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MARKETING TEA FOR UGANDA'S SMALLHOLDER SECTOR

by

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Submitted in fulfilment of the requirements for the degree of

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Promoter:

Prof. H. D. Van Schalkwyk

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FOREWORD

The quality of tea is very significant and yet there has been no research to determine its economic impact; research that can be incorporated into the day to day management of the production process. The main marketing channel for the Ugandan smallholders is the Mombasa auction market, which in turn influences the prices quoted for contracts sought outside the auction market. Added to this is the fact that the information generated within the tea industry, and in particular the smallholder tea factories, is mainly qualitative.

It is therefore of great importance to know whether the Mombasa auction market is well structured to generate an efficient price, and how the price generated is related to the quality of the tea produced by Uganda's smallholder farmers. These issues became apparent to the researcher while he worked with Agri-industrial Management Agency (AGRIMAG) Limited as a Monitoring and Evaluation Officer, Projects Manager and finally as Planning and Marketing Manager.

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Finally, to my family and friends, thank you for your encouragement. To my wife, Martha, I say you have truly been a helper and one that can only be God given. Thank you so much and sorry for the long nights or should I call them long days, as there seemed to be no end to the days that just continued into the following morning.

HANS NATSON BALLYAMUJURA
BLOEMFONTEIN
MAY 2001

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Degree : **PhD**
Department : **Agricultural Economics**
Promoter : **Prof. H. D. Van Schalkwyk**

ABSTRACT

Literature shows that consumers and processors demand a particular good or product based on the utility they are able to derive from it, or on its ability to meet processing requirements. A number of studies have been conducted to model the relationship between price and the various quality attributes for a number of products such as vegetables, pork, beef, pineapples, etc. However, no such studies have previously been conducted on a product like tea, whose price determination is greatly dependent on the physical appearance and savoury.

The quality of the various tea grades implicitly determines the price received by the producer. It is widely recognised in the tea fraternity that a good tea fetches a higher price. It is therefore of utmost importance to fully understand the impact of change in various quality attributes on the price of a particular tea grade. The absence of the ability to estimate the impact of change in quality attributes causes tea producers to make decisions without all the necessary information, which could in turn lead to losses in terms of price.

Market research has tended to concentrate on seller concentration and has paid little attention to buyer concentration. Literature shows that buyer concentration exists commonly in agricultural markets due to the nature of the products. This study has

shown that the level of buyer concentration at the Mombasa auction market is high. Therefore, there are legitimate concerns that the market will not guarantee an efficient price to the producer. The East African Tea Trade Association has an important role to play in ensuring that these concerns are dealt with by seeing to it that the rules and regulations do not encourage this to happen. Producers, on the other hand, may find the balance through increased market access, which will entail exploring other market alternatives and not being too dependent on the Mombasa auction market. There are a number of export opportunities in already established tea markets, which can easily be explored by the tea producers through increased promotional activities and trade alliances.

Growth prospects are still greatly limited by the infrastructure, provision of financial and extension services, research, etc. The feeder road networks still remain in a very poor state, at times necessitating repairs by the factories so as to be able to collect green leaf. The government is still unable to provide an adequate agricultural extension service and the smallholder factories have had to start their own extension services. The government has recently embarked on a programme for the modernisation of agriculture, but this will only show tangible results if a conducive environment for agricultural trade in the country is created.

BEMARKING VAN TEE VAN UGANDA SE KLEINBOER SEKTOR

Deur

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SAMEVATTING

Literatuur toon dat verbruikers en verwerkers se vraag na 'n spesifieke goed of produk gebaseer is op die nut wat hulle daaruit kan kry of op die vermoë daarvan om te beantwoord aan die vereistes vir verdere verwerking. 'n Aantal studies is al gedoen om die verhouding tussen prys en die verskeie kwaliteitseienskappe van produkte soos groente, vark, beesvleis, pynapples ensovoorts te modelleer. Daar is egter nog nie 'n soortgelyke studie gedoen op 'n produk, soos tee, waarvan prysbepaling van die fisieke voorkoms daarvan en smaaksintuie afhanklik is nie.

Die kwaliteit van die verskillende grade tee bepaal die prys wat ontvang word deur die produsent implisiet. Dit word wyd erken in die teegemeenskap dat 'n goeie kwaliteit tee beter pryse behaal. Dit is dan ook daaroor baie belangrik om die impak van veranderings in die verskeie kwaliteitseienskappe op die prys van 'n spesifieke graad tee ten volle te verstaan. Die afwesigheid van die vermoë om die impak van veranderinge in die kwaliteitseienskappe te skat, veroorsaak dat teeprodusente besluite neem sonder al die nodige inligting, wat weer kan lei tot verliese in terme van prys.

Marknavorsing is geneig om te konsentreer op die konsentrasie tussen verkopers in stede daarvan om aandag te gee aan die konsentrasie tussen kopers. Volgens die literatuur kom konsentrasie tussen kopers weens die eienskappe van die produkte algemeen voor in die landbou. Hierdie studie het getoon dat die vlak van konsentrasie tussen kopers op

die Mombasa veilingsmark hoog is. Daar is dus geldige kommer dat hierdie mark nie effektiewe pryse aan produsente kan waarborg nie. Die Oos-Afrika Teehandelsvereniging het 'n baie belangrike rol om te speel in hierdie verband deur toe te sien dat die reëls en regulasies dit verhinder. Produsente kan ook 'n balans vind deur verhoogde marktoegang, wat sal behels dat ander markalternatiewe ondersoek moet word en dat hulle nie so afhanklik moet wees van die Mombasa-veilingsmark nie. Daar is 'n hele aantal uitvoergeleenthede in reeds gevestigde markte vir tee wat maklik benut kan word deur teeprodusente, deur onder meer verhoogde promosie-aktiwiteite en handelsalliansies.

Groeivoorsigte word steeds grootliks beperk deur infrastruktuur, verskaffing van finansiële en voorligtingsdienste, navorsing ensovoorts. Die padnetwerke is steeds in 'n baie swak toestand, wat by tye noodsaak dat die fabriek self herstelwerk moet doen om die groen teeblare te kan insamel. Die owerheid is ook steeds nie daartoe in staat om die verlangde landbouvoorligting te verskaf nie, wat veroorsaak het dat die kleinboerfabriek met hulle eie landbouvoorligting begin het. Die regering het onlangs begin met 'n program vir die modernisering van landbou, maar dit sal slegs tasbare resultate lewer as 'n omgewing wat landbouhandel in die land ondersteun, geskep word.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

The tea industry in Uganda almost collapsed entirely during the period of political and economic instability. The collapse began at the time the Indian community was expelled by the then president Idi Amin, at the declaration of the economic war in 1972. This was followed by the liberation and civil wars of 1979 and 1980 to 1986. Uganda lost its entire regulatory infrastructure, technical and managerial capacity.

Uganda has, since the end of the 'Guerrilla war' in 1986, returned to the road of development and is currently regaining its once held position, when it was referred to as the Pearl of Africa. A fairly stable government was established, and free and fair general elections were held in 1996 and in April 2001. Uganda has shown an economic growth rate varying between 4 and 12 percent and an inflation rate varying between 3 and 10 percent over the last fourteen years. In the 1999/00 financial year, the GDP grew at 5,1 percent and the inflation rate was 3,8 percent per annum (Ministry of Planning and Economic Development, 2000).

The political and economic stability since 1986 has permitted foreign governments and organisations to aid various sectors of the economy. As a result, the tea industry has benefited from the European Union through the Smallholder Tea Rehabilitation Project (STRP). The STRP was in operation from 1989 to 1993. The main aim of this project was to encourage and assist farmers to rehabilitate abandoned tea gardens and estates. This was followed by another project, the Smallholder Tea Development Project (STDP) which supported tea farmers and factories. The beneficiaries of this project were the factories operated and managed under the Uganda Tea Growers Corporation (UTGC), the farmers who sell their green leaf to these factories and those farmers in areas where the government had previously planned to build factories but did not. The majority of farmers supplying green leaf to the existing factories have signed agreements

with their respective factories to deliver all their leaf to the factory. This project ended during 1999 and is currently in a consolidation phase. The Uganda Tea Growers Corporation is a government parastatal that was established in 1966 to encourage and support tea development in the country.

The farmers supported under this project are mainly smallholder farmers. These are farmers who own or maintain small gardens varying from as low as 0.2 ha. Large estate owners willing to sell leaf to these factories are also supported. Tea production is highly labour intensive and therefore provides several employment opportunities in the rural areas. The Smallholder Tea Development Project consisted of two components: the development of green leaf, administered by UTGC, and development of the tea factories by a management agency.

The tea factories supported by this project rely and depend entirely on green leaf produced by smallholder farmers and a few large estates. These factories are Mabale, Mpanga, Igara and Kayonza, in the Kabarole, Bushenyi and Rukungiri districts of western and south-western Uganda. The tea factories are managed by a subsidiary company of UTGC, Agri-Industrial Management Agency (AGRIMAG) Limited, which was set up in 1994. This was formed as a national alternative to using a foreign managing agent. Through the project the managing agent was assisted with foreign technical expertise in executive positions to manage the agency and train Uganda's own capacity to take over management at the end of the project.

The four tea factories that buy leaf from the farmers were privatised as part of the project. Only farmers who own tea gardens or estates and sell all their leaf to these factories were allowed to buy shares, which are allotted according to the farmer's level of patronage. Under the scheme, farmers receive an extra (second) payment if the factory operates at a profit within a given financial year. This extra payment is also payable to farmers who rent their tea gardens and have signed green-leaf agreements. The extra payment is dependent on the quantity of leaf sold by each individual to the factory during that financial year.

The management agency carries out the duties of managing the factory companies on behalf of the factory boards of directors. It is responsible for sound management of factory operations, manpower, financial management, factory engineering and supply services, green leaf collection services, credit recovery and marketing of made teas. The smallholder management agent sells tea on both the local and international markets. The teas sold on the international market are either sold through the Mombasa auction market or by direct contract.

Made tea is graded by the smallholder factories according to the size of the broken or curled leaf, mainly into the following grades: Pekoe Fannings 1 (PF1), Broken Pekoe 1 (BP1), Broken Pekoe (BP), Pekoe Dust (PD), Dust (D), Fannings 1 (FNGS1) and Fannings (FNGS). Demand for these different grades is greatly influenced by consumers' tastes. The tea offered for sale is presented to the buyers in lots of uniform quality. This implies that two teas of the same grade but presented as different lots will not necessarily be of the same quality standard.

Prices are mainly determined on auction markets through forces of demand and supply. The tea broker values the tea just to provide the buyers with an indication of market conditions. Prices of a particular grade of tea differ considerably due to the varying quality characteristics within each grade. The Mombasa auction prices serve as reference prices on the local and contract markets for the smallholders, which operate outside the Mombasa auction. The management agency sets a premium above the average price of the respective grade and makes an offer to a prospective buyer. The contract arrangement is finalised when the buyer finds the price and quality agreeable. In regard to the local market, the average prices of the respective grades on the Mombasa auction are used to determine the ex factory prices and the prices on the local market.

1.2 PROBLEM DEFINITION

Uganda continues to rehabilitate her tea gardens and estates, and has just been able to attain the production level she had before the civil strife between 1972 and 1985, which

was 17 million kg of made tea. This was not attained until the end of 1996. The smallholder factories are currently being restructured with better machinery and staff training. This will improve both the volume and quality of production. Production will increase even further because of the timely availability of farm inputs. There is therefore, a need to fully understand the economic impact of quality changes and broaden current markets.

The Mombasa auction market has a great impact on tea prices in the East African region because, at present, most tea from the region is sold through this auction. It is, therefore, important to know whether the Mombasa auction market is a fair market. Any unfair competition through market concentration may result in distorted prices and in turn signal poor reference prices on both the local and contract markets.

The asking price for tea on both the local and contract markets is determined on basis of the prevailing Mombasa auction prices. It is important to note that prices vary within grades depending on the quality of the tea. Up to now the relationship between the quality and the price of a specific grade has not been determined. Teas sold by contract are usually of higher quality and are sold at a premium over and above the Mombasa auction price. This premium, as mentioned earlier, is determined by the marketing agent of the smallholders. There is no well-defined dynamic mechanism to determine the asking price for the contract or the local market. This implies that once prices on the local and contract markets are adjusted, taking into account prices on the auction market as reference prices, changes in the auction price levels are not immediately reflected in the asking price made for the smallholder teas. The asking price should reflect the effect of demand, supply and quality conditions on the world market.

The management agency of the smallholder tea factories does not operate any clearly defined system for attaching values to the teas produced by the smallholder tea factories. It depends mainly on evaluation reports made by the tea brokers in Mombasa. The local evaluation reports are qualitative and provide no quantitative measure of the quality of the tea. This leaves very little room to analyse the production process in regard to quality, which plays a vital role in price determination, especially on the international

market. An evaluation mechanism for smallholder factories would assist in determining the asking price on the local and international contract markets.

It is also important that the trend and the variations within grades observed in the tea price at the auction market are confidently predicted. A greater understanding of pricing and its trends in the Mombasa auction will allow the formulation of clear guidelines and a mechanism for determine asking prices on both the local and contract markets.

1.3 OBJECTIVES

This study concentrates on the analysis of the market structure of the Mombasa auction. Various concentration measures are estimated and market trends between 1987 and 1999 are analysed. The relationship between the auction price and the various attributes of selected grades of made tea are analysed and discussed. This helps to determine the effect of various changes in the quality attributes on the price of a particular tea grade, develop a mechanism to value made teas and determine the asking price on the local and international contract markets.

The specific aims of the study are to:

- a) Analyse the market structure and buyer composition of the Mombasa auction market.
- b) Estimate the relationship between the attributes of the tea by grade and the price of Uganda's smallholder teas on the auction market.
- c) Develop a tea tasting report that is both qualitative and quantitative, as well as a model to attach values to the teas tasted and evaluated by the smallholders or other producers.
- d) Highlight the way forward for the tea producers, in particular smallholders, through a strategy for market growth.

1.4 DELINEATION

The study only addresses the marketing of tea for Uganda's smallholder sector with specific reference to the Mabale, Mpanga, Igara and Kayonza Growers Tea Factory companies. The study neither attempts to address the production and household characteristics of the individual tea growers nor perform an analysis on the profitability of the manufacturing process.

1.5 MOTIVATION

Any meaningful development in the agricultural sector of Uganda will have to be influenced by the development of agro-processing industries. Currently the Ugandan government, with the help of foreign assistance, is encouraging the development and revitalisation of the agro-processing sector. If properly done, this could go a long way in alleviating poverty in the rural areas (increasing their levels of income) but it is important that this is taken place hand in hand with improved marketing. Only between 5 and 10 percent of the smallholder factories' made tea is sold on the local market. It is therefore imperative to ascertain whether the generated price signal is well suited to generate the required incentive, bearing in mind that tea has been predicted by some to be the world's next beverage boom (O'Rourke, 1996).

Improved marketing and fair pricing of tea will have an immediate positive impact on households of smallholder farmers and the large labour force employed by this sector. This impact is made possible through a special arrangement that gives farmers a second payment over and above the initial purchase price of the green leaf, when profits are realised. At the same time, this serves as an incentive to the farmers to produce more, as the second payment is dependent on the volume of green leaf produced and sold to the factory. Through this scheme the sector is able to reinvest the revenue generated directly into the smallholder households, which is the only way in which the present level of household incomes can be improved. Any improvement in household income

levels will guarantee these households greater opportunities to educate their children and break out of the vicious cycle of poverty.

1.6 RESEARCH METHODOLOGY

The study involves a comprehensive analysis of the market structure of the Mombasa auction between 1987 and 1999. The market share held by each active buyer is estimated and a description is given of the entry and exit movement into active tea buying.

A questionnaire was developed to collect information on tea quality from the four smallholder tea factories. This is mainly a semantic differential questionnaire, in which the respondents are required to rate the product to depict its quality. A scale ranging from one to ten was used, against which the answer can be quantified (see appendix A for specimen of the questionnaire).

The qualitative and quantitative data obtained from the questionnaires and the Mombasa auction was used to formulate and estimate hedonic price functions for selected grades. A hedonic price model was developed and used to analyse the various attributes of tea and their effect on the prices offered on the auction market. A hedonic price function is a regression of the observed price of the product against its quality attributes (Lucas, 1975). Both linear and non-linear relationships between price and quality of tea were investigated in the analysis (O'Connell, 1986).

1.7 DATA USED

Data used was mainly collected from the Mombasa auction market and the tea factories. Data for the Mombasa auction was obtained from annual statistics recorded by the brokerage firms at the Mombasa auction for the period 1987 to 1999. In regard to data collected from the tea factories, the Production Managers at each of the four factories completed questionnaires for teas packed and sold between January and June 1998. The characteristics analysed were divided into four sections. Information was collected on

the black leaf appearance, infusion, liquor and the mode of packaging. The analysis concentrated mainly on the grades of Broken Pekoe, Pekoe Fannings and Pekoe Dust. The data collected on the Dust grade was insufficient for statistical analysis. Among the secondary grades, only the Fannings¹ and Fannings grades were analysed.

The primary grades should ideally account for 85 percent of the smallholders' production. As at the end of June, 1998 the level of primary grades attained was 73,5, 75,7, 78,3 and 80,4 percent for Mabale, Mpanga, Igara and Kayonza respectively. The Fannings, on the other hand, should ideally account for only 11 percent but at the end of June 1998 it accounted for 18,2, 13,7, 15,2 and 14,2 percent for Mabale, Mpanga, Igara and Kayonza respectively.

A formal sampling procedure was not adopted due to the constantly varying supply situation, coupled with varying production patterns in both the field and the factory, that usually result in varying proportions of each grade being manufactured. The market to which the made tea will be sold is also not known at the time the tea is dispatched from the factory. This led to a number of questionnaires being dropped from the sample because the made tea lots they referred to, were sold privately and not through the Mombasa auction market. The procedure adopted was therefore to obtain a sample of tea from each of the four tea factories that was as large as the circumstances could permit and unlikely to disrupt the production process at the factories. This approach is similar to that followed by O'Connell (1986).

Most of the measured aspects of the quality of tea are subjective and as a result subject to error. In a bid to minimise the occurrence of error, the measurement was carried out under the supervision of the Production Managers at each factory. It was assumed that the Production Managers' day to day experience in the supervision of quality control in the tea manufacturing process would help to reduce the occurrence of error.

However, it is important to note that in the course of their daily operations the smallholder tea factories collect most production information on the quality of tea in a qualitative manner. This posed great problems right from the beginning of the study.

However, the questionnaire was formulated with the help of the Factory Supervisors, each in charge of two factories under the smallholder programme. Where possible the variables were quantified on a scale of one to ten.

A total of 235 questionnaires were used in this study: 45 for the Broken Pekoe (BP and BP1) grade, 73 for the Pekoe Fannings (PF1) grade, 59 for the Pekoe Dust (PD) grade and 58 for the Fannings1 and Fannings (Fngs1 and Fngs) grade. By the end of June 1998, 671 tea lots had been sold. Therefore the sample represented 35 percent of teas manufactured in 1998 and sold through the auction market before the end of June of the same year.

1.8 OUTLINE OF THE STUDY

The primary concern of the study is to determine whether the Mombasa auction market is fair and as a result generates the right incentive to producers in the region, but in particular to the smallholders in Uganda. The study starts in Chapter 2, with a brief review of the history of tea, a description of the world tea trade, the tea industry in Uganda and the role of tea production in poverty eradication among smallholder households. An overview of factors that influence the quality of tea is given, as well as a brief description of the tea manufacturing process.

Chapter 3 discusses the Mombasa auction market, the East African Tea Traders' Association, including an analysis and discussion of the market structure. Chapter 4 gives a detailed description of the formulation of the hedonic price model for various grades. In Chapter 5 the results of the analysis are discussed. A market growth strategy for the smallholder tea factories is proposed in Chapter 6. Conclusions and recommendations for further research are made in Chapter 7.

CHAPTER 2

BACKGROUND

Tea is the most popular beverage in the world. Only water is rated higher in world consumption than tea ("Tea Man", 1996).

2.1 INTRODUCTION

Tea growing, and thus tea processing, has a vital role to play in improving the rural livelihoods of the Ugandan rural population, especially in western Uganda. This results from the revenues generated by the production of tea and the numerous employment opportunities created through the gardens and tea factories. This chapter provides an overview of the history of world trade in tea and the tea industry in Uganda. The role of income from tea farming in rural households is also discussed in view of Uganda's poverty eradication strategy. The manufacturing process of the different types of tea and the various factors that affect the quality of tea are also highlighted.

2.2 HISTORY OF TEA

The first authentic account of tea was made in the year 780 AD, in a book entitled *Ch'a Ching* (Tea Book) written by Lu Yu, describing the tea manufacturing process (Weatherstone, 1992). Regular tea trade was recorded as early as 960 - 1127 AD during the Sung dynasty. The government permitted trade across its borders into Mongolia and exported tea to Tibet (Weatherstone, 1992).

The first tea reached Europe through the Dutch during the 17th century, while China began supplying small quantities of tea to Russia towards the end of the same century (Weatherstone, 1992). Tea drinking became fashionable in England during the reign of Queen Anne. China was the sole source of tea for the European market during the 19th century, at a time when China was reaching the height of her production, and Britain dominated the tea markets in the Far East (Barclays Bank, 1967 and Eden, 1958).

The expansion of the tea industry into its present form started in India between 1818 and 1834, when several private individuals and government officials became interested in the possibilities of cultivating tea in north-east India. This was primarily as a source of revenue but also as an alternative source of tea for the European market, as relations with China were disturbed from time to time (Eden, 1958). In 1834, after claims of "wild tea" being discovered in Nepal and the Manipur district, a Committee of Tea Culture was formed. This consisted of "gentlemen of high character and great intelligence" in Calcutta (Eden, 1958).

Experiments were made with tea seed from China at the Calcutta botanical gardens before attention was turned to tea found growing "in the wild" within the territory of the East India company, from Sadiya to the borders of the Chinese province of Yunan. This led to the discontinuation of imports from China and the development of the Indian enterprise from locally discovered types (Eden, 1958).

In Sri Lanka (Ceylon), the cultivation of tea began in the 1870s, with 4 ha in 1867, and by 1880 this had expanded to 5 750 ha. The area under tea cultivation expanded to 123 400 ha during the next fifteen years, and 194 000 ha under tea cultivation during 1997 (International Tea Committee, 1998). This followed the government's encouragement for tea to replace coffee, which was being destroyed by the Coffee Rust Fungus (Eden, 1958).

As early as 1850 tea was being grown at the Durban botanical gardens in South Africa. This later developed into a plantation industry in Natal in 1877 after the failure of coffee, as had been the case with Sri Lanka (Eden, 1958). The oldest and continuing tea industry in Africa is that of Malawi. Tea seeds were first introduced in 1878 but none survived. They were later re-introduced in 1886 and 1888 and the first tea estate was planted in 1891 (Eden, 1958).

At the beginning of the 20th Century the three East African countries had specimen plants being raised in Limuru (Kenya), Entebbe (Uganda) and Amani (Tanzania).

Despite this, it was not until the decade of 1920 to 1930 that commercial development began to take place (Eden, 1958).

Between 1921 and 1925 three companies started establishing tea on the eastern and western escarpments of the Rift valley in Kenya. In 1924 a commercial estate was established in Tanzania near Tukuyu and later, in 1931, another in the Usambara Mountains. In Uganda, however, significant development in tea cultivation did not start until the early 1930s (Eden, 1958 and Barclays Bank, 1967).

There are four recognised phases of development in the preparation and manufacturing of tea. The first phase was that of hand processing used in China for many centuries. The second phase began in 1839 in Assam when early planters, using the Assam tea variety, simplified the Chinese method of hand preparation. The third phase started in 1880, when mechanical rollers and dryers were invented and the leaf was manufactured rather than prepared (Harler, 1963). The fourth phase began with the use of Crushing, Tearing and Curling (CTC) rollers in 1925; the rotorvane was later incorporated into the manufacturing process. Instant tea, first patented in 1943 by Werner Arndt, marked the fifth phase of tea manufacturing (Saltmarsh, 1992). Most of the world's black teas are manufactured based on the process developed in the fourth phase.

