TRANSACTION COSTS IN PRODUCTION AND MARKETING OF SUGARCANE UNDER OUTGROWERS' SCHEMES IN MOROGORO REGION OF TANZANIA

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

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ABSTRACT

The purpose of this study was to analyse the production and marketing transaction costs of sugarcane outgrowers in Mvomero and Kilosa districts of Morogoro region in Tanzania. The specific objectives were to determine the level of transaction costs in different categories of outgrowers, to examine the influence of institutional arrangement on sugarcane transaction costs, and to examine the impact of transaction cost on the quality of sugarcane in terms of sucrose content (Rendement). Data were collected through a cross sectional survey by using structured questionnaire, complemented by focus group discussions, personal interviews with key informants, and field observations. A total of 160 sugarcane outgrowers (80 from Turiani and 80 from Ruembe) were randomly selected and interviewed. Checklists were used to gather information from sugarcane participating institutions. Descriptive statistics and regression analyses were used to analyse the data. The result showed that distance from the field to the factory is the only significant factor affecting the transaction cost positively in both study area. Regression analysis was also used to investigate the effects of transaction cost on sugarcane quality. The study revealed an inverse relation between transaction costs and rendement level with insignificant variable under study and weak explanatory power of the model. The study also revealed that there are several production and marketing problems that hinder prosperity of outgrowers' involvement is sugarcane production. The existing institutional arrangement has resulted in inefficient services delivery, losses to outgrowers and increased transaction costs; the study recommends reorganisation of the institutional set up of sugar industry; setting up policy that would create a good working environment between sugarcane outgrowers and the factories.

DECLARATION

I, **FLORIAN BUBERWA BOMBO**, do hereby declare to the Senate of Sokoine University of Agriculture that this is my own original work and has neither been submitted nor being currently submitted for a higher degree award in any other University.

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The above declaration is confirmed

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DEDICATION

To the Almighty God, my mother Felista Ruhunge and my late father Melchades Bwemero, I dedicate this work.

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LIST OF ABBREVIATIONS

AMA	American Marketing Association
BACAS	Bureau for Agricultural Consultancy and Advisory Services
BCGA	Bonye Cane Growers Association
BLUE	Best Linear Unbiased Estimator
DALDO	District Agriculture and Livestock Development Officer
DRD	Daily Ratable Deliverable
IITA	International Institute of Tropical Agriculture
K1 & K2	The portions of the Kilombero Sugar Company's land located, respectively, on the right and left banks of Ruaha river
KSC	Kilombero Sugar Company
KSL	Kagera Sugar Limited
MACGA	Maendeleo Cane Growers Association
MAFC	Ministry of Agriculture, Food Security and Cooperatives
MCGA	Msindazi Cane Growers Association
MCP	Miller Cum Planter
MKUKUTA	Mkakati wa Kupunguza Umasikini Tanzania
MOA	Mtibwa Outgrowers Association
MSE	Mtibwa Sugar Estate
MUSCGA	Muungano Cane Growers Association
NA	Not Applicable
NAFCO	National Agriculture and Food Corporation

NMB	National Microfinance Bank
OLS	Ordinary Least Square
OG	Outgrowers
RCGA	Ruembe Cane Growers Association
REPOA	Research on Poverty Alleviation
SACCOS	Savings and Credit Cooperative Society
SBT	Sugar Board of Tanzania
SDC	Sugar Development Corporation
SIA	Sugar Industry Act
SPSS	Statistical Package for Social Science
SRI	Sugarcane Research Institute
SUDECO	Sugar Development Co-operative
TASGA	Tanzania Sugarcane Outgrowers Association
TCH	Tonne Cane per Hectare
TFP	Total Factor Productivity
TPC	Tanganyika Plantation Company
TUCOCPROCOS	Turiani Cane and Other Crops Cooperative Society
URT	United Republic of Tanzania
USDA	United State Development Agency

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information

In Tanzania the sugar industry is important not only because it produces sugar which is a source of energy, but the commodity also complements other key foodstuffs in Tanzania such as tea and coffee. Furthermore, the industry provides on average direct employment to 80,000 workers, a third of which is unskilled rural labour (Sugar Board Tanzania [SBT], 2007). It provides indirect employment through provision of services and goods e.g. purchases, sales and distribution of imported sugar, supplies of raw materials, transport and social services in sugar townships (shops, bars, schools etc). The sub-sector also contributes significantly to the government revenue estimated at 2 percent of the total annual Government revenue. On the other hand direct exchange earnings from sugar export amounts to US $ 9.7 million per annual. This industry further promotes import substitution thereby saving country the much needed foreign currency. The direct earnings and savings amount to about US $ 28 million annually (SBT, 2007).

Sugarcane production also generates income to small-scale sugarcane growers. The spread of benefits covers a population of about 150,000 people in the country (SBT, 2007). Therefore when considered in the context of rural agriculture income, sugarcane is a major contributor in alleviating rural poverty, thereby contributing positively to MKUKUTA, government strategy for poverty alleviation (Sugarcane Research Institute [SRI], 2005).

Out-growers supply approximately 45 percent of cane crashed by the Mills in Kilombero and 48 percent in Mtibwa located in Kilombeo and Mvomero districts respectively. Outgrowers supply is therefore a significant share and therefore an important business partner with sugar Mills (SBT, 2010).

Currently the Industry is led by the Sugar Board of Tanzania (SBT) established by Sugar Industry Act, 2001. The Board is under the Ministry of Agriculture, Food Security and Cooperatives. Its roles and functions range from being a government regulatory agency for facilitation of harmony and growth in the industry through regulations, promotion, importation of sugar, seed varieties, development and funding research activities related to the industry (Matango, 2006).

An important feature of the sugar industry has been the participation of outgrowers who supply significant percentage of sugarcane requirements to Kilombero and Mtibwa plants in Morogoro Region. The organization of outgrowers has been undergoing several changes. It has passed through three important phases (i) Settler Owner phase; (ii) Parastatal phase; and (iii) Privatization phase. The first two phases had one thing in common. In both cases, the relationship between outgrowers and the sugar factories was primarily captive in nature. The outgrowers depended on the factories for all the important services, including land preparation, provision of seed cane, harvesting and transport of cane. The role of outgrowers was limited to supervision and overall management of their plots. During the privatization era, important changes started to emerge including the formation of stronger outgrowers associations, reduced dependence by out-growers on their buyers for land

preparation, seed cane and harvesting. Outgrowers associations appear to be very important tools for sugar industry development for they facilitate the participation of out-growers in the governance of the sugar supply chain (SBT, 2010).

Two types of out-growers' associations are found in the study areas. These are associations registered under the "Societies Act, 2002" and cooperatives registered under the "Cooperatives Act, 2003". In the course of their operations, the out-growers associations, be societies or cooperatives, are facing a number of constraints including inadequate management and lack of equipment and resources for cane cutting, loading and transport. In combination these constraints are rapidly rendering the associations unable to fulfill their role in improving the position of out-growers in the supply chain (SBT, 2010)

This study is an attempt to analyze the transaction cost in production and marketing of sugarcane, identifying institutions in the study area that support sugarcane production for efficient supply chain. The study has explored and suggests ways of linking farmers with chain actors in order to reduce transaction costs along the chain hence increase efficiency in sugarcane production and marketing in the study area.

1.1.1 Historical perspectives of the sugar estates

1.1.1.1 Kilombero sugar estate

Cane cultivation in Kilombero Valley was initiated by a number of private farmers, each with farms of several acres, with an objective of processing cane in jiggery mills. This development dates back from the 1930's or a bit earlier and saw

accelerated development in the 1950's. At this time there were cane processors already selling jaggery to wholesalers and retailers throughout Tanzania.

Kilombero Sugar company limited was incorporated on the 30th May 1960 in the then Tanganyika. Later in 1972 the government bought all shares of the company from initial investors. These shares were later in 1986 entrusted to the National Agriculture and Food Corporation (NAFCO) and to the Sugar Development Corporation (SDC) when it was born in 1974. Kilombero Sugar Company has two separate estate in two different districts; Kilombero I or Msolwa in Kilombero District and Kilombero II or Ruembe in Kilosa District, both in Morogoro region (SRI, 2005).

1.1.1.2 Mtibwa sugar estates.

Mtibwa Sugar Estates was opened in 1939 by William Kurge, a German, for the purpose of growing sisal. During the Second World War, the British took over the estate from W. Kurge and handed it over to a fellow British citizen, John Lee. Nevertheless, John Lee could not run the estate profitably and it was passed over to a Greek, by the name of Stephen who was interested in other crops besides sisal. These included pawpaw, beans, sunflowers etc. In 1958, Stephen tried out growing sugarcane, which did well in the Mtibwa soils. By 1960, he went full scale into growing canes and encouraged the villagers living around his estate to grow cane and sell it to his factory, which was then under construction.

Stephen's company was registered on the 22 December 1961 and in 1963, the factory with a daily crushing capacity of 350 tons of cane was commissioned. This capacity was doubled in 1965 to 700 tons. Stephen sold the company to Mr. Patel of Nairobi, who in turn in 1967 sold it to the famous Ugandan sugar producer, the Madhvan Group, who placed it under the management of EMCO (T) limited.

In 1969, NAFCO bought 50% of the Mtibwa Sugar Estates shares. Shortly thereafter, a new factory, which had a crushing capacity of 1565 tons was constructed and commissioned, early 1975, SUDECO bought out all the shares from EMCO (T) Limited, making it a company wholly owned subsidiary of SDC.

1.1.2 A Evolution of outgrowers' schemes in sugarcane production

1.1.2.1 Kilombero valley sugarcane out-growers

When Kilombero Sugar Company was started in 1961, it became another alternative market segment for sugar cane grown by the private farmers besides the six jaggery mills. Nevertheless, the private farmers were reluctant to sell their canes to KSC because the jiggery market remained stable and profitably paying. In order to force the private farmers to sell their canes to KSC instead of the jaggery mills, the government withdrew the licenses of all but one jaggery maker in the Kilombero valley. The spared jiggery maker was Ulanga cotton company, which until to date continues to produce jaggery.

The government took another deliberate step to increase the number of private sugarcane farmers by forcing the villagers living in the villages around KSC to

produce canes for KSC factory. This was done through the village settlement schemes and the Ujamaa villagisation. The two techniques tremendously increased the number of small-holder farmers who grew sugarcane for selling to KSC factory. This was the beginning of Kilombero sugar cane Out-growers (SRI, 2006). To date there are 4372 active out-growers in Ruembe sugarcane basin (K2) and 5787 active out-growers in Msolwa sugarcane basin (K1) (SBT, 2011)

Despite the fact that the beginning of the sugarcane out-growers was by the government's force, later the business was proving to be generating higher return hence competing with other cash crops and eventually sugar cane farming took roots on a voluntary basis among the smallholder farmers.

1.1.2.2 Mtibwa sugar cane out-growers

Cane out-growers in Mtibwa were encouraged by Stephen, a Greek, who was the owner of the first estates to grow sugar cane for sale to his factory. The villagers around Stephen's factory at Mtibwa did not grow sugarcane just because it was good to produce but its price was the best alternative source of income to them. Hence, many smallholder farmers took to sugarcane farming in Mtibwa.

When Madhvan took over the management of Mtibwa and before the government participated in 1973, several changes happened which had direct effects to the out-growers. In the first place, Madhvan did not want to expand. Consequently, the earlier campaigns to expand cane growing and verbal contracts were violated and the farmers were treated as outsiders. They had to cut and transport their cane to the

factory on their own means and secondly, a quota system of cane supply was instituted limiting individuals to a certain allotted amounts despite the fact that the factory's capacity was still under-utilized. Thirdly, price determination was not open to discussion and the farmers never comprehended what was happening.

As a result, the smallholder cane farmers felt indifferent to cane production and this did more harm to those farmers who could not afford to cut and transport cane to the factory. As a result of these measures taken by Madhvan, jaggery plants started in order to utilize the excess cane after the instituted quota. As a matter of fact, Madhavan's policies eroded the farmers' confidence and most of the fields turned into bushes which led to out-growers cane production to fall. Therefore the government took over Mtibwa in 1973 with a weak out-grower base (SRI, 1999). To date, Mtibwa has 4527 active sugarcane out-growers (SBT, 2011).

1.3 Problem Statement and Justification

In Tanzania sugar supply is still inadequate due to the fact that an average, annual sugar production as per 2007/08 statistics is about 265 396 tons (70% of local demand) against local demand of 342 871 tons. The country's net imports of sugar is about 150 000 tons (30% of local demand) per annum to bridge the gap (SRI 2010). The main reasons for inadequacy are firstly, low productivity of cane per unit area. The current productivity under outgrowers' scheme is estimated at 45-55 tons of cane per hectare while the potential is 75-100 tons cane per hectare (TCH). Productivity under estate is estimated at 75-85 TCH while the potential is 110-120 TCH. Secondly, unit cost of producing local sugar is high. Reaction from

government has been protecting industry against imported sugar from the efficient-low-cost sugar producing countries. However, under trade liberalization, this protection cannot sustain (SRI 2010). Clearly, the sugar industry in Tanzania needs to develop and embrace modern and efficient production technologies, if its production costs are to come down, and its productivity increase to the levels where its sugar can compete favorably with those from abroad.

Several studies have been conducted on sugarcane production and marketing in Tanzania. Some of which are Chongela (2008) who analysed economic analysis of outgrowers' sugarcane production scheme at Ruembe sugarcane basin; Regnard (2006) who investigated the influence of Mtibwa Sugarcane Estate (MSE) outgrowers' scheme on household poverty reduction; Msuya and Ashimogo (2005) who assessed technical efficiency of sugarcane production in Turiani division in Mvomero district; Tarimo and Takamura (1998) who assessed sugarcane production and marketing in Tanzania. However, none of the research studied sugar industry from an institutional economics perspective, in which the factors behind are very likely to be the source of sugar inefficiency. Therefore little is known about institutional setting of the sugarcane marketing chain in Tanzania and its contribution to total household income, leave alone the specific problems that face the industry. This study was therefore an attempt to fill that gap.

1.3 Objectives of the Study

1.3.1 General objective

The general objective of this study is to analyze transaction costs in production and marketing of sugarcane under outgrowers in Turiani and Ruembe areas in Tanzania.

1.3.2 Specific objectives

  i.   To determine the influence of socio-economic factors on production and marketing transaction costs of sugarcane outgrowers.

 ii.   To examine the influence of institutional arrangements on sugarcane transaction costs.

iii.   To examine impact of transaction costs on the quality of sugarcane in terms of sugar content (Rendement).

1.3.3 Hypotheses

This study was guided by the following null hypotheses:

  i.   There is no variation in transaction costs in different categories of out-growers

 ii.   Institutional arrangement has no influence on transaction costs

iii.   Sugarcane quality *(*Rendement level) is not influenced by the transaction costs

1.4 Justification of the Study

As outgrowers supply about 50% of the sugarcane in their respective factories, analysis of transaction costs and suggestion of clear mitigation measures will lead

into increased productivity and profitability of the sugarcane under outgrowers scheme. This will have positive significant effect on output of the factories as well as livelihood of the outgrowers' households.

Understanding of the transaction costs on production and marketing, and how it can be alleviated is cardinal to improving marketing channels as well as out-growers livelihoods.

In African economies that are only partly commercialized, smallholder farmers face higher transaction costs than large-scale producers, with the former having greater difficulty than the latter in adopting and profiting from new opportunities (Makhura, 2001). This has led to complaints by governments that farmers do not respond to government incentives and opportunities to adopt new technologies (de Janvry *et al*, 1991). This non-responsiveness, which is more prevalent with rural households, is explained partly by transaction costs. Lack of access to assets, credit and information, which feature in high transaction costs limit production and market growths in smallholder farmers.

1.6 Limitations of the Study

Most data were obtained mainly through interviewing farmers whose responses were subject to error due to inadequate knowledge, or faulty memory or because of untruthful replies due to consideration of pride or suspicious. Farmers under this study are homogeneous so it was expected to have the same shortcomings thus reliability of the collected data could somehow be carrying the same weakness. The

problems were minimized by careful probing the interviewee to enable them disclose and remember more information on production and marketing of sugarcane. Conversion of unit was also a problem since some farmer use local units (e.g. rows in estimating cost for various operations like seedcane cutting, fertilizer and herbicides application). However estimation had been done to convert local units into conversional ones mainly tones and kilogram.

1.7 Organization of the Report

The report is organized into five chapters. The first chapter presents the background information for the study, problem statements and justification, objectives of the study and hypotheses. The second chapter reviews the literature on transaction costs and institutional arrangement particularly to those related to agricultural production and marketing. The third chapter presents the methodology used in the study. The fourth chapter presents the results and discussion of the study. The last chapter presents the conclusion and recommendations emanating from the findings of the study.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Overview

This chapter reviews theoretical and empirical aspects of transaction cost on various agriculture enterprises. This will prepare grounds for discussing specific issues relevant to production and marketing transaction costs in sugarcane outgrowers in Turiani and Ruembe sugarcane basin.

2.2 Definition of Key Terminologies

2.2.1 Production

Production is the process of combining and coordinating materials and forces (inputs, factors, resources, or productive services) in the creation of some good or services (output or product) (Beattie and Taylor, 1985). The terms input and output only have meaning in connection with a particular production process. Output from one production process can be an input to another production process, or it can be final consumer good. An abstract representation of the production process is given by the production function. A production function is a quantitative or mathematical description of the various technical production possibilities faced by a firm. The production function gives the maximum output (s) in physical terms for each level of the inputs in physical terms (Battie and Taylor, 1985)

2.1.2 Marketing

Marketing is the activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society at large. (American Marketing Association [AMA], 2007). Gabagambi (2011) defined marketing as the performance of all the transactions and services associated with the flow of a good from the point of initial production to the final consumer. Marketing may also be defined as the process of creating form, time and space utility (Kohls and Uhls, 1990). Agricultural marketing refers to the performance of all business activities involved in the flow of goods and services from the point of initial agricultural production to the ultimate consumer (Kohls and Uhls, 1990). Dixie (1989) defines agricultural marketing as series of steps involved in moving a product from the point of production to the point of consumption.

The marketing concept must not only be adopted by the entire organization, but also the entire marketing system. Marketing system has two dimensions (FAO, 1997). The first dimension is the institutions, organizations and enterprises, Regional and District authorities, which participate in a market. The second is the functions that these participants perform. Kohls and Uhls (1990) have classified the functions involved in agricultural and food marketing processes as into three sets of functions of a marketing system. These classes are physical functions and facilitating functions. Each of these functions adds value to the product and they require inputs, thus they incur costs. As long as the value added to the product is positive, most firms or entrepreneurs will find it profitable to compete in supplying the service.

2.1.4 Outgrowers

Outgrowers schemes is a system that intends to enable ordinary peasants to join the production of cash crops (United State Department of Agriculture [USDA], 2004). It is a diverse group of cane growers with area sizes ranging from less than one hectare to over 100 hectares (BACAS, 2004). Outgrowers grow cane within the Supply Area for delivery to the Mills and are registered with the Mills and with the Sugar Board for the delivery of cane to the Mills and for the payment thereof (SBT, 2006). The extent of smallholder participation in production depends on number of factors, of which the adequate and timely supply of cane to the processing plants is the most crucial. Sugarcane must be milled within two days of being cut, or it quickly loses its sucrose content. This put a high demand on the efficient organization of the production and transportation of sugarcane (Tarimo and Takamura, 1998). The outgrowers' schemes are usually formed with special agreement between the company and farmers. In both study areas, there is an agreement that the company would be responsible for purchasing all the sugarcane produced in accordance with the annual planting programs

2.1.5 Rendement

Rendement is a per cent sugar extracted from cane, reflecting both sucrose content of cane and extraction efficiency of the factory (ADB, 1981). In relation to payment for delivered to the Mills for crushing, means the theoretical recoverable apparent sucrose (POL) per ton of cane (SBT, 2006). Climatic conditions and seasonal weather changes affect sucrose levels. Sucrose levels are at an optimum under the conditions of sunshine, low humidity, low night temperatures, and low rainfall. The

year starts with a very dry short period in January, but as this period lasts for only one month, January's sunshine does not increase the sucrose levels significantly. This short dry period is followed by a long period of heavy rainfall in February until May. The long dry season starts at the end of May and continues through to September. A long period of rainfall in Tanzania starts at the end of August, but this rain is not sufficient to make the land wet enough to enable the sugarcane roots to absorb much water from the soil. This rain continues until September. A shorter period of heavy rainfall occurs during October until December. In October, rainwater starts to diminish the sugar content as the roots absorb water, which affects the sucrose content. The sucrose levels in the stem of the sugarcane are at the highest from the end of June until the end of September (SRI, 2006). At both study area these months are considered the harvesting season.

Sugarcane grows rapidly in the rain seasons between October to January and between February and May. Therefore, many physiological activities take place during these periods and the plant does not store much sucrose in the stem. Instead, it uses sucrose to grow. During the rain seasons, the invertase enzyme (the enzyme that destroys sucrose levels) is more active in the sugarcane plant than in the dry season. Harvesting in the period between June and September is recommended because during this time of year the sugarcane yields the highest level of sucrose in the stem. Many farmers like to sell their sugarcane between August and September. Hence, governing the sugarcane supply chain is about harvesting at that moment when the sucrose levels in sugarcane are at the maximum. However, good farming practices increase sucrose levels in sugarcane regardless of the season. Good farming practices

include applying the required amount of fertilizers in the sugarcane farm, weeding, burning, and harvesting at the required time (SRI, 2006)

2.1.6 Ratoon

Ratoon is a cane growing from the stubble of a previous crop. Ratooning is a method which leaves the lower parts of the plant along with the root uncut at the time of harvesting to give the ratoon or the stubble crop. The main benefit of ratooning is that the crop matures earlier in the season. Ratooning is also more economical as land preparation and planting operations are not needed (Saves up to 30% cost). This method cannot be used endlessly as the yield of the ratoon crop decreases after each cycle. There is also an increased risk of pests and disease. Nonetheless, ratooning enable the farmers to get three to four crops to farmers before they have to replant. The total economy of sugarcane crop is directly dependent upon the successful raising of ratoon crop (Rehman and Ullah, 2008).

2.2 Transaction Costs

Different definitions of transaction costs (or market user costs) appear in the literature. Arrow (1969, cited in Benham *et al*, 1998) defines transaction costs as "the costs of running the economic system". Barzel (1997, cited in Benham *et al*, 1998) defines transaction costs as "the costs associated with the transfer, capture and protection of rights". Barzel concurs with Eggertson (1990) who observes that transaction costs are the costs that arise when individuals exchange ownership rights to economic assets and enforce their exclusive rights.

According to Coase (1960) transaction costs are the full costs of carrying out exchange and include marketing costs. These costs are associated with exchanging, including informational costs of finding out price and quality, service record, availability, durability record, etc, of a product, plus the cost of contracting and enforcing that contract (Besley, 1994).

Jaffee (1991, cited in Makhura, 2001) in his definition separates transaction costs into the following categories:

- **Search costs**. These are costs associated with identifying and contracting potential buyers and sellers, and quality of resources in which they have property rights. Search costs such as information costs, communication costs, arise ex ante of an exchange.

- **Bargaining costs.** These are the costs of gathering information on price in other transactions and on factors that might influence the willingness to bargain by either party.

- **Monitoring costs.** These costs include the costs associated with monitoring the contract agreement to see that its conditions are fulfilled. Monitoring costs occur ex post a transaction

- **Enforcement costs.** These are the costs of enforcing the exchange agreement. Enforcement costs occur ex post a transaction. These costs include the costs associated with default provisions in contracts, i.e. the collection of damages when partners fail to observe their contractual obligations.

Jaffee's classification of transaction costs is conceptually similar to that of Hobbs (1997), who classified transaction costs into information, negotiation and monitoring or enforcement costs into (a) search and information costs, (b) bargains and decision costs, and (c) policing and enforcement costs and then states that all of these cost "represent resource losses due to lack of information"

A list of relevant transaction costs affecting the exchange of agricultural and a livestock product is non-exhaustive. Jaffee and Morton (1995) add two categories of transaction costs of marketing agricultural products. These are:

- **Transfer costs:** Jaffee's "transfer costs" category refers to costs of marketing services performed in physically handling the commodity, such as transport, storage, retailing and wholesaling. Examples of transfer costs are transportation costs, costs associated with risk attitude of farmers, and administrative costs.

- **Screening costs:** These are costs that are associated with gathering information about the reliability or trustworthiness of a particular party and the quality of goods being transacted.

Staal *et al* (1996) argues that transaction costs include, inter alia, the costs of searching for a suitable partner with whom to exchange, screening trading partners to ascertain their trustworthiness, bargaining with trading partners to reach an agreement, transferring the product (this typically involves transportation, processing, packaging and securing title, if necessary), monitoring the agreement to

see that its conditions are fulfilled, and enforcing (or seeking damages for any violation of) the exchange agreement (Staal *et al*, 1996). Both fixed and proportional transaction costs play a significant role in explaining household behaviour.

Williamson (1985), argue that transaction cost theory derives from the "New Institutional Economics" approach and focuses on institutions of governance. It is based on the premise that institutions are transaction cost minimizing arrangements which may change and evolve with changes in the nature and sources of transaction costs. Transaction costs, occasionally referred to as "hidden costs" are the observable and non-observable costs associated with exchange of goods and services. These costs arise due to the frictions involved in the exchange process as it entails transfer and enforcement of property rights.

Transactions costs in economics, is associated with the work of Oliver Williamson posits that the structure of economic institutions evolve in a way that reflects attempts by management to minimize overall cost including, especially, the costs of transacting (Simmons, 2005). While there may be a plethora of structures possible for organizing production, the one that emerges minimizes the costs of assembling the resources necessary to meet demand emanating from markets. These costs include the standard production costs of producing the output but also the transaction costs are defined as the costs of running the system. Ex ante transaction costs are the costs of drafting, negotiating, and safeguarding the agreement and ex post transaction costs are maladaption costs, negotiation costs associated with dealing with

maladaption, set up and running costs of governance structures, and bonding costs of securing commitments.

In understanding transactions costs associated with the organization of production, three factors need to be considered: bounded rationality, opportunism, and asset specificity (Simmons, 2005). Bounded rationality describes differences in information between contracting parties. For example, the firm may have excellent knowledge of markets while smallholders may have little market knowledge and hence may benefit from a contract. Opportunism may occur when there are opportunities for taking advantage of situations, often to the detriment of the other party in an agreement. For example, smallholders may be concerned that the firm could, by virtue of its market domination, offer a very low price in the post market or, alternatively, the firm may worry that sellers could collude to drive up prices. Writing contracts clearly spelling out obligations can reduce these types of concern. Finally, asset specificity reflects the risks associated with protecting "sunk costs" in processing plants, logistical systems, or market development or, for smallholders, costs of protecting investments in specialized machinery and knowledge. Both, the firm and smallholders, may protect their investments through contract which secure inputs for the firm and a market for the smallholder (Dorward, 2001).

Shortly, transaction costs are the costs of negotiating, measuring, and enforcing exchanges. Negotiating an agreement can be a long and costly process. All sides to the exchange must bargain with one another even when they are in bitter opposition. Labor unions and management must negotiate new contracts periodically. Sometimes

the process is so difficult that mediators must be brought in to facilitate the discussions. Measurement costs involve measuring all the attributes of a good or service. The root source of measurement costs is poor information. For example, when purchasing a computer, the buyer would like to know a lot more about the computer's attributes than simply the price. Finally, transaction costs include the costs of enforcing exchanges. Differences in enforcement costs across countries may be the single most important reason why some nations are wealthy and others are poor (Yeager, 1999). With these factors in mind, the study will attempts to analyze and compare production and marketing transaction costs for the benefits of the firms and farmers in the sugar industries.

