A COMPARATIVE ECONOMIC ANALYSIS OF SPECIALTY AND CONVENTIONAL SMALL-SCALE COFFEE PRODUCTION IN KIGOMA DISTRICT, TANZANIA

BY

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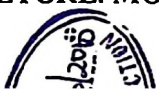


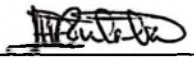
ABSTRACT

This study was conducted in Kigoma district of Kigoma region to compare the economics of specialty and conventional small-scale coffee production. Four villages namely Kalinzi, Nyarubanda, Mkabogo and Mkongoro were surveyed. Random sampling technique was adopted to get 30 respondents from each selected village. This means 10 households for specialty and 20 for conventional coffee farming, making a total sample size of 120 household. A structured questionnaire was used to collect data from the sample households and complimented by secondary data collected from key organisations in the industry. Data were cleaned, coded, entered and analysed using the Statistical Package for Social Sciences (SPSS) version 11.5 and Excel programs. Descriptive statistics, regression analysis, gross margin and independent sample t-test were used to analyse the data. The results showed that coffee growers in Kigoma District have household characteristics common to most rural household settings elsewhere in Tanzania. Results from regression analysis indicate that amount of coffee sold and total cost used in both specialty and conventional coffee production influenced producer profitability significantly. From independent sample t-test, the results indicate the gross margin for specialty coffee was higher than for conventional coffee by about TZS 753 per coffee tree at 5% level of significance. The emperical results comfirm that specialty coffee farming improve farmers income than their counterpart conventional farmers thereby contributing more to poverty reduction in the study area. From these findings. it is recommended that deliberate efforts be made to assist more farmers to grow specialty coffee. This could be achieved through farm input subsidies, access to international and local markets, improvement in coffee marketing information system and sources of low cost credit. In addition, construction of

village based central pulperies could be considered. In this way, producers could get better price that contribute significantly to poverty reduction.

DECLARATION

I, Ernest Peter Rutaba, do hereby declare to the senate of Sokoine University of Agriculture that this dissertation is my own original work and that it has not been submitted for a degree award at any other University.



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DEDICATION

Dedicated to my parents, the late Mzee Peter Tibanyendela Rutaba and Scholastica Kalaileho, my wife, Sophia Richard and my kids, Rutaba and Joyce-Kent.

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LIST OF ABBREVIATIONS AND ACRONYMS

BACAS	-	Bureau of Agricultural Consultancy and Advisory Services
BOT	-	Bank of Tanzania
BTC	-	Beligium Technical Cooperation
CWD	-	Coffee Wilt Disease
DADP	-	District Agricultural Development Plans
DALDO	-	District Agriculture and Livestock Development Officer
EPOPA	-	Export Promotion of Organic Products from Africa
GDP	-	Gross Domestic Product
JGI	-	Jane Goodall Institute
KACOFA	-	Kalinzi Coffee Farmers Group
KANYOVU	-	Kalinzi-Manyovu Union
KDC	-	Kigoma District Council
MAFSC	-	Ministry of Agriculture, Food Security and Cooperatives
NGO	-	Non-Governmental Organization
PRIDE	-	Promotion of Rural Initiative Development
SADC	-	South African Development Community
SH	-	Sustainable Harvest Company
SIDO	-	Small Industries Development Organization
SNAL	-	Sokoine National Agricultural Library
SPSS	-	Statistical Package for Social Sciences
TACARE	-	Lake Tanganyika Catchment Reforestation and Education
TaCRI	-	Tanzania Coffee Research Institute

TCB	-	Tanzania Coffee Board
TZS	-	Tanzania shillings
UCDA	-	Uganda Coffee Development Authority
URT	-	United Republic of Tanzania
USA	-	United State of America

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Tanzania is one of the poorest countries in the world. this might be caused by low investment in the agricultural sector. According to URT (2006) its economy depends heavily on agriculture, which accounts for almost half of GDP. Agriculture is the major source of productive employment and income for rural Tanzanians. It provides 75% of merchandise exports and employment opportunities to about 80% of Tanzanians (URT, 2006). Agriculture has linkage with the non-farm sector through forward linkage to agro-processing and export as it provides raw materials to industries and market for manufactured goods (Rweyemamu, 2001). However, the production and distribution of agricultural products is an important mechanism for raising the income levels of farmers and promoting the economic development of a country (Gabagambi, 1998).

The country's traditional export crops include coffee, cotton, tea, tobacco, cashew nuts, sisal and pyrethrum. The value of traditional exports increased from US$ 267.1 million in 2006 to US$ 290.1 million in 2007, which was equivalent to an increase of 8.6 percent. This increase was due to the increase in the price of coffee. cotton, tobacco and sisal in the world market. Coffee exports was leading in national foreign currency earnings by an average of 33.8% (URT. 2007). Coffee has been the mainstay of the country's agriculture-based economy since its introduction as a cash crop around 100 years ago (BACAS. 2005). About 95% of coffee is produced by small-scale farmers on average plots of 1 to 2 hectares while the remaining 5% is grown on estates. Also it is estimated that 2 million additional

people have been employed directly or indirectly in the coffee industry (Baffes, 2003; Masumbuko, 2005).

Tanzania produces two kinds of coffee, Arabica and Robusta. Coffee production is concentrated in three main geographic areas of Tanzania: namely North (Kilimanjaro, Arusha and Tarime/Mara), West (Kigoma and Kagera) and South (Mbeya, Iringa and Ruvuma). Tanzania produces between 45 000 and 55 000 tons of green coffee annually and there were hopes to boost its output to 60 000 tons by 2007 (Mangeni, 2004). However, Arabica accounts for around three-quarters of Tanzania's annual coffee output. This study was conducted in Kigoma district of Kigoma region in West part of the country.

1.2 Problem Statement

According to Mathania (2007), agriculture in Tanzania is based on small scale farmers who depend on hand hoes and rainfall. Its growth rate has decreased from 5.1% in 2005 to 4.1% in 2006 due to decline in production, lack of adequate rainfall, fluctuations in world market prices and loss in soil fertility (URT, 2007). Despite the fact that coffee is the main agricultural commodity of Kigoma district, which serves as the major source of income for about 15 532 households of 98 964 populations, the district produced an average of 593.8 tons of low quality coffee per year from 2000 to 2005 (DALDO, 2006).

As observed by Masumbuko (2005), in the early 1970s, the quality of coffee in Tanzania was low and therefore sold to the most volatile and least profitable "blended" coffee market. In addition, currently there is improvement in coffee quality and the idea is to aim for "specialty coffee" markets. Tanzanian coffee, apart from a few estates that market

specialty coffee, does not command a premium price compared to its neighbours such as Kenya and Ethiopia (Baffes, 2003). There is thus lack of experience and knowledge concerning the production of that high quality products. In order to produce consistently high quality coffee, the producers and processors must understand the factors that affect coffee quality.

Given the oversupply of average quality coffee coupled with low prices and in an increasingly competitive coffee world, both productivity and quality of coffee from Tanzania should be increased in order to enable small coffee growers to maintain their plantations in a sustainable basis. Increase in coffee quantity and quality would lead to the rise in small scale farmer's income through profit. In order to improve coffee quality and earn good price alternative approaches such as specialty coffee farming may be inevitable. Chapman (2001) observed that there is a need to assist in the identification of specialty coffee and markets for such coffee. Several studies have been done on small-scale coffee production concentrating on economics of peasant coffee production (Mbilinyi, 1976), changes in the coffee markets after liberalization (Temu, 1999), coffee sector constraints and challenges (Baffes, 2003) and coffee marketing system (BACAS, 2007; Mbise, 2007). The present study strives to compare the specialty and conventional coffee in the economics of small-scale farmers in Kigoma district of Tanzania. It is hoped that the findings from this study will provide information that would enable policy markers to formulate and modify the policies in order to improve coffee quality as well as producer profitability.

1.3 Objectives of the Study

1.3.1 Main objective

The main objective of this study is to compare economic performance of specialty and conventional coffee production among small-scale farmers in Kigoma District, with a view of improving farmers' income in the study area.

1.3.2 Specific objectives

This study pursued the following specific objectives

(i) To identify the role of different key actors along the coffee production and marketing channels in the study area.

(ii) To examine factors influencing profitability of coffee production in the study area.

(iii) To compare relative profitability of specialty coffee and conventional coffee among small-scale coffee producers.

(iv) To recommend, based on the findings of this study, measures for improving coffee quality in Kigoma district.

1.4 Hypothesis

(i) Factors such as producer price, age of the household head and amount of coffee sold have the influnce on profitability of coffee production in the study area.

(ii) Specialty coffee is more profitable than conventional coffee in terms of returns per coffee tree.

1.5 Significance of the Study

It is envisaged that the findings from this study will provide information that would enable policy makers to formulate and modify policies in order to improve coffee quality for high prices in the world market. Farmers in the study area and all over the country will benefit through a range of inputs, outputs and management options that will be technically and practically feasible. In the long run, the findings will contribute in ensuring economic, social and ecological sustainable livelihoods.

1.6 Organization of the Study

The study is organized in five chapters. The proceeding chapter is Chapter One that has presented background, problem statement. objectives, hypothesis and significant of the study. The second chapter presents a review of the existing literature on coffee production and other related studies with the aim of showing gap in the existing body of knowledge. The third chapter presents the research methodology highlighting the location and characteristics of the study area, justification for selecting the study area, design of the study, conceptual framework, data collection, data analysis and limitation of the data collection. Research results and discussion are presented in chapter four. Conclusion and recommendations are presented in chapter five.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Definitions of Concepts

This part introduces the key concepts used in this study. These include; specialty coffee farming, conventional coffee farming and profitability. which are discussed in the subsequent sections.

2.1.1 Specialty coffee farming

The concept of "specialty coffee" simply means coffee beans with special flavours as a result of interaction of the geographic microclimates such as altitude, soil, rainfall, temperature and the varieties of coffee resulting in beans with unique flavour profiles, hence the term "Specialty coffees." However, good husbandry practices. processing and handling all are important parts in production of specialty coffees (Masumbuko. 2005). Hoang and Trinh (2001) defines 'specialty coffee' as unique coffee resulting from a combination of a number of factors such as growing conditions, varieties, good husbandry practices, processing and handling. All these are important parts in production of specialty coffees.

According to Chapman (2001) 'specialty coffee' is quality coffee where effort and consciousness is given at every step to bring quality into the cup. It begins with variety and growing location of the tree, and proceeds through the manner of its harvesting, how the bean is roasted and the skill of brewing. Specialty coffee industry comprises people and businesses that have dedicated their efforts to quality coffee. Within the specialty coffee

market, three segments of sustainable coffee have been developed even though there is no unique definition of sustainable coffees (Murekezi, 2003). They are known as organic coffee, shade grown coffee and fair trade coffee. Ponte (2004) defined the three phenomena as: organic coffee which is produced with methods that ensure a viable and sustainable agro-ecosystem. Shade grown coffee is grown under forest cover, thus preserving biodiversity and providing an appropriate habitat for migratory birds and other small forest animals. And fair trade coffee is based on a trading relationship between stakeholders that has both market-based and ethical elements and aims to be sustainable in the long term.

Sustainable harvest company which buy specialty coffee in Kigoma defined it as high quality coffee with unique flavor profiles due to the variety and growing location. Where by farmers in groups control quality by picking only red ripen cherries through implementing wet-proccessing, drying under shade, packaging and storage. However, it's considered to be a quite subjective definition because it's on the preference of the consumer. Conventional coffee farming is different from specialty as defined in the next section.

2.1.2 Conventional coffee farming

Conventional farming is referred to as a system which employs a full range of pre and post plant tillage practices, synthetic fertilizers and pesticides (EPOPA, 2006). Ortega and Oscar (2004) reported that the conventional system of coffee production is characterized by the use of chemical pesticides, herbicides, fertilizers and petroleum fuel. The

profitability is other concept to be considered as applied in both farming system and defined in the following section.

2.1.3 Profitability

Profitability is the primary goal of all business ventures. Without profitability the business will not survive in the long run. However, profitability is measured with income and expenses (Don, 2006). Income is money generated from the activities of the business. Expenses are the cost of resources used up or consumed by the activities of the business. However, profit is defined as revenue minus cost, that is, as the price of output times the quantity sold (revenue) minus the cost of producing that quantity of output. Profitability can be defined as either accounting or economic profit.

Accounting Profit can be defined as the sales of the farm less costs of production such as labour cost and fertilizers. Traditionally, farm profit has been computed by using accounting profit by ignoring opportunity cost (Don. 2006). In addition to deducting business expenses, opportunity costs are also deducted when computing "economic profit". Opportunity costs relate to capital (net worth), labour or management ability that could be used or employed off the enterprise in question. Opportunity cost is the investment returns given up by not having money invested elsewhere and wages given up by not working elsewhere (Don, 2006). These are deduced. along with ordinary business expenses, in calculating economic profit.

In this study, economic profit was calculated since it provides a long-term perspective of farm enterprises, and also the farmer that can consistently generate a higher level of

personal income by using his/her money and labour elsewhere, he/she may want to examine whether he/she could continue farming or not. Besides the definition of some concepts, there are several other phenomena such as smallholder cash crop production which is important as discussed below.

2.2 Smallholder Cash Crop Production

The rural economy of many African countries is based on cash crop production and are grown primarily for marketing with only a small proportion of the produce being kept back for home use (Rweyemamu, 2001). This definition encompasses a wide range of crops. However, most cash crops share some common characteristics.

Tanzania is predominantly an agricultural country with crop sector playing an important role in the socio-economic development of its people. In the country's economic development policies, agriculture has been given a top priority (Philip, 2001). He also supported that the agricultural sector in Tanzania is predominantly based on small-scale peasant agriculture. It is estimated that smallholder's production under labour intensive farms with low production technology account for more than 75% of the total agricultural production in the country (Mushi, 1993; Philip, 2001). Furthermore, Tanzania's 3.5 million farm families work on smallholdings with area cultivated averaging 0.9 hectares with some 93% of all farmers cultivating less than 2.0 hectares. He also reported that smallholder farmers on privately owned plots carry out about 85% of agricultural production. And they account for about 90% of the marketed agricultural output that depend mainly on rain fed agriculture. Peter (2006) indicated that smallholders dominate in coffee production enterprises. As about 80% of output from farms less 2 hectares and type of production

system practiced is mostly inter-cropping coffee and banana. In the subsequent subsection the study discuss the origin of coffee in Tanzania.

2.3 Origin of Coffee

Coffee growing and drinking spread around the world, starting in the Horn of Africa in Ethiopia, where the coffee tree probably originated in the province of Kaffa(Hicks, 2001). The succulent outer cherry flesh was eaten by slaves taken from present day Sudan into Yemen and Arabia. Coffee was certainly being cultivated in Yemen by the 15th century. Morever, the Dutch obtained some live coffee trees in 1616, and brought these back to Holland where they were grown in greenhouses (Hicks, 2001).

Beside such countries, the crop was grown in the southern part of Africa. For instance, it was one of the first cash crops grown in Tanzania by peasants and large-scale farmers starting in the days of German East Africa, when the country was a German colony. Early reports show that coffee exports from German East Africa in 1899 totaled 50 tons worth £4817. In 1912, the coffee export was 1575 tons worth £95 150 (Maghimbi, 2007). The area planted to coffee expanded significantly during the 1970s and the 1980s when prices were favourable (Baffes, 2003). The next section discusses the economics of coffee production.