2.3 WORLD TRADE IN TEA

By 1938 the United Kingdom accounted for about half of the world's imports of black tea, with 200 000 tonnes for consumption in the United Kingdom and 185 000 tonnes sold through the London auction (Van de Meeberg, 1992). All other major importing countries (Europe, the United States of America, Canada, Australia, etc.) together absorbed about just as much as tea as the United Kingdom alone. London was considered to be the world market for (black) tea and London auction prices were, in practice, world market prices. London auction prices were the guideline for other markets (Van de Meeberg, 1992).

In 1932 the United Kingdom accounted for 60 percent of the world's imports (260 000 tonnes), of which 200 000 tonnes were required for the United Kingdom's own consumption and the balance re-exported to various destinations in Europe, the United States of America, Canada, Australia, the former Soviet Union, etc. However, the London market could not absorb the ever-increasing supplies of tea and stocks of tea in London accumulated, rising to 7 months' supply of the United Kingdom market in 1932. This resulted in the price of tea falling to very low levels. In an effort to protect British producers' interests against tea competition from 'foreign' tea from Java/Sumatra, the British government (in 1932) imposed an import duty. Imports from commonwealth countries such as India and Sri Lanka enjoyed a lower import duty than non-commonwealth member countries such as Java/Sumatra (Van de Meeberg, 1992). As a result less tea was exported from Java/Sumatra to the United Kingdom. Imports by the United States, Egypt, Iraq, etc. from the Netherlands East Indies increased, as these tea imports were cheaper compared to imports from India and Ceylon (Sri Lanka) which are commonwealth member countries.

Producers then realised that more effective measures had to be taken, considering that India, Ceylon (Sri Lanka), and the Netherlands East Indies (Indonesia) accounted for 83 percent of world exports. The British and Dutch producers had to come to an arrangement aimed at regulating production, export and consequently prices. The first attempt towards achieving this was made in 1929, but this failed. In 1933 the situation had become so serious that agreement could no longer be postponed (Van de Meeberg, 1992).

The International Tea Agreement was signed in February 1933 (International Tea Committee cited in Van de Meeberg, 1992). The agreement was formulated by British and Dutch tea producing interests and was ratified and implemented by their respective governments. Binding regulations were made not to extend cultivation areas and to regulate tea exports from India, Ceylon (Sri Lanka) and the Netherlands East Indies (Indonesia). The International Tea Committee was formed in 1933 to administer the agreement and collect statistical data from producing and consuming countries in order to make recommendations in respect to quotas. The International Tea Committee (ITC)

is an independent organisation representing tea worldwide. Until 1978 the ITC was funded by producing countries and thereafter on an equal basis by most of the principal producing/exporting and consuming/importing countries (Van de Meeberg, 1992).

When World War II broke out on 3 September 1939, all stocks of tea in the United Kingdom were taken over by the government. The London tea auctions were cancelled on 5 September 1939 and tea was rationed at a rate of 56.7 g per head per week (Forrest cited in Van de Meeberg, 1992). The first auctions after the war were held in April 1951. Production and exports from the 'old' producing countries (India, Sri Lanka and Indonesia) during the first few years after the war did not show a significant increase. Production and exports from Africa were still unimportant, but became of significance in the 1970s. The political changes in a number of tea producing countries left their mark on the tea trade and industry and in some cases on the ownership of tea estates and factories (Van de Meeberg, 1992).

A different world tea market emerged after the world war. Producers have had and still have a number of channels through which to dispose of their crop and the channel selected is the one likely to be most rewarding. The producers can also make forward sales, selling part of their produce at a negotiated price. The producers can make private sales of 'ready' tea for immediate delivery and can sell by public auction (Van de Meeberg, 1992).

The bulk of tea exports are through the auction markets of Mombasa, Blantyre, Colombo, Jakarta, Calcutta, Guwahati, Cochin and Chittagong. All these markets offer orthodox and CTC teas except Mombasa and Blantyre, which offer only CTC teas. In the Western world most of the tea is now sold in tea bags instead of packs. This mode of packaging encouraged the shift from orthodox to CTC manufacture. In north India 85 percent of tea is CTC manufactured. All African countries without exception adopted the CTC mode of manufacture. Sri Lanka, Indonesia, Argentina and China (black tea) are still sticking to the orthodox manufacture with a few exceptions, but this may soon change (Van de Meeberg, 1992).

It is however, important to note that despite the existence of the International Tea Committee (ITC) there is no instrument that could either stop or put a brake on steep price fluctuations. There is also no futures market for tea similar to that for coffee, as the product is unsuitable for such a market. Tea is not standardised or 'homogenised' and not storable for any prolonged period, thus excluding the use of 'bufferstock' as a solution against price fluctuations (Van de Meeberg, 1992).

It should also be noted that some countries produce unfermented tea (green tea), which is a completely different market from black tea, and it does not appear on the world market in sizeable quantities compared to black tea. However, its consumption outside the producing countries is on the increase. The leading producers of green tea are China and Japan (Van de Meeberg, 1992). Green tea was 23,5 percent of total tea production during 1999 but the majority of it is consumed domestically (Van de Meeberg, 1992 and International Tea Committee, 2000).

The global tea market reached maturity over a decade ago and is now in a critical period, with fundamental changes taking place in a highly competitive environment (Lister, Ali and Choudhry, 1997). World production of tea is mainly divided into the production of black and green tea. World production of black tea and green tea was 2 170 210 and 667 608 tonnes, respectively during 1999 (International Tea Committee, 2000). The world's largest tea producer during 1999 was India, producing 36,7 and 1,2 percent of the world's production of black and green teas respectively. Asia produced about 78,7 percent of the world's black teas in 1999. Africa produced only 18,2 percent of the world's production in the same period. Asia, apart from being the world's largest producer, retains most of her production to meet local demand. Between 1985 and 1996 Asia, on average, retained 84,6 percent of her annual production, while Africa only retained 16,3 percent of her production for the same period.

Sri Lanka was the world's largest tea exporter during 1999, with 23,9 percent of the world's exports from producing countries. Kenya was the second largest exporter with 22 percent of the world's tea exports from producing countries during 1999. China was the largest exporter of green tea, with 77,9 percent of total exports.

Uganda exported 2 percent of the world's total tea exports from producing countries during 1999. Table 2.1 shows the share of world tea exports held by the different producer countries between 1985 and 1996. Uganda's share of tea exports made by producing countries has been increasing since 1985 when Uganda had a share of only 0,1 percent. By 1993, Uganda's share had increased to 1 percent. This has been due to the changes that have taken place in Uganda as a result of political stability, resulting in increased production by both the commercial and smallholder tea factories. The annual growth rates in production (1985 to 1999) for the world's leading producer countries are shown in Table 2.2. To achieve the above change in exports, Uganda has shown an annual growth rate of 15,2 percent between the period 1985 and 1996.

Table 2.1: Share of world tea exports by leading producer countries (1985 –1999)

COUNTRY	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
India	24.1%	22.4%	22.1%	21.0%	20.4%	19.8%	20.3%	18.7%	16.4%	15.7%	16.0%	14.5%	17.9%	17.6%	16.8%
Bangladesh	3.4%	3.1%	2.4%	2.8%	2.3%	2.6%	2.6%	3.0%	3.1%	2.5%	2.5%	2.5%	2.3%	1.9%	1.4%
Sri Lanka	22.3%	22.9%	22.4%	23.2%	19.9%	20.7%	21.6%	19.4%	20.1%	24.0%	23.3%	22.4%	23.3%	22.7%	23.9%
Indonesia	10.2%	8.8%	10.1%	9.8%	11.1%	10.5%	11.0%	12.8%	10.8%	8.3%	7.6%	9.3%	5.7%	5.5%	8.2%
China Mainland	8.7%	12.3%	11.8%	12.7%	11.4%	10.8%	10.3%	9.8%	10.9%	10.4%	9.9%	10.9%	11.2%	9.1%	7.1%
Taiwan	0.8%	0.8%	0.7%	0.6%	0.5%	0.5%	0.5%	0.5%	0.4%	0.4%	0.2%	0.2%	0.2%	0.2%	0.2%
Iran	0.1%	0.2%	0.1%	0.2%	0.2%	0.1%	0.2%	0.1%	0.1%	0.2%	0.2%	0.2%	0.2%	0.2%	0.3%
Japan	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Malaysia	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Turkey	0.1%	0.1%	0.0%	0.0%	2.4%	2.7%	0.2%	0.6%	3.8%	0.6%	0.2%	0.2%	1.7%	1.5%	0.4%
Vietnam	0.8%	0.8%	0.8%	0.8%	0.7%	0.7%	0.4%	0.8%	0.9%	1.0%	0.8%	0.8%	1.4%	1.4%	1.4%
Total Asia	70.6%	71.3%	70.6%	71.1%	69.0%	68.6%	67.1%	65.5%	66.6%	63.2%	60.8%	61.2%	64.0%	60.1%	59.8%
Burundi	0.5%	0.4%	0.5%	0.4%	0.4%	0.4%	0.5%	0.6%	0.6%	0.6%	0.7%	0.4%	0.5%	0.5%	0.6%
Cameroon	0.0%	0.0%	0.0%	0.0%	0.4%	0.4%	0.3%	0.3%	0.6%	0.3%	0.4%	0.4%	0.3%	0.4%	0.4%
Kenya	14.3%	12.9%	15.1%	14.7%	16.0%	16.3%	18.0%	18.2%	18.1%	19.7%	23.6%	23.5%	18.0%	22.6%	22.0%
Malawi	4.2%	4.5%	3.7%	3.9%	3.9%	3.9%	3.8%	3.9%	3.4%	4.2%	3.3%	3.5%	4.5%	3.5%	3.9%
Mauritius	0.8%	0.7%	0.7%	0.6%	0.5%	0.4%	0.2%	0.6%	0.4%	0.4%	0.3%	0.1%	0.0%	0.0%	0.0%
Mozambique	0.4%	0.2%	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
Rwanda	0.7%	0.7%	0.8%	0.9%	1.1%	1.0%	1.1%	1.4%	0.7%	0.5%	0.3%	0.3%	1.0%	1.0%	1.0%
Tanzania	1.5%	1.6%	1.3%	1.1%	1.2%	1.4%	1.8%	1.9%	1.9%	2.0%	2.0%	1.8%	1.7%	1.9%	1.9%
Uganda	0.1%	0.3%	0.2%	0.3%	0.3%	0.5%	0.7%	0.9%	1.0%	1.2%	1.1%	1.4%	1.7%	2.0%	2.0%
Zaire	0.3%	0.3%	0.2%	0.2%	0.3%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
Zimbabwe	1.1%	1.3%	1.1%	1.3%	1.2%	1.1%	1.2%	0.7%	0.8%	1.0%	0.9%	1.1%	1.2%	1.0%	1.4%
Total Africa	24.0%	22.9%	24.0%	23.5%	25.2%	25.7%	27.8%	28.7%	27.6%	30.2%	32.9%	32.8%	29.1%	33.1%	33.5%
Georgia	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%	0.5%	0.6%	0.7%	0.9%
Argentina	3.5%	4.0%	3.8%	3.6%	4.2%	4.4%	3.7%	4.0%	4.2%	4.6%	4.1%	4.0%	5.1%	5.1%	4.7%
Brazil	1.0%	1.1%	0.9%	1.0%	0.9%	0.7%	0.8%	0.9%	0.8%	0.9%	0.7%	0.6%	0.3%	0.3%	0.3%
Ecuador	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.2%	0.1%	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%
Peru	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total South America	4.5%	5.2%	4.7%	4.7%	5.2%	5.2%	4.6%	5.1%	5.2%	5.7%	5.5%	5.2%	6.2%	6.1%	6.0%
Papua New Guinea	0.8%	0.6%	0.6%	0.6%	0.5%	0.5%	0.4%	0.6%	0.6%	0.7%	0.6%	0.6%	0.6%	0.5%	0.5%
Other Countries	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
Grand Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100%	100%	100%

Source: International Tea Committee (1998 and 2000).

Table 2.2: Annual growth in black tea production (1985–1999)

Country	Annual Growth Rate (Percent)
Sri Lanka	2,2
Kenya	4,5
India	1,9
Indonesia	2,2
China	2,2
Argentina	2,7
Malawi	0,2
Uganda	15,2
Tanzania	3,7
Zimbabwe	0,6
Bangladesh	2,4
Vietnam	5,5
Rwanda	-0,9
Georgia	6,1
Burundi	4,1

Source: International Tea Committee (1998 and 2000).

All countries among the top fifteen in the export market during 1999 show a positive annual growth in their production, except Rwanda, which shows a negative growth for the period. This could be attributed to the civil war and the genocide in 1993 and 1994, but by 1997 the production was back to levels comparable to 1991 and 1992. However, there are a number of other countries that also show a negative growth between 1985 and 1999. These are China, Mauritius, Mozambique, South Africa, Democratic Republic of Congo, the Russian Federation, Brazil and Peru.

Tea prices on the world market have shown modest increases. Between January 1994 and June 2000 tea prices at the Calcutta and Mombasa auction markets have shown average monthly growth rates of 0,43 and 0,49 percent, respectively. The price trends at selected auctions are shown in Figure 2.1. All the markets shown depict a similar price trend. The price at the Mombasa auction appears to have been more stable between October 1994 and April 1997, preceding the price increases that occurred in 1997 and peaked in February 1998, before dropping to 154,42 US cents in May 1998. Since then price fluctuations have been much greater compared to the period prior to the February 1998 price peak. Only Jakarta and Mombasa of the auction markets presented in Figure 2.1 show a significant positive linear relationship.

It is however important to note that the prices at each of these markets are determined or greatly influenced by the forces of demand and supply. The market participants influence all the markets. For example, the Jakarta market, which trades both orthodox and CTC, may be strong on days the Pakistan bazaar is active and weak on days when it is not active. Buyers will always have a retail market for which the purchase is being made, and the quality has to suit that market.

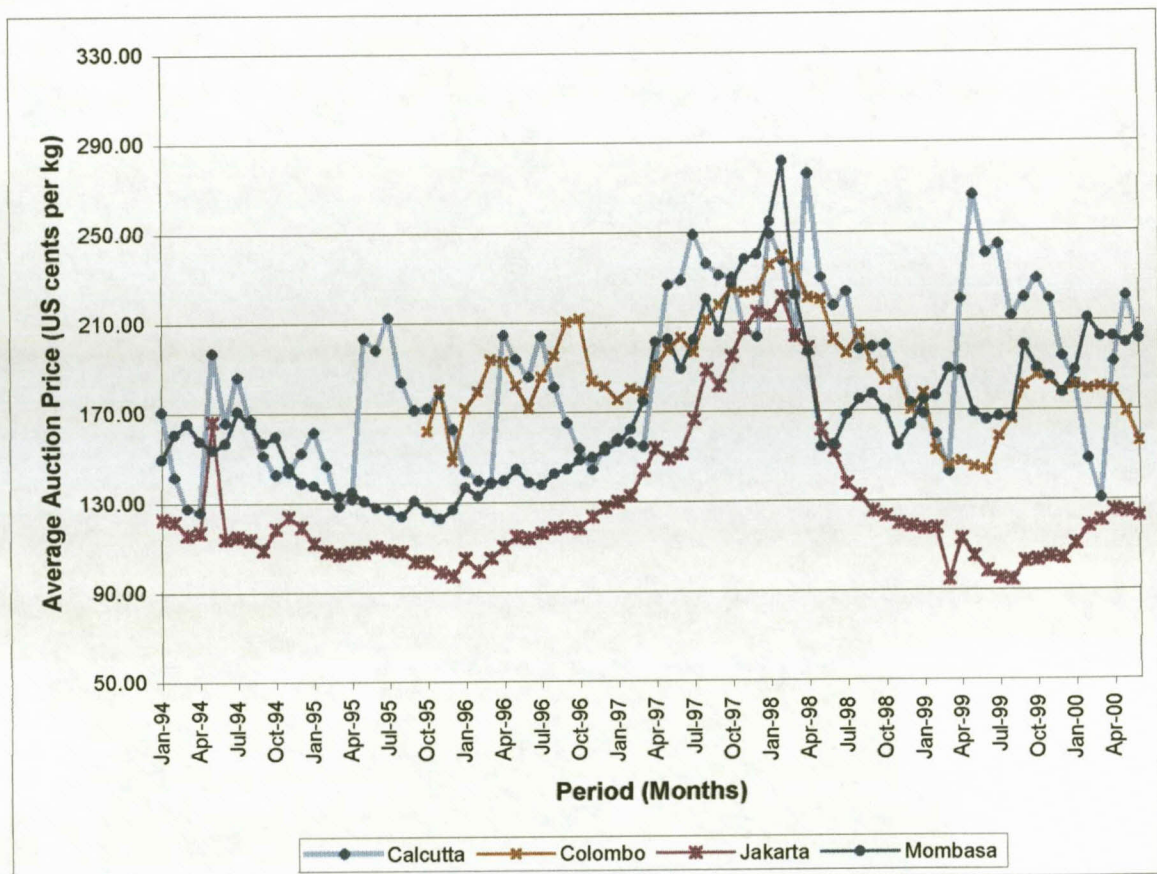


Figure 2.1: Nominal price trend at selected tea auction markets

2.4 UGANDA'S TEA INDUSTRY

The tea industry in Uganda has had an impact on the national economy since the early 1940's. By 1949 Uganda had about 5 565 ha of land under tea production and by the end of 1964 this had risen to 11 250 ha. The production was about 1,5 million kg in 1949

compared to about 17,2 million kg in 1972 and 29,3 million kg in 2000 (Barclays Bank, 1967 and International Tea Committee, 2000). World tea production was 2 170 210 tonnes, of which 13,7 percent was from the East African countries of Kenya, Tanzania and Uganda. The world's largest tea producer in 1999 was India, with 36,7 percent of the world's production of black teas.

During the early 1960s the Ugandan government became actively involved in the sponsorship of tea cultivation, in close collaboration with the Uganda Development Corporation. At the time, as is still the case today, most of the tea was grown on large tea estates. In a 1965 'White Paper' the government accepted a recommendation to expand the production area under 'outgrowers' (or the African smallholders' scheme) by 5 000 ha, to be achieved by 1970 (Barclays Bank, 1967). The development plan envisaged expenditure estimated at £4,3 million by 1971. Production was forecast to increase four-fold to 22,6 million kg by 1976, with the establishment of ten more factories by that date. In early 1966 the Uganda Tea Growers' Corporation was set up by an Act of parliament, as a government parastatal to encourage and support tea development in the country.

2.4.1 SMALLHOLDER TEA DEVELOPMENT PROGRAMME

The Smallholder Tea Development Programme consisted of two components namely the development of green leaf production and the tea factories. The Uganda Tea Growers Corporation administered the green leaf development component, while the tea factory development was administered by a management agency.

The project goals for the two main components of the smallholder farmers and the factories were as follows:

Outgrowers:

- To enable outgrowers to take full control of the company to which they deliver green leaf through the process of privatisation of the factory companies.

- To ensure the ownership gained by the growers increases the momentum of rehabilitation of the tea industry, which was greatly destroyed during the regime of Idi Amin (1971-1979) and ensuing civil wars.
- To contribute to the removal of some of the difficulties encountered by farmers, especially the medium and large scale farmers. The project hoped to achieve this through assistance in the form of finance for labour housing, social infrastructure, equipment and by setting up training programmes in farm and labour management for the farmers.
- To develop farmers' capacity to manage their operational activities more efficiently through extension services, i.e. finances, labour, inputs and timing of agronomic practices.

Tea factory companies:

- To support the farmers in collecting their green leaf, processing and marketing of made tea.
- To help factories improve factory equipment (buildings, machinery and vehicle fleet) in order to achieve a higher level of production.
- To encourage and support the factory company boards of directors, who are the growers, to control the management activities of the tea factory companies (Sorgem and Agrisystems, 1992).

2.4.2 THE PROGRAMME AS A STRATEGY FOR DEVELOPMENT

The smallholder tea development programme has served as an instrument to help the smallholder overcome production constraints, thus making tea growing a viable operation.

This is in agreement with Monu (1996) who suggests it is more convenient and sometimes easier to provide technical advice and develop managerial and technical expertise to people within an organisation than among individual farmers.

In his Prebisch lecture Stiglitz articulated a vision for development that raises the need to pay more attention to culture and institutional development. It emphasises focus on the individual, the family and the community in addition to the public and private sectors of the economy. As technological and economic changes unfold, they have impacts on the different stakeholders. These groups influence the manner in which society responds to these changes in terms of ownership and participation, inclusion and consensus, and social capital (Stiglitz, 1998).

The set-up of the smallholder tea factories has, in a way, been developed along the lines of the Stiglitz vision in that the small-scale tea farmer has been targeted, resulting in the transformation of the farmer as an individual and the family. The target has been the tea farming communities in the areas around the smallholder tea factories.

This augurs well for the government's overall strategy to eradicate poverty. The government's main thrust in poverty eradication is as follows:

- To virtually wipe out mass poverty from Uganda by reducing the percentage of the population currently living below the upper absolute poverty line from the present 26,2 percent down to less than 10 percent and reduce the proportion of the population living in absolute poverty from 45,6 percent to 30 percent by the year 2017.
- To increase the entire population's access to basic services by the year 2017 from the current levels of 53 percent with respect to primary education, 49 percent to primary health care and 34 percent to safe drinking water.
- To empower and build capacity of people to enjoy long, healthy and creative lives.

- To eliminate the phenomenon of destitute children and beggars from Uganda's streets by the year 2015 through suitable centres to care for them and provide training in useful skills to make them self-reliant.

The government believes these goals can be met through the maintenance of existing macroeconomic policy and the already established growth pattern. The economic growth would have to also be broad based to include the poor through the provision of infrastructure and development of a national capacity to respond quickly to natural disasters and man-made calamities (Ministry of Planning and Economic Development, 1997).

In line with the above action plan, the smallholder tea sector is actively involved in improving the livelihood of the farmers through attempts to obtain the best possible prices on the world market through trade organisations with intentions to help improve the lives of the producers. New opportunities are explored constantly to improve on the smallholders' income. For example, an opportunity is being utilised through Traidcraft, a public company committed to promoting fairtrade labelling based on the concerns of the producers i.e. the status of their livelihood. Through the Fairtrade Labelling Organisation a premium is paid over and above the market price. The premium is used to assist in rural development among the tea farming communities (Kimpwitu, 1998).

Uganda's absolute poverty line for food and total expenses for individuals is estimated at US\$ 10,00 and US\$ 14,30 per month, respectively. While the average monthly household consumption on food and total expenses is estimated at US\$ 48,10 and US\$ 68,60 respectively (Ministry of Planning and Economic Development, 1997). In 1992, 55,6 percent of the population was below the total poverty line (soft-core poverty) and 35,2 percent below the food line (hardcore poverty), in 1996, the proportions were 45,6 percent and 26,2 percent respectively. This indicates a 2,5 percent annual decline in absolute poverty between 1992 and 1996. The level of poverty was on the increase in Western Uganda until 1994, but declined between 1995 and 1996. However in Northern and Eastern Uganda poverty deepened between 1995 and 1996 (Ministry of Planning and

Economic Development, 1997). Poverty reduction in Western Uganda indirectly highlights the role played by trade and industry in these areas. The smallholder tea factories are located in Western Uganda, thus further strengthening the role of trade in poverty eradication. Appleton (2001) echoes this as he highlights the role of cash crop production and involvement in manufacturing, and states that the reduction in poverty was mainly explained by growth, though the drop in inequality also contributed. However, poverty reduction was uneven across economic sectors, those engaged in cash crop farming, manufacturing, and trade performing better (Appleton, 2001).