2.2.1 Forms of transaction costs

Several forms of transaction costs are prevalent. Transaction costs can be classified into observable (explicit) and unobservable (implicit) or inhibitive transaction costs. The observable transaction costs, which include marketing costs such as transport, handling, packaging, and storage, affect the magnitude of trade. The unobservable transaction costs, which include cost of information, search, bargaining, screening partners or customers, monitoring, coordination, and enforcement are inhibitive. The other delineation of transaction costs is ex ante fixed and proportional transaction costs. Ex ante fixed transaction costs are the same regardless of the magnitude or level of transactions made. An example of ex ante fixed costs is information cost on finding market, which would remain the same regardless of the amount of produce a farmer sells after the market information has been obtained (Yustika, 2008).

On the other hand proportional or ex post variable transaction costs vary with the level of, or the amount involved in, the transaction. In general, transaction costs rise with an increase in volume of trade. Key *et al*. (2000) have categorized these costs into fixed and variable transaction costs. Fixed transaction costs are invariant to the volume of output traded and affect market participation decisions of smallholder farmers. They include the costs of: (a) searching for a trading partner with whom to exchange or searching for a market (b) negotiation and bargaining particularly when there is imperfect information regarding prices (c) screening, enforcement of contracts and supervision particularly when credit sales are involved as the sellers have to screen the buyers for reliability and lower the likelihood of defaults (Kirsten and Vink, 2005). Variable transaction costs on the other hand are per unit costs of accessing markets that vary with the volumes traded and may affect the decision of market participation as well as quantity traded. These include costs associated with transferring the output being traded such as transportation costs and time spent to deliver the product to the market. These costs are largely unobservable or cannot be easily recorded in a survey. In essence, the variable transactions costs raise the real price of commodity purchased and lower the real price received for commodity sold.

Furubotn and Richter (as quoted by Benham and Benham, 1998) pointed out typical examples of transaction costs are the costs of using the market (market transaction costs) and the costs of exercising the right to give orders within the firm (managerial transaction costs). There is also the array of costs associated with the running and adjusting of the institutional framework of a polity (political transaction costs). For each of these three types of transaction costs, it is possible to recognize two variants:

(1) "fixed" transaction costs, that is, the specific investments made in setting up institutional arrangements; and (2) "variable" transaction costs, that is, costs that depend on the number or volume of transactions.

2.2.2 Sources of transaction costs

Transaction costs result from the complexities of transactions. Transaction costs in production, marketing and processing typically arise because market prices do not fully reflect the true costs and returns to all market actors, who have equal initial endowments and for whom market solutions may not be available to all. Some transaction costs are related to physical details of the transaction, such as transport, packaging or handling. Others result from information asymmetries and contract enforcement problems, which cause economic agents to incur expenditures associated with search, recruitment, coordination, supervision, management and litigation (Makhura, 2001). In many instances low market participation or market failures are a result of inhibitive transaction costs. Beasley (1994), for instance, elaborated that transaction costs are used to explain why credit markets might be missing.

2.2.2.1 Information asymmetries

Asymmetric information refers to a situation where prices do not fully reflect quality because buyers and sellers do not have the same information. Before making a decision about how to market a product and to whom to sell it, producers must determine the price that they expect to receive. Eggertson (1990) argues that transaction costs arise when market information is asymmetric as this induces

activities such as information searches, bargaining, market contracts, monitoring, enforcement and protection of property rights, which are, by nature costly.

2.2.2.2 Contract monitoring and enforcement

Transaction costs also result from contract monitoring and enforcement problems, such as the collection of damages when partners fail to observe their contractual obligations. Monitoring and enforcement costs occur ex post to a transaction and are the costs of ensuring that the terms of transactions, e.g. quality standards or payment arrangements are adhered to by other parties to the transaction (Hobbs, 1997).

2.2.2.3 Negotiation

Exchange of property rights through negotiating has costs involved. These costs consist of the opportunity costs of the producer's (or seller's) time in negotiations. Physically carrying out the transaction may include the costs of negotiating the terms of drawing up contracts.

2.2.2.4 Bargaining costs

The difficulties as farmer faces in finding reliable markets for products is one source of transaction costs, due to his low bargaining power. According to Makhura (2001) bargaining is needed to find the true position of contracting parties, especially when prices (including wages, interest rates) are not determined exogenously.

2.2.2.5 Transport and communication costs

Transport and communication costs feature as the most prominent source of transaction costs. These costs increase with distance from markets as well as unavailability of transport. Factors such as poor roads (or inadequate road network) make it costly for producers to take their products to the market or to sources of information. When the condition of the roads is poor, transporter increase fees to compensate for damages to their vehicles emanating from the use of such roads, hence reducing the price that traders are prepared to pay famers.

Poor communication infrastructure (such as telephone services, inadequate computer network services and inefficient mail services) restricts access to information, making it difficult for farmers to compare process being offered by traders. This raises transaction costs; in particular, search and monitoring costs by necessitating frequent physical visits to trading partners or government agencies.

2.2.2.6 Property rights

The enforcement and exchange of property rights typically involve costs. Property rights can take the form of property rules or liability rules (Kahkones and Leathers, 1991). According to Delgado (1998) transaction costs facing households in Africa stem in large part from structural aspects of the economic and political environment facing African producers, and the absence of property rights and enforcement makes any form of contracting risky (moral hazard) and generally discourages commercial activities. Kahkones and Leathers (1991) conclude from their study that sources of transaction costs associated with property rights on maize and cotton marketing in

Zambia and Tanzania were largely due to institutional impediments in government bureaucracy and inappropriate legal environment.

2.2.2.7 Nature of the product

Transaction costs vary by product. The nature of the product determines the transaction costs of the product and its derivatives. Smallholders in Africa often face high transaction costs in production and marketing of agricultural products because of the nature of their products and the institutional environment in which they have to operate (Matungul *et al*, 2001). High value-for-weight and high value-added tradable commodities, whose potential profitability has been enhanced by structural adjustment, typically are among those items with the highest associated transaction costs, e.g. fish, vegetable, and meat (Jaffe *et al*, 1995). These highly perishable commodities limit marketing options for small and remote producers and imply greater losses due to spoilage than non-perishable commodities such as grain.

Other sources of transaction costs include uncertainty, complexity, opportunism, culture and asset fixity. Their effect on transaction costs would be or other socio-economic factors that influence the participation decision.

Opportunism manifests itself in moral hazard and adverse selection. Adverse selection arises when one party cannot ascertain the trustworthiness of the other party. For example, adverse selection may arise when moneylenders cannot ascertain the truthfulness of the borrower and hence the riskiness of the activity being financed. Moral hazards, in turn, allow borrows to undertake riskier actions after

funds have been disbursed. Once funds are disbursed borrowers tend to use the funds in riskier projects in which the funds were not initially intended.

When transactions are conducted under risk or uncertainty, it becomes very costly or impossible to anticipate all contingencies. Barriers such as ethnicity increases a household's cost of observing market prices to make transaction decisions (Goetz, cited in Matungul *et al*, 2001). As institutions grow and diversify their operations, complexities in management of contracts on both assets and liabilities increase, raising transaction costs.

2.2.3 Effects of transaction costs on farm households

The existence and effects of transaction costs in agricultural production and marketing can be assessed through differences in marketing costs, marketing channels used, costs of inputs (including capital necessary for entry into marketing) and price received for agricultural products. High transaction costs in either production or marketing of potentially remunerative commodities exclude poorer farmers from participating in growth opportunities. Their non-participatory behavior implies that they are subjected to significantly different levels of transaction costs for producing and selling the same output mix (de Janvry *et al*, 1991). The real incentive they face is much lower than the nominal price in the market.

2.2.4 Transaction costs and information

Due to high transaction costs, small and large farm households may not have access to the same technology, information, asset base, input supplies and profitable market

outlets as households with lower transaction costs. Williamson (1979), following on Coase's research, elaborated the reasons for transactions being costly, noting that informational asymmetry was inherent in transactions. Leonard (2000) also adds that smallholder farmers who do not have full information as a result of transaction costs are unable to contract and enforce terms of exchange. Transaction costs and information asymmetries may also inhibit liquidity and intensify liquidity risk as well as keep capital from flowing to its highest value use.

2.2.5 Transaction costs and market prices

The presence of transaction costs is often reflected by the difference or discrepancy between perceived buying and selling prices (de Janvry, 1991). Makhura (2001) adds that when these discrepancies occur, sellers experience low selling prices and consequently feel discouraged to sell, while buyers experiencing a high buying price become discouraged to buy. Generally, sales of a household facing higher transaction costs will be less than sales of a household facing lower transaction costs. Similarly a household tends to purchase less when faced with high transaction costs. This generates discontinuous behavior in which the household is a net seller at a certain market price band and a net buyer at another price band. That is when transaction costs create a disutility greater than the utility gain farmers become discourage to participate in the market.

For every existence of transaction costs, *ceteris paribus*, also leads to a lower number of observable transactions than would have been the case if there had not been any transaction costs. The costs in exchange do not benefit either of the parties to the

transaction. High transaction costs simply make it difficult and less attractive to transact.

2.2.6 Transaction costs and transportation

Transportation costs, and related issues of time required to transport products to marketing centres imply that the ability of smallholders to access market outlets is limited, the greater the distance from market or service centres the larger the transaction costs which become prohibitive mostly to smallholders than large-scale producers/seller. As Woods (2000) observed, transaction costs limited the availability of veterinary services for subsistence farmers in Uganda and Zimbabwe. Livestock owners must often travel a large distance to request the assistance of a veterinary technician for their sick animals. It is difficult for a smallholder to transport a large animal to a veterinary practitioner, so the practitioner has to travel to where the animal is. This imposes a double cost on the farmer as he/she has to pay in time and money, i.e. time to get to the practitioner to report the case and the cost of the vet's trip put to the farm. The mobility costs involved in visiting the technician are often so prohibitive that the poor farmer are excluded from visiting the technician. In contrast the large-scale farmers would avoid multiple journeys by transporting his animal to the practitioner.

2.2.7 Transaction costs and marketing channels

Transaction costs have an effect on the choice of livestock marketing channels as shown by Hobbs (1997). Hobbs showed that some transaction cost variables (such as grade uncertainty, risk of not selling, time spent at the auction) were significant

factors affecting the choice of either live-ring auction or direct-to-packer sales of cattle in Scotland. Farmers choose channels that are less costly. The basis is that transaction costs affect price, which in turn affects traded output and channel used.

In a similar study by Mathye *et al,* (2000) on smallholder farmers producing bananas and mangoes in some areas of the Northern Province of South Africa (now Limpopo Province), it was found that not all farmers sell their products. Those who sell tend to use different channels such as fresh produce markets and direct sales to consumers depending on the magnitude of the transaction costs imposed on the sellers. The study also concludes that problems of transport, searching for markets and education tend to influence participation.

2.2.8 Transaction costs and financial institutions

Transaction costs in agriculture may constrain supplies and demand for financial serves in the rural areas. The costs of screening and monitoring borrowers may simply be too high for agricultural lending to be profitable, especially when there are numerous and heterogeneous small borrowers scattered across the country. Fenwick and Lyne (1998) suggested that high transaction costs faced by rural households in South Africa limit their access to formal credit markets. Lenders feel threatened by their less comprehensive knowledge of the riskiness of the borrowers, activities and by the ability of the latter to modify the level of risk (probability of default) in opportunistic attempts to profit that may hurt the lender (moral hazard). Under some restrictive assumptions, adverse selection and moral hazard could also prevent interest rates from equilibrating the supply and demand for credit.

2.2.9 Transaction costs and property rights

If transaction costs are high relative to the benefits of secure and exclusive ownership, property rights and the related markets will fail to emerge. Gut well-defined property rights do not, however, bring markets into existence if the co-ordination and marketing costs necessary for the commodities to be traded voluntarily are very high. Even if the markets appear they tend to be thin and inactive.

The principal question is whether "there is a way of reducing or eliminating transaction costs so that smallholder farmers can enter competitive markets on an equal footing with the other players?" the following section briefly answers that question.

2.2.10 Transaction costs and household characteristics

Personal characteristics, such as age, level of education and gender, impact directly on transaction costs. Less educated farmer tends to face higher transaction costs than educated farmers because the former cannot assimilate information at lower costs. The level of education provides a proxy for information costs. Basic communication comes mostly in English and therefore requires and understanding of English in order to interpret information. Education reduces transaction costs by improving access to information that is disseminated through newspapers and bulletins.

The age of the head of the household (in years) normally provides a proxy for experience in farming. The age is considered a crucial factor since it determines

whether the household benefits from the experience of an older person, or has to base its decisions on the risk-taking attitude of a younger farmer. Older and more experienced household heads tend to have more personal contacts (or stronger social capital and networks), allowing the discovery of trading opportunities at low costs. Age may also reflect increased trust and reputation (credibility within the networks), allowing the discovery of trading opportunities at low costs. Age may also reflect increased trust and reputation (credibility within the networks) gained through repeated exchange with the same party (Goetz, cited by Matungul, *et al*, 2001). Older household heads are therefore expected to face lower transaction costs.

The gender of the head of the household also has impact on transaction costs. Male farmers are involved in agricultural activities than female farmers to the extent that when female farmer want to engage in agricultural activities they face higher transaction costs than men. Female famers ore known to face constraints such as weak land rights, limited access to common property resources, lack of equipment, limited contact with agricultural extension officers and lower levels of education (Matungul *et al*, 2001). Some authors argue that women face greater legal uncertainty than men in customary courts, and in the national courts when married under customary or common law, especially if separated from their husbands through migration, abandonment, divorce or death. Women therefore face higher ex post variable transaction costs than do men.

2.2.11 Reducing high transaction costs

There is no uniform strategy to reduce transaction costs. The strategy to reduce transaction costs depends on the transaction to which the costs are related. Reducing transaction costs entails reversing or correcting the sources of transaction costs by promoting or increasing access to assets, information, services and markets necessary to grow or increase producers' income and welfare.

One of the principal tools for reducing transaction costs is the construction of efficient farmer supporting institutions. Institutions are broadly defined here as a means of reducing information and transaction costs relative to the exchange of goods and services. Without these institutions, markets cannot perform either efficiently or equitably. The notation that the costs of arranging exchange may reduce or even prevent exchanges from occurring, and may give rise to institutions and organizations to offset their negative impacts is widely accepted (Jaffee *et al*, 1995). North (2000) argues that institutions are formed precisely to reduce uncertainty in human exchange of goods and services. In the absence of formal institutions that regulate transactions, the farmer has to face costs to obtain information about different agents, to contract, monitor and enforce adverse selection and moral hazards costs because producers are better informed for the screening and monitoring of potential partners. Access to information, both technical and market, may be improved by providing incentives for rich farmers to share their knowledge with the less well-off, (Delgado, 1998). Institutions are also crucial in specifying property and enforcing contracts both of which promote specialization and reduce the costs of market exchange.

It is, however, argued that it is not enough to create formal institutions, which lower transaction costs without an enabling political environment to sustain the appropriate formal institutions. A country's legal system and political institutions certainly drive both financial and economic developments.

Other mechanisms through which transaction costs and risk can be reduced are provision of physical infrastructure, promoting access to credits by the government. It is argued that access to credit has comparative advantage in significantly reducing transaction costs in rural financial markets and improves income levels. Investment in public goods such as roads, telecommunications and an efficient legal system (to uphold commercial contracts), as well as farmer support services (input supply, extension, marketing information and research), would probably raise farm and non-farm income by reducing transaction cost (Matungul *et al*, 2001).

The government should also intervene through protectionist policies that enhance the reduction of transaction cost for purchased. Government policies, education, knowledge and access to capital are important factors in market participation by small-scale farmers. Incentives should be created allow information or management-rich individuals to share their expertise with small-scale and poor farmers. Policies that reduce transaction costs in input and output markets may improve the welfare of all producers (Nkhori, 2004)

2.2.12 Measuring transaction costs of sugarcane farmers

In the case of sugarcane farmers, the transaction costs' variables can be classified into three components as follows: (i) market transaction costs (cooperative fee and donation, OGR Number /letter of delivery order fee, middleman fee, interest rate, interest margin, paperwork, opportunity cost, and credit delay); (ii) managerial transaction costs (cut-load carry costs); and (iii) political transaction costs (land tax). In addition, some variables still exist in transaction costs of sugarcane farmers, like costs of security, village donation/tax, making contract, ceremonial meal cost, and group fee. However, because only a few sugarcane farmers spent money on those variables, the variables are not involved in this analysis. In general, most of the variables are explicit (which means that farmers have the data), so it is not difficult to measure transaction costs. However, some variables like paperwork, opportunity cost, and credit delay must be approached with special measurements, because farmers usually do not calculate these variables (implicit).

The two behavioral assumptions on which transaction cost analysis relies-and without which the study of economic organization is pointless, are bounded rationality and opportunistic behavior (Williamson, 1985), which manifests itself as adverse selection, moral hazard, cheating, shirking, and other forms of strategic behavior, to explain contractual choice and the ownership structure of firms. In Williamson's framework, a trade-off has to be made between the costs of coordination and hierarchy within an organization, and the costs of transacting and forming contracts in the market. This trade-off will depend on the magnitude of transaction costs. The ease or difficulty of contracting, and the types of contract

made are determined by the level of transaction costs which are influenced by the extent of imperfect information involved in making a transaction. Central to transaction costs economics is the costliness of information. TCE seeks to understand the interplay between institutional factors and market and non-market exchange under positive transaction costs (Kherallah and Kristen, 2001).

2.3 Institutions in Perspectives

New Institutional Economics defines institutions as the rules that govern social interaction. They are the rule of game both formal (laws, contracts, political systems, organizations and market) and informal (norms, traditions, customs, value systems, religions, sociological trends) that facilitate coordination or govern relationships between individuals or groups (North, 1990). According to Kherallah and Kirsten (2001), institution environment as understood by New Institution Economics (NIE) refers to the rules of the game as they affect behavior and performance of economic actors and in which organizational firm and transactions are embedded. Institutions emerge to minimize transaction costs and to facilitate market exchange (North and Thomas, 1993)

2.3.1 Role of institutions in strengthening market access for commodities

Institutions plays an important role in strengthening markets for commodities produced, bought and sold by smallholder, reducing transaction costs, managing risks, building social capital, enabling collective action, providing financial assistance and reducing missing market (Torero and Gulati, 2004). It is thus clear that the institutional infrastructure to facilitate market exchange is critically

important for small holder agriculture (Torero and Gulati, 2004). Through efficient operations of these institutions smallholders access to market is improved. However the exact nature of infrastructure and institutions that can enable the small farmers transcend from the subsistence farming of the village economy to actively participate into market economy would vary from country to country and between farmers (Gabre-Madhin, 2001)

Financial institutions have an important role to play in smallholder marketing because smallholder famers lack assets (Kashuliza, 1994). The adoption of capital intensive technologies, which would result in increased production such as processing, requires high capital investment. However, smallholder farmers do not have assets to meet this investment (Kashuliza, 1994). Furthermore, the financial system in developing countries is much less developed with a much narrower range of institutions and instrument and being smaller relative to the size of the economy.

Another role of institutions is provision of inputs and credit to farmers. Kherallah and Kristen (2002) indicated that, the withdrawal of parastatals from this role in many developing countries has not been replaced by the private sector. Because of high transaction costs (including information costs), inability to enforce contract with farmers, and thin markets, private traders are unwilling to provide input and credit to farmers. As a result, there is market failure in the provision of credit to rural household and farmers are unable to finance the purchase of agricultural inputs such as improved seeds and fertilizers.

Cooperative and farmer organizations are institutions arrangements, whose main role has been to organize small scale farmers in developing countries. The advantage of organizing farmers in groups include, among other factors, a reduction in transaction costs of accessing input and output markets, as well as improving the negotiating power of smaller farmers visa vie large buyers or sellers (Cook, 1995; Cook and Iliopoulos, 2000).

Grades and standards are another set of institutions that play a crucial role in providing internationally recognized information and quality assurance about a product, thereby reducing information and transaction costs and facilitating trade (Coulter and Onumah, 2002). However, grades and standards can also be used as non-tariff barriers to trade. Thus, imposition of minimum standards that can be met by small farmers is important for small farmers' access to markets (Reardon *et al*., 2001).

2.4 The Sugar Policy

During the past 20 years, the Tanzanian sugar industry has been characterized by a high degree of government intervention in price setting and commodity distribution. For each stage of the marketing chain, the government established prices. Annual fixing of the ex-factory and consumer prices of sugar was a cumbersome procedure, mainly because sugar is a politically sensitive product. Primarily the policy aimed at protecting the consumer from too high process. Currently the industry is led by the Sugar Board of Tanzania (SBT) established by Sugar Industry Act 2001 (SIA) (URT, 2001). The board is under the Ministry of Agriculture Food Security and

Cooperatives. Its roles and functions range from being a government regulatory agency for facilitation of harmony and growth in the industry through regulation, promotion, importation of sugar, seed varieties, development and funding research activities related to the industry. Reports indicate that for some years the relationship between the associations and the sugar millers has been characterized with mistrust. The outgrowers feel that their cane is not graded honestly, that the weighbridge is tampered with the millers, and often delay payments. For example, from 1999 onwards, the millers frequently delayed payments in violation of their contracts with the associations. The situation was particularly critical in Mtibwa, where some farmers had to wait 6 months or longer before they were paid.

The implementation of the sugar Acts has created a mechanism for resolving these issues and building trust among the various players. In other words, the associations together with the millers and the Sugar Board have managed to put in place a series of mechanisms-contracts, forums, consultations and stakeholder meetings to discuss thorny issues and come up with settlements (MAFC *et al*., 2006)

2.5 Characteristics of Sugarcane Farming

Masaku (2009), in the study of the role of trust in contract enforcement: An analysis of smallholder farmers and sugar millers in Swaziland found that sugarcane farming has several characteristics that necessitate specific institutional arrangements, such as contracts to facilitate and coordinate exchange. First, it involves highly capitalized and highly specific investments, especially at the processing levels. Second, it takes about 12 months for the sugarcane crop to be ready for harvesting, and once it has

been harvested it has to be processed within 24 hours to prevent loss in the sucrose yield of the cane. This timing requirement also has implications for the optimal distance between the mill and sugarcane fields. The distance between the farm and the mill not only affects the quality of the cane through the loss in sucrose but also has cost implications that could substantially reduce the net return to the farmer.

In addition, harvesting of sugarcane must be done according to a schedule that allows all growers the possibility of delivering a predetermined daily quantity during the crushing season. This daily quota is needed because the sucrose content of the crop is low at the beginning of the season and increases with time, but it decreases toward the end of the season because of increased rainfall. Thus delivery scheduling enables every farmer to go through all the stages of sucrose concentration in the crop without some farmers benefiting more than others. Due to high transaction costs in coordinating so many small growers, milling companies often resort to farming large estates to secure their own supply of cane at lower costs. The limited size of own estates plus the sociopolitical imperative to encourage development necessitates some procurement of cane from outgrowers, which brings about a set of different coordination and contractual challenges to the milling company

2.6 Risk Associated with Sugarcane Production

As sugarcane plant matures throughout the growing season, the amount of sucrose in the cane increases. Most of this sucrose production occurs when the plant is fully mature and begins to ripen. Several studies have developed models to predict the sucrose level in sugarcane. Crane *et al*., (1982) developed a stubble replacement

decision model for Florida sugarcane producers. They reported that sugar accumulation is a function of both sucrose accumulation and vegetative growth. The study suggested that the accumulation of sugar may be approximated as a quadratic function of time. Chang (1995) while conducting research on Taiwanese sugarcane cultivars suggested that individual cultivars have distinct sucrose maturation curves with different peak levels. The study concluded that the sugar content of a cultivar could be predicted as a function of time with reasonable accuracy and that the within-season trend of sucrose accumulation follows a second order curve. One factor which would have an effect on optimal harvest travel cost (Salassi *et al*., 2002)

Burning the sugarcane before harvesting has got several benefits in the process of sugarcane harvesting. As listed by Legendre (2002), an overall lower cost of production that benefits farmers and consumers, allows more efficient harvesting of sugarcane in the field, reduces the number of hauling units on the highways delivering sugarcane to the factory for processing, thus reducing wear and tear on public roads, decreases the volume of material to be processed by the factories, shorten the harvest season by as much as 10 percent, increases the yield of sugar recovered per ton of sugarcane by the factories and improves overall quality of the sugar produced. In Mtibwa and Ruembe, burning sugarcane before harvesting is also recommended. Burning however, if uncontrolled, or happening as bushfires, can lead to burning of other farms, not being in harvesting program and hence causing a loss to the farmers. Abbot (2005) recommended that for commodities such as sugarcane and tea, where the time period between harvesting and processing is necessarily short to avoid substantial losses in quality, imply close integration between growers and

processors. However, labor problems associated with harvesting sugarcane during the short period of maximum yield have led processors to prefer contracts with independent growers (Abbot, 2005).

2.7 The Conceptual Framework

Conceptual or analytical framework presents scope guiding the empirical inquiry. The conceptual framework helps to indicate the most useful research domains on which analysis and limited resource should focus. In general, the choice of variables for information generation depends very much on the objectives of the study (IITA, 2002).

The framework groups the variables into three major parts (background, independent and dependent variable) as it is shown in Fig. 1. According to presentation in Fig.1, five variables are used to depict the background characteristics of the respondents, and seven variables are used as independent variables. These are characterized into restricting/motivating factors, and social economic variables. The framework indicates that, the objective is to examine the relationship between the household head characteristics, independent variables and transaction costs. It also shows that the institutional arrangement supporting sugarcane out-growers has an influence on transaction costs. Finally it indicates that the level of sucrose/rendement can be associated with the transaction costs incurred in production and marketing of sugarcane. This means that there is an interaction between the various factors influencing transaction costs in Turiani and Ruembe Sugarcane basin community

Background variables   **Independent variables**   **Dependent variables**

Restricting/motivating factors

Land acquiring
Ownership, tax, search cost, &
contracting, enforcement

Labour availability
Laborers, tractors, search costs,
contracting, enforcement, time
wasted

Characteristics of the
household head

Distance from Farm to
Factory (Km)
Gender
Education level
Farm size (Ha)
Year of experience in
sugarcane farming

Input availability
(Fertilizer, pesticides & seedcanes)
Transportation, search costs,
contracting, enforcement

Extension services availability
Search cost, contracting, service cost

Financing support
Credit availability, amount,
conditions, interest rate, contracting,
enforcement, time wasted, paper
work, delay, fees

Transaction
costs

Marketing
Transportation cost, contracting
enforcement, supervision, time
wasted

Risk associated
Fire
Harvesting time/quality
Weather
Others

Sugarcane Sucrose
/ rendement level

Supporting institutions
arrangement

Figure 1: The Conceptual framework for the study of Mtibwa and Ruembe
sugarcane outgrowers in relation to transaction costs

Sugarcane production and marketing sectors considered as a system involve physical, institutional and microeconomic environment as exogenous constraints and the product characteristics of as endogenous constraint. In analyzing agricultural production and marketing most of studies used systems approach to describe relations between productions, trade and consumption combined with Perfect Competition School (structure-conduct-performance) to analyze competition between traders, pricing efficiency to economics (transaction, search, bargaining and enforcement costs) to introduce the idea of uncertainty and transaction cost in the analysis. In an attempt to analyze sugarcane production and marketing various methodologies and techniques have been used, these was improved and employed in this study.

Chongela (2008) when studying economic analysis of outgrowers' sugarcane production scheme at Ruembe sugarcane basin used a Cobb-Douglas production to determine the technical relationship between sugarcane productivity and the inputs. He also used gross margins of the sugarcane and paddy enterprises to determine profitability. The study found that fertilizer, labour and credit were statistically significant factors of production for sugarcane at $P<0.05$ where as land, herbicides and extension services were not statistically significant at $P<0.05$. The gross margin analysis showed that sugarcane enterprise has higher returns than paddy enterprise. The study further determined mean annual contribution of Ruembe sugarcane outgrowers to Kilombero (K2) Sugar factory and the mean annual per capita sugar consumption of Ruembe outgrowers. However, the study did not investigate anything on transaction costs variables.