2.4 Economics of Coffee Production

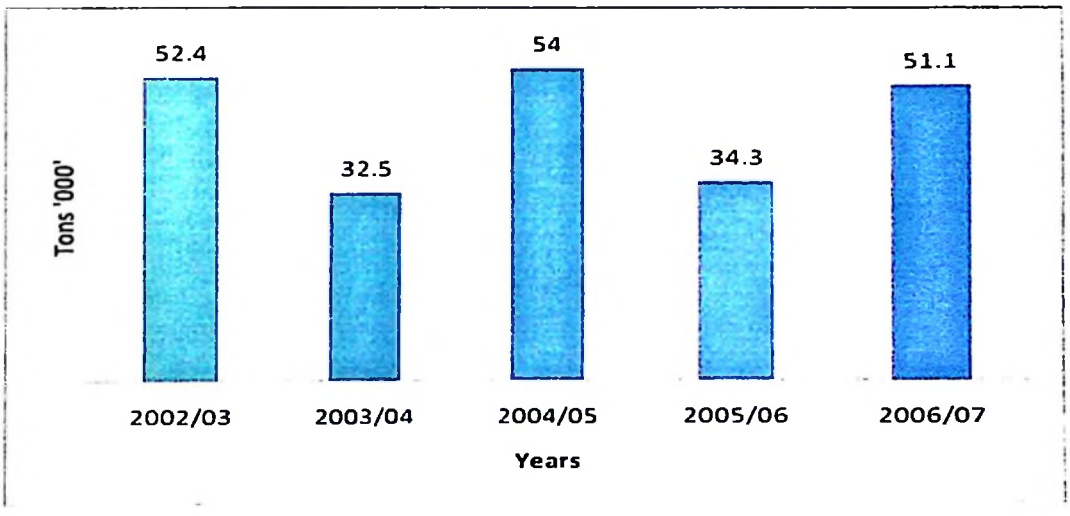
Coffee is of major importance in the world economy and is one of the most valuable primary products in the world trade (Hicks, 2001). Its cultivation, processing, trading, transportation and marketing provide employment for millions of people worldwide.

Coffee is the second most traded product in the world after petroleum (Lingle, 2000). It produces income for millions of small farmers. An estimated 25 million households in 70 developing countries grow coffee (Liangzhi and Simon, 2006). According to Dorward *et al.* (1998) cited by Rweyemamu (2001), the rural economy of many African countries is based on cash crop production such as coffee. Also coffee is grown primarily for marketing purposes due to its value. Leonidas (2000) indicated that coffee has been a crop of great importance to Burundi since many decades as it contributes to about 81% of the total export earnings. It is also the main source of income for more than 830 000 households. Agayo (2007) revealed that coffee is the third most important agricultural export after tea and horticultural crops contributing up to 20% of the total hard currency revenue in Kenya. It further estimated that out of the 70% of Kenya's workforce engaged in agriculture, 30% are employed by the coffee industry. Furthermore, the smallholder sector contributes 60% of the national coffee production. The crop supports the livelihoods of more than 700 000 smallholder resource poor farmers, 2000 small/medium estate farmers and 200 large-scale estate farmers. The next section discusses the coffee production in Tanzania.

2.5 Coffee Production in Tanzania

BACAS (2005) revealed that coffee is Tanzania's largest export. It contributes about US$ 115 million which is about 20% of the country's export earnings per year and provides income to some 400 000 smallholders who produce 95% of the coffee on average plot sizes of 1 to 2 hectares. Moreover, estates grow the remaining five percent. The study also reported that the country's production of coffee was about 48 000 tons, or about 0.7% of the world's output of 7.02 million tons per year. During 2002/03 and 2006/07 season

coffee production in Tanzania showed varying trends (Fig. 1). The Tanzania Coffee Board estimates the area of production in the country to be 250 000 hectares compared to the area suitable for coffee production, which is 650 000 hectares (BACAS, 2005). Moreover, production of coffee was lowest in 2003/04 and highest in 2004/05 season due to the promissing prices. With this fluctuating trend (Fig. 1), expanding the country's market share will require improvements both in productivity and quality. The coffee production constraints discussed in the next section.



Source: BOT (2008).

Figure 1: Production of coffee in Tanzania.

2.6 Coffee Production in Kigoma

In the last nine years between 1997/98 and 2005/06, Kigoma experienced repeated falls in coffee price. But also from 2001/02 - 2005/06 price picked up substantially (Table 1).

The study conducted by Lazaro *et al.* (2008) found that coffee experienced a dramatic downward trend in the world market prices that led to a decreased contribution to foreign exchange earnings in producing countries in the early 2000s. They observed that, price of coffee reached the lowest level ever recorded in real terms between 2001 and 2002.

Table 1: Area under coffee, production and price/kg in Kigoma district in 1997/98 – 2005/06 seasons

Year	Area under coffee (Ha)	Production/year (Tons)	Price/kg (TZS)
1997/98	-	413.5	1 480.40
1998/99	-	238.8	1 080.00
1999/00	1 248	568.5	700.00
2000/01	1 388	492.1	500.00
2001/02	1 390	386.8	460.00
2002/03	1 440	551.9	600.00
2003/04	1 570	355.0	800.00
2004/05	1 695	926.6	1 050.00
2005/06	1 695	850.1	2 000.00

Source: Kigoma District Council –DALDO's Office (2007).

Price decline took place partly due to structural changes in the global coffee market, including production innovation in Brazil and booming supply from Vietnam. Also partly this was due to changes in corporate strategies among the largest roasters, including the way in which coffee is blended. This low price had directly affected the smallholder coffee

producers. Smallholder farmers play main role in coffee production in the area of study. The bulk of coffee produced in Kigoma district comes from small and scattered smallholder farmers who operate independently. Although Kalinzi and Mahembe divisions are major coffee producing areas in the district, farmers have had problems making a living from coffee production due to fluctuating in both volumes and market prices. Its production trend was not steady; it was lowest in 1998/99 and highest in 2004/05 because of the same reasons (Table 1). Although prices have improved over the past few years, economies that are dependent on traditional agricultural exports such as coffee need improvement strategies to ensure stability in export earnings.

2.7 Coffee Production Constraints

There are a number of factors affecting cash crop production. According to Leonidas (2000) the household coffee production can be influenced by three major factors; firstly, inputs, technology and efficiency with which farmers handle inputs and technology. Secondly, production is affected by institutional factors; well organized institutions entail production increase. Thirdly, other factors such as environment, population, pests and diseases may affect production in one way or another. The farmers in Tanzania have been facing a number of constraints including poor technology, inadequate extension services, market reliability and input accessibility such as pesticides, fertilizer and herbicides (Regnard, 2006). Others are good infrustructure such as communication systems, world market price, cultural factors and land scarcity. The following section discusses the specialty coffee production and marketing.

2.8 Specialty Coffee Production and Marketing

Masumbuko (2005) argued that Tanzania has the ideal environment, climate and altitude and coffee varieties to produce specialty Arabica coffee that commands premium prices in the world market. He added that, it seems to be the way forward in making Tanzanian coffee more competitive. According to Stewart (2005), groups of small-scale growers in Mbinga produced extraordinarily high quality coffee through which they captured attention of world's premiere quality roasters and importers such as United States of America (USA), Europe (Germany, England, Italy and Belgium) and Japan. However, a total of 184 tons of high quality arabica coffee beans grown by 4434 smallholders were exported. These were sold for an average price of US$ 2.8 per kilogram compared to the average price for auctioned Tanzanian mild Arabica of US$ 1.94 per kilogram. Sustainable harvest is the main company which buy the coffee of KANYOVU in Kigoma and export it directly to USA. In 2007 it exported about 360 bags (18 tones) of specialty coffee. Futhermore, these were sold at an average price of US$ 2.04 per kilogram (Joseph, 2008). Baffes (2006) indicated that during the 2003/04 season, 7 692 bags equivalent to 538.4 tons of specialty coffee in Uganda were marketed. The coffee processing is explained in the following section.

2.9 Coffee Processing

Most agricultural produce is not in a form suitable for direct delivery to the consumer/ buyer when it is first harvested; rather it needs to be changed in some way before it can be sold. The form changing activity is one of that adds value to the produce. Primary processing of cherries, the end product of which is green coffee traded at auction, takes place within the district in the form of wet-processing and is a key determinant of coffee

quality. In the wet processing method, the red ripen coffee cherries are harvested, sorted, pulped, fermented and washed, dried, hulled and graded. However agricultural inputs have significant on coffee production as explained below.

2.10 Agricultural Input Supply

Raising farm productivity as well as output depends mainly upon the use of increased quantities of purchased inputs (Gabagambi, 1998). Several surveys on farming systems in Tanzania have revealed that poor supply of inputs to farmers is the most limiting factor to agriculture productivity (Mlambiti, 1985). The supply of agricultural inputs is a private sector operation and the government has removed the subsides on agricultural inputs. The removal of subsides, coupled with high marketing costs has lead to a drastic increase in prices of important agricultural inputs such as fertilizer, agro-chemicals and improved seeds (Philip. 2001). However, he pointed out that the increase in prices of inputs has lead to a decrease in their use by small scale farmers. And also the problem of access to agricultural inputs has been compounded by the collapse of cooperatives, which were suplying the inputs on credit. The next section discusses the credit services in agricultural enterprises.

2.11 Credit Services and Agriculture

Philip (2001), asserts that credit services to small-scale farmers is needed for them to be able to purchase inputs and pay for additional labour requirements that are associated with the use of agro-chemicals such as fertilizer, pesticides and herbicides. Nowadays access to formal rural finance facilities are limited in Tanzania and particulaly in Kigoma district. Even few existing ones like PRIDE Tanzania, SIDO and banks in Kigoma rarely do extend

services for purely agricultural enterprises. The mentioned institutions are willing to support non-agriculture micro enterprises than small-scale agriculture enterprises in the area. Although there were no rural based credit providing institutions, which could give credit in kind and/ or in cash in the area of study, only few cooperatives reported to provide some credit (inputs) in kind. The increase in income is expected basing on the argument that the provision of credit facilities alongside other support services enables farmers to adopt improved production technologies and thus enhance their productivity. Credit moves the budget constraint outwards by enabling them to purchase capital assets from which an income is expected.

Philip (2001), in his study on economic analysis of medium scale agricultural enterprises in a predominantly smallholder agriculture sector argued that the income may materialise in either of two ways: as a result of additional purchases of equipment within the existing technology, so that returns per unit of capital remain constant, i.e *capital widening.* Or as a result of purchases of new technology so that not only is the capital stock expanded. but also its productivity increases a well, i.e *capital deepening.* Therefore, generally the provision of credit facilities *ceteris paribus* is expected to increase the rate of adoption of improved technology (Msangi, 2007).

2.12 Review of analytical approaches

2.12.1 Linear regression analysis

A good and reliable business decision is always founded on a clear knowledge on how a change in one variable can affect all the other variables that are in one way or another associated to it. The dependent and independent variables should be quantitative.The most

common parameters of interest on regression analysis are F ratio, coefficient of determination and beta coefficients. The aim was to determine how the predicted variable reacts to the variations of the predictor variables. The model was then estimated using ordinary least square method (OLS) under the assumption that residual term (error term) was independently distributed from farmer to farmer with a zero mean and finite variance. The coefficients of the variable indicate the responsiveness of producer profitability as a results of a unit change in an explanatory variables used, *ceteris puribus*.

A similar modal was used by Parikh and Shah (1994) in their study on the relationship between size, structure and efficiency in agricultural enterprises where they found a positive relationship between the size and efficiency of the studied enterprises. However, Otieno (1995) used a similar modal in her study on institutional credit and the efficiency of resources use among small scale farmers in Kenya in which she found that there exists a positive relationship between access to credit and amount of inputs used and farm productivity. Furthermore, Ngwasy (2007) used regression analysis to study the factors that influencing loan amount in horticultural marketing traders. But he used the model results in coefficient forms which may cause problem of interpretation due to the influence of the units in which the variables were measured. To solve this problem, there is therefore the need to calculate elasticities of variables that will allow an interpreter to choose units of interest. Also Mutakubwa (2007) used regression analysis to study factors that influencing production and marketing of cassava, whereby he found that the revenue of cassava business for traders was mostly explained by selling price. But he did not examine the factors influencing farmers profitability. This study intend to fill these knowledge gaps.

2.12.2 Gross margin analysis

Gross margin is the difference between the value of an enterprise's gross output and the marginal cost of that production (Johnson, 1985). Gross margin analysis is thereby a simple and in many cases a sufficiently powerful tool for economic analysis of introduced technologies (Makeham *et al.*, 1986). It is the analytical tool that has been widely used in finding the profit in farm activities. He also reported that gross margin of a farm activity is the difference between gross income earned and variable costs incurred. Most often new technologies in smallholder agriculture are aimed at increasing the farm production by the fact that increased income is one of the immediate objectives of the overall enterprise of the farmers (Mutayoba, 2005).

Gross margin is simple to estimate and enterpret and therefore effective in extension education among smallholder farmers where most of whom are illiterate. It is easy, simple and flexible to use, also it does not require advanced mathematical computation than addition, substraction and multiplication which are within capacity of an intelligent farmer. According to Ferris and Malcolm (2000) the gross margin analysis has the limitations such as; gross margin is not a profit figure since fixed costs has to be covered by the gross margin before arriving at a profit figure. According to Phiri (1991) the technique is not a good measure of profitability but it remains the most satisfactory measure of resource use efficiency in small-scale agriculture. In the subsequent chapter, the methodology that was used to conduct the study is outlined.

Gabagambi (1998) used the model to study profitability analysis for smallholder production process by analysing gross margin per hectare and returns per resource invested

in paddy and cotton production. Mutayoba (2005) used gross margin of vanilla, coffee, tea, banana and maize to establish the relative economic profitability of various smallholders' production Bukoba district, in which he found that vanilla was the most profitable enterprise with a gross margin per hectare of TZS 22 121 900. However, gross margin per hectare was TZS 118 900 for coffee (robusta) , 408 100 for tea, 95 000 for maize and 225 000 for banana. And he argued that considering labour requirements, vanilla was found to be labour demanding crop with a total of 270 mandays and cash returns per manday of TZS 81 930. Also Senkondo (1988) used gross margin per hectare in study of sugarcane and paddy to obtain the most profitable enterprise. However, there is no any study which have been done on analysing profitability using gross margin per tree for smallholder coffee production in the study area.