2.4.3 THE SMALLHOLDER TEA FACTORIES

At present Uganda has 25 factories in operation, processing tea currently produced on about 20 570 ha of land. Only four of these factories serve the smallholders. Figure 2.2 shows the location of the smallholder tea factories and the smallholder tea-growing areas in Uganda.

The four smallholder factories were privatised and supported as part of the Smallholder Tea Development Programme (STDP). Only farmers who own tea gardens or estates and sell all their leaf to these factories are able to buy shares in these factories.

Shares are allotted according to one's level of patronage. Under the scheme farmers are supposed to be paid extra, if the factory operates at a profit within a given financial year. The farmers entitled to buy shares are referred to as bona fide farmers.

A bona fide farmer is a tea farmer who has a special or close relation and connection to the tea factory company and has fulfilled the following conditions:

- A registered owner of a tea plantation or garden.
- A producer and supplier of green leaf in the area served by the factory.
- Has signed a green-leaf agreement with that factory.

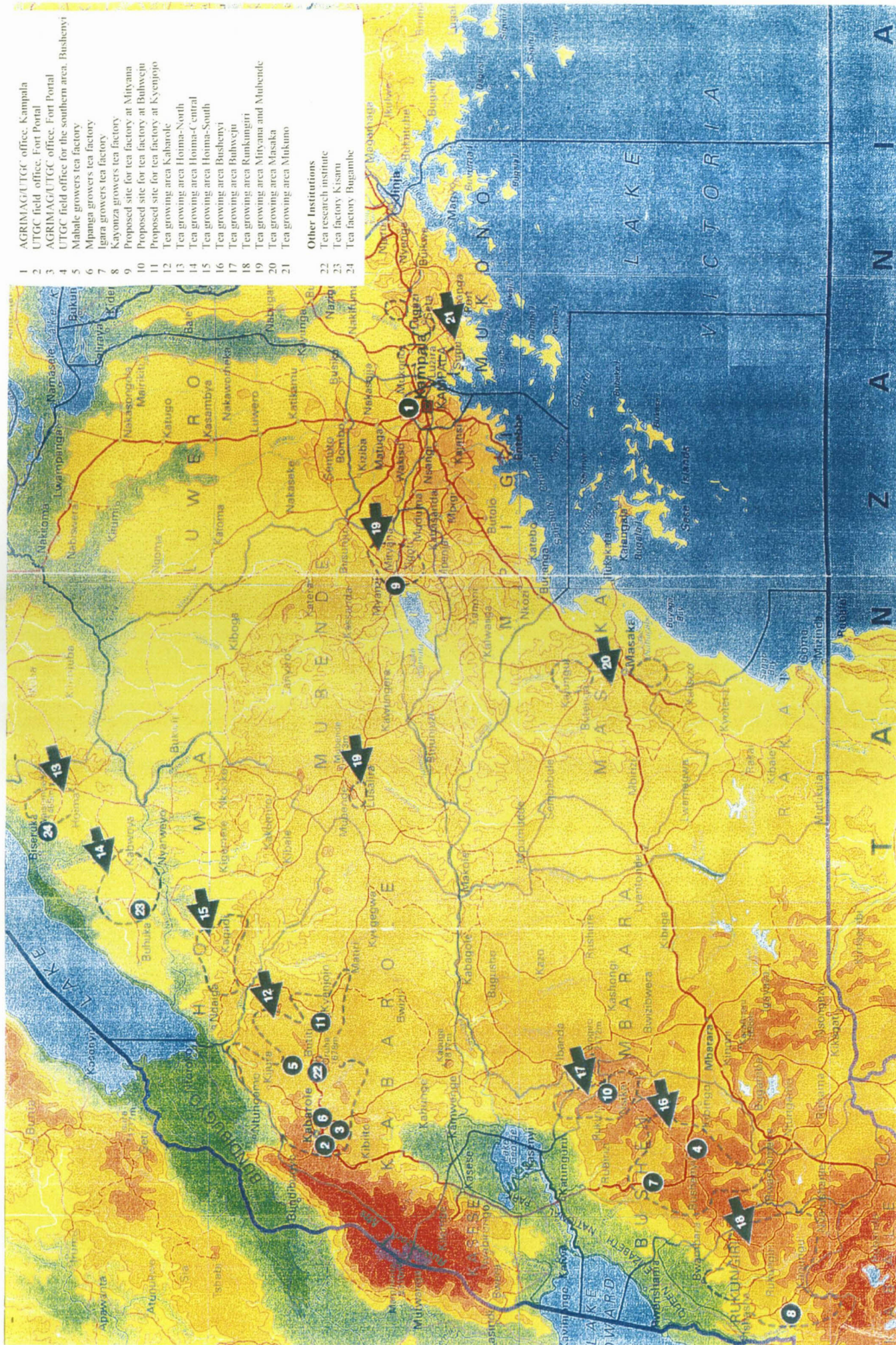


Figure 2.2: Smallholder tea sector in Uganda

The green-leaf agreement, signed between the farmer and the factory committing the farmer to deliver all his or her leaf to the factory, entitles the farmers to an additional payment over and above the original price paid for the green leaf by the factory. This is referred to as the second payment. It is paid if the factory operates at a profit within a given financial year. This extra payment is also payable to farmers who rent their tea gardens and have signed green-leaf agreements. The extra payment is dependent on the volume of leaf sold to the factory by the farmers and the net income generated by the factory during that financial year.

The smallholder tea sector has played an important role in the revival of the tea industry. In 2000 the smallholder sector produced 7,0 million kg of made tea, this was 29,1 percent of the national production. The smallholder factories serve a total of about 7 650 farmers. The majority of active farmers, i.e. farmers selling tea to these factories, have less than 2 acres of land under tea. Table 2.3 below shows the variation in land sizes owned.

Table 2.3: Variation of smallholder tea garden sizes (1997)

Garden size	Number of farmers			
	Mabale	Mpanga	Igara	Kayonza
Less than 2 Acres	1 038	514	2 628	3 440
2 to 5 Acres	149	45	74	49
5 to 20 Acres	35	34	12	2
Over 20 Acres	5	8	2	2

Source: AGRIMAG (1997)

Between 84,6 and 98,2 percent of the farmers in the hinter area of Mabale, Mpanga, Igara and Kayonza own less than 2 acres of land under tea. Only 0,06 to 1,3 percent of the farmers in the hinter area of each of these tea factories own more than 20 acres of land under tea cultivation. The biggest proportion of the active smallholder farmers is concentrated in Kayonza, Rukungiri district. This area experiences land pressure problems and a high level of land fragmentation. Despite this, a number of farmers are active and

receive a steady income throughout the year, with slight variations caused by weather conditions. Production is lowest in the dry periods, January to February, and May to July. Table 2.4, below shows the income received by the active farmers during 1997.

Table 2.4: Average annual income of active tea growers (1997)

Income groups	Number of farmers			
	Mabale	Mpanga	Igara	Kayonza
0 - 52 US\$	5	2	34	121
53 - 261 US\$	161	53	718	1 046
262 - 1 045 US\$	253	132	692	527
More than 1 045 US\$	100	66	113	61

Source: AGRIMAG (1997)

The income received is directly dependent on the amount of green leaf produced. Table 2.4 shows that between 79,7 and 90,5 percent of the active tea farmers earned between US\$ 52 and US\$ 1 045 during 1997 from tea production only.

Table 2.4 further highlights the role of tea production as a source of income for these rural communities. The overall income received from tea production by the farmers is influenced by the factory's profitability at the end of the financial year. This is greatly influenced by the cost of production and the prices offered on the world market.

2.5 MANUFACTURE OF TEA

Three types of tea are produced in the world. These are green, semi-fermented and fermented teas. The fermented teas are commonly referred to as black teas. It is however important to note that instant tea is made from all three types, so the tea type used is determined by the market. Instant tea for the Japanese market, for instance, is made using green tea, which is the most common form in which this market consumes tea. Speciality teas such as flavoured teas are also made from any of the tea types.

2.5.1 GREEN TEA

Green tea is produced by steaming or pan firing the green leaf soon after plucking. The enzyme action is inhibited and the endogenous components of the leaf are retained (Takeo, 1992). The odour intensity of green tea is very weak compared to oolong tea or black tea, which possess large amounts of aroma compounds as a result of the biochemical reactions during the fermentation process (Takeo, 1992). Green tea is mainly consumed in China, Japan and some parts of South America. In the western world green tea is sometimes consumed as a speciality tea (Tea Council, 2001).

2.5.1.1 *Manufacture of green tea*

The manufacturing process for Sen-cha, which is fine and needle-like in form, consists of a series of controlled heating and curling operations. Plucked leaf is steamed for 45 to 50 seconds, then curled and dried in hot air at 90 to 110°C for 40 to 50 minutes. This reduces the moisture content of the leaf from 76 percent to 50 percent and prevents oxidation and fermentation (Takeo, 1992 and Tea Council, 2001). The leaf is rolled for another 15 minutes without heat and then pressed and dried for 30 to 40 minutes in hot air at 50 to 60°C. This further reduces the moisture content to 30 percent. Further curling is followed by the third drying stage, in which the tea leaves are dried directly on a hot pan at 80 to 90°C and twisted for 40 minutes under the pressing and rolling process by a curling hand mounted on the pan. Finally, the leaf is dried at 80°C until a moisture content of 6 percent is achieved (Takeo, 1992).

2.5.2 SEMI-FERMENTED TEA (OOLONG)

The oolong process originated from a modification of the 15th century process of manufacturing Chinese green tea. During the 18th century oolong tea became famous among Europeans as Bohea tea. However, Bohea tea was accepted as a black tea in Europe and was the forerunner of the modern black tea developed in India during the 20th century.

Tea plants for making oolong tea were selected by farmers some 100-200 years ago from native plants growing in Fujian province, China. The clones selected for oolong tea production are characterised by their ability to impart a strong flowery aroma to the product, formed during the fermentation process. However, if green tea clones are used a much weaker flowery note results (Takeo, 1992). Oolong tea consists of large leaf or orthodox tea and is best drunk without milk, as it has a pale, bright liquor with a very delicate flavour (Tea Council, 2001).

2.5.2.1 *Manufacture of oolong tea*

Fresh shoots are spread thinly on a flat bamboo basket and withered under sunlight for 30 to 60 minutes. During the process, called Sai-qing, the leaf temperature increases to between 35 and 40°C. After Sai-qing, the leaf is transferred to a dirt floor and withered at room temperature for 6 to 8 hours. During this process the leaf is agitated gently by hand once every hour. This process is called the Yao-qing. During these processes the edge of the leaf turns red, the strong aroma evaporates and the moisture content of the leaves falls from 78 to 60 percent. This controlled withering under sunlight facilitates the biochemical reactions, which generate the unique colour and aroma of oolong tea (Takeo, 1992). The manufacturing process for oolong tea is summarised in Figure 2.3.

The withered leaf is fired in a pan at 250 to 300°C for 15 minutes, thus inactivating the leaf enzymes and terminating the fermentation. After this the leaf is rolled and dried (Takeo, 1992). The process is similar to that of black tea, but the fermentation period is cut down to half the time before it is dried (Tea Council, 2001).

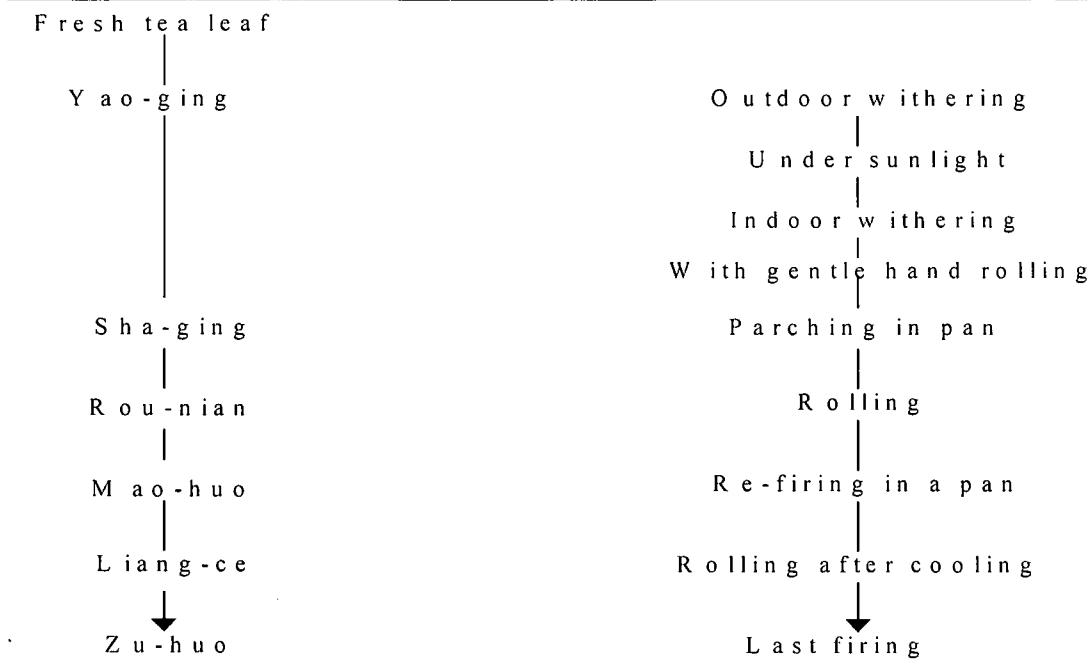


Figure 2.3: An outline of the manufacturing process of oolong tea

Adopted from (Takeo, 1992).

2.5.3 BLACK TEA

Unlike the green and oolong teas, which are semi-fermented, black tea is fermented longer and dried after the fermentation process to obtain the characteristic black colour. Black tea dominates the world tea trade and is the main produce of most African tea producers.

2.5.3.1 *Manufacture of black tea*

The manufacturing process presented in this study is based on the process followed by the smallholder tea factories of Uganda, namely Mabale, Mpanga, Igara and Kayonza, which produce the product under consideration in this study. The principal machines employed in the manufacture of black tea are orthodox process, Crush, Tear and Curling (CTC) machine and the Lawrie Tea Processor (LTP) machine (Hampton, 1992). The manufacturing process described in this study is based on the Crushing, Tearing and Curling machine.

The vehicles leave each factory for the various collection points, which supply them with green leaf on a fixed schedule, but flexible route. Each vehicle, lorry or tractor with trailer, has a turn boy and leaf collector. The distance within which green leaf is collected varies between 19,6 and 107,5 km. This may vary from time to time as the routes for green leaf collection are redesigned to suit the level of production, i.e. shorter in periods of high production and longer in periods of low production.

Once the green leaf is delivered to the factory, it is weighed again to determine the weight received at the factory. A sample is drawn to determine the quality from each collection route or area. This is recorded and at the end of the day an average is calculated to determine the leaf quality received. The leaf is then taken to the withering section, where it is spread on troughs to enable it to wither easily.

Physical withering

During withering the green leaf is transformed from its fresh crispy texture to a partially dried state that is able to go through the machines easily. Passing air around the green leaf removes moisture from the surface, causing it to wither. The withering process allows the green leaf structures to be more permeable, limp and flaccid, which helps give the final product the twist and curl it requires. On average, the green leaf arrives at the factory with a moisture content of 70 to 83 percent and the factory machinery require that this be reduced by about 30 percent. This is commonly known as a 70 percent wither in the tea fraternity. A good wither of 70 percent is achieved after 16 to 20 hours. Humidity has a significant role to play because the air used to wither the green leaf is drawn from outside. In cases of high humidity, hot air is used when the green leaf has just been put onto the troughs. The use of hot air may also be common during wet seasons as it is then used to quicken the removal of excess surface moisture. It is however, important to note that a cold wither will produce better tea compared to a wither achieved with artificially heated air (AGRIMAG, 1994).

Chemical withering

This starts as soon as the green leaf is plucked and it will take place whether the green leaf is being physically withered or not. During this process the starch and soluble gum content decreases as the caffeine content increases. The withering process has a marked effect on the green leaf that has been damaged in the field or during transportation. Damaged leaf cannot produce good tea (AGRIMAG, 1994).

Processing of withered leaf

The processing of the withered leaf begins when the correct withering level has been attained, i.e. when the leaf is limp enough to be crushed without breaking too quickly (AGRIMAG, 1994). The machinery used to process the withered leaf, with specific reference to the smallholder tea factories, squeezes the leaf, rubbing and crushing its cells to release all juices within the cells. The main machinery for this is the rotorvane for pre-conditioning the leaf before it moves to the crushing, tearing and curling action by a set of roller pairs.

The process of squeezing, rubbing and crushing mixes the catechins and enzymes, and coats them onto the outside of the leaf particles. It is this mixture that gives tea its characteristic black colour when fully processed.

Fermentation

After the tea has been crushed, torn and curled, and other corrective actions to prevent it from forming balls have been taken, it undergoes fermentation. Fermentation actually begins with the crushing, tearing and curling process. At the end of this process, due to the frictional action of the machinery and the fermentation process itself, the temperature of the leaf is quite high. The tea leaf leaves the rotorvane and CTC system at about 85°F or higher, but the optimum temperature for fermentation is between 70 and 75°F (21 and 24°C). At 80°F and above the fermentation is too fast, and too slow at temperatures below 65°F (AGRIMAG, 1994).

The temperature is controlled by blowing high-pressure humidified air through the tea to quickly bring it into the preferred range of 70 to 75°F. The actual length of fermentation will depend on the degree of wither, temperature in the fermenting room, temperature of air being used to cool the tea, leaf temperature and to some extent the standard of plucking. The fermentation process, on average, takes about one hour and forty minutes (AGRIMAG, 1994). This may however vary between one and two hours (Harler, 1963).

The first chemical change that takes place during tea fermentation is the oxidation of two or more polyphenolic bodies of the catechin group. This is due to the damaged semi-permeable membrane in the cells, through which the catechin is brought into contact with polyphenol oxidase (Harler, 1963). Oxygen is present in the air being blown through the crushed, torn and curled tea leaf, and the catechins are oxidised to ortho-quinones (Harler, 1963)

The ortho-quinones condense rapidly to form bisflavanols and theaflavins, which are yellow bodies. These substances change to form bodies known as thearubigins, which are red and brown compounds (Harler, 1963). However, Varnam and Sutherland (1994) mention that a number of other pathways exist in addition to the oxidation of theaflavin intermediates, as thearubigins may also be formed by catechin-catechin interactions (Varnam and Sutherland, 1994).

The thearubigins are considered important in imparting strength and colour to made tea, but formation of thearubigins as a result of theaflavin interactions will result in the loss of tea quality. However, the formation of thearubigins from catechin-catechin interactions, without any loss of theaflavins, will have a positive effect on the tea quality (Varnam and Sutherland, 1994).

It is extremely important that all machinery that comes into direct contact with the tea is cleaned daily to avoid contamination. The most common form of contamination is bacterial.

Drying

This is yet another important phase in ensuring that a good quality product is produced, and results in both a physical and chemical change in the tea. Drying imparts some liquor qualities, a mellower character and stops the fermentation process by inactivating the enzymes. Tea is very hygroscopic and is therefore dried to a moisture content of between 2,5 and 3 percent, to ensure a moisture content of less than 7 percent, the maximum permissible by the time of packing.

The smallholder factories use boilers heated by firewood to generate the steam needed to run the dryers and heat up the air when necessary during the withering process.

Sorting and Grading

Tea that has been dried to a moisture content of between 2,5 and 3 percent is what is known as made tea or black tea. This tea will not change colour or alter its chemical composition significantly if it is stored properly.

The tea that leaves the drier is of mixed sizes and qualities containing dust and fibre produced by the crushing, tearing and curling (CTC) action, and has to be sorted into various grades. Sorting is the physical separation of the different-sized particles of tea by passing it through a series of sieves, separating the tea particles according to size. The basic aim of tea sorting is to grade tea by size, volumetric weight and by standard of cleanliness. This is done with minimum handling to avoid greying of the teas.

According to some researchers, grading tea has been identified to cause variations in the chemical quality parameters of tea (Owuor and Othieno, 1988). The descending order of theaflavin content in different tea grades is: Dust, Pekoe Dust, Pekoe Fannings and Broken Pekoe (Owuor and Othieno, 1988). This is also the order of increasing particle size, i.e. the smaller the particle size the higher the theaflavin content of made tea. This implies that smaller particle grades produce teas with better briskness, brightness and thickness. However, the aroma of the tea is in the reverse order. The larger the particle size the superior the flavour (Owuor and Othieno, 1988).

2.5.4 INSTANT TEA

The development of tea can be traced back to 1885 when John William Brown of Huddersfield in the United Kingdom was granted a patent for a paste, made from a concentrated tea extract, evaporated milk and sugar, which on reconstitution with boiling water, gave a cup of tea. The process was further developed in 1943 with a process that involved two or three stage extraction processes using water at different temperatures, vacuum evaporation and spray drying the resultant concentration (Saltmarsh, 1992). After the process and the product were established, the market for instant tea grew. It is manufactured in seven countries, namely United States of America, Switzerland, the United Kingdom, Sri Lanka, India, Kenya and Japan.

Instant tea may be made from black tea leaf, semi-fermented, undried leaf, oolong or green tea. The process for producing instant tea consists of the following operations: selection of raw materials (type of tea), extraction, aroma, stripping, cream processing, concentration and drying (Saltmarsh, 1992).

2.5.5 THE CLASSIFICATION OF TEA GRADES

The procedure followed in the classification of tea has its origin in China (Harler, 1963). In broad terms, tea may be described as follows:

- Black tea is fully oxidised or fermented during processing and yields a hearty-flavoured, amber brew.
- Green tea, on the other hand, is not oxidised and possesses a more delicate taste and is light green/golden in colour. It is a staple beverage among the Orient and is gaining popularity worldwide.

- Oolong tea is popular in China and is partly oxidised. It is a cross between black and green tea in both taste and colour.

2.5.5.1 *Tea grades*

Early records of the Assam Company show that in 1843 an invoice included five whole leaf grades designated in the order of value, as Pekoe, Souchong, Congou, Campoi and Bohea. The broken leaf was thrown away as useless. The terms used for the grades came from the Chinese. Pekoe is derived from *Pek-ho*, meaning white hairs or down, and refers to the 'tip' of the tea. Souchong is from *Sia-chung*, meaning small sort. Congou from *Koong-foo*, the laborious sort, while Campoi describes a carefully fired tea and Bohea, which originally denoted tea from the Wu-I hills, indicated a fine grade, though it was later used to describe a coarse tea (Harler, 1963).

The tea market has exerted considerable influence on the tea grades being sold. As early as 1864 the London market offered good prices for the Broken teas and Fannings. This resulted in half of Assam's exports consisting of leaf grades and the other half consisting of Broken Pekoe (BP), Fannings and Dust (Harler, 1963). The terms Flowery Pekoe (FP), Orange Pekoe (OP), Pekoe (P), Pekoe Souchong (PS), Souchong, Congou and Bohea remained in use until around 1885 (Harler, 1963). The broken grades were termed Broken Pekoe, Pekoe Dust, Broken Souchong, Fannings and Dust. The bolder type of leaf grades, the Congou and Souchong, were eliminated from the market around 1900, though leaf grades continued to be produced (Harler, 1963).

During 1900 the demand for Broken grades increased on the London market and by 1920 it was often difficult to sell leaf grades. In 1945, there was a marked demand for small leaf teas, which encouraged the production of teas using Legg-cut and the Crush, Tear and Curl machines.

2.5.6 PACKING

Tea is packed by invoice, each ideally consisting of bags or packages in multiples of 20 up to a maximum of 100, the average package weight varying between grades and among producers. Each bag is clearly marked with a bag number, invoice number and the name of the manufacturer. Each invoice should consist of a uniform product irrespective of the number of bags it comprises. The manufacture differs from day to day in size, quality and appearance, thus resulting in non-uniformity of the tea. Tea produced over a number of days has to be bulked before it is packed. The whole mass of each grade should be mixed thoroughly to secure uniformity. Unbulked teas are not popular with buyers, as the buyers make an offer for a particular tea lot based on the sample sent to them.