Regnard (2006) investigated the influence of Mtibwa Sugar Estate (MSE) outgrowers' scheme on household poverty reduction. He used the Principal Component Analysis (PCA) method to categorize the household poverty strata by using poverty indicators. The results showed that, there was significant relationship between engagement in sugarcane production and household poverty status whereby the households engaged in sugarcane production comprised 84% of the less poor households. Availability of credit for sugarcane growing, reliable extension services and market as well as the profitability of sugarcane production were the factors that motivated farmers to engage in sugarcane production. Scarcity of land for sugarcane production, lack of capital for investment and lack of information on how to get into the sugarcane farming were the factors that restricted non growers in joining the sugarcane farming. This study did not critically investigate on the how institutional arrangement restrict or motivate farmers on participating in sugarcane cultivation.

Mshiu (2007) in the study of assessing the contribution of contractual arrangement in sugarcane farming in Morogoro and tobacco farming in Tabora regions, Participatory Rural Appraisal and Pre tested questionnaire methods were used to capture data. Cobb Douglas production function assessed the factors influencing production in the two contractual arrangements while, Gross Margin was used to determine and compare the profitability of the two crops in their contractual arrangement. Results revealed that the Gross Margin realized by tobacco contract farmers was significantly higher than that earned by sugarcane contract farmers. This result was supported by Cobb Douglas production function that farmers in tobacco contractual arrangement accrue more benefit than those in sugarcane contractual arrangement.

However the study concluded that there are no clear guidelines as to how contract farming should be framed in Tanzania. Thus based on those findings government should stipulate clearly how contract should be framed with the help of respective boards for both crops. However the study did not estimate the transaction costs involved in production and how they are influenced by participating institutions.

Msuya and Ashimogo (2005) described the technical efficiency of sugarcane production and the factors affecting this efficiency in Turiani division, Mvomero district. The study determined and compared the level of technical efficiency of outgrowers and non-outgrowers farmers, and examined the relationship between levels of efficiency and various specific factors. The results of the estimation showed that there were significant positive relationships between age, education, and experience with technical efficiency. The study did nothing on institution economics aspects.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Overview

This chapter describes the methodology that was used in the study. Section 3.2 is the conceptual framework, and section 3.3 is the description of the study area, rationale of the study is shown in section 3.4, and section 3.5 presents an outline of data collection process and instrumentation. Sampling procedure is shown in section 3.6 while data processing and analysis have been presented in section 3.7.

3.2 Description of the Study Area

The study was carried out in two different areas in Morogoro region, that is, Turiani division in Mvomero districts and Ruembe Sugarcane basin in Kilombero district. The research locations were purposely determined. They represent regions with more or less similarity in agricultural farming systems.

3.2.1 Location of Ruembe sugarcane basin

Ruembe sugarcane basin is located in Kilosa district which is among the six districts of Morogoro region, with a population of people of about 488191 (244862 females and 243329 males) by census of 2002. It has area of about 14 245 square kilometers (1,424,540 Hectares). To the East it is bordered by Morogoro and Mvomero districts. To the South it is bordered by Kilombero and Kilolo districts. To the west it is bordered by Mpwapwa and Kongwa districts. To the North it is bordered by Kiteto and Kilindi districts.

3.2.1.1 Climate

Kilosa district has bimodal rainfall of about 1106 millimeters per annum split between the short rains from November to January and the long rains from March to June. The warm climate of about 10° Celsius in highland areas and 30° Celsius in lowland areas provide excellent cane growing conditions in the flat, fertile area at the base of the Udzungwa Mountains.

3.2.1.2 Topography and economic activities

The altitude of the farm land is some 800 feet above sea level with the mountains rising to almost 10,000 feet, because of the build-up of cloud over the mountains immediately to the west; sunshine hours are lower than in many East and Central African Sugar estates which have about 6.5 hours per day on average. Crops grown in highland areas are maize, beans, bananas, Irish potatoes, yams, coffee, and vegetables while those grown in lowland areas are paddy, sugarcanes, cassava, sorghum, cotton, bananas, coconuts, cashew nuts, sweet potatoes and vegetables. (Chongela, 2008)

3.2.2 Location of Turiani division

Turiani division in located in Mvomero district about 130 km from Morogoro Municipality along Kilosa-Handeni road. The district lies between longitudes $37^o10'$ to $38^o31'$ East of Greenwish and between latitudes $5^o5'$ to $7^o4'$ South of the Equator. Turiani is found at longitude $37^o36'$ East and Latitude $6^o00'$ South. The division is comprised of five wards namely, Mtibwa, Sungaji, Mhonda, Diongoya and Kanga. The division headquarter is located in Sunguja ward (Regnard, 2006)

3.2.2.1 Climate

The division receives a bimodal type of rainfall with peaks in April and December while May to October remains relatively dry. The average rainfall is 1200mm per annum with variations from 800mm to 2000mm. Average monthly rainfall is about 106mm making up a total annual rainfall of about 1270mm.The mean annual precipitation is marginal for cane growing under rain-fed conditions, taking account of the annual distribution pattern and year-to-year variation. The prolonged dry season, which is beneficial for harvest operations, unfavourably affects yield level.

3.2.2.2 Topography

The altitude is between 380 and 520 metres above sea level. This altitude provides a suitable climate for varieties of tropical crops.

3.2.2.3 Population

According to the population census of 2002 (URT, 2004), Mvomero District had a population of about 260 525 people with a population growth rate of 2.6%. Turiani had a total population of about 90,129 with an average of 4.6 people per household and an average population density of 22.3 people per square kilometer.

3.2.2.4 Economic activities

The main crops grown are sugarcane, paddy, maize, cassava and banana. Other crops include beans, millet, cowpeas, potatoes, groundnuts, citrus fruits, mangoes, jackfruits, coconut, tomatoes, and eggplant. With exception of paddy and sugarcane field, cultivation is carried out mainly by use of the hand hoe, using primarily family

labour and hired labour when the situation demands. Few individuals own tractors. In the division few individuals keep livestock such as dairy cows, swine, goats, local chicken and ducks.

3.3 Rationale of Choosing the Study Area

Turiani and Ruembe sugarcane basins were chosen as the study areas basing on the fact that sugarcane is one of the main crops of the areas as well as there are well established sugarcane outgrowers schemes in these areas. Despite several years of cultivating sugarcane in these areas, the productivity per unit area under outgrowers' scheme is still below what is expected. This necessitates a thorough examination of state of affairs in the sector. Other areas with sugarcane outgrower schemes are Kilomboro district (Msolwa sugarcane basin) and Kagera (Misenyi district).

3.4 Sampling Technique and Sample Size

The reliability and validity of any research results ultimately depend on the availability of the appropriate data. In Turiani division, by using multistage sampling, four wards namely Mtibwa, Sunguja, Diongoya and Kanga were chosen purposively to obtain a sample of farmers due to their potentiality in growing sugarcane than the one remaining (Mhonda ward). A combination of multistage, purposive sampling techniques was also applied to obtain five villages namely Kilimanjaro, Kwadori, Kunke, Lusanga and Kanga. Finally from each village 16 sugarcane outgrowers were purposefully selected based on variable under study. In Ruembe sugarcane basin, multistage and purposeful technique was used to obtain one ward namely Ruembe due to its largest population of sugarcane outgrowers than

the remaining two (Ruaha and Kidodi). From this stage, four villages namely Ruembe, Kitete, Kihelezo and Kidogobasi were also purposively selected. Thereafter 20 sugarcane outgrowers were purposively selected from each village. The whole technique resulted in having a sample size of 160 sugarcane outgrowers (80 from Turiani division and 80 from Ruembe basin) available for the study.

Multistage technique is convenient for studying large and diverse population as well as population whose list of actual individuals to be studied is hardly available. Additionally, the technique reduces the amount of travelling for interview and hence the corresponding cost (Casley and Kumar, 1988). Based Glenn, D. (2000), the selected sample will have $\pm$10% precision level and 95% confidence level. Current population is estimated to be 4527 and 4372 active sugarcane outgrowers Turiani division and Ruembe sugarcane basin respectively (SBT, 2011).

3.5 Research Design

A cross-section research design was used in this study. This design allows the data to be collected at a single point in time and is useful for description purposes as well as for determination of relationship between variables (Bailey, 1998; Babbie, 1990). It is considered to be favourable when resources are limiting in terms of finance, human and time.

3.6 Data Collection

3.6.1 Primary data

Primary data were collected through structured questionnaire containing both closed and open-ended questions (Appendix 1). The main survey was conducted between mid January 2012 and February 2012. The survey was carried out by the author with the assistance of two enumerators in each district. To ensure validity and reliability, the first draft of the questionnaire was pre-tested in the study area. The pre-testing of the questionnaires was necessary as it checks its relevance and comprehensiveness in gathering the required information. The information collected includes household characteristics, production and marketing aspects sugarcane focusing on the source of transaction costs. Also key informants' interview was used to collect primary information by use of checklists (Appendices 2, 3 and 4).

3.6.2 Secondary data

Secondary data was obtained from various sources including existing outgrowers' associations/co-operative in study areas (MOA and TUCOCPROCOS in Turiani and RCGA, MACGA, MUSGA and BCGA in Ruembe), Sugar Board of Tanzania, Sugarcane Research Institute, Factories (Miller cum planters), financial institutions and National Agricultural Library and via internet. The source of secondary data obtained was as detailed in table 1.

Table 1: Type of information gathered from secondary source

No	Source	Information gathered
1	Farmers organization	Background and history, function and managerial structure, functional relationship with other institutions, activities related with sugar production and marketing, and cane supply agreements
2	Sugar Board of Tanzania	Mtibwa cane growers register, Kilombero 2 (K2) cane growers register, Institutional arrangements, data on production trend of sugarcane
3	Sugarcane Research Institute	History of sugarcane outgrowers in Tanzania
4	Factories (Miller cum planters)	Company profile, price of sugarcane and future plans
5	Financial institutions(Turiani SACCOS, ROA SACCOS, NMB AND CRDB	Institutional arrangement, cost component of lending, operation difficulties, successes and future plans.
6	Sokoine National Agricultural Library	Basic data on climate, topography and economic activities, previous study in production and marketing of sugarcane

3.7 Data Analysis Techniques

A substantial part of the analysis of this study is based on the descriptive statistics such percentages and means, that have been used to summarize the survey results and provide the basis and preliminary ground on whether to verify or reject the hypotheses presented in section 1.3.3. In assessing the influence of socio-economic variables on transaction costs and influence of transaction costs on sugarcane quality (rendement level), Cobb-Douglas production function was used. This kind of

production function was chosen based on the fact that, according to economic theory many production observations fit well in it. For detailed literature survey of the model see Henderson's and Quants (1998) and Gujarati (2008). The collected data were analysed using Statistical Package for Social Science (SPSS version 16.0) package.

3.7.1 Description of analytical technique

In this section, the conceptual framework structured and described in section 3.2 is operationalised by specifying the relationship between (i) production and marketing transaction costs and factors hypothesized to influence them, and (ii) sugarcane quality (rendement level) and production and marketing transaction costs.

3.7.1.1 Influence of socio-economic factors on transaction costs

Given our research objective number one, it was hypothesised that socio-economic factors have an influence on transaction costs. In this case the general form of Cobb-Douglas function was adopted and used. The model used in this objective was specified stochastically as in equation 1 below.

$$PMCOST = \beta_0 DSTANCE^{\beta_1} GENDER^{\beta_2} YEAR^{\beta_3} SIZE^{\beta_4} EDUCAT^{\beta_5} e^{\mu i} \quad \text{........(1)}$$

Where;

PMCOST   =   Production and marketing Transaction costs incurred by
                       outgrowers (Tshs.)

DSTANCE   =   Distance from the farm to the sugar factory (Km)

GENDER   =   Gender of respondent (1=male, 0= otherwise)

YEAR	=	Year of experience in sugarcane farming
SIZE	=	Farm size (Ha)
EDUCAT	=	Education level of respondent (Years)
β_0	=	Constant term
μ_i	=	Error term
$\beta_{is}(i= 1….5)$	=	Parameters which when estimated can be interpreted directly as elasticises
e	=	Base of natural logarithm

In equation (1) above the relationship between the socio-economic factors and transaction costs is non linear. For the sake of estimation the equation was log transformed to become linear. The following linear model was specified for purpose of statistical estimation of the   parameter of the Cobb-Douglas function:

$$lnPMCOST = ln\beta_0 + \beta_1 lnDSTANCE + \beta_2 lnGENDER - \beta_3 lnYEAR + \beta_4 lnSIZE + \beta_5 lnEDUCAT + \mu \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots (2)$$

The model is therefore linear in the parameter $\beta 0$, $\beta 1$, $\beta 2$, $\beta 3$, $\beta 4$ and $\beta 5$ and is therefore a linear regression model. The model was then estimated using ordinary least method (OLS) to make sure that model is not emanate from the basic assumption that the error term was independently distributed from farmer to farmer with a zero mean and finite variance. Similar approach has been used by Regnard (2006), Nyimbo (2002) and Gabagambi (1998).

3.7.1.2 Influence of transaction costs on sugarcane quality (rendement level).

It is also assumed that variation in sugarcane quality is influenced by production and marketing transaction costs. A Cobb-Douglas model was used to examine the relationship between sugarcane quality and production and marketing transaction costs. By use of steps in section 3.6.1.1 above, the model was specified as follows and estimated using OLS

lnSUQ　　　　　=　　　　　$\ln\beta_0 + \beta_1\ln PMCOST + \mu$ · (3)
Where;

lnSUQ	=	Sugarcane quality (Rendement level)
PMCOST	=	Production and marketing Transaction costs incurred by outgrowers (Tshs.)
β_0	=	Constant term
μ	=	Error term
$\beta_{is}(i=1)$	=	Parameter which when estimated can be interpreted directly as elasticise

3.7.2 Advantages and limitations of ordinary least squares

According to Gujarati (1995) Ordinary Least Square estimation technique has the following advantages:

i.　　　It is simple to use, eloquent and gives the best estimator and it does not require knowledge of the probability distribution of the underlying population being studied.

ii.   It leads to best linear unbiased estimator (BLUE) and hence its popularity in applied econometrics.

3.7.3 Limitation of applying ordinary least square estimation technique

i.   With non-linear models, variances of the parameter estimates cannot be obtained easily and the estimate do not have well behaved statistical properties that lend themselves to statistical theory.

ii.   Testing of the parameter is not possible because the sampling distributions of the parameter estimate in most cases are unknown.

Regression equations generated by ordinary least square are associated with a number of problems depending on the type of data used and the nature and form of the regression model employed in the analysis. The common problems encountered in the regression analyses include multicollinearity, heteroscedasticity, and outocorrelation (Gujarati, 2008; Madala, 1988).

Pooled cross-sectional data that have been used in this study are likely to have problems of heteroskedasticity and multicollinearity. On one hand, the presence of heteroskedasticity leads to one main problem. The problem is that the ordinary least squares estimators while still linear and unbiased, can no longer provide minimum variance. This makes the ordinary least squares estimators unreliable, that is, the variance will be large leading to small t-values. The small t-values associated with the large variance leads to a situation whereby the explanatory variables' parameters are rejected more frequently than necessary.

To contend with this situation in this study, a natural logarithm transformation of the data was adopted. Furthermore, relevant tests were performed to ascertain that the basic assumptions governing linear regression procedure were not seriously violated. It is important to note that changing the functional form of the model can take care of the heteroscedasticity problem. That is why the transformation of the data was employed in this study to take care of the problem of heteroscedasticity.

On the other hand, in multiple regression analyses, the existence of linear relationships among the explanatory variables is very common. This situation poses a problem known as multicollinearity. Multicollinearity is the situation whereby one or more of the independent variable are highly correlated. The rule of thumb is that Variance Inflation Factor (VIF) of five or greater indicates severe multicollinearity. After running multicollinearity test it was observed that VIF of each independent variable in all model is less than five hence conclude that our data is free from multicollinearity problem.

3.8 Measuring transaction costs of sugarcane farmers.

In this study, the transaction costs variables are classified into the components as follows:

  (i) Market transaction costs (cooperative/association and donation, cost of obtaining OGR number, group fees, interest rate, interest margin, market information search, paperwork, opportunity cost, and credit delay

  (ii) Managerial transaction costs (cut-load-carry)

(iii) Political transaction costs (Cess, land tax, community development fees)

In addition, some variables still exist in transaction costs of sugarcane farmers, like costs of security, village donation/tax, making a contract, ceremonial meal cost, and group fees. However, because only a few sugarcane farmers spend money on those variables, the variables are not involved in this analysis. In general, most of the variables are explicit (which means that famers have the data), so it is not difficult to measure transaction costs. However, some variable like paperwork, opportunity cost, and credit delay must be approached with special measurements, because farmers usually do not calculate these variables (implicit). In detail, the measurement of sugarcane farmers' transaction costs can be explained as follows:

- Tax = Legal tax paid to local government charged per tonne of sugarcane charged at three percent of gross income from sugarcane sales and in Turiani and 200 Tsh per tonne in Ruembe (Explicit).

- Cut-load-carry = Cost incurred by sugarcane farmers to organize cut-load-carry activities, including costs of truck rented, loading and cutting. For sugarcane farmers, this cost can be seed from sugar mill vouchers/report (Explicit).

- Out-grower Number (OGR) number fees/cost= Cost to obtain OGR number from sugar mill. This include transport to association/ cooperative office and lunch/refreshment (implicit)

- Cooperative/association fees = regular cooperative deducted from the sales of sugarcane; and also illegal fees paid to cooperative worker/contractors in the forms of commission (this data comes from interview with farmers) (explicit)

- Interest rate = interest rate paid to financial institutions based on amount of money borrowed. 7.5-24% per year. Interest is included in the transaction costs because it reflects the sugarcane outgrowers' cost to get credit. In the case of banking, interest expense is a direct indicator of the external cost of the way banking firms organize their activities are situated on all interest bearing liabilities, and is affected by monetary policy, pricing regulation, pricing competition, and internal funds management practices (Polski, 2000) (explicit).

- Other deductions = regular fees deducted from sales of sugarcane, they varies among farmer organizations. These include TASGA fees only paid by RCGA and MOA members, group fees, community development fees sometimes called secondary school fees, infrastructure development fees and outgrowers service fees. All of these are indicated in sugarcane vouchers (explicit).

- Paper work = Cost of completing all the forms required by the cooperative/sugar mill/financial institutions including photocopies of documents, pictures, and others. Commonly sugarcane outgrowers do not calculate paperwork expenditure. By assuming conservatively, the cost for paperwork (as a requirement to make a contract), including photocopies of documents, pictures, elaboration of personal documents, and others add up to

approximately Tshs. 15,000/=. This cost is for outgrowers who get credit from financial institutions (implicit).

- Opportunity cost of time = Cost of the time needed to gather all the information required by the financial institution and day spent for tractor search. The aim is to measure the opportunity cost in such a way as to compare its extent to the monetary cost components. In the literature, the opportunity cost of time is often valued at the daily wage rate (Yustika, 2008 and Adams and Nehman, 1979) or the daily minimum wage established by law (Erhardt, 2002). In the case of sugarcane farmers, the calculation of opportunity cost comes from two things: (i) days spent on search for tractors and days spent to processing credit; (ii) transportation to go the tractor owners and to the financial institutions. In this study the calculation of opportunity costs comes from wage rate of factories casual workers in the study area which stand at Tsh. 3500/= and 4000/= per day in Turiani and Ruembe respectively. It is assumed that, outgrowers could be willingly to work as casual labour and earn that amount of money per each day spent otherwise (implicit).

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Overview

This chapter presents the results and discussion of the study. The results are divided into three main sections. The first section addresses economic analysis covering general household characteristics, production and marketing aspects of sugarcane, sources of sampled outgrowers credit facilities and technical assistance in farming. Problems encountered by farmers in production and marketing sugarcane and recommendations for solving the existing problems are also discussed. The second section discusses the empirical results from the Cobb-Douglas production function model showing existing relationship between transaction costs and socio-economic variables. It also discusses the empirical results from the Cobb-Douglas production showing existing relationship between transaction costs and sugarcane quality (rendement levels). The models are presented with the aim of testing stipulated hypotheses. The third section presents analysis of major institutions participating in sugarcane outgrowers' areas namely outgrowers organizations, financial institutions and millers.

4.2 Sugarcane outgrowers' socio-economic characteristics

4.2.1 Age distribution of sampled outgrowers

The distribution of respondents according to age is presented in Fig. 2. Majority of outgrowers in Turiani follow in older categories as compared to Ruembe. This suggests that there is a chance for the sugarcane cultivation opportunity no to be

available to young people in as compared to Ruembe sugarcane basin. The main reason may be due to low sugarcane price and increased a transaction cost which has lead young people to engage in off-farm activities as it will be explored later in this study. The results concur with that of BACAS (2004) which found that the outgrowers growth rate for KSCL has demonstrated and increasing upwards trend while that for MSE has been negative because KSCL outgrowers are taken as partners of KI and K2 sugar factories. They are paid a fair price (48% in 2003 and 49% in 2004) and they are paid on monthly basis according to their deliveries. The age difference between two study areas is found to be statistically significant with probability ($P \leq 0.05$). However, the influence of age on sugarcane production is found to be insignificant in the two study areas (Appendices 5a and 5b).
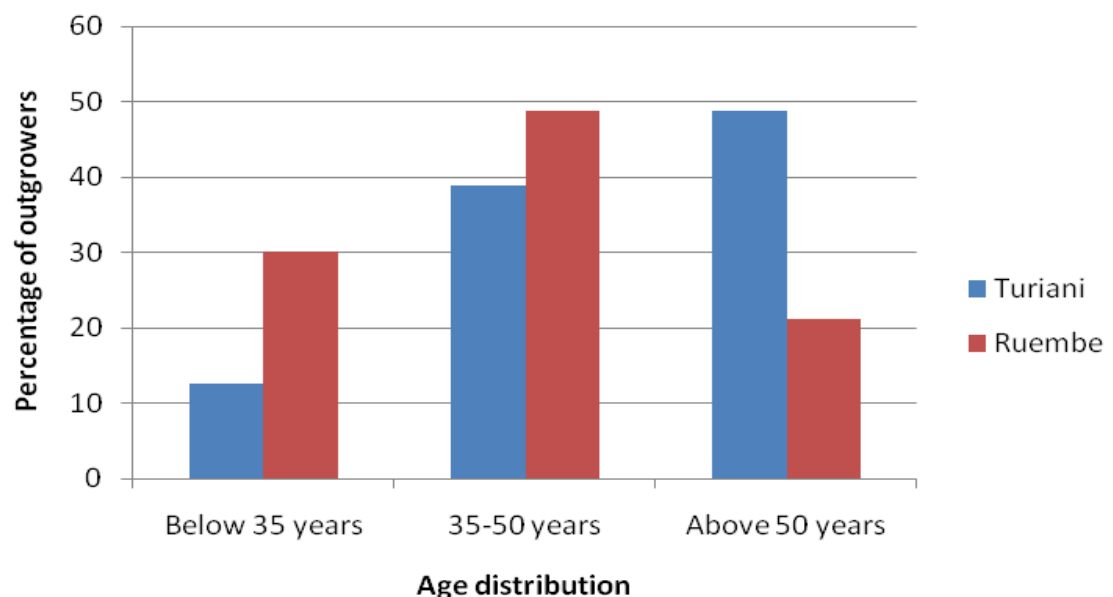
Figure 2: Age distribution of sampled outgrowers

4.2.2 Gender of the household head

With respect to gender, distribution slightly varies between the two areas. However, male dominate female in both study areas (Table 2). This implies that most of sugarcane activities are under the control of males than female outgrowers. This is common phenomenon to African traditions where most societies are patrilineal, in which husbands are in most cases the heads of households. Gender of respondents has insignificant relation with average sugarcane production per ha in the two study areas.

Table 2: Summary of sampled outgrowers socio-economic characteristics

	Turiani		Ruembe		t-test
	Number of OG	Percent	Number of OG	Percent	
Gender					
Male	56	70.0	54	67.5	
Female	24	30.0	26	32.5	
Total	80	100.0	80	100.0	0.339
Marital status					
Single	3	3.8	7	8.8	
Married	68	85.0	63	78.8	
Divorced	7	8.8	9	11.2	
Widow or widower	1	1.2	1	1.2	
Separated	1	1.2	0	0	
Total	80	100.0	80	100	0.769
Education level					
No formal education	8	10.0	1	1.2	
Adult education	11	13.8	7	8.8	
Primary education	52	65.0	57	71.2	
Secondary education	5	6.2	8	10.0	
Post secondary education	1	1.2	6	7.5	
Post graduate training	3	3.8	1	1.2	
Total	80	100.0	80	100.0	-1.834
Mean Household size	5.34		5.37		-0.112
Mean wealth status (Tshs)	4 546 554		6 173 243		-1.599
Number of years in sugarcane farming	11.42		9.39		4.789

4.2.3 Marital status of the sampled outgrowers

Table 2 above shows that most of the farmers practicing sugarcane farming are married. This is an indication that societies are stable with a large percentage of married respondents. The stable family can concentrate more in production than unstable ones and this influences agricultural production in the area. However, the association between marital status and average sugarcane production per hectare, as well as the difference are statistically insignificant ($P \leq 0.05$) in the two study areas.

4.2.4 Education level of the sampled outgrowers

Education improves the capacity of people to assimilate and use information and thus can help reduce transaction costs (Norton et al., 2006). Regarding the education level attained by the respondents, most of them, had attended primary school (Table 2). Educated outgrowers are expected to have an increased productivity per unit area than non-educated outgrowers. This was not revealed in the study areas as shown in appendices 5(a) and 5(b) the relationship between education of outgrowers and productivity is not statistically significant ($P \leq 0.05$). The difference of education level between two areas is also insignificant.

4.2.5 Household size

It would be expected that the increase in household size have a significant association with the increase in sugarcane productivity per unit area. This does not seem to be the case in both study areas. As shown in appendices 5(a) and 5(b), an increase in household size has no significance relationship with an increased productivity per ha ($P \leq 0.05$). However, the household size greater than five people

showed the decrease in productivity, this might be due to the fact that there was large group of dependant or other people are not involved in sugarcane production. The difference in household size between Turiani and Ruembe is statistically insignificant.

4.2.6 Years in sugarcane farming

Table 2 result shows that a good number of outgrowers have a reasonable experience in sugarcane farming though Turiani outweighing Ruembe. The difference in years of sugarcane farming between Turiani and Ruembe is found to be statistical significance with probability ($P \leq 0.05$). Decreased mean years in Ruembe may be due to increased number of new entrants in sugarcane cultivation as compared to Turiani. However, the increased number of sugarcane farming has no significant relation with increased productivity per unit area.