CHAPTER THREE

3.0 METHODOLOGY OF THE STUDY

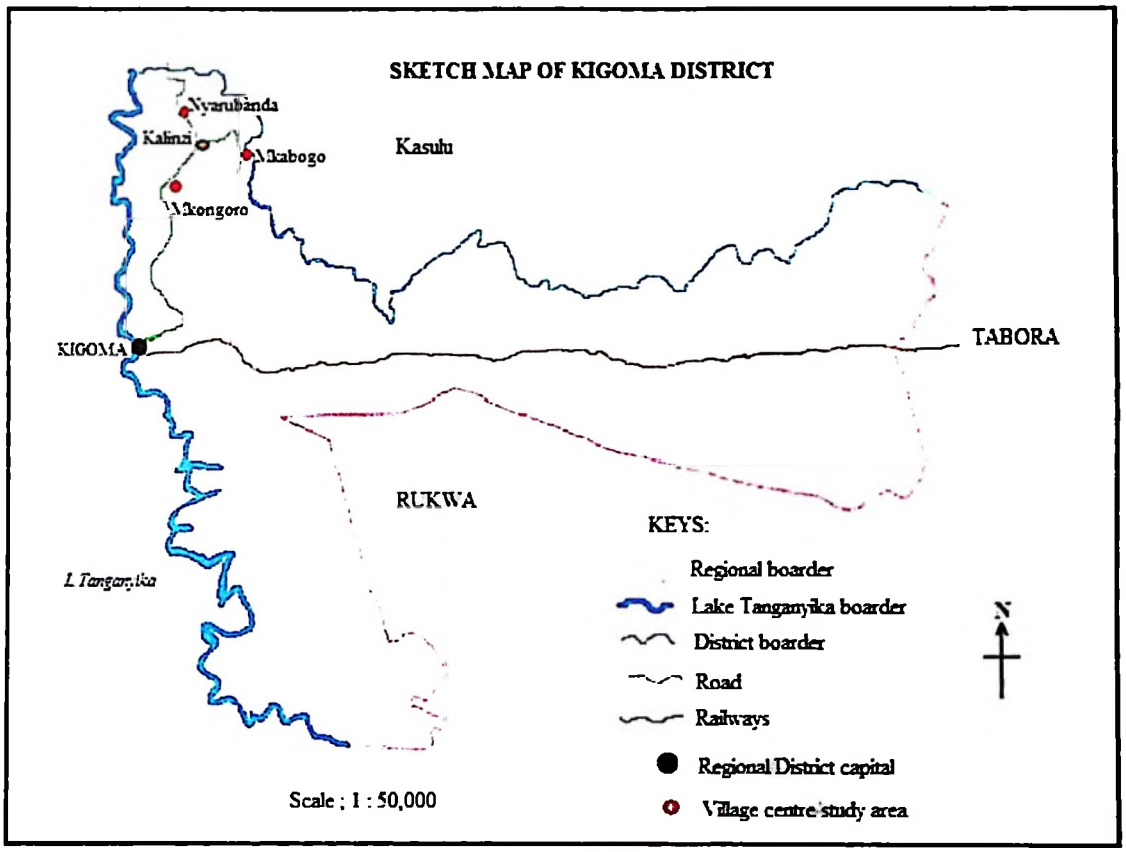
3.1 Overview

This chapter describes the methodology that was used in the study. Section 3.2 is the description of the study area, conceptual framework is shown in section 3.3, section 3.4 presents data collection method, data analysis is presented in section 3.5 and section 3.6 presents limitations of the study.

3.2 The study Location

This study was conducted in Kigoma District which is located along Lake Tanganyika at the North–West corner of Tanzania. The district has a total area of 19 574 square kilometres which is equivalent to 43.4 percent of the total area of Kigoma Region. The arable land covers 10 150 square kilometres which is equivalent to 51.9 percent of the total area, and only 18 percent is developed. Altitude of the district ranges between 800 and 2462 metres above sea level that makes it perfect for growing high quality coffee. Annual precipitations commence in October through May and are almost reliable and well distribute during the cropping season. Annual rainfall is variable ranging between 600 mm and 1500 mm being the heaviest in highlands. Agriculture is the main economic activity with coffee, palm oil and tobacco as the major cash crops whereas major food crops include maize, paddy, beans, banana, cassava and sweet potatoes (DALDO, 2006). This study find the perfomance of small-scale farmers dealing with the production of specialty and conventional coffee in the district as representative on the performance of small-scale farmers in Tanzania. The study area was selected purposefully based on involvement in

both specialty and conventional coffee production, distribution and the presence of appreciable number of small-scale farmers who practice the two farming enterprises in the area (Fig. 2).



Source: Kigoma district council (2008)

Figure 2: Location of the study area.

3.3 Research Design

A cross sectional research design was used in this study. The design allows data to be collected once at a single point in time that may be used in descriptive analysis and for determination of relationships between variables (Bailey, 1998). It was used due to the limited time and resource for fieldwork.

The study population included coffee small-scale growers. The household sample selected for the empirical analysis includes both farmers producing in the specialty segment as well as in the conventional segment. Household were considered to be the unit of analysis. Three primary cooperatives (Rumako, Mukigo & Kalinzi) and the union cooperative (KANYOVU) were involved. KANYOVU is the union of several primary cooperatives that includes, Rumako (Mkabogo/Matyazo), Manyovu Mahwenyi, Kalinzi/Mkongoro, Mkigo, Mkibanda, Muhange-Kibondo in kigoma region. The study covered four institutions, namely Lake Tanganyika Catchment Reforestation and Education (TACARE), Tanzania Coffee Research Institute (TaCRI), Action Aid and Sustainable harvest (SH).

3.4 Sampling Technique

In order to obtain the desired representative sample, purposive, multistage and random sampling techniques were employed. The first stage involved purposive selection of two divisions based on the availability of households involved in coffee farming and the relatively differences in agro-ecological location. The second stage also involved purposive selection of wards producing coffee to obtain two wards from the first division and one ward from the second division based on the intensity of coffee farming. The third stage involved simple random selection of two villages from one ward and purposively selection of two villages from the remaining two wards. The last stage involved simple random sampling of 30 households from each selected village, 10 who practice specialty and 20 for conventional coffee farming. Small number of specialty coffee growers were surveyed due to the fact that they were few compared to conventional coffee farmers. The village register available at the village government office was used at this stage. Therefore

from four villages a total of 120 households were involved in the study (Table 2). The interview was conducted by the researcher with the assistance of three trained enumerators.

Table 2: Sample size by division, ward and village in the study area

Division	Ward	Village	Male	Female	Total
Kalinzi	Kalinzi	Kalinzi	25	5	30
		Mkabogo	21	9	30
	Mukigo	Nyarubanda	28	2	30
Mahembe	Bitale	Mkongoro	26	4	30
Total			**100**	**20**	**120**

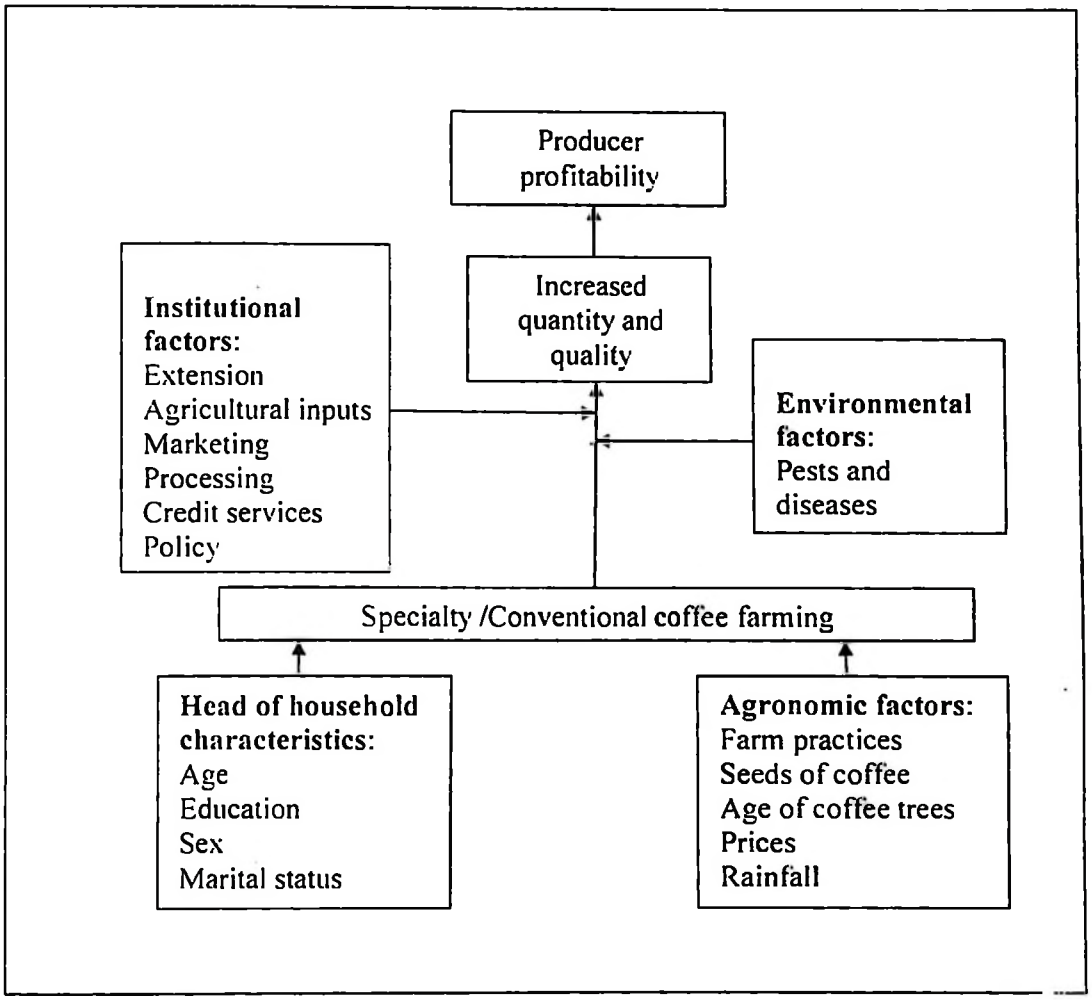
3.5 Conceptual Framework

Conceptual framework helps to prevent fragmentation of knowledge statements. Katani (1999) cited by Msangi (2007) revealed that conceptual framework binds facts and provides guidance towards collection of realistic data and information. Conceptual framework on the performance of small scale farms and the way in which farmers strive to maximize profit is essential as a guideline in identifying important variables and for effective to efficient data collection. Philip (2001) stress that such frameworks should help to indicate the most useful area on which to focus limited research resources and ensure that data collected is relevant to the objectives of the research. This section presents a brief outline of the conceptual framework used for information generation through the field work and through literature search data collection. In general, the choice of variables for information generation dependent very much on the objectives of the study.

As stated in chapter one the general objective of the study was to compare economic performance of specialty and conventional coffee production among small-scale farmers in Kigoma district, with a view of improving farmers' income in the study area. The specific

objectives were: to identify the role of different key actors along the coffee production and marketing channels; to examine factors influencing profitability of coffee production and to compare relative profitability of specialty coffee and conventional coffee among small-scale coffee producers. The ultimate aim was to make appropriate recommendations on the best way to improve the performance of small scale coffee quality and increase income in Tanzania.

To acquire the information needed for mentioned objectives above and identify the variables for data collection, a conceptual framework for selecting variables and respondents in coffee production was developed. The centre of this study was the profitability of small-scale coffee farms. This is to a great extent, influenced by head of household characteristics (age, education, sex and marital status) and agronomic factors (farm practices, seeds, soil type/fertility, rainfall, prices and age of coffee trees). Also institutional factors (extension services/training, marketing, processing, policy, credit services and transportation) can also influence the small-scale coffee farms profitability. Other factors such as environmental factors (pests and diseases and growing condition) also affect profitability of coffee production in one way or another (Fig. 3).



Source: Modified from Mashimba (2007).

Figure 3: Conceptual framework

In this study. it is assumed that small scale farmers make production decisions independent of their consumption and time allocation decisions. This assumption stems from two main reasons. First, coffee is mainly a commercial crop in the study area, others are palm oil. cassava and banana: all farmers in the area produce coffee for sale at TCB Auction in Moshi and NGO's such as sustainable harvest. Secondary. small scale farmers in the sample area participated actively in the local labour markets in one way or another.

Therefore, small scale farmers can reasonably be assumed to make coffee production decisions as if they are maximizing profit.

3.6 Data Collection

Primary data collection was done by using structured and pre tested questionnaire that comprised of both open and closed questions (Appendix 1). A checklist was used to collect information from focused group discussion and key informant interview. The questionnaire was used to interview respondents to capture important information for the study such as socio-economic characteristics, coffee production practice, farm resources, inputs availability and output and marketing information. Secondary data were obtained from Cooperatives, Kigoma District Council (KDC), Non Governmental Organisations (NGO's), Tanzania Coffee Board (TCB), Sokoine National Agriculture Library (SNAL) and electronic sources.

The questionnaire pre testing exercise took place in October. 2008 at Kalinzi village. It involved ten farmers and one cooperative. The exercise was conducted to test the ability of the tools to gather the intended information. The practice enabled some corrections in the structure and rephrasing of some sections and questions; thereafter the final version was developed and used to collect data for this study.

3.7 Data Analysis

Data collected from the primary sources were coded, cleaned. transformed and analyzed. The computer based statistical software that is Statistical Package for Social Sciences (SPSS) was employed for both qualitative and quantitative analysis of data.

3.7.1 Qualitative analysis

Descriptive statistics employed the use of frequencies, means, cross tabulations and percentages to summarize general characteristics of coffee small-scale farmers in the study area.

3.7.2 Quantitative analysis

The key quantitative analytical tool that were used in this study are regression techniques and gross margin analysis. These techniques were used to test the hypothesis that factors such as producer price of coffee, age of the household head and amount of coffee sold have significant impact on profitability of coffee production and also to demonstrate that specialty coffee is more profitable than conventional coffee in terms of returns per tree. The simple linear regression analysis used in this study is explained in the next subsection.

3.7.2.1 Linear regression analysis

The model was estimated using ordinary least square method (OLS) under the assumption that residual term (error term) was independently distributed from farmer to farmer with a zero mean and finite variance. The household sample selected for the empirical analysis includes both farmers producing in the specialty segment as well as in the conventional segment. To account for the use of different production technologies, separate models were estimated for specialty coffee farmers (denoted by subscript S) and conventional coffee farmers (denoted by subscript C). The model adopted to determine factors that influence producer profitability from both specialty and conventional coffee production in the study area as were hypothesized in the following multiple linear regression equations.

Specialty equation:

$$Y_s = \alpha_s - \beta_1 \chi_{s1} + \beta_2 \chi_{s2} + \beta_3 \chi_{s3} + \beta_4 \chi_{s4} + \beta_5 \chi_{s5} + \mu_s \quad (1)$$

Conventional equation:

$$Y_c = \alpha_c - \beta_1 \chi_{c1} + \beta_2 \chi_{c2} + \beta_3 \chi_{c3} + \beta_4 \chi_{c4} + \beta_5 \chi_{c5} + \mu_c \quad (2)$$

Where,

Producer profitability

χ_1 = Age of the household head in years

χ_2 = Amount of coffee sold in kg

χ_3 = Total cost used in coffee enterprise in TZS

χ_4 = Age of coffee trees in years

χ_5 = Producer price of coffee in TZS/kg

α = Constant term (intercept),

$\beta_1 - \beta_5$ = Parameter estimates (Coefficients) and

μ = Error term

The expected variable signs in both specialty and conventional coffee enterprises are shown in Table 3. Profitability is measured with income and expenses as explained in section 2.1

Table 3: Variables expected signs

S/N	Variable	Code	Units	Nature	Expected sign
1	Producer profitability	(Y)	TZS	Dependent	Positive
2	Age of the household head	(χ_1)	Years	Independent	Positive
3	Amount of coffee sold	(χ_2)	Kg	Independent	Positive
4	Total cost used	(χ_3)	TZS	Independent	Negative
5	Age of coffee trees	(χ_4)	Years	Independent	Negative/ Positive
6	Producer price of coffee	(χ_5)	TZS	Independent	Positive

After the model is estimated, computation of elasticity of variables is carried out from the variable coefficients as shown below in equation number 3. The importance of carrying out this computation has been explained under section 4.14.

$$\eta = \beta_i [\frac{\chi_i}{Y_i}] \quad (3)$$

Where η denotes elasticity at the variables means. β_i stands for the coefficient of ith explanatory variables, χ_i stands for the mean value of ith explanatory variables and Y_i is the mean value for the ith dependent variable.

