by contrast, is often an unspecialised operator, and may not perform as well in maintaining quality standards (Coulter and Norvell, 1998).

2.5.2 The general warehousing model

General warehouses are dedicated to the storage function, but store all kinds of goods, not simply agricultural products. They sometimes carry out other service functions such as freight forwarding, but tend to be barred from trading on their own account, so as to avoid conflicts of interest between service and trading functions. They often engage in “field warehousing” i.e. taking control of the stores of farmers, traders or manufacturers, and issuing warehouse receipts that are used to raise bank loans. They are licensed and overseen by public authorities dealing with trade or monetary matters, who normally place particular emphasis on capital adequacy requirements (Coulter and Norvell, 1998).

Given successes in countries as far apart as Argentina and Hungary, one should not immediately dismiss the general warehousing model. A possible advantage of this model is that it is less demanding on public regulatory capabilities, since a company which only stores commodities faces fewer business risks than one which takes a multiplicity of trading positions. Even in the United States, where there is a general culture of trust in agricultural trading circles and a range of institutional mechanisms to minimise risks, warehouse companies have been associated with some notable business failures on account of their trading activities-particularly in the case of “hedge-to-arrive” contracts (Coulter and Norvell, 1998).

The general warehousing model is also strongly associated with the development of field-warehousing services. African-based inspection companies sometimes provide such services and they might be extended to a much large number of operators, making better use of existing storage facilities and local labour (Onumah, 2003).

2.5.3 The private trader model

In countries without warehousing legislation, private traders sometimes offer services similar to those described in the licensed warehouse-company model, including the storage of grain on behalf of farmers. Where such services do not exist, government development finance institutions and donors may collaborate to provide a framework of incentives to encourage private traders to provide them (Coulter and Norvell, 1998).

The advantage of the private sector model is that it can be instituted in circumstances where there is practically no regulatory framework whatsoever (Coulter and Norvell, 1998). There are also some disadvantages, such schemes can only be operated by a few large (often multinational) companies which enjoy a high credit rating, and; they contain no external checks and balances to protect the interest of depositors (Giovannucci *et al.*, 2005).

2.5.4 The collateral management agreements model

According to Onumah (2003) collateralised financing is quite new in Africa, and the most common model has been developed around local subsidiaries of international inspection companies. The inspection companies set up tripartite Collateral Management Agreements (CMA) involving a bank, the borrower and the collateral manager (i.e. the inspection company acting as warehouse operator), which allow depositors to secure bank credit. The warehouse receipts are issued directly to the financing bank and not to the depositor, and they are non-negotiable and non-transferable.

This model rests on the credibility of the collateral manager (which is the inspection company acting as warehouse operator). In the liberalised marketing environment with significant performance and credit risks in many developing countries, the CMA provide

the confidence for banks to continue financing import and export transactions; especially because the European-based parent companies of the inspection companies have various kinds of professional liability cover that provide additional comfort for lenders (Onumah, 2003).

2.5.5 The electronic warehouse receipt model

This model was developed due to the fact that paper WRS suffers from certain problems like the physical delivery of receipts, which is the final stage of the transaction, can lead to extra transaction costs (handling, transporting and storing certificates) and may also lead to losses in form of theft, loss in transit or counterfeiting (Diwakar, 2006). Electronic warehouse receipt is not a new concept especially in developed countries. It is a system in which electronic data have given the prospect of eliminating paper documents, reducing costs and improving efficiency by exchanging business information in electronic form (Dilber, 2007). According to Boehnke (2003), the system avoids all kinds of contingencies which are faced under the paper WRS, just by keeping the electronic record of the ownership of receipts. This supplement electronic business as the buyer can be sure about the quantity, and the quality of the commodity mentioned in the offer and certificates are not required to be physically produced (Diwakar, 2006).

Example of the country where the EWR is being practiced is in India. The system was for time introduced in 1996 by the National Securities Depository Limited (NDSL). It has succeeded in persuading companies to dematerialize a portion of their shares and allow electronic trade and settlement. So, to make EWR successful, there has to be a central body like NDSL (Diwakar, 2006).

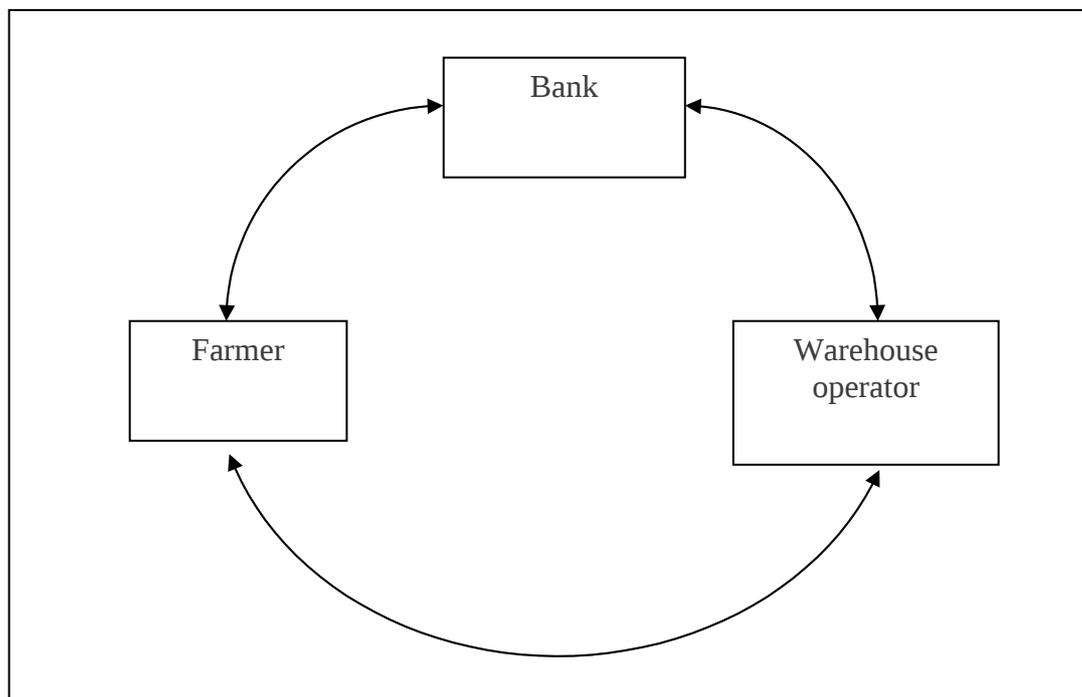
2.5.6 The Tanzania warehouse receipt model

According to the pilot marketing system that was conducted by the Ministry of Agriculture Food Security and Cooperatives (MAFSC) the Tanzania's model has been improvised from the above models in order to suite Tanzania business environment. The considerations that were placed during modification include: availability of warehouses which are adequately licensed; depositors who have tradable commodity which meets standards; and their being agricultural financiers (banks) and buyers of the deposited commodities (MAFSC, 2008).

Warehouse receipt gives farmers the option of holding back their produce if prices are low and can get up to 60% to 80% funding of the value of their produce from banks. A warehouse receipt, also guarantees the existence of a given quantity and quality of a commodity in storage for safe keeping and is often used in cash and futures transactions (MAFSC, 2008).

2.6 Key Players in a Warehouse Receipt System

Most of the commodities do not go directly from producers to consumers. Middlemen such as traders, brokers or warehouses need to be included. All kinds of cash crops are inevitably linked to warehouses (Garcia, 2006). Warehouse receipts are crucial elements for risk mitigation, enabling a financier to lend to a borrower. Banks will lend against crop stored in a reliable warehouse (Dayrobinson, 2003).



Source: Coulter and Shepherd (1995).

Figure 1: Primary key players

According to Garcia (2006) there are three primary key players under the WRS: the farmer, a banking institution, and the warehouse. Farmers have to face mainly two kinds of risks. On the one hand the price volatility because it is difficult to forecast the selling price of the commodity that would be produced. On the other hand the physical risk of loss or damage to the crop due to weather conditions, harvesting losses, storage or handling (Dayrobinson, 2003). Therefore, risk management has impacts on the farmers' income, his productivity and also access to credit. Farmers are exposed to price fluctuations causing them uncertainty about the price that they will receive for their crop when it is sold. This uncertainty on the part of farmers makes it hard for them to allocate resources efficiently; their access to credit is constrained and leads them to adopt less suitable technologies that affect yields and therefore their income is further reduced. Additionally, the lack of skills, information and capital to try to invest in new enterprises makes it difficult for farmers to diversify (Varangis *et al.*, 2003).

Warehouses play a key role within the WRS. A licensed warehouse must have and fulfil the following requirements: Adequate facilities, capital adequacy, managerial qualities and insurance. Crop handling staff for weighing, sampling and grading should be licensed as well. Warehouse operators' reputation will be determined by its management, operations and financial strength. Therefore, a person that owns the warehouse must be reliable, somebody that sells the crop and must not disappear with the money (UNCTAD, 1996).

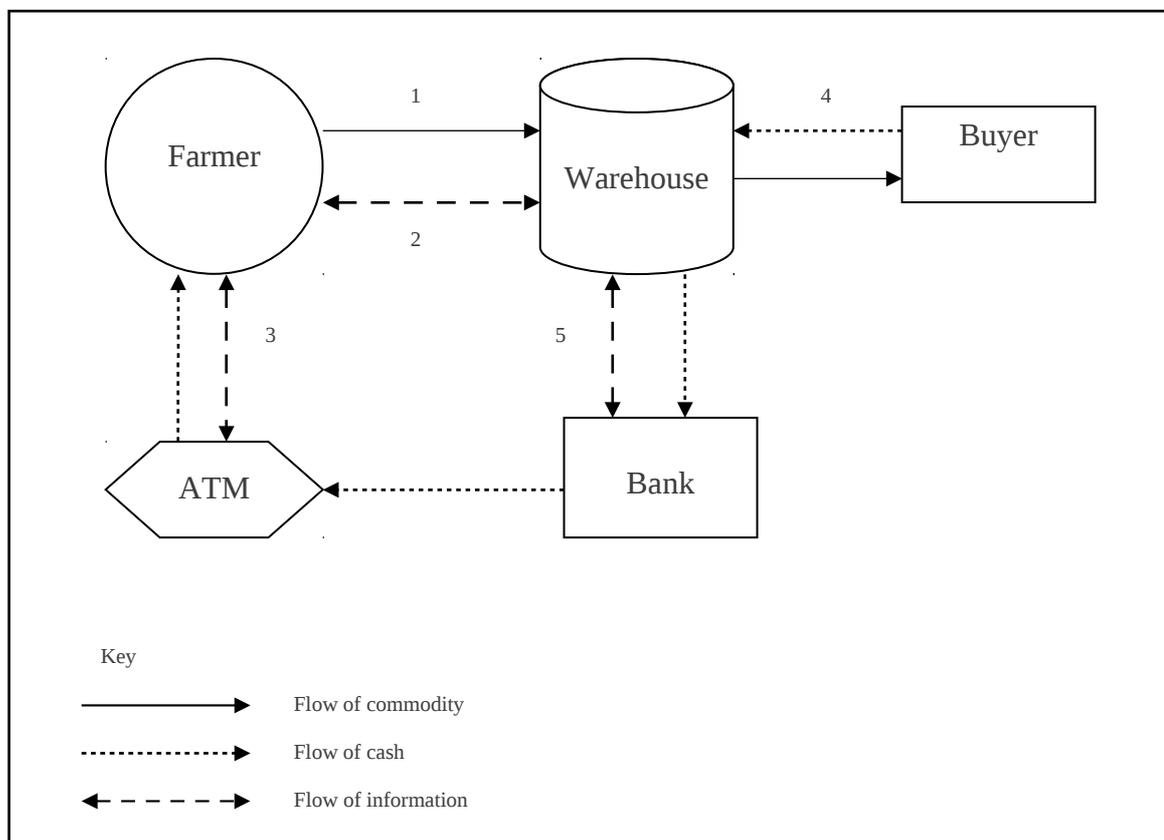
Licensed warehouses must be willing to accept official supervision without prior announcement. Such supervisors are authorized to suspend the warehouse's license immediately in case of any fraud (Coulter and Onumah, 2002). Licensing and inspection of warehouses are essential to make sure that crop warehouses meet basic standards both physically and financially. If these standards cannot be fulfilled a WRS will not be credible and the crop will not be treated as reliable collateral (Boehnke, 2003).

2.7 Interaction Amongst the WRS Key Players

Garcia (2006) identified the interaction of the primary key players under the WRS as illustrated in Fig. 2. The following flows are identified.

- (i) At harvest the farmer delivers his crop into a licensed warehouse.
- (ii) The warehouse operator registers the quality, quantity and location of the crop on a smart card, which act as a physical proof of the ownership of the crop and informs the availability of credit, it also can generate data for instance the cost of hedging the grain.
- (iii) To receive the payment in cash, the farmer inserts the smart card in the Automated Teller Machine (ATM).

- (iv) Before the due date of the loan or when the buyer needs the crop, the farmer sells the crop consulting with the bank.
- (v) After the farmer pays for the crop and storage services, the warehouse operator makes the transaction to the bank for the value of the crop and the bank pays any exceeding amount as a profit to the farmer.



Source: UNCTAD (2002).

Figure 2: Warehouse receipt system

2.8 Mode of Payments for the WRS Financing

The first mode of payment is when the farmer identifies a warehouse and takes his/her goods to the warehouse for deposit. The warehouse operator grades and classifies the goods and gives a receipt for storage of said goods to the farmer. The farmer then takes the receipt to the MFI and, based on projections of the goods' market value, the MFI gives the

farmer a loan. The loan is extremely flexible as it allows the farmer to spend it to finance expansion activities, pay off debts, or use it for any other reason. When the goods at the warehouse are sold then, the loan is instantly recovered (UNCTAD, 1996). Second mode of payment is when the farmer takes his/her goods to the warehouse whereby the warehouse pays cash directly to the farmer. Then, the farmer is still allowed to take the receipt to the financial institution for accessing agricultural input credit for the subsequent season. Another mode of payment is the pre-payment financing. This modality is structured as a purchase of goods with payment made in advance. It allows the buyer (“off taker”) to raise a loan from a bank and use it to effect pre-payment to the farmer basing on the previous season’s price. When the commodity is once exported, the additional payments are made to farmers provided the export price exceeds the first payment made to farmers (Coulter *et al.*, 2000).

2.9 Economics of the WRS

Costs and charges for storing crops under WRS are generally very low in developed countries when compared to developing countries (Coulter *et al.*, 1997). In the United Kingdom, commercial rates for storage (excluding handling and pest-control charges) are typically around USD 1.5 per tonne-month, while in developing countries like South Africa they are about USD 15 per tonne-month. In Zambia storage charges go above USD 2.0 per tonne-month and USD 3.0 to USD 4.0 per tonne-month in Ghana. Even USD 4.0 per tonne-month would not allow Ghana to cover the replacement costs of plant installed under donor assistance programmes.

However, the relatively low charges in developed countries reflect the abundance of storage capacity in the country per se. Other cost factors which make storage cheaper in the developed economies than in the developing economies like Zambia, Ghana and other

countries in similar circumstances include: local availability of plant and equipment; more skilled labour and maintenance services; economies of scale in large-scale handling and storage; and past subsidies or tax-breaks which have encouraged Western industry to invest in stores and equipment; more efficient financial systems, involving easier access to credit and lower cost of capital; lower variability in production resulting in higher usage of available storage capacity; and less of theft problem in the developed countries and security arrangements need be less rigorous (Coulter *et al.*, 1997).