4.2.7 Respondent occupation

The result in Fig. 3 shows that all sampled respondents (100%) in Turiani and Ruembe are involved in sugarcane cultivation. It also shows that they are involved in cultivation of other crops estimated at 97% in Turiani and 82% in Ruembe. Despite of cultivating sugarcane, respondents are also involved in non agriculture activities. Five percent of respondents in Turiani and ten percent of respondents in Ruembe they have permanent employment, while 1.2% and 3.8% of respondents they are also involved in petty business in Turiani and Ruembe respectively. 7.5% of respondents in Turiani and five percent in Ruembe they are also doing business. The result also shows that 2.5% in Turiani and five percent in Ruembe are doing other activities

including carpentry, fisheries and livestock keeping in Ruembe and food vending in Turiani division.
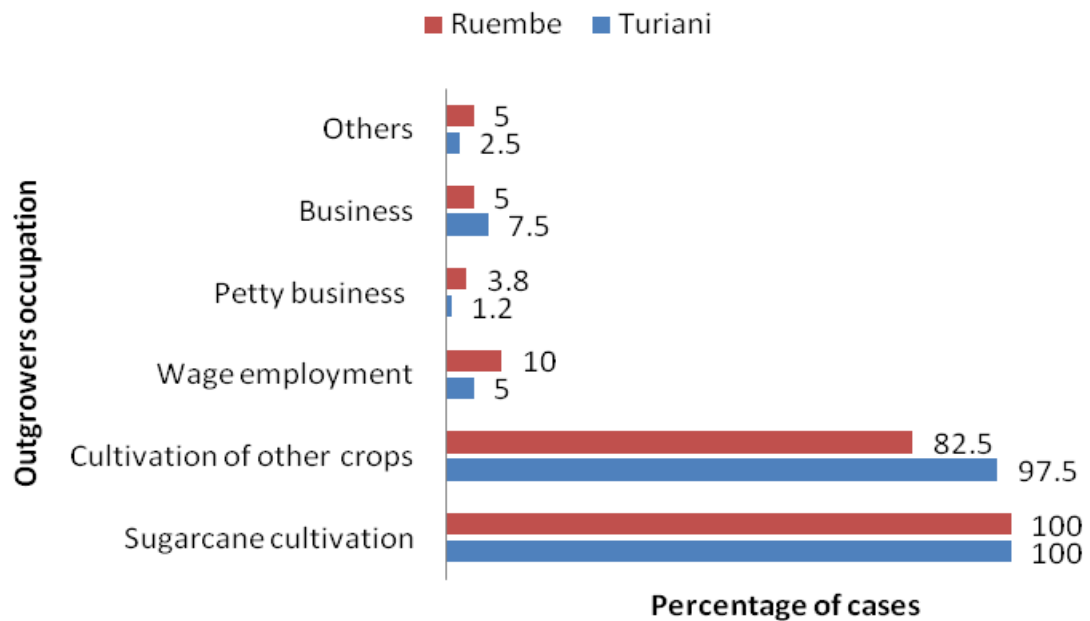
Figure 3: Outgrowers occupation

4.2.8 Outgrowers wealth status

The sampled outgrowers were asked to estimate the value of functioning household assets, buildings and livestock they own. The result in Table 2 shows that sampled outgrowers in Ruembe sugarcane basin are better off than their counterparts in Turiani division. The mean worth in Turiani was 4 546 554 Tshs while that of Ruembe was 6 173 244 Tshs. The difference between wealth statuses was found not to be statistical significance between two study areas.

4.2.9 Percentage of time devoted in sugarcane production

The results show that there was a significant difference in time devoted in sugarcane production between Turiani and Ruembe sugarcane basins as observed at T-value

(-12.826) statistically significant difference at p<0.001 (Fig. 3). In Turiani division, majority of respondents 62.5% devote 26 up to 50% of their time in sugarcane cane production. This is followed by 31.2% who devote 1 up to 25% of their time and lastly 6.2% who devote 51 up to 75% of their time in sugarcane production. None of respondent is devoting more that 76% of his/her time in sugarcane production Turiani division. In Ruembe sugarcane basin, majority of the respondents 50% devote 76% and above of their time in sugarcane production. This is followed by 25%, 17.5% and 7.5% who devote 51-75, 26-50, and 1-25% of their time in sugarcane production respectively. It can therefore be concluded that more time is devoted in sugarcane production in Ruembe while less time is devoted in production of the same in Turiani division.
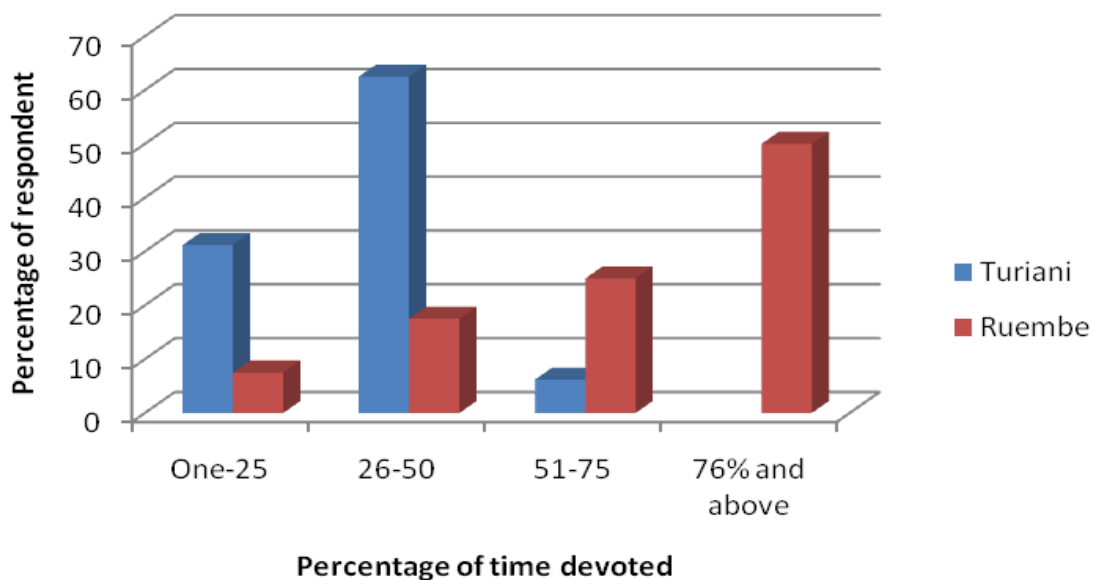
Figure 4: Percentage of time devoted in sugarcane production

In case of percentage of time devoted in other crops, the opposite of section 4.2.9 is true. More time is devoted in production of other crops in Turiani while less time is devoted in production of the same in Ruembe division (Fig. 4). This is also statistically significant different at p<0.001.
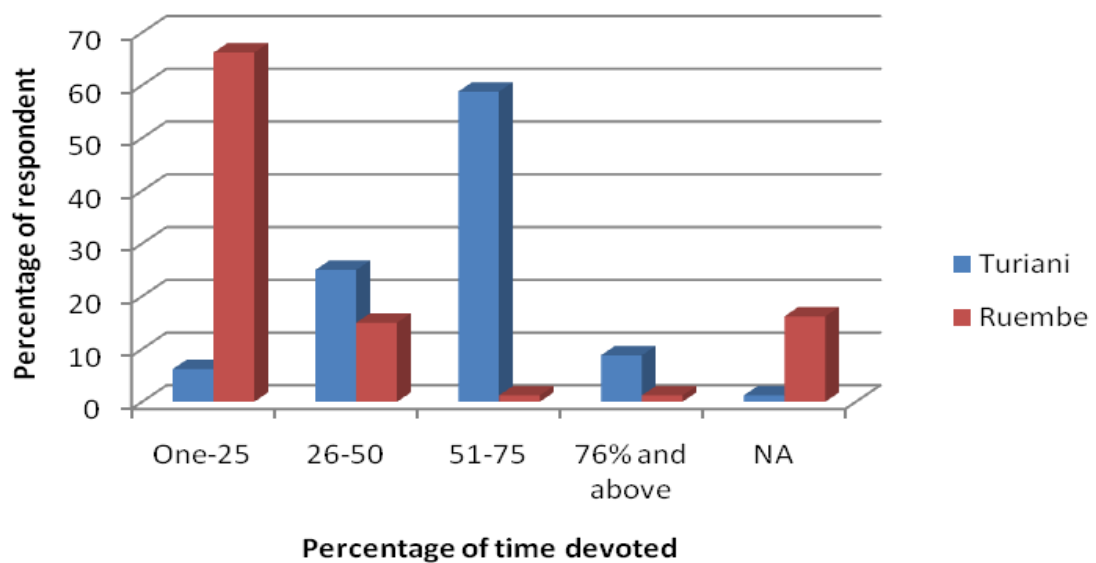
Figure 5: Percentage of time devoted in other crops

4.5 Input Variables

4.5.1 Land availability

4.5.1.1 Area under sugarcane cultivation

Table results show that the difference in area under sugarcane cultivation is not statistically significant at p<0.05 level. Area under sugarcane cultivation by outgrowers ranged from 0.40 hectare to 22.80 hectare (Table 3). The minimum cultivated area in both areas was 0.40 Hectare. The mean and maximum cultivated area in Turiani was 2.23 and 18 hectare respectively, while the same was 3.5 and 22.80 hectares in Ruembe. The difference in area under cultivation is not significant

at p<0.05. It indicates that sugarcane outgrowers in the study area are predominantly smallholders with about 80% cultivating less than 3 hectares. Farm size is not a major impediment to adoption of new biological technologies such as use of fertilizer. However, larger farms do tend to be among the first adopters on many new technologies, probably because it pays large farms more to invest in obtaining information about the technologies. Owner of large farms may have more formal education that helps them process the information, and a greater ability to absorb risk. Large farms often have better access to credit needed to purchase modern

Table 3: Descriptive statistics of land under sugarcane

	Turiani	Ruembe	t-test
Average area under sugarcane cultivation			
Mean	2.23	3.50	
Standard deviation	2.39	3.55	
Minimum	0.40	0.40	
Maximum	18	22.80	-1.781
Land rent per season			
Mean	119 583.3	199 583.3	
Standard deviation	24 227.02	64 764.99	
Minimum	50 000	75 000	
maximum	165 000	300 000	-6.077
Value of owned land			
Mean	514 772.7	2 332 192	
Standard deviation	298 459.1	471 505.4	
Minimum	250 000	1 250 000	
Maximum	1 500 000	3 750 000	-28,360

About 76% of Turiani respondents cultivate between 0.01 and 2 hectare while 15.5% and 6.2% had cultivated 2.01-5 hectare and 5.01 hectare and above respectively (Table 4). In Ruembe, 67.5% of outgrowers cultivated between 0.01-2 hectare while 25% and 7.5% cultivated 2.01-5 hectares and 5.05 hectares and above respectively. This indicates that sugarcane outgrowers in the study area are predominantly smallholders with about 80% cultivating less than 3 hectares. Farm size is not a major impediment to adoption of new biological technologies such as use of fertilizer. However, larger farms do tend to be among the first adopters on many new technologies, probably because it pays more for large farms to invest in obtaining information about the technologies. Owner of large farms may have more formal education that helps them process the information, and a greater ability to absorb risk. Large farms often have better access to credit needed to purchase modern inputs. With large scale farm it is easier to reduce transaction cost through improved information flows.

Table 4: Land under sugarcane variables for sampled outgrowers

Estimated variable	Turiani		Ruembe	
	Number of OG	Percent	Number of OG	Percent
Farm size categories (Ha)	N=80		N=80	
0.01-2	61	76.2	54	67.5
2.01-5	14	17.5	20	25.0
5.01 Ha and above	5	6.2	6	7.5
Possession of title deeds	N=80		N=80	
Yes	7	8.8	NA	NA
No	73	91.2	80	100
Reasons for not possessing title deeds	N=80		N=80	
Bureaucracy	NA	NA	6	7.5
Expensive process	16	20.0	4	5.0
Has started the process	5	6.2	5	6.2
Hired land	NA	NA	5	6.2
Little awareness	NA	NA	7	8.8
No follow up	24	30.0	36	45.0
Not aware	26	32.5	17	21.2
Small scattered plot	1	1.2	NA	NA
NA	7	8.8	NA	NA
Problems in acquiring land	N= 80		N= 80	
No problem	12	15.0	9	11.2
Bureaucracy	4	5.0	8	10.0
High cost	63	78.8	59	73.8
Others	1	1.2	4	5.0
Payment of land tax	N=80		N= 80	
No	**80**	**100**	**80**	**100**

4.5.1.2 Value of land per hectare

Table 3 shows that the value of land in Ruembe sugarcane basin is higher than that of Turiani division. The difference was found to be statistically significant at p<0.001. The land rent per hectare per season in Turiani range from 50 000 up to 165 000 Tshs with the mean of 119 583.3 Tshs while that of Ruembe range from 75 000 up to 30000 with mean of 199 583.3 Tshs. The mean value of owned land is 541 7722.7 and 2 332 192 Tshs in Turiani and Ruembe respectively, while the minimum and maximum value of owned land are 250 000 and 1 500 000 Tshs in Turiani and 1 250 000 and 3 750 000 Tshs in Ruembe respectively. Land shortage is main reason leading to high value of land in Ruembe as a nearby suitable land for sugar cultivation is occupied by Mikumi National Park (Table 4).

4.5.1.4 Possession of title deeds

As per Table 4 below, 8.8% of the respondents have land title deeds in Turiani division while 91.2% do not possesses the title deeds. All sugarcane outgrowers in Ruembe pointed out that they don't possess title deeds for their land.

The reasons for not possessing the land title deeds applicable in Ruembe only include bureaucracy (7.5%), hired land (five percent) and little awareness (8.8%), while reason applicable in Turiani only is small scattered plot (1.2%). Other reasons include expensive process; 20% in Turiani and five percent in Ruembe, have started the process; 6.2% in Turiani and Ruembe, no follow up; 30% in Turiani and 45% in Ruembe and lastly not aware; 32.5% in Turiani and 21.2 in Ruembe Table 4). As most of the land does not possess the title deeds, it becomes unattractive for financial

institutions to be used as collateral for the loans necessary for small-scale growers to finance capital investment and provide operating capital. This is so because land used by the outgrowers has normally been allocated through customary law. Many would prefer to obtain a title dees under statutory law because these can be used as collateral when applying for credit from a commercial bank.

4.5.1.5 Problem in acquiring land

With regards to the problem in acquiring land, 78.8% of respondent in Turiani and 73.8% in Ruembe they said high cost is a major problem (Table 4). Fifteen percent in Turiani and 11.2% percent in Ruembe said they have no problem in acquiring land while bureaucracy was mention by five percent in Turiani and ten percent in Ruembe. Others reason mentioned by Turiani respondents included not started looking for the new farm, therefore not aware of the problem (one percent), while in Ruembe the other reason was land shortage (five percent).

4.5.1.6 Payment of land tax

All respondent in study areas pointed out that they don't pay land tax for the land the use in sugarcane production (Table 4)

4.5.2 Labour availability

Labour markets in developing countries often contain imperfections due to power imbalances, imperfect information, and transactions costs. Power imbalances emerge when a single or small number of employee exist in an area. Is such cases, the employers may exercise monopsony power over their employees and use fewer

workers at the lower wages than would exist in a competitive labor market. Imperfect information and transactions costs also constitute major sources of labor market imperfections. Labor must be hired, with corresponding cost of search and contracting, and supervised. Supervision involves costs of monitoring and enforcement. Such costs may distort incentives for hiring and use of different type of labor. Given information imperfections, employers may b unaware of the reliability of workers, some of whom shirk their duties. As a result, costly supervision or other contractual mechanisms must be undertaken to ensure the worker performs his or her duties as expected (Norton *et al.*, 2006).

4.5.2.1 Problems in acquiring labour

Table 5 shows that 6.2 respondents in Turiani did not respond to the question as their sugarcane had never been harvested for several seasons. High cost of labour was mentioned by 70% in Turiani and 37.5% in Ruembe. Bureaucracy was mentioned by 1.2 percent in both study areas, while lack of trust and underperformance was mentioned by 12.5 in Turiani and 2.5% in Ruembe. Others 10% in Turiani and 58.8% in Ruembe mentioned that there are no problems in acquiring labour. The majority of outgrowers stated that labour is high cost to acquire due to presence of competition among cane growers and the factory estates in both study areas. As outgrowers are close to the sugarcane estate, the price of labour is set by a comparison of the wage offered by the sugar estate, and quite often higher that the outgrowers can afford.

**Table 5: Problems in acquiring labour, tractor ownership, means of contacting
tractor owner and contract signing**

Outgrowers response	Turiani		Ruembe	
Problem in acquiring land				
	Number of OG	Percent	Number of OG	Percent
N/A	5	6.2	NA	NA
No problem	8	10.0	47	58.8
Bureaucracy	1	1.2	1	1.2
High cost	56	70.0	30	37.5
Lack of trust and underperformance	10	12.5	2	2.5
Total	80	100.0	80	100.0
Tractor ownership				
Yes	1	1.2	NA	NA
No	79	98.8	80	100.0
Total	80	100.0	80	100.0
Means of contacting tractor owner				
N/A	1	1.2	NA	NA
Physical contact	78	97.5	76	95
Via cell-phone	1	1.2	4	5
Total	80	100.0	80	100.0
Signing contract between outgrowers and tractor owner				
No	80	100	80	100
Tractor delay from agreed date				
Yes	72	90.0	51	63.8
No	8	10.0	29	36.2
Total	80	100.0	80	100.0

4.5.2.2 Tractor ownership and contracting

Table 5 shows that none of the sugarcane outgrowers own a tractor in Ruembe where only 1.2% of outgrowers own of the tractor in Turiani. This reveals that most outgrowers in Turiani and Ruembe depend on hired tractors for cultivating their land. Majority of the sugarcane outgrowers (97.5%% in Turiani and 95% in Ruembe) contact the tractor owner physically by visiting his office/residence (Table 5). Use of cell phone were mentioned by only 1.2% and five percent in Turiani and Ruembe respectively.

Table 5 shows that none of the outgrowers in both study areas sign a contract. That means an agreement between sugarcane outgrowers and tractor owners is informal. Lack of contract enforcement is likely to lead into irregularity of conduct including unnecessary delay for land cultivation and ultimately delay in field establishment.

As it was expected, 90% and 63.8% of outgrowers in Turiani and Ruembe respectively said that there is a delay between agreed dates to actual date of cultivation (Table 5). Only 10% in Turiani and 36.2% in Ruembe said there is no delay between agreed dates to actual date of cultivation.

The average delay from agreed date to actual date of cultivation is 5.2 days in Turiani and 7.7 days in Ruembe Table 6). The minimum and maximum delay is one days and 10 days in Turiani and two days and 25 days in Ruembe respectively. Increasing number of delay in Ruembe is due to increasing number of new entrants in sugarcane cultivation.

Table 6: Descriptive variable for tractor search

	Turiani	Ruembe	t
Number of days for tractor delay			
Mean	5.21	7.71	
Minimum	1	2	
Maximum	10	25	-1.781
Transaction cost for tractor search			
Mean	7245.46	5293.48	
Minimum	1000	1000	
Maximum	42000	32500	1.456
Idle days for tractor search			
Mean	4.02	3.84	
Minimum	1	1	
Maximum	8	10	0.533

4.5.2.3 Transaction costs for tractor search

Table 6 shows that the mean transaction costs incurred in searching for tractor is

7245.45 Tshs and 5293.49 Tshs in Turiani and Ruembe respectively. The minimum

transaction costs in both areas is 1000 Tshs while the maximum is 42 000 Tshs in

Turiani and 32 500 Tshs in Ruembe. The transaction costs incurred include transport

cost from the village to the tractor owners and communication costs. It also include

opportunity cost of time spent (idle days) on searching for tractors. The results show

that the mean day spent for search for tractor is 4 days in Turiani and 3.8 days in

Ruembe. Higher mean transaction costs in Turiani is due to high dispersion of

outgrowers from the major tractors owner at Madzini as compared to Ruembe where

majority of outgrowers are close to major tractor owners at Ruaha hence less cost of

transport. However, the difference between these variables are not significant at $P \leq 0.05$ level of significance.

4.5.3 Fertilizer usage

It was revealed that majority of the outgrowers in Turiani (90%) do not use fertilizer in sugarcane production. Only 10% of respondents in Turiani apply inorganic fertilizer. The situation was different in Ruembe where 85% of respondents apply inorganic fertilizer and 15% do not apply (Table 7). The difference in the uses of fertilizer between the two areas is statistically significant at $P \leq 0.001$.

In both study areas outgrowers were asked to give reasons or factors hindering fertilizer application in sugarcane production. Table 7 summarizes the reasons given in both locations. High price of fertilizer was the major constraints which slow down the adoption of inorganic fertilizer application technology. However some outgrowers in Turiani thought that application of fertilizer will be uneconomical because their fields are still fertile while other were worried of early drying-up of their cane as harvesting is not guaranteed.

Table 7 shows that the only means of payment for fertilizers in Turiani is cash (11.2%), this is applicable to only 43.8% of outgrowers in Ruembe. The other means of payment in Ruembe include loans which accounted for 30% of the outgrowers. Provision of loan to outgrowers is likely to be motivation for fertilizer usage in Ruembe as compared to Turiani. Currently existing source of fertilizer in Turiani is from input suppliers where this accounted 47.5% in Ruembe. Other sources of fertilizer in Ruembe include factory/Miller and association 18.8% each (Table 7).

Table 7: Fertilizer usage

Outgrowers response	Turiani		Ruembe		t
	Number of OG	Percent	Number of OG	Percent	
Use of fertilizer	N=80		N= 80		
Yes	8	10.0	68	85.0	
No	72	90.0	12	15.0	
Total	80	100.0	80	100.0	-20.011
Reason for not using fertilizer	N=80		N=80		
NA	8	10.0	68	85.0	
Expensive	55	68.8	12	15.0	
The land is still fertile	9	11.2	NA	NA	
To avoid early blossoming as harvesting is not guaranteed	8	10.0	NA	NA	
Means of payment	N=80		N=80		
NA	71	88.8	21	26.2	
Cash	9	11.2	35	43.8	
Loan	NA	NA	24	30.0	
Means of payment	N=80		N=80		
NA	71	88.8	12	15.0	
Input suppliers	9	11.2	38	47.5	
Factory/Miller	NA	NA	15	18.8	
Association	NA	NA	15	18.8	

4.5.4 Herbicide usage

The result in Table 8 shows that, majority of outgrowers in Turiani (93.8%) do not use herbicide in their sugarcane farms. Only 6.2% of the outgrowers use herbicides. The situation was different in Ruembe were 76.2% of the respondents use herbicides and 23.8% do not use (Table 8). The difference in use of herbicides is significantly different at $P<0.001$. Outgrowers were asked to give reasons for not using herbicides in their fields, the only reasons mentioned in the two study areas was high cost of herbicides (Table 8).

Table 8: Use of herbicides

Outgrowers response	Turiani		Ruembe		t
	Number of outgrowers	Percent	Number of outgrowers	Percent	
Use of herbicides	N=80		N=80		
Yes	5	6.2	61	76.2	
No	75	93.8	19	23.8	-21.332
Reasons for not using herbicides	N=80		N=80		
NA	5	6.2	62	77.5	
Expensive	75	93.8	18	22.5	
Means of payment	N=80		N=80		
N/A	75	93.8	19	23.8	
Cash	5	6.2	36	45.0	
Loan	NA	NA	25	31.2	
Sources of herbicides	N=80		N=80		
NA	75	93.8	23.8	23.8	
Input suppliers	5	6.2	43.8	43.8	
Factory/Miller	NA	NA	16.2	16.2	
Association	NA	NA	16.2	16.2	

The only means of payment in Turiani was cash while cash and loan applied in Ruembe area (Table 8). The source of herbicides in Turiani was input suppliers only while in Ruembe both stockiest and factory/miller were the sources. Outgrowers were asked to mention major problem in accessing of inputs in sugarcane production. The major problem mentioned was high cost of inputs both in Turiani and Ruembe (Table 9). Other problems mentioned in Ruembe only include getting inputs late (12.1%), no nearby stockiest (25.8%) and other inputs being fake particularly herbicides (8%)

Table 9: Major Problems in accessing of inputs in sugarcane production

Outgrowers response	Turiani		Ruembe	
	Number of outgrowers	Percent	Number of outgrowers	Percent
NA	9	11.2	NA	NA
Inputs are expensive	71	88.8	74	59.7
We get them late	NA	NA	15	12.1
Not always available at input supplier	NA	NA	2	1.6
No nearby input supplier	NA	NA	32	25.8
Other are fake particularly herbicides	NA	NA	1	.8
Total	80	100.0	124	100.0

4.5.5 Source of seedcane

Planting materials for sugarcane are known as seedcanes. It was reported by farmers that about four tons of seedcane are enough to plant one acre. Majority of the outgrowers 87.5% in Turiani and 93.8% in Ruembe purchase seedcane from their

fellow farmers. Another source mentioned was from own seedcane plots which counted 10% in Turiani and 6.2% in Ruembe. Seedcane from estate nursery was accessed by only two percent in Turiani and none of the outgrowers in Ruembe accessed seedcane from the nursery estate (Table 10).

Table 10: Sugarcane outgrowers' source of seedcane

Outgrowers responses	Turiani		Ruembe	
	Number of outgrowers	Percent	Number of outgrowers	Percent
Source of seedcane	N=80		N=80	
Estate nursery	2	2.5	NA	NA
Fellow farmers	70	87.5	75	93.8
Own seedcane plot	8	10	5	6.2
Reason for not using clean seedcane	N=80		N=80	
N/A	2	2.5	NA	NA
Not readily available to outgrowers	37	46.2	12	15
Not aware	9	11.2	25	31.2
They are expensive	32	40	19	23.8
Not readily available and expensive	NA	NA	24	30
Means of payment	N=80		N=80	
On spot cash basis	78	97.5	78	97.5
Loan	2	2.5	2	2.5

Outgrowers were asked to give reasons for not accessing clean seed cane (Hot water treated) from estate nursery. Potential number of respondent 46.2% in Turiani and 25% in Ruembe said clean seed cane are not readily available to outgrowers, while

other said that clean seed cane are expensive (40%) in Turiani and 23.8% in Ruembe. Twenty four percent of the outgrowers from Ruembe indicated that clean seedcane are not readily available and expensive. Surprisingly nine percent and 31.2% from Turiani and Ruembe respectively said that they are not aware of the clean seedcane from estate nursery (Table 10). The large number of outgrowers are not aware of the clean seedcane in Ruembe this could be due to increased large number of new entrants' outgrowers as it was indicated in section 4.2.1. The results differ from the study done by SRI (1999) which indicated that the estate nursery was the main of seed cane in Mtibwa (62%) and Kilombero (85.4%).

The major means of seedcane payment was through cash as indicated in Table 10.

4.5.6 Extension services

Extension services are important common services. Extension services are vital for adoption of production technologies by outgrowers. In short, extension services ensure that outgrowers grow recommended cane varieties using proper husbandry techniques which lead to adequate supply of cane to the millers. It should therefore be in the interest of all stakeholders to have efficient extension service delivery system. Extension is complementary to other sources of information because it speeds up the transfer of knowledge about new agricultural technologies and other research results. Traditionally, extension services are provided by the government. In the study areas, the government has deployed a number of extension staff to work in the sugar cane fields through Districts Councils. There are also other institutions involved in delivering extension services as discussed below.

Table shows that 86.2% and 70% of the respondents in Turiani and Ruembe respectively received extension service for the past 24 month. On other hand 13.8% and 30% did not receive extension services for the past 24 month in the same areas respectively in the same area respectively. (Table 11)

Table 11: Extension services for the past 24 months

Outgrowers responses	Turiani		Ruembe	
	Number of outgrowers	Percent	Number of outgrowers	Percent
Receiving extension services	N=80		N=80	
Yes	69	86.2	56	70.0
No	11	13.8	24	30.0
Whether satisfied with services	N=80		N=80	
N/A	4	5.0	10	12.5
Yes	51	63.8	45	56.2
No	25	31.2	25	31.2
Payment for extension service	N=80		N=80	
No	80	100	80	100

Potential institutions involved in delivering extension services included government extension officers, factories, NGO's, Farmers association and Sugarcane Research Institute (SRI) as indicated in Fig. 6.
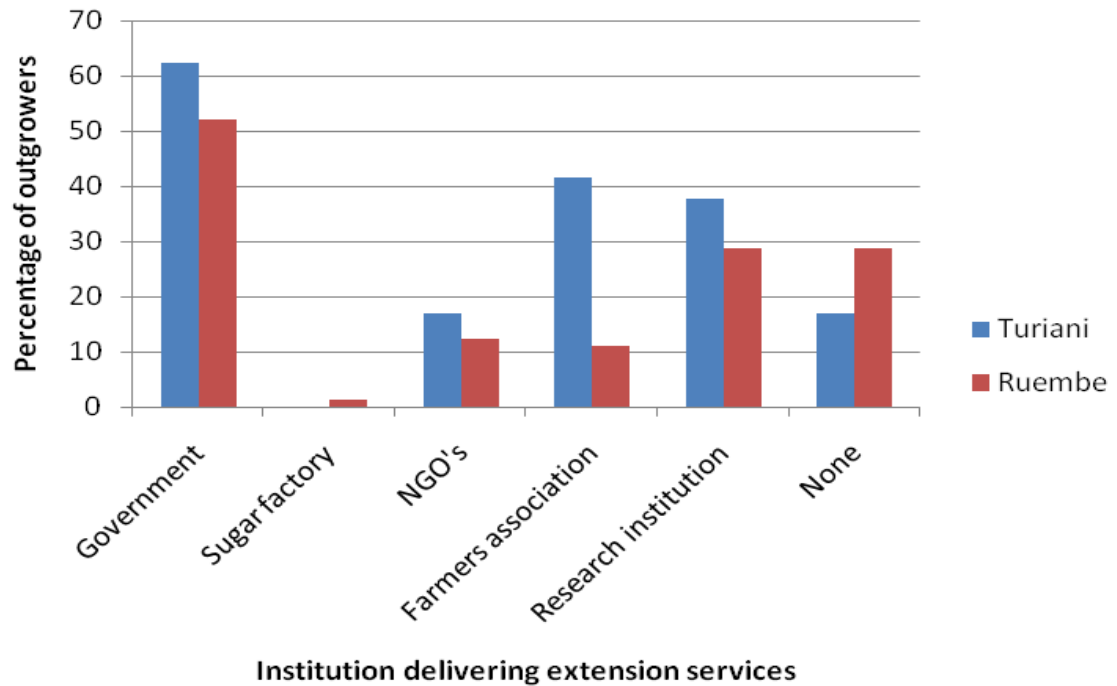
Figure 6: Institutions delivering extension services

Majority of outgrowers were satisfied with the quality of extension officer (Table 11). In the study areas extension service is provided free of charge, that is, no transaction costs is incurred for accessing extension services.