3.7.2.2 Gross margin analysis

Gross margin analysis was used in this study to establish the differences between gross income earned and variable costs incurred. While gross income was calculated from gross outputs times its price. The gross output included the amount of produce (coffee) being sold and that used/ kept for other purpose. Morever, variable costs consisted fertilizers.

pesticides, herbicides, labour (hired and family) used in agrochemical applications, pruning, weeding and mulching activities in 2006/07 season in area of study. As proposed by Hill (1990), financial prices, economic prices and opportunity cost principle were used to calculate input costs and non-priced particulars such as family labour. A unit of calculation for crop is one coffee tree apart from other intercropped crops in the area and the calculation was based on an actual technology of growing coffee and on the assumption that there exists a commodity market on this kind of produce. The gross revenue were estimated at farm gate prices. The following mathematical expression was estimated as shown below:

$$GM = \Sigma TR - \Sigma TVC \quad (4)$$

Where:

GM = Average gross margin (TZS/tree)

TR = Average total revenue (TZS/tree)

TVC = Average total variable costs (TZS/tree)

This was calculated by multiplying average yield in kilogram per tree by average price per kilogram for both enterprises. The prices and yields of specialty and conventional coffee under study were obtained from farmers interview in the study area.

TVC = Average total variable costs (TZS/tree). These were obtained directly from respondents. The cost involved here include the input costs like fertilizers, pesticides and mulch, also labour costs for activities such as, mulching, weeding, pruning, harvesting and other cost. These costs also were calculated on per coffee tree basis. The term other cost in

this study has been used for inputs such as sacks, herbicides and its application. These inputs used by few farmers and their costs were obtained directly from the farmers.

The data used in gross margin analysis were obtained directly from coffee farmers as costs of production and returns. Since the study considered specialty and conventional coffee growers, a comparison between them was done in terms of their performance. This was done to test the null hypothesis that Specialty coffee is more profitable than conventional coffee in terms of returns per coffee tree. The comparisons of gross margins for two different means using independent t–test were done to check for any statistical difference in the variables between specialty and conventional coffee enterprises. The next section discusses the limitation of the study.

3.8 Limitation of the Study

Literature on specialty coffee production and marketing in Tanzania was limited. And hence literatures from other countries were used. Most small scale farmers in the study area as in the whole country do not keep record, and therefore computational work was to be undertaken to convert responses into proper units, for example cost of production per coffee tree could only be obtained from total cost of certain input per total coffee trees and then culculated into one tree. During data collection it was the period of rain, so it consumed more time to visit farmers. Furthermore, most of coffee growers were angry because of delayed payment and low prices of coffee offered to them this (2007/08) year from what they had expected. This reduced some cooperation, although efforts were made to convice them to give the information.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Overview

This chapter presents results and discussion for the data obtained from the survey. The results are divided into three sections; the first section presents descriptive statistics by showing household characteristics of sampled coffee growers. The second section shows empirical results and discussion from the econometric analysis. Finally the chapter addresses the results and discussion of coffee enterprises in which gross margins for two coffee segments were computed.

4.2 Socio-economic Characteristics Impact on Coffee Production

Socio-economic characteristics have important implications on the farming practice and towards factors influencing profitability of coffee production. For example, family characteristics of respondents usually influence the volume of the agricultural yield. Therefore, this section describes the main characteristics of sampled respondents, focusing on gender aspects, age of the household head, marital status and education level that were examined in the study area.

4.2.1 Gender aspects and its effect on coffee production

Of the 120 respondents 83.3 percent were males and the remaining (16.7%) were females. The results in Fig. 4 show that 82.5% of specialty coffee respondents were men, which was almost the same to 83.8% of conventional coffee. The smaller percentage of female respondents can be explained by the fact that the Kigoma district in particular and

Tanzania in general men-headed households are many as compared to female-headed households. This concurs with findings from several studies. This is because under normal situation for Tanzanian culture men are the ones who head the family, so they are the main speakers, bearing in mind that during the study respondents were visited at their residential areas and informal gatherings.

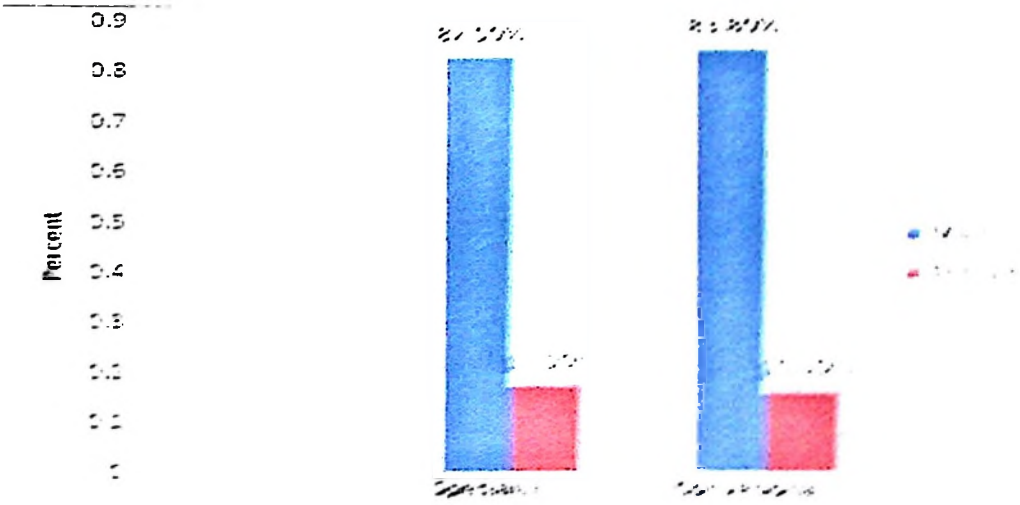


Figure 4: Gender of respondents

However the results show that [illegible] gender and coffee yields [illegible] categories of coffee production [illegible] have coffee yield above 1000 [illegible] majority (90%) of respondents [illegible] compared male of female [illegible] association may be due [illegible] addition to coffee production [illegible] potential resources and [illegible]

Table 4: Effect of gender on coffee production

Variable	Specialty yield (kg)			Conventional yield (kg)		
Gender	< 500	500 - 1000	> 1000	< 500	500 - 1000	> 1000
Male	15(83.3)	11(78.6)	7(87.5)	47(79.7)	17(94.4)	3(100)
Female	3(16.7)	3(21.4)	1(12.5)	12(20.3)	1(5.6)	0(0.0)

Note: Number in bracket indicate percentage of total for each category.

4.2.2 Age of the household heads and its effect on coffee production

Age influences productivity as well as an income. A study by Minja (2007), argued that age of the house hold head influences decision making and provision of labour itself. Moreover, younger and old people do not participate fully in farming activities. Therefore, age composition of respondents was considered to be important factor in this study. The results in Table 5 show that 50% of the specialty coffee were between 35 and 54 years old, as compared to 48% of conventional coffee growers in the same age category. This indicate that the people within this class for Tanzania and Kigoma in particular are the owner of farm resources and also fully participate in farming activities. Kalinzi and Mkabogo village in case of specialty and Mkongoro for conventional coffee growers had no respondent in the range of 25 to 34 years old (Appendix 2). The implication of this is that coffee production in Kigoma district is dominated by older people in the society (averaging 44 years for specialty and 39 years for conventional). BACAS (2007), asserted that in Tanzania people below 36 years old are socially considered young men and those above 59 years are too old to work effectively in the farm. The young men mostly engage in off-farm activities or migrate to urban areas.

Table 5: Age of respondents

Variable	Specialty		Conventional	
Age of respondents	Frequency	Percent	Frequency	Percent
Between 25 and 34 years	5	12.5	12	15.0
Between 35 and 44 years	13	32.5	20	25.0
Between 45 and 54 years	7	17.5	18	22.5
Between 55 and 64 years	8	20.0	17	21.3
Above 64 years	7	17.5	13	16.3
Total	**40**	**100.0**	**80**	**100.0**

Morever, the results revealed that the age of respondent has significant association with the coffee output in both segments under study. The majority of respondents (42.9%) in 35 - 44 years category have coffee yield between 500 – 1000 kg for specialty while the majority (25.4%) of respondents for conventional in 55 – 64 years category have coffee yield below 500 kg (Table 6). Furthermore, the majority (27.8%) in 35 – 44 and 45 – 54 years categories have coffee output between 500 – 1000 kg for conventional segment. This implies that people who are capable of being involved in coffee production activities are those within certain age limit such as 35 – 54 years old for both enterprises and young and old members of society cannot be engaged fully in production activities due to their physiological incapability. Furthermore. those who lack capital or do not own land/farms or possesses inadequate labour forces also are unproductive. This is very common in Cashew nut growing district like Mtwara. Newala, Masasi and Tandahimba.

Table 6: Effect of age on coffee production

Variable	Specialty yield (kg)			Conventional yield (kg)		
Age	< 500	500 - 1000	> 1000	< 500	500 - 1000	> 1000
25-34 years	3(16.7)	1(7.1)	1(12.5)	9(15.3)	3(16.7)	0(0.0)
35-44 years	5(27.8)	6(42.9)	2(25.0)	14(23.7)	5(27.8)	1(33.3)
45-54 years	2(11.1)	3(21.4)	2(25.0)	13(22.0)	5(27.8)	0(0.0)
55-64 years	4(22.2)	2(14.3)	2(25.0)	15(25.4)	2(11.1)	0(0.0)
64 years	4(22.2)	2(14.3)	1(12.5)	8(13.6)	3(16.7)	2(66.7)

Note: Number in bracket indicate percentage of total for each category.

4.2.3 Marital status and its effects on coffee production

Marital status is very important parameter in farming society because it has implication in production. The stable family (married) can concentrate more on production than an unstable one that may influence agricultural production. The results indicate that about 93 percent of the specialty coffee respondents were married, whereby 78.8% of the conventional coffee respondents were married. It was also observed that, except for Mkabogo with 5 percent for conventional coffee growers, all remaining villages for both segments none of respondents were unmarried. However, divorced (2.5%) and widowed (5.0%) of specialty segment had small percentage as compared to its counterpart of which 6.3% were divorced and 13.8% were widowed (Table 7). This implies that the whole society in the study area was stable.

The marital status of the respondents was found to have significant relationship with the coffee output. The results show that married people from respondents dominate in coffee

yield for all production categories in both specialty and conventional enterprises. For example 100% of married respondents for specialty coffee obtained yield above 1000 kg while none of the remaining categories attained the same output. Also 66.7% of married category for conventional segment obtained yield above 1000 kg of coffee. This can be explained by the fact that married households are stable and can fully participate in every stage of coffee production activities comfortably. However, could be due to effective labour force, managerial skills and well organized effort. Several studies confirm the findings.

Table 7: Marital status and effects on coffee production

Variable	Specialty coffee yield (kg)				Conventional coffee yield (kg)			
	<500	500-1000	>1000	Total	<500	500-1000	>1000	Total
Marital status								
Single	-	-	-	-	1(1.7)	0(0.0)	0(0.0)	1(1.7)
Married	17(94.4)	12(85.7)	8(100)	37(92.5)	46(78.0)	15(83.3)	2(66.7)	63(78.8)
Divorced	0(0.0)	1(7.1)	0(0.0)	1(2.5)	5(8.5)	0(0.0)	0(0.0)	5(6.3)
Widowed	1(5.6)	1(7.1)	0(0.0)	2(5)	7(11.9)	3(16.7)	1(33.3)	11(13.8)

Note: Number in bracket indicate percentage of total for each category.

4.2.4 Level of education and its effects on coffee production

Education level for respondents was categorised into five groups in both coffee enterprises: without formal, adult, primary, secondary and college or university education. As can be noted in Fig. 5, the majority of the respondents for specialty (75.0%) and for conventional (64.0%) coffee had formal education. The higher percent of education for specialty coffee respondents implies that possibly specialty coffee requires relatively higher education due to the risk element involved; educated people are more likey to take risk of innovations than uneducated farmers. Among the villages studied only 5 percent of Nyarubanda respondents has secondary education (Appendix 2). It was also noted that 20.0% of respondents in specialty coffee and 21.0% of respondents in conventional coffee enterprise had informal education. However, the formal education attained by the majority of respondents is highly inadequate because as it enables an individual to know how to read and write only. Such level of education can not put a person in a good position to cope with challenges of coffee production as new technology in the study area.

Education level of household people expected to influence production in agriculture. The results reveal that there is relationship between education of respondents and all coffee output categories whereby, farmers with primary education done better than those having no formal education in specialty and conventional segments. This is attributed by the fact that growers in the study area produce coffee for commercial whereby reading and writing knowledge could add value on farming activities. The primary education helps them to read some leaflets on fertilizer and herbicides application and record keeping. Ofcourse early adopters of rural technology or innovators are educated smallholder farmers.

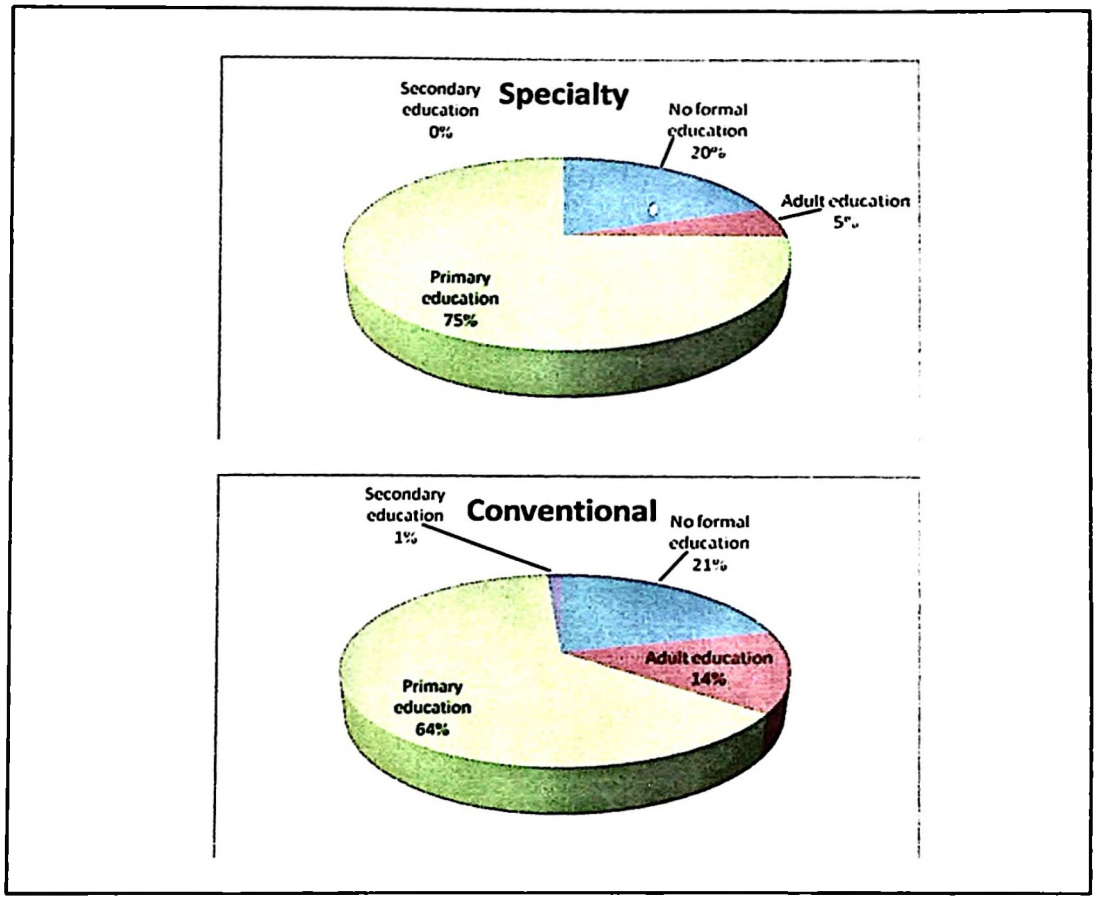


Figure 5: Education level of respondents.