2.6 FARM LEVEL DETERMINANTS OF BLACK TEA QUALITY

The raw material for making black tea is the green tea leaf. Commercially oriented farmers and smallholder peasant farmers on tea estates and tea gardens produce the green tea leaf. In theory green leaf from the different sources should be similar, but this is not always the case, due to several factors such as collection time, amount of fertiliser applied to the gardens or estates, different plucking standards, etc. Variations also arise due to the differences in planting material used to establish the garden or estate. Some are vegetatively propagated from carefully selected bushes, while others are from seedlings, which are genetically different.

Black tea is judged for its market value by a number of characteristics. These are colour, brightness, appearance, liquoring properties, strength and aroma. It is these characteristics that make up the quality of tea (Odhiambo, Owour & Othieno, 1988). Some tea quality attributes and characteristics present in a tea may cause special buyer preferences and therefore result in a price differential (Odhiambo, *et al*, 1988). Odhiambo, *et al* (1988) further highlight that in the past, the supply of tea was adequate to service market demand, so selective pricing rarely occurred. However, with increased productivity per unit area of land, the resultant expansion in supply appears to be outstripping demand and

consequently buyers have become more selective. This has increased the significance of quality and therefore the importance of producers knowing the magnitude to which quality affects the offers they receive.

Made tea quality is influenced by pre-harvest and post-harvest factors. The pre-harvest factors occur in the field before harvest. These may be divided into controllable and non-controllable factors. The controllable factors are the cultural practices, while the non-controllable are the environmental and genetic factors. Genetic factors, however can be influenced by the use of the same variety or clones (Odhiambo, *et al*, 1988). The post-harvest factors mainly cover the factory operations and handling from the plucking stage. Other factors such as infrastructure and factory management may also affect the quality of made tea.

2.6.1 PRE-HARVEST FACTORS

This section highlights the factors which occur before the tea is harvested and influence its quality. Man may influence some of these factors to some extent but in some situations is unable to control the influences.

2.6.1.1 Cultural Practices

Cultural practices include field operations involved in the cultivation of tea. These include plucking, pruning and fertiliser application.

Plucking

The objective of plucking is to obtain economic yields, produce high quality tea and to maintain the tea bushes in good health (Werkhoven, 1974). A good plucking standard, i.e. the portion of harvested shoot, will range from a bud and one or two leaves. This will allow the interval between successive harvests to vary between 5 and 14 days depending on the prevailing weather conditions. A coarse plucking standard will consist of a bud and three leaves or more. The chemical composition for good tea will be lower as a result of

coarse plucking (Odhiambo, *et al*, 1988). The coarse plucking also affects the plucking cycle, causing it to vary from 5 to 14 days even under favourable conditions. In effect, future production is lowered.

Pruning

Some researchers have demonstrated that teas which are at varying stages (ages) from pruning differ in their quality of made tea. The teas that are just recovering from pruning produce a lower quality tea compared to those that are nearest to pruning (Odhiambo, *et al*, 1988).

Fertilisers

Several studies have shown that climatic conditions and agronomic practices, which promote high green leaf production, have an adverse effect on quality. For example, there is need to ensure that nitrogenous fertilisers are not applied in excess amounts, but at the recommended rates (Odhiambo, *et al*, 1988).

2.6.1.2 *Genetic Factors*

The leaf's genetic make up, i.e. its chemical composition, which is the content of polyphenolics and caffeine, has a considerable impact on the quality of tea.

2.6.1.3 *Environmental Factors*

The environmental factors which affect the natural growth of tea bushes, affect the quality of made tea through their effect on the leaf structure, rate of shoot growth and its chemical composition. It has been suggested by some that factors which favour slow growth of tea shoots, favour the production of better made tea (Odhiambo, *et al*, 1988). The main environmental factors which cause variation in made tea are discussed below.

Rainfall

Moisture is an important factor in determining tea quality. Research has shown that soil moisture influences leaf character, such that fine and small leaves which produce better quality tea are favoured by low moisture conditions. On the other hand, the tea bush flushes faster during the rains and the tea made from such green leaf generally has a flat taste and is of low quality (Odhiambo, *et al*, 1988).

Temperature

Higher temperatures favour faster growth of the tea bush provided moisture is not limiting, which results in a lower quality of made tea. Research has shown that in Sri Lanka, certain seasons produce flavoury teas which are rated as high in quality, while other seasons produce plain teas due to seasonal changes (Odhiambo, *et al*, 1988).

Altitude

The altitude at which a tea is grown may influence its yields. At high altitudes the air temperatures are generally lower and this causes a decline in the growth rate. Altitude has an effect on the quality of made tea. However, the quality of made tea from clones improves with a rise in altitude while others decrease (Odhiambo, *et al*, 1988).

Soils

Tea grown in different soils contains different levels of various chemicals, each in combinations, which affect teas in different ways.

Climatic conditions are the main factors affecting tea quality in Kenya. Kenya's tea zones are divided mainly into east and west of the rift valley. The presence of the rift has created weather patterns on the western side that are warm and wet throughout the year. These conditions favour fast and even growth of tea shoots, leading to higher yields, but low quality of made tea. The eastern side of the rift valley has two distinct seasons, wet and dry. During the dry season the growth of the tea shoot is slower and yields are lower, but the made tea is of a higher quality. The dry season is also characterised by cool night temperatures, which are conducive to high quality made tea (Odhiambo, *et al*, 1988).

2.6.2 POST-HARVEST FACTORS

Made tea results from processing the green leaf, starting immediately after plucking. During this time a number of physiological, biochemical and physical changes occur, affecting the quality of the product (Owuor and Othieno, 1988). The following are some of the post-harvest variables that affect the quality of tea:

Leaf handling and transport

Owuor and Othieno (1988) highlight that leaf handling between the time of plucking and the time it reaches the withering troughs, is one of the most important set of operations that affects the quality of tea, but has received little attention from most researchers.

Pluckers

Pluckers are paid on the basis of weight and therefore aim at plucking as much leaf as possible. As a result, they tend to hold too much leaf in their hands in order to reduce the time taken to put the leaf into the receptacles they carry. This causes early fermentation due to the reaction between polyphenol oxidase and the catechins. Early fermentation lowers the quality of tea.

Plucking baskets

Different types of plucking baskets or receptacles are used. The best should allow adequate aeration. Research has shown that if the heat generated in the leaf exceeds 43°C, the cell tissue begins to break down, resulting in early fermentation (Owuor and Othieno, 1988). Given well-designed baskets, pluckers should avoid overloading or compacting the leaf to allow adequate aeration.

Transport to buying centres

Some smallholders' gardens are located fairly long distances from the nearest buying centre to which they must carry their plucked leaf. Occasionally farmers may compress the plucked leaf into bags that are not well aerated and then carry the tea on their heads to

the buying centre. This results in the bruising of the leaf and heat generation, causing early fermentation.

Weighing sheds or leaf buying centres

The leaf is weighed at weighing sheds before it is transported to the factory. It is very important that heat build up is prevented at these centres. The leaf should be spread out on the floor to ensure adequate aeration and it should be protected from direct sunlight (Owuor and Othieno, 1988).

Transport to the factory

Most of the leaf is collected from areas that are quite distant from the factories, more particularly for the smallholders in Uganda and Kenya. The mode of transport varies from specialised to multipurpose lorries and tractor-trailers. The biggest damage to the leaf occurs in the multipurpose mode of transport through overloading, especially during periods of peak production, or by factory employees who abuse the leaf during collection by standing on it or transporting other goods on it. This results in the compaction of the leaf, which leads to early fermentation.

2.7 QUALITY TEA

The best black tea is made from shoots with two leaves and an unopened bud plucked with care and transported to the factory undamaged. Fine plucking consists of the following:

One leaf and a bud (large)	10 percent
Two leaves and a bud	65 percent
Soft single bhanji	15 percent
Soft double bhanji	5 percent
Three leaves and a bud (small)	5 percent

This is the ideal of fine plucking that must be aimed at to ensure good prices for the made tea on the world market (AGRIMAG, 1994).

When the tea has been manufactured it is offered for sale and the price is judged (by experts) on the liquoring quality, taste and appearance in the cup and the physical appearance of the tea leaves and the infused leaf. By definition the infused leaf is the tea leaves after the liquor has been drained off.

The liquoring qualities of tea include the briskness, strength, colour and brightness of the liquor. These properties depend primarily on the amount of certain polyphenols present in the fresh tea leaf (AGRIMAG, 1994). Chemicals of main concern are the catechins, when oxidised and condensed, impart the liquoring property observed in tea. This is what differentiates the various teas on the market.

2.7.1 CHEMICAL COMPOSITION OF TEA

The acceptability of tea as a beverage is largely dependent on the flavour of the product available for consumption. This also depends on the composition of the plant from which this product is made, and the chemical and bio-chemical changes that occur during processing. Differences in processing are reflected in the character of the different types of tea.

Tea flavour results mainly from taste and aroma. Aroma is, however, considered to be more important. Non-volatile compounds are responsible for taste and volatile compounds for aroma. However the terms volatile and non-volatile should not be considered absolute (Varnam & Sutherland, 1994).

The significant non-volatile compounds are pigmented, hot water soluble polyphenolics derived originally from the shoots during fermentation and the early stages of drying. The polyphenols are directly related to the perceived quality of the made tea and considered to contribute to "brightness", "depth of colour", "strength" and "mouth feel" (Varnam & Sutherland, 1994).

The quantity of polyphenols and in particular catechins in a plucked leaf has been estimated as a percentage of dry matter in relation to each portion of the leaf (see Table 2.5).

Table 2.5: Proportion of catechin and caffeine related to different leaf portions

Leaf portions	Catechin percentage of dry weight	Caffeine percentage of dry weight
Bud	26,5	4,7
First Leaf	25,9	4,2
Second Leaf	20,7	3,5
Upper Stem	11,1	2,5
Third Leaf	17,1	2,9
Lower Stem	5,0	1,4

Source: AGRIMAG (1994)

This clearly shows that the first two leaves and a bud determine the liquoring properties or the quality of tea. Unfortunately this does not relate in a similar way to weight. The farmer's payment is based on the weight of the green leaf supplied. As depicted in Table 2.6 below the farmer will gain more by supplying up to three leaves and a bud than two leaves and a bud; therefore there is a need for quality control measures on the green leaf being supplied. To further complement Table 2.5, Varnam and Sutherland (1994) indicate that young tea shoots have a high content of polyphenols and that catechins make up as much as 30 percent of dry weight of the shoot portion.

The other polyphenolics present are at low concentrations and are regarded to play no significant part in the formation of the characteristic of polyphenolics of black tea.

Table 2.6: Relative proportions by weight of fine and coarse leaf

Leaf portions	Nature of leaf plucking	
	Two Leaves and a Bud (Percent)	Three Leaves and a Bud (Percent)
Bud	14,0	7,0
First Leaf	24,0	12,0
Second Leaf	45,0	24,0
Upper Part of Shoot	17,0	8,5
Third Leaf		33,0
Lower Part of Shoot		15,5

Source: AGRIMAG (1994)

2.8 *TEA TASTING*

The tea taster is responsible for describing and evaluating the tea. The description includes the appearance of the tea, the infused leaf, and the appearance and taste of the liquor.

Human beings group all tastes under four categories: sweet, savoury, sour and bitter. The tea liquor is tasted on the basis of these senses. In addition to the four tastes, the gums and mucous membrane of the mouth are able to detect the sensations of pungency and briskness as the liquor is swirled around the mouth (Harler, 1963). Its thickness and body are felt and judged by the tea taster. Professional tea tasters have acquired their skills over long periods of apprenticeship of tasting large numbers of teas daily (AGRIMAG, 1994).

2.8.1 *TEA TASTING PROCEDURE*

The teas are smelt for any aroma or odour in the black leaf. The appearance of the black leaf is also judged with regard to its twist and evenness of grading. The presence of stalk and greyishness is not good, and is a sign of poor sorting and over handling of the tea respectively.

The tea tasters' infusion is made from 2,8 g of tea in a 0,14 l mug fitted with a lid. Boiling water is poured onto the tea and the lid is replaced. The infusion is then allowed to stand for 5 to 6 minutes (Harler, 1963 and Barclays Bank, 1967).

After infusion the liquor is poured into a cup without a handle of a slightly larger capacity than the mug. The infused leaf is shaken out of the mug onto the inverted mug lid and placed on the mug. The mug lid remains inverted. The infused leaf is then pressed free of any excess liquid (Harler, 1963 and Barclays Bank, 1967).

The tea taster is faced with a line of tins containing the tea, in front of which is the corresponding infused leaf on the inverted mug lids and in front of this, the cups containing the liquors (Harler, 1963). He or she draws the liquor into the mouth rather sharply so as to bring the tea into contact with the tongue and palate. The liquor is not swallowed but spat into a large spittoon. The taster then describes the tea features using specialised terms. These refer to the appearance of the leaf, infused leaf and liquor, the colour, strength, pungency of the liquor and its flavour (Barclays Bank, 1967). Tea tasting conforms to a set of patterns and although there is no precise method of evaluating a tea, the concerted opinion of selling and buying brokers, together with that of the interested blender's taster, provides a reliable indication of its worth.

2.9 CONCLUSION

The tea industry in Uganda serves as one of the alternative ways of ensuring that the rural population plays a part in revitalising the economy, and in the process helping to eradicate poverty and transforming their livelihoods. The majority of the smallscale tea farmers own less than 0,8 ha (94,8 percent), about 4 percent earned less than US\$ 53 during 1997 from their tea activities, in a country where the absolute poverty line was US\$ 48,10 per month. According to these figures tea production plays a significant role in improving the lives of smallholder tea producers.

Tea quality is greatly influenced by both pre and post harvest factors, which all play an important role in determining its market value. The best quality tea is made from two leaves and a bud, but this is of the least concern to the grower in terms of the immediate benefit. The second payment serves as an incentive to the farmers to supply good quality to ensure that the factories are able to generate a profit, and thus a second payment to the farmers. However, the smallholder tea factories have to cover long distances to collect the green leaf. This increases the cost of the green leaf and ultimately the cost of production. Attention to detail is required throughout the manufacturing process, right from the withering of the leaf to the packing of the manufactured tea. This necessitates the presence of supervisory management at the factory during the entire manufacturing process.

The world tea market is particularly important with regard to black tea, though the consumption of green tea is on the increase. Most of the world's black teas are CTC teas, thus emphasising quality if fair prices are to be attained. The production of tea and its consumption have been greatly influenced by the Western countries, namely the United Kingdom and the Netherlands. The new producers (African countries) and the old producers (Asian countries) have since independence strived to take control of the industry and this was significantly marked by the close of the London auction market. This showed a shift in importance from a market in a non-producing country to various markets in tea producing countries in Africa and Asia.

3.1 INTRODUCTION

The majority of tea farmers are poor and there is a need in most developing countries to improve their household incomes through trade. In Uganda's tea growing areas, tea production could play a leading role in alleviating poverty. The trade in tea may have a significant positive impact in terms of profitability if fair prices are attained on the market. Fair prices can be achieved through a competitive market with near perfect competition in the industry. However, other factors such as production costs, transportation costs, interest rates, etc. could also influence the positive impact of trade in terms of profitability. The ever-growing supplies of tea being traded have resulted in a change and expansion of the tea trading mechanism over time. This has resulted in a number of tea auction markets developing in a number of tea producing countries while some traditional markets, such as London, declined gradually.

The smallholder factories will only obtain a fair price for tea on the Mombasa auction market if the market is efficient and if the forces of demand and supply determine prices.

3.2 ORGANISED COMMODITY MARKETS

Organised markets may take the form of spot, cash or futures markets. A spot or cash market involves trading actual commodities, normally on the basis of samples, while the futures market specifies the minimum grade or grades of the commodity that must be delivered at some future date. Auction markets provide facilities to arrive at prices for those commodities that are more difficult to standardise, such as feeder cattle, tobacco, tea, etc. Electronic trading is yet another mode of trading that could be used with the advent of information technology. Technology makes it possible to transfer

commodities directly from sellers to buyers, without having to assemble such commodities at a central location (Tomek and Robinson, 1990).

An auction market may be defined as a system that brings together a group of buyers and one or more sellers for the purpose of conducting price bidding for the purchase of the supply offered. The seller does not depend on a price offer from a single buyer but rather on a setting within which a group of interested buyers bid against one another for the commodity lot (Branson and Norvell, 1983). The different types of auctions can be defined as follows:

- The English Auction: Bidding starts at a minimum asking price and moves upwards. The sale goes to the highest bidder, though the sale can be rejected if the final bid is not suitable (Branson and Norvell, 1983).
- The Dutch Auction: This uses a clock, the clock hand starts at a high price and drops until a buyer stops the clock by pressing a button to bid, and accepts the lot or part of the lot. Prices start high and are lowered progressively, so that whoever bids first gets the sale. The clock was invented in the 1870s to reduce the time growers spent at the markets. The clock type of auction frees the producers from the price determination process. This auction system is also used in the Dutch flower auctions (Bloemen Veiling Holland, 2001).
- The Tele-auction: This is a fully computerised operation that separates product location from pricing, but uses the concept of the Dutch auction to determine the price. Buyers have a personal computer, which is linked to the auction clock. The buyers are provided with information on the quality of the product. Using the computer, the buyer stops the clock and through a telephone connection determines how much of the lot he or she wishes to take. This system is also used in the Dutch flower auctions (Bloemen Veiling Holland, 2001).
- A kind of 'Blind Auction': This is mainly used by food chain buyers and presents a system where the lower bidders get the sale (Branson and Norvell, 1983).

However, it is important to note that physical inspection of these items is important, since quality of commodities varies greatly. Auctions tend to be characterised by excessive price fluctuations that may at times be irrational and in response to rumours or mass psychology (Tomek and Robinson, 1990). Unfavourable weather may lead to buying in anticipation of a price increase. Thin markets may also lead to price imperfections because one or more interested buyers may not be present at the time of the sale (Tomek and Robinson, 1990), or the buyers may simply not be interested in the commodity at the time. This could, however, be alleviated through electronic trading that involves more buyers and sellers in price discovery (Tomek and Robinson, 1990).

3.2.1 TEA AUCTION MARKETS

Tea auction markets in producer countries started as early as 1860 in India, followed by another in Sri Lanka in 1883. Further auctions in India followed during 1947 in Cochin with more in Gauhati and Siliguri. In the same year, an auction market was started in Chittagong, Bangladesh. The first tea auction in Africa was the Mombasa auction market, which was started during 1956, followed by another in Limbe (Malawi), in 1970 (Forrest, 1985 cited in Van de Meeberg, 1992).

Traditional tea auction markets are in Mombasa, Blantyre, Colombo, Chittagong, Jakarta, Calcutta, Guwahati and Cochin. The London auction market, which dominated tea trade since 1834 (Eden, 1958), closed 29 June 1998. The change in pattern or shift from the London market started with the gaining of national independence by the producer countries and the opening up of new tea markets in these countries.

Tea may also be sold by private treaty and forward contracts, either in the producing or consuming country. However the majority of tea sales in the world take place at established tea auction markets (Eden, 1958).

3.3 EAST AFRICAN TEA ASSOCIATION (EATTA)

The Mombasa auction market is established under the East African Tea Trade Association, which was formed in 1957 and, therefore, governed by its rules and regulations. The objectives of the association are to:

- Promote the best interests of tea trade in Africa.
- Foster and ensure the orderly sale of tea and the centralisation of trade in tea in Eastern Africa.
- Promote close relations within the tea industry.
- Establish facilities for the sale of tea by auction or otherwise.
- Facilitate the settlement of disputes within the trade.
- Collect and circulate statistics and to maintain such records as may be of assistance to members in conducting their business.

3.3.1 RULES AND REGULATIONS

The activities of the East African Tea Trade Association (EATTA) are governed by a number of rules and regulations. Some of these are highlighted briefly in the following section.

Membership

The association has about 300 corporate members (EATTA, 1998), mainly African tea producing countries such as Kenya, Uganda, Tanzania, Rwanda, Malawi, Democratic Republic of Congo, Burundi, Zambia and Zimbabwe.

Persons or companies intending to become members are first granted provisional membership on application. They are then elected by the management committee to become full members of the Association. The management committee has the powers to approve or reject applications for membership without explanation. According to EATTA (1997), members may be elected to the following categories of membership:

- Buyer member: Any person or firm actively engaged in buying tea. The member should buy at least 50 000 kg of tea in a twelve month period between 1st January and 31 December.
- Packer member: Any person or firm actively engaged in buying tea in eastern Africa for retail to the public. The intending packer member should purchase at least 5 000 kg of tea through an active broker, buyer or producer member of the association in a period of twelve months from 1 January to 31 December. The packer is allowed to pack tea to a maximum package weight of 5 kg for sale to the public.
- Producer member: Any person, firm or agent acting on their behalf actively engaged in the growing and/or manufacture of tea in eastern Africa.
- Broker member: Any person or firm established in eastern Africa for the purpose of negotiating the purchase or sale of tea between members of the association.
- Warehouse member: Any person or firm established in eastern Africa with the purpose of warehousing teas being sold under the rules and regulations of the East African Tea Trade Association. This person or firm must not be a member under any other category. A warehouse member does not have the same rights as a buyer, producer or broker member.
- Associate member: Any person or firm not directly connected to the tea industry in eastern Africa. The associate member has the same rights and privileges as a warehouse member.

Buyer members who do not purchase a minimum of 50 000 kg in any year are automatically transferred to associate membership but are able to revert to full membership when they become active (EATTA, 1997).

Provisions for Membership

All members have equal rights and privileges except the associate, packer and warehouse members who do not have the right to vote at general meetings or serve on the Association's management committee (EATTA, 1997).

Election of Members

The management committee has the power to reject any application for buyer members or expel buyer members. This may result if, in the opinion of the management committee, the applicant for membership does not have sufficient resources to enable such applicant or member to meet his/her financial obligations as expected of a buyer member (EATTA, 1997).

On applying for broker membership or upon continuing membership as a broker member, the firm or person has to satisfy the management committee that they have sufficient financial resources to enable them to serve as guarantee brokers. This is necessary because, in normal business operations, the brokers have to guarantee payment in full to the owners of the tea (EATTA, 1997).

The brokers also have to submit a letter of appointment from producer members of the Association guaranteeing a minimum of 5 million kg of made tea to be offered on the auction over a period of twelve months. In addition to this the applicant has to satisfy the management committee that they have the technical capacity to taste, value, report and auction teas. The management committee carries out the evaluation of the prospective broker's technical abilities (to taste, value, report and auction teas), or the committee forwards the matter to the general meeting. The prospective broker must be nominated by members of the Association. The nominating members must have been members of the Association for at least a three year duration, and the prospective broker must be known to them personally (EATTA, 1997).

3.3.2 THE MOMBASA AUCTION MARKET

The Mombasa auction market is divided into two categories, i.e. a Category A auction which consists of the main tea grades and a Category B auction for secondary grades and main grades that do not meet the market's standardised number of packages per lot. The full details of teas submitted for sale in Category A or B, such as the factory name, grade and package quantity details, should be handed to the broker twenty days prior to the auction date. Any teas packed in non-standard packing have to be specified on the factory invoice and catalogue.

According to EATTA (1997), both Category A and B tea samples have to be availed to the broker two weeks before the auction. A 4 kg sample, representative of the lot, has to be drawn from each invoice at the time of packing by the factory and sent to the broker. However, a producer may opt for the selling broker to arrange for a 4 kg sample to be drawn from 4 different packages of each invoice, ensuring that not more than 1 kg is drawn from any one package. The procedure of drawing samples is repeated if the invoice was withdrawn from a previous auction and is being reprinted.