4.6 Sugarcane Marketing and Contractual Arrangement

Market arrangement between producers and buyers has impact on transaction costs. Well enforced contract will reduce uncertainty and therefore lower transaction cost. As discussed under institutional arrangement, business relationship between millers and outgrowers is formalized through cane supply agreements which in that case be treated as contract between millers and sugarcane outgrowers.

4.6.1 Understanding of outgrowers on issues of contract

In this study, understanding of the outgrowers about contractual arrangement was captured by asking if there was any contract between factories and outgrowers. Table 12 shows that 66.2 % of the respondents in Turiani and 73.8% in Ruembe said that there is a contract between outgrowers and the factories, while 33.8% and 26.2 in Turiani and Ruembe respectively said there is no contract between outgrowers and the factories.

Table 12: Sugarcane marketing and Contract arrangement

Outgrowers responses	Turiani		Ruembe	
	Number of outgrowers	Percent	Number of outgrowers	Percent
Is there any contract?	N=80		N=80	
Yes	53	66.2	59	73.8
No	27	33.8	21	26.2
Ever seen a contract	N=80		N=80	
Yes	NA	NA	5	6.2
No	80	100.0	75	93.8
Participation in price setting	N=80		N=80	
Yes	NA	NA	2	2.5
No	80	100.0	78	97.5
Who set price?	N=80		N=80	
Our Association	53	66.2	53	66.2
Sugar Board	NA	NA	2	2.5
The Miller	27	33.8	25	31.2
Satisfied with current price?	N=80		N=80	
Yes	2	2.5	19	23.8
No	78	97.5	61	76.2

Sampled outgrowers were asked if they had ever seen a contract/cane supply agreements. Only 6.2% of the respondents in Ruembe have seen the contract. The rest had never seen the contract and they are not aware of its contents. Generally, majority of the outgrowers have low understanding on how the contract is effected.

Outgrowers were asked if they participate personally in price settings. The results in table 12 show that 2.5% in Ruembe said that they do participate in price setting as they are leaders in their associations. The rest of the outgrowers in both areas do not participate in price setting. Outgrowers have a different understanding on who set price for sugarcane in both study areas (Table 12). In both study areas, 66.2% of the respondents said that the price is set by their association, while 33.8% in Turiani and 31.2 in Ruembe said that the miller set the price. In Ruembe, 2.5% think that the SBT is responsible for price setting.

4.6.2 Current price of sugarcane

Price paid to cane growers per ton of cane differs significantly between Turiani and Ruembe, and the difference has remained so over the years. The results in Table 17 show that a mean price of one tone stand for 36 984.3 Tshs in Turiani division while it is 63 089.57 Tshs in Ruembe. The minimum and maximum price in Turiani are 25 500 Tshs and 46 750 Tshs respectively, while the minimum and maximum price in Ruembe are 50 775.9 Tshs and 66810.4 Tshs respectively. The difference in sugarcane price per ton between two study areas is statistically significant at $p<0.001$. Majority of the respondent in both study areas are not satisfied with the current price.

Farmers were asked to suggest action to be taken to correct the current price of sugarcane. The responses applicable to all areas with their corresponding percentage as per Annex 11 include: association should negotiate with the miller; negotiation is ongoing between miller and association; nothing needs to be done. The responses applicable to Turiani only included do not know; no alternative as we have a single buyer; reduction of area under sugarcane to paddy production and uprooting sugarcane farm. Suggestion applicable to Ruembe only included government should intervene; SBT and the miller should negotiate with the miller and association solidarity to pressurize the miller to increase the price.

4.6.3 Sugarcane transportation to the factory

Regarding transportation of sugarcane to the factory, only one respondent (1.2%) in Turiani was found to organize individual means of transport (truck owner), while majority of the respondents 98.8 in Turiani and all respondents in Ruembe transport their sugarcane to the factory through their respective associations and they use association contracted trucks (Table 13). Payment of transportation is deducted from the sales proceeds by the millers from all respondents in the two study areas.

Table 13: Transportation of sugarcane to the factory

Outgrowers responses	Turiani		Ruembe	
	Number of outgrowers	Percent	Number of outgrowers	Percent
Organizing transportation of cane to factory	N=80		N=80	
Managed by the association	79	98.8	80	100.0
Individual farmer's arrangement	1	1.2	NA	NA
Is transportation of cane to the factory a problem?	N=80		N=80	
Yes	33	41.2	20	25.0
No	47	58.8	60	75.0
Categories of transportation problem	N=80		N=80	
Minor problem	5	6.2	9	11.2
Serious problem	22	27.5	8	10.0
Major problem	6	7.5	3	3.8
Loss of sugarcane (spillage)	N=80		N=80	
Yes	67	83.8	40	50
No	13	16.2	40	50
Categories of spillage	N=80		N=80	
NA	14	17.5	41	51.2
Minor problem	5	6.2	18	22.5
Serious problem	38	47.5	11	13.8
Major problem	23	28.8	10	12.5

Transportation of sugarcane to the factories was not considered as a major problem

to majority of the outgrowers. As shown in the table 13 below, 47% of respondents

in Turiani and 75% in Ruembe said transportation of sugarcane to the factory is not a

problem. Those who considered it as a problem, some said it is a minor problem (6.2% in Turiani and 11.2% in Ruembe), other said it is a serious problem (27.5% in Turiani and 10% in Ruembe) and the remaining said it is the major problem 7.5% in Turiani and 3.8% in Ruembe) (Table 13).

The costs for haulage are borne completely by the outgrowers and are deducted from their payments. Also the outgrowers bear the entire extra costs involved for inefficient cane haulage. Depending on the distance of the farm from the factory different rates are charged for transportation. Transportation rates vary across different associations within both study areas; this also applies to other charges including cutting, haulage, and various fees.

4.6.4 Loss of sugarcane during transporting sugarcane to the factory

Outgrowers were asked if there are sugarcane losses due to spillage during transporting sugar to the factories. About 84% in Turiani and 50% in Ruembe reported losses due to spillage. The main reason for the spillage was due to overfilling of contracted trucks and bad roads (Table 13). Categorically 6.2% of respondent in Turiani and 22.5% in Ruembe said the loss is just a minor problem, 47.5% in Turiani and 13.8% Ruembe said the sugarcane loss is serious problem while others said the loss is a major problem (28.8% in Turiani and 12.5 in Ruembe) (Table 13). Estimated mean sugarcane loss due to spillage is 1.5 tonne in Turiani, while it is 1.2 tonne in Ruembe. Minimum loss is estimated to 0.1 tonne on each study area while maximum is estimated to be 6 tonne and 5 tonne in Turiani and Ruembe respectively (Table 17).

4.6.5 Sugarcane weighing

When sugarcane is transported to the weighbridge of the factory, outgrowers do not accompany the trucks carrying their cane but remain in the farm guarding the cane not yet transported so that it is not stolen by neighbours. In this way, outgrowers deter theft of cane on the farm but risk failing to know the tonnage of cane that has been taken to the factory and do not know how the sucrose content in their sugarcane has been measured. To test the understanding of the outgrowers, they were asked to tell who supervise the weighing exercise at the weighbridge. Majority said the miller supervise (97.5% in Ruembe and 63% in Turiani). Few outgrowers in Turiani think that association representative do the job of supervising while others said no one supervises (Table 14)

Table 14: Sugarcane weighing

Outgrowers responses	Turiani		Ruembe	
	Number of outgrowers	Percent	Number of outgrowers	Percent
Who supervise weighing?	N=80		N=80	
Association representative	4	5.0	NA	NA
None	13	16.2	NA	NA
The miller	63	78.8	78	97.5
NA	NA	NA	2	2.5
Satisfaction with current weighing system	N=80		N=80	
Yes	5	6.2	29	36.2
No	75	93.8	51	63.8

Many of the respondents reported that during transportation, they simply write down the number on the number plate of the truck and the name of the driver then later they get the papers from a third person quoting the tonnage delivered by the respective truck driven by the named driver . So no outgrower witnesses the weighing stage and therefore, they are not sure if the quoted tonnage is right or wrong. As evidenced by the result in Table 14, majority of the outgrowers (93.8% in Turiani and 63.8% in Ruembe) are not satisfied with the way sugarcane is weighed at the factory weighbridge. The reason given for not being satisfied was a lack of outgrowers' representation during weighing and rendement determination.

4.6.6 Distance from field to factories

Estimated distance from outgrowers farm to factory is within 3 km to 35 km and the mean of 17.75 km in Turiani, while it is within 10 km to 37 km with mean of 16.7 km in Ruembe (Table 17). Depending on the distance of the farm from the factory, different rates are charged for transportation and this differs from one association to anothers. Transportation cost is the major contributing of transaction costs in the sugarcane production and marketing. Net revenue of the cane decrease sharply with increasing transport costs. It also important to note that, the decrease in revenue per distance is the same percentage for large quantities as for small; thus it is clear that no economies of scale exist. This is caused by the fact that all deductions are calculated per tonne, and do not give advantage to large suppliers. Therefore the current system does not include any incentives on block farming or synchronized farming from nearby plots. Furthermore, it does not encourage the farmer to intensify production on one plot. On the contrary, the risk averse outgrower may prefer to

produce his cane on two plots at similar distance from the factory, in order to increase his chances of the crop being harvested at the right time.

4.6.7 Possibility of expanding area under sugarcane

With respect to possibility of expanding area under sugarcane, 18.8% of outgrowers in Turiani and 63.8% in Ruembe said they are likely to expand, but majority of outgrowers in Turiani (81.2%) and other in Ruembe (36.2%) said they are not likely to expand area under sugarcane (Table 15).

Table 15: Expanding area under sugarcane

Outgrowers responses	Turiani		Ruembe	
	Number of outgrowers	Percent	Number of outgrowers	Percent
Possibility of expanding area under sugarcane				
Yes	15	18.8	51	63.8
No	65	81.2	29	36.2
Total	80	100.0	80	100.0
Reasons for not expanding				
Inadequate capital	3	4.9	7	25.9
Canes are not harvested	24	39.3	NA	NA
Low sugarcane price	30	49.2	NA	NA
High service charge	25	41.0	NA	NA
Land shortage	8	13.1	23	85.2
Low weight and rendement determination	2	3.3	NA	NA
Intensification of current area	NA	NA	2	7.4
High production costs	NA	NA	1	3.7

Those unwilling to expand area under sugarcane were asked to give reasons for their decision. Reasons from the two study areas (Table 15) included inadequate capital (4.9% in Turiani and 25.9 in Ruembe), land shortage (13.1% in Turiani and 85.2% in Ruembe). Other reasons from Turiani (but not applicable to Ruembe) included cane are not harvested (39.3%), low sugarcane price (49.2%), high service charge (41%) and low weight and rendement determination (3.3%). Other reason from Ruembe (but not applicable to Turiani) included intensification of current area under sugarcane (7.4%) and high production costs (3.7%).

4.6.8 Sugarcane harvesting for the season 2011/12

Farmers were asked if they managed to harvest their cane during the previous season. The results in Table 16 show that 53.8% in Turiani and 81.2% in Ruembe were able to harvest their sugarcane. Those who did not harvest are 46.2% of the respondents in Turiani and 18.8% in Ruembe. The differences in outgrowers who harvested their cane in the two study areas was statistically significant at p<0.001.

Table 16: Sugarcane harvesting for the year 201/12

Did you harvest sugarcane?	Turiani		Ruembe		t-value
	Number of outgrowers	Percent	Number of outgrowers	Percent	
Yes	43	53.8	65	81.2	
No	37	46.2	15	18.8	
Total	80	100.0	80	100.0	3.860

Reasons for not harvesting included accidental fire which accounted for 8.8% in Turiani and 2.5% in Ruembe and deffered cane (37.55 in Turiani and 8.7% in Ruembe). Reasons applicable in Ruembe only include field uprooted and replanted (1.2%) and 1.2% said they harvested but their cane were not transported to the factory (Fig. 7).

Cane not harvested during the harvesting season is referred to as deferred cane. As usual, an over-aged cane has more reducing sugars, which cannot be crystallized (non-sugar) than mature cane. Consequently, when deferred cane is harvested in the succeeding harvesting season much of the sugar will have been converted into dextrans (non reducing sugar) hence lower revenue to the concerned outgrower with an increased transaction cost per unit of sugarcane harvested. This is the major bottleneck of outgrowers in Turiani division

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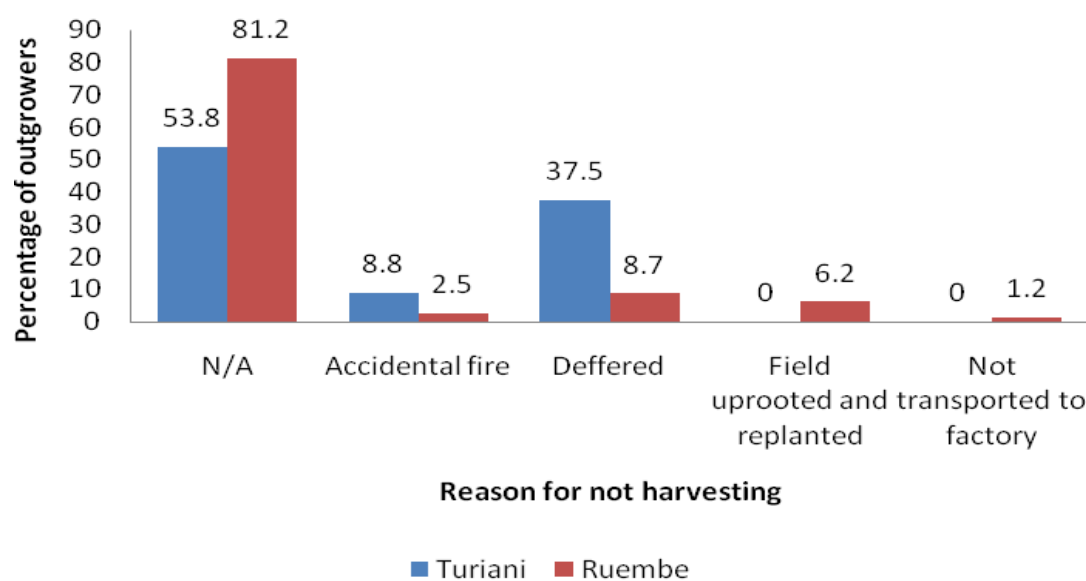
Figure 7: Reason for not harvesting in a year 2010/11

4.6.8 Mean output per hectare

Output per individual outgrowers varies greatly depending on various reasons including area under cultivation, management aspects, ratoon stage etc. Of interest is production per unit area (hectare). Table 17 shows that the mean sugarcane production under outgrowers per hectare in Turiani and Ruembe is 31.27 and 40.48 tons respectively. The minimum production was found to be 6 tonne in Turiani and 10 tonne in Ruembe, while the maximum production per hectare was 75 tons and 100 tons in Turiani and Ruembe respectively. In both study areas, production is below expected potential of 75-100 tons per hectare (SRI, 2010). Mean rendement for Turiani was 8.7 while that of Ruembe was 9.44. The maximum and minimum rendement for Turiani was 6 and 11 respectively, while the same for Ruembe was 7 and 12 respectively. The difference in output per unit area and the mean rendement level in the two study areas are statistically significant at $p < 0.001$.

Table 17: Sugarcane production in a year 2011/12

Variables	Turiani	Ruembe	t
Mean output per hectare (Tons)			
Mean	31.27	40.48	
Minimum	6	10	
Maximum	75	100	
Standard deviation	17.31	21.10	-2.381
Rendement level			
Mean	8.70	9.45	
Minimum	6	7	
Maximum	11	12	
Standard deviation	1.18	0.85	-3.836
Sugarcane price			
Mean	36 984.3	63 089.57	
Minimum	25 500	50 775.9	
Maximum	46 750	66 810.4	
Standard deviation	5017.	3868.68	-30.459
Estimated sugarcane loss (spillage)			
Mean	1.58	1.25	
Minimum	0.10	0.10	
Maximum	6	5	
Standard deviation	1.13	3868.68	1.258
Distance from field to factories			
Mean	17.75	16.70	
Minimum	3	10	
Maximum	35	37	
Standard deviation	9.971	7.97	0.359

4.6.9 Current field ratoon stages

It was observed that most of the outgrowers' fields are at advanced ratoon stages in Turiani as compared to Ruembe. Fig.8 shows that only five percent of the field follow under plant crop to first ratoon categories where this account for 48.8% in Ruembe. Other 15% of respondent said their fields follow under 2nd -3rd ratoon stage in Turiani while this accounts for 35% in Ruembe. The last advanced ratoon categories is where majority of Turiani field follow, 32% of the respondent said their fields follow in 4th-5th ratoon and 6th ratoon and above respectively in Turiani, while this applies for 10% and 6.2%; of the respondents in Ruembe respectively. This concurs with the previous results under section 4.2.1 indicating that sugarcane production is no longer attracting new entrants in Turiani as compared to Ruembe. The difference is statistically significance at $p<0.001$.
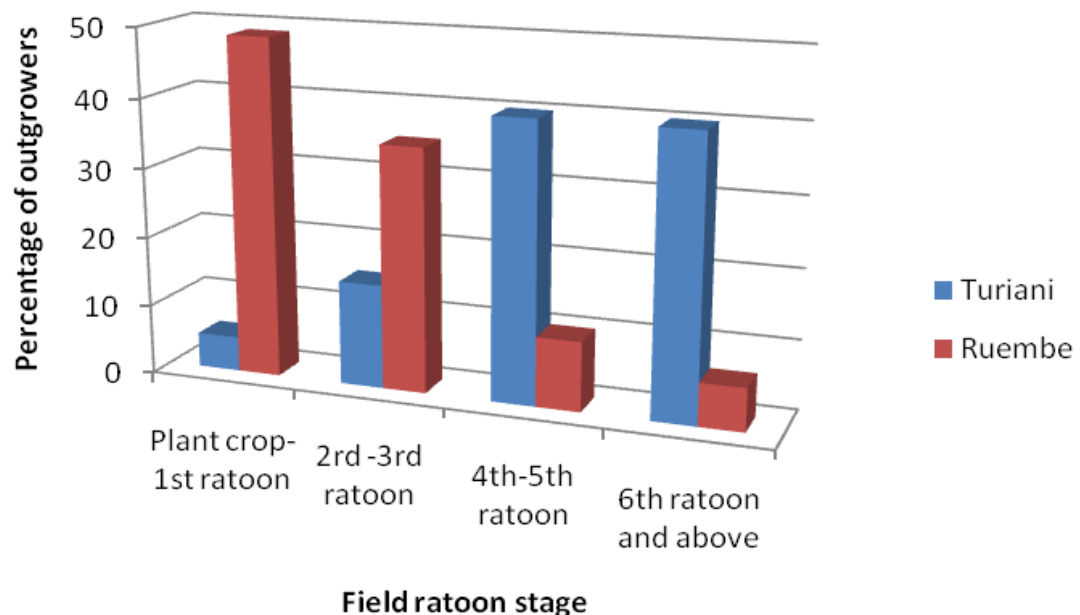
Figure 8: Outgrowers current stage of sugarcane farm

4.6.10 Overhead cost for production and marketing of sugarcane

In this study overhead cost mainly constituted various fees/charges and all deductions subjected to sugarcane outgrowers in the study areas. The major proportional of transaction costs are from overhead costs. The results in Table 18 show that the difference in overhead costs and overhead cost as a percentage of gross revenue between the two study areas are statistically significance at $p<0.001$. The mean overhead cost per tonne in Turiani is 20 682.87 Tshs while in Ruembe is 17 931.07 Tshs. It also shows the mean overhead as percentage of total gross revenue (sales) which is 57.25% in Turiani and 28.56% in Ruembe. Minimum, maximum and standard deviation is also presented in the table below.

Table 18: Overhead cost for production and marketing of sugarcane

Variable	Turiani	Ruembe	t
Overhead per ton			
Mean	20682.87	17931.07	
Minimum	17432.3	15595.3	
Maximum	25145.05	24615	
Standard Deviation	2813.89	2141.27	5.486
Overhead as % of gross revenue			
Mean	57.24	28.56	
Minimum	39.80	23.34	
Maximum	83.39	42.24	
Standard Deviation	12.52	4.02	17.208

4.6.11 Obtaining Outgrowers number

In order to supply sugarcane to the factory Outgrowers number (OGR) has to be obtained from the factory. Outgrowers were asked to tell if obtaining OGR is a problem, the results in Table 19 shows that 7.5% of the respondents in Turiani and 18.8% in Ruembe said that it is a problem, while 92.5% in Turiani and 81.2 in Ruembe said it is not a problem obtaining OGR number. Of those who said it is a problem majority emphasized that it is just a minor problem and there is no cost charge/fees paid for getting OGR number. The situation was different in Ruembe whereby those who said it is a problems emphasized that it was a major problem.

Table 19: Is obtaining OGR number a problems?

Outgrowers responses	Turiani		Ruembe	
	Number of OG	Percent	Number of OG	Percent
Yes	6	7.5	15	18.8
No	74	92.5	65	81.2
Total	80	100.0	80	100.0

The only cost involved is the transport on following-up the OGR number. Table 20 below shows the number of days, number of trips and cost for following up OGR number. In all cases the high figures are from Ruembe as compared to Turiani.

Table 20: Days, trips and cost of obtaining OGR number

Variables	Turiani	Ruembe
Number of days to get OGR number		
Mean	7.6	149.44
Standard deviation	8.61	222.75
Number of trips to get OGR number		
Mean	2.35	2.53
Standard deviation	0.64	1.33
Cost of obtaining OGR number		
Mean	2558	5214.3
Standard deviation	1123.07	4022.6

4.6.12 Delay hours from sugarcane burning to transportation

Outgrowers were asked to indicate if there is any delay from sugarcane burning to transportation of sugarcane to the factories. Majority of the respondents in the two study areas said there is a delay (Table 21).

Table 21: Delay between sugarcane burning, harvesting and transportation

Outgrowers responses	Turiani		Ruembe	
	Number of outgrowers	Percent	Number of outgrowers	Percent
Is there delay?				
NA	NA	NA	9	11.2
Yes	75	93.8	43	53.8
No	5	6.2	28	35.0
Total	80	100.0	80	100.0
Total delay hours				
Mean (hours)	54.04		49.13	
Standard deviation	30.48		34.07	

Canes should be milled as soon as possible after harvesting or within 48 hours after cutting. Any delay would mean a corresponding percentage loss of sugar. Cut canes should be hauled immediately to the factory. Sugar content decreases when milling is delayed from the time of cutting due to sucrose deterioration and evaporation. Canes delivered to the mill 2-5 days after cutting showed a 10% decrease in yields compared with that of the fresh canes milled immediately after harvest (Cover, 2008)). Rosenfield (1989) showed that fresh canes cut and left lying in the fields for 8 days have lost weight through evaporation by as much as 11%. Calma (1944) observed that 5 days after the canes were burned, there was a marked decline in purity of the juice and the loss in weight ranged from 3.5% to as high as 20.5%.

On burnt canes, the rendement showed significant decrease on the 6th day after harvest. The reducing sugar increased significantly on the second day but did not go beyond the standard 1.28% until the 6th day (Hernia and Gregorio, 1984).

Corpuz, *et al* (2006) and Lezarde (1993) stated that canes delivered more than 48 hours after burning tend to contain much non-sugar due to deterioration, making clarification and crystallization difficult. Table 21 shows that the total mean delay hours are 54.04 and 49.12 in Turiani and Ruembe respectively. This is above the recommended hours which could be a result of increasing transaction costs.

4.6.13 Market information source

Information creates knowledge, but knowledge is also needed to create information. It is knowledge that helps us to access information, by knowing where to find and how to use information sources, by assessing whether it is truth or false, of value or not. It is knowledge that helps us to apply information, by adapting it to our particular needs and circumstance (Talero and Gaudtte, 1995). Based on the nature of the product and type of market under consideration the main source of marketing information was farmers' association which accounted for 92.5% in Turiani and 87.5% in Ruembe. Other least sources of information were extension officers and the word of mouth (Table 22). Type of information sought was almost the same across all respondents that is, information about harvesting schedule, sugarcane payment and inputs sources. In both areas the market information is accessed free of charge. It was revealed that provisions of market information to outgrowers was not very effective and efficient as some of the outgrowers were not aware on the way the sugarcane marketing operates.

Table 22: Sugarcane outgrowers market information sources

Outgrowers responses	Turiani		Ruembe	
	Number of outgrowers	Percent	Number of outgrowers	Percent
Extension officers	2	2.5	2	2.5
Farmers association	74	92.5	70	87.5
Word of mouth	4	5	8	10
Total	80	100	80	100

3.6.14 Limitations of measuring transaction costs

The limitations of this research have to do with the difficulty of measuring some data. At the level of sugarcane farmers, transaction costs have not yet been calculated for these components:

i. Decreasing weight of sugarcane volume. Sugarcane farmers cannot control this process because all processes are done by the sugar mill;

ii. Transportation from field to factories (transportation means are owned by the contractors). Some sugarcane fall off the truck during transportation, hence a loss in total weight to the outgrowers;

iii. Transaction cost in the form of decreasing sugar content (rendement) as result of the indolence of the sugar mill in milling sugarcane. Sugarcane milled 24 hours after being cut, according to sugar mills, will decrease the sugar content by 1%.

iv. Therefore, it can be said that total transaction costs calculated in this study are actually lower than the real ones.

4.7 Regression Analysis Results

Regression analysis was done to examine the influence of socio-economic factors on production and marketing transaction costs of sugarcane outgrowers. Predicator variables include average distance from the farm to the factory, average years in sugarcane farming, average size of sugarcane farm, average age of respondent, gender of respondent, education level of respondent and were estimated using SPSS software. The way the model was constructed has been explained in detail in Chapter three. The mean values of variables used in the model are presented in Table 23.

Table 23: Mean value of variables used in the regression analyses

Variables	Variable code	Status of variable	Unit	Mean value		Standard error	
				Turiani	Ruembe	Turiani	Ruembe
Transaction cost	PMCOST	Dependent[1*] Independent[2*]	Tshs	20 682.87	17931.07	429.11	259.67
Distance from farm to the factory	DSTANCE	Independent	Km	17.75	16.70	1.115	0.840
Gender of outgrowers	GENDER	Independent	Dummy	0.70	0.68	0.052	0.053
Years in sugarcane farming	YEAR	Independent	Years	11.42	9.39	0.785	0.833
Size of sugarcane farm	SIZE	Independent	Hectare	1.66	2.23	0.178	0.267
Age of respondent	AGE	Independent	Years	52.19	42.55	1.328	1.512
Education level	EDUCT	Independent	Level	2.90	3.19	0.125	0.094
Rendement level	REND	Dependent[2*]		8.60	9.33	0.251	0.117

1*= Model 1

2*= Model 2

4.7.1 Influence of socio-economic factors on production and marketing transaction costs

The results of the regression analyses carried out to identify the socio-economic factors influencing the transaction costs in Turiani and Ruembe are presented in Table 24 and 25 respectively. The results of the model for Turiani in Table 24 show

a strong explanatory power of the model, with adjusted R square of 72.1% and a significant F ratio. Distance from the farm to the factory, years in sugarcane farming and age of respondent are significant at 1%, 10% and 10% respectively. With regard to Ruembe, the model had an adjusted R square of 81.9% and a significant F ratio. Distance from the farm to the factory and education level of respondent are significant at 1% each, whereby gender of respondent is significant at 10% (Table 25). The large R square implies that the regression models were strong enough to explain the relationship between dependent and independent variables.