4.4 Age of Coffee Trees

Coffee productivity is influenced by the age of coffee in years from the time of planting. Results revealed that all coffee trees in specialty segment were below 51 years, while only 97.5 percent of conventional coffee trees were below 51 years (Table 8). Of the villages studied, Nyarubanda and Mkabogo had 5 percent of coffee trees over 50 years old in conventional segment (Appendix 3). This indicates that at these ages, under good agronomical management coffee productivity can be higher than the overall an average obtained in the study of 0.8382 kilogram per tree for specialty and 0.6927 kilogram per

tree conventional coffee. A bit higher productivity in specialty enterprise may be due to the age of the trees, farmers training and promising prices for specialty than conventional coffee. The number of coffee trees in the farm explained in the following subsection.

Table 8: Age (years) of coffee trees in the farm 2006/07

Variable	Specialty		Conventional	
Age of coffee trees	Frequency	Percent	Frequency	Percent
Below 20 years	21	52.5	40	50.0
Between 20 and 50 years	19	47.5	38	47.5
Above 50 years	0	0.0	2	2.5
Total	**40**	**100.0**	**80**	**100.0**

4.5 Number of Coffee Trees in the Farm

The distribution of number of coffee trees owned by respondents is shown in Table 9. About 55 percent of the respondents for specialty had a number of coffee trees from 701 and above per hectare which was contrary to conventional coffee farmers whereby 71.3 percent of respondents owned a number of coffee trees between 300 and 700 per hectare.

Table 9: Number of coffee trees in the farm 2006/07

Variable		Specialty	Conventional	
Number of coffee trees	Frequency	Percent	Frequency	Percent
Less than 300	2	5	8	10
300 - 500	8	20	37	46.3
501 - 700	8	20	20	25
701 - 900	9	22.5	8	10
More than 900	13	32.5	7	8.8
Total	**40**	**100**	**80**	**100**

4.6 Land Acquisition

The ownership of land is the precondition to plant coffee in the study area. This is attributed by the fact that landowners do not allow other farmers to plant permanent crops on their land (Mutayoba, 2005). The survey revealed that 45.0% and 46.3% for specialty and conventional respondents respectively had inherited land. These results indicate that most people in Tanzania especially those who grow permanent crops in particular experienced to inherite land from their ancestors. And about 42.5% of respondents for specialty acquired land through purchasing while only 32.5% for conventional (Fig. 6). This indicate that probably some money obtained by individuals from off-farm activities are used to buy land.

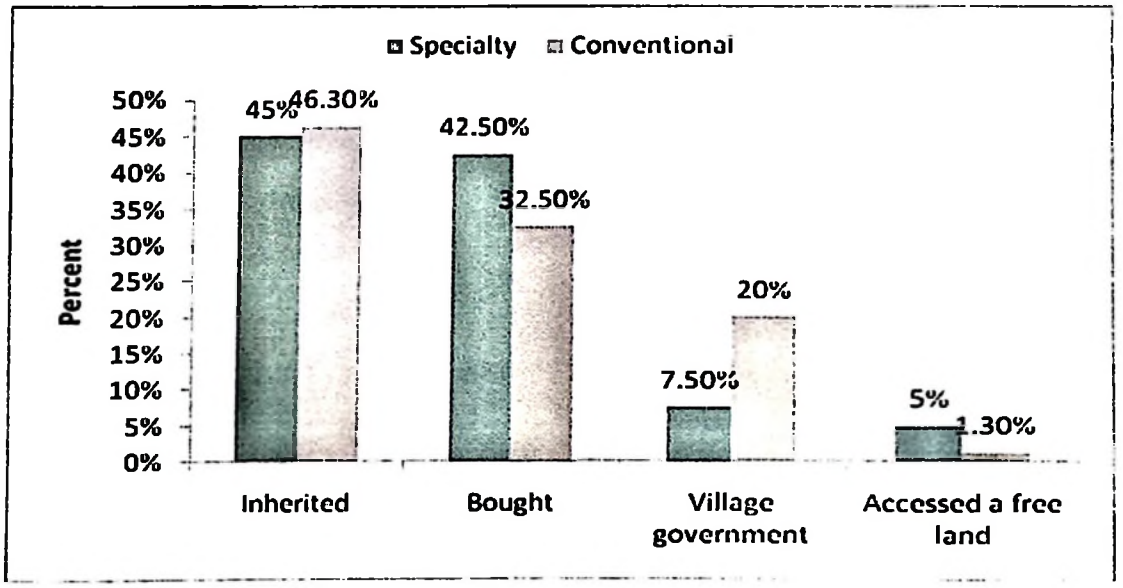


Figure 6: Land acquisition.

4.7 Land Allocated to Coffee and Banana

Table 10 shows land that is allocated to coffee intercropped with banana. The result shows that the majority (50%) of respondents from specialty coffee enterprise had farm size

between 0.5 and 1.0 hectare. While more than half (51.3%) of respondents from conventional coffee enterprise had farm size between 1.1 and 2.0 hectare. Only 12.5 % from specialty coffee respondents were between 1.1 and 2.0 hectare. On other hand, about 7.5% and 3.8% of specialty and conventional coffee respondents respectively were above 2.0 hectare. The higher percent of respondents in both enterprise own small farm size. Furthermore, the majority (50.0 %) of specialty farmers had slightly smaller farm size. This can be explained by the close supervision required in this type of farming. Small farm sizes limit the possibilty of farmers to enjoy eonomies of scale (BACAS, 2007).

Table 10: Land allocated to coffee intercropped with banana 200/07

Variable	Specialty		Conventional	
Land allocated to coffee	Frequency	Percent	Frequency	Percent
Below 0.5 ha	12	30.0	1	1.3
Between 0.5 and 1.0 ha	20	50.0	35	43.8
Between 1.1 and 2.0 ha	5	12.5	41	51.3
Above 2.0 ha	3	7.5	3	3.8
Total	**40**	**100.0**	**80**	**100.0**

4.8 The Trend of Farmer Income From Coffee Farming 2006/07

Income is one of the most important aspects for household development due to the fact that it assists in buying day to day family requirements. Lack of sufficient income can hinder one's ability to afford buying household expenditures. Results reveal that 70% of respondents for specialty coffee reported the increasing income within 5 years, whereby 52.5% of respondents for conventional coffee growers reported that, there were no change

of their income in the same period. This is due to the fact that specialty coffee produers sold coffee of high quality at good price which covered most of production cost.

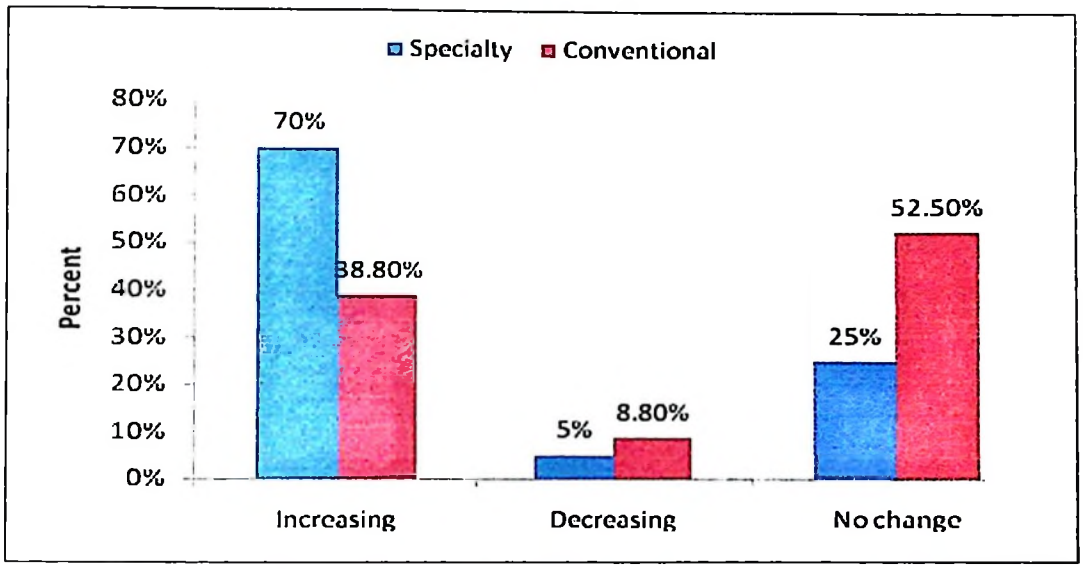


Figure 7: Trend of farmer income from coffee farming.

4.9 Extension Services

Extension services are important as far as productivity of agricultural enterprise is concerned. Survey results indicate that all respondents interviewed for specialty segment had access to extension services whereby only 74.0% of respondents obtained extension services for conventional enterprise. On the other hand the remaining 26.0% for conventional respondents claimed to have difficulties in getting extension services. The problem of accessing extension services seem to be more serious in conventional farming. This is due to the fact that in some village like Mkabogo and Nyarubanda there were no agricultural extension staff who could provide advices on coffee husbandry practices to coffee farmers. It is interesting to note that Sustainable harvest has noted the problem of inadequate extension services. In response to the problem it employed one extension agent in the area of all study villages to assist in specialty coffee enterprise.

The results indicate that 75.0% of respondents who claimed to have difficulties in getting extension services, said that no extension personnel in the area and 25.0% of them argued that it was too expensive to seek advise especially cost incurred to find extension agents. However, the advice obtained from extension staff were completely adequete to meet their objectives of coffee treatment, pruning, fertilizer application and other improved coffee husbandry practices (group discussion). The specialty coffee segment had more yield per coffee tree as compared to the conventional segment as described in section 4.4. This difference in production level of two different farming enterprises can be explained also by intensive extension services provided to specialty coffee growers.

Table 11: Extension services accessibility

Variable	Specialty		Conventional	
Access extension services	Frequency	Percent	Frequency	Percent
Yes	38	100.0	57	74.0
No	0	0.0	20	26.0
Total	**38**	**100.0**	77	**100.0**
If no, why				
No extension personnel	0	0.0	15	75.0
Too expensive	0	0.0	5	25.0
Total	**0**	**0.0**	**20**	**100.0**

4.10 Credit Services

Out of 120 interviewed farmers about 37.5% for specialty enterprise had access to credit facilities while only 25.0% for conventional enterprise obtained such services.

Furthermore, the rest of percentage in both segments had no access (Table 12). The proportional of respondents who had access to credit facilities was relatively higher in the case of specialty coffee farmers. This can be attributed to the fact that most of specialty coffee farmers have more knowledge and skills obtained through extension services that help them confidently to seek credit in kind. Also the results show that the farmers obtained credit from cooperative were 100 percent for specialty, while only 95.0% of conventional farmers received credit from cooperatives. However, only 5 percent of conventional farmers received credit from banks.

Table 12: Credit services accessibility

Variable	Specialty		Conventional	
Credit access	Frequency	Percent	Frequency	Percent
Yes	15	37.5	20	25.0
No	25	62.5	60	75.0
Total	**40**	**100.0**	**80**	**100.0**
If yes, who				
Farmers cooperative	15	100.0	19	95.0
Banks	0	0.0	1	5.0
Total	**15**	**100.0**	**20**	**100.0**

4.11 Problems Encountered in Coffee Production 2006/07 Season

Surveyed farmers pointed out many problems facing agricultural enterprises. The main problem reported by the majority of them in both specialty and conventional coffee enterprises was high price of inputs at 42.5% for specialty and 50 percent for conventional

coffee. This implies that the agricultural inputs price at villages level was too high for many farmers to buy and use it. Large number of respondents complained about high price of inputs for coffee production. About 22.5% for specialty and 20.0% for conventional of the respondents reported low price of coffee as compared to the cost of production. Also Table 13 shows that delayed payment were another problem complained about by respondents from both coffee enterprises. This problem of delayed payment supported by Gabagambi (1998), in his study that the delays in paying farmers are still common inspite of government's strong stance that farmers have to be paid promptly for their crops.

Table 13: Problems encountered by farmers in coffee production

Variable	Specialty		Conventional	
Problems	Frequency	Percent	Frequency	Percent
High price of inputs	17	42.5	40	50.0
Low price of coffee	9	22.5	16	20.0
Delayed payment	4	10.0	13	16.2
No assured market	7	17.5	6	7.5
No extension services	3	7.5	5	6.3
Total	**40**	**100.0**	**80**	**100.0**

4.12 Roles of Institutions in Coffee Production and Marketing

The first objective of the study was to identify the role of different key actors along the coffee production and marketing in the study area. Coffee production and marketing in the district depends heavily on the institutional and organizational arrangements that promote the crop (DALDO Personal communications, 2008). The quality of coffee production and

marketing operations depend much on governmental and non-governmental organisations. The organizations engaged in production and marketing of coffee in one way or another were the Jane Goodall Institute (JGI) through TACARE, Action Aid, TaCRI and SH.

4.12.1 Government responsibilities

The Ministry of Agriculture, Food Security and Cooperatives (MAFSC) supervises the sector in the area. The ministry provides policy guidance and operational framework that is geared towards restructuring cooperatives to operate on an independent, voluntary and economically viable basis and to develop into centres for providing and disseminating agricultural inputs, technology and information. And all these responsibilities are implemented through District Agricultural and Livestock Development office. Tanzania Coffee Board advises the government on policies and strategies for the development of the coffee industry, regulates the industry, issues various licenses and permits, collects and disseminates statistics, and runs the coffee auction in Moshi.

4.12.2 Cooperatives responsibilities

Societies often act as agents of coffee buyers (Mahwisa Personal communications, 2008). They also engage in coffee quality control at primary processing stage and some other commercial activities. Farmers are mainly responsible for coffee production. KANYOVU often buys parchment coffee and process (hull) it to get green coffee, and store coffee in their own facilities based on quality control and also engage in other activities such as coffee marketing and transportation (Mahwisa Personal communications, 2008).

4.12.3 Non-government organizations

TACARE is one of the organ in Jane Goodall Institute Tanzania (JGI). Currently under the partners fund grant, JGI Tanzania established a technologically-advanced coffee laboratory at its education center (TACARE) in Kigoma and employed a skilled coffee specialist/ cupper to oversee quality control efforts. TACARE provides strong support on environmental sustainability through promotion of agro forestry in coffee production area, pre and post harvest coffee training. However, it established coffee seedling nurseries, promoted specialty coffee and linked coffee farmer associations in the area to export market such as SH.