The word invoice has a special meaning to members of the tea trade. Each individual estate or factory will continue to pluck and manufacture throughout the season but nothing is packed for dispatch until there is sufficient quantity to pack an 'invoice' (Barclays Bank, 1967). Twenty packages is the minimum quantity that is sufficient to pack an invoice. The average package weights vary depending on the grade and the density of the tea.

3.3.2.1 Procedures at the Auction

During the Association's auctions, only buyers and broker members may bid for the teas in their own capacity or on behalf of principals who are buyer members of the Association. A sale is complete at the fall of the hammer and the next lot is up for auction immediately. If, however, the previous lot was withdrawn without a bid being

accepted, then the next lot will only be up for auction after the lot number is announced by the auctioneer (EATTA, 1997).

The purchase goes to the highest bidder, and the auctioneer, whose decision is final, settles any dispute that may arise. Bidding at the auctions advances by not less than one US cent on all teas. Teas unsold during the auction or withdrawn by the selling broker may be sold by the broker concerned after the auction, as an out-lot at a price acceptable to him or her (EATTA, 1997).

The EATTA, the auction market's governing authority, has set standards with regard to the number of packages that constitute an invoice. The various tea grades should be packed as invoices with a minimum of 40 and 20 packages for primary and secondary grades, respectively. Buyers at the auction are not permitted to divide amongst themselves an invoice with a minimum of 40 packages for PF1 and PD grades, but may divide lots of 60 packages between two buyers and lots of 80 packages among three buyers (EATTA, 1997).

Any error in bidding must be notified to the auctioneer before the cessation of bidding on five subsequent lots. In such event, the auctioneer is entitled to re-offer the tea if he or she thinks it is the best decision, otherwise the sale is binding (EATTA, 1997).

The due date for payment for all purchases made at the auction is the tenth full working day from the date of sale. Tea is at the seller's risk until the due date of payment or until delivery to the buyer (EATTA, 1997).

3.4 MARKET STRUCTURE

Competition between firms is generally accepted as the regulating force in a free market economy. The market structure is usually associated with a certain form or magnitude of competition based on the number of firms, the extent of product differentiation and the nature of entry into and exit from the industry. The firm size is generally associated with the number of competitors and the extent of economic power in the market

structure. Aspects of concentration, integration, collusion, mergers, conspiracy, power and free entry are considered as basic parameters to determine the extent of competitive conduct (Lubbe, 1992). Lubbe (1992) also emphasises that a study of competition within a market should inevitably include a study of the market structure in terms of growth, concentration, integration, economic power and the number of units. Competition in an industry is usually considered with regard to perfect or pure competitive models. Real world deviations from these models are considered to be market imperfections or imperfect competition. However, some researchers have considered agricultural markets to be close to perfect competition models in terms of many sellers of homogenous products but, in reality, agricultural markets do not nearly approach this model because of co-operative bargaining and concentration of agricultural commodity buyers (Lubbe, 1992).

Although marketing has been defined as the physical process or service required to give a product the form, time, place and possession of utility that consumers desire, the raw materials have to be assembled, graded and stored, then processed into a final product, which is then stored before transporting to the various market outlets (Branson and Norvell, 1983). In regard to the smallholder tea sector, a specified grade of the raw material is purchased from the farmers, processed into black tea, packed and transported to the various market outlets. As a result of liberalising the tea sector in 1986 (Uganda Tea Authority, 1988) the smallholder tea factories face near perfect competition for the green leaf (raw material). The establishment of more tea factories, also demanding for the smallholder green leaf to meet their optimal operational capacities, has further enhanced this. The tea factories, on the other hand, face a differentiated oligopsonistic market in which all the producers produce a similar but not identical product (Tomek and Robinson, 1990).

The tea industry does not in general produce a uniform product. Each country or factory produces a product that is unique and characteristic to the factory (Eden, 1958). Superimposed on these differences are variations arising from the climatic season, when the leaf is harvested and manufactured. The tea buyer has to take all these into consideration while making judgement on the quality of a tea. This is achieved through

long experience. The tea buyer knows what type of tea to expect at a particular time from a particular area and factory (Eden, 1958). A tea buyer does not buy in bulk, but in a series of small lots, bearing in mind the multiplicity of the factories and his/her blended product (Eden, 1958).

3.4.1 ECONOMIC CONFLICT

Economic conflict may arise during an exchange. It is clear that exchange cannot take place unless both parties stand to gain or at least think they gain, from the exchange. There is definitely a certain common interest in the exchange (Boulding, 1948). This greatly undermines the common notion that in trade, one party must gain and the other lose; this is especially commonly held for international trade. Therefore, if one party linked to a prospective exchange thinks he or she will lose, then he or she does not enter into the exchange at all (Boulding, 1948).

There is always a conflict of interest in most exchanges as the buyer and seller each tries to ensure his or her gain. This is a conflict about the price and the terms on which the goods are to be exchanged. Boulding (1948) states that in the case of any given exchange, there is a certain range of prices within which the exchange will take place and outside which one of the parties will feel he or she does not benefit from the exchange. This greatly underlines the tea lot withdrawals that are made during auctions when low price bids are made.

3.4.2 BUYER CONCENTRATION

Market concentration is concerned with the dominance of individual markets by leading firms (Clarke and Davies, 1983). Market concentration may take two forms, namely seller and buyer concentration. When it is high in either form it may tend to an oligopoly or oligopsony. Oligopoly, which is competition among few sellers is the cornerstone of Industrial Organisation (IO). However, its sister concept oligopsony, competition among few buyers, is scarcely mentioned (Rogers and Sexton, 1994). Two reasons apparently account for IO economists' lack of interest in buyer market power:

- They do not think it is important.
- They do not believe it presents any unique modelling issues relative to seller market power (Rogers and Sexton, 1994).

Scherer and Ross (cited in Rogers and Sexton, 1994) illustrate this viewpoint, arguing that average concentration on the buyers' side in manufacturing is undoubtedly lower than seller concentration. Rogers and Sexton (1994) argue that this is a dismissive treatment of buyer market power and it is not reasonable for an economist interested in agriculture and agricultural markets, and that the Scherer and Ross viewpoint may apply when considering generic inputs such as labour, capital and energy. Competition for these inputs is expected to exceed competition for their outputs, because firms cross product market boundaries to compete for inputs, and there is no branding among the input buyers to diminish price competition among them. These inputs are typically mobile and therefore elastic in supply to the individual buyer, limiting the exercise of oligopsony power even in geographic settings where relatively few buyers prevail. This view of input markets does not apply to first handler markets for raw agricultural commodities that are inputs into processed or fresh-packed food products (Rogers and Sexton, 1994). Rogers and Sexton (1994) identify the following as distinctive structural characteristics of these markets:

- The products are often bulky and /or perishable, causing shipping costs to be high, thus restricting product geographic mobility and limiting access to buyers.
- Processors' needs of agricultural products are highly specialised, thus limited or no substitution.
- The producers are specialised in the supply of particular products through extensive investments in sunken assets.

- Marketing co-operatives or bargaining associations of seller power are present in the market.

The analysis of market power should therefore begin with definitions of the relevant markets. Collectively relevant markets for raw agricultural products will typically be narrower with respect to product classes and geography than markets for the finished products they produce. Rogers and Sexton (1994) further state that point 1 and 2 above contradict the general Scherer and Ross proposition that buyer concentration will be less than seller concentration. The higher buyer concentration in the relevant market coupled with inelastic supply of the commodity (point 3), jointly constitutes compelling structural evidence of buyer market power (Rogers and Sexton, 1994).

The sales records from the Mombasa auction for the period 1987 to 1997 show the presence of considerably big firms, in regard to the volume of tea purchases made annually. There are usually different combinations of different firm sizes in different agricultural industries and the large firms are usually the dominant ones. These act as price leaders and/or leaders in technological innovation (Lubbe, 1992). The concern here is, if indeed the level of concentration is high, what measures could be taken by the Association to ensure that this is not abused. The economic power that comes with concentration, undue protection to the large firms and the freedom of entry into the industry, may result through a process of natural growth or integration (mergers or take overs) (Lubbe, 1992).

3.4.2.1 Natural Growth

Strong demand may exist for a firm's product as a result of good management, marketing and product quality. Lubbe (1992) highlights that concentration results due to the need to diversify products or services and interests, difficulty of entry into the industry, restrictive trade, trade practises that protect the interests of established firms, and rules and regulations that benefit certain forms of business organisations.

3.4.2.2 Integration (Mergers or Take Overs)

This is the combination or affiliation of two or more enterprises in an industry with identical or similar products or in the same line of business. This may be referred to as horizontal integration, and results in a reduction in the number of competitors demanding for the same product (Lubbe, 1992, Branson and Norvell, 1983).

Integration could also take the form of combining several marketing stages within the same firm. It could be either forward, such as a buyer combining with a retailer, or backward, through a buyer combining with a processor. Vertical integration does not limit the number of competitors but alters the nature of the competition, as it excludes other buyers or sellers from certain markets or sources of supply (Lubbe, 1992, Branson and Norvell, 1983).

Firms dealing in unrelated products or activities could also combine in a form referred to as conglomerate integration. This has a reciprocal or subsidising effect on competition (Lubbe, 1992).

3.4.3 MEASURING MARKET CONCENTRATION

Some researchers have stated that the magnitude of concentration is usually considered a proxy for market power, which in turn is a proxy for economic power (Lubbe, 1992). Three measures of market concentration were considered in this study, i.e. concentration ratios, Herfindal indices and Lorenz curves. Each of these measures has strengths and weaknesses and the consideration of both aspects is necessary to understand the levels of market concentration (Lubbe, 1992, Hanson and Simmons, 1995). Hall and Tideman (1967) state that a good measure of concentration should possess the following properties:

- Concentration is a one-dimensional measure and above all unambiguous. Given two industries A and B (for any measure of concentration), A is either more concentrated than B, less concentrated than B or the two are equally concentrated.

- Concentration is independent of the size of the whole industry and is some function of the relative shares of the firms in the industry.
- A measure of concentration should be affected by a change in any market share held, with concentration increasing if there is a shift from a lower ranked firm to a higher ranked firm, and vice versa.
- If each firm in an industry is divided into two firms of equal size, the effect on the measure of concentration should be to reduce it by one half.

3.4.3.1 Concentration Ratio

The concentration ratio measures the proportion of sales in a given industry controlled by a specified number of firms, usually four or eight, although this may vary. In the United States of America ratios are based on the top four and eight firms, while British ratios are usually based on the top 3 and 5 firms (Shepherd, 1985). Mathematically this is defined as

(Equation 3.1)
$$CR_n = \sum_{i=1}^n \frac{X_i}{X}$$

Where:

CR_n = the concentration ratio for the n largest buyers,

X_i = the volume of trade of firm i,

X = the volume of all trade in the industry.

For example, CR_4 would measure the market share of the four largest firms in the industry. According to Hanson and Simmons (1995), the ratio's greatest weakness is lack of information on the number of firms in the industry. Despite this, the Concentration Ratio is intuitively appealing and widely used as it performs well in the

measurement of small changes in the concentration of a particular industry (Hanson and Simmons, 1995).

3.4.3.2 Herfindal Index

The Herfindal Index (HI) is bound between zero and one in a manner similar to the concentration ratio, but has an advantage over the Concentration Ratio in that all firms in the industry are considered and therefore the number of firms affects the value of the index. In addition, a greater weight is attached to larger firms than to smaller firms, thus a complete representation of the market structure is given (Hanson and Simmons, 1995). Equation 3.2 shows the mathematical definition of the Herfindal index.

$$\text{(Equation 3.2)} \quad H - \text{Index} = \sum_{i=1}^n \left[\frac{X_i}{X} \right]^2$$

Where:

- n = the total number of firms in the industry,
- X_i = the volume of trade of firm i ,
- X = the volume of all trade in the industry.

3.4.3.3 Lorenz Curves

Traditionally Lorenz curves have been used to compare income distributions and are drawn with income on the horizontal axis and the cumulative function of income on the vertical axis. An equal income distribution corresponds to a Lorenz curve that is a straight line at 45 degrees from the origin. By replacing income with the number of buyers and the function of cumulative income with the function of cumulative market shares, the Lorenz curves can be used to make a graphical representation of the distribution of market shares in an industry. The 45 degree straight line corresponds to equal-sized market shares (Hanson and Simmons, 1995).

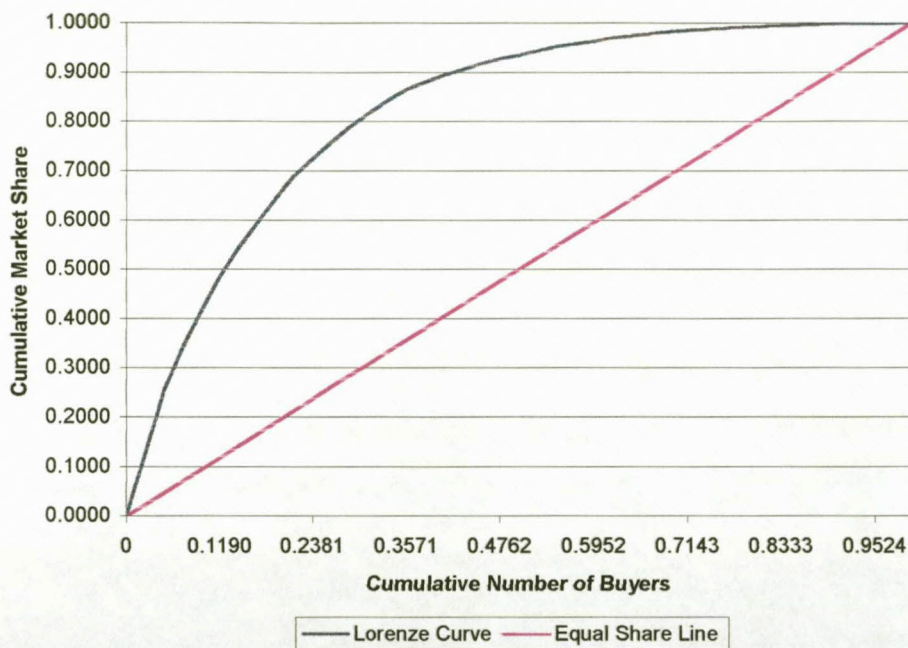


Figure 3.1: The Lorenz Curve

Figure 3.1 shows a typical Lorenz curve. The diagonal represents a situation of “equal share” in the percentage of the market held by each buyer. The Lorenz curve is a relative measure of the inequality of firm size, which shows the percentage of firms that account for a certain percentage of the market. The deviation from the 45 degree line is an indication of relative concentration (Lubbe, 1992).

3.5 RESULTS OF CONCENTRATION ANALYSIS

The Mombasa auction market is typically characterised by products that are bulky and perishable. This increases shipping costs and restricts the product’s geographic mobility, ultimately limiting access to buyers. There is no substitution because the processors’ needs of tea are highly specialised. Since the close of the London tea auction in 1998, the Mombasa auction has played a more significant role in setting the world price of tea, particularly for the black teas, thus the importance of the concentration analysis.

3.5.1 CONCENTRATION RATIO

The Mombasa auction market is definitely controlled by a few buyers. The market has had a total number of 124 firms active in tea purchase between 1987 and 1999. However, the maximum number of active buyers in any one year has been between 38 and 65 firms during this period. The highest number of active buyers was observed in 1999, while the lowest number was in 1988 and 1989. A list of active buying firms is shown in Appendix B.

The CR₄ and CR₈ over the period 1987 to 1999 are shown in Table 3.1. Among the active buyers, the top eight firms have purchased, on average, 69,1 percent of all the tea sold at the auction between 1987 and 1999. This is depicted by Figure 3.2, which shows the trend of the concentration ratio for the top four and eight firms. The top four firms, on average, made half of the total purchases at the Mombasa auction market between 1987 and 1999. The worst scenario occurred in 1997, when the top four firms made 58 percent of the total purchases.

Table 3.1: Concentration ratios of the Mombasa auction market

Year	CR ₄	CR ₈
1987	0.417	0.644
1988	0.477	0.696
1989	0.528	0.739
1990	0.431	0.658
1991	0.473	0.645
1992	0.513	0.685
1993	0.516	0.693
1994	0.465	0.649
1995	0.448	0.665
1996	0.497	0.695
1997	0.586	0.758
1998	0.574	0.731
1999	0.575	0.730

It also seems from Figure 3.2 that the level of concentration is increasing over the years at both the CR₄ and CR₈ level. The strength of the buyers at the Mombasa auction has increased progressively over time. The market share of the top eight firms has increased despite modest increases in the number of active firms. There is no doubt that the strength of the top eight firms has increased over the periods 1990 to 1993 and 1995 to

1999. It is also important to note that there is a significant linear relationship between CR_4 and CR_8 and the average auction price. The correlation coefficients depicted are 89,2 and 72,8 percent, respectively, implying that higher levels of concentration are associated with higher average prices or vice versa.

At the end of 1999, the top four firms dominating the Mombasa auction market were Lipton Limited, James Finlay, Global Tea Commodities and Van Rees BV. These firms purchased 57,5 percent of all tea sold at the Mombasa auction in 1999, during which time Lipton Limited had 26,8 percent of the total market share.

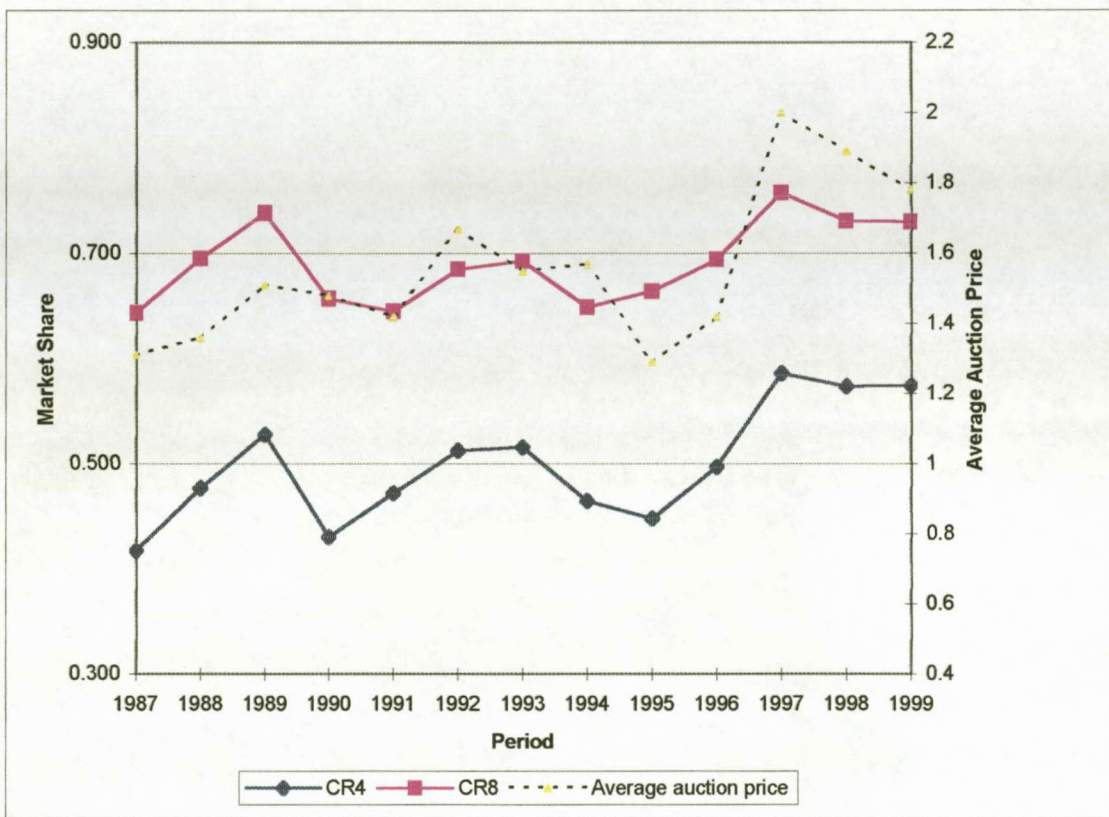


Figure 3.2: Concentration ratios of the Mombasa Auction Market (1987-1999)

The Mombasa auction market may continue to experience smaller firms dropping out or struggling to survive. However, it should be noted that Brooke Bond (Mombasa) which was ranked 7th in 1996 with 4,7 percent of the market share, merged operations with Lipton Limited in 1997. Lipton Limited had 20,2 percent of the market share at the time (Kimpwitu, 1998).

The Mombasa auction market had a concentration of 0,575 and 0,730 during 1999 for the top four and eight firms respectively. The group of firms on which the concentration measure is based cannot be less than two or much more than eight of the firms with the largest market share. It is their combined market share that is the degree of concentration in the market (Shepherd, 1985).

3.5.2 HERFINDAL INDICES

The number of active firms at the auction has increased slightly over the period 1987 to 1999 to a high of 65, from 38 between 1987 and 1989. The Herfindal index shows an increase for the periods 1988 and 1989, 1991 to 1993, and 1996 to 1999 (see Figure 3.3). The increase in the Herfindal index for 1988 and 1989 could be attributed to the fall in the number of active firms at the auction to 38 for the same period.

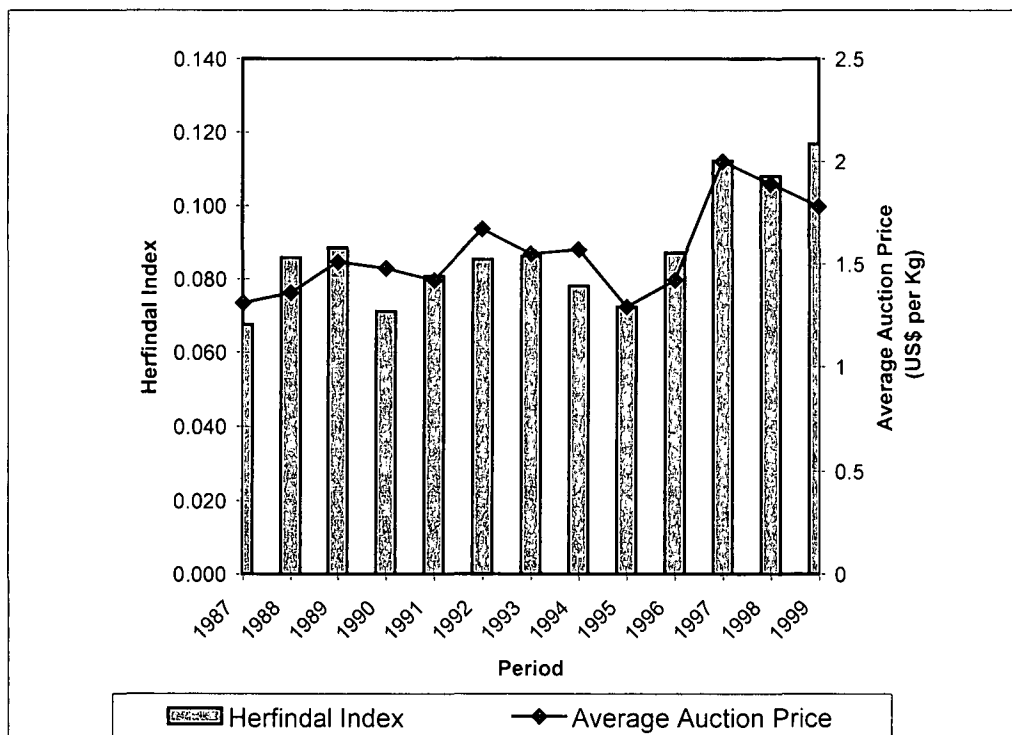


Figure 3.3: Herfindal Indices of the Mombasa Auction Market (1987-1999)

When the number of active buyers increased to 40 from 38 in 1990, the Herfindal index dropped from 0,088 to 0,071, a drop of 19,3 percent. Figure 3.3 shows a steady increase

in the Herfindal index from 1991 to 1993, by which time the number of active buyers had risen to 45. During this period, the number of active buyers increased and although the Herfindal index should have decreased due to the increase in the number of active buyers, it increased. This clearly shows growth in concentration despite the increase in the number of active firms. The increase in the index shows that concentration increased, which further confirmed by the increase in the market share held by the top four firms (see Figure 3.3). The Herfindal index increased by 6,2 percent between 1991 and 1993, to 0,086 in 1993. However, it dropped by 9,3 percent to 0,078 in 1994 and by a further 7,7 percent to 0,072 in 1995. This drop could be attributed to the increase in the number of active firms during the period. It should be noted that the drop in the Herfindal index for 1995 could also be due to the drop in the average market price for the period. The drop in price was a result of a 16,8 percent increase in Kenya's tea production, which resulted in Kenya contributing 29,7 percent of the world's exports.