Table 24: Regression results for Turiani

Variable in the equation	Coefficient	Std. error	t-value	significance
(Constant)		0.194	47.215	0.000***
LN DSTANCE	0.754	0.017	8.341	0.000***
LN YEAR	-0.262	0.018	-2.458	0.019*
LN SIZE	0.010	0.016	0.113	0.911
LN AGE	0.227	0.050	2.317	0.026*
GENDER	-0.051	0.025	-0.575	0.569
LN EDUCT	0.115	0.032	1.286	0.207

Dependent variable: Natural logarithm for transaction costs (LNPMCOST) in Turiani
Adjusted R^2 = 0.721   F Value = 19.106***
*** = Significant at P<0.01
* = Significant at P<0.1

Table 25: Regression results for Ruembe

Variable in the equation	Coefficient	Std. error	t-value	significance
(Constant)		0.108	83.931	0.000***
LN DSTANCE	0.864	0.013	16.257	0.000***
LN YEAR	0.094	0.009	1.479	0.144
LN SIZE	0.015	0.008	0.256	0.799
LN AGE	0.008	0.025	0.125	0.901
GENDER	-0.122	0.013	-2.270	0.027*
LN GENDER	0.230	0.025	4.045	0.000***

Dependent variable: Natural logarithm for transaction costs (LNPMCOST) in Ruembe
Adjusted $R^2 = 0.819$ F Value = 51.442***
Note: *** = Significant at P<0.01
             * = Significant at P<0.1

For both Turiani and Ruembe total transaction cost was positively related to distance from farm to the factory, size of sugarcane farm, age of respondent and education level. Distance from farm to the factory was a significant factor in the two study areas. This result implies that both areas of the study have to take some measures to minimize the transportation costs due to distance from farm to the factories.

In Turiani, years in sugarcane farming was inversely related and significant to the transaction costs, but this was the opposite in Ruembe and was not significant. This can be due to the fact that, experienced outgrowers in Turiani have their farms close to the factory and are not willingly to expand due to lower profit earned from sugarcane cultivation. The opposite applies in Ruembe whereby experienced farmers keep on increasing area under cultivation even if the farm is far away from the

factory as it pays to do so. By cultivating away from the factory transaction costs will tend to be higher due to transportation costs.

Gender of the respondent was inversely related to the total transaction cost per unit area in both study areas though only significant in Ruembe. In both areas this can be explained by the fact that most male outgrowers are land owners and avoid risk of cultivating distant farm, hence female outgrowers incur high transportation costs than their male counterpart.

The results have validated the hypothesis that there is variation in transaction cost in different categories of sugarcane outgrowers. The results indicate that an increase of 10% in distance would result in increase of 7.5% in transaction cost for Turiani and 8.6% for Ruembe. It also reveals that as years in sugarcane farming increase by 10% results in decreasing transaction costs by 2.6 % for Turiani division, while increasing age by one year result in increasing transaction costs by 0.22 Tshs.

For Ruembe, gender and education level of respondent were also important variables whereby by being a male results in decreasing transaction costs by 0.12 unit, while as education level increase by one stage results in increasing transaction costs by 0.23 unit.

4.7.2 Effect of transaction costs on sugarcane quality (rendement level)

The results of the regression models estimated to determine the effect of transaction cost on sugarcane quality *(*rendement level) of sugarcane outgrowers in the study

areas are presented in Table 26 and 27. For both Turiani and Ruembe, the total transaction cost per unit was inversely related to rendement level. The model results for Turiani in Table 26 show a very weak explanatory power, with adjusted R square of 2.4% and insignificant F ratio, whereby the variable transaction cost is also insignificant. For Ruembe, the model results in table 27 also show a very weak explanatory power, with adjusted R square of negative 0.3% with insignificant F ratio and insignificant variable under consideration.

Table 26: Regression results for Rendement level and transaction costs in Turiani

Variable in the equation	Coefficient	Std. error	t-value	significance
(Constant)		1.606	2.767	0.008
LN PMCOST	-0.217	0.162	-1.427	0.161

Dependent variable: Natural logarithm for Rendement level I Turiani

Adjusted $R^2 = 0.024$ $F = 2.036^{ns}$

Table 27: Regression results for Rendement level and transaction costs in Ruembe

Variable in the equation	Coefficient	Std. error	t-value	significance
(Constant)		0.997	3.134	0.003
LN PMCOST	-0.111	0.102	-0.885	0.380

Dependent variable: Natural logarithm for Sugarcane quality/Rendement level (LN SUQ) for Ruembe.

Adjusted $R^2 = -0.003$ $F = 0.783^{ns}$

It is important to note that the small values of adjusted R square and insignificant F ratio may imply that there are some relevant variables that affect rendement (sucrose) level in the two study areas that were not considered in this analysis. As argued in SRI (2006), and other results (Masaku, 2009; Crane et al., (1982); Legendre, (2002); Abbot, (2005) and Salassi *et al*., 2002) that the value of sugarcane is determined by sucrose content contained in the cane. Sucrose is made while the cane is growing. The content of sucrose is subject to many factors like variety, soil type and condition, field management etc. The reasons believed to affect sucrose content by farmers included high moisture content in the soil, late harvesting, poor field management, payment based on a group sucrose content, harvesting of immature cane and cutting cane too late after burning.

The results have failed to reject the null hypotheses number three that Sugarcane quality *(*rendement level) is not influenced by the transaction costs.

4.8 Institutional Arrangements and Transaction Costs

Taking the theory of institutional development as a starting point, one observes that the condition under which producers negotiate their transactions is characterized by information asymmetries and incomplete information (among other market failures). Under this information-gap, diverse institutional forms appear in order to ensure that trade occurs. In this context, contracts are made in order to formalize parties' commitments to the objectives of their marketing arrangement, and may be seen as bilateral coordination agreements.

An institutional arrangement is an arrangement between economic units that governs the ways in which these units can cooperate or compete. An ownership arrangement is an institutional arrangement that allocates the property rights to individual, a group of individuals, or government (Tian, 2001; Kherallah and Kirsten, 2001; Groenewegen, *et. al*, 1995). These, according to Williamson (Kherallah and Kirsten, 2001), refer more to the modes of managing transactions and include market, quasi-market, and hierarchical modes of contracting. The focus here is on the individual transaction and questions regarding organizational forms (vertical integration versus out-contracting) are analyzed. For Williamson, the institutional arrangement is probably the closest counterpart of the most popular use of the term "institution."

4.8.1 Analysis of the current situation

4.5.1.1 Historical evaluation of cane growers association

Outgrowers' involvement in cane growing in Kilombero and Mtibwa valleys date back to the early 1960s, during which they supplied cane to the Mills on the spot market basis. No formal organization existed to mobilize farmers or to negotiate on their behalf. In early 1990, due to problems with parastatal-operated mills in terms of capacity utilization, sugar production and marketing, cane growers experienced production decline and decided to form associations to protect their interest and to advocate for a sustained captive-type business relationship involving integrated agricultural service provision by the Miller in exchange for costs of those services deducted from cane proceeds.

Kilombero Cane Growers Association (KCGA) was established in 1991 to serve K1 cane outgrowers, while Ruembe Cane Growers Association (RCGA) was formed in 1992 to serve K2 cane out-growers. In 1996, Mtibwa Outgrowers Association (MOA) was formed in Mtibwa. These associations represent outgrowers organized in small farmer groups, which is discussed in detail under the organizational structure.

The effects of deteriorating production condition during the 1990s and uncertainty surrounding the move to privatize sugar mills led the three associations to form and apex organization, Tanzanian Sugarcane Growers Association (TASGA), which was registered in 2000 to advocate for the interests of 6000 members at national level.

The three tier structure of outgrowers organization continued with the three Mill level associations since then until recently, when the three Mill level associations began to split. To date, there are five registered association in Kilombero and two in Mtibwa. Newly formed associations are Msolwa Ujamaa Cane Growers Association (MUSGA), Association of Mang'ula Cane Outgrowers (AMCO), Msindazi Cane Growers Association (MCGA), Muungano Cane Growers Association (MCGA), and Bonye Cane Growers Association (BCGA) in Kilombero; and Turiani Cane and Other Crops Cooperative Society (TUCOCPRCOS) in Mtibwa. In support of the above argument results from this study reveal that all respondents in Turiani division are members of cane growers association whereas this accounts for 97.5% in Ruembe. The main reason put forward for not being a member in Ruembe is that of being a new comer in the industry and the process of registering is ongoing (Table 28).

Table 28: Outgrowers and association membership

Outgrowers responses	Turiani		Ruembe	
	Number of outgrowers	Percent	Number of outgrowers	Percent
Are you a member of any organization?	N=80		N=80	
Yes	80	100	78	97.5
No	NA	NA	2	2.5
Total	80	100	80	100
Existing outgrowers and their member	N=80		N=80	
MOA	44	55.0	NA	NA
TUCOCPRC0S	36	45.0	NA	NA
BCGA	NA	NA	8	10.0
MACGA	NA	NA	4	5.0
MCGA	NA	NA	19	23.8
MUCGA	NA	NA	2	2.5
RCGA	NA	NA	45	56.2
Cost of membership				
Mean cost(Tshs)	14 241.67		7664.58	
Standard deviation	12 505.42		6463.53	

In Turiani only two associations exist namely MOA with 55% of the total membership and TUCOCPROCOS with 45% of the total membership (Table 28). Five farmers' associations exist in Ruembe, majority of the outgrowers belong to RCGA (56.2%), followed by MCGA (23.8%), BCGA (10%), MACGA (5%) and MUSGA (2.5%).

Factors behind the split and their consequences are briefly examined. Firstly, inadequate crushing capacity of the Mills, especially during the years 2004-2006, which contributed to oversupply of outgrowers' cane. As a result, farmers began to compete for harvesting allocation, and association's leadership faced difficulties in managing harvesting schedule in such and environment. Secondly, limited organizational and managerial capacity of associations relative to their growth in terms of membership, expanded geographical areas of operations, and higher demand for member services. Following privatization, while most the Miller Cum Planters (MCP) discontinued provision of some integrated farming services from cane growing to crop maturity, they continued to provide all harvesting services that include cutting, loading, and haulage, deducting their costs from cane proceeds. During the mid 2000s, the associations decided to take over most of these activities. With the support from international development partners and commercial loans, these associations were able to procure machinery and equipment for farm development and harvesting, started to provide those services to their members at a cost. The associations also began to outsource some of these services, particularly haulage to private providers of transport service. However, the management capacity for most associations became constrained as they grew, causing massive problems, particularly in the management of harvesting schedule, harvesting operations, and loan administration. This raised a lot of discontent among farmers who felt they were unfairly treated, causing their cane to be harvested at the time of low rendement or was not harvested at all. A solution for many of such outgrowers was to form their own associations so as to exercise control and management of their own fields and negotiation with the Miller.

Thirdly, multiple level occurrences of conflicts of interests created inefficiencies and mistrust among the association members and leaders, further aggravating the discontent. At one level, some employees of the mills were also cane outgrowers, who are claimed to exercise some influence on cane harvesting schedule in their favor. Another level of such conflicts is at the level of association leaderships, where some leaders of the associations are also providers of services contracted by associations, or are related to the contractors without declaration of such conflicts of interest. As a consequence ineffective contractors have continued to operate, and costs of such services charged to out-growers are sometimes contested, raising discontents and lack of trust among out-growers and leaders of association. Another conflict of interest is inherent in organizational structure of associations, which affects downward accountability, and therefore reduces effectiveness of associations in meeting their objectives. Combinations of these conflicts have led to the fall in trust among members of associations, to the extent that in a focus group discussion of some association leader, one remark characterized the situation "…as the one in which associations get rich, and farmers get poorer".

Fourthly, hostile relationship between the MCP and outgrowers. This is particularly the case with Mtibwa, where the relationship between Mtibwa Sugarcane Company and Mtibwa Outgrowers Association have remained hostile over the years, and efforts by SBT and government leaders at district, regional, and national levels have not been able to resolve fully, despite considerable efforts.

This hostility has made some members of the outgrowers association to establish a new association in the hope of resolving the hostility and for better cane supply negotiation and better terms with the Miller including on time payment of cane proceeds.

Fifthly, but closely associated with capacity and hostility between MCP and outgrowers is the widespread incidence of fire accidents. Fire accidents in the cane fields have been associated with poor coordination of harvesting schedules, causing some farmers to burn cane so as to accelerate their cane harvest, or some unscheduled field being harvested in an unplanned blocks. When this happens, hundreds of tons of cane are lost either because of hostility between the Miler and the outgrowers' associations.

Lastly was the lack of accountability, transparency and resource and financial mismanagement within the associations. At Mtibwa, for instance, some out-growers opted for a cooperative system which they thought would ensure accountability, transparency and proper financial management. It was pointed out that since cooperatives are governed by a separate law which requires them to be audited annually and follow certain rules; accountability, transparency and proper financial management will be guaranteed. The system is however criticized by many as being prone to instability, interference and government control.

The results of these association splits, ongoing conflicts of interests, and hostility between some Millers and outgrowers associations have had negative consequences

to the potential outgrowers to grow profitably, and to maintain a desired balanced partnership between the Millers and Outgrowers. Cane output from outgrowers is declining, yield rate have remained low, transaction cost as a percentage of total revenue increasing and cane fields are deteriorating rapidly, causing some risks of excess capacity by Millers as outgrowers supply falls short of projections. This will mean that unit costs of sugar produced by Tanzanian Millers will increase rather than decrease as the industry reforms aspire.

A lesson drawn from this history is that if not addressed the splitting of associations will continue for some time, a situation that will render the sugar industry plagued with a multitude of outgrowers associations with a great deal of overlaps in terms of geographical coverage. These overlapping multitudes of associations will grow conflicts and poor coordination of harvesting schedules and result into loss of economies of scale in sugarcane production. An effort is needed to set up an organizational structure which is sustainable and which ensures effective coordination of negotiation with the miller, planning and execution of harvesting and haulage schedules. The present organizational structure allows the establishment of any type of farmer organization. The Sugar industry Act is silent on the type of farmer organization suitable for outgrowers in the sugar industry and more importantly the Act does not provide guidance on the formation of farmer organizations. There should be some guidelines in terms of regulations on how farmer organizations should be formed and operated.

For instance the guidelines should stipulate on whether out growers should be organized through cooperatives or association considering that these differ in terms on their suitability and their potential for insuring accountability and transparency.

Cost of being a member varies among associations/cooperatives and the year of joining associations. In old organization namely MOA in Turiani and RCGA in Ruembe only entrance fees and service charges are the only cost in being a member. In the new established associations in Ruembe and Cooperative in Turiani the issues of share are also introduced as the cost of being a member. The service charges are deducted from the sales proceeds by the outgrowers' association/cooperative. Results in Table 28 show the costs of being a member excluding services charges which are charged based on the tonnage of the cane harvested.

4.5.1.2 Industry organization structure

The organization of smallholder in cane industry is in three tiers. The first tier is the national level apex organization known as Tanzania Association of Cane Growers (TASGA). It is an advocacy and lobbying organization at national level, representing outgrowers at national level through the Sugar Board of Tanzania (SBT) and others. It is also responsible for mobilizing capacity development support for its member organizations. TASGA is mainly financed by crop cess charged at Tshs, 100 per ton of cane. The second tier is the mill level associations, financed also by crop cess, which range from Tshs 300-400 per ton of cane, depending on the association's decisions. The major activities of these associations are to negotiate terms of business between outgrowers and Millers, and to provide essential agricultural series

to their members. These services have expanded in scope in recent years, which include cane harvesting, loan brokerage and administration, and extension support, which use to be provided by the Millers in an integrated package in the past. The third tier is farmer groups which are organized along geographical areas in Kilombero, and along villages in Mtibwa. These together formed older associations. The new associations are not organized along these lines, so that their members are drawn from across various areas and villages. This is particularly the case with Mtibwa, where the two associations compete for members scattered in all villages, causing some serious problems in the management of harvesting schedule.

From the analysis of the current organizational structure, three observations were noted. Firstly, the organization structure lacks a unified body that is responsible for negotiation with the miller and provision of common services. During the focused group discussions it became clear that following the abrupt trend of splitting the association, each association individually negotiates with the miller for cane supply agreement. This has undermined the position of outgrowers. At Mtibwa, for instance, each association has a separate contract with the miller with different terms. Initially, the newly established association had negotiated for a lower cane price of round Tshs 31,000/= per ton of cane, which was opposed by the old association. The price was later on raised to Tshs 38,000/= following pressure mounted by the old association and intervention by SBT. In Kilombero, the situation was different. The old associations in Kilombero have refused to cooperate formally with the newly formed associations. At the same time the miller is not in favour of dealing with many associations. Thus, the newly established associations have no formal cane supply

agreement with the miller. Having no contract with the miller, the associations cannot guarantee their members to secure loans from banks. The cane supply agreement is one of the important documents required by banks before lending to the outgrowers. Recently NMB has refused to give loans to the Kilombero outgrowers who have no cane supply agreement; resulting into difficulties for out-growers to attend their cane field, a situation that threatens future cane supply and incentives for outgrowers to raise productivity.

Secondly, the organizational structure lacks strong grassroots organization. It was found that associations have branches in the villages. However, these branches are not mandated to own or hire assets and resources for executing cane production, harvesting and haulage. They all depend on the headquarters for directives. The association have tended to centralize planning and execution of activities ranging from negotiation with the miller, harvesting, haulage and provision of common services. By trying to do everything, the association are overstretched, a situation which has led to inadequate services to outgrowers by the associations. The spontaneous splitting of the associations was a response to the failure of the associations to adequately provide services and increasing transaction costs to outgrowers. The formation of new association has complicated matters. It was found that in the same locations there is more than one association, creating confusion and conflicts among the outgrowers the system is also not cost effective as one association has members scattered in various places, making it difficult for the associations to provide effective and sustainable services with increased transaction costs on outgrowers for compensation.

Thirdly, the apex organization does not have strong support from some of the associations especially the newly formed ones. The impression obtained from the field is that TASGA does not recognize the newly formed association. Apparently, the newly formed associations are not member of TASGA and they have stopped contributing any fees to it. Another impression obtained from the stakeholders is that the roles of TASGA are not popular to outgrowers. Most of the comments directed to TASGA by stakeholders highlight the inadequate impact of the services provided by TASGA. Issues related to good governance were also reported. Especially the conflict of interests between leadership and business activities carried out by leaders are some of the issues which appear to have undermined the role of TASGA as a mouth piece of the outgrowers.

4.5.1.3 Business relationship between millers and outgrowers

Business relationship between millers and out-growers is formalized through cane supply agreements which stipulate on how their business should be conducted. Related to this some observations are made as follows:

(a) Determination of common marketing costs and the actual price of sugar sold are determined almost exclusively by miller, and so may produce little incentive for cutting costs. In addition, out-growers associations may not have the capacity or administrative mandate to verify them, although the millers argue that these are available for verification for audits by association.

(b) Price paid to cane growers per ton of cane differs significantly between Mtibwa and Kilombero, and the difference has remained so over the years. It has not been possible under this study to establish at this moment if the

difference is caused by the differences in the efficiency of sugar processing, marketing, and distribution between the two millers

(c) Rendement analysis and weighing of cane delivered by outgrowers to the mills have been matters of utmost concerns to outgrowers. Outgrowers, individually and through associations claim that rendement analysis is not done fairly, because they are not presented in the process. The difference in rendement allocated on different lots of cane delivered by outgrowers is questioned by outgrowers, although part of this could be explained by relative rendement system applied by the Miller in Kilombero. The weighting of cane at the weigh bridge by the miller is not trusted by outgrowers, claiming unfair practices in favour of the miller.

(d) Delayed payment to outgrowers have been the major source of the long standing conflicts between the Mtibwa miller and the outgrowers and resultant loss of trust and hostility between the miller and most of the outgrowers.

(e) Another important issue that was observed was inadequate application of business principle. On the part of outgrowers, major weaknesses were reported on the ability of associations to handle business issue. The lack of business approach to problems by some associations could be one of the sources of the reported misunderstandings between the millers and some of the associations.

On the other hand, outgrowers and their associations see the millers as not being serious in business. Especially in Mtibwa, outgrowers and their organization have the

opinion that the owners of the miller have no technical and financial capacity to run the plant, linking these to the divestiture process which according to them was not conducted with sufficient due diligence to explore the experience and capacity of the investor to run the sugar mill.

4.5.1.4 Organization methods and accountability systems

For accountability purposes the organization structure is supposed to have effective checks and balance. In its present form, the organizational structure and constitutions of most associations have given unlimited powers to top leaders, making them almost executives with multiple decisions making powers. Chairpersons are not only chairs of the associations but also chairs of the annual general meetings, chairs of the Boards of associations, and chairs of the executive committees. They chair tender awarding processes for the selection of contractors for various serves, and presides over several other key decisions. This has tended to limit downward accountability within associations, thereby causing ineffectiveness of the associations in delivering services to its members, in mismanagement of harvesting schedules, and in poor administrations of loans advanced to their members. Claims of corruption by association were detected as shown in Appendix 5 (b).

4.5.1.5 Agricultural support services and farming practices

Most agricultural support services are currently provided under the umbrella of association, and the involvement of the Mills have been reduced to advisory where necessary, and coordination of harvesting process through a joint operations committees that allocate Daily Ratable Deliverable (DRD)s between outgrowers and

Millers. However, the levels and adequacy of essential agricultural services differs between now and the previous arrangements when the Mills provided integrated services. Because certain services are very costly, requiring huge financial capita, associations have not been able to provide them sufficiently. For example, fertilizers require huge upfront financial capital, which cannot be afforded by association. As a result, the application of fertilizer by outgrowers is limited and variable across farmers. Difficulties of accessing agricultural loans have led many outgrowers to rely on loans negotiate through tripartite agreements between the Miller, financial institutions (mainly National Microfinance Bank and CRDB Bank), and associations requiring the Miller to channel payment of cane proceeds through accounts of farmer groups to the respective banks, and the associations to administer the repayment of loans by their members. However, these are often in small amounts per farmer, and the interest rates and conditions are based on commercial lending, which are too costly given the peculiarities of agriculture.

Most outgrowers are small in terms of size of their farm holdings or cane farming, and operate on a fragmented basis except in very areas where block farming is being practiced. This practice has made unit costs of production high and management of harvesting schedule difficulty and costly, ultimately increased transaction costs.

Block farming could solve most of the problems related to agricultural services. Block farming in Tanzania is however constrained by (i) lack of knowledge of the benefits of block farming; (ii) land tenure systems; (iii) inadequate revenue sharing systems; (iv) inadequate social trust. Lack of awareness on the advantages and

disadvantages of block farming is the most important stumbling block to the adoption of block farming in the country.

4.5.1.6 Financing and management of common services

Financing of common services such as infrastructure and extension support is based on multiple sources. These include grants from the European Union and other development agencies through SBT; crop cess from proceeds of outgrower cane supply; and through the government of Tanzania. However, the provision of these services is far from adequate, requiring significant investment for development, maintenance, and operation. The area under cane has expanded and the number of member has increased dramatically over the last ten years. Most outgrowers do not access services of extension officers, and much cane remains un-harvested, especially during rainy season due to poor infrastructure. Fire accidents tend to cause severe losses due to lack of adequate fire breaks and coordination.

Three methods of service delivery are used in the study areas namely direct service delivery by associations; service delivery through service providers outsourced by association; and service delivery provided by the millers under captive arrangements between the miller and the associations. Essentially, service delivery is a business by itself. As a result, associations are providing both commercial and non commercial services. This brings in issues if whether running commercial activities through associations are the right method or not. While associations would be suitable for negotiation, representation in weighing and rendement determination, advocacy and lobbying; they may not be a suitable form of organization for running commercial

activities such as harvesting, hauling, inputs supply and other services that are provided for cash. In many case associations operate on self help basis. It was pointed out by some stakeholders that associations are usually voluntary and operate on self help basis. Under such circumstances associations are unlikely to be cost conscious and profit motivated. Mixing commercial and non commercial services could be one of the causes of the inefficiencies, inadequate accountability; inadequate transparency; and resource and financial mismanagement within the associations. Coupled with inadequate accountability and transparency emanating from constitutional inadequacies; this problem can be magnified.

4.5.2 Financial institutions

Financial institutions have an important role to play in smallholder marketing because smallholder farmers lack assets (Kashuliza, 1994). Credit availability is potential in augmenting the flow of return to farm enterprises (Kashuliza, 1986). According to Mukwenda (2005) the shortage of credit is one of the limiting factors in operation and business. Mukwenda (*op cit*) mentioned further that, the reason for not acquiring credit to be high interest rates, lack of awareness and lack of capital. The result in Table 29 shows that only 33% and 42% had an access to credit for sugarcane production in Turiani and Ruembe respectively. The findings revealed that, despite the obvious need for financial services for agricultural producers, financial facilities for farmers are lacking. The lack of funds is main limiting factor that slow down inputs use in both study areas.

Table 29: Outgrowers who have accessed credit financial service for sugarcane production for the past five years.

Outgrowers responses	Turiani		Ruembe	
	Number of outgrowers	Percent	Number of outgrowers	Percent
Ever accessed credit?	N=80		N=80	
Yes	47	58.8	38	47.5
No	33	41.2	42	52.5
Source of finance				
N/A	33	41.2	42	52.5
NMB	14	17.5	23	28.8
TUR SACCOS	33	41.2	NA	NA
CRDB	NA	NA	7	8.8
ROA SACCOS	NA	NA	8	10.0
Whether finished repaying in time	N=80		N=80	
NA	33	41.2	42	52.5
Yes	17	21.2	16	20.0
No	30	37.5	22	27.5
Difficulty in securing loan	N=80		N=80	
NA	33	41.2	42	52.5
Easy	9	11.2	7	8.8
Moderately	33	41.2	18	22.5
Very difficult	5	6.2	13	16.2

The financial institutions providing loans to the sugarcane outgrowers in Ruembe include CRDB Bank, National Microfinance Bank (NMB) and ROA Kiruvi SACCOS Ltd. NMB bank and TUR SACCOS were the only providers of credit to sugarcane outgrowers in Turiani (Table 29). At present no financial institutions

provides credit services to sugarcane outgrowers in Turiani. NMB stopped in 2007 and TUR SACCOS have stopped in 2010. The main reason for stopping providing credit is failure of the outgrowers to repay their loans.

Due to the shortage of funds, only shareholders are eligible for loans in case of SACCOS. Each member has to purchase a minimum amount of shares at a fixed price. In the case ROA SACCOS this amounts to 15 shares each 10,000 Tshs per share, which is 150,000 Tshs per member. Obviously, not all outgrowers can afford this type of investment and therefore they are excluded from the possibility of receiving a loan through SACCOS. Note also that no dividend is paid on the shares, so that interest forfeited should almost be added to the interest paid on the loans that are received.