Action Aid Tanzania has been working with poor and marginalized communities in the southern, coast and western regions of Tanzania. According to the organization representative, with other activities such as promoting education, food security and gender, it has been conducting social forum programmes. In these forums coffee growers from different localities in Kigoma region discussed and shared ideas about ongoing activities and their future plans aiming at strengthening their organizational structures. He noted that by using these forum farmers convey their message direct to government and other non-government organization on whatever they demand. Also he revealed that they assisted KANYOVU on establishment of good governance, leadership and management in the association. However it helps coffee grower to increase efficiencies in marketing system, enabled cooperative to mobilize coffee farmers for sake of exposure by conducting study tour in Rwanda, Mbinga and Kagera. And it focuses on extension services, farm inputs and marketing of farmers produces. The organization established internet system for manager

and accountant to be competent in strengthening and access marketing information for cooperative.

The role TaCRI is to improve smallholder incomes by improving coffee productivity, quality and marketing. Regarding to the discussion with TaCRI representative in Kigoma region, they put emphasis on training by organizing smallholder coffee growers into farmer groups around production and primary processing to improve productivity and quality. Moreover, they support the development of the coffee industry in Kigoma district by disseminating proven technologies to district extension staff and farmers through provision of training courses and promoting extension messages. Finally they established proven Coffee Wilting Disease (CWD) resistant coffee nurseries of Kp - 423 and N - 39 arabica varieties at village levels.

SH started its work in Kigoma region early in 2007, dealing with KANYOVU coffee farmer cooperative. The company buy green bean produced by coffee grower after advising them on how to improve its quality through workshops and agronomic trainings. SH helps coffee growers in area to get a high quality specialty coffee and try as much as possible to find a good market where the coffee is well paid. Its commitment to coffee growers is quality assurance, relationship building, advanced logistic systems, and reliability to create win-win business opportunities for both sides of the supply chain. The next subsection discusses the subsector organization in the study area.

4.13 Coffee Subsector Organization in Kigoma 2006/07

Coffee is mostly grown by smallholders in the study area. On average a coffee field consists of 973 trees per hectare of conventional and 1108 trees per hectare of specialty

enterprise. The number of coffee trees are much larger for the case of specialty than conventional per hectare due to the fact that farmers filled the space after get training on specialty coffee by TACARE. Specialty coffee production base on proper farm management procedures such as fertilizer application, pesticides, mulching and frequently weeding if no muching materials (Group discussion. 2008). Specialty coffee growers benefit from harvesting and processsing procudures that used in the area which provide green coffee of high quality and that give them premium prices as compared to their counterpart. These procedures decribed in the next subsection..

4.13.1 Coffee harvesting and processing

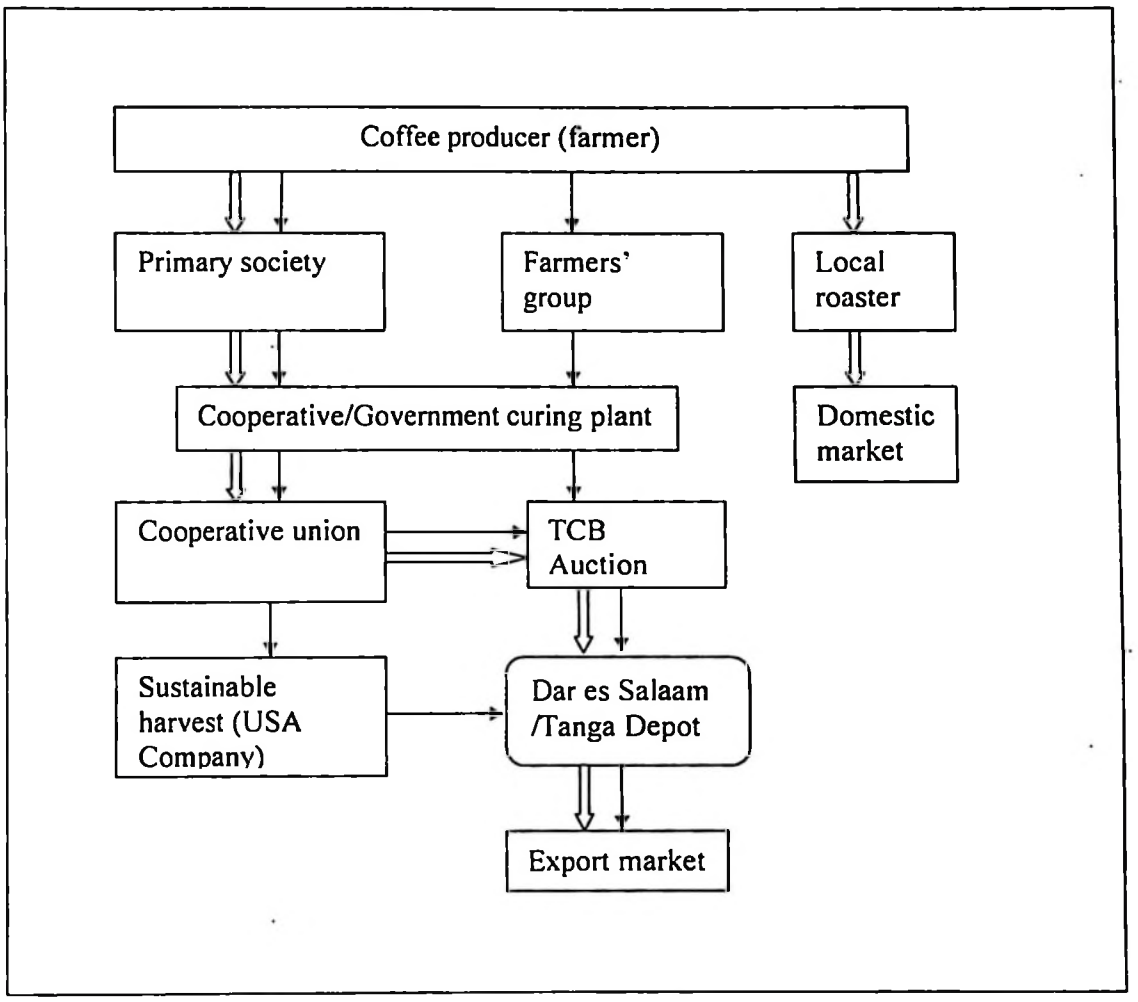
Kigoma district is mostly producing the wet processed mild Arabica type of coffee which grows side by side with Great Gombe Game reserve, the last home for Chimpanzee (TaCRI, 2006). Interviewed coffee growers in group discussion said that in order to maintain high coffee quality (specialty) during harvesting the only red ripen cherries are picked. After harvesting, farmers deliver their harvest within eight hours to a central pulpery/ washing station for pulping and drying to avoid post-harvest decay.

At washing station cooperatives take care of quality control from cherry reception, pulping (using Penago machine), drying (avoid direct hot mid-day sun), hulling, package and storage to the point of selling. In other hand the conventional coffee in the study area normally pulping done at farmer premises or at hand-pulpery centre whereby individual farmers take care of quality control in all stages. Like in other part of the country, farmers formed associations so that they can easily obtain extension services and technical assistance to undertake the processing function. Central pulpery units provided by central

government through District Agricultural Development Plans (DADP) in 5 villages are owned by village governments. Some processing facilities in the district are cooperatively owned, for example KANYOVU coffee curing mill which hull parchment to green coffee.

4.13.2 Coffee marketing channels

A Coffee marketing channel with clear flow of produce from farmers to exporter or roaster do exsist in the study area (Fig. 8). After processing stage, small growers of conventional coffee through KANYOVU coffee curing joint enterprise pack and sell the green coffee at Tanzania Coffee Board (TCB) auction to exporters. On delivery farmers do receive only an initial advance while the final price paid in almost six months after harvest. However individual farmers sell low quality coffee if any to local roasters who process it for local consumption in the region. For the case of specialty coffee, KANYOVU sold it direct to SH (exporter) in Kigoma and access amount of coffe sent to TCB auction. In the study area there are two farmer registered groups which are Kalinzi Coffee Farmers Group (KACOFA) and Mkabogo *kwenda na wakati* coffee group. They produce, collect and process their specialty coffee and sell it direct to exporters/roasters at TCB auction in Moshi.



Keys: ⟶ ⟹

Specialty coffee marketing flow Conventional coffee marketing flow

Source: Modified from BACAS (2007)

Figure 8: Coffee marketing channels.

Actually coffee growers cooperative and groups bring the green coffee directly to exporters without passing through the middleman traders. The transportation of coffee from Kigoma to Dar es salaam for shipping was the cooperative responsibility (Mahwisa Personal

communications, 2008). All coffee growers associations undertake all functions from the production stage to the exportation of the green coffee. Fig. 8 shows the coffee marketing flow chart for Kigoma region. The Sustainable harvest argued that they were looking for specific niches/segment in the USA for specialty coffee, as the bulk market did not offer interesting prospects due to the high world coffee supply. Farmers in Kigoma through supporters such as Kigoma district council, TACARE, Action Aid, TaCRI and Sustainable harvest (SH) were preparing to compete with other coffee producers in this new market. The regression analysis results discussed in the following section.

4.14 Regresion Analysis Results

Regression analysis was done to examine the factors influencing profitability of coffee production in the study area. The way the models were constructed have been explained in detail in chapter three. Table 14 presents parameter estimates from the two regression analysis models.

Significance of the F-value ($p<0.05$) for both enterprises indicate that the models were significant. Moreover, R^2 value of 0.824 for specialty and 0.607 conventional enterprises indicate that the models explained about 82% and 61% of the variations in regression models. The higher R^2 value of specialty enterprise suggests that the model fitted well to the data than its counterpart. This implies that the regression model was stronger in explaining the relationship between dependent {producer profitability (Y)} variable and independent {age of household head (χ_1), amount of coffee sold (χ_2), total costs (χ_3), age of coffee trees (χ_4) and producer price of coffee (χ_5)} variables in specialty as compared to the conventional coffee enterprise.

Table 14: Regression results showing variables explaining variations for coffee producer profitability 2006/07

Variables	Specialty coffee				Conventional coffee			
	Coefficient	Std. Error	t-value	Sig.	Coefficient	Std. Error	t-value	Sig.
(α)	42.061	35.445	1.187	.244	10.412	41.711	0.250	.804
χ_1	0.209	0.345	0.604	.550	0.066	1.009	0.065	.948
χ_2	2.007	0.204	9.840**	.000**	4.464	0.575	7.763**	.000**
χ_3	-1.270	0.248	-5.113**	.000**	-2.570	0.751	-3.420**	.001**
χ_4	0.104	0.190	0.549	.586	0.071	0.618	0.115	.909
χ_5	9.816	10.212	0.961	.343	7.780	12.610	0.617	.540

Specialty:

$R^2 = 0.824$ and Adjusted $R^2 = 0.798$

F-value = 31.736 ***

Conventional:

$R^2 = 0.607$ and Adjusted $R^2 = 0.569$

F –value = 15.76***

Note: *, ** and ***, significant at 0.1, 0.05 and 0.01 levels respectively

Using the model results in coefficient forms may cause a problem of interpretation due to the influence of the units in which the variables were measured. To demonstrate this point considers the impact of a kilogram increase of coffee sold for the specialty segment (Table 14). This would results in an increase of producer profitability by TZS 2.007. To Tanzanians, this statement makes sense because they are familiar with shillings. For people not used to the Tanzanians shilling, this change in profitability may not show a clear picture. To solve this problem, elasticities of variables at their mean values were calculated (Table 15). This allows an interpreter freedom to choose units of interest. For the purpose of this study, percentage units were chosen.

Table 15: Elasticity Estimates for Specialty and Conventional coffee producers

Variable	Elasticity	
	Specialty	Conventional
χ_2	0.0011	0.0007
χ_3	0.80	0.96

Also, results show negative regression coeficients for costs (χ_3) variable whereby the amount of coffee sold (χ_2) for both specialty and conventional coffee enterprises were positive. These signs indicate the positive and negative relationship with profitability. The negative signs on the total cost used in both enterprises show that an increase in cost decreases producer profitability, this relationship was statistically significant at ($p<0.05$) in both enterprises. A 1% increase of costs results into a 0.80% decrease in producer profitability for specialty and 0.96% decrease in the profitability for conventional segment. This means that for coffee grower to increase profit from his/ her produce he/ she must

either reduce cost of production by maintaining productivity or rise productivity while costs of production remain constant. Based on these results, an increase in production costs affects profitability of conventional coffee more than that for specialty coffee. This implies that higher prices of inputs and labour cost used in coffee farms led to reduced farmer income in the study area. Yavuz and Cengiz (2002) reports similar findings for factors affecting profits of broiler enterprises in Turkey.

The amount of coffee sold had a significant ($p<0.05$) positive effect (as expected) on producer profitability. The results indicate that when amount of coffee sold increase by 1%, the producer profitability is favoured by 0.0011% for specialty and 0.0007% for conventional coffee enterprise. This implies that large amount of coffee sold increases farmer income in study area. This means that those farmers produce and sell many kilograms of coffee have a benefit than those producing only few coffee.

4.15 Gross Margin Analysis

The analysis aims at estimating income generated from the production of both specialty and conventional coffee per tree. Results in Table 16 presents on-farm production costs and output per coffee tree in both enterprises for Kalinzi, Nyarubanda, Mkabogo and Mkongoro villages. Analysis indicate that the average producer price per kilogram for specialty coffee in all village was TZS 2782.50. The total variable cost per tree in this enterprise was TZS 1346.00. However the average producer price per kilogram for conventional coffee in the same area was TZS 2162.50 and the total variable cost per tree for conventional coffee was TZS 1265.00. Furthermore, the total variable costs in specialty segment was less than its counterpart (Table 16) due to the fact that processing costs at that

period were covered by cooperatives as incentives in specialty so as to encourage more people to join the sector. Also gross margin per tree was about TZS 986.00 for specialty and TZS 233.00 for conventional coffee. The results revealed that little was earned from producing and selling conventional as compared to specialty coffee in 2006/07 season. Morever, there were complaining of low profit relative to the production costs for conventional segment in study area (Group Discussion, 2008).

Table 16: Gross margins analysis results 2006/07 season

Item	Specialty segment	Conventional segment
Total coffee output (Kg) (a)	25 711	30 177
Total no. of coffee trees (b)	30 674	43 565
Output/tree (a/b) (c)	0.8382	0.6927
Average price (TZS/Kg) (d)	2 782.50	2 162.50
Revenue/tree (TZS) (cxd) (e)	2 332.29	1 497.96
Total variable costs (TZS) (f)	41 293 319.45	55 124 369.85
Cost/tree (TZS) (f/b) (g)	1 346.00	1 265.00
Gross margin/tree (e-g)	**986.29**	**232.96**

Source: Compiled from survey (2008).

Findings from this study suggest income of coffee farmers in Tanzania can be increased through specialty coffee production as its price is higher because of good quality compared to conventional coffee. This would likely encourage more farmers to join the business as a way to combat rural poverty.

4.15.1 Mean difference T–test

Hypothesis number (ii) was examined by testing the difference between two means of coffee farming gross margin, to find the most profitable enterprise. Independent samples t–test was used for specialty and conventional coffe enterprise. Results reveal that, there were statistical differences between specialty and conventional at $p<0.05$ level of significance in relation to gross margin per coffee tree. Therefore, there was enough evidence to reject the alternative hypothesis in favour of the null hypothesis for the specialty enterprise. Specialty enterprise had consistently higher values and this implies that the use of specialty production procedures is playing a positive role in alleviating if not eradicating poverty because enables the coffee farmers to meet cost of production.