The 1997 peak in the concentration ratios could be attributed to the severe drought that affected the East African region; most severely affected was Kenya. This resulted in a drop of 14,2 percent in Kenya's production compared to 1996. As a result of the changes in the supply conditions the prices at the auction increased. However the changes that occurred in 1994 are peculiar in that there was a drop in production in the market mainly due to a drop in Kenya's production. This led to an increase in price but the level of concentration decreased. This trend can only be attributed to the increase in the number of active buying firms from 45 to 53 during 1994 (see Figure 3.2 and 3.3).

The Herfindal index decreased during 1998, to 0,108 but increased during 1999 to 0,117, the highest level of concentration between 1987 and 1999. The decrease in the Herfindal index during 1998 could be attributed to the increase in the number of active buyers, from 54 to 61. The increase in the Herfindal index during 1999, despite the increase in the number of active buyers, could be attributed to the increase in the market share held by the top two firms during 1999 compared to 1998. It is also important to note that African Highlands Produce Limited reorganised operations and started trading as James Finlay PLC during 1998. This was mainly aimed at ensuring that there is no confusion between African Highlands Produce and African Highlands Limited, a tea

producer (Muchura, 2001). This strategy resulted in James Finlay displacing Van Rees as the firm with the second largest market share.

The trend in the average Mombasa auction price appears to follow a similar pattern as the Herfindal indices, except for 1990, 1992, 1994 and 1999. These are periods that have already been highlighted for lower Herfindal indices due to an increase in the number of active firms.

The average market price observed, coupled with the number of active firms, has greatly influenced the Herfindal indices observed in the period 1987 to 1999. This is because as the average prices increase, the tea-buying firms require more capital to maintain their levels of operation. This then brings into focus the fact that concentration may result due to economies of scale (Lubbe, 1992). This also goes to show that the Mombasa auction market, in its present structural form, may not be well suited to generate the best price possible for the tea producer, especially if firms lose their market share due to an upward shift in price levels. This has a greater implication when considered with the view that Mombasa auction market is setting international world prices for the region.

It could however, be argued that the market share held by the larger firms enables them to ensure profitability even when the tea price may be on the rise. This is based on the fact that empirical results show a strong relationship attributable to causes such as brand name recognition, economies of scale, experience curves and bargaining power (Woo, 1987). Another stream of research has cautioned that market share is not a necessary or sufficient condition for profitability. On the other hand a number of studies have established a negative relationship between concentration and risk. Systematic risk is risk that influences a large number of assets, and has been established to have a negative correlation with concentration (Sullivan, 1978, Scott, 1981 and Moyer and Chatfield, 1983). According to Woo (1987) this suggests that the more powerful firms may be in a better position to mitigate the impact of adverse events. Firms with market power may also pass their risk on to customers through price adjustments rather than to their shareholders and creditors through profit fluctuations (Moyer and Chatfield, 1983).

3.5.3 LORENZ CURVES

Figure 3.4 shows the distribution of the market shares of the participants in the Mombasa auction market. Clearly over 90 percent of the total sales are purchased by the top 14 buyers in 1997 and 1999, implying a decreasing role being played by the buyers ranked 14th and lower with respect to market share.

The movement of the curve away from the equal share line between 1987 and 1989 shows that a major shift in market concentration occurred in 1989. As a result the role played by firms ranked 15th and higher reduced. The Lorenz curves show 1987 as the period with the lowest deviation from the equal share line.

Despite depicting a lower concentration for 1989, the Lorenz curve for 1989 crosses the curves for 1997 and 1999 at the buyers ranked 21st and 22nd. This implies that, despite showing less concentration, the buyers ranked lower than 21st and 22nd in 1989 had a small influence on the market compared to those ranked lower than 21st and 22nd in 1997 and 1999 respectively.

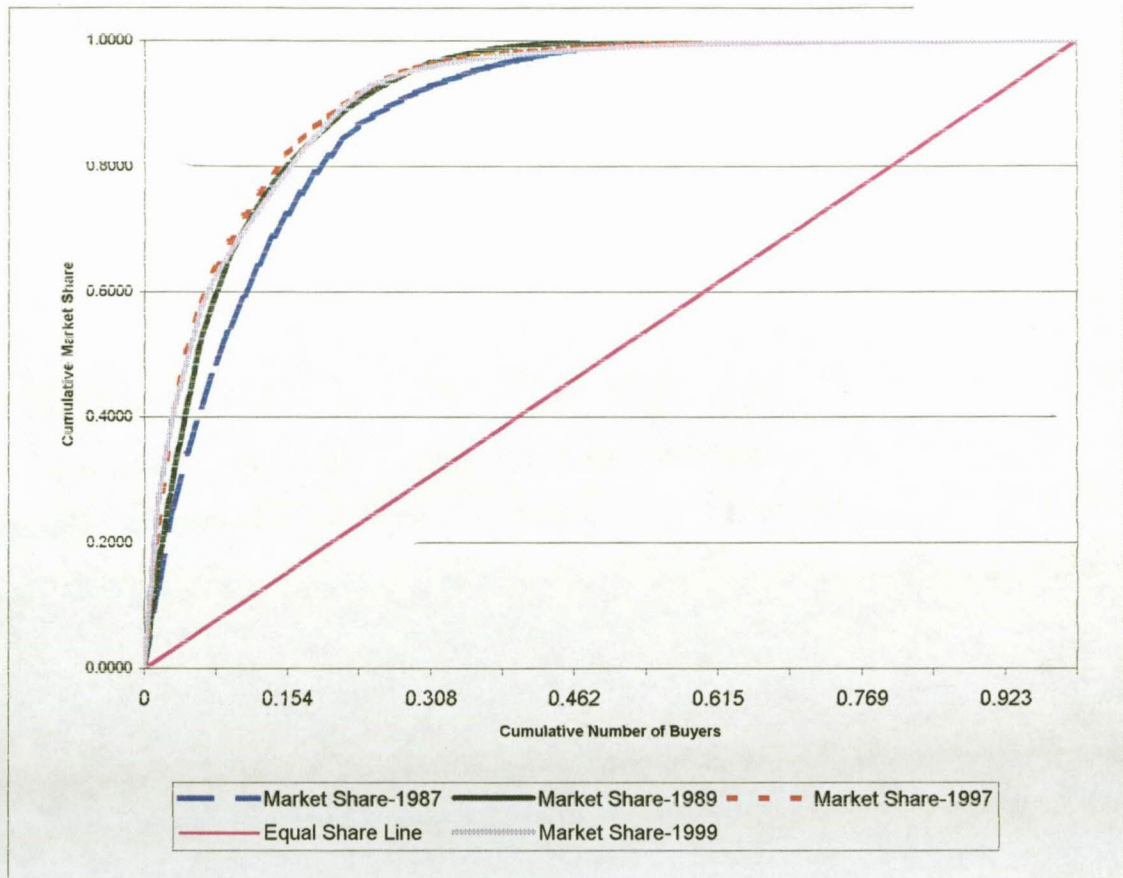


Figure 3.4: Lorenz market inequality curve - Mombasa Auction

3.6 ENTRY AND EXIT

In a competitive market where profits are normal, barriers to entry into the industry are expected to be minimal. If, however, abnormal profits are earned there is an incentive to create barriers to entry to discourage new firms (Hanson and Simmons, 1995). Hanson and Simmons (1995) and Lubbe (1992) state that barriers may exist due to natural causes resulting from economies of scale, advantages of being an already established firm and legislative or institutional actions.

The Mombasa auction experienced changes in the number of active buyers (firms) between 1987 and 1999, as shown in Table 3.2. The data shows a considerable number of changes in the market in various purchase categories. The changes are shown in terms of exit, entry, loss gain of market share and no change in market share held (No mov't). Exit refers to firms that were actively buying tea in the previous year but not in

the year under consideration. Entry refers to those firms that were not actively participating in the purchase of tea in the previous year but are active in the year under consideration. However, it should be noted that only 13 firms have been active in every year during the period 1987 to 1999.

Most movement in terms of entry and exit into and from the market has occurred in the categories $\geq 150\ 000 < 500\ 000$ kg and below, while gains and no movement in market share positions have occurred in the categories above $\geq 150\ 000 < 500\ 000$ kg. This depicts a situation in which the bigger firms are increasing in size. The loss in market share position has mainly occurred in categories $\geq 150\ 000 < 500\ 000$ kg and below. In the period 1987 to 1999 exit from the market by firms in the category $\geq 5\ 000\ 000$ kg occurred in 1993, 1997 and 1998. The 1993 movement was due to the scaling down of James Finlay PLC's operations, when the firm started trading as African Highlands Produce Limited. The 1997 exit was by Brooke Bond (Mombasa) following the merger of operations between Brooke Bond and Lipton Limited, but trading on the auction market continued as Lipton Limited.

Table 3.2: Changes in companies trading on the Mombasa auction market (1987-1999)

Category	1988						1989						1990					
	Firms	Exit	Entry	Lost	Gain	No Mov't	Firms	Exit	Entry	Lost	Gain	No Mov't	Firms	Exit	Entry	Lost	Gain	No Mov't
Volume of annual Purchases ('000 kg)																		
≥5 000	4				1	3	6				3	3	8			4	4	
≥1 000 < 5 000	13	1		7	5	1	14			6	7	1	13			8	6	2
≥500 < 1 000	4			1	3		1				1		4			3	1	
≥150 < 500	6	1	1	2	3		7	2	3	2		2	6	1	1	2	4	
≥50 < 150	7	3	1	3	2	1	4	2	1	2		1	3		2			1
≥10 < 50	2	3	1	1			2	1		2			6	1	3	3	2	
≥5 < 10	1		1				3	1	2	1			0	1				
>0 < 5	1						1					1	0	1				
Total	38						38						40					
Category	1991						1992						1993					
Volume of annual Purchases ('000 kg)																		
>5 000	5			1	2	2	6			2	3	1	7	1	1	1	1	5
≥1 000 < 5 000	17	1		8	9		17			8	7	2	15	1	2	10	7	1
≥500 < 1 000	5		1	1	3		1	2			1		8		3	1	1	
≥150 < 500	3	1			2	1	8		4	3	1		5	2	1	5	1	
≥50 < 150	6		2	2	1	1	4	2	1	2		1	4		2	4		
≥10 < 50	1	4	1				2		1	1			4	1		1		
≥5 < 10	2		2				3	1	1	2			1	2	1	3		
>0 < 5	1					1	1	1					1		1			
Total	40						41						45					
Category	1994						1995						1996					
Volume of annual Purchases ('000 kg)																		
>5 000	10			3	5	2	9			2	3	4	12			1	6	5
≥1 000 < 5 000	14		1	6	5	2	19		1	6	8	4	11	2	1	5	5	
≥500 < 1 000	6		2	3		1	4			2	2		3	1		1	2	
≥150 < 500	6			4	2		10		3	5	2		13		1	5	7	
≥50 < 150	4	1	1	1	2		5		1	3	1		4	3	2	1	1	
≥10 < 50	7	3	4	2		1	4	4		3	1		6	2	2	2	1	1
≥5 < 10	2		1	1			1	1		1			1			1	1	
>0 < 5	4	1	4				2	1	2				2	1	1			
Total	53						54						52					
Category	1997						1998						1999					
Volume of annual Purchases ('000 kg)																		
>5 000	9	1		1	2	6	14	1	1	3	6	4	14			6	5	3
≥1 000 < 5 000	10	1	1	2	7		11		1	6	3	1	7			3	2	2
≥500 < 1 000	4				4		4			2	2		5			1	4	
≥150 < 500	11		1	3	6	1	5	2	1	3		1	11	1	1	3	7	
≥50 < 150	8	1	3	3	1	1	9	2	3	3	3		8	2	1	5	2	
≥10 < 50	4	3	2	2			13	1	6	4	3		17	2	7	9	1	
≥5 < 10	3	1		3			1		1					1				
>0 < 5	5	2	4	1			4	2	2	2			3	2	3			
Total	54						61						65					

During 1998, the exit was once again due to the change in the operations of African Highlands Produce Limited and James Finlay reverting to its former trade name.

The greater entry and exit into the Mombasa auction among the smaller buying firms supports the argument advanced by Lubbe (1992) and Hanson and Simmons (1995), that natural barriers do exist. This reflects both economies of size and the benefits derived from long-standing client relationships.

The change in the number of actively participating buyers could therefore be said to account for the low level of significance. This, however, still highlights the fact that bigger firms are increasing in size and smaller firms are exerting less influence in the market.

With reference to Table 3.2, the number of firms active on the Mombasa auction market has increased annually between 1987 and 1999 except for 1991, 1988 and 1996. There was no change in the number of active firms in 1991 and 1989, but the number of active firms decreased by 4 during 1988 and by 2 during 1996.

The number of firms entering (becoming active) the Mombasa auction market has varied between 4 and 14. These firms were observed in 1988 and 1998 respectively. The number of firms ceasing to be active in any one year has varied between 4 and 9, observed during 1997 and 1996 respectively. The largest number of firms retaining market share ranks was 6, which occurred in 1997. All of these firms were in the $\geq 5\ 000\ 000$ kg category. It was also during 1997 that the highest average auction price between 1987 and 1999 was observed. In the same period concentration based on the CR_4 and CR_8 measures of concentration was the highest that has been experienced at the Mombasa auction for the same period. It was only in 1990 that no firms in the $\geq 5\ 000\ 000$ kg category were able to retain their market share rankings.

A correlation analysis was performed on the ranking of the 13 firms that have participated annually on the auction market between 1987 and 1999 (see Table 3.3).

There was significant correlation at a 5 percent level of significance for the ranks of 1987 to 1999, except for 1989 and 1999. This could be attributed to change in the market share of these firms in 1989 and 1999. For example, Lipton was ranked 4th in 1989 and 1st in 1999, Khaku exports was ranked 21st in 1989, but 44th in 1999, Phillips Kenya Tea was ranked 3rd in 1989 and 15th in 1999. This also corresponds with the fact that, even in the $\geq 5\,000\,000$ kg category, only three firms were able to retain their market share ranking between 1989 and 1990. As expected, changes in rankings have occurred, but with a similar trend. The high correlation coefficients and the fact that they are significant at a 5 percent level implies that a linear relationship does exist in the rankings of these firms.

Table 3.3: Correlation coefficients of buyer market share ranks

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1987	1	0,895	0,765	0,669	0,773	0,638	0,854	0,763	0,867	0,727	0,606	0,675	0,578
1988			0,908	0,772	0,860	0,817	0,901	0,595	0,813	0,684	0,700	0,687	0,608
1989				0,872	0,850	0,754	0,808	0,499	0,674	0,515	0,608	0,536	0,412
1990					0,935	0,843	0,863	0,599	0,735	0,547	0,706	0,669	0,544
1991						0,859	0,899	0,618	0,789	0,712	0,761	0,718	0,646
1992							0,890	0,546	0,759	0,667	0,778	0,775	0,741
1993								0,765	0,905	0,656	0,751	0,790	0,710
1994									0,905	0,623	0,672	0,771	0,691
1995										0,770	0,834	0,896	0,826
1996											0,813	0,813	0,822
1997												0,957	0,942
1998													0,967
1999													1

3.7 CONCLUSION

Tea produced by the industry is generally not a uniform product. Despite similar grading the product from each production unit is unique and it is influenced by a number of factors at the time of harvest and manufacture. Most of the tea produced in the East African region is sold through the Mombasa auction market, which a few buyers dominate. Buyers ranked 15th and lower have very little influence within the market. This situation favours the large buyers and it could well be at the expense of the producers. All measures of market concentration show that the big buyers have grown in terms of their share of the market over time in the period between 1987 and 1999, and small buyers are losing the little influence they once had.

In light of the fact that the Mombasa auction is the major market for tea producers in the region, it stands to reason that the producers will have to join forces to attain a bigger return from their product, especially as production continues to increase. Producers could lobby for greater participation in the market by encouraging mergers among the smaller buyers, attracting new international buyers and seeking alternative markets in the developed world and the former Eastern Block countries.

The smallholder tea growers, and all producers in general, desire a higher price for their product, but the trend between the Herfindal index and price indicates that a higher price may lead to more concentration in the market and further reduce the role of the small buyer. This clearly highlights the need for alternative markets if tea is to help eradicate poverty among smallholder farmers and those directly associated with it in Uganda and the other tea producing areas in the East African region.

Clearly the big firms on the Mombasa auction market have remained big, and have in some cases increased their market share. In light of the fact that this is a market for an agricultural product, there appears to be a high level of buyer concentration, but it would then follow that buyer concentration would try to keep prices low. However, the trend seems to be an increase price being associated with an increase in buyer concentration. On the other hand, it could be argued that the market share held by the large firms

enables them to ensure profitability when prices increase. The large firms are in a position to increase their bids in periods of low supply and pass on the increased costs to the consumer as has been put forward by Woo (1987). This would imply that the small firms drop out when the price levels increase due to increased financial requirements and input costs, which the small firm cannot pass it onto the consumer.

SPECIFICATION OF THE HEDONIC MODEL

4.1 INTRODUCTION

A hedonic price function is a regression of the observed price of a commodity against its quality attributes (Lucas, 1975). Hedonic pricing involves implicit prices of attributes or characteristics of a commodity rather than the price of the commodity itself. The underlying hypothesis is that goods are valued for their utility bearing characteristics and that the prices of the goods vary according to specific amounts of each characteristic the good contains. This leads to the implication that observed prices are a composite of the values of the product's characteristics (Brorsen, Grant and Rister, 1984).

Gorman (1980) also suggests that hedonic prices are implicit prices of the attributes or characteristics embodied in a commodity as opposed to the price of the commodity. Gorman (1980) further states that it is assumed that the consumers obtain utility from consuming the characteristic of the good in question (Gorman, 1980). Utility refers to the satisfaction that a consumer obtains from the use of a particular product (Miller, 1982).

The functional form of hedonic models may be difficult to conceptualise. It has been noted that first stage hedonic models are different from any general pricing models, where the price is determined by general demand and supply factors (Brown and Ethridge, 1995). Hedonic models determine implicit prices of all recognised levels of quality characteristics embodied in the product on the basis of utility or productivity of the characteristics.

Brown and Ethridge (1995) further observe that the conceptualisation of the appropriate functional form cannot be determined a priori due to the absence of a theoretical basis. The tea industry recognises six major characteristics which influence the overall quality of a tea. These qualities with respect to the black tea leaf include particle size,

uniformity, density, the brightness and pungency of the liquor, and brightness of the infusion. The absence of any taint in both the liquor and the infusion is also an important characteristic. It is difficult to conceptualise all relationships between and among attributes in the pricing mechanism. This is in line with Brown and Ethridge (1995), who highlighted the same difficulty in the cotton industry, where nine characteristics are recognised as being relevant in price determination.

Rosen (1974) observed that when goods are treated as tied packages of characteristics, observed market prices are compared on the same terms. The economic content of the relationship between observed prices and observed characteristics becomes more evident once price differences among the goods are recognised as equalising differences held by the various alternative packages (Rosen, 1974).

4.2 HEDONIC PRICE FUNCTIONS

Hedonic prices are the implicit prices of attributes or characteristics embodied in a commodity as opposed to the price of the commodity (Ethridge and Davis, 1982). This assumes that the consumers obtain utility from consuming the attributes of the commodity in question (Gorman, 1980). The observed commodity prices are a composite of the values of the commodities' characteristics (Brorsen, *et al*, 1984).

Lucas (1975) states that hedonic price functions are regressions of the following general form:

(Equation 4.1)
$$P_i = P(V_{i1}, \dots, V_{ij}, \mu_i)$$

Where:

- P_i = the observed price of commodity i ,
- V_{ij} = the amount of some 'intrinsic quality',
- μ_i = a disturbance term.

4.2.1 THE CONSUMPTION APPROACH

Lucas (1975) draws a close link between Lancaster's model of consumer theory and estimated hedonic price functions. Lancaster writes the individual's utility function as:

$$(Equation 4.2) \quad U = U(Z_1, \dots, Z_j)$$

Where Z_j is the total amount of characteristics j obtained by the consumer. Linear consumption technology is assumed to relate the vector of characteristic totals to the quantities of commodities consumed.

$$(Equation 4.3) \quad Z_j = \sum V_{ij}q_i \quad j = 1, J$$

Where q_i is the quantity of commodity i consumed.

Lancaster assumes that the consumer chooses quantities of the continuously variable commodities so as to maximise utility, subject to the consumption technology and budget constraints (Lucas, 1975).

$$(Equation 4.4) \quad \begin{aligned} &Max. U(Z) \text{ Subject to } Z = Vq, \\ &Y \geq Pq, Z, q \geq 0 \end{aligned}$$

Where:

- | | | |
|-----|--|--------------------|
| Z | = the vector [Z_j] | $j = 1, J$ |
| V | = the matrix [V_{ij}] | $I = 1, Ij = 1, J$ |
| Y | = the consumer's income | |
| P | = the vector of commodity prices [P_i] | $I = 1, I$ |
| Q | = the vector [q_i] | $I = 1, I$ |

This non-linear program has a solution for the optimal bundle of characteristics, which is represented as Z^* below.

(Equation 4.5)
$$\begin{aligned} & \text{Min. } Pq \text{ Subject to } Vq \geq Z^*, \\ & q \geq 0 \end{aligned}$$

The dual is written as follows;

(Equation 4.6)
$$\text{Max. } \rho Z^* \text{ Subject to } \rho V \leq P$$

Where ρ is the shadow price of the characteristics.

(Equation 4.7)
$$P^a = \rho V^a$$

Where:

P^a is the solution sub-vector of P ,

V^a is the solution of sub matrix of V .

The above is a linear specification of the hedonic function (Equation 4.1) and relates to the estimated hedonic function as follows:

- a) In the case of a single representative consumer, estimates of the hedonic price functions are typically obtained by treating each commodity as an observation. Therefore, if one estimates the hedonic function by multiple regression analysis, it is necessary that the true relation should hold for a greater number of the commodities than characteristics (Lucas, 1975).

In the case of a non-degenerate program, a consumer will only choose to consume no more than the characteristics present. It follows that Equation 4.7 holds for at most j commodities and cannot, in this case, be the hedonic price function estimated by multiple regressions, as this would rule out the gaining of degrees of freedom upon dropping a variable (Lucas, 1975).

- b) Figure 4.1 below illustrates the non-degenerate programming problem, using the Lancasterian diagram for the case of two characteristics (Z_1 and Z_2) and five commodities ($A, B, C, D,$ and E).

Commodity A has characteristics Z_1 and Z_2 in the proportion represented by the angle of the ray OA . If a consumer spends all his income on commodity A , at the given price, he can obtain a combination of characteristics equal to the coordinates of point A through to E , which are corresponding points for the other commodities.