2.10 Profitability of the WRS Financing

According to the Bamako report (2000), WRS can be profitable for both MFI and farmers. Experience has shown that MFI can enjoy a high repayment rate on WR loans. Farmers can increase their possible selling price by as much as 230 percent, in some cases. That is sizeable impact in light of the risks involved in agricultural micro-enterprises. Profitability to other stakeholders such as exporters and processors depends on their sells from the world market, because, they usually store the commodity and sell when the world market price is good. Warehouse operators fetch more profit when the rate of production from farmers is high, which is same with input suppliers, as farmers need expand their rate of production, automatically some additional inputs are unavoidable.

2.11 Constraints of the WRS financing

The paucity of deposit-taking institutions and savings options especially in rural areas results primarily from two interlinked problems. Many larger commercial banks do not find it profitable to operate in rural areas because of the transactions and informational costs of offering services. While there are some notable exceptions, financial institutions serving rural areas often do not accept savings, and in many countries are restricted from doing so (Carter and Waters, 2004).

While these legal restrictions may be prudent, breaking the savings constraints will require a creative approach to: ensuring that rural financial institutions can serve as reliable custodians of savings deposits; and modifying the legal and regulatory structure to permit them to take deposits and require them to protect deposits. If successful, this approach not only expands the financial services provided in rural areas but also enhance the sustainability of rural financial institutions by lowering their cost of funds (Carter and Waters, 2004).

Mwesigye (2006) found that, while trader-supplied credit and contractual arrangements with processors may be the best option a producer has for financing production, traders or processors may enjoy spatial monopoly and the resulting credit contracts may not be competitive or fair. Depending on the region and crop, the terms of the contract may place the producers at a serious disadvantage. At a minimum, price differences for product sold can hide the actual cost of the loan extended by the trader. Many farmers cannot access larger markets where they might receive a better price for their product and therefore are dependent on the price offered by the traders operating in their region. Limited competition among traders and a lack of transparency in formation of contracts can lead to higher credit costs for producers.

Even when supplier/trader credit is functioning with a reasonable degree of transparency and efficiency, the limited liquidity of non-financial agents limits their ability to support economic growth in the agricultural sector through these arrangements. Most input suppliers, processors and other trading intermediaries are not in the business of financial intermediation and have limited liquidity. Without access to additional funds, they often have to limit the number of contractual relationships they form (Carter and Waters, 2004).

On the side of warehouse receipt, splitting the WR is not possible. In case the depositor has an obligation to transfer only a part of the commodities, the receipt cannot be divided. Need to move the WR from one place to another with risk of theft or mutilation, if the transferor and transferee are at two different locations. It also suffers from the risk of forgery (Rick *et al.*, 2007).

However, EWR can help solve several problems. It reduces manual-paper handling. Transportation of paper documents is eliminated along with the attendant risks. Multiple keypunching of data is also reduced. Moreover, an audit trail of receipt activity is kept, and the electronic receipt system serves to back up receipt data for the warehouse. This system will also help reduce chances of forgery. EWR should be legally equivalent in every respect to a paper WR (Diwakar, 2006).

Finally, the liquidity problems that producers experience as a result of the seasonality of production can be smoothed by non-financial mechanisms. Prices for most commodities are often lowest at harvest time when the supply is very high, and are higher later in the season. This price fluctuation can be problematic for farmers who often need to sell their product at harvest in order to repay the loans that financed production. Without a means to store their output for sale when prices are more optimal, and to cover loan or working capital expenses until later in the season, many farmers get locked into low-input, low-return production strategies (Pelrine, 2007).

2.12 WRS Experience Around the World

Although there has been considerable recent experience with warehouse receipts schemes in Poland, Hungary, Slovakia, and Bulgaria, the general experience of both transition and developing countries with WRS is limited. Nonetheless, the little available provides

important lessons on the impact of government intervention. In the past, sophisticated agricultural markets, including thriving futures markets, once flourished in India. More recently, however, government interventions in setting and maintaining domestic prices have displaced the economic viability of many storage schemes and limited the demand for inventory-based credit. In Mali, credit systems were established in 1997, based partly on inventory receipts. However, a number of government-imposed conditions and delays helped the system ineffective.

Several countries in Latin America have introduced WRS. Argentina's WRS account for a significant portion of agricultural lending where total receipts issued now exceed USD 1 billion. Brazil's legislation dates back to 1903 but its systems have deteriorated because of political intervention and bureaucratic entanglement. In some cases, however, the receipts are not widely used because of the low return to storage resulting from government policies, high real interest rates, an inadequate legal environment (collateral laws, liquidation procedures, property rights), and lack of informal grades and standards.

In the United States, the WRS has been in place since 1916. Its usefulness in the economy has been well established, for instance, it is widely recognised that the United States (US) would have found it difficult to manage and liquidate the huge grain inventories its farmers accumulated during the mid-1980s in the absence of a system of warehouse receipts as negotiable instruments. US warehouse code require that every commodity receipt contain the location of the warehouse; date of issuance; consecutive number of the receipts; statement guaranteeing delivery of the product to the bearer, to a specified person or to the order; storage rate; and the quantity, weight, grade, or class of the product. In addition to the statement that the receipt is the subject to the warehouse law and the signature of the licensed warehouse operator, the receipt also must identify the ownership

of the warehouse and specify the amount of the advance and the liabilities incurred (Rick *et al.*, 2007).

The integrity of the WRS in US is enhanced by the presence of performance guarantees which are usually posted as insurance bonds, sometimes supplemented with an indemnity fund. These funds are created through contributions of participating warehousemen, collected as part of the fees they charge for their services. The funds are used either alone or as secondary guarantee alongside insurance bonds. In the latter case, they reduce the cost of the main guarantee instrument, the insurance bond, making the provision of guarantees accessible to smaller warehouses. This broadens the market for warehouse services and increases competition in the storage industry (UNCTAD, 2002).

Dilber (2007) points out that, warehouses in Germany and France are shaped by the relatively high labour costs and inflexibility of the work force. In the past, the economies of Europe were separate, more recently the economies are integrating into a common market, which creates economies of scale, that lead to larger warehouses. However, urban areas, many of which have grown out of ancient towns, will still present challenges to the efficient flow of product.

In Zambia, warehousing services are accessible to various depositors of different sizes: producers, processors, and traders with the minimum sizes of grain deposit between 10 and 30 tonnes. Only commodities that meet prescribed weight and grading standards are accepted. Warehouse operators and their front-line staff (samplers, graders and weighers) are trained and certified in commodity quality and quantity assurance to facilitate enforcement of commodity standards.

2.13 WRS Experience in Tanzania

2.13.1 WRS in the coffee sub sector

In the coffee sub sector, the system is working smoothly for all key players including farmers' groups, small scale traders, cooperative unions, primary cooperative societies, and licensed private companies (MAFSC, 2008).

Four warehouses: Mbozi Coffee Curing Company Ltd (Mbeya), Mbinga Coffee Curing Company Ltd (Ruvuma), Tanganyika Coffee Curing Company Ltd (Kilimanjaro, Arusha, and Tanga), and Kanyovu Coffee Joint Venture Company Ltd (Kigoma) have been approved by the National Advisory Committee to provide collateral management services to the interested trader and coffee farmers. The services are provided at a fee which ranges from one to three TShs Per kilogram of parchment coffee delivered to these warehouses per season. The performance of the system is very successful as to date none has suffered loss for the past three years, and different stakeholders has managed to payback the loan facility from the lending bank (MAFSC, 2008).

2.13.2 WRS in the cotton sub sector

In the cotton sub sector Tanzania has two main growing areas namely the Western Cotton Growing Area (WCGA) and the Eastern Cotton Growing Area (ECGA). The system is now tested in the ECGA whereby Kilimanjaro Native Cooperative Union (KNCU) ginnery as warehouse operator where farmers are depositing seed cotton. CRDB bank (Arusha branch) is a financing bank which honours the receipt submitted to the bank by the authorised leader of the Oridoy Primary Cooperative Society (MAFSC, 2008).

2.14 Econometric Models used in Studies Related to WRS

Proper analysis leads to rightful decision making in any endeavour. Analytical methods are nonetheless a function of previous methodologies and procedures for which improvements can be made to enhance new findings and strengthen reliability of old findings. More recently, many studies on WRS have been focused on its feasibility at different locations for marketing different commodities. Basing on the economic assessment of the WRS, very few analytical works has been done. For example, Coulter *et al.* (1997) studied the economics of warehousing operations in Sub-Saharan Africa using the spread sheet model developed by economists at the NRI. Based on the information and analysis assembled, the team drew implications for the role of warehousing in improving marketing systems and identified features for incorporation and testing in future schemes.

Different methodologies have been suggested and adopted for feasibility studies related to WRS. For example, Garcia (2006) conducted a feasibility study on grain receipts for corn producers in Mexico using an abductive approach and with both qualitative and quantitative methods. The broad picture about agricultural activities, post harvest practices, how farmers finance their agriculture, and how they perceive the WRS and its feasibility was obtained. Giovannucci *et al.* (2005) conducted WRS analysis for facilitating credit and commodity markets using the general equilibrium model. The study sets out the critical conditions for the success of a WRS and illustrates the roles of the key actors in setting up and running such a system.

Mark (2002) conducted a feasibility study for a regional warehouse receipt program for Mali, Senegal, and Ghana in West Africa and used a distributed analysis model to assess the feasibility of WR program in the three countries of West Africa. The study revealed the roles of producers, traders, processors, and bank institutions in the WR program. The

study in addition addressed the requirements for adopting a WR program to facilitate an efficient cross border trading system.

Coulter *et al.* (2000) used a predictive model that deployed discriminant analysis to articulate a strategy for the development of a WRS for agriculture in India. The study based on the feasibility of developing a WRS in India. The conclusion was that WRS makes more willing banks to lend the agricultural sector, reduce transaction costs and improve price-risk management. WRS can also play an important part in new policies which would make agriculture more responsive to market opportunities and more competitive in relation to the world markets. Eventually the potential net benefits of WRS to the economy are large.

However, this study relied on quantitative and qualitative kinds of analysis to test the hypotheses. While quantitative analyses included: GM analysis, regression analysis and one-way analysis of variance (ANOVA), qualitative analyses were based on the use of means, percentages, frequency, and Market Channel Baseline Analysis (MCBA).

2.15 Gross Margin and Past Studies on Measuring Profitability

More useful ways to assess the profitability of farm business are well established in farm management economics. Methods such as gross margin analysis, economic farm surplus, return on investment, the benefit-cost ratio, internal rate of return and marketing margin have been suggested for studies similar to this one (Philip, 2001). Of the above-mentioned techniques; GM analysis has been used widely because of its easiness to be understood (Onumah, 2002). Johnson (1985) defines GM as the difference between the enterprise's gross output and the marginal cost of production.

For the WRS, GM is worked out for each key actor in the system. Gross output becomes the value of sales of the commodity plus the value of quantity consumed and any other transferred to other farm enterprises. For the farmer, GM becomes the gross revenue minus all variable costs incurred in production and marketing of the commodity. Other key actors like traders, and processors, in the WRS GM becomes the gross revenue less buying cost and marketing and transaction costs. In case of the financial institution, GM becomes the value of the interest charge less operational costs incurred in effecting loans. However, for the warehouse, GM becomes the gross revenue accrued from warehousing the commodity less warehouse operational costs (Onumah, 2002).

WRS studies which adopted GM as profitability-measure include: Onumah (2002), used GM to determine the profitability of using WRS to market maize for smallholders. The results show that smallholders benefit more financially using WRS than without it. Mukwenda (2005) studied potential for using WRS for financing maize marketing. Using GM to determine the profitability of various crops under WRS financing, the study revealed that profitability under WRS financing is not the same for all crops, it depends with the crop type and size of the farm or enterprise. The obtained GM per hectare was highest to coffee followed by cotton and lastly maize.

With regard to the popular use of GM, this study has deployed it to work out the profitability of WRS key players under cashew nut sub sector. The application of the gross margin in this study seems to be unique as it goes step further into examining factors affecting such profitability.

2.16 One-way ANOVA and Past Studies on Comparing Means

According to a statistical book on analyzing multivariate data by Lattin *et al.* (2003), there are two major analytical tools to use in comparing means which are t-test and analysis of variance. T-test is used to compare means of the scores of two different groups or conditions. In many research situations, however, the interest is to compare the mean scores of more than two groups. In this situation the use of analysis of variance is inevitable. One-way analysis of variance involves one independent variable (referred to as a factor), which has a number of different levels. These levels correspond to the different groups or conditions. For example in comparing the profitability of WRS for cashew nuts across key players, GM for each key player becomes dependent factor while group of key player becomes independent factor. The dependent factor must be continuous variable.

While Philip (2001) used ANOVA to compare the GM values of different size categories of farmers' acreage, Akyoo (2004) adopted it to test the statistical significance difference of GM mean scores between villages. In both cases the ANOVA results were in agreement with the earlier notion that it compared the variability in scores between the different groups which are believed to be due to the independent variable with the variability within each of the groups. The obtained large F-ratio indicates that there is more variability between the groups caused by the independent variable than there is within each group.

Due to the fact that ANOVA has been quite useful in the studies above, this study adopted it to compare gross margins across the WRS key players. The key player category becomes dependent factor and the gross margin an independent factor.

2.17 Linear Regression and Past Studies on Factors Affecting Profitability

Many studies have used linear regression to test the effect of socio-economic variables on profitability. Of course, this is in agreement with the earlier argument by Gujarati (1995) that the linear regression technique is simple to use, eloquent and gives the best estimator and it does not require the knowledge of the probability distribution of the underlying population being studied hence, its popularity in applied economics.

Philip (2001) on economic analysis of medium scale agricultural enterprises in a predominantly smallholder agriculture sector, used linear regression to determine factors affecting the profitability of farms. The key factors that were examined were size of the enterprise, education level of the farmers, and access to credit and extension services. The study found positive relationship between the factors and the profit accrued by farmers.

Mkude (2003) used linear regression in his study on economic analysis of smallholder's cashew nuts production and marketing under market liberalisation to test the effect of price, farm size, credit availability and amount of labour used on cashew nut output. All factors were significant and found to influence cashew nut output positively. Mutakubwa (2007) used linear regression to investigate the relationship between profitability of cassava production and quantity of cassava harvested, household size, market price of cassava, and education of the farmer. The study-results were in agreement with the earlier expectations of the signs from the independent variables that quantity harvested; price; household size; and, education level have positive influence on profitability of cassava production and marketing.

Sango (2003) in his study on the role of social capital in coping with household food insecurity in urban areas of Tanzania; used a similar model to test the effect of stock of

human capital, household physical capital, and household stock of social capital on household income. The results show that all independent variables have positive influence on the household income.

Munga (1998) on impact of structural adjustment programme on small scale enterprises. Linear regression model was employed to determine factors affecting output growth in small scale enterprises. The study found that the location of the enterprise, the year of establishment of the enterprise, education level of the entrepreneur, and initial capital had positive influence on the output growth of the enterprise.