Table 17: T – test results of gross margin between two coffee farming

Type of farming	Respondents number	Mean (GM)	T test for means difference		
			T	Df	Sig.(2-tailed)
Conventional	80	408.54	-7.342	86.527	0.000**
Specialty	40	1 345.32			

Note: ** indicate statistical difference at ($p< 0.05$) significant level.

The empirical results of this study tentatively confirm that specialty coffee produce improve farmer income than its counterpart thereby contributing to poverty reduction in the study area. The findings suggest that the household farmers should choose to adopt the quality-enhancing technology since the utility gained from participation in the specialty segment is greater than the utility of producing in the conventional segment. After several analysis (description and quantitative), the results obtained allow the conclusion and recommendations of the study as explained in the following chapter.

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Overview

This chapter concludes the explainations and discussions made in the preceding chapters. The main objective of this study was to compare economic performance of specialty and conventional coffee production among small-scale farmers in Kigoma District, with a view of improving farmers' income. The Specific objectives were to identify the role of different key actors along the coffee production and marketing channels, to examine factors influencing profitability of coffee production in the study area, to compare relative profitability of specialty coffee and conventional coffee among small-scale coffee producers and finally to recommend, based on the findings of this study, measures for improving coffee quality in the study area.

5.2 Conclusion

5.2.1 The role of different key actors

The study found that smallholder farmers from both specialty and conventional enterprises have household characteristics common to most rural household settings elsewhere in Tanzania. Most of the farmers had attained at least primary education. Furthermore, most of males were owned coffee farms, although both male and women together with hired labour partcipated in all coffee production activities. The study shows that there were Governmental and Non-governmental institutions promoting coffee production and marketing in the area. Different institutions such as TACARE, Action Aid, TaCRI and Sustainable harvest involved in coffee promotion each playing its roles. Most of them were

imparting knowledge and skills for good coffee husbandry and processing to get coffee of high quality and only one organisation conducted training to coffee growers and established market for specialty coffee.

5.2.2 Factors influencing profitability

Regression analysis was used to analyse factors affecting coffee profitability in study area. Given that farmers in the sample use different sets of technologies, two separate multiple regression analysis estimated for farmers in each sub-sample. The result reported that an increase in amount of coffee sold in kilogram was associated with increase in the producer profitability for both segments. This implies that the larger the amount of coffee sold the higher the farmer income in area. It was further noted that the increase in year of coffee trees also results into increase in the producer profitability in both specialty and conventional coffee enterprises. Moreover, an increase in age of household head was positively related to producer profitability, although was not statistically significant. The findings show that price of coffee in both coffee enterprises had a positive effect on producer profitability, but also not statistically significant at ($p<0.05$). The results from the study also revealed that total cost used in both coffee enterprises had a negative relationship to profitability of coffee growers and was statistically ($p<0.05$) significant. This may be due to the fact that profit decrease with high variable cost and ofcourse the vice versa is true. It could be because of the input prices in study area whereby it found to be high, which means it cost much for farmers to operate in coffee farms as a business.

5.2.3 Relative profitability of specialty against conventional coffee growers

Gross margin analysis was used to analyse coffee profitability. The result revealed that the specialty coffee production is more profitable enterprise with gross margin averaging TZS 986 per coffee tree as compared to the conventional coffee production which had gross margin of about TZS 233 per coffee tree. Furthermore, to the pre-specified level of significance ($p<0.05$), there was enough evidence to support the hypothesis that specialty is more profitable than conventional enterprise. Hence specialty coffee is a profitable enterprise to be undertaken by farmers in the area through encouraging them to follow the enterprise proceducers for high quality produces. From the interviewed coffee growers in study area, earned about TZS 1 855 756 as mean income from sales of specialty coffee and about TZS 814 882 as mean income from sales of conventional coffee.

Compared to National per capita income, which was US$ 293 (TZS 380 900) in 2007, it shows that coffee growers in the area were relatively better off because of coffee industry. Coffee production is very important because of cash earnings realized from the crop. Generally the industry plays a significant role in contributing to social economc development of the people in the area. Findings of this study and their subsequence recommendations will form important bases for various development sectors such as policy makers, central and local government, academicians and all coffee farmers in Tanzania and particularly in Kigoma district. Basing in the results of this study the following measures are recommended.

5.3 Recommendations

This study was conducted with reference to the 2006/07 season in Kigoma district. Based on the findings of this study, the following recommendations aimed at improving coffee quality and quantity so as to increase producer profitability in the area as stated in fourth objective.

(i) Low quality coffee is the problem in the study area which hinder high prices especially in conventional coffee enterprise. However, for small-scale farmers to be successful in the specialty market, they must produce coffee of high quality. To improve coffee quality in the area of study and allover the country, the government should provide supportive programs that will train coffee growers at farm level in quality control systems from production to selling point. Policy makers can support such growers' efforts to enhance quality by expanding programs and policies that provide technical assistance in quality control. This probably would be achieved through increase in provision of training and extension services that would also increase yield per tree and marketing techniques to farmers. However, the government should establish institution that will be assessing and certifying coffee quality domestically.

(ii) Since high farm input prices ranked first in the list of problems mentioned by respondents then the government should make deliberate efforts to tackle that problem. Removing the tax on important inputs such as fertilizer and other agro-chemicals is one way of solving the problem. Furthermore, because farmer cooperatives already established in the area, could be used to reduce the unit input

cost to the farmers by exploiting economies of scale accrued through purchase prices by discounts and lowered unit transport charges. But also government can subsides all important farm inputs for cash crops and coffee in particular to favour farmers in the rural area like Kigoma villages. Warehouse receipt system could be useful for input availability, stabilising prices, solving delayed payment, ensuring market outlets to coffee growers in study area. This could improve coffee quality and quantity in the area.

(iii) The profitability of specialty and conventional coffee business for farmers was mostly explained by amount of coffee sold. This requires intervention by the policy maker and implementer to improve coffee production. Improving the productivity of its coffee is a vital way for Kigoma to increase rural incomes through empowering the coffee growers to manage their production for maximum profit. Therefore, KANYOVU in collaboration with government should promote the production and improve its access to international and local markets in order to boost the income of all coffee growers in the area. However, TCB and other financial services institutions should come up with well established buying and selling price of coffee, which will improve coffee growers ability on poverty reduction. Surely profitable coffee production will engage young people on the land and slow down the drift to the cities.

(iv) Government and Non-governmental organizations should support KANYOVU to manage their growth by focusing on access to sources of low-cost credit, identification of new specialty coffee markets and improvement of management

information systems in the area. Since the lack of transparency in the market information discourages farmer's productivity and lead to the poverty, the study also recommend that the government should facilitate KANYOVU to make sure pricing and business information are shared with all partners involved in the coffee industry.

(v) The government should enhance the efficiency of the extension services by strengtherning the linkage between farmers, extension personel and researchers through provision of working facilities. This will facilitate the flow of information from the researchers to the farmers and vice versa (proper communication) which is important for the development of relevant technologies. However, the government should recruit many extension personnel in order to provide extension services in all villages.

(vi) Government and Non-government organization should provide soft loan to primary cooperatives in order to increase the construction of additional village based central pulperies and improved farm equipments. The more efficient coffee processing machines such as Penago machines are needed. These machines will allow coffee to be congregated in each community and washed consistently. This would enable more small-scale farmers to process and market high quality coffee and get premium prices. This should be done together with water accessibility in the area, because without it central pulperies are useless. The water could be collected through the guttering system near the washing station whereby, the rain water harvest tanks should be constructed in villages with washing station to reduce water shortage for washing coffee during pulping process.

REFERENCES

Agayo, O. (2007). *The small farmer on the way to the global market.* The case of Kenya. Kenya national chamber of commerce and industry, Nairobi, Kenya. [http://www.epaa.org.af/pdfs/agri7.pdf] site visited on 25/02/2009.

BACAS, (2007). *A study on Kagera coffee marketing system.* Bureau of Agricultural Consultancy and Advisory services, Sokoine University of Agriculture, Morogoro, Tanzania. 9pp.

BACAS, (2005). Final report on coffee baseline report for TaCRI (Tanzania Coffee Research Institute). Bureau of Agricultural Consultancy and Advisory services, Sokoine University of Agriculture, Morogoro, Tanzania. [http://www.tacri .org/home/coffee-in-tanzania.html] site visited on 15/05/2008.

Baffes, J. (2006). Restructuring Uganda's coffee industry: Why going back to the basics matters. Development prospects group. The World Bank. [http://www - wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/2006/09/29/0 00016 4062006092916102 7/Rendered/PDF/wps4020.pdf] site visited on 02/07/2008.

Baffes, J. (2003). *Tanzania's coffee sector: Constraints and challenges in a global sector.* The World Bank. [http://aec.msu.edu/fs2/inputuseworkshop/Baffes Tanzania Coffee.pdf] site visited on 02/07/2008.

Bailey, D. K. (1998). *Method of Social Research.* The press Collier. Macmillan Publisher, London. 478pp.

Chapman. K. R. (2001). Introduction to the first regional round-table on sustainable organic and specialty coffee, production processing and marketing. [www. fao.org/organicag/doc/coffeebrochureem24-01.pdf] site visited on 14/05/2008.

DALDO (District Agricultural and Livestock Development Officer), (2006). Agriculture and livestock development report. Kigoma District Council, Tanzania. 8pp.

Don, H. (2006). *Understanding profitability*. Extension value-added agriculture. Iowa State University, USA. [http://www.extension.iastate.edu/agdm] site visited on 25/02/2009.

Dorward. A., Kydd. J and Poulton. C. (1998). *Smallholder cash crop production*. New institutional economics perspective, CAB International. Wallingford. 280pp.

EPOPA (Export Promotion of Organic Products from Africa), (2006). *Regulations, standards and certification for agricultural export*. A practical manual for producers and exporters in East Africa.

Ferris. A. and Malcolm, B. (2000). *Farm Management Economic Analysis*. University of Melbourne. Parkville Victoria, Australia. 679pp.

Gabagambi, D. M. (1998). Production and marketing of paddy and cotton in Ulanga district of Tanzania. Dissertation for Award of MSc Degree at Sokoine University of Agriculture, Morogoro, Tanzania. 137pp.

Hicks. P. A. (2001). Postharvest processing and quality assurance for specialty/organic coffee products. processing and marketing. [www.fao.org /organicag /doc/coffeebrochureem 24-01.pdf] site visited on 14/05/2008.

Hill, B. (1990). *An Introduction to Economics for Students of Agriculture*. Pergamon press. 381pp.

Hoang. T. T. and Trinh, D. M. (2001). Present status of coffee industry in Vietnam and opportunities for specialty/organic coffee production. [http://www.fao.org /docrep/003/x6938e/x6938e05.htm#bm5.8] site visited on 22/05/2008.

Johnson, D. T. (1985). *The Business of Farming*: A guide to farm business management in the tropics. Macmillan publishers Ltd. 126pp.

Joseph, B. (2008). Coffee in Tanzania. Report submitted to the meeting of coffee stakeholders. Kigoma. Tanzania. 5pp.

Katani, J. Z. (1999). The role of gender based indigenous knowledge in developing coping strategies against deforestation in Mwanza district. Dissertation for Award of MSc Degree at Sokoine University of Agriculture, Morogoro, Tanzania. 110pp.

Lazaro, E. A., Makandara. J. & Kilima, F.T.M. (2008). *Sustainability standards and coffee exports from Tanzania*', *DIIS working paper* 2008/1 Copenhagen: Danish Institute for International Studies. Denmark. pp. 1-36.

Leonidas, G. (2000). Coffee production and export marketing structure: The case of Burundi. Dissertation for Award of MSc Degree at Swedish University of Agricultural Sciences. Uppsala, Sweden. [http://www.lpl.slu.se/ publications/ masters6.pdf] site visited on 26/06 /2008.

Liangzhi, Y. and Simon, B. (2006). An evaluation of alternative development strategies for Robusta coffee in Uganda. *DIIS working paper* 2006/16. Danish Institute for International Studies, DIIS Strandgade 56, DK-1401 Copenhagen, Denmark. [www.diis.dk] site visited on 24/02/2009.

Lingle, T. (2000). *The State of the Specialty Coffee Industry*. In fall coffee and tea handbook. [www.gourmetretailer.com] site visited on 08/06/2008.

Maghimbi, S. (2007). Changes in crop patterns in the Kilimanjaro region of Tanzania: The decline of coffee and the rise of maize and rice. *African study monographs*, Suppl.35: 73-83.

Makeham, J. P. and Malcolm, L. R. (1986). *The Economics of Tropical Farm Management*. Cambridge Universty Press. 968pp.

Mangeni, J. J. (2004). *Tea and coffee trade journal, Tanzania*. [http://goliath.ecnext com/coms2 /summary_ 0199-191116_ITM] site visited on 10/06/2008.

Mashimba, S. (2007). Evaluation of on-farm cassava processing and its implications on marketing and farmers income: a case of Coast region, Tanzania. Dissertation for Award of MSc Degree at Sokoine University of Agriculture, Morogoro, Tanzania. 89pp.

Masumbuko, L. I. (2005). Study of genetic diversity and micropropagation of coffee Arabica L. and evaluation of genetic diversity in *cocos nucifera* L. from Tanzania. Thesis for Award of PhD Degree at Swedish University of Agricultural Sciences. Alnarp. [http://diss-epsilon.slu.se/archive/0000093 8/01/ Acta98_ LinusMa_utan_artiklar .pdf] site visited on 26/06/2008.

Mathania, A. J. (2007). Analysis of production and marketing potential for paprika as an alternative crop to tobacco in Urambo district, Tabora. Tanzania. Dissertation for Award of MSc Degree at Sokoine University of Agriculture, Morogoro, Tanzania. 122pp.

Mbilinyi, S. M (1976). The economics of peasant coffee production: The case of Tanzania. University of Dar es Salaam. 170pp.

Mbise. M. (2007). Analysis of coffee marketing system in Arumeru district of Tanzania. Dissertation for Award of Msc Degree at Sokoine University of Agriculture Morogoro, Tanzania. 99pp.

Minja, M. G. (2007). The contribution of smallholder dairy cattle production to household food security in Kilombero district. Dissertation for Award of MSc Degree at Sokoine University of Agriculture. Morogoro, Tanzania. 123pp.

Mlambiti, M. E. (1985). Planning regional agriculture development using LP: The case of Kilimanjaro region Tanzania. Thesis for Award of PhD Degree at University of Dar es salaam, Tanzania. 421pp.

Msangi, R. J. (2007). Bambara groundnuts and cowpeas for farmers' livelihood in the semi arid regions of Tanzania: A case of Dodoma region. Dissertation for Award of MSc Degree at Sokoine University of Agriculture, Morogoro, Tanzania. 130pp.

Murekezi, A. K. (2003). Profitability analysis and strategic planning of coffee processing and marketing in Rwanda: A case study of a coffee growers association. Dissertation for Award of MSc Degree at Michigan state University, USA. 147pp.

Mushi, S. S. (1993). Nutrition relevant actions in Tanzania. Country case study. *Journal of nutrition.* 3: 210 – 224.

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. 81pp.

Mutayoba, V. (2005). Economic analysis of vanilla production and marketing: A case study of Bukoba District, Kagera Region. Dissertation for Award of MSc Degree at Sokoine University of Agriculture, Morogoro, Tanzania. 85pp.