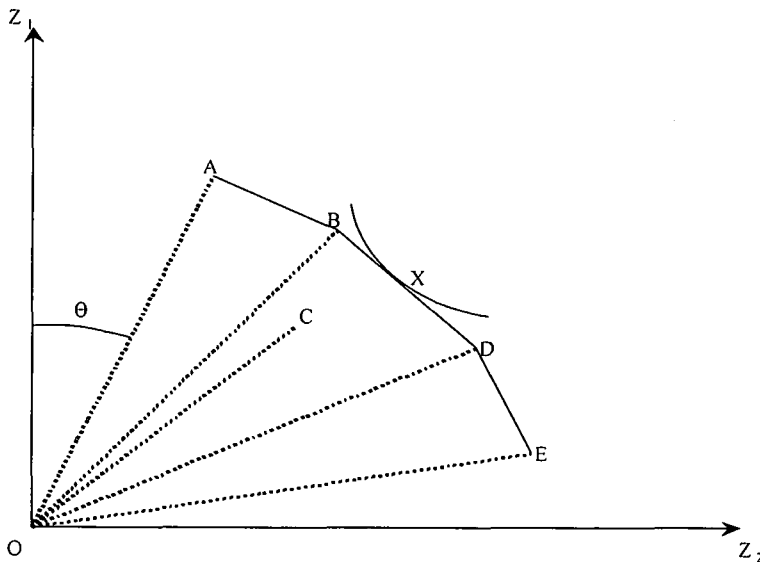


Figure 4.1: Lancasterian diagram illustration of the non-degenerate programming problem

Adopted from Lucas (1975)

The locus $ABCDE$ is the consumption possibility frontier in characteristic space as defined by the consumption technology, parametric prices and budget constraints to the consumer.

A consumer will only choose that combination of commodities B and D , which provides characteristics represented by point X . Hence Equation 4.7 holds for

commodities B and D . This implies a zero demand for commodities A , C and E at present prices and therefore, excess supply if they appear on the market. If markets are stable, the prices of these commodities will fall. The prices of these commodities should adjust until points A to E fall in the same plane. In such a generate case the number of commodities with positive consumption levels is indeterminate, but the consumer may choose to consume more than j commodities.

When prices have adjusted to the generate case, the number of binding constraints in Equation 4.7 may be greater than the number of characteristics. It is then possible to estimate the relationship using multiple regression analysis. It is however important to note that the degenerate case implies a strictly linear specification of the hedonic function (Lucas, 1975).

- c) In the case of the non-degenerate program, a linear hedonic price function (Equation 4.7) holds for the same number of commodities as characteristics. Such equations hold with a different vector of values of ρ for each facet. Therefore, a piecewise linear function relates commodity prices to characteristics for all commodities on the consumption possibility frontier. This function cannot be estimated by taking break points in the characteristic variables at values corresponding to vertices in the true equation and applying a piecewise linear estimator. This is due to the fact that each segment of the piecewise linear equation would, again, only involve the same number of commodities as characteristics, thus leaving zero degrees of freedom. However, a non-linear function can be estimated to approximate the surface of the flat facets, and this presents a plausible interpretation of the estimated non-linear hedonic functions (Lucas, 1975).

- d) A non-linear hedonic price function capable of estimation by multiple regression analysis, and interpreted as representing variations in commodity prices and characteristics around the consumption possibility frontier, requires that the Lancasterian consumer problem be non-degenerate. However, if some quantity of

every commodity used to estimate the hedonic price function is consumed, this would imply that the representative consumer cannot be on the consumption possibility frontier, and therefore the representative consumer must be abandoned (see section (a)) (Lucas, 1975).

Any number of consumers facing an identical choice set of commodities with a common price vector and constrained by the same consumption technology will have a consumption possibility frontier similarly shaped in the characteristic space. Consumers with different preferences, or different incomes, and non-homothetic indifference maps, will in general be in equilibrium at different points on the 'common' consumption possibility frontier. As shown in Figure 4.2, one consumer may be in equilibrium at Y and consume a combination of A and B, while the other is at X and consuming a combination of B and D.

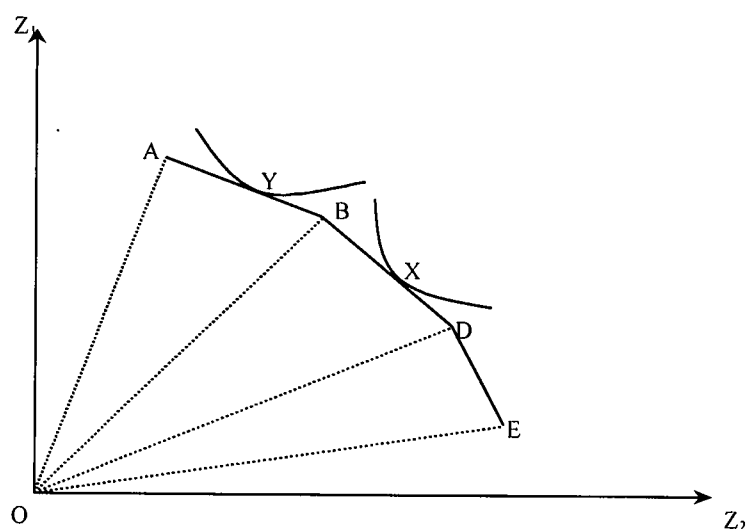


Figure 4.2: Consumers Y and X at equilibrium on the consumption possibility frontier

Adopted from Lucas (1975)

This implies that consumers efficiently select commodities with parametric prices and characteristics, giving rise to the following equation:

(Equation 4.8)
$$P_i^* = P^* (V_{i1}, \dots, V_{ij})$$

Where P_i^* is the demand reservation price for commodity i , this function can be non-linear if the representative consumer myth is not adhered to (Lucas, 1975).

4.2.2 THE DEMAND APPROACH

Ladd and Martin (1976) adapted the demand approach for application to production inputs. This approach assumes profit maximising, competitive multi-product processing firms whose independent production processes require inputs of characteristics for the appropriate end use performance (Veeman, 1987). For such a firm the production functions are depicted as:

$$\text{(Equation 4.9)} \quad Q_y = f(Z_{1y}, \dots, Z_{ny})$$

Where:

Q_y = the quantity of output y ($1, \dots, Y$),

Z_{jy} = the quantity of input characteristic j , ($1, \dots, n$),

The firm's profit function is:

$$\text{(Equation 4.10)} \quad \Pi = \sum_{y=1}^Y P_y f(Z_{1y}, \dots, Z_{ny}) - \sum_{y=1}^Y \sum_{i=1}^m P_{xi} X_{iy}$$

Where:

X_{iy} = the quantity of market input i ($1, \dots, m$) used in the production of output Y ,

P_y = the price of output Y ,

P_{xi} = the price of input X_i .

Z_{jy} is the total quantity of each characteristic used in the production of Y and is a function of the input quantities applied to the production process (X_{iy}) and the quantity of characteristic j contained in the input. The first-order conditions for profit maximisation with respect to the use of market input i can be stated as:

$$(Equation\ 4.11) \quad \delta\Pi/\delta X_i = P_y (\delta f/\delta Z_{jy}) (\delta Z_{jy}/\delta X_{iy}) - P_{xi} = 0, \quad i = 1, \dots, m$$

Solving for P_{xi} gives:

$$(Equation\ 4.12) \quad P_{xi} = P_y \sum_{j=1}^n (\delta f/\delta Z_{jy}) (\delta Z_{jy}/\delta X_{iy})$$

Where:

$\delta Z_{jy}/\delta X_i$ = the marginal yield of characteristic j from the i th input in the production of Y ,
 $\delta f/\delta Z_{jy}$ = the marginal physical productivity of one unit of characteristic j in the production of Y .

The term $(\delta f/\delta Z_{jy})$ is the marginal value product of a unit of the j th characteristic used in producing Y . Simplifying Equation 4.12 by substituting $\delta f/\delta Z_{jy}$ with β_j ($\delta f/\delta Z_{jy} = \beta_j$) and $\delta Z_{jy}/\delta X_{iy}$ with Z_{ij} ($\delta Z_{jy}/\delta X_{iy} = Z_{ij}$) giving the hedonic price function:

$$(Equation\ 4.13) \quad P_{xi} = \beta_j Z_{ij}$$

Regression analysis can be used to obtain estimates of β_j , given data on input prices and marginal yields of the various characteristics from the inputs Z_{ij} .

4.3 HEDONIC PRICE MODEL FOR SMALLHOLDER TEA

The market price of tea may be regarded as a collection of implicit prices determined by the quantity and quality of tea as recognised by the tea industry. General supply and demand forces determine the general levels of prices for any given period (Brown and Ethridge, 1995). Brown and Ethridge (1995) also note that the demand and supply factors of the individual attributes affect the market valuations of the attributes within any period of time.

Estimated hedonic functions have been stated to neither identify demand nor supply functions (Rosen, 1974), but contains attempts to treat product quality in consumer demand and pricing of commodities (Murphy, 1980 cited in Bogahawatte and Iresha, 1994). The observed and implicit prices of embodied attributes may be affected by the market demand and supply. Due to market forces the implied value of an embodied quality attribute may be constant over time, but may vary with specific market characters (Bogahawatte and Iresha, 1994).

Brown and Ethridge (1995), however, state that attribute pricing by the market relies on the accuracy and appropriateness of the quality of information. For example, the system of cotton quality information in the U.S., administered and maintained by the U.S. Department of Agriculture, measures a number of quality characteristics of the cotton fibres on each bale produced. The measurements are made on the trash, colour, fibre length, strength, micronaire and length uniformity of the fibre. This information is available to all participants trading cotton. The reliability of the information is widely accepted (Brown and Ethridge, 1995). This is contrary to the situation present in the tea industry. The quality observations made by the tea brokers are confidential and only made available to the producers, though all participants on the tea market are informed of the broker's evaluation price. All the buyers are also provided with a sample of the tea in question for their own tasting. This clearly results in the undermining of one of the basic aspect raised by Brown and Ethridge (1995) regarding accuracy and appropriateness of the quality of the information. Since tea tasting is highly subjective, one would expect the buyers to hold different opinions in regard to the quality of the product in question.

4.4 FUNCTIONAL FORM SPECIFICATION

Partial and residual regressions are used to test the structural form of the models to ensure that the attributes included in the model are transformed correctly. The partial regression analysis identifies the price-quality relationship in the presence of other attributes recognised in trading. This type of analysis aims to achieve the following:

- The price-quality relationships that yield implicit prices.
- Correction of any systematic error in the model estimates (Brown and Ethridge, 1995).

This is the procedure followed by Brown and Ethridge (1995) in which partial regressions of both price and attributes are regressed against the other attributes in the model. The generated residues for each are regressed against one another to show the nature of the regression relationship for the attributes and the marginal importance of each particular attribute in reducing the residue variance (Brown and Ethridge, 1995).

The partial regression analysis is illustrated as follows, using a two independent variable function as an example:

(Equation 4.14)
$$P_i = \alpha_0 + \alpha_1 X_{1i} + \alpha_2 X_{2i} + \varepsilon_i$$

Where P_i is the price of the product under consideration, α represents the regression coefficients, X_{1i} and X_{2i} are the attributes that explain the price and ε_i the error term (Brown and Ethridge, 1995).

One attribute at a time is considered for the partial regression analysis. In the first analysis, X_{2i} is excluded from the model and the regression performed and the residual obtained.

(Equation 4.15)
$$P_i = \beta_0 + \beta_1 X_{1i} + \lambda_i$$

Where β represents the estimated coefficients and λ_i the error term with X_{2i} excluded. The residual λ_i contains any random error in price and the effect of the excluded attribute on price. Another regression is performed to identify the relationship between the attributes X_{2i} and X_{1i} .

(Equation 4.16)
$$X_{2i} = \theta_0 + \theta_1 X_{1i} + \mu_i$$

Where θ represents the estimated coefficients and μ_i the error term. The residue μ_i contains any random error in the excluded attribute and the effect of the excluded attribute not associated with the included attribute. If there is no correlation between these attributes, then θ_1 is not significant and μ_i approximately equals X_{2i} . By contrast, if θ_1 is significant, X_{1i} explains X_{2i} and μ_i is only a random error (Brown and Ethridge, 1995).

Brown and Ethridge further show that the two series of residual obtained above should be regressed against one another

(Equation 4.17)
$$\lambda_i = \gamma_0 + \gamma_1 \mu_i + \gamma_2 \mu_i^2$$

Where γ represents estimated regression coefficients. These show the relationship between price and the excluded attribute and therefore provide evidence of what the appropriate transformation might have been when placed in the model. This equation determines the shape and significance of the non-random error in relation to price and the excluded attribute, given that there is some random error (Brown and Ethridge, 1995).

Brown and Ethridge (1995) further note that if only random error exists, the attribute does not decrease any error variance and therefore should not be included in the model. If used in this manner, partial regressions can provide an indication of the direction, the rate of change in the slope of each attribute and an indication regarding whether the variables should be included in the model (Brown and Ethridge, 1995).

A regression analysis of the residuals is used to ensure that the attributes are adequately transformed. This is achieved by regressing the regression error term against each attribute. Brown and Ethridge (1995) state that if the attribute is transformed correctly the residual statistic should be zero and not significant. If found significant, this implies

that the transformation is incorrect because the residuals are not linear across attribute levels. Brown and Ethridge (1995) further note that there is no significant relationship between the attribute and the residuals if the transformation accurately tracks change in price from changes in the attribute, holding other attributes or factors constant.

4.5 CONCLUSION

The consumption and demand approaches highlight the fact that hedonic functions can be estimated using regressions and are used to address consumption and demand attributes. The procedure followed by Brown and Ethridge (1995) has been selected mainly because the price of tea is regressed against the known tea attributes that a buyer demands. The partial and residual regression assist in ensuring that the variables included in the model explain the changes observed in price. This procedure ensures that the researcher does not include variables that may increase the coefficient of correlation but are unable to track change in the independent variable. The partial regression analysis considers both the accuracy of estimation and the consistency of implicit price structures. It identifies the characteristics that will reduce the variance in the estimation error (Brown and Ethridge, 1995).

Hedonic price functions are based on the assumption that goods are valued for the utility bearing characteristics they contain. This is highlighted in a consumption and demand approach, showing that the price-quality relationship can be estimated using regressions. A tea buyer will offer a price for a particular tea based on its quality and that tea meeting the buyer's needs in terms of his or her consumers and/ or blending needs. In the next chapter hedonic price functions are estimated for Uganda's smallholder teas.

ESTIMATION OF THE HEDONIC PRICE FUNCTIONS

5.1 INTRODUCTION

Hedonic functions for a commodity assume that the prices are implicit prices of attributes contained in a commodity. Their estimation assesses the values of intrinsic characteristics or qualities of heterogeneous commodities such as tea.

Based on the procedure outlined in Chapter 4, hedonic price functions are estimated in this chapter for selected tea grades, namely Broken Pekoe, Pekoe Fannings 1, Pekoe Dust and Fannings. As highlighted earlier, the Broken Mixed Fannings and Dust could not be analysed due to the sample size of these specific grades that could be collected during the period in which the data was collected.

At the end of this chapter, each of the grades analysed will have a hedonic price model, on the basis of which the implicit value of the various tea attributes that a buyer or consumer seeks, can be valued. This will show how quality differentials are reflected in price and enable producers to know the discounts associated with some of the tea attributes, in order to make profit maximising decisions. The hedonic price models could also be used to project a price of a particular tea lot at the auction market.

5.2 REGRESSION ANALYSIS

Ordinary least square regressions were run for each grade to identify the price-quality relationship. The functional forms were for individual grades because each grade has unique quality characteristics that differentiate it from another. However, the Broken Pekoe 1 and Broken Pekoe were analysed together, as were Fannings 1 and Fannings. This was done because the individual sample sizes collected were too small to permit significant individual analysis. The sample sizes of the different tea grades were influenced by the time period in which the questionnaires were completed. Also

influencing the sample size was the rate of production of the various grades which is a proportion of the total production, and which is influenced by the quality of the green leaf and the marketing channel through which these grades were sold.

As mentioned earlier, data used was obtained from questionnaires completed by production managers at each of the four smallholder tea factories. The sample sizes were 45 for Broken Pekoe and Broken Pekoe 1, 73 for Pekoe Fannings 1, 59 for Pekoe Dust and 58 for Fannings1 and Fannings. Auction prices were obtained from the Mombasa auction market. Dummy variables were used to account for aspects such as the evenness of the tea, the presence of taints in the black tea and differences between grades and producing factory, which could not be measured on a continuous scale.

5.2.1 MODEL SPECIFICATION

The model specification was based on the procedure followed by Brown and Ethridge (1995) as outlined in Chapter 4. The models presented here are the models with the best-fitted results for each of the selected grades. The attributes that were tested in the models include the leaf size in terms of evenness, density, brightness and pungency of the liquor, and the brightness of the infusion, number of packages at the auction, weight of tea at the auction, etc. The attributes were divided into three categories namely aspects of the black leaf, infused leaf and the liquor. Information on each of these was collected using the questionnaire discussed earlier (see Appendix A). Ratios were also created for the different attributes that described characteristics of the same category, for example in the tea fraternity it is well known that a well rolled tea, if well sorted will be even, but this will not be the case if it is poorly rolled. Thus a ratio of degree of rolling to evenness was formed. Similarly a ratio was created for the measures of the liquor based on its brightness and pungency. Several dummy variables were also tested to capture the presence of taints, the formation of a precipitate on the liquor as it cools or the liquor's becoming opaque on cooling, etc.

The following functional forms presented the best fit for the selected tea grades:

Broken Pekoe grade

(Equation 5.1) $LPR = f(RPUNBRIG, RROLLEVEN, DUBP, DUIGARA, DUKAYONZA)$

Where:

- LPR = Natural Log of auction price (US\$ per kg),
RPUNBRIG = Ratio of degree of pungency to degree of brightness in the liquor,
RROLLEVEN = Ratio of degree of rolling, twisting and curling to tea evenness,
DUBP = Dummy for grade difference (BP = 1 and 0 otherwise),
DUIGARA = Dummy for Igara tea factory (Igara = 1 and 0 otherwise),
DUKAYZA = Dummy for Kayonza tea factory (Kayonza = 1 and 0 otherwise).

Pekoe Fannings 1

(Equation 5.2) $PR = f(RCLEAROLL, DEGBRINF, RPUNBRIG, WTPERBAG, RWTNOPACKAGES, DUKAYZA)$

Where:

- PR = Auction price (US\$ per kg),
RCLEAROLL = Ratio of degree of cleanness to degree of rolling, twisting and curling,
DEGBRINF = Degree of infusion brightness,
RPUNBRIG = Ratio of degree of pungency to degree of brightness in the liquor,
WTPERBAG = Average package weight per lot,
RWTPACK = Ratio of weight to number of packages available at the auction,
DUKAYZA = Dummy for Kayonza tea factory (Kayonza = 1 and 0 otherwise).

Pekoe Dust

(Equation 5.3) $PR = f(\text{DEGEVEN}, \text{RPUNBRIG}, \text{WTPERBAG}, \text{RWTPACK}, \text{DUIGARA}, \text{DUMPANGA})$

Where:

- PR = Auction price (US\$ per kg),
DEGEVEN = Degree of tea evenness,
RPUNBRIG = Ratio of degree of pungency to degree of brightness in the liquor
WTPERBAG = Average package weight per lot,
RWTPACK = Ratio of weight to number of packages available at the auction,
DUIGARA = Dummy for Igara tea factory (Igara = 1 and 0 otherwise),
DUMPANGA = Dummy for Mpanga tea factory (Mpanga = 1 and 0 otherwise).

Fannings

(Equation 5.5) $PR = f(\text{DEGREEPUN}, \text{RCLEAROLL}, \text{WTPERBAG}, \text{DUIGARA}, \text{DUF})$

Where:

- PR = Auction price (US\$ per kg),
DEGREEPUN = Degree of liquor pungency,
RCLEAROLL = Ratio of degree of cleanness to degree of rolling, twisting and curling,
WTPERBAG = Average package weight per lot,
DUIGARA = Dummy for Igara tea factory (Igara = 1 and 0 otherwise),
DUF = Dummy for grade difference (Fannings1 = 1 and 0 otherwise).

5.3 INTERPRETATION OF RESULTS

Several functional forms were tested but only the results of the best-fitted models after the partial and residual regression analysis are discussed. All variables were significant at a 5 percent level of significance and they all bore the expected signs. The estimated coefficients for the selected tea grades that were analysed are shown in Table 5.1.

Table 5.1: Estimated coefficients of hedonic models for selected tea grades

Variable	Estimated Coefficients for the Different Models			
	Broken Pekoe	Pekoe Fannings1	Pekoe Dust	Fannings
INTERCEPT	0,634 (0,0000)*	22,5633 (0,0000)	28,0369 (0,0000)	1,3306 (0,0000)
DEGREEPUN				0,0639 (0,0135)
DEGBRINF		0,0592 (0,0018)		
RPUNBRIG	-0,2638 (0,0023)	-0,4230 (0,0698)	-0,6094 (0,0102)	
DEGEVEN			0,0774 (0,0038)	
RROLLEVEN	0,1396 (0,1231)			
DUBP	-0,0669 (0,0157)			
DUF				0,1363 (0,0497)
DUIGARA	0,2475 (0,0000)		0,1861 (0,0233)	0,3155 (0,0001)
DUKAYZA	0,0772 (0,0093)	-0,1335 (0,0000)		
DUMPANGA			0,4487 (0,0036)	
RCLEAROLL		0,3475 (0,0749)		0,1047 (0,0000)
WTPERBAG		-0,0317 (0,0014)	-0,0872 (0,0017)	-0,0247 (0,0000)
RWTPACK		-0,3335 (0,0000)	0,3591 (0,0000)	
R ²	0,6945	0,6588	0,6608	0,6225
F	17,2789 (0,0000)	21,2383 (0,0000)	16,5565 (0,0000)	16,4865 (0,0000)

* Figures in parenthesis are the t-values

Each of the models were analysed using partial regressions, following a procedure similar to that followed by Brown and Ethridge (1995). It was found that all the attributes included in the model explained the variations that occurred in the dependent variable and were therefore retained. The results of the partial regression are shown in Table 5.2.

Table 5.2: Partial regressions for the different hedonic price models

Broken Pekoe model			
Dependent Variable	Independent Variables		
	Intercept	Residual	(Residual)²
RPUNBRIG	-0,0080 (0,5720)*	-0,2723 (0,0014)	0,1734 (0,5801)
RROLLEVEN	-0,0004 (0,9793)	0,1414 (0,1353)	0,0188 (0,9614)
Pekoe Fannings1 model			
RCLEAROLL	-0.0066 (0.8416)	0.3102 (0.1432)	0.2893 (0.6966)
DEGBRINF	0.0180 (0.6248)	0.0610 (0.0010)	-0.0071 (0.4478)
RPUNBRIG	-0.0275 (0.4211)	-0.3964 (0.0766)	1.7228 (0.1644)
WTPERBAG	-0.0229 (0.4513)	0.0327 (0.0005)	0.002452 (0.0751)
RWTPACK	0.0051 (0.8756)	-0.3277 (0.0000)	-0.01045 (0.7574)
Pekoe Dust model			
DEGEVEN	-0,0043 (0,9146)	0,0786 (0,0032)	0,0027 (0,8638)
RPUNBRIG	-0,0083 (0,8184)	-0,5876 (0,0116)	0,3797 (0,6643)
WTPERBAG	-0,0181 (0,6542)	-0,0954 (0,0011)	0,0118 (0,4775)
RWTPACK	-0,0322 (0,3880)	-0,4062 (0,0000)	0,0835 (0,1234)
Fannings model			
DEGREEPUN	-0,0202 (0,5192)	0,0769 (0,0064)	0,0207 (0,2083)
RCLEAROLL	0,0068 (0,8154)	0,1430 (0,0028)	-0,0075 (0,3570)
WTPERBAG	-0,0159 (0,6374)	-0,0233 (0,0000)	0,0005 (0,4681)

* Figures in parenthesis are the t-values

The partial regression analysis was followed with a residual regression analysis. The results of which are shown in Table 5.3. All attributes used in the four selected models are correctly transformed.