The above mentioned studies were scientific in that they used some statistical means like percentages in determining the magnitude of various variables. However, the regression models were usually associated with some problems. Heteroscedasticity and multicollinearity were the commonest problems encountered. In all these studies, the problem of heteroscedasticity was taken care of by building a logarithmic transformed model. The problem of multicollinearity was not so much serious as an assessment of the presence of multicollinearity was done by running a correlation matrix. The matrix showed there being no pair of independent variables that correlates with a correlation coefficient value approaching 0.8, hence confirming the absence of the effects of multicollinearity (Menard, 1995).

The current study adopts the linear regression analysis to identify factors affecting cashew nut profitability at farmer level under the WRS. The problem of heteroscedasticity and multicollinearity are taken care off through step wise regression.

2.18 Market Channel Baseline Analysis

Studies which used MCBA, the intention were to record all firms involved in a market channel from production to final consumer demand. With that regard, firms carrying out similar functions were grouped together and data on number of firms, size of firms and prices of product that flow in and out were also recorded. Lastly, there was an analysis of how the product flows through market channel in order to determine opportunities and constraints.

Madhin (2001) used MCBA to record the opportunities and constraints along the value chain of grain marketing. The results obtained were useful in determining the consumers' demand for rice and hence its price in relation to the costs of production. The effectiveness of the MCBA in recording data on number of firms, size of firms and prices were revealed by Garcia (2006) on grain receipts as collateral for agribusiness financing. The study was successful in drawing out the number of firms and size of the firms.

Based on the usefulness of MCBA in the mentioned studies. It is correctly found that the tool is quite suitable for this study so as to record the number of players and in particular their constraints along the cashew nut value chain in the warehouse receipts system.

2.19 Conclusive Opinion

Given the description of the econometric models used in previous studies. Very few studies relate to the current study on economic assessment of the WRS. Many studies conducted on WRS were based on the feasibility of a WRS. Different methodologies have been adopted and came up with good results. However, for the aim of accomplishing this study, different models that were adopted to meet similar objectives are deployed. Similar methodologies are modified to fit the current study. Gross margin is employed to measure

the profitability of cashew nuts under the WRS to each key player, followed by ANOVA that compares the profitability across the key players. Linear regression model is used to determine factors affecting the profitability of cashew nuts to the farmers under the WRS. The key factors are age of the farmer, household labour size, experience of the farmer in cashew nut production, distance from the farm, age of the cashew nut tree, training on WRS, gender of the household head, and distance to the primary cooperative society. The study employed the MCBA to investigate the constraints faced key players under the WRS. The MCBA is used in identification of the interactions of the key players under the WRS.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Introduction

This section covers the description of the study area, conceptual framework of the study, data collection methods, the used sampling technique, tools for data collection, questionnaire administration, statistical analyses and analytical tools used to test the stated research hypotheses.

3.2 Description of the Study Area

Mtwara region is located in the southern part of Tanzania. It lies between longitudes 38° and 40° 30' East of the Greenwich. It is also situated between latitudes 10° 05' and 11° 25' South of the Equator. It borders with Lindi region to the North, the Indian Ocean to the East, and it is separated by the Ruvuma River from Mozambique in the South. To the West it borders Ruvuma region. The region occupies 16 720 square kilometres equivalent to 1.9% of Tanzania mainland area of 885 987 sq. km. It is the second smallest region after Kilimanjaro.

Mtwara region had a population of 1 124 481 according to population census of 2002, at growth rate of 1.7%. It has a population density of 67 people per square kilometres. Administratively Mtwara region is subdivided into six districts, 21 divisions, 102 wards and 554 villages (URT, 2006).

Economically, about 92% of the population engage in agriculture, apart from other rural activities like fishing, beekeeping and small-scale industries. Approximately, 85% of region's land total is arable land. However, less than 20% of this is under cultivation.

Main food crops produced include cassava, millet and sorghum. Only recently maize has gained popularity. Exchange crops are cashew nuts, ground nuts and sesame.

The region was selected because it is listed as one of the regions in Tanzania producing more than 50% of total cashew nut production. It is the only cashew nut producing region in Tanzania whereby cashew nuts are marketed through WRS. The WRS in Mtwara region started in 2007/08 production season where it is still operating.

3.3 The Conceptual Framework

Fig. 3 indicates how the WRS for cashew nut marketing works. The system consists of four major parts which are the cashew nut farmer, a licensed warehouse, a bank, an exporter, and a processor.

First, the farmer deposits cashew nuts at the licensed warehouse and in turn is issued with a WR. The original copy implies a certificate of title (CT); the duplicate implies a certificate of pledge (CP); and the triplicate is a book copy. The farmer is given a CT and the CP. These receipts are the warrant for the loan.

Second, the farmer then borrows against the deposited cashew nuts. The farmer takes the CT and the CP to the bank, the loan is credited to the farmer and the bank remains with CP as a collateral securing the loan. The size of the loan depends on the value of the cashew nuts and it is up to 60% of the farm gate price. In addition, the loan is charged a normal interest rate which was 15% of the loan in the year 2007/08. If the farmer fails to repay, the bank becomes the owner of the cashew nuts and can sell it to liquidate the loan.

Third, the farmer sells cashew nuts to an exporter and a processor. Under this, the farmer gives CT to the cashew nut buyer (exporter and processor).

Fourth, the cashew nut buyer un-pledges cashew nuts from the bank. The buyer takes the CT to the bank and pays for the proceeds in turn, he/she obtains CP. The bank deducts the loan plus interest rate and pays the remaining amount, if any, to the farmer.

Fifth, the buyer (exporter and processor) receives cashew nuts from the warehouse after presenting both the CP and the CT to the warehouse operator.

The list of banks, exporters, processors, and input suppliers were as well obtained from the cooperative union of each district. One bank was purposively selected from each district depending on its existence in financing the WRS for cashew nut marketing. Six exporters were purposively selected depending on whether they won closed bid auctions in 2007/08. Six processors were purposively selected depending on whether they processed cashew nuts in 2007/08. One input supplier was purposively selected from each district depending on whether he/she supplied inputs to farmers in 2007/08.

3.4.2 Sample size

The sampling procedure used produced 90 farmers, 30 primary cooperative societies, three banks, six exporters, six processors, and three input suppliers making a sample size of 138 as shown in Table 1.

Table 1: Distribution of respondents in Mtwara region by three districts

District	Key players						Total
	Farmers	Primary cooperatives	Banks	Exporters	Processors	Input suppliers	
Masasi	30	10	1	2	2	1	46
Newala	30	10	1	2	2	1	46
Nanyumbu	30	10	1	2	2	1	46
Total	90	30	3	6	6	3	138

3.5 Data Collection Technique

Both primary and secondary data were collected for analysis. Primary data were collected through interview questionnaire and checklists of questions. The questionnaire (Appendix 1) consisted of closed ended, open ended and tabular form questions, the checklists (Appendix 2) consisted of open ended questions. Secondary data were collected from CBT, Tandahimba and Newala Cooperative Union (TANECU) and Masasi and Mtwara Cooperative Union (MAMCU), Masasi District Council (MDC), Newala District Council

(NDC₁), Nanyumbu District Council (NDC₂), Sokoine National Agricultural Library (SNAL), and Internet.

3.6 Research Design

A cross-sectional survey research design was applied. The design was useful for description purposes as well as for the determination of the relationship between and among the variables. Kedir *et al.* (1999) defined cross sectional survey as a method of collecting data at one point in a time from selected sample of respondents. The method consumes less time in data gathering, although more triangulation and probing needed in order to get accurate information.

3.7 Questionnaire Pre-testing

A pilot survey was conducted prior to the main fieldwork for pre-testing the questionnaire. This was done in the first three weeks of December 2008. This was necessary to enable the researcher to check the relevance and comprehensiveness of the data collection tools in gathering the required information. A pilot survey was done by taking a sample of 19 respondents. Among the 19 respondents, nine respondents were farmers of which three were from each district, and three primary cooperative societies of which one was from each district. Two traders, two processors, two input suppliers, and one bank from the three districts. These assisted in the modification of some questions and tables which were used in the main fieldwork.

3.8 Survey and Questionnaire Administration

A survey was conducted by the researcher assisted by three thoroughly trained enumerators from the early January 2009 to early March 2009. The data were collected at the primary cooperative societies, banks, regional warehouses, cashew nut processing

factories and district input supplier funds. At the primary cooperative society the leaders and farmers were interviewed using the checklist of questions and structured questionnaires respectively. At the bank, regional warehouse, cashew nut processing factory and input supplier respondents were interviewed using checklist of questions.

The structured questionnaires and checklist of questions used in the survey were prepared in English but translated in Kiswahili during the field stage. Kiswahili is understood better by all respondents and was therefore a useful language for the purpose of the study.

The content of structured questionnaire and checklist of questions were designed to collect sufficient data intended to address the objectives of the study. In this regard, the questionnaire included questions properly set to collect information required in running all the anticipated statistical and econometric analyses for testing hypotheses.

3.9 Analytical Techniques

The study employed four analytical techniques to test stated hypotheses. The analytical techniques were GM Analysis, Linear Regression Analysis, One-way ANOVA, and MCBA.

3.9.1 Gross margin analysis

GM analysis was employed to test the hypothesis that there is no significant difference across the gross margin earned by the key players under the WRS. GM is the difference in values of gross sales and gross variable costs. This was used to determine profitability of each key player under the WRS for cashew nut marketing. It was assumed that own labour of each key player's enterprise was unpaid, since it was tedious to estimate it as a cost incurred in cashew nut marketing. It was as well assumed that fixed costs are small

enough to affect the sustainability of the key player's enterprise. The expression which was used to calculate the GM across different key player enterprises in cashew nut marketing is therefore as shown below:-

$$\mathbf{GM}_i = \sum \mathbf{TR}_i - \sum \mathbf{TVC}_i$$

Where; \mathbf{GM}_i = Gross margin per bag of i^{th} key player

$\sum \mathbf{TR}_i$ = Total revenue from sales of one bag of i^{th} cashew nuts

$\sum \mathbf{TVC}_i$ = Total variable cost spent on one bag due to i^{th} production and/or marketing function.

3.9.2 Linear regression analysis

Linear regression analysis was used to test the hypothesis that socio-economic factors such as age of the farmer, size of the household labour, experience in cashew nut production, distance of the cashew nut farm, age of the cashew nut tree, training on WRS before its inception, gender of the household head, and distance to the primary cooperative society do not contribute to different profitability to farmers under the WRS. Thus, the independent variables that were examined include; Age of the farmer, household labour size, experience of the farmer in cashew nut production, farm distance, age of the cashew nut trees, training on WRS before its inception, gender of the household head, and distance to the primary cooperative society. These were examined against the gross margin which was the dependent variable.

$$\mathbf{GM} = \beta_0 + \beta_i X_i + \mu_i$$

Where;

GM = average gross margin

β_0 = an intercept

β_1 - β_n = parameters attached to the explanatory variables X_1 - X_n

X_1 - X_n = variables assumed to be linearly related to GM

μ_i = disturbance term

Summary of independent variables used in regression analysis;

AGE = age of the farmer (number of years)

HLSIZE = household labour size (number of people work on cashew nut farm in the household)

EXPC = experience in cashew nut production of the farmer (number of years)

FDIST = average distance of the cashew nut farm(s) (kilometre)

AGECT = average age of the cashew nut trees (number of years)

WRSTR = training on WRS before its inception (1 = yes, 2 = no)

GENDHH = gender of the household head (1 = male, 2 = female)

PCSDIST = distance to the primary cooperative society (kilometre)

3.9.2.1 Expected signs from the variables' coefficients

AGE: Age of the farmer

The increase in age of the farmer was expected to reduce efficiency in cashew nut production. Therefore, as the farmer is getting old, profitability is expected to decrease. A negative sign was expected for the parameter attached to this variable.

HLSIZE: Household labour size

Farmers with relatively higher household labour size are expected to have better chance of getting more profit from cashew nuts due to the fact that most of the activities on cashew

nut production are done by the family. Thus, a positive sign was expected for the parameter attached to this variable.

EXPC: Experience in cashew nut production of the farmer

It was expected that as the farmer spent more years in cashew nut production, he/she becomes expert in cashew nut production and hence increased output of quality cashew nuts. Therefore, a positive sign was expected for this coefficient.

FDIST: average distance of the cashew nut farm

It was expected that as the distance from farmer's house to the cashew nut farm increases, transport cost and security guard charges increase too. This reduces profit from cashew nut sales. Thus, a negative sign was expected for this coefficient.

AGECT: Average age of the cashew nut trees

As the cashew nut trees are getting old, the canopies increase which increases the quantity of cashew nuts harvested per tree. This increases both cashew nut sales and profit accrued from cashew nut production. Therefore, a positive sign was expected for this coefficient.

WRSTR: Training on WRS before its inception

It was postulated that as a farmer got training on WRS before its inception, would have stimulated efficiency in cashew nut production and hence increased output that eventually leads to increased profit from cashew nuts. Thus, a positive sign was expected for this coefficient.

GENDHH: Gender of the household head

Male household headed is more capable of carrying out cashew nut business than female household headed. Thus, it was expected that male household headed to accrue more profit from cashew nut business than female headed households and hence this variable was expected to bear positive sign.

PCSDIST: Distance to the primary cooperative society

The shorter the distance to the primary cooperative society the higher the profit margin accrued. This was so, because short distance reduces the cashew nut transportation cost to the farmer. Thus the negative sign was expected for this coefficient.

However, regression models are usually associated with problems of heteroscedasticity and multicollinearity. In this study problem of heteroscedasticity has been taken care by dropping some explanatory variables that seemed to render the model insignificant. There was no problem of serious multicollinearity observed in this study and thus, a stepwise regression was conducted to prove the absence of serious multicollinearity.

3.9.3 One-way analysis of variance

One-way ANOVA was used to test the hypothesis that there is no significant difference of the gross margin accrued by different key players under the WRS for cashew nut marketing. It was used to test statistical significance of the GM means between the key players under the WRS. Thus, GM was the dependent factor and group of key player was the independent factor.

3.9.4 Market channel baseline analysis

The MCBA was deployed to test the hypothesis that: lack of training on the WRS, lack of warehouses, and poor infrastructures are not significant constraints impairing cashew nut marketing through the WRS.

MCBA is an analytical technique used to assess the way a market channel operates. It records all enterprises in the market channel from production to final consumers. The enterprises carrying out similar functions are grouped together and the product flows in and out are recorded. Finally, the constraints, which hamper the facilitation of commodity flow from producers to consumers, were examined.

3.9.5 Data Analysis

3.10.1 Software

Data from the questionnaire survey were analyzed using the statistical procedure from the Statistical Package for Social Sciences (SPSS) software computer program. The SPSS computer program displayed descriptive statistics, which were frequencies, percentages, means, and the quantitative statistics which were one-way analysis of variance.

3.10.2 Descriptive analysis

Descriptive statistics were used to test the hypothesis that factors such as big volume of cashew nut produced by farmers, little guarantee from the government, lack of cashew nut marketing financing facilities, high interest rate on loans, lack of trust by the banks to farmers, collateral towards loans, and good market for cashew nuts do not significantly led farm gate price be paid in instalments. The analysis included deduction of means, frequencies, cross-tabulation and percentages of different key players under the WRS.

3.10.3 Quantitative analysis

One-way ANOVA was used to test the hypothesis whether there is no significant difference in gross margin accrued by key players under the WRS. Linear regression analysis was used to test the hypothesis that age of the farmer, size of household labour, experience in cashew nut production, cashew nut farm distance, age of the cashew nut tree, and training on WRS do not contribute to different profitability to farmers under the WRS.