4.5.2.1 Loan Repayment

Respondents were asked if they have finished repaying their loan from the financial institutions, 37.5% in Turiani which is more than half of those who secured loan said they have not finished paying their loan, this accounted for 27.5% in Ruembe (Table 29). The SACCOs and commercial banks have signed agreements with the factories ensuring that all payments for cane deliveries of farmers with outstanding loans will be issued through SACCOS. The SACCOS then deducts the outstanding loan before the outgrowers receives his/her payment. *Ceteris paribus* repayment rate is thus very high and is almost done without any involvement or action of the outgrower him/herself. If the concerned plot is not harvested, or if the payments for the cane do not suffice for the full reimbursement of the loan, the outstanding amount is deferred

to the next year. The interest will continue to be charged, so the amount to be reimbursed becomes higher and higher. This increased reimbursement (part of transaction costs) lead to divergence of loan as outgrowers consider being unjust. It was reported that many outgrowers are trying to escape repayment by registering their different plots under different names, for instance other member of their household. Following the registration rules, several members of the household can obtain a registration number, provided they are all members of the association. It was observed that the outgrowers and their association are not eager to improve the transparency of ownership; this further complicates the availability of credit to outgrowers.

Table 29 shows the level of difficulty in securing loan to outgrowers. Majority of the outgrowers, 41% in Turiani and 22.5% in Ruembe said it is moderate to secure loan, others said it is easy; 11.2% in Turiani and 8.8% in Ruembe where other said it is very difficult to secure loan, 6.2% in Turiani and 16.2% in Ruembe. Increasing number of outgrowers who said it is very difficult to secure a loan in Ruembe may be contributed by lack of collateral. As most of the cane growers do not dispose of title deeds for their land, alternative solutions for collateral had to be found. The standing a cane acts as some sort of collateral, since this can always been harvested even if, for instance, the owner of the crop has died. The previous results have shown that a good number of outgrowers in Ruembe are new entrants and they do not have a standing cane.

Most outgrowers use the loan for the purpose it was intended. The levels of activities in which loan money are spent differ significantly between two study areas. Fig. 9 shows that land preparation were the major activities in which loan money were used in Turiani (62.8%) while this accounts for 29.7% of outgrowers. Also it shows that 67.4% of outgrowers in Turiani used the loan to purchase crop inputs while this accounted for 13.5% in Ruembe. Ratoon maintenance accounts for 75.7% in Ruembe while it is 25.6% in Turiani. Others use loan money for field recovery, which accounts for 9.3% and 5.4% of outgrowers in Turiani and Ruembe respectively. Use of loan money for land purchase or hire is only applicable in Ruembe.
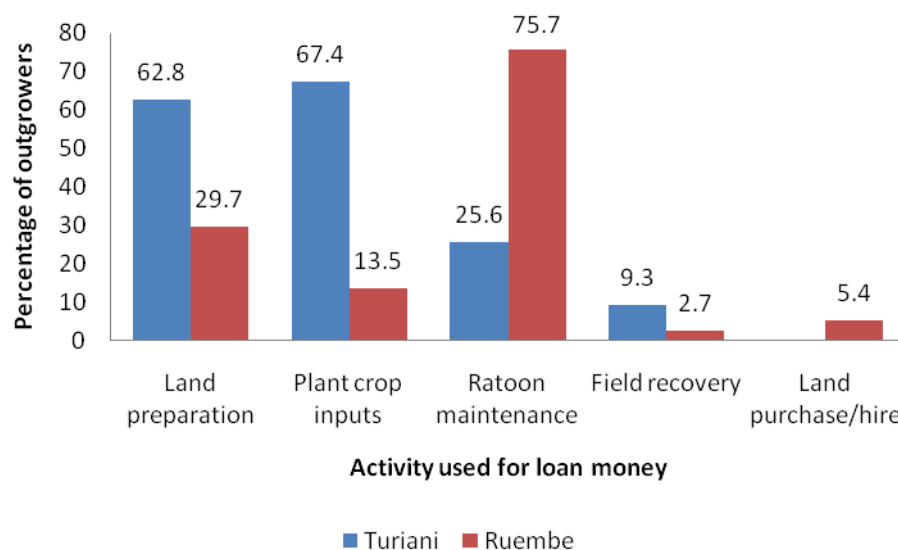
Figure 9: Outgrowers activities undertaken using loan money

The above results are not surprising as it was revealed before that there is low level of inputs use particularly of fertilizer and herbicides for ratoon maintenance in Turiani as compared to Ruembe. It was also revealed land shortage was not a serious problems in Turiani, and more cane were deffered hence more money was used to recover the field as compared to Ruembe.

In both study areas, most outgrowers received credit as cash and only one respondent in each of the study area had received credit as input (Table 30). Most outgrowers in Turiani received credit as cash (56%) and only 1.2% had received as both cash and input forms. About 40% of outgrowers in Ruembe had received credit on cash basis, while 6.2% had received loans in both cash and credit. Only 1.2% in both study area had received loan in input form.

Table 30: Form of receiving credit

Outgrowers responses	Turiani		Ruembe	
	Number of OG	Percent	Number of OG	Percent
N/A	33	41.2	42	52.5
Cash	45	56.2	32	40.0
Input form	1	1.2	1	1.2
Both cash and input	1	1.2	5	6.2
Total	80	100	80	100

Contract enforcement is very important in the issue of credit business. Outgrowers were asked if the there is any inefficiencies in the court system during loan contract enforcement. Majority of respondent who took credit in Turiani (33.8%) said there were inefficiencies in contract enforcement while this counted for 1.2% in Ruembe. Twenty five percent in Turiani and 46.2% in Ruembe said that there are no inefficiencies Table 31).

Table 31: Inefficiencies in the court system during loan contract enforcement?

Outgrowers responses	Turiani		Ruembe	
	Number of OG	Percent	Number of OG	Percent
NA	33	41.2	42	52.5
Yes	27	33.8	1	1.2
No	20	25.0	37	46.2
Total	80	100	80	100

4.5.2.2 Sugarcane outgrowers financial costs variables

Appendix 11 shows that in Turiani mean interest rate were 21%, standard deviation was 4.29 maximum and minimum interests were 15% and 24% respectively. In Ruembe the mean interest was 16.22 % while the minimum and maximum were 7.5% and 24% respectively. The higher interest rate in Turiani was due the fact that majority of the respondents were taking loan from the SACCOS which charge higher interest rate than commercial bank in Ruembe.

The loan disbursement lag gives an indication as to the degree of complications associated with the processing of loans applications. As regards borrowers included in this study the loan disbursement lag ranges from 2 to 120 days in both study area (Appendix 11). In Turiani mean disbursement lag was 36 days, with two days and 90 days as minimum and maximum respectively. In Ruembe the mean disbursement lag was about 45 days while minimum and maximum were 7 days and 120 days respectively. In any case it is reasonable to suggest that the longer the disbursement lag the greater the possibility for the loan transaction costs to be higher. Yustika

(2008) argued that because of the lateness of receiving credit usually outgrowers are also delayed in giving fertilizer to their sugarcane plants. Some farmers said that the two months' lateness of fertilizing caused a decrease of 10% in their sugarcane. Therefore, the opportunity costs of sugarcane outgrowers are estimated to be 5% of outgrowers' income (approximation of one month delay).

The mean total days (idle days) spent on processing credit was 6.3 and 5.9 in Turiani and Ruembe respectively, with the same maximum and minimum range of 2 days and about 15 days respectively (Appendix 11). This was estimated as opportunity cost of time. As it has already seen before in this study the calculation of opportunity costs comes from wage rate of factories casual workers in the study area which stand at Tsh. 3500/= and 4000/= per day in Turiani and Ruembe respectively, plus mean transportation cost incurred by outgrowers on the same exercise.

Cost for enforcing contracts averaged 2266.67 Tsh., while minimum, maximum and standard deviation was 1500, 3600 and 578.4 in Turiani respectively. In Ruembe the same mean cost was 5 142.86 Tsh., while the minimum, maximum and standard deviation was 2000, 17 000 and 4243.63 Tsh respectively. The variation of cost depends on the amount to be borrowed and mutual understanding between the court official and the outgrowers. In both areas this was done informally and no formal receipt were given to the outgrowers.

Mean transaction costs as a percentage of total loan was 25.37% in Turiani and 25.77% in Ruembe. This included interest rate charged per loan, paper work, contract enforcement fees and other informal payment, but excluded opportunity cost of time and the effect of credit delay.

As indicated in Table 29 above, good number of outgrowers did not take loan from the financial institutions (41.2%) in Turiani and 52.5% in Ruembe. The common reasons put forward for not taking loan was high interest rate and bureaucracy, this accounted for 50% and 12.5% in Turiani and 27% and 10.8% in Ruembe respectively. Other reasons were location specific. In Turiani included not a SACCOS member (9.4%), profit unpredictable 31.2%, self analysis before I borrow 3.1% and requested but not given. Reasons specific to Ruembe included afraid taking loan 21.6%, taking loan with interest is considered as a sinful act as per Islamic law 5.4%, corruption 2.7%, has no OGR number 5.4% , I had enough capital and no collateral 16.2% each (Table 32).

Table 32: Reasons for not taking loan/credit

Outgrowers responses	Turiani		Ruembe	
	Number of OG	% of cases	Number of OG	% of cases
High interest rate	16	50.0	10	27.0
Bureaucracy	4	12.5	4	10.8
Not a SACCOS member	3	9.4	NA	NA
Not decided	1	3.1	NA	NA
Profit is unpredictable	10	31.2	NA	NA
Requested but not given	1	3.1	NA	NA
Self analysis before I borrow	1	3.1	NA	NA
Afraid taking loan	NA	NA	8	21.6
As per Islamic law, loan with interest is considered as sin	NA	NA	2	5.4
Corruption	NA	NA	1	2.7
Has no OGR number	NA	NA	2	5.4
I had enough capital	NA	NA	6	16.2
No collateral	NA	NA	6	16.2
Total	36	112.5	39	105.4

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Overview

The general objective of this study was to analyse production and marketing transaction costs of sugarcane outgrowers in Turiani and Ruembe areas. Specifically the study aimed at determining the influence of socio-economic factors on production and marketing transaction costs; to examine the influence of institutional arrangement on transaction costs and to examine the influence of transaction cost on the quality of sugarcane in terms of sucrose content (Rendement).

5.2 Summary of Major Findings

5.2.1 Influence of socio-economic factors on production and marketing

      transaction costs

Production and marketing transaction costs is influenced by socio-economic factors which include distance from the farm to the factory, education level, gender of respondents and number of year in sugarcane farming. In Turiani, distance from the farm to the factory and age of respondent are expected to increase transaction costs while increased years of experience in sugarcane farming is expected to lower transaction costs. In Ruembe distance from the farm to the factory and education level are expected to increase transaction costs while male outgrowers are expected to have lower transaction cost than their female counterpart.

5.2.2 The influence of institutional arrangements on production and marketing transaction costs

The study found institutional arrangement to have and an indirect and direct influence on production and marketing transaction costs .In this, detailed analysis was made and the following are important conclusions from the analysis (i) There are outstanding issues that have to be resolved to allow a smooth implementation of sugarcane production and marketing under outgrowers system. These include the hostility between outgrowers and the millers, especially in Mtibwa; conflicts between the old and the newly formed association; conflicts between TASGA and the newly formed association. All these have indirect effects on increased transaction costs. (ii) Outgrowers must feel it is in their interest to design and enforce particular institutional changes; and they need to know the implications of those changes. Institutional change involves costs because some people benefit from current arrangements and will fight any change. (iii) Situation of sugarcane outgrowers in Turiani is in pathetic state characterized by low sugarcane price, delayed payment, most of the cane not harvested and transaction cost of more than 50% on gross income; serious measures need to be to overcome existing problems. (iv) The tendency of conducting negotiations with the miller on individual outgrowers basis, not only undermines the position of outgrowers in the negotiations as it ruins their unity and vision. An effort is needed to unite the out-growers so that they can have strong position in the negotiation. Under monopsonic conditions, strong unity among outgrowers is needed to safeguard their interest. (v) Common vision for out-growers is important for improving their position in the cane supply chain. With various forms of organization operating using differing constitutions and registered under

differing Acts jeopardizes the possibility of having a common vision. This suggests a need to have a common form of organizations. Hypotheses that there is no influence of institutional arrangements of production and marketing transaction costs is rejected.

5.2.3 The effect of transaction costs on sugarcane quality (rendement level)

In both study areas, the results showed an inverse relationship between transaction costs and rendement level with a very weak R square and insignificant F ratio. The results imply that some relevant variable that affect rendement revel were not considered in both study areas.

5.3 Conclusion

It has been shown that production and marketing do not take place in frictionless environment. Production and marketing involve transaction costs. Socio-economic factors as hypothesized have an influence in production and marketing of sugarcane. An increase in distance from the farm to the factories significantly increased the transaction costs in both study areas. Hence the hypothesis that there is no influence of socio-economic factors on production and marketing transaction costs is rejected.

The present institutional arrangements supporting sugarcane outgrowers has resulted into conflicts and inefficiencies in the sugar industry which lead into increased production and marketing transaction costs. Therefore, hypothesis that institutional arrangements have no influence on transaction costs is also rejected.

Transaction costs have resulted into decreased Rendement level insignificantly in both study areas, hence failed to reject the hypothesis that sugarcane quality is not influenced by the transaction costs.

5.4 Recommendations

Based on the findings of the study, the following recommendations are made aimed at minimizing transaction costs on production and marketing of sugarcane under outgrowers' scheme.

(i) There is a need to establish an intermediary institution that can be trusted by sugarcane farmers and sugar mills to determine sugar content. The problem is that sugarcane farmers cannot control the determination of sugar content because they do not have the technical capability. This demonstrates the importance of an intermediary institution as a mediator of sugarcane farmers' and sugar mills' interests.

(ii) Cooperatives should be restructured as institutions that help farmers to get information, guidance/supervision, cheap seedcane/fertilizer, and credit quickly and at low interest, so that they can support the decline of production and increase in transaction costs.

(iii) The government must open access for sugarcane farmers to be able to get credit from banks. It is hoped that this can decrease transaction costs borne by sugarcane farmers

(iv) Because of the existing organizational structure (three tier multiple associations) has resulted in conflicts, inefficient service delivery, and losses to outgrowers; the study recommend a reorganization of the

institutional set up of the sugar industry. A three tier organizational structure which is different from the present one is recommended.

(v) Because there is a need to have a common vision for outgrowers it is good to have a common form of organizations that is agreeable to all stakeholders. To arrive to such a form all stakeholders should be involved. Based on the evaluation made on the advantages and disadvantage of the various forms of organization; the use of associations to run business promotion activities should be abandoned. Outgrowers can still have associations, but these should be for non commercial activities. The study recommends the establishment of business oriented organizations to handle commercial activities. The sugar sector can adopt either trust fund structure organization or cooperative society mode of organizations from the village level/ward level (primary societies) to the district level (secondary societies) with an apex organization. The two modes of organization structure have both commercial and social features. Cooperative society organization structure is currently practiced in Tobacco and Cotton sectors where they have shown signs of success. Trust organizational structure has not been tried in Tanzania but it is working well in other countries such as Malawi and Kenya.

(vi) Mtibwa Sugarcane Estate needs to develop Rendement Adjustment Formula as it is done with Kilombero Sugarcane Company and not to pay outgrowers based on sliding payment scale. Under this system, the sucrose rendement of outgrower is adjusted based on the average rendement throughout the season. This means that, if he is delivering at

time when the sucrose content is lower that it was on average throughout the season, he will receive an additional payment. It also means that those, whose crop was harvested at a very advantageous moment, will receive less than they would have if the Formula was not in place. This will minimize the incidence of malicious fire happening and decrease the transaction cost if expressed as percentage of gross income.

(vii)   Farmers profit is not increasing due to high production and transaction costs and increased government levies. The government should lower production cost of farmers by subsidizing fertilizers and herbicides as well as reducing levies such as district levy (cess) particularly in Turiani and infrastructure levies respectively.

(viii)   A government structure is needed that includes enforceable laws to protect outgrowers from each other and from the government itself. Government policies and regulations can also be used to reduce market failure. Well functioning and transparent legal systems can help facilitate transition toward enhanced institutions.

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APPENDICES

Appendix 1: Sugarcane outgrowers' questionnaire

SECTION 1.1: BACKGROUND INFORMATION

Questionnaire number: Date of interview: Name of interview:

Name of respondent: District: Division:

Ward: Ward: Zone:

SECTION 1.2: RESPONDENT CHARACTERISTICS

1. Age of respondents (Years)………………………………………………………..
2. Gender: 1= Male ( )   2= Female ( )
3. Marital status: 1= Single ( ) 2= Married ( ) 3= Divorced ( )
       4= Widow/er ( ) 5= Separated ( )
4. Education level:
   1= No formal education   ( )
   2= Adult education   ( )
   3= Primary education   ( )
   4= Secondary education   ( )
   5= Post secondary   ( )
   5= University education   ( )
   6= Post graduate training   ( )
   7= Others   ( ) Specify……………………………………
5. House hold size………………………………………………………………………
6. Household composition

No	Sex M=1, F= 2	Age	Relationship to HH (1=Head; 2=Spouse; 3=Child; 4=Other	*Occupation 1, 2, or 3
1				
2				
3				
4				

*Occupation: 1= Activities related to sugarcane production, 2= other activities, 3= not applicable e.g students

7. How long the household have been living in the place? …………………(Years)
8. What is ethnic group for the household head?…………………………………..
9. What is the farmer main occupational/activities during the last 24 months? (tick)

   1) Crop farming (sugarcane)...........................(time split in %)
   2) Crop farming (other crops).........................(time split in %)
   3) Wage employment (specify)........... ....(time split in %)
   4) Petty business (specify)............. ....(time split in %)
   5) Business (specify)...................... ....(time split in %)
   6) Other (Specify) ( )………………………………………………………..

SECTION 2: HOUSEHOLD ASSETS

2.1.1 Tools Possessed	2.1.2 Gross estimated value of tools possessed	2.1.3 Do these tools work? 1 = yes, 2 = no
1. Radio/ Radio Cassette		
2. Telephone/cellphone		
3. Refrigerator		
4. Sewing Machine		
5. Television set		
6. Furniture (Chairs, Sofas, Wardrobes, Beds, etc.)		
7. Clocks		
8. Lantern		
9. Kitchenware		
10. Iron (Charcoal/Electric)		
11. Cooker (Electric or gas)		
12. Motor vehicle		
13. Motorcycle		
14. Bicycles		
15. Goods cart/ Wheelbarrow		
16. Boat/ Dhow		
17. Yatch engine		
18. Hoes		
19. Solo		
20. Water pump		
21. Tractor		
22. Plough/ Harrow		
23. Dehusking/milling machine		
24. Fish nets and other fishing equipment		
25 Beehives		
26. Farm building		
27 Family house		
28 Other (State)		

2.2 How many livestock does this household own?

	Actual number	Value
Chickens,ducks and geese		
Pigs		
Horses		
Sheep and goats		
Cattle		
Others		
Others		

SECTION 4: AGRICULTURE AND EXTENSION SERVICES

4.1 DETAILS ON SUGAR CANE FARMING

4.1.1 When did you start cultivating sugarcanes? ………………(…..years in farming)

4.1.2 Fill in the table below about land issues

Total farm size in ha:	Area under sugarcane in ha:	Area under other crops in ha:	Number of other crops

4.1.2.1 Kind of land ownership	4.1.2.2 Area in ha	4.1.2.3 Value per ha
Rented land		
Owned land		

4.1.2.5 If you own land, how did you acquire it?
 1= Bought from village government (   ) 2= Hired ( ) 3= Inherited (   )   4= Given by the village government, 5= Accessed a free land, 6= bought from another owner ( ) Others (specify)…………………………………………..
4.1.2.5   If hired, how much do you pay for per season?..
4.1.2.6   Do you have title deeds for the land you own? 1=yes, 2= no ( )
4.1.2.7   If no why?...
4.1.2.8   Indicate the problems you experience in acquiring a land. 1= No problem, 2= Bureaucracy,
       3= High cost, 4= others (   ) (specify)
       ………………..…………………
4.1.2.9   Do you pay any land tax? 1= Yes   ( ) 2= No   ( )
4.1.2.10 If yes, how much………………………………………………………….(Tshs)
4.1.2.11 Mention any other cost and their amount in using land for sugarcane production

4.2.3 Fill in the table below about sugarcane production in your farm for the last 2 years

Year	Quantity (tons)	Sucrose content	Price per ton	Gross sales
2009/10				
2010/11				

4.2.4. F ill in the table below about other major crops you produce in your farm

4.2.4.1 Kind of crop	4.2.4.2 Area in ha	4.2.4.3 Production level during 2010/2011	4.2.4.4 Units	4.2.4.5 Quantity sold	4.2.4.6 Price per unit	4.2.4.7 Gross sale

4.2.5 In the last 5 years, have you switched from production of certain crops to sugar cane? 1= Yes 2= No

4.2.6 If answer is yes to 4.2.5, please name these other crop...

4.2.7 What factors made you to switch from production of certain crops to sugar cane?

4.2.8 In the last 5 years, have you reduced area under sugarcane production in favour of another/other crops? 1= Yes 2= No

4.2.9 If answered Yes to question 4.2.8, please name these other crops...

4.2.10 What factors made you to reduce area under sugarcane production in favour of another/other crops?

Conversion from	Crop	Area converted (in ha)	Change in profit as a result of conversion
Cane to other crops			
Other crops to sugarcane			

4.2.11.4 what is the current stage of your sugarcane farm
1= Field crops ( ) 2=first ratoon ( ) 3=second ratoon ( ) 4=third ratoon ( ) 5=others (specify) ( )

4.3 Estimate investment and production costs of sugarcane in you farm guided by the tables below.
4.3.1 Investment costs per ha as of 2011

Basic operations	Estimated cost	Any comments
Land clearing		
1st ploughing		
2nd ploughing		
Harrowing		
Ridging		
Seed cane		
Planting		
Irrigation systems		
Fertilizer		
Herbicides		
Fire break		
Harvesting		
Loading		
Transportation		
Others (specify)		

4.3.2 Operational costs per ha as of 2011
4.3.2.1 Labour costs

4.3.2.1.6 Indicate the problems you experience from acquiring labour. 1= no problem, 2= bureaucracy, 3= high cost, 4= others (specify)…………………………………………………………………………………………………
…
4.3.2.1.7 Do you own tractor used for land preparation? 1= yes ( ) 2= no ( )
4.3.2.1.8 If no, how much do they charge you per hectare? 1. Primary tilling.............(Tshs). 2. Secondary tillage…………………(Tshs)
4.3.2.1.9 How do you contact the tractor owner?..
4.3.2.1.10 Do you sign any contract with tractor owner for land preparation 1= yes ( ) 2= no ( )
4.3.2.1.11 Is there any delay from agreed date to actual date of land cultivation? 1= yes ( ) 2= no ( )
4.3.2.1.12 If yes, how long…………………………………………………………..(days)

4.3.2.1.13   Mention any other cost associated with securing a tractor for land preparation
          a)   Transportation………………………Tshs
          b)   Communication…………………….Tshs
          c)   Others……………………………..Tshs
4.3.2.1.14   Total days wasted for searching a tractor in 2010/2011 season ……………….

4.3.2.2 Costs of inputs other than labour

Input	Input source1= stockists 2= Factory/Miller 3= Association 4 = Other (Specify)	Quantity	Units	Price per unit	Any comments
Fertiliser					
Herbicides					
Pesticides					
Improved seed cane					
Water					
Fuel/diesel					
Other specify					

4.3.2.2.7 Do you have problem accessing any of the inputs you require in sugarcane production? 1= Yes   2= No

4.3.2.2.8 If the answer above is Yes, give explanation
....
....

4.3.2.3 Other overhead costs

Cost item	Unit	Price per unit	Total cost
Transport cost for cane from the farm to the factory			
Contractors fee			
Farm insurance			
Electricity for farm operations			
Taxes			
Fees			
Advisory Services			
Tips			
Others			

4.2 EXTENSION SERVICES

4.2.1   How often did your household attend meetings, receive advice or get visited by extension officers from the government or any other institution engaged in agriculture extension services in the last 24 months? Please fill the table below

Name of institution/project	Type of institution (code) *Government extension service…………………1* *Investor/ Sugar factory…………………2* *NGO……………………………………………………3* *Private Company……………………………………4* *International organisation……………………………5* *Farmers'Association…………………………………6* *Research institutions* *Others (state)…………………………………*	Number of visits

4.2.2   What specific aspects of agriculture did you receive professional advice in, in the last 24

months? (Tick √ if YES and X if NO)

Farm preparations and planting ( )
Harrowing, fertilizers and pesticides ( )
Harvesting and Transporting ( )
Processing   ( )
Others (state) ....

4.2.3 In the last 12 months, have you received extension services support for any other crops besides

sugar canes? 1=Yes   2=No

4.2.4 In general, are you satisfied with the quality of extension services in your area? 1=Yes

          2=No

4.2.6.1   Did you pay for the extension services? 1=Yes   ( ) 2= no   ( )
4.2.6.2   If yes, how much did you pay...(tshs)

4.2.7 Marketing arrangement and future prospects

Is there a contractual arrangement between the grower and the factory? 1= Yes 2=No	If Yes, have you ever seen that contract 1=Yes 2= No
Is the contract renewed on yearly basis 1=Yes 2= No 3= Don't know	Do you participate personally in price setting 1=Yes 2= No
If not, who sets price? 1=Our association 2= The miller 3= SBT 4= Other (Specify)…	4.2.7.6 Are there any deductions from the price? 1=Yes 2= No
4.2.7.7 Are you satisfied with the current price 1=Yes 2=No	If no what is being done to correct the situation?
How is sugarcane transportation from the field to the mill organised? 1= Managed by the mill 2= Managed by the association 3=individual farmer's arrangement 4= Other (Specify)	How is payment for cane transportation effected? 1 = Deducted from sales proceeds by miller 2 = Deducted from sales proceeds by the association 3 = Paid upfront by farmers 4 = Other (Specify)
Is there a possibility for to expand area for planting cane? 1= Yes 2 = No	If the answer in question 4.2.7.11 is no, give reason (i) _____ (ii) _____ (iii) _____
Do you plan to expand acreage under sugarcane in a near future 1= Yes 2= No	4.2.7.14 If YES to question 4.2.7.13 THEN how far will the new field be from the mill (Km)
Do you plan to expand acreage under other crops in a near future 1= Yes 2= No	If the answer is no, give reason (i) _____ (ii) _____ (iii) _____

4.3   Sugarcane harvesting and transportation

4.3.1   For sugarcane to be harvested a permit (OGR number) has to be obtained from the factory. Is obtaining permit a problem? 1= yes (   ) 2= no (   )

4.3.2   If yes, is it a 1= Minor problem? (   ) 2= Serious problem? (   )3= Major problems? (   )

4.3.3   How long does it take to get that permit?..days.

4.3.4   Do you pay for the permit? 1= Yes (   ) 2= no (   )

4.3.5   If yes how much…………………………………………………………………………….

4.3.6   Number of trips to obtain OGR number………………cost………………………..Tshs.

4.3.7   Is there any delay between sugarcane burning and harvesting/harvesting and transportation? 1= yes (   ) 2= no (   )

4.3.8   If yes, is it a 1= minor problem (   ) 2= serious problem (   ) 3= Major problem (   )

4.3.9   Indicate the delay for the following seasons

Season	Delay time (hours) B-H	Delay time (hours) H-T	Sugarcane harvested (tons)	Rendement level
2010/2011				
2009/2010				

B= Burning, H=Harvesting & T= Transportation

4.3.10   Do you own your means of transport for sugarcane to the factory 1=yes ( ) 2= no ( )
4.3.11   If no how do you transport your sugarcane to the factory?....................................
....
4.3.12   What is distance from your farm to the factory?...(Km)
4.3.13   Is transport to factories a problems? 1= yes ( ) 2= no
4.3.14   If yes, is it a 1= a minor problem? ( ) 2= serious problem ( ) 3= Major problem
4.3.15   Is the loss of sugarcane through transporting to the factory a problem? 1= yes ( ) 2= no ( )
4.3.16   If yes, is it 1= a minor problem ( ) 2= serious problem ( ) 3= major problem ( )
4.3.17   What are the estimates of sugar loss during transportation in 2010/2011 season
…..……….(tons)
4.3.18   How much does it cost to tranport sugarcane to the factory?............................(Tshs)
4.3.19   Who supervise your sugarcane to the weighbridge?...
4.3.20   How much do you pay for supervisor of your sugarcane to weighbridge?..... ……(Tshs)
4.3.21   Are you satisfied with the way sugarcane is weighed? 1= yes ( )   2= no ( )
4.3.22   If no, give reasons…………………………………………………………..
....
....
4.3.23   Indicate the marketing problems you experience in selling your sugarcane. 1= no problem (
) 2= low price ( ), 3= lack of transport ( ), 4= delayed payment (   ), 5= unstable prices (   ),
6= lack of market outlet ( ) 7= others ( ) specify………..
....
....