Ngwasy, G. Z. (2007). Financing agricultural marketing in Tanzania: A case of horticultural traders in Mbeya and Dar es salaam regions. Dissertation for Award of MSc Degree at Sokoine University of Agriculture, Morogoro, Tanzania. 112pp.

Ortega, E and Oscar S. (2004). Emergy analysis and bookkeeping accounting of conventional and organic coffee production in Brazil. [http://www.unicamp.br/fea/ortega/energy/Oscar.pdf] site visited on 25/05/2008.

Otieno, R (1995). *Institutional Credit and Efficiency of Resource Use Among Small Scale farmers in Kenya.* Justus –Lie berg University press, Giessen. 214pp.

Parikh, V and Shah, G. (1994). *Empirical Studies of Size, Structure and Efficiency in Agriculture.* Boulder, West view press. 231pp.

Peter, G. (2006). *The Potential for diversification in coffee exporting countries: Tanzania case study.* Natural Resources Institute. International Coffee Organization (ICO) Workshop. [http://www.ico.org/event_pdfs/ilimanj.pdf] site visited on 15/01/2009.

Philip, D. (2001). Economic analysis of medium scale agricultural enterprises in a predominantly smallholder agriculture sector. Dissertation for Award of MSc Degree at Sokoine University of Agriculture, Morogoro. Tanzania. 247pp.

Phiri, C. D. (1991). An evaluation of smallholder farming systems in Chinguluwe settlement scheme, Malawi. Issue in Africa rural development. *Journal of African rural social networks.* 84-104.

Ponte, S. (2004). Standards and sustainability in the coffee sector. *A global value chain approach.* Danish Institute for International Studies. [http:/www.iisd.org /pdf/2004/sci_coffee_standards.pdf] site visited on 14/06/2008.

Regnard, I. (2006). Contribution of outgrowers scheme in household poverty reduction: a case study of Mtibwa sugar estate, Tanzania. Dissertation for Award of MSc Degree at Sokoine University of Agriculture, Morogoro, Tanzania. 115pp.

Rweyemamu, D.C. (2001). Economic analysis of cash crop production and marketing in Tanzania under a liberalized market economy: A case study of tobacco in Songea district. Dissertation for Award of MSc Degree at Sokoine University of Agriculture, Morogoro, Tanzania. 148pp.

Senkondo, E. (1988). Economic analysis of Tanzanias' sugar industry: the case study Kilombelo company. Dissertation for Award of MSc Degree at Nairobi University, Kenya. 194pp.

Stewart, P. (2005). In Tannzania 4.400 small-scale coffee growers sell directly to Peet's and five other overseas buyers, earning premium prices. Techno Serve - Tanzania. [http://www.value-chains.org/dyn/bds/docs/519/Technoserve%20 Tanzania %202005%20Press%20Release.pdf] site visited on 12/06/2008.

TaCRI (Tanzania Coffee Research Institute); (2006). TaCRI-substations. [http://www.tacri.org/home/tacri-substations/mwayaya.html] site visited on 21/07/2008.

Temu, A. (1999). Empirical evidence of changes in the coffee market after liberalization: a case of northern Tanzania. Thesis for Award of PhD Degree Urbana-Champaign University of Illinois, Urbana-Champaign. 210pp.

URT (United Republic of Tanzania); (2006). The 10th edition of the SADC trade, industry and investment review 2006. The ministry of planning and economic empowerment, Dar es Salaam, Tanzania.

URT (United Republic of Tanzania); (2007). *The economic survey*. The ministry of planning and economy empowerment, Dar es Salaam, Tanzania.

Yavuz, C. and Cengiz, Y. (2002). *A quantitative model to determine factors affecting profits of Broiler enterprises.* Department of livestock economics, Faculty of Veterinary Medicine, Ankara University, Ankara, Turkey. [http://journals.tubitak .gov.tr/veterinary/issues/vet-03-27-5.pdf] site visited on 13/08/2008.

APPENDICES

Appendix 1: Farmer Questionnaire for coffee production

A comparative economic analysis of specialty and conventional small-scale coffee production in Kigoma District, Kigoma Region, Tanzania

Questionnaire No.....Date of .interview.....

Division.....Ward.....Village.....

Name of respondent.....

A: Farm household characteristics

A1. Household size and composition

Person	Name of household member	Age	Sex	Marital status	Education level	Relationship
1						
2						
3						
4						
5						
6						
7						
8						

Sex	Marital status	Education level	Relationship
1. Male	1. Single	1. No formal education	1. Household head
2. Female	2. Married	2. Adult education	2. Wife
	3. Divorced	3. Primary education	3. Child
	4. Widow	4. Secondary education	4. Other
		5. University/College	

A2. By ranking according to the importance, what are major occupations?

(i).....

(ii).....

(iii).....

B: Farm activities

B1. Which variety of coffee do you grow?

1. Arabica
2. Robusta ( )

B2. What type of coffee farming do you practice?

1. Conventional coffee farming
2. Specialty coffee farming ( )

B3. How many years have you been in general coffee farming? ..... (Experience in years)

B4. How many years have you been in specialty coffee farming..... (Experience in years)

B5. Besides coffee, what other cash crops do you grow? Rank your crops according to the order of importance.

(1)..... (2)..... (3).....

B6. Which procedures do you follow to produce specialty/ conventional coffee?

(i).....(ii).....

(iii)..... (iv).....

(v)..... (vi).....

B7. How far is the selling point from the homestead for different crops?

Coffee.....km, Beans.....km, Banana.....km,

Others (specify).....

B8. What are the proportional of your coffee trees in years?

Age in years	Proportional (%)	Age in years	Proportional (%)
‹ 10		30 – 40	
10 – 20		40 -50	
20 – 30		› 50	

B9. What is the total number of coffee trees in your farm (s)?

1. ‹ 100 2. 100 - 200 3. 201 – 300 4. › 300 ( )

C: Household farm resources and input availability

(i) Land availability

C1. What is the total land owned by the family? (Acres)

C2. How did you acquire this land?

1 = Inherited 2 = Bought 3 = Hired ( )

4 = given by the village government 5 = Accessed a free land

C3. Give actual acres allocated to different enterprises last season (2006/07)

Enterprise	Acres	Enterprise	Acres
Coffee		Banana	
Beans		Others (specify)	

C4. How many acres had no coffee last season (2006/07)?

(ii) Labour availability

C5. Indicate labour used for coffee enterprise in last season (2006/07).

Activity/variable	Family labour	Hired labour	
	man days	man days	Payment rate for hired labour
Fertilizer application			
Mulching			
Weeding			
Herbicide application			
Pesticide application			
Pruning			
Harvesting			
Pulping			
Sorting			
Transporting			
Others (specify)			

Note: One day = 8hours. Man days = No. of labours x No. of days worked

C6. What was your labour requirement in coffee farming for the whole last season (2006/07)?

D: Farm input information

D1. Indicate inputs, sources, unit prices for last season (2006/07)

Inputs			Source	Quantity	Unit price
Fertilizers	Inorganic	SA			
		Urea			
		TSP			
		Others			
	Organic	Manure			
		Others			
Pesticides					
Herbicides					
Sacks					
Mulching					
Others (specify)					

Source of inputs: 1 = Stockiest 2 = Cooperative 3 = others (Specify).....

E: Output and marketing

E1. How much coffee did you harvest from your farm last season (2006/07).....? (Kg)

E2. What was the average coffee productivity per tree last season (2006/07).....? (Kg)

E3. How many kg did you sell last season (2006/07).....? (Kg)

E4. How do you collect information on market prices of coffee?

1 = Direct visit to the market 2 = Hear from friends ( )

3 = From extension officers 4 = from NGOs 5 = Others (specify)

E5.what was the average price per kg for last season (2006/07) ..... (Tshs)

E6. What has been the price trend of coffee produce for last five years?

1 = Increasing 2 = Decreasing 3. Constant ( )

E7. Do you know different institutional buyers of coffee in your area?

1 = Yes 2 = No ( )

E8. If yes, mention them.

(i)..... (ii).....

(iii)..... (iv).....

F: Benefit from coffee farming

F1. What are the benefits you get by farming coffee?

1 = Managed to build good house ( )

2 = Able to meet health requirement for the family

3 = Able to meet education requirement for the family

4 = Able to meet dressing requirement

5 = Others (specify) .....

.....

F2. What is the trend of your income from coffee farming activities?

1= Increasing 2 = Decreasing ( )

3= No change 4 = Other

G: Coffee producer association and Institution support

G1. Is there any farmers association/cooperative concerning coffee production and marketing in this area?

1. Yes 2. No ( )

G2. Are you a member of farmers' cooperative in your village?

1. Yes 2. No ( ) if No go to question G4

G3. What are the benefits of being a member?

(i).....

(ii).....

(iii).....

G4. Is there any government or Non-government institution that is currently assisting coffee production and marketing in this area?

1. Yes 2. No ( )

G5. If yes, specify the institution, type of assistance and condition under which assistance provided last season (2006/07).

No.	Institution	Assistance	Any accompanied conditions
1.			
2.			
3.			
4.			

H: Other information

H1. Have you attended any training on proper coffee farming techniques in the last five years?

1. Yes 2. No ( )

H2. Is there a ware house for coffee storage in your area?

1. Yes 2. No ( )

H3. How many times did you seek advice from extension agents in the last season (2006/07)?

1 = Less than 10 times 2 = 10 – 20 times ( )

3 = More than 20 times

H4. If not, why? (If not applicable go to question H5)

1 = No extension agents in your area

2 = Too expensive to seek advice ( )

3 = Services provided not adequate 4 = Other (Specify)

H5. For what activities did you seek advice for coffee production?

(i).....

(ii).....

H6. On your opinion, are the technical advices or services provided adequate?

1 = Completely adequate

2 = Partially adequate 3 = Not adequate ( )

H7. Is there any organization providing credits in terms of capital, inputs, operation services etc. to farmers?

1. Yes 2. No ( )

H8. If Yes. Which organization:

1= Farmers' organization 2 = District council 3 = Banks ( )

4 = NGO 5 = Other Organizations (specify).....

H9. What are the most critical problems in coffee production.....

.....

H10.How to solve these problems.....

.....

H11. Please give your general opinion on coffee farming in your area

.....

.....

.....

.....

.....

Thank you very much for your cooperation

Appendix 2: Household characteristics in villages under study (n=120)

		Specialty enterprise				Conventional enterprise				
Gender of respondent	Kalinzi	Nyarubanda	Mkabogo	Mkongoro	Total	Kalinzi	Nyarubanda	Mkabogo	Mkongoro	Total
Male	8(80.00)	10(100.00)	7(70.00)	8(80.00)	33(82.50)	17(85.00)	18(90.00)	14(70.00)	18(90.00)	67(83.80)
Female	2(20.00)	0(0.00)	3(30.00)	2(20.00)	7(17.50)	3(15.00)	2(10.00)	6(30.00)	2(10.00)	13(16.20)
Age of respondent in years										
25 -34 years	0(0.0)	3(30.0)	0(0.0)	2(20.0)	5(12.50)	3(15.00)	4(20.00)	5(25.00)	0(0.00)	12(15.00)
35 -44 years	4(40.00)	0(0.00)	4(40.00)	5(50.00)	13(32.50)	4(20.00)	6(30.00)	3(15.00)	7(35.00)	20(25.00)
45 -54 years	2(20.00)	3(30.00)	2(20.00)	0(0.00)	7(17.50)	6(30.00)	4(20.00)	4(20.00)	4(20.00)	18(22.50)
55 -64 years	2(20.00)	4(40.00)	2(20.00)	0(0.00)	8(20.00)	5(25.00)	3(15.00)	5(25.00)	4(20.00)	17(21.30)
over 64 years	2(20.00)	0(0.00)	2(20.00)	3(30.00)	7(17.50)	2(10.00)	3(15.00)	3(15.00)	5(25.00)	13(16.20)

	Specialty enterprise					Conventional enterprise				
Gender of respondent	Kalinzi	Nyarubanda	Mkabogo	Mkongoro	Total	Kalinzi	Nyarubanda	Mkabogo	Mkongoro	Total
Marital status of respondent										
Single	0(0.00)	0(0.00)	0(0.00)	0(0.00)	0(0.00)	0(0.00)	0(0.00)	1(5.00)	0(0.00)	1(1.30)
Married	9(90.00)	10(100)	8(80.00)	10(100)	37(92.50)	17(85.00)	17(85.00)	11(55.00)	18(90.00)	63(78.80)
Divorced	0(0.000	0(0.00)	1(10.00)	0(0.00)	1(2.50)	0(0.00)	2(10.00)	2(10.00)	1(5.00)	5(6.30)
Widow	1(10.00)	0(0.00)	1(10.00)	0(0.00)	2(5.00)	3(15.00)	1(5.00)	6(30.00)	1(5.00)	11(13.80)
Education level of respondent										
No formal education	1(10.00)	2(20.00)	2(20.00)	3(30.00)	8(20.00)	2(10.00)	7(35.00)	3(15.00)	5(25.00)	17(21.30)
Adult education	1(10.00)	0(0.00)	0(0.00)	1(10.00)	2(5.00)	1(5.00)	0(0.00)	6(30.00)	4(20.00)	11(13.80)
Primary education	8(80.00)	8(80.00)	8(80.00)	6(60.00)	30(75.00)	17(85.00)	12(60.00)	11(55.00)	11(55.00)	51(63.80)
Secondary education	0(0.00)	0(0.00)	0(0.00)	0(0.00)	0(0.00)	0(0.00)	1(5.00)	0(0.00)	0(0.00)	1(1.10)

Figures in parenthesis are respectively percentages

Source: Own survey, 2008

Appendix 3: Age of coffee trees and number of coffee trees in farm (n=120)

	Specialty enterprise					Conventional enterprise				
Age of coffee trees (years)	Kalinzi	Nyarubanda	Mkabogo	Mkongoro	Total	Kalinzi	Nyarubanda	Mkabogo	Mkongoro	Total
Less than 20	6(60.00)	6(60.00)	2(20.00)	7(70.00)	21(52.50)	10(50.00)	11(55.00)	7(35.00)	12(60.00)	40(50.00)
20 - 50	4(40.00)	4(40.00)	8(80.00)	3(30.00)	19(47.50)	10(50.00)	8(40.00)	12(60.00)	8(40.00)	38(47.50)
Over 50	0(0.00)	0(0.00)	0(0.00)	0(0.00)	0(0.00)	0(0.00)	1(5.00)	1(5.00)	0(0.00)	2(2.50)
Number of coffee trees in farm										
Less than 300	1(10.00)	0(0.00)	0(0.00)	1(10.00)	2(5.00)	3(15.00)	3(15.00)	1(5.00)	1(5.00)	8(10.00)
300 - 500	2(20.00)	3(30.00)	1(10.00)	2(20.00)	8(20.00)	8(40.00)	7(35.00)	11(55.00)	11(55.00)	37(46.20)
501 - 700	1(10.00)	4(40.00)	1(10.00)	2(20.00)	8(20.00)	5(25.00)	6(30.00)	4(20.00)	5(25.00)	20(25.00)
701 - 900	3(30.00)	1(10.00)	2(20.00)	3(30.00)	9(22.50)	2(10.00)	2(10.00)	2(10.00)	2(10.00)	8(10.00)
More than 900	3(30.00)	2(20.00)	6(60.00)	2(20.00)	13(32.50)	2(10.00)	2(10.00)	2(10.00)	1(5.00)	7(8.80)

Figures in parenthesis are respectively percentages

Source: Own survey, 2008