3.11 Limitations of the Study

- i. Data collection was done during harvesting and marketing season, as this was time that all the key players were in the study area. It was difficult to find respondents especially farmers in their respective homes. Thus, the researcher was obliged to visit them at their marketing places (primary cooperative societies).
- ii. Some of the respondents especially farmers had no records on costs of cashew nut production. So it was difficult to know exactly the net cost of cashew nut production. Thus, what have presented are actually estimates given by the respondent and secondary data collected from the government officials.
- iii. Other respondents especially exporters were reluctant in giving cashew nut export data thinking that the researcher has been sent by Tanzania Revenue Authority (TRA) to scrutinize them. Thus, the researcher was obliged to collect the cashew nut export data from CBT because has all export data. The CBT uses the data in setting an indicative price.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Characteristics of the Farmers

Farmers' characteristics that are relevant in this study include age, gender, education, main occupation, household size, household labour, experience and training on WRS. Household in this study is considered to be composed by people who eat and sleep in the same house (Rick *et al.*, 2007).

Results show that age-range of the household heads considerably from 27 to a maximum of 82 years with mean age of 48 years. The mean age indicates that most of the farmers belong to the productive group. The majority (48.9%) of the farmers were in the 18 to 45 age group category while 34.4% of the farmers belonged to 46 - 60 age category and 16.7% of the respondents were aged above 60 years. This implies that there is high proportion of adults in the community who mainly make up the community workforce. The fact that 16.7% of the respondents are above 60 years old suggest high life expectancy. It also implies that cashew nut production in the study area is carried out by old people as well (Table 2).

Results further shows that the majority (93.3%) of the respondents are male, suggesting societies with male headed households. In male headed households in the study area, it is a man who concentrates more on cashew nut production than a woman. The women are pre-occupied with home duties and hence reducing their concentration on cashew nut production (Table 2).

The level of basic education in the study area is relatively high. Out of 90 respondents, 88.9% had attained primary education, 2.2% had secondary education while 8.9% had no formal education. This implies relatively high literacy level among the farmers (Table 2).

Table 2: Characteristics of the farmers

Characteristics	Frequency	Percentage
Age distribution:		
Young age (18-45 years)	44	48.9
Middle age (46-60 years)	31	34.4
Elder age (>60 years)	15	16.7
Total	90	100.0
Gender distribution:		
Male	84	93.3
Female	6	6.7
Total	90	100.0
Education level:		
No formal	8	8.9
Primary	80	88.9
Secondary	2	2.2
Total	90	100.0
Occupation:		
Farmer	89	98.9
Government employee	1	1.1
Total	90	100.0
Household size:		
Small size 1-3 people	6	6.7
Medium size 4-8 people	70	77.8
Large size 9-11 people	14	15.5
Total	90	100.0
Household labour:		
Small labour 1-3 people	47	52.2
Medium labour 4-8 people	39	43.3
Large labour 9-11 people	4	4.4
Total	90	100.0
Experience:		
1-20 years	42	46.7
21-40 years	48	53.3
Total	90	100.0
Ownership:		
Own	88	97.8
Clan	2	2.2
Total	90	100.0
Training on WRS:		
Yes	8	8.9
No	82	91.1
Total	90	100.0

Most (98.9%) of the farmers were depending on cashew nut farming as a major livelihood source. The remaining (1.1%) are government employees depending on both monthly salaries and cashew nut farming as livelihood sources. This implies that, agriculture is the main economic activity in the study area and contributes significantly to the livelihood security of the people (Table 2).

Family size per household is important in determining the levels of cashew nut production. Family size is used to determine the available labour for farm work basing on the extent of contribution of each in farm work (Boehnke, 2003). Results show that, household size of the respondents ranged between 1 and 11 members with the average household size of 6 members. Household labour force ranged between 1 and 11 members with the average of 4 members work on cashew nut farm. The majority of the households (77.8%) had medium family size of 4 to 8 members followed by large size (15.5%) and very few small size households (6.7%). On household labour force, the majority (52.3%) of the households had small size family work force followed by medium size (43.3%) and very few (4.4%) had large size family labour. This implies that majority of the households in the study area had small family labour for cashew nut production, thus they have to depend on hired labour (Table 2).

Most (53.3%) of the cashew nut farmers have experience of more than 20 years, while 46.7% are less experienced with less than 21 years. This implies that experience is an important element for farmer's proper performance and profit realization. The results thus suggest that most of the farmers are able to handle risks and uncertainties of cashew nut business (Table 2).

Regarding the ownership of cashew nut plots, results show that 97.8% of the respondents own their cashew nut plots and the remaining 2.2% use clan cashew nut plots. This implies that there were decreases in the clan cashew nut plots that could be passed on to younger generations (Table 2).

Also the results show that 91.1% of the farmers did not get training on the WRS before its inception while 8.9% got training only once. This is in agreement with Garcia (2006) that training on WRS to all key actors is necessary before its inception (Table 2).

4.2 Characteristics of the Primary Cooperative Societies

Experience in cashew nut marketing for the primary cooperative societies is very important as it guides good performance in cashew nut business. In the study area, experience range from five years to a maximum of 38 years. Most (80.0%) of the respondents had experience of 11 to 20 years, indicating that most of the primary cooperative societies were established around 1990s (Table 3).

Total number of members registered at the primary cooperative societies under the WRS ranged from 158 to a maximum of 650 members. The results show that among these, 73.3% of the primary cooperative societies had 251 to 450 members. This implies most of the primary cooperative societies have medium size number of members, where small size and large size were 16.7% and 10.0% respectively (Table 3).

Table 3: Characteristics of the primary cooperative societies

Characteristics	Frequency	Percentage
Experience:		
1-20 years	4	13.3
11-20 years	24	80.0
21-40 years	2	6.7
Total	30	100.0
Members:		
Small size 150-250 people	5	16.7
Medium size 251-450 people	22	73.3
Large size 451-650 people	3	10.0
Total	30	100.0
Distance from the bank:		
0.1-10.0 km	8	26.7
10.1-30.0 km	8	26.7
>30.0 km	14	46.7
Total	30	100.0
Distance from the regional warehouse:		
1-10 km	6	20.0
11-40 km	8	26.7
>40 km	16	53.3
Total	30	100.0
Training on WRS:		
Yes	10	33.3
No	20	66.7
Total	30	100.0
How often got training:		
Not at all	15	50.0
Once	12	40.0
Twice	3	10.0
Total	30	100.0

The fact that as the distance from bank of the primary cooperative society increase, the transaction cost increases too (Garcia, 2006), has been indicated in the results whereby 46.7% of the primary cooperative societies had a distance of above 30 kilometres. Also, 53.3% of the primary cooperative societies had distance above 40 kilometres from the regional warehouses (Table 3). Thus, suggesting establishment of more regional warehouses which are close to farmers in the study area.

The results show that there was no adequate training on the WRS to all primary cooperative societies before its inception (66.7%). It further more show that 40.0% and 10.0% got training on the WRS once and twice respectively (Table 3).

4.3 Characteristics of the Banking Institutions

The results show that all (100%) bank institutions involved in financing cashew nut marketing under the WRS had one year of experience in financing cashew nut marketing in the study area. This is in agreement with CBT (2008c) who argued that bank institutions in the study area had never financed crop marketing before the WRS (Table 4). The objective of the bank institutions in financing cashew nut marketing was to provide full range of financial services to the rural and peri-urban population in the study area.

Number of primary cooperative societies given loan by the bank institutions was ranged from 16 to a maximum of 33 cooperative societies with a mean of 27 cooperatives for each bank institution. This implies that there were still opportunities for more primary cooperative societies to be given loans for cashew nut marketing under the WRS (Table 4).

Conditions for bank institutions to give loan to the primary cooperative societies were a letter of loan application, a cash flow projections, a certificate of registration, a security of the loan, a list of debtors and creditors, and the cashew nut stock position, if available. Primary cooperative societies had to fulfil the conditions before they were given a loan.

Table 4: Characteristics of the banking institutions

Characteristics	Frequency	Percentage
Experience:		
1 year	3	100.0
Total	3	100.0
Number of primary cooperatives:		
1-20 cooperatives	1	33.3
21-40 cooperatives	2	66.7
Total	3	100.0

4.4 Characteristics of the Exporters

The results show that 83.3% of the exporters had experience above two years while the remaining 16.7% had experience of two or less than two years. This indicates that few exporters are coming into cashew nut business under the WRS. Many cashew nut exporters are the one who were in the study area even before the WRS, thus suggesting experience matters on cashew nut business (Table 5).

Source of capital to exporters is very important. This is revealed by 66.7% of exporters whose source of capital was loan from bank. The 33.3% of exporters had private savings as their capital source. The results also show that 100.0% of the exporters export cashew nuts to India. This is again in agreement with CBT (2008c) who earlier argued that the main export market for Tanzania cashew nuts is India (Table 5).

Table 5: Characteristics of the exporters

Characteristics	Frequency	Percentage
Experience:		
Less or equal to 2 years	1	16.7
Above 2 years	5	83.3
Total	6	100.0
Source of capital:		
Loan from bank	4	66.7
Savings	2	33.3
Total	6	100.0
Selling place:		
Export to India	6	100.0
Total	6	100.0

4.5 Characteristics of the Processors

Cashew nut processing in the study area is of very much importance. However, big volume of raw cashew nut is being exported. The results show that 66.7% of the processors available belonged to a group of people and 33.3% were owned by private companies (Table 6).

Experience of the processing firms available in the study was found to be above two years (66.7%), while 33.3% were two years or less than two years. This implies very few processing firms began under the WRS. The results show that 83.3% of the processing firm sold kernels to the local market. The remaining processing firms (16.7%) sold in the export market. This implies lack of export market for processed cashew nuts. Source of capital to the processing firms was private savings (66.7%), the remaining (33.3%) depended on loans from financial institutions (Table 6).

Table 6: Characteristics of the processors

Characteristics	Frequency	Percentage
Ownership:		
Group	4	66.7
Private	2	33.3
Total	6	100.0
Experience:		
Less or equal 2 years	2	33.3
Above 2 years	4	66.7
Total	6	100.0
Selling place:		
Export market	1	16.7
Local market	5	83.3
Total	6	100.0
Source of capital:		
Private savings	4	66.7
Loan	2	33.3
Total	6	100.0

4.6 Characteristics of the Input Suppliers

The results show that the district input supplier was by 100.0% responsible for the inputs supply in the study area. This served as sole farmers input supplier. The source of capital to this input supplier was farmers' contributions by 100.0%. Further more the results show that 66.7% of the input suppliers had experience of above two years while 33.3% had equal to or less than two years (Table 7).

Table 7: Characteristics of the input suppliers

Characteristics	Frequency	Percentage
Experience:		
Less or equal to 2 years	1	33.3
Above 2 years	2	66.7
Total	3	100.0
Ownership:		
Farmers	3	100.0
Total	3	100.0
Source of capital:		
Farmers contribution	3	100.0
Total	3	100.0

4.7 Interaction of the Key Players under the WRS

The key players under the WRS for cashew nut marketing in the study area were farmers, primary cooperative societies, bank institutions, exporters, processors, and input suppliers. The CBT and Cooperative unions are also important stakeholders. They represented the primary cooperative societies in cashew nut closed bid auctions. All these players interacted under the supervision of the government through CBT. Fig. 4 describes the WRS operation in the study area.

- (i) Primary cooperative societies send farmers' input deduction to the district input fund. Farmer's input deduction is TShs 30 per kg of cashew nuts sold at the primary cooperative society. The district input fund with consultation from CBT pays input traders for supplying inputs. It is the CBT making procurements on inputs for the district input fund.
- (ii) The district input fund supplies inputs to the primary cooperative societies.
- (iii) The primary cooperative societies supply inputs to farmers. Each farmer gets inputs depending on the value of cashew nuts he/she sold in the last season. The higher the volume of cashew nuts sold the higher the volume of inputs one get.

- (iv) Once the cashew nut harvesting season is ready, usually in October, the CBT announces the indicative price to be paid to farmers. The cooperative unions inform primary cooperative societies to go to the bank for loans.
- (v) Banks issues loans to the primary cooperative societies up to 65% of the value of cashew nuts to be collected from farmers.
- (vi) Farmers collect their cashew nuts and deliver to the primary cooperative society. In turn, farmers get a WR with a value equivalent to 60% of the payment due basing on the indicative price.
- (vii) The primary cooperative societies then take the cashew nuts to the regional warehouses. In turn, the warehouse operator issues to the primary cooperative societies a CT and a CP.
- (viii) The primary cooperative societies take CT to the secondary cooperative societies.
- (ix) The primary cooperative societies submit the CP to the Banks as security against the loan.
- (x) The CBT and the secondary cooperative society then conduct the closed bid auctions for the collected cashew nuts.
- (xi) The buyers (exporters and processors) apply for cashew nut buying at the closed bid auctions.
- (xii) The highest bidder wins the auction and acquires buying rights. The secondary cooperative society hands over the CT to the bid winner.
- (xiii) The buyer submits CT to the bank. On receiving the CT, the bank matches it with the CP and allows the buyer to make payments.
- (xiv) Immediately after making the payments, the bank hands over the CP to the buyer.

- (xv) The buyer takes both the CT and the CP to the regional warehouse. On receiving the CT and CP, the warehouse operator matches it with the original copy and thereafter.
- (xvi) The warehouse operator allows the buyer to take cashew nuts from the warehouse.
- (xvii) The bank deducts the loan and interest rate from payments made by buyers, and pays the rest to the primary cooperative societies.
- (xviii) The primary cooperative societies pay the warehouse operator warehouse all warehouse storage charges. Also pay the secondary cooperative society and all kind of levies, including district council levy.
- (xix) The primary cooperative societies then pay farmers the remaining 30% of the indicative price.
- (xx) If cashew nuts at closed bid auctions were sold at a price above the minimum price, the farmer then enjoys a bonus payment.