4.4   Seed-cane acquisition
4.4.6   Where to you obtain seed-cane?...
4.4.7   How much did you spent on the seed-cane………………………………
4.4.8   Have you ever used clean seed-cane (Hot water treated)? 1= yes ( ) 2= no ( )
4.4.9   If no, give reason……………………………………………………………….
………………………………………………………………………………….
4.4.10   Mention other cost and their amount in obtaining seed-cane
a)   Cutting………………Tshs   d) Communication……………..Tshs
b)   Loading……………...Tshs   e) Others (specify)……………..Tshs
c)   Transportation……….Tshs
4.4.11   Means of payment 1= on spot cash basis 2= loan 3= others ( ) specify………..
4.5.1 Where do you get market information in regard to sugarcane production and marketing? 1= extension officers
2= farmers association ( ) 3= factory ( ) 4= word of mouth ( ) 5= others specify (e.g radio, billboard, newspaper etc)

4.5.2 Do you pay for the market information? 1= yes ( ) 2= no ( )

4.5.3 If yes how much did you pay for the year 2011......................................Tshs

SECTION 5: ACCESS TO FINANCE

5.1 Have you ever borrowed money from a friend/relative or financial institution for cane production? 1=Yes   2=No

5.2 If Yes, please give the following details about the loan

Institution	Year	Amount borrowed	Loan period	Total amount paid back	Time lag to start repayment	Time lag btn application and securing loan	Transaction costs in following up the loan	Whether finished repaying in time 1=Yes 2=No	Difficult in securing loan 1= Easy 2= Moderately difficult 3= Very difficult 4= indifferent	Interest rate

*=paper work, contract enforcement , communication etc.

5.2.12 Did you always use the loan for the purpose it was intended?   1= Yes   2= No

5.2.13 In which activities did you use the money borrowed?

(a) ploughing (b) planting (c) Irrigation (d Fertilizer application (e) Plant protection measures (f) Harvesting   (g) harvesting (h) Transportation

(i) Others (state)..

5.2.14 In which form were the above loans received? 1= cash ( ) 2= input form ( ) 3= both cash and input ( ) 4= others ( )

specify..............................

5.2.15 What was the repayment period? 1= one year ( ) 2= two years 3= three years ( ) 4= Years ( ) 5= others ( )

(specify)..

5.2.16 What is total days spent on processing credit?...

5.2.17 Is there any inefficiencies in the court system during loan contract enforcement 1= yes ( )   2= No ( )

5.2.18 If yes how do you handle

them?...

5.2.19 Is there any other undocumented costs for securing credit? 1= yes ( ) 2= no ( )

5.2.20 If yes mention them and their amount 1........................(tshs) 2.................................(tshs)....................................

5.2.21 If you have never taken loan what are the

reasons?(1)...(2)...

(3)..

5.2.22 What is the effect of not obtaining

credit?...

SECTION 6: FARMERS' ORGANISATION

6.1   Are you a member of any social and farming groups   1=Yes   2=No

6.2   List down the names of social and farming groups

5.2.15 Is there any inefficiencies in the court system during loan contract enforcement 1= yes 2= no   (   )

5.2.16 If yes how do you handle them?...……………………………………………………………...

5.2.17 Are there any other undocumented costs for securing credit? 1= yes ( ) 2= ( )

5.2.18 If yes mention them and their amount 1……….(tshs) 2……………(tshs)

5.2.19 If you have never taken loan what are the reason?

    1.   ....

    2.   ....

    3.   ....

5.2.22 What is the effect of not obtaining

credit?..SS

SECTION 7: FARMERS' ORGANISATION

    6.1   Are you a member of any social and farming groups   1=Yes   2=No

    6.2   List down the names of social and farming groups

Name of the group	Year joined	Objective/activities	Benefits gained 1= harvesting services 2= higher price 3=lower transport costs **4=extension services** 5=others (specify)	Comments for improvement

6.2.6 Have you ever shifted from one group to another? 1= Yes   2= No

6.2.7 If yes in question 6.2.6 above, mention the group/association from which you moved and explain the circumstances that made you shift:…………………………………………………………………………….

6.2.8 Mention the cost involved in being a member of association………………………………………………

SECTION 8: CONCLUDING QUESTIONS

7.1 What are the most pressing problems in your household in order of priority in regards to sugar cane production and marketing?

    1.   ....

    2.   ....

    3.   ....

    4.   ....

7.2 What do you think should be done to improve the production and marketing of sugarcane in your area?
....
....
....

Thank you very much for your patience.

Appendix 2: Checklist for associations
1.0 Background and history

- Short history of the association
- Registration type (association or cooperative?)
- Number of members
- Objectives of the associations
- Activities of association

2.0 Functional and managerial structure

- What are the main functions of the association?
- How is the association financed to perform its functions?
- Do you have activities that you need to share with other associations and institution?
- What proposal do you have on the best ways of financing the function of the associations?
- Do you have activities that you need to share with other associations and institutions?
- What proposals do you have for financing such shared functions?
- What is the organizational and leadership structure of the organization?
- How was this kind of organization formulated?
- How do the various leadership organs work together to ensure the association performs its functions?
- How does checks and balance work between legislative and executive roles to insure accountability and transparency? What kind of constitutional amendments for you propose to insure accountability and transparency?
- What are the main strengths, weakness, opportunities and challenges facing the association?
- What are the main causes of the weakness and challenges facing the association?
- What should be done to ease the weaknesses and challenges facing the associations?

3.0 Functional relationships with other institutions
- In performing its functions which institutions do the association collaborate with?
- What kind of collaboration does the association make with each one of the institutions?
- What are the modalities that guide the kind of collaboration with other institutions?
- What constraints does the association encounter in the process of collaboration?
- How is the quality of collaboration with various institutions rated?
- Do you think the current institutional relationship between the association and other institutions insures efficiency, productivity and profitability of the industry?
- If no what proposals do you have to improve the institutional relationship with various institutions?

4.0 Participation in the sugar industry development
- What are the important services the industry requires for its development?
- In what way does the association play a role in the delivery to the industry?
- Which other institutions are involved in services delivery to the industry?
- How to the association collaborate with other institutions in delivering the services?
- What do you think is the best way of providing the services to the industry?

5.0 Cane supply agreements
- Who are your main buyers of cane?
- Do you have any contract with your buyers?
- If yes, what is the nature of the contract (time of delivery, pricing and price setting, product quality, payment mode, delivery mode)?
- How is the contract negotiated (through associations, individual farmers, SBT, government)?
- Have you ever experienced oversupply of cane to your buyers?
- In case of oversupply of raw materials what do you normally do with the excess supply?
- What do the buyers do in case of cane oversupply?
- Do you think the current contracting system ensures efficiency, productivity and profitability of the industry?
- If no what are the main problems with the current contracting system?
- If no what proposals do you have to improve the procurement system?

6.0 Other issues

- In your opinion, do you know of any other issues necessary for efficient associations?
- If yes, which one?
- What should be done to address them?

Appendix 3: Checklist for millers

1.0 Background and history

- Short history of the miller

- Processing capacity and capacity utilization for the last five years

- Production trend for the last five years

- Sources of raw materials/sugarcane for the last five years (indicate

  tones/DRD/%)

2.0 Raw materials procurement arrangements
- Who are your main suppliers of raw materials?
- Do you have any contract with your suppliers?
- If yes, what is the nature of the contract (time of delivery, pricing and price
  setting, product quality, payment mode, delivery mode)?
- How is the contract negotiated (through associations, individual farmers,
  SBT, government)?
- Have you ever experienced oversupply of raw materials?
- In case of oversupply of raw materials what do you normally do with the
  excess supply?
- Do you think the current procurement system ensures efficiency, productivity
  and profitability of the industry?
- In no what proposals do you have to improve the procurement system?

3.0 Participation in the sugar industry development
- What are the important services the industry requires for its development?
- In what way to play a role in the delivery of such services?
- Which other institutions are involved in services delivery to the industry?
- How do you collaborate with other institutions in delivering the services?
- What do you think is the best way of providing the services to the industry?

4.0 Cane production system

- What types of production systems are practiced in your areas (small holder farms, block farms, large scale farms?
- What are the strengths, weaknesses, opportunities and challenges facing the various farming systems?
- What kind of farming system do you recommend for your area and what kind of institutional arrangements could be in place to support it?

5.0 Institutional arrangements for associations

- How many growers associations are in your area?
- What benefits do you get from having growers associations in your area?
- How do you interact with the associations (meetings, formal communication, and joint services to farmers)?
- What do you think are the strengths, weaknesses, opportunities and challenges facing the associations?
- What do you recommend to improve the managerial structure of the associations?

Appendix 4: checklist for lenders' interview

A. Basic information

Name of institution………………………..Name of respondent…………………….

Designation………………………….. date of interview………………………….

1. Village served by lender, number of clients approximate distance from lender's location
2. What criteria do you use in selecting (screening) clients for credit
3. What is the number of loan approvals and refection by your bank in the past five years

B. Credit forms, targeting and size

4. In what form is credit provided to the approved borrowers?
5. If credit is provided for farm production, do you target a particular farm enterprise? If yes describe the farm enterprise
6. What criteria governs the size or amount of loan given to each borrower?
7. What are the lowest and highest amounts of loan that can be issued to an individual out growers?
8. How is the credit delivered to clients by the lender?
9. Are you also involved in borrower group formation? If yes, explain.

C. Credit interest rate and repayment

10. What is the interest rate charged on loans issued (per amount or year?
11. Are different interest rates charged for certain activities? If yes, explain why.
12. What is the average gestation period (in months) of the loans issued?
13. What is the acceptable duration of repayment of the loans issued (after which the loans are regarded to be in default)?
14. In what form are repayments made? e.g cash, crops etc
15. What is collection rate of loans issued in the past five years?
16. What are the measure (penalties) taken against clients who fail to pay back loans in the specified period?

17. Is additional interest charged on delayed payment? If yes how much is charged per month/year?

18. What is the procedure followed in monitoring the issued loans

D. Transaction cost and accessibility

19. In what ways is lending a costly activity for the lender?

20. What are the lending costs for the past five years (as a percentage of total loans issued)? Cost of processing, administering and monitoring of loans?

21. Have you evolved any methods to reduce lending transaction costs? Explain.

22. Is the credit issued by your institution accessible to poorer farmers in the villages? Explain.

23. Is the repayment record of poorer borrowers worse than those of relatively well-off borrowers? Explain.

24. What are the major sources of finance (Capital) or credit input for the lender for the past three years.

25. What type of arrangements/procedures exists between the lender and the main fund supplying institution?

26. Are there linkages between your project and other credit institutions and informal lenders? If yes explain nature of linkages.

27. Is interest rate paid on the funds or credit inputs you use? If yes, indicate interest rate paid on the funds for the past three years

28. Are you in arrears with respect to payment of loan funds? If yes, what are the reasons?

29. What type f operational problems have you faced in lending activities? What type of support would you need from government etc to be able to provide credit to the poorer farmers in the villages?

30. What type of support would you need from government etc. to be able to provide credit to the poorer farmers in the villages?

E. Functional relationship with other institutions

31. In performing its functions which institutions do the bank collaborate with?

32. What kind of collaboration does the association make with each one of the institutions?

33. What are the modalities that guide the king of collaboration with other institutions?

34. What constraints does the association encounter in the process of collaboration?

35. How is the quality of collaboration with various institutions rated?

36. Do you think the current institutional relationship between the association and other institutions ensure efficiency, productivity and profitability of the industry?

37. If no what proposals do you have to improve the institutional relationship with various institutions?

38. How do you handle the issues of loan recovery? Do you get assistance from association?

39. What do you think are the strength, weakness, opportunities and challenges facing the associations?

40. In your opinion, do you know of any other issues necessary for efficient association and lending systems

41. If yes, which one?

42. What should be done to address them?

Appendix 5 (a): Influence of household characteristics on average sugarcane production per ha (tons) in Turiani sugarcane basin

Variables	Average sugarcane production per ha (tons)						
	Below 30 tons		30-60 tons		Above 60 tons		
	N	%	N	%	N	%	χ^2
Age of outgrowers (years) (n= 65)							
<35	3	12.5	3	17.6	0	0.0	
35-50	8	33.3	7	41.2	0	0.0	
50>	13	54.2	7	41.2	2	100.0	0.610
Total		**100**		**100**		**100**	
Gender of outgrowers							
Female	8	33.3	5	29.4	1	50.0	
Male	16	66.7	12	70.6	1	50.0	0.835
Total		**100**		**100**		**100**	
Education level of OG							
No formal education	1	4.1	2	11.8	0	0.0	
Adult education	1	4.1	2	11.8	1	50.0	
Primary education	17	70.8	12	70.6	1	50.0	
Secondary education	3	12.5	1	5.9	0	0.0	
Post graduate training	2	8.3	0	0.0	0	0.0	0.465
Total		**100**		**100**		**100**	
Experience in sugarcane farming (years)							
1-10 years	15	62.5	8	47.1	1	50.0	
11-20 years	5	20.8	9	52.9	1	50.0	
21-30 years	2	8.3	0	0	0	0.0	
31 and above	2	8.3	0	0	0	0.0	0.351
Total		**100**		**100**		**100**	
House hold size							
1-4	7	29.2	7	41.2	2	100.0	
5-8	14	58.3	8	47.0	0	0.0	
9 and above	3	12.5	2	11.8	0	0.0	0.383
Total		**100**		**100**		**100**	
Area under sugarcane (ha)							
0-2	17	70.8	13	76.5	2	100.0	
2.01-5	6	25.0	3	17.6	0	0.0	
5.01 and above	1	4.2	1	5.9	0	0.0	0.897

Appendix 5 (b): Influence of household characteristics on average sugarcane production per ha (tons) in Ruembe sugarcane basin

Variables	Average sugarcane production per ha (tons)						
	Below 30 tons		30-60 tons		Above 60 tons		
	N	%	N	%	N	%	χ^2
Age of outgrowers (years) (n= 65)							
<35	9	39.1	9	30.0	3	25.0	
35-50	8	34.9	16	53.3	7	58.3	
50>	6	26.1	5	16.7	2	16.7	0.640
Total		**100**		**100**		**100**	
Gender of outgrowers							
Female	6	26.1	7	23.3	4	33.3	
Male	17	73.9	23	76.7	8	66.7	0.801
Total		**100**		**100**		**100**	
Education level of OG							
No formal education	0	0.0	0	0.0	1	8.3	
Adult education	2	8.7	3	10.0	2	16.7	
Primary education	17	73.9	22	73.3	9	75.0	
Secondary education	4	17.4	2	6.66	0	0.0	
Post graduate training	0	0.0	3	10.0	0	0.0	0.180
Total		**100**		**100**		**100**	
Experience in sugarcane farming (years)							
1-10 years	16	69.6	17	56.7	7	58.3	
11-20 years	5	21.7	11	36.7	4	33.3	
21-30 years	0	0	2	6.6	0	0	
31 and above	2	8.7	0		1	8.3	0.395
Total		**100**		**100**		**100**	
House hold size							
1-4	23	100.0	29	96.7	12	12.0	
5-8	0	0.0	1	3.3	0	3.3	
9 and above	0	0.0	0	0.0	0	0.0	0.553
Total		**100**		**100**		**100**	
Area under sugarcane (ha)							
0-2	15	65.2	18	60.0	8	66.7	
2.01-5	8	34.8	8	26.7	2	16.7	
5.01 and above	0	0.0	4	13.3	2	16.6	0.553

Appendix 6 (a): Turiani Most pressing production and marketing problems

	Responses		Percent of Cases
	N	Percent	
Low price for sugarcane	71	26.2%	88.8%
Delayed payment	74	27.3%	92.5%
Lack of market outlet	16	5.9%	20.0%
Poor infrastructure	1	.4%	1.2%
Absence of farmers representative during weighing and rendement determination	26	9.6%	32.5%
High production costs	9	3.3%	11.2%
Accidental fire	2	.7%	2.5%
Corruption during harvesting	3	1.1%	3.8%
Poor harvesting schedule	39	14.4%	48.8%
High input cost	1	.4%	1.2%
Unavailability of clean seedcane	2	.7%	2.5%
High service charge/fees	6	2.2%	7.5%
Factory inefficiency	2	.7%	2.5%
Canes are left in the field if not enough to fill the truck	1	.4%	1.2%
Failure to transport cane after harvesting	2	.7%	2.5%
Unavailability of cheap credit to OG	4	1.5%	5.0%
Absence of subsidized inputs	1	.4%	1.2%
Un co-operative leadership	2	.7%	2.5%
Poor sugarcane cutting which leads to smut	2	.7%	2.5%
Poor supervision of contractors during harvesting	6	2.2%	7.5%
Inadequate knowledge in sugarcane husbandry	1	.4%	1.2%
Total	271	100.0%	338.8%

Appendix 6 (b): Ruembe most pressing production and marketing problems

	Responses		Percent of Cases
	N	Percent	
No problems	10	5.3%	12.5%
Low price for sugarcane	20	10.5%	25.0%
Delayed payment	5	2.6%	6.2%
Absence of farmer's representative during weighing and rendement determination	16	8.4%	20.0%
Lack of market outlet	1	.5%	1.2%
Poor infrastructure	2	1.1%	2.5%
Unstable price	2	1.1%	2.5%
High production costs	12	6.3%	15.0%
Disease particularly smut	4	2.1%	5.0%
Accidental fire	16	8.4%	20.0%
Irregular factory breakdown	3	1.6%	3.8%
Corruption during harvesting	3	1.6%	3.8%
No solidality among OG associations	5	2.6%	6.2%
Delay in transporting sugarcane to factory	3	1.6%	3.8%
Inadequate harvesting equipment	4	2.1%	5.0%
Poor harvesting schedule/failure of harvesting cane	12	6.3%	15.0%
High input cost	13	6.8%	16.2%
Unavailability of clean seedcane	2	1.1%	2.5%
High service charge/fees	5	2.6%	6.2%
Factory inneficiency	1	.5%	1.2%
Failure to transport cane after harvesting	2	1.1%	2.5%
Unavailability of cheap credit to OG	10	5.3%	12.5%
Bureaucracy at village level	1	.5%	1.2%
Poor supervision of contractors during harvesting	2	1.1%	2.5%
Inadequate knowledge in sugarcane husbandry	10	5.3%	12.5%
Late disbursement of credit	3	1.6%	3.8%
Difficult to secure loan	1	.5%	1.2%
High land rent	1	.5%	1.2%
Delay in getting OGR number	1	.5%	1.2%
Low DRD for OG as compared to number of farmers	9	4.7%	11.2%
The same plot to have different renderement level in case of using different name for each trip	2	1.1%	2.5%
Unavailability of input at right time	3	1.6%	3.8%
Unavailability of extension officers	1	.5%	1.2%
No payment on mollases and bargass	5	2.6%	6.2%
Total	190	100.0%	237.5%

Appendix 7 (a): Turiani comments for improvement on production and marketing

	Responses		Percent of Cases
	N	Percent	
Provision of cheap credit at right time	35	13.9%	43.8%
Provision of subsidised inputs	11	4.4%	13.8%
To increase sugarcane price	36	14.3%	45.0%
To have farmers representative during weighing and renderement determination	24	9.5%	30.0%
Early payment	33	13.1%	41.2%
Replacement of new investors/new investor needed	6	2.4%	7.5%
To have another factory at Turiani to encourage/promote competition	4	1.6%	5.0%
Association solidality	2	.8%	2.5%
To increase factory efficiency	4	1.6%	5.0%
Govenment to intervene in solving outgrowers problem	3	1.2%	3.8%
To have and follow proper harvesiting schedule	39	15.5%	48.8%
Association to play fairly to its member	5	2.0%	6.2%
Reduction of service charges/fees	10	4.0%	12.5%
Associations to combat corruption	3	1.2%	3.8%
Proper supervision of contractor during harvesting	13	5.2%	16.2%
To avoid unfare competition among outgrowers associations	1	.4%	1.2%
Training on husbandry aspect	2	.8%	2.5%
Association to organize provision of clean seedcane/fertilizer on credit	5	2.0%	6.2%
The miller to take care of contracting instead of our association	5	2.0%	6.2%
Harvesting of sugarcane when renderment is high	1	.4%	1.2%
Complete shift from production of sugarcane to other crops like paddy as they have little chaos	2	.8%	2.5%
Association to higher knowledgeable contractor for harvesting	5	2.0%	6.2%
Standardize renderement to all farmers per season	1	.4%	1.2%
Infrastructure improvement	2	.8%	2.5%
Total	252	100.0%	315.0%

Appendix 7 (b): Ruembe comments for improvement in production and marketing

	Responses		Percent of Cases
	N	Percent	
Provision of cheap credit at right time	27	14.1%	36.5%
Government to subsidise inputs for sugarcane production	7	3.6%	9.5%
To increase sugarcane price	13	6.8%	17.6%
To have farmers representative during weighing and rendement determination	19	9.9%	25.7%
Early payment	4	2.1%	5.4%
Solidarity among association during sugarcane price negotiation and setting	5	2.6%	6.8%
To increase factory efficiency	8	4.2%	10.8%
To have and follow proper harvesting schedule	11	5.7%	14.9%
Association to play fairly to its members	1	.5%	1.4%
Reduction of service charges/fees	4	2.1%	5.4%
Associations to combat corruption	3	1.6%	4.1%
Proper supervision of contractor during harvesting	3	1.6%	4.1%
Training on husbandry aspect	14	7.3%	18.9%
Association to organize provision of clean seedcane/fertilizer on credit	6	3.1%	8.1%
Harvesting of sugarcane when renderment is high	1	.5%	1.4%
Infrastructure improvement	5	2.6%	6.8%
Association to be zone specific for easy harvesting	2	1.0%	2.7%
Factory to increase DRD for OG	12	6.2%	16.2%
We should be paid on mollases and bargase	2	1.0%	2.7%
To have early access of inputs at lower price	11	5.7%	14.9%
Regular visit of extension service	2	1.0%	2.7%
The factory should start processing sugarcane from OG	1	.5%	1.4%
Better management of our farms	14	7.3%	18.9%
Retain of 10% instead of current 5% of final pay; should be used in purchase of inputs in bulk for OG	2	1.0%	2.7%
To use the better harvesting and transportation equipment	5	2.6%	6.8%
Accessing good quality seedcane	1	.5%	1.4%
Provision of new seed varieties eg. N41	1	.5%	1.4%
To lower production costs	8	4.2%	10.8%
Total	192	100.0%	259.5%

Appendix 8 (a): Turiani-OGR number and delay time

	N	Minimum	Maximum	Mean	Std. Deviation
Number of days to get OGR number	80	1.00	30.00	7.6000	8.60909
Number of trips to obtain OGR number	79	1.00	5.00	2.3544	.64127
Cost of obtaining OGR number	69	1000.00	7000.00	2.5580E3	1123.07427
Delay time in 2010/2011-burning to harvesting (hours)	43	12.00	72.00	20.7907	15.65637
Delay time in 2010/2011-harvesting to transportation (hours)	43	4.00	96.00	33.2558	21.51754
Total delay time 2010/2011	43	16.00	124.00	54.0465	30.47946
Delay time in 2009/2010-burning to harvesting (hours)	47	12.00	82.00	20.1915	15.64225
Delay time in 2009/2010-harvesting to transportation (hours)	48	2.00	96.00	29.8542	21.05513
Delay 2009/2010-total	48	2.00	134.00	49.6250	30.18357

Appendix 8 (b): Ruembe-OGR number and delay

	N	Minimum	Maximum	Mean	Std. Deviation
How long does it take to get OGR numbers	59	1.00	1095.00	1.4644E2	222.75487
Number of trips to obtain OGR number	17	2.00	7.00	2.5294	1.32842
Number of trips to obtain OGR number-cost	14	1000.00	15000.00	5.2143E3	4022.60098
Delay time in 2010/2011- burning to harvesting (hours)	64	12.00	72.00	16.4062	10.75664
Delay time in 2010/2011-harvesting to transportation (hours)	61	3.00	144.00	34.3279	34.12463
Delay 2010/2011-total (hours)	64	12.00	156.00	49.1250	34.06693
Delay time in 2009/2010-burning to harvesting (hours)	46	12.00	72.00	16.8696	12.75863
Delay time in 2009/2010-harvesting to transportation (hours)	45	5.00	96.00	24.0889	24.83566
Delay 2009/2010-total	46	17.00	108.00	40.4348	28.48910

Appendix 9: Sugarcane production in a year 2010/211

Variables	Turiani	Ruembe
Total output		
Mean	47.09535	102.7015
Minimum	6	9
Maximum	290	900
Standard deviation	54.08565	140.2699
Average tons/Ha		
Mean	31.26814	40.48193
Minimum	6	10
Maximum	75	100
Standard deviation	17.31181	21.09834
Renderement level		
Mean	8.697674	9.448615
Minimum	6	7
Maximum	11	12
Standard deviation	1.18004	0.853548
Sugarcane price/Tone		
Mean	36984.3	63089.57
Minimum	25500	50775.9
Maximum	46750	66810.4

Appendix 10: comments for improvement on outgrowers organization

Outgrowers responses	Turiani		Ruembe	
	Frequency	Percent	Frequency	Percent
Government should intervene on activities of association/cooperatives	1	1.2	NA	NA
Proper supervision of contractors during harvesting	11	13.8	10	12.5
Reduction of service charge	20	25.0	1	1.2
To have and follow proper harvesting schedule fairly	44	55.0	27	33.8
To procure harvesting equipment and not to depends on contractor	4	5.0	3	3.8
NA	NA	NA	2	2.5
Provision of inputs on credit	NA	NA	9	11.2
To improve infrastructure	NA	NA	4	5.0
To look for subsidized inputs	NA	NA	1	1.2
To negotiate on increase of DRD.	NA	NA	22	27.5
To procure inputs in bulk at low price and at right time	NA	NA	1	1.2
Total	80	100.0	80	100.0

Appendix 11: Sugarcane outgrowers financial service costs

Variables	Turiani	Ruembe
Interest rate		
Mean	21	16.22368
Minimum	15	7.5
Maximum	24	24
Standard deviation	4.29058	3.896806
Time lag from application to receiving loan		
Mean	36	45.18
Minimum	2	7
Maximum	90	120
Standard deviation	36	31.54
Total days spent on processing of credit		
Mean	6.2826	5.921053
Minimum	2	2
Maximum	15	14
Standard deviation	2.84927	2.246698
Contract enforcement costs		
Mean	2266.667	5142.857
Minimum	1500	2000
Maximum	3600	17000
Standard deviation	578.4595	4243.631
Transaction costs as percentage of total loan		
Mean	25.3769	25.77392
Minimum	11.90	17.26667
Maximum	42.12	37
Standard deviation	6.00128	4.338597

Appendix 12: Action to take for improving sugarcane price

Outgrowers responses	Turiani		Ruembe	
	Frequency	Percent	Frequency	Percent
N/A	2	2.5	18	22.5
Association should negotiate with the miller	21	26.2	39	48.8
Negotiation ongoing between the miller and the association	19	23.7	8	10.0
I don't know	1	1.2	NA	NA
No alternative -single buyer	1	1.2	NA	NA
Nothing	34	42.5	9	11.2
Reduction of area under sugarcane to paddy	1	1.2	NA	NA
Uprooting sugarcane farms	1	1.2	NA	NA
Government should intervene	NA	NA	1	1.2
SBT and association should negotiate with miller	NA	NA	4	5.0
Association solidarity to pressurize the miller to increase price	NA	NA	1	1.2
Total	80	100.0	80	100.0