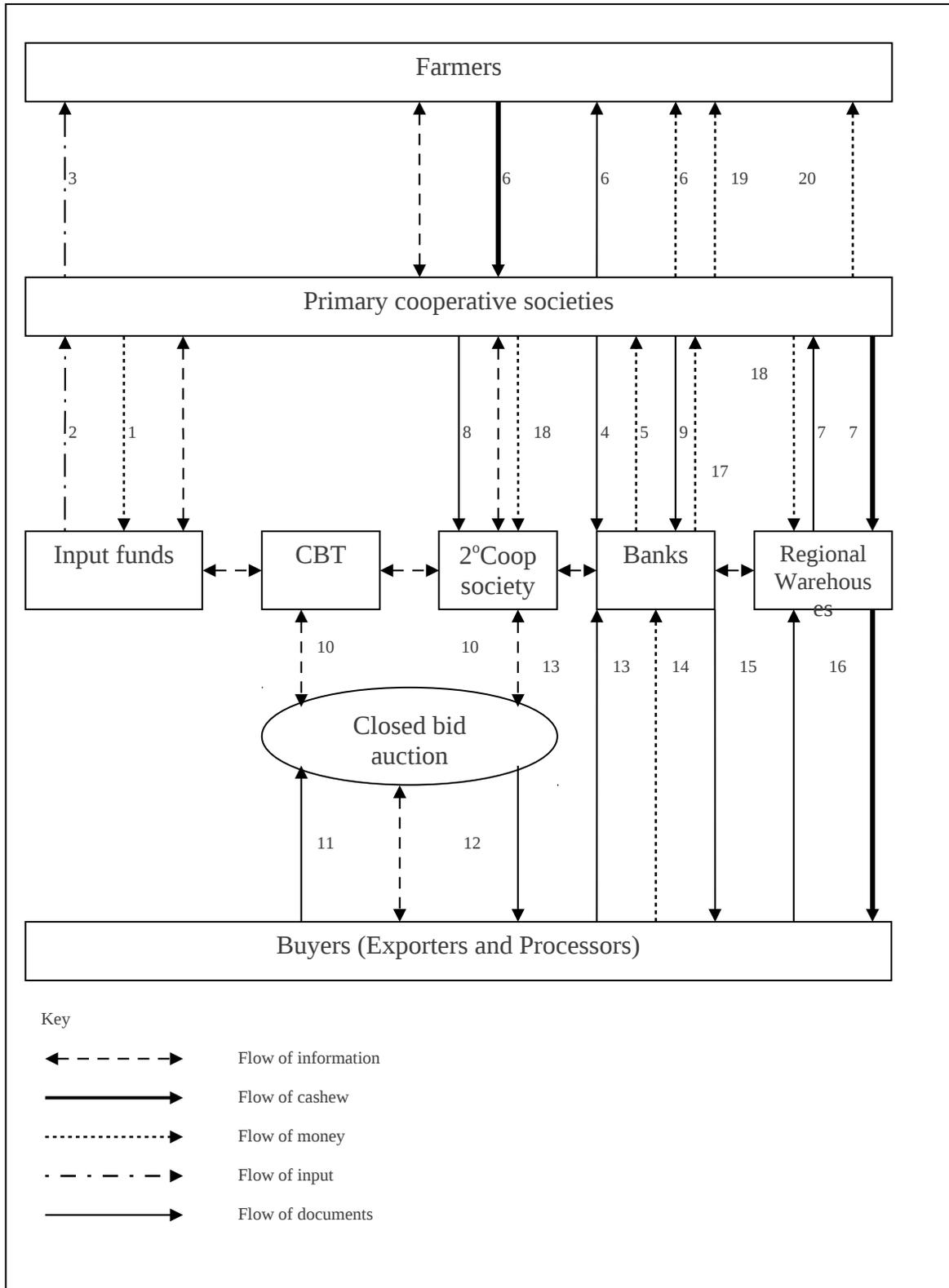


Figure 4: Functioning of the WRS for cashew nut marketing

4.8 Gross Margin Analysis

Results from GM analysis show that of the six key players under the WRS, the banking institution ranked the first and highest earner by accruing an average GM of TShs 164 172.96 per bag. The farmer ranked last and lowest earner by accruing the average GM of TShs 6 386.68 per bag. Average gross margins for other key players were: TShs 64 806.67 per bag for processor, TShs 53 112.8 per bag for exporter, TShs 51 287.47 per bag for primary cooperative society, and TShs 16 548.38 per bag for input supplier.

Bank institutions accrued higher GM than others due to the fact that the interest rate is high as it is charged per day. As the number of days the cashew nuts kept at the regional warehouse increase, interest charge also increases. Apparently the time in stay at warehouses is many because warehouse has to wait for the auction. Higher processor's GM than that of exporter implies the potential for processing raw cashew nut in the study area rather than exporting it (Table 8).

Table 8: Gross margins of the key players under the WRS

Descriptions	Key player					
	Farmer	Cooperative	Bank	Exporter	Processor	Input supplier
Total Variable Cost (TShs/bag)	53 662.92	76 366.77	20 291.04	105 833.20	69 060.00	63 541.68
Total Revenue (TShs/bag)	60 049.60	127 654.24	184 464.00	158 946.00	133 866.67	80 090.06
Gross Margin (TShs/bag)	6 386.68	51 287.47	164 172.96	53 112.80	64 806.67	16 548.38

Note: One bag of cashew nuts equal to 80 kg.

4.8.1 Farmers' gross margin analysis

In analysing the farmers' GM, the results show that the TVC incurred in cashew nut product was at TShs 53 662.92 per bag. The TR accrued from cashew nuts was TShs 60 049.60 per bag. Thus, the GM was at TShs 6 386.68 per bag (Table 9).

While the cost of weeding (TShs 14 374 per bag) was relatively higher than other variable costs, the cost of oil (TShs 14.27 per bag) was the lowest. The cost of powdery sulphur (TShs 12 114.24 per bag) and the cost of liquid sulphur (TShs 8162.9) were next to the cost of weeding (Table 9). The costs of sulphur were high because it was found that the sulphur supplied by the district input supplier was not enough to meet all spraying rounds within a season. This obliged farmers to buy sulphur from private dealers.

Table 9: Farmers' gross margin analysis

Descriptions	Mean value (TShs/bag)
Cost of powdery sulphur	12 114.24
Cost of liquid sulphur	8 162.19
Cost of weeding	14 374.00
Cost of planting	517.31
Cost of spraying	6 448.54
Cost of harvesting	3 307.16
Cost of transportation	1 770.24
Cost of security guard	670.41
Cost of hand hoe	2 256.03
Cost of machete	660.30
Cost of rake	234.73
Cost of slasher	51.39
Cost of spade	213.46
Cost of bag	1 673.92
Cost of petrol fuel	982.20
Cost of oil	14.27
Cost of cleanliness	79.43
Cost of celecron	53.33
Cost of bucket	79.77
Total Variable Cost	53 662.92
Total Revenue	60 049.60
Gross Margin	6 386.68

4.8.2 Primary cooperative societies' gross margin analysis

GM analysis for the primary cooperative societies included the cost of buying cashew nuts from farmers at TShs 48 800 per bag and amount of bonus payment at TShs 11 249.6 per bag. While the TVC was TShs 76 366.77 per bag, the TR was TShs 127 654.24 per bag. Therefore, GM accrued was TShs 51 287.47 per bag (Table 10).

Table 10: Primary cooperative societies' gross margin

Descriptions	Mean value (TShs/bag)
Cost of buying	48 800.00
Cost of giving services	1 120.00
Cost of warehousing	640.00
Cost of fumigation	160.00
Cost of interest rate	7 686.00
Cost of loan application	240.00
Cost of bags and ropes	2 200.00
Cost of crop insurance	160.00
Cost of cash distribution	160.00
Cost of gunny bags distribution	80.00
Cost of transport	3 391.17
Cost of bonus payment	11 249.60
Total Variable Cost	76 366.77
Total Revenue	127 654.24
Gross Margin	51 287.47

4.8.3 Bank institutions' gross margin analysis

The high GM (TShs 164 172.96 per bag) accrued by the bank was mainly because of the interest rate (15%) charged per day for the total number of days which the cashew nuts stayed at the regional warehouses. The banks also recorded low transaction costs because most of the costs are actually covered by the primary cooperative societies. The cost for electricity (TShs 5533.92 per bag) was high as there is no reliable power in the study area. The banks therefore had to use generators. The cost for labour charges (TShs 5533.92 per bag) emanated from the need for frequent inspections because the cashew nut had to stay at regional warehouses for long periods (Table 11).

Table 11: Bank institutions' gross margin analysis

Descriptions	Mean value (TShs/bag)
Cost of labour	5 533.92
Cost of computer	3 689.28
Cost of electricity	5 533.92
Cost of stationery	1 844.64
Cost of communication	1 844.64
Cost of other charges	1 844.64
Total Variable Cost	20 291.04
Total Revenue	184 464.00
Gross Margin	164 172.96

4.8.4 Exporters' gross margin analysis

The results (Table 12) show that among the variable costs, the cost of buying cashew nuts (TShs 78 161.47 per bag) was the highest followed by the cost of levy (TShs 8321.60 per bag) and then the cost of shipping at TShs 7645.20 per bag. Other costs are as presented in Table 12.

The cost of buying cashew nuts was high because of the highest price that was picked from the closed bid auction. This is in agreement with CBT (2008c) argument that cashew nuts are no longer cheap in the study area (CBT, 2008c). The high cost of levy was high due to the fact that all exporters had to pay all levies before they exported their cashew nuts. The levy was charged per kilogram of cashew nuts, and it was CBT which charged it.

Table 12: Exporters' gross margin analysis

Descriptions	Mean value (TShs/bag)
Cost of buying	78 161.47
Cost of transport to the port	2 293.33
Cost of port charges	2 400.00
Cost of handling	2 406.67
Cost of storage	1 153.33
Cost of labour charge	2 026.67
Cost of levy	8 321.60
Cost of shrinkage	715.20
Cost of brokerage	709.73
Cost of shipping	7 645.20
Total Variable Cost	105 833.20
Total Revenue	158 946.00
Gross Margin	53 112.80

4.8.5 Processors' gross margin analysis

The results show that the highest cost that the processors incurred was related to buying of raw cashew nuts at TShs 57 706.67 per bag. This was followed by the cost of labour and processing which was TShs 2706.67 per bag and TShs 2306.67 per bag respectively. Other variable costs are as presented in Table 13. This implies that despite the lack of a reliable

market for processed cashew nuts, the few available cashew nut factories available were still processing cashew nut at a profit (Table 13).

Table 13: Processors' gross margin analysis

Descriptions	Mean value (TShs/bag)
Cost of buying raw cashew	57 706.67
Cost of processing	2 306.67
Cost of packaging	1 826.67
Cost transport	1 533.33
Cost of storage	813.33
Cost of handling	1 293.33
Cost of labour	2 706.67
Cost of market levy	873.33
Total Variable Cost	69 060.00
Total Revenue	133 866.67
Gross Margin	64 806.67

4.8.6 Input suppliers' gross margin analysis

The results show that the variable costs were the highest (TShs 59 750 per bag) for buying inputs followed by the cost of transport (TShs 1416.67 per bag). The lowest costs were service charges (TShs 266.67 per bag) and storage charges (TShs 566.67 per bag). Other costs are as presented in Table 14. However, the TR accrued was relatively high due to the fact that all cashew nut farmers in the study area submitted their input contributions to the district input fund.

Table 14: Input suppliers' gross margin analysis

Descriptions	Mean value (TShs/bag)
Cost of buying	59 750.00
Cost of input supplier services	266.67
Cost of labour	916.67
Cost of handling	625.00
Cost of transport	1 416.67
Cost of storage	566.67
Total Variable Cost	63 541.68
Total Revenue	80 090.06
Gross Margin	16 548.38

4.9 One-way Analysis of Variance

One-way ANOVA was adopted to test the null hypothesis that there is no significant difference across the GM accrued by the key players under the WRS in the study area. GM accrued by different key players was thus the dependent variable and the group of key player was the factor. The ANOVA was run at 0.05 level of significant and multiple comparisons were generated through Least Square Differences (LSD). Overall ANOVA results show that the null hypothesis was rejected ($P < 0.05$) with F statistic of 14.324 (Table 15). This implies that there is a significant difference in the gross margins earned by key players in the cashew nut sub sector.

The results from multiple comparisons were used to test the significant difference across the GM between the key players. It shows that the GM accrued by the farmers was significantly different from bank institutions, primary cooperative societies, processors, and exporters. There was no significant difference between the farmers and input suppliers. Generally, the gross margin accrued by farmers was significantly smaller than other key players.

The GM accrued by primary cooperative societies was significantly different from that of the bank and the farmer. This implies that the GM accrued by the primary cooperative societies was statistically not different from that of exporter, processor, and input supplier.

On side of the bank institution, its GM was statistically different from all the key players. This indicates how bank accrues much profit from the WRS through high (15%) interest rate per day, for the whole period of time the cashew nuts stay at the regional warehouses.

The GM accrued by the exporter is statistically different from that of the bank and the farmer. This implies that the WRS is as good as it has reduced the gap between the exporter's profit and the profit accrued by primary cooperative societies. Thus, the primary cooperative societies in long run can uplift farmer's profit by paying him/her with high farm gate price.

Processor's GM was statistically significant difference from the bank institution and the farmer. This implies that processor's profit is statistically not different with that of exporter who usually exports raw cashew nuts. The results show that input supplier's GM was not statistically different from all key players except bank institution. This implies that the district input fund was relatively earning less from the WRS, which is even not far from that accrued by the farmer.

Table 15: Multiple comparisons of GM under the WRS

(I) Groups of key player	(J) Groups of key player	Mean difference (I-J)	Significance level
Farmer	Cooperative	-44900.796*	0.000
	Bank	-157786.286*	0.000
	Exporter	-46726.123*	0.009
	Processor	-58419.990*	0.001
	Input supplier	-10161.716	0.679
Cooperative	Farmer	44900.796*	0.000
	Bank	-112885.487*	0.000
	Exporter	-1825.327	0.922
	Processor	-13519.193	0.470
	Input supplier	34739.080	0.171
Bank	Farmer	157786.283*	0.000
	Cooperative	112885.487*	0.000
	Exporter	11060.160*	0.000
	Processor	99366.293*	0.001
	Input supplier	147624.567*	0.000
Exporter	Farmer	46726.123*	0.009
	Cooperative	1825.327	0.922
	Bank	-111060.160*	0.000
	Processor	-11693.867	0.628
	Input supplier	36564.407	0.217
Processor	Farmer	58419.990*	0.001
	Cooperative	13519.193	0.470
	Bank	-99366.293*	0.001
	Exporter	11693.867	0.628
	Input supplier	48258.273	0.104
Input supplier	Farmer	10161.716	0.679
	Cooperative	-34739.080	0.171
	Bank	-147624.567*	0.000
	Exporter	-36564.407	0.217
	Processor	-48258.273	0.104

F-Value = 14.324

*The mean difference is significant at the 0.05 level

4.10 Linear Regression Analysis

A linear regression equation was estimated to test the effect of the socio-economic factors, which were hypothesized to contribute to differences in profitability among farmers. The GM estimates used to measure cashew nut profitability was thus the dependent variable and independent variables were age of the farmer, household labour size, experience in cashew nut production, distance from the cashew nut farm, age of the cashew nut trees, and training on WRS before its inception.

After estimating the model, independent variables: training on WRS before its inception, gender of the household head, and distance to the primary cooperative society were dropped for two major reasons. First, the variables were insignificant in the relationship and second, their inclusion was rendering the model insignificant ($P < 0.05$) (Table 16).

Table 16: Dependent variable: Average gross margin value

Variable	β	Std Error	T	Significance level
(Constant)	722.438	4215.265	0.171	0.864
AGE	-257.938	70.740	-3.646**	0.000
HLSIZE	1284.178	553.508	2.320*	0.023
EXPC	331.018	111.478	2.969**	0.004
FDIST	-731.043	219.459	-3.331**	0.001
AGECT	204.642	73.923	2.768**	0.007

R² = 71.1%

F – Value = 41.322

R-2 = 69.4%

SE = 8097.457

Note: **Significant at 1%

*Significant at 5%

The results of the ultimate specified model are shown in Table 16. It shows that the model was significant as indicated by the significance of F value ($P < 0.05$). Moreover, R² value of 0.711 indicates that the model explained about 71.1% of the variation in the odds ratio. The high R² value implies that the Model fitted well to the data, i.e. have high explanation power of the joint association of the socio-economic factors contributing to cashew nut profitability differences among the farmers in the study area. According to these results only 28.9% of variations were attributed to other factors that were not included in the Model. Final results of parameters are summarized in Table 16.

The results show that coefficients: household labour size, experience in cashew nut production, and age of cashew nut trees as it was expected, were positively related to the cashew nut profitability and found to be statistically significant ($P < 0.05$). Age of the farmer and average distance of the cashew nut farm, as postulated, were negatively related to cashew nut profitability and found to be statistically significant ($P < 0.05$) (Table 16).

The positive relationship between the household labour size and cashew nut profitability can be attributed due to the fact that household labour size is unpaid hence reduces the paid cost for cashew nut production. In case of experience in cashew nut production and cashew nut profitability, the positive relationship is because of the increase in knowledge for cashew nut production and hence increased quantity and quality of cashew nut output (Table 16).

Age of cashew nut trees and cashew nut profitability were positively related. This can be explained by the fact that as the cashew nut trees grow *ceteris paribus* there is an increase in the canopies which gives out increased quantity of cashew nut harvested. Age of the farmer and cashew nut farm distance were negatively related because, as the farmer gets old the efficiency in cashew nut production decreases and hence decreased quantity and quality of output. The farm distance increases costs of cashew nut production in terms of transport cost of both cashew nut output and inputs such as sulphur. If the cashew nut farm is far from the house there has to be guards for cashew nut security, all guards have to be paid which in essence increases cost of cashew nut production. The positive intercept indicates the cashew nut profitability in the absence of factors used in the model (Table 16).

4.10.1 Testing for multicollinearity

In order to observe multicollinearity problems a stepwise regression was conducted. This method involved gradual addition of variables to the elementary regression and then their effects observed on the overall R^2 . In this study the dependent variable was GM which was regressed on the explanatory variables. Then the results of each regression were examined in the overall R^2 as shown in Fig. 5.

Equation 1: GM = -13290.208 + 4149.55HLSIZE			
	(8.435**)		R ² = 0.447
Equation 2: GM = -4721.33 + 3133.514HLSIZE – 1285.282FDIST			
	(6.84**)	(-5.706**)	R ² = 0.598
Equation 3: GM = 7188.99 + 2964.632HLSIZE – 977.967FDIST – 255.202AGE			
	(6.778**)	(-4.194**)	(-3.282**) R ² = 0.642
Equation 4: GM = 4405.058 + 1758.827HLSIZE – 847.275FDIST – 255.558AGE +			
384.358EXPC	(3.218**)	(-3.788**)	(-3.479**)
	(3.371**)		R ² = 0.685
Equation 5: GM = 722.438 + 1284.178HLSIZE – 731.043FDIST – 257.938AGE +			
331.018EXPC + 204.642AGECT	(2.32*)	(-3.331**)	(-3.646**)
	(2.969**)	(2.768**)	R ² = 0.711
Where;	* Significant at 0.05 level		
	** Significant at 0.01 level		
	Figures in brackets are T-values		

Figure 5: Prove of the absence of serious multicollinearity

It was observed that the new variables improved R² without rendering a considerable effect neither on the signs nor on the values of the individual coefficients to be unacceptable in the equation. This proved the absence of serious multicollinearity problem in the regression model (Koutsoyiannis, 1977., Boadu, 1992).

4.11 Reasons behind the Farm gate being Paid in Instalments

Results from descriptive analysis of the reasons behind the fact that the farm gate price is being paid in instalments, show a big discrepancy in understanding on part of the farmer, the primary cooperative society officials, and the bank. This is in agreement with the fact that very few farmers got training on WRS before its inception and thus fail to know the reasons for the farm gate price being paid in instalments. According to the farmers

responses, amongst all the reasons investigated, only the lack of cashew nut marketing financing facilities (21.1%), and to find good prices for cashew nut (15.6%) were scored a “much” and “very much” respectively.

Regarding the primary cooperative societies, the reasons for the farm gate price being paid in instalments were: little (65%) guarantee from the government (60.0%), high interest rate charged by the bank (70.0%), collateral towards loan from the bank (86.7%), and seeking good price for cashew nut (83.3%). This implies that WRS training to the primary cooperative societies were better compared to the nothing provided to farmers.

Further more, the results show that little (65%) guarantee from the government (100.0%), high interest rate (100.0%), collateral towards loan taken by the primary cooperatives (66.7%), seeking good price for cashew nut (100.0%), and requirement of the WRS (100.0%) were the reasons given by the bank institutions. This implies that the reasons given by the bank institutions were the major reasons behind the fact that the farm gate price is being paid in instalments as similar reasons were given by the primary cooperative societies (Table 17).

Table 17: Reasons behind the farm gate price being paid in instalments

Reasons	Descriptions	Farmer	Cooperative	Bank
Big volume of cashew	not at all	85 (94.4)	28 (93.3)	3 (100.0)
	a little	5 (5.6)	2 (6.7)	0 (0.0)
Little guarantee from the government	not at all	83 (92.2)	10 (33.3)	0 (0.0)
	a little	2 (2.2)	1 (3.3)	0 (0.0)
	much	5 (5.6)	1 (3.3)	0 (0.0)
	very much	0 (0.0)	18 (60.0)	3 (100)
Lack of cashew nut marketing financing facilities	not at all	28 (31.1)	22 (73.3)	3 (100.0)
	a little	40 (44.4)	2 (6.7)	0 (0.0)
	much	19 (21.1)	0 (0.0)	0 (0.0)
	very much	3 (3.3)	6 (20.0)	0 (0.0)
High interest rate charged by the bank	not at all	81 (90.0)	7 (23.3)	0 (0.0)
	a little	3 (3.3)	1 (3.3)	0 (0.0)
	much	5 (5.6)	1 (3.3)	0 (0.0)
	very much	1(1.1)	21 (70.0)	3 (100)
Lack of trust by the banks to the cooperatives	not at all	75 (83.3)	19 (63.3)	3 (100.0)
	a little	12 (13.3)	5 (16.7)	0 (0.0)
	much	3 (3.3)	1 (3.3)	0 (0.0)
	very much	0 (0.0)	5 (16.7)	0 (0.0)
Collateral towards loan from the bank	not at all	81 (90.0)	4 (13.3)	0 (0.0)
	much	3 (3.3)	0 (0.0)	2 (66.7)
	very much	6 (6.7)	26 (86.7)	0 (0.0)
To find good price for cashew nuts	not at all	70 (77.8)	4 (13.3)	0 (0.0)
	a little	5 (5.6)	0 (0.0)	0 (0.0)
	much	1 (1.1)	1 (3.3)	0 (0.0)
	very much	14 (15.6)	25 (83.3)	3 (100)
Requirement of the WRS	not at all	90 (100)	18 (60.0)	0 (0.0)
	a little	0 (0.0)	9 (30.0)	0 (0.0)
	very much	0 (0.0)	3 (10.0)	3 (100)

Note: Figures in parentheses are percentages

4.12 Constraints Faced by Key players under the WRS

Key players under the WRS faced several constraints in the cashew nut marketing process.

Such constraints differ from one key player to another.

4.12.1 Constraints faced by farmers

The findings show that, of the ten constraints that were postulated to be faced by farmers, only six were proved to be true. These were: lack of training on WRS (91.1%), late of second instalment (40%) payment (100.0%), lack of input credit (93.3%), lack of working capital (86.7%), late of input supply (100.0%), and low cashew nut price compared to its

cost of production (100.0%) (Table 18). This implies that farmers were not comfortable with the system.

The constraints not only affected cashew nut marketing under the WRS but also cashew nut production in the subsequent season. Other constraints were: poor infrastructures (17.8%), and poor quality of inputs (12.2%) (Table 18).

Table 18: Constraints faced by farmers

Constraints	Descriptions	Frequency	Percentage
Lack of training on WRS	not at all	4	4.4
	a little	4	4.4
	very much	82	91.1
	Total	90	100.0
Lack of input credit	a little	6	6.7
	very much	84	93.3
	Total	90	100.0
Lack of working capital	not at all	8	8.9
	a little	4	4.4
	Much	78	86.7
	Total	90	100.0
Late of second (40%) payment	very much	90	100.0
	Total	90	100.0
Late of input supply	very much	90	100.0
	Total	90	100.0
Low cashew nut price	very much	90	100.0
	Total	90	100.0
Poor infrastructures	not at all	65	72.2
	a little	9	10.0
	Much	16	17.8
	Total	90	100.0
Poor quality of inputs	not at all	66	73.3
	a little	13	14.4
	very much	11	12.2
	Total	90	100.0

4.12.2 Constraints faced by primary cooperative societies

Results show that most of the primary cooperative societies were constrained by lack of training on WRS (86.7%), late of cashew nut auction (86.7%), high interest rate on bank loan (86.7%), inadequate participation in the cashew nut auctions (66.7%), lack of the

regional warehouses (56.7%), and cheating through tempered weigh bridges at the regional warehouses (50.0%) (Table 19).

As long as the WRS was put in place by the government, it is very apparent that the government did so before moving onto analysis of the system itself. That's why there were no adequate trainings prior to the functioning of the system. Similar findings were reported by Coulter *et al.* (1997) who commented that before the implementation of the WRS there has to be adequate training to all players.

Other constraints that were anticipated to be faced by the primary cooperative societies were not faced by most of the primary cooperative societies (i.e. < 50.0%) (Table 19). Thus, their inclusions in the list of constraints were limited.

Table 19: Constraints faced by the primary cooperative societies

Constraints	Descriptions	Frequency	Percentage
Lack of training on WRS	a little	2	6.7
	Much	2	6.7
	very much	26	86.7
	Total	30	100.0
Late of cashew nut auction	Not at all	2	6.7
	a little	2	6.7
	very much	26	86.7
	Total	30	100.0
Poor quality of cashew nuts	Not at all	27	90.0
	a little	3	10.0
	Total	30	100.0
High interest rate on bank loan	Not at all	1	3.3
	a little	2	6.7
	Much	1	3.3
	very much	26	86.7
	Total	30	100.0
Lack of working capital	Not at all	16	53.3
	a little	5	16.7
	Much	4	13.3
	very much	5	16.7
	Total	30	100.0
Cheating of weigh bridges	Not at all	8	26.7
	a little	7	23.3
	very much	15	50.0
	Total	30	100.0
Inadequate participation in cashew nut auctions	Not at all	2	6.7
	a little	2	6.7
	Much	6	20.0
	very much	20	66.7
	Total	30	100.0
Low cashew nut price	Not at all	13	43.3
	a little	2	6.7
	Much	6	20.0
	very much	9	30.0
	Total	30	100.0
Some farmers sell cashew nuts outside the WRS	Not at all	25	83.3
	a little	2	6.7
	Much	1	3.3
	very much	2	6.7
	Total	30	100.0
Lack of the regional warehouses	Not at all	13	43.3
	very much	17	56.7
	Total	30	100.0
Negative response from anti-ruling political party members	Not at all	21	70.0
	a little	5	16.7
	Much	2	6.7
	very much	2	6.7
	Total	30	100.0
Poor infrastructures e.g. roads	Not at all	19	63.3
	a little	4	13.3
	Much	3	10.0
	very much	4	13.3
	Total	30	100.0

4.12.3 Constraints faced by banking institutions

Lack of training on the WRS was also constraining bank institutions (100.0%). The banks were complaining illiteracy of farmers towards banking operations as it undermined their efficiency in financing the system. Another constraint was lack of good weigh bridges (100.0%) at the regional warehouses (Table 20). This implies the use of weighing equipment that had been tempered with.

The banking institutions are also faced with the government and political interference (66.7%). Government interference that undermines banking operation is when the government official (minister, regional commissioner, and district commissioner) orders bank to issue loan to the primary cooperative societies without adhering to banking regulations. Similar interference was also found from Member of Parliament (MP). MP often times asked the bank to pay the remaining farm gate price as cashew nuts stay at the regional warehouses. Both the government officials and the politicians interrupted banking operations with the aim of maintaining their positions in the study area.

Table 20: Constraints faced by banking institutions

Constraints	Frequency	Percentage
Lack of training on WRS	3	100.0
Government interference undermines bank operations	2	66.7
Political interference undermines bank operations	2	66.7
Tempered weigh bridges	3	100.0
Late cashew nut sales	1	33.3

4.12.4 Constraints faced by exporters

Unfairness of the closed bid auction (66.7%), bureaucracy (66.7%), and low cashew nut quality (50.0%) were the major constraints faced cashew nut exporters in the study area. Another constraint was high market levy (33.3%) (Table 21).

Cashew nut exporters in the study area were complaining about the long bureaucratic procedures in the whole process of buying cashew nuts. Before unloading cashew nuts from the regional warehouse, they had to be approved by the CBT and the banking institution. Thus, traders were not happy with the number days (two to three weeks) that took them to get cleared by the two organisations.

Also cashew nut exporters doubted on the fairness of the closed bid auctions, as some traders won few auctions despite of having similar bid price of the winner for several times. Low quality of cashew nuts was noted by the exporters which in essence lowered their selling price at the world market.

Table 21: Constraints faced by exporters

Constraints	Frequency	Percentage
Unfairness of the closed bid auction	4	66.7
Low cashew nut quality	3	50.0
High market levy	2	33.3
Bureaucracy	4	66.7

4.12.5 Constraints faced by processors

Results show that all (100.0%) processors were constrained with no reliable market for processed cashew nuts. This was followed by lack of working capital (66.7%), bureaucracy in accessing raw cashew nut (66.7%), and poor quality of raw cashew nut (50.0%) (Table 22).

Cashew nut processing firms in the study area were lamenting on the unreliable markets as this was slowing down their speed (processing 30 tonnes per day). This led them to

continue processing cashew nuts based on the purchaser's order. The firms were arguing if all cashew nuts were processed in the study area, they could manage to raise the farm gate price to TShs 1000 per kilogram.

Poor quality of cashew nuts was revealed during processing. This led to poor grade kernels which have relatively low price. Processing firms argued that farmers are harvesting pre-mature cashew nut that's why the quality is poor.

Table 22: Constraints faced by processors

Constraints	Frequency	Percentage
Bureaucracy	4	66.7
No reliable market	6	100.0
Lack of working capital	4	66.7
Poor quality of raw cashew nuts	3	50.0
Un-profitability of cashew nut business	1	16.7

4.12.6 Constraints faced by input suppliers

The major constraints that were faced by the input suppliers: un-profitability of inputs business (100.0%), lack of working capital (100.0%), poor infrastructures (100.0%), late input supply (100.0%), and farmers' rigidity on the type of inputs to use (100.0%) (Table 23).

Input suppliers argued that the input business is not worth as the contribution (TSh 30 per kilogram of cashew nuts) made by farmer is low compared with the current input prices. The time that the CBT took in inputs procurement is relatively big. This caused them to become late in supplying inputs to farmers. Hence affected cashew nut production as some farmers did not use inputs at all.

Farmers were noted to be rigid on the use of powdery sulphur. They were arguing that powdery sulphur is good compared to liquid sulphur. The liquid sulphur was being

promoted by the government in the sense that it was cheap and environmentally friend. Contrary to the powdery sulphur which increases soil acidity and hence unsuitable for future production. Nonetheless farmers continued applying powdery sulphur because it gives more output than when liquid sulphur is applied.

Table 23: Constraints faced by input suppliers

Constraints	Frequency	Percentage
Lack of working capital	3	100.0
Late input supply	3	100.0
Rigidity of farmers towards changes in inputs	3	100.0
Poor infrastructures	3	100.0
Un-profitability of input business	3	100.0

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The study was designed to analyze the economics of warehouse receipts system in the cashew nut sub sector. Specifically, the study aimed at scrutinizing the cashew nut value chain to identify which players benefit most from the marketing system. Other goals included identifying socio-economic factors that affect the profitability of cashew nut production at farmer level; identifying reasons that lead to the need for payments to cashew nut farmers to be staggered over several instalments; and, in general identifying other constraints impairing the development of the cashew nut industry.

Conclusion made is based on the tested hypotheses that: there is no significant difference across the profit earned by the key players; age of the farmer, household labour size, experience in cashew nut production, distance from the farm, and age of the cashew nut trees do not significantly affect cashew nut production at farmer level. Other hypotheses were: little (65%) government guarantee, and high interest rates charged by the bank are not significant reasons behind the fact that farm gate price is being paid in instalments; and, lack of training on WRS, lack of warehouses, and poor infrastructures are not significant constraints impairing the WRS.

5.1.1 Profitability of cashew nuts to the key players under the WRS

The critical question on who gain and who loss under the WRS for cashew nut marketing in the study area has been raised often times. The tested hypothesis that: there is no significant difference across the profit earned by the players, was rejected ($P < 0.05$). This implies that there is significant difference across the profits earned by the key players. The findings show that: bank institution was the most profitable entity followed by the

processor; and third, the exporter. The primary cooperative society ranked fourth followed by the input supplier; and last, the farmer.

5.1.2 Socio-economic factors affecting cashew nut production

The tested hypothesis that: age of the farmer, household labour size, experience in cashew nut production, distance from the farm, and age of the cashew nut trees do not significantly affect cashew nut production, was rejected ($P < 0.05$). This implies that the mentioned factors affect cashew nut production in the study area. The issue of training regarding the warehouse receipts system at farmer level is necessary but not a sufficient condition for profit maximization. This has been revealed in the findings that some farmers did not get training and yet generated relatively high profit. Most of the cashew nut trees were found to be too old to give out yield. This led to a loss as farmer continued allocating inputs.

5.1.3 Reasons behind the farm gate price being paid in instalments

The tested hypothesis was: little government, high interest rates charged by the bank, and the need to wait for good price of cashew nuts are not significant reasons behind the fact that farm gate price is being paid in instalments. The hypothesis was rejected ($P < 0.05$) implying that the mentioned reason really staggered the payments to be in instalments.

However, it was difficult for farmers, exporters, input suppliers and processors to know the reasons for farm gate price to be paid in instalments because of lack of training on WRS before its inception. The bank and primary cooperative societies officials, who got training on the WRS before its inception gave reasons such as little (65%) guarantee from the government. Thus, it was not possible to pay 100% of the farm gate price at once.

Instead, only 60% of the farm gate price was paid as the first instalment. The second and third were paid after the auctions.

The high interest rate charged by the bank was due to the fact that the cashew nut business is associated with high risk. Cashew nut price fluctuations at the world market are quite often; thus, it is difficult for the banks to reduce the interest rates. Bear in mind that the motive behind banking institutions in the WRS is to maximise profit.

5.1.4 Constraints faced key players under the WRS

It is very apparent that the key players under the WRS faced many constraints right from the beginning. This was so because the government jumped into pushing the system without preparation. Saying, it was serving desperate farmers from wobbled cashew nut market.

The tested hypothesis that: lack of training on WRS, lack of warehouses, and poor infrastructures are not significant constraints impairing the WRS, was rejected ($P < 0.05$). This implies that the mentioned factors were the major constraints impairing functioning of the marketing system in the study area.

5.2 Recommendations

It is clear from the study findings that there is no simple or single recommendation that will make the WRS for cashew nut marketing work efficiently. However, there are several potential inter-linked strategies at the government and individual level, which if implemented effectively and efficiently, could have an impact in making the WRS work better. From the study it can be recommended that:-

- (i) In order to bridge the gap in profitability between farmers and other players in the system, setting of an indicative price should base on the costs of production rather than the world market price per se.
- (ii) Regarding socio-economic factors affecting cashew nut production, the study recommends planting of new cashew nut trees preferably short term varieties. This will enable farmers to generate increased quantity and quality of cashew nuts.
- (iii) The findings show that, as far as the WRS is concerned there is no room for payments to be accomplished at once. If that the case then, the government should find a way of harmonizing the guarantees to enable the farmer to get 90% of the indicative price at first instalment. Many farmers in the study area lack alternative sources of generating income; hence paying them 60% of the farm gate price is quite questionable towards their livelihoods.
- (iv) The high interest rates from the bank, gives an indication that the risk behind cashew nut business is quite big. Here, the government is advised to share such risk with the bank so that the interest charges get reduced. This is only possible by increasing the guarantee to 100%.
- (v) The system right from the grass root is non-transparent as no training was equally given to all players. The farmers are confused about the system and do not fully understand it. The impact here is that, it diminishes their ability to

lobby for effective reform. Thus, the government is advised to give detailed training to all players.

- (vi) The three regional warehouses which currently exist, could not economically meet the demand. Thus, the study recommends establishment of at least one regional warehouse for each district.
- (vii) However, the study could not cover every aspect of the WRS for cashew nut marketing in the study area. Hence, it calls up on other researchers to conduct further studies especially in parts that were not tackled by this study.

REFERENCES

- Akyoo, A. M. (2004). Agricultural Production, Natural Hazards and Risks: Analysis of Coping Mechanisms and the Potential of Crop Insurance. Dissertation for Award of MSc Degree at Sokoine University of Agriculture, Morogoro, Tanzania, 156pp.
- Bamako Report (2000). Innovations in Microfinance. [<http://www.infiniste.org/sites/www.mireda.org/DOCUMENTS/00553.pdf>.] site visited on 21/02/2008.
- Boadu, F. O. (1992). Contingent Valuation for Household Water in Ghana. *Journal of Agricultural Economics* 43 (3): 458 - 465.
- Boehnke, R. W. (2003). The Challenges of Introducing a Warehouse Receipts System in Developing Countries. *Journal of Agricultural Economics* 34 (2): 21 - 35.
- 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.
- Cashew nut Board of Tanzania (CBT) (2008a). *Ripoti ya Uzalishaji wa Korosho Msimu 2005/06 Ikilinganishwa na Ununuzi wa 2006/07*. Makao Makuu Bodi ya Korosho Tanzania. Mtwara, Tanzania. 10pp.
- Cashew nut Board of Tanzania (CBT) (2008b). Cashew Farmers Gaining from Warehouse System. [http://www.freshplaza.com/news_detail.asp?id=18156] site visited on 26/06/2008.

- Cashew nut Board of Tanzania (CBT) (2008c). *Taarifa ya Ununuzi wa Korosho Msimu wa Mwaka 2007/08*. Makao Makuu Bodi ya Korosho Tanzania. Mtwara, Tanzania. 12pp.
- Chachage, S. L. C. and Nyoni, J. (2001). *Economic Restructuring and the Cashew nut Industry in Tanzani: A Research Report*, University of Dar es salaam. Dar es salaam. 67pp.
- Carter, M. and Waters, E (2004). Rethinking Rural Finance: A Synthesis of the Paving the Way Forward for Rural Finance Conference. *Journal of Agricultural Economics* 20 (1): 1 - 57.
- Coulter, J. and Norvell, N. (1998). The Role of Warehousing in Africa; Lessons for Implementation from Four Continents. [<http://www.cphp.uk.com/uploads/disseminations/R6768%20002%20The%20role%20of%20of%20warehousing%20in%20Africa.pdf>.] site visited on 15/01/2009.
- Coulter, J. and Onumah, G. E. (2001). The Impact of Government Policy and Regulation on the Effectiveness of WRS: The Case of Africa. *Paper Presented at Workshop on Warehouse Receipts Financing: Making the Difficult Deals Easier and More Profitable*, July 9 – 11, 2001. Amsterdam. 117pp.
- Coulter, J. and Shepherd, A. W. (1995). Inventory Credit: An Approach to Developing Agricultural Markets. *Journal of Agricultural Economics* 45 (5): 137 - 190.

- Coulter, J., Oldham, P., Day, G., Sondhi, J., Boxall, R., and Kotecha, P. (1997). The Economics of Warehousing Operations in Sub-Saharan Africa. [<http://www.cphp.uk.com/uploads/disseminations/R6768%20002%20The%20role%20of%20Warehousing%20in%20Africa.pdf>] site visited on 05/02/2009.
- Coulter, J. P and Onumah, G. E. (2002). *The Role of WRS in Enhanced Commodity Marketing and Rural Livelihoods in Africa*. International Food Policy Research Institute IFPRI 2020 Brief., Washington DC. 337pp.
- Dayrobinson, D. (2003). The Roles of Market Participants and their Influence on Risk Management in the Agricultural Sector. *Journal of Agricultural Economics* 11 (3): 167 - 181.
- Dilber, U. (2007). EU Market Access: The Way of Licensed Warehousing System for Turkish Food Producers and Exporters. [<http://ageconsearch.umn.edu/bitstream/7860/1/pp07ul01.pdf>.] site visited on 15/01/2009.
- Diwakar, S. K. (2006). Integrated Electronic Warehouse Receipt Management. [[http://dspace.inflibnet.ac.in/bitstream/1944/553/1/13\(cal+06\).pdf](http://dspace.inflibnet.ac.in/bitstream/1944/553/1/13(cal+06).pdf).] site visited on 23/07/2008.
- Garcia, I. A. O. (2006). Grain Receipts as Collateral for Agribusiness Financing. Dissertation for Award of MSc Degree at Swedesh University of Agricultural Sciences, Uppsala, Sweden. 79pp.
- Giovannucci, D., Varangis, P. and Larson, D. (2005). Warehouse Receipts Facilitating Credit and Commodity Markets. *Journal of Agricultural Economics* 14 (2): 60 - 91.

- Gujarati ,D. N.(1995).*Basic Econometrics*. McGraw- Hill International Editors., New Delh. 705pp.
- Reporter (2008). Mfumo wa Stakabadhi Ghalani Unavyoongeza Kipato Mtwara. Habari Leo, Issue No. 00434. p. 9.
- Johnson, D. T. (1985). *The Business of Farming: A Guide to Farm Business Management in the Tropics*. Macmillan Publishers Ltd., London. 126pp.
- Kedir, J. B., Rutatora, D. F. and Kashuliza, A. K. (1999). The Role of Sakasawa Global 2000 Project Credit System in Promoting Adoption of Improved Wheat Technologies by Smallholders Farmers in Ethiopia: The Case of Hetosa District. *Journal of Agricultural Economics* 3: 50 - 96.
- Koutsoyiannis, A. (1977). *Theory of Econometrics*. Second Edition. Macmillan Education Ltd., London. 760pp.
- Kwadjo, G. T. M. (2000). Inventory Credit: a Financial Product in Ghana. *Paper Presented at Conference on Advancing Microfinance in Rural West Africa*, February 22-25, 2000. Bamako. 45pp.
- Lattin, J., Carrol, J. D. and Green, P. E. (Eds.) (2007). *Analyzing Multivariate Data*. International Print-o-Pac Ltd., Noida. 556pp.
- Madhin, E. (2001). The Role of Intermediaries in Enhancing Market Efficiency in Ethiopia Grain Market. *Journal of Agricultural Economics* 25 (2): 311 – 320.

- Mark, D. L. (2002). Feasibility Study for a Regional Warehouse Receipts Program for Mali, Senegal, and Guinea. [http://pdf.usaid.gov/pdf_docs/PNACT862.pdf.] site visited on 17/02/2009.
- Menard, S. (1995). *Applied Logistic Regression Analysis*. Sage University Paper Series, Quantitative Application on Social Sciences. Thousand Oaks CA., Sage. 37pp.
- Munga, N. M. (1998). Impact of Structural Adjustment Programmes on Small Scale Enterprises in Tanzania: A Case Study of Agro-based Enterprises in Dar es Salaam Region. Dissertation for Award of MSc Degree at Sokoine University of Agriculture, Morogoro, Tanzania. 107pp.
- Ministry of Agriculture Food Security and Cooperatives (MAFSC) (2008). Pilot Cashew nut Marketing System Introduced in 2007/08. Government Printing Press. Dar es salaam, Tanzania. 9pp.
- Mkude, C. D. (2003). Economic Analysis of Smallholder's Cashew nuts Production and Marketing Under Market Liberalization: A Case Study of Coast Region. Dissertation for Award of MSc Degree at Sokoine University of Agriculture, Morogoro, Tanzania. 137pp.
- Mukwenda, E. B. J. (2005). Potential of Using Warehouse Receipt System in Financing Marketing in Tanzania Under Market Liberalization. Dissertation for Award of MSc Degree at Sokoine University of Agriculture, Morogoro, Tanzania. 56pp.
- Mutakubwa, E. B. (2007). Production and Marketing Analysis of Cassava in the Coast Region of Tanzania. Dissertation for Award of MSc Degree at Sokoine University of Agriculture, Morogoro, Tanzania. 85pp.

- Mwangu, P. (2007). New Cashew Buying System Brews Tension. [<http://www.ippmedia.com/ipp/observer/2007/10/28/101334.html>] site visited on 22/07/2008.
- Mwesigye, F. E. (2006). The Role of Government in Supporting Small rural Producers Reach New Markets and Supply Chains. [<http://www.unctad.org/templates/Download.asp?docid=7956&lang=1&intltemID=4029>] site visited on 07/02/2008.
- Onumah, G. E. (2002). Facilitating Smallholder Access to Warehouse Receipt System in Zambia: Review of Options. [<http://www.nri.org/projects/wrs/zambia-smallholder-wr-model.doc>.] site visited on 03/02/2009.
- Onumah, G. E. (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”*. June 2 – 4, 2003. Washington. 15pp.
- Pelrine, R. (2007). Rural Speed WR Pilot in Kapchorwa. [http://www.speeduganda.org/pdf/wrs_structured_trade_finance_pdf] site visited on 16/06/2008.
- Philip, D. (2001). Economic Analysis of Medium Scale Agriculture Enterprises in a Predominantly Smallholder Agriculture Sector. Dissertation for Award of MSc Degree at Sokoine University of Agriculture, Morogoro, Tanzania. 154pp.
- Rick, A., Munro, R., and Mike, F. (2007). Building a Warehouse Receipts Programme that Works for all Stakeholders. [<http://www.businessgrowthinitiative.org/BGIProducts/Documents/Building>] site visited on 16/02/2009.

- Sango, D. (2003). *The Role of Social Capital in Coping with Household Food Insecurity in Urban Areas of Tanzania: The case of Dar es salaam and Morogoro Municipality*. Dissertation for Award of MSc Degree at Sokoine University of Agriculture, Morogoro, Tanzania. 134pp.
- Shoo, J. A. (1997). *The Cashew nut Industry in Tanzania. Status Report*. In: *Proceedings of the International Cashew nut and Coconut Conference*. (Edited by Topper, C. P., Calgari, P. D. S., Kulaya, A. K., Shomari, S. H., Masawe, P. L. A., and Mpumani, A. A.). Biohybrids International Ltd, Reading, United Kingdom. 7 – 9pp.
- United Nations Conference on Trade and Development (UNCTAD) (1996). *Collateralised Commodity Financing With Special Reference to the Use of Warehouse Receipts*. Proceedings of United Nations Conference on Trade and Development, New York, US, 2 July, 1996. 60pp.
- United Nations Conference on Trade and Development (UNCTAD) (2002). *Exploring the use of Inventory Credit Mechanism*. [http://www.unctad.org/infocomm/comm._docs/docs/projectp/docsgamb/WR-GAMBIA.pps] site visited on 01/07/2008.
- United Republic of Tanzania (URT) (1987). *Cashew nut Marketing-Domestic*. Cashew nut Production Improvement Pilot Project (CPIPP), Mtwara. 56pp.
- United Republic of Tanzania (URT) (2006). *Population and Housing Data: Analytical Report*. National Bureau of Statistics, Ministry of Planning, Economy and Empowerment., Dar es Salaam. 194pp.

United Republic of Tanzania (URT) (2005). *The Warehouse Receipts Act No. 10 of 2005*.

Parliament of the United Republic of Tanzania., Dodoma. 38pp.

Varangis, P., Hess, U. and Bryla, E. (2003). Innovative Approaches for Managing Agricultural Risk. *Journal of Agricultural Economics* 7 (2): 111 - 129.

APPENDICES

Appendix 1: Farmer's questionnaire

Serial number.....	Interviewer name.....
--------------------	-----------------------

A: IDENTIFICATION

Name of District.....
Name of Ward.....
Name of Village.....
Name of Household Head.....
Address of Household.....
Date and time of interview <u> </u> / <u> </u> / <u> </u> <u> </u> : <u> </u>

B: DEMOGRAPHIC PARTICULARS

B1	Sex of household head	Male [1] Female [2]
B2	Age of household head	.....
B3	Educational level of household head (number of years at school)	.....
B4	Main occupation of household head	.....
B5	How many people are in your household?	.....
B6	How many adults are in your household (18 years and above)?	.....
B7	How many children are in your household (below 18 years)?	.....

C: CASHEW PRODUCTION AND LAND INFORMATION UNIT

C1	When did you start cashew production?	.....			
C2	How many cashew plots do you have?	.....			
C3	I would like to ask few questions about each cashew plot					
	Plot No.	1	2	3	4	5
C3a	Name of plot					
C3b	In which village is it located?					
C3c	How far is it from your house (minutes)? NOTE: 15min = 1km					
C3d	How large is it (acres)?					
C3e	How many cashew trees are there?					
C3f	Ownership? 1=Own 2=Family 3=Short rent 4=Long rent 5=Others					
C3g	In which year cashew trees were planted?					
C3h	Did you use sulphur spray in 2007/08? 1=Yes 2=No					

C3i	Which type of sulphur sprayed in 2007/08? 1=Powdery sulphur 2=Liquid sulphur						
C3j	What quantity of cashew harvested in 2007/08 (kg)?						
C4	What is the farm labour force in your household? (Fill the following part below)						
Yrs	Males			Females			
> 18							
< 18							
C5	Did you use hired labour?				Yes [1] No [2]		
C6	If YES, on average, how many hired labour did you use per season?				.....	
C7	What was your main source of capital for cashew production?				Personal saving from other activities [1] Cashew sales [2 Loans [3] credits [4] Remittances [5] others (specify)....[6]		
C8	How much capital did you start up with your cashew enterprise (TAS)?				.....	
C9	What means of transport do you use in marketing your cashew?				.....	
C10	What was the quantity and cost of each variable input used in 2006/07 and 2007/08? (Fill the following part below)						
C11	How much did you earn from cashew sales in 2007/08? (Fill the following part below)						
	Season	Quantity of cashew sold (kg)		Price of cashew sold (TAS/kg)		Bonus payment (3rd payment)	
		Grade A	Grade B	Grade A	Grade B		
	2007/08						
C12	What was the quantity and cost of each variable input used in 2007/08? (Fill the following part below)						
	Variable input				Quantity	Costs (TAS per unit)	
	Powdery sulphur (kg)						
	Liquid sulphur (litre)						
	Hired labour in weeding						
	Hired labour in planting						
	Spraying rounds						
	Hired labour in harvesting						
	Hired labour in transportation						
	Security guard						
	Hand hoe						
	Machete						
	Rake						
	Slasher						
	Spade						
	Bags						
	Fuel (petrol) (litre)						
	Oil (litre)						
	Others (specify)						

D: WRS FOR CASHEW MARKETING

D 1	Where do you sell cashew nuts under WRS?	.....
D 2	How far is the selling place from your house (km)?	.....
D 3	What advantages do you get by selling cashew nuts through WRS?	..... .....
D 4	What disadvantages do you observe by selling your cashew nuts through WRS?	..... .....
D 5	Did you get any training on WRS before its inception?	Yes [1] No [2]
D 6	If YES, who offered it?	.....
D 7	How often have you got training on WRS?	.....
D 8	What training needs about WRS are relevant to you so far?	..... .....
D 9	What do you think is the key contribution of the WRS in cashew marketing?	..... .....
D 10	What benefits have you attained resulting from WRS?	.....
D 11	Are you satisfied the way WRS operate so far?	Yes [1] No [2]
D 12	What are the key limitations of the WRS as far as cashew marketing is concerned?	..... .....
D 13	What do you suggest to be done to address these limitations?	..... .....
D 14	How do you get information on cashew prices under WRS?	..... .....
D 15	Are you comfortable with the current cashew prices?	Yes [1] No [2]
D 16	If NO, why?	.....
D 17	What cashew price do you suggest? (TAS/kg)	.....

D 18	Are you comfortable with the mode of payment under WRS?	Yes [1] No [2]				
D 19	100% payment at once under the WRS is not possible, what percent of the first payment do you suggest	.....			
D 20	In what ways did the WRS affect your cashew farming?	No effect [1] Increased area under cashew production [2] Used more inputs [3] Increased income from cashew sales [4] Others (specify)...[5]				
D 21	Give your opinion towards functioning of WRS since its inception. Please tick in the appropriate cells according to the scale 1=Strongly disagree 2=Disagree 3=Undecided 4=Agree 5=Strongly agree					
D 22	Does each of the following factors led farm gate price be paid in three instalments? Please show the extent to which each of the following factors led farm gate price be paid in three instalments by indicating accordingly (1) Not at all (2) No (3) A little (4) Much (5) Very much					
	Factor	Not at all (1)	No (2)	A little (3)	Much (4)	Very much (5)
	Big volume of cashew produced by Mtwara farmers					
	Little guarantee (i.e. 70%) from the government					
	Lack of cashew marketing financing facilities					
	High interest rate charged by the bank					
	Lack of trust by the financial institution to the cooperatives					
	To use cashew nuts as collateral towards loan from the bank					
	To find good market (high price) for cashew nuts					
D	What are the major constraints of cashew marketing through the WRS?					

Appendix 2: Checklists of questions

A. Checklist for primary cooperative society

	Name of district	
	Name of ward	
	Name of primary cooperative union	
	Registration number of cooperative union	
	Experience of your cooperative union in cashew marketing (years)	
	Number of members registered in your cooperative union under WRS	
	Number of male members in your cooperative union under WRS	
	Number of female members in your cooperative union under WRS	
	Key roles of your cooperative union under the WRS	
	Did your cooperative union get adequate training on WRS before its inception?	
	How often did you get training on WRS?	
	Who offered the training?	
	What training needs on WRS are relevant to you so far?	
	Distance of your cooperative union from the bank (km)	
	Amount of loan taken from the bank in 2007/08?	
	Interest rate charged in 2007/08 (percent)?	
	Did you return the loan in 2007/08?	
	What was the repayment procedure?	
	Quantity of cashew collected by your cooperative union in 2007/08 (kg)	
	Buying price of cashew at your cooperative union in 2007/08 (TAS/kg)	
	Average selling price of cashew at auctions in 2007/08 (TAS/kg)	
	Amount of bonus (third payment) given to farmers in 2007/08 (TAS/kg)	
	Revenue collected in 2007/08 (TAS/kg)	
	Cost of giving services in 2007/08 (TAS/kg)	
	Warehousing cost in 2007/08 (TAS/kg)	
	Transport cost to the regional warehouse in 2007/08 (TAS/kg)	
	Fumigation cost in 2007/08 (TAS/kg)	
	Interest charge on loan in 2007/08 (TAS/kg)	
	Cost of loan in 2007/08 (TAS/kg)	
	Cost of bags and ropes in 2007/08 (TAS/kg)	
	Crop insurance in 2007/08 (TAS/kg)	
	Cash insurance in 2007/08 (TAS/kg)	
	Cash distribution in 2007/08 (TAS/kg)	
	Gunny bags distribution cost in 2007/08 (TAS/kg)	
	Weigh bridge cost in 2007/08 (TAS/kg)	

	Distance of your cooperative union to the regional warehouse (km)					
	What do you do with profit if any at your cooperative union?					
	To whom did you sell cashew in 2007/08?					
Does each of the following factors led farm gate price be paid in instalments? Please show the extent to which each of the following factors led farm gate price be paid in three instalments by indicating accordingly (1) Not at all (2) No (3) A little (4) Much (5) Very much.						
Factor		Not at all (1)	No (2)	A little (3)	Much (4)	Very much (5)
Little guarantee (i.e. 70%) from the government						
Lack of cashew marketing financing facilities						
High interest rate charged by the bank						
Lack of trust of the financial institution						
To find good market (high price) for cashew nuts						
To use cashew nuts as collateral towards loan from the bank						
Big volume of cashew nuts produced by Mtwara farmers						
Give your opinion towards functioning of WRS since its inception. Please tick in the appropriate cells according to the scale; 1 = strongly disagree 2 = disagree 3 = undecided 4 = agree 5 = strongly agree.						
What are the major constraints of cashew marketing through the WRS? Please show the extent to which each of the following constrain cashew marketing through the WRS by indicating accordingly (1) Not at all (2) No (3) A little (4) Much (5) Very much.						
Constraint		Not at all (1)	No (2)	A little (3)	Much (4)	Very much (5)
Lack of training on WRS						
Late of cashew selling at the secondary cooperative union						
Poor quality of cashew nuts						
High interest rate charged by the bank						
Lack of working capital						
Cheating of measures at the regional warehouse						
Inadequate participation in cashew auctions						
Low cashew price at auctions						
Some of the farmers are selling cashew nuts outside the cooperative union						
Lack of the regional warehouses						
Bureaucracy at regional warehouse and cooperative union						
Negative response from anti-ruling political party members						
Poor infrastructures such as roads						
Please, suggest solutions for the constraints that you showed above						
.....						
.....						

B. Checklist for bank institution

	Name of financial institution	
	Name of district	
	For how long have you been involved in financing crop marketing?	
	Objectives for financing crop marketing	
	Who are given loan for cashew marketing under the WRS?	
	Number of primary cooperatives given loan in 2007/08	
	Conditions and eligibility for loans	
	Amount of loans given to primary cooperatives in 2007/08 (TAS)	
	Interest rate charged in 2007/08	
	How was interest rate charged in 2007/08?	
	Average number of days the interest rate was charged in 2007/08	
	Labour charge incurred in processing loan in 2007/08	
	Computer charge incurred in processing loan in 2007/08	
	Electricity charge incurred in processing loan in 2007/08	
	Stationary cost incurred in processing loan in 2007/08	
	Water charge incurred in processing loan in 2007/08	
	How is the government guarantee under the WRS in your institution?	
	Reasons for farmer to be paid in instalments under WRS	
	Constraints encountered in implementing WRS	
	Suggest solution for the above constraints	

C. Checklist for exporters

	Name of the trader	
	For how long have you been doing cashew marketing (years)?	
	Are you a formal registered business?	1 = Yes 2 = No
	What is your main source of capital?	
	How much capital did you start up with your cashew business (TAS)?	
	How do you access cashew nuts under the WRS?	
	Where do you buy cashew nuts under the WRS?	
	Where do you sell cashew nuts under the WRS?	
	Quantity of cashew nuts bought in 2007/08 (kg)	
	Buying price of cashew nuts in 2007/08 (TAS/kg)	
	Amount of cost incurred in transporting cashew nuts to the port (TAS/kg)	
	Port cost in 2007/08 (TAS/kg)	
	Handling cost in 2007/08 (TAS/kg)	
	Storage cost in 2007/08 (TAS/kg)	
	Labour charge in 2007/08 (TAS/kg)	
	Export levy in 2007/08 (TAS/kg)	
	Shrinkage cost in 2007/08 (TAS/kg)	
	Brokerage in 2007/08 (TAS/kg)	
	Shipping cost to India in 2007/08 (TAS/kg)	
	Quantity of cashew nuts sold in 2007/08 (kg)	
	Selling price of cashew nuts in 2007/08 (TAS/kg)	
	How did WRS affect your cashew business?	
	Constraints encountered under the WRS	
	Suggest solution for the above constraints	

D. Checklist for processor

	Name of the district	
	Name of the cashew processor	
	Ownership type of your enterprise	
	For how long have you been processing cashew nuts?	
	Main source of capital	
	How much capital did you start with your cashew processing (TAS)?	
	Processing capacity of your enterprise (kg/day)	
	Where do you get raw cashew nuts?	
	Distance from the buying point of raw cashew nuts (km)	

	Where do you sell processed cashew nuts	
	Distance to the selling point of processed cashew nuts (km)	
	Quantity of raw cashew nuts bought in 2007/08 (kg)	
	At what price did you buy raw cashew nuts in 2007/08 (TAS/kg)?	
	Cost of processing raw cashew in 2007/08 (TAS/kg)	
	Packaging cost in 2007/08 (TAS/kg)	
	Cost of transport in 2007/08 (TAS/kg)	
	Cost of storage in 2007/08 (TAS/kg)	
	Cost of handling in 2007/08 (TAS/kg)	
	Labour charge in 2007/08 (TAS/kg)	
	Market levy in 2007/08 (TAS/kg)	
	Quantity of kernels sold in 2007/08 (kg)	
	At what price did you sell kernels in 2007/08 (TAS/kg)?	
	How many grades of processed cashew kernels did you sell in 2007/08?	
	List of processed cashew kernels and their prices per kilogram respectively	
	Apart from cashew nut processing what other roles do you play under the WRS?	
	How did WRS affect your cashew processing?	
	Constraints encountered under the WRS	
	Suggest solution for the above constraints	

E. Checklist for input supplier

	Name of district	
	Name of supplier	
	Ownership type of business	
	Main source of capital	
	Amount of initial capital (TAS)	
	Experience of the business (years)	
	How big is your enterprise (tonnes/season)?	
	Amount of input deductions collected from farmers in 2007/08 (TAS)	
	Where did you get inputs supplied to farmers in 2007/08?	
	Type of inputs supplied in 2007/08	
	Quantity of powdery sulphur supplied in 2007/08 (kg)	
	Quantity of liquid sulphur supplied in 2007/08 (l)	
	Buying price of powdery sulphur in 2007/08 (TAS/kg)	
	Buying price of liquid sulphur in 2007/08 (TAS/l)	
	Selling price of powdery sulphur in 2007/08 (TAS/kg)	
	Selling price of liquid sulphur in 2007/08 (TAS/l)	
	Input supplier service provision in 2007/08 (TAS/unit)	

	Labour charge in 2007/08 (TAS/unit)	
	Handling cost in 2007/08 (TAS/unit)	
	Transport cost of inputs in 2007/08 (TAS/unit)	
	Storage cost of inputs in 2007/08 (TAS/unit)	
	Input levy in 2007/08 (TAS/unit)	
	Amount of input subsidy given by the government in 2007/08 (TAS/type of input)	
	Constraints encountered in supplying inputs under the WRS	
	Suggest solution for the above constraints	