Table 5.3: Regression statistics for residual terms in the Broken Pekoe model

Variable	Intercept	Variable	(Variable) ²
Broken Pekoe model			
RPUNBRIG	0,2042 (0,4069)*	-0,4492 (0,3926)	0,2396 (0,3879)
RROLLEVEN	0,0055 (0,9839)	-0,0124 (0,9834)	0,0067 (0,9832)
Pekoe Fannings model			
RCLEAROLL	0.0878 (0.6400)	-0.1976 (0.5920)	0.1017 (0.5779)
DEGBRINF	-0.3149 (0.3372)	0.10335 (0.3160)	-0.0079 (0.3099)
RPUNBRIG	0.0901 (0.6450)	-0.2031 (0.5979)	0.1059 (0.5828)
WTPERBAG	6.3395 (0.1966)	-0.2276 (0.1951)	0.0020 (0.1946)
RWTPACK	-146.2715 (0.2060)	4.9901 (0.2059)	-0.0426 (0.2059)
Pekoe Dust model			
DEGEVEN	-0,4778 (0,3845)	0,1465 (0,3707)	-0,0106 (0,3671)
RPUNBRIG	-0,1622 (0,8455)	0,3521 (0,8416)	-0,1857 (0,8406)
WTPERBAG	-33,8508 (0,1968)	1,0635 (0,1967)	-0,0083 (0,1966)
RWTPACK	154,3869 (0,3013)	-5,2434 (0,3012)	0,0445 (0,3012)
Fannings model			
DEGREEPUN	0,7410 (0,2875)	-0,2275 (0,27640)	0,0169 (0,2735)
RCLEAROLL	-0,0926 (0,2860)	0,0958 (0,2509)	-0,0113 (0,2385)
WTPERBAG	0,4049 (0,7887)	-0,0163 (0,7871)	0,0002 (0,7865)

* Figures in parenthesis are the t-values

The residual statistics were not significant, thus an indication that the changes in price were being tracked by the attribute, and confirmed the absence of patterns in the error terms with attribute transformation as suggested by Brown and Ethridge (1995).

In the residual analysis, the residuals were regressed against each of the attributes included in the different models, with each attribute as the dependent variable. This is illustrated using the attributed RPUNBRIG in the following equation:

$$\text{(Equation 5.6) } e_{BP} = -0,2042 - 0,4492 (\text{RPUNBRIG}) + 0,2396 (\text{RPUNBRIG}^2)$$

Where:

e_{BP} = error term for the Broken Pekoe model.

Flexibility coefficients are a variable dependent on the value of the dependent and independent variables or both, except in Log-linear models. In this section this would imply that the flexibility coefficients are dependent on the price (the independent variable) and the value of the independent variable (various tea attributes). When no dependent or independent variables are specified, it implies that the flexibilities are measured at their average values (Gujarati, 1992). The results presented in this study are measured at their average values.

A one percent increase in the ratio of the degree of pungency to brightness of the Broken Pekoe liquor (RPUNBRIG) is associated with a 0,24 percent decrease in the price, *ceteris paribus*. This implies that the degree of pungency of the liquor has the leading role and could be described as the price leader between the two attributes in the case of the Broken Pekoe grade. This suggests that the Broken Pekoe market attaches greater importance to bright liquoring teas compared to the degree of pungency. The trend observed in regard to the ratio of the degree of pungency to brightness is similar for the Pekoe Fannings and Pekoe Dust.

A one percent increase in the ratio of the degree of pungency to brightness of the liquor (RPUNBRIG) is associated with a 0,25 and 0,39 percent decrease in the price of Pekoe Fannings and Pekoe Dust respectively, *ceteris paribus*. Similar behaviour is observed in the Broken Pekoe grade, in which bright liquor is the price leader, when compared to liquor pungency.

A one percent increase in the degree of evenness of Pekoe Dust (DEGEVEN) is associated with a 0,35 percent increase in price, *ceteris paribus*. A similar increase in the ratio of degree of rolling, twisting and curling to degree of evenness of the Broken Pekoe is associated with a 0,14 percent increase in the price, *ceteris paribus*. The implication of the result obtained is that the degree of rolling, twisting and curling is a price leader compared to the degree of evenness. It also follows common logic within the tea industry that a well rolled, twisted and curled tea will, if well sorted, result in a generally even tea.

The influence of the degree of brightness of the infusion is such that, a one percent increase in the degree of brightness of the Pekoe Fannings' infusion (DEGBRINF) is associated with a 0,24 percent increase in the price, *ceteris paribus*. On the other hand, a one percent increase in the degree of pungency of the Fannings (DEGREEPUN) is associated with a 0,56 percent increase in its price, *ceteris paribus*.

A 1 percent increase in the average package weight per lot is associated with a 1,09 percent decrease in the Pekoe Fannings' price, *ceteris paribus*. Similarly a one percent increase in the average package weight per lot is associated with a 3,46 and 1,55 percent decrease in the prices of Pekoe Dust and Fannings respectively, *ceteris paribus*. Average package weight is used as a proxy for the density of the tea. This result bears serious implications for the smallholder tea factories because at present, the goal is to improve the average package weight in order to reduce packing costs. The result implies that, while the average weight may be increased above the present levels, the increase is associated with a drop in price. The increase in average package weight may be associated with some negative aspects relating to tea quality, such as the compaction process. In addition to this, the apparent increase in the average bag weights could also be due to poor sorting, and thus grade mixing, especially in the case of the Fannings.

A one percent increase in the ratio of degree of cleanness to the degree of rolling, twisting and curling is associated with a 0,21 and 0,18 percent increase in the prices of the Pekoe Fannings and Fannings respectively, *ceteris paribus*.

A one percent increase in the ratio of the weight to number of tea packages at the auction is associated with a 12,22 percent decrease in the price of the smallholders' Pekoe Fannings and a 13,25 percent decrease in the price of the smallholders' Pekoe Dust. As the weight of tea for auction increases relative to the number of packages, the price drops.

Several intercept shifters were used to capture the effect of tea evenness namely, the presence of taints due to over firing and smoke, the difference between the Broken Pekoe and Broken Pekoe1 grades, Fannings 1 and Fannings grades and the difference between producer factories of the smallholders.

Only intercept shifters for grade difference and differences among producer factories were found to be significant. The dummy for grade difference between Broken Pekoe and Broken Pekoe1 (DUBP) shows a shift of -0,067 in the intercept for the Broken Pekoe grade, while that for the Fannings 1 grade showed an intercept shift of 0,14. This implies that the Fannings1 is statistically different compared to Fannings in its relationship to the price achieved at the Mombasa auction. This implies that Broken Pekoe will fetch a lower price compared to Broken Pekoe 1.

In the Broken Pekoe model, intercept shifters for the Igara and Kayonza smallholder tea factories were found to be significant, with a 0,248 shift for Igara and a 0,077 shift in the intercept for Kayonza. This shows that the Broken Pekoe produced by the factories of Igara and Kayonza is statistically different and superior compared to the other smallholder tea factories with regard to the price attained at the Mombasa auction market.

The factories of Mpanga and Igara were found to obtain prices for Pekoe Dust that were statistically different from the other factories as shown by the intercept shifters DUMPANGA and DUIGARA for Mpanga and Igara respectively. Mpanga showed an intercept shift of 0,45 and Igara 0,19, both of which are significant at a 5 percent level of significance. Kayonza factory's tea was found to be statistically different from the others with regard to the price received for Pekoe Fannings. An intercept shifter for the

Kayonza smallholder tea factory was significant at 6,9 percent for a -0.134 shift in the intercept.

Only Igara-produced Fannings were found to be statistically different from Fannings produced by the other factories in their relation to price with an intercept shift of 0,32.

The various intercept shifters that were found to be significant highlight the fact that there are indeed differences in the tea produced by the smallholder factories. This agrees with the view held by some tea producers and buyers, that there is a difference in the tea quality produced by each of the four smallholder tea factories.

5.4 CONCLUSION

The regression results show that quality does have a relationship with the observed price. The results obtained here should mark the beginning of an attempt by the smallholders to predict the value of their product. This should give the factories an opportunity to have their own evaluation, the broker's evaluation and the auction price. These should serve as a clear guideline in accounting for failure to stick to detail in the manufacturing process. The results obtained are applicable to each of the four tea factories differences between the factories have been accounted for using dummy variables catering for an intercept shift. The range of prices implied by the variations in the various attributes in this study has a substantial effect on the auction prices over and above the effects from formal market fluctuations. The smallholder tea factories know the importance of each of the various attributes but have never been able to associate any change in these attributes in the production process with a change in the auction price. This means that the smallholder tea factories can estimate the impact on the price due an innovation aimed at improving the quality and establish the expected level of profitability. Losses that may be incurred during the time of implementation should the tea quality initially deteriorate could also be estimated.

It should, however, be noted that lack of quantitative measures posed a great constraint to the analysis. The qualitative aspects that were transformed into a quantitative

measure assisted in the analysis, though these were in some cases highly correlated. The high correlation was avoided by using ratios of the measured attributes. The results show that factors that influence the price are unique to each grade. An improvement in the estimation of the hedonic price models will require an initiative from the tea brokers, who will have to standardise and quantify their tea tasting reports. These reports should be freely available to all market participants.

Electronic marketing is having a significant impact on trade in the world today. It could be described as one of the most effective ways to access a wide market at minimal cost. The opportunity is there, for tea marketing to be conducted in a parallel electronic market in future. There is therefore a need for the tea industry to invest in the development of simple standard measures that reveal the inherent quality the tea bears. This should be in the interests of the producers to explore this, and the large tea buying firms on the Mombasa auction could be best described as being ahead of the producers in regard to the electronic media. This also applies to the international trade of tea along the marketing channel after the tea producer. It appears the tea producer may be left behind. E-trade is bringing exciting opportunities and creating a whole new game in international trade, a game with new rules. It allows traditional exporters to conduct business in new ways and offers new business opportunities (Domeisen, 2001).

“... if the automobile and plane business had developed like the computer business, a Rolls Royce would cost \$2,75 and run for 3 million miles on one gallon of gas. And a Boeing 767 would cost just \$500 and circle the globe in 20 minutes on five gallons of gas.” (Forester, 1985 cited in Bernt, 1991)

6.1 INTRODUCTION

The livelihood of the rural smallholder can be enhanced through better and more competitive outlets for their products. The changes that have taken place in Uganda's tea sector, particularly the smallholder tea sector, are evidence that smallholders are willing to work to improve their livelihoods. The aspect that needs most attention is increasing profitability of their production endeavours through the reduction of production costs, but better still would be an attractive price through an efficient market.

This chapter highlights the effects and challenges that the producer faces in a market that outwardly shows a limited amount of competition and in which conditions are attractive for collusion. Also highlighted are market opportunities, the aspects of a conducive environment needed for market growth, and how the tea producers can in the absence of public assistance create a more favourable environment.

6.2 MARKET STRUCTURE

Development in this sector greatly depends on the profitability of the product and the price offered to the grower. If the incentive to produce (price) is right, then the industry will continue to grow. As the industry grows, so will the quantity of tea available for sale at the Mombasa auction, the region's major tea outlet.

The quantity of tea at the Mombasa auction grew at an annual rate of 10,6 percent between 1987 and 1999. In effect, the quantity of tea sold (211 107 tonnes) at the auction market in 1999, was 161 percent more than the quantity sold in 1987. Tea production appears to be set to increase, but the question that stands unanswered is whether the Mombasa auction will give the producers the right signal in terms of price. The analysis of the market structure has shown that concentration on the Mombasa market has increased in the period 1987 to 1999. The top eight firms hold 73 percent of the market and, in periods when average auction prices have increased, so too has the level of concentration.

Market share is the most important single indicator of a firm's degree of market power. Larger market shares always lead to more market power, whereas low market shares involve little or no power (Shepherd, 1997). According to Shepherd (1997) a degree of market power usually appears when the market share reaches 15 percent for an individual firm, and at higher levels of 25 to 30 percent the degree of market power could be quite significant.

Literature shows that market share is usually the principal focus of a company's goals. Companies usually report success in terms of market share as well as profits (Shepherd, 1997). Market share is an important source of profits to a firm. Shepherd (1997) highlights the general relationship between each firm's market share and its level of profitability. The rate of return is a function of the market share as depicted in Figure 6.1 and in equation 6.1.

Shepherd (1997) states the following:

(Equation 6.1) $\text{Rate of Return} = a + b \text{ Market Share}$

Where a is the competitive rate of return, and b is the slope of the line. If b is high, the market share is particularly rewarding and will be sought fiercely.

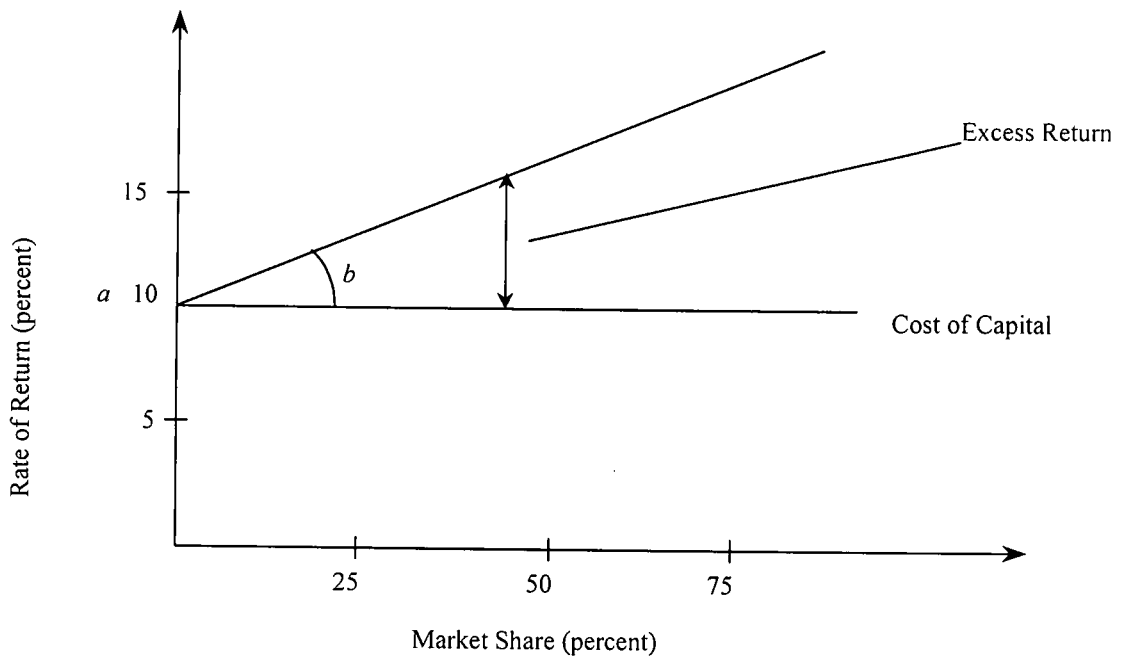


Figure 6.1: Basic relationship between market share and profit

Adopted from Shepherd (1997)

However, some researchers argue that profits are a reflection of rents unique to assets such as unique brand names, and not as a result of exercising market power. Higher industry profits are merely a reflection of high efficiency of some firms. There is no widespread agreement in the various empirical studies on the relative importance of power in comparison to efficiency as the determinants of industry profits (Cool and Henderson, 1998).

Ravenscraft (1983) found that buyer concentration was positively related to profitability and argued that firms could economise on marketing and sales costs if there were fewer buyers. On the other hand Cowley (1986) found that the number of buyers accounting for 50 percent of the selling firm's total sales was positively associated with firm's gross margins but also with firm's fixed costs, leading to an insignificant 'total' relationship with profitability. As intuitive as the power concept may be, there are no clear-cut results from the empirical studies (Cool and Henderson, 1998). It has been argued by some that the ambiguity of the results may be due to a varying degree of market share distribution for a given level of concentration or the incidence of vertical integration across the suppliers', sellers' and buyers' industries (Cool and Henderson, 1998).

Kwoka (1979) found that the same degree of seller concentration can have a different impact on industry profits depending on whether the share distribution of the leading firms reflects clear leadership or similar market share positions. This is of relevance in that fights for leadership and market share often erupt in industries where the leading firms have a similar share of the market. On the contrary, a clear market share leadership is more likely to lead to price discipline and higher industry profits. Cool and Henderson (1998) state that if Kwoka's argument is right, then higher buyer or supplier concentration does not necessarily lead to lower profits for firms in the middle of the chain if there is no clear share leadership in the industry. In addition to this they state that a strong market share leadership in the industry in the middle of the supply chain may help offset the effects of buyer concentration. However, Cool and Henderson (1998) conclude that profitability of sellers will be higher if there is a higher degree of market share leadership in the sellers' industry and a lower degree of market share leadership in the buyers' industry.

All buyers are certainly faced with several conflicting incentives, to compete or to collude. Literature states that elementary economic reasoning suggests that if such a market were to collude, it would attract entry as long as there are profits to be made and that such an entry process would break any given degree of collusion (Stenbacka, 1990). Collusion would also be attractive to the buyers who are in business with the goal of making a profit. Collusion would therefore generate higher profits to the buyers (Shepherd, 1997).

Collusion among the top eight buyers would bias the market towards a monopsony, and indeed the present tea market is conducive to such a situation. If collusion were to occur in the Mombasa auction, its benefits could be prolonged as a result of the requirements that have to be met to gain membership (buyer membership) in the East African Tea Trade Association.

The present Mombasa market structure may not be able to generate the best price for the product auctioned due to the structure of power that is in place. The present structure appears to be of great benefit to the buyers and not to the producers. Unless there are

shortfalls in production, the present market may certainly suppress the price and any increases observed will be of a smaller magnitude due to market power. The resultant effect of price suppression due to market power is illustrated in Figure 6.2.

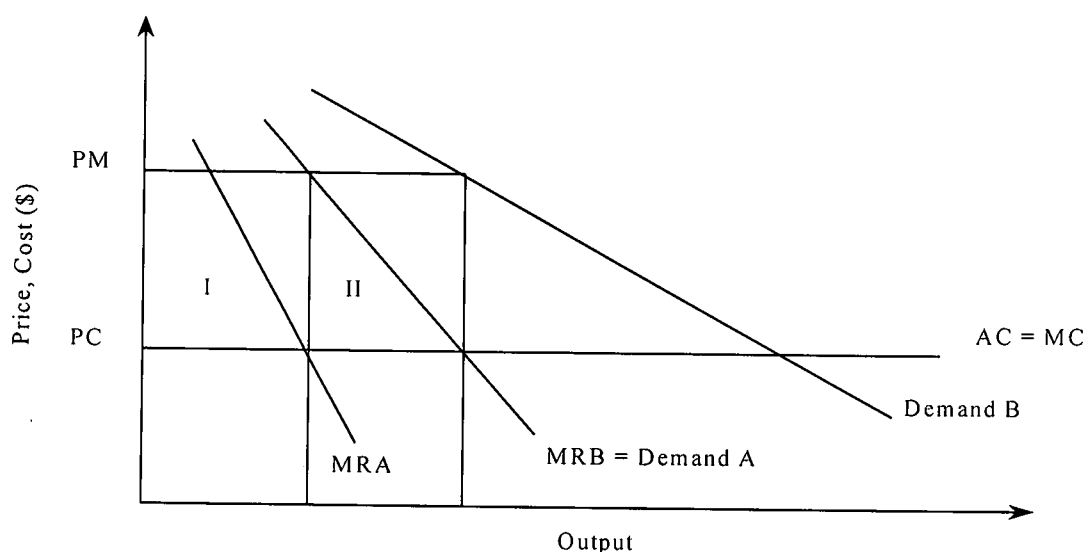


Figure 6.2: Bilateral monopoly

Adopted from Shepherd (1997)

The monopsonist firm B prefers to buy from producer A at competitive price PC, so as to resell the output at the higher monopoly price PM, but this clashes with producer A's choice. Producer A wants to collect price PM in selling to firm B so that profits are maximised. If producer A sells at PM, excess profits gained are shown by area I. If however, firm B buys at PC excess profits gained are shown by areas I and II (Shepherd, 1997).

The price paid to producer A is not determinate. The producer prefers price PM, while the monopsonist prefers to pay as little as possible i.e. PC. This is a situation that would occur in a typical bilateral monopoly. The situation at the auction market draws close to monopsony with increasing market power. In making a bid, each buyer faces the above scenario of wanting to pay as little as possible, bearing in mind that the resale market is competitive. This implies that the small buyer will rationally try to keep the price as low as possible, just as the bigger buyer, all hoping to make excess profits. In such a

situation the major role players, the big buyers, would be expected to take the initiative to increase the price to levels between PC and PM. But that only occurs if it suits them. Assuming the bigger buyers also have bigger capital resource bases and the benefits of economies of scale would imply that the bigger buyers are also more willing to increase the price, thus making them price leaders (Shepherd, 1997). The assumption that the bigger buyers would be willing to increase the price agrees with the fact stated by Woo (1987) that bigger firm would be more risk averse and have the capacity to pass on the price increase to their consumers, unlike the small firms. It could therefore be argued that the similarity observed in the trend of price and concentration is due to the large firms being risk averse.

6.4 MARKET OPPORTUNITIES

The world's black tea production grew at an average annual rate of 1,02 percent between 1986 and 1999. Exports and imports have shown an annual growth rate of 1,56 and 1,28 percent for the same period, respectively. During 1999, the world's leading tea exporter among the tea producing countries was Sri Lanka, with 21,1 percent of tea exports. Kenya was ranked second with 19,4 percent of the market share. Uganda was ranked 8th and had 1,6 percent of the world's tea exports. These do not include tea exports from non-tea producing countries.

Uganda depicts the highest growth rate for the period 1985 to 1999 in the volume of tea exports. The Ugandan tea exports have grown at an annual rate of 19,9 percent. This is followed closely by Turkey with 19,47 percent. The world's leading tea exporter, Sri Lanka, has had an annual growth of only 2 percent between 1985 and 1999. Kenya, on the other hand has had an annual growth rate of 5,4 percent for the same period. It is important to note that traditional tea producing countries such as India, Indonesia and China have had declining rates of 1,3, 1,7 and 0,06 percent, respectively in their world exports for the period 1985 to 1999. China clearly shows a decline in her tea sector as her production has also declined over the same period at an annual rate of 1,3 percent. However, India and Indonesia both show an annual growth in their production of 1,9 and 2 percent, respectively. The Indian trend is mainly due to a large domestic

consumption. India had a consumption of 0,66 kg per head in the period 1997 to 1999, with a population of about 644,33 million in 1998. India has maintained the consumption per head of 0,66 kg over the 5 years despite her rapidly growing population (International Tea Committee, 2000). On the other hand, India is opposed to tea imports from Sri Lanka. Tea imports from Sri Lanka at competitive prices could free up more Indian teas for export, but would increase supply and ultimately lead to a decline in the price at the Indian auction centres. However, this would result in the Indian prices reflecting the international market's demand and supply conditions (Reuters, 2001).

It is important to note that non-producing countries are making considerable tea exports (re-exports). When these are included, Uganda's share of the world's tea exports drops to 1,6 percent. Most notable among the non-producing exporters of tea are the United Kingdom, Germany and the Netherlands, these held 2,1, 1,1 and 0,7 percent of the world's tea exports in 1999 (the world's 20 leading tea exporters are shown in Appendix C).

6.4.1 DETERMINATION OF OPPORTUNITIES

In a bid to determine the opportunities that exist for Uganda's smallholder tea farmers, inter and intra-industrial trade intensities for tea trade were estimated for selected countries and TradeMaps were analysed. The countries included are Uganda, Kenya, the United Kingdom, Germany and the Netherlands. The United Kingdom, Germany and the Netherlands were selected because they are non-tea producers but have a considerable share of the world trade in tea. Kenya, on the other hand, is selected because it is the world's second largest tea exporter, from which Uganda's tea sector could benefit in terms of trade patterns.

6.4.1.1 *Inter and Intra industrial trade intensities*

The inter-industrial trade was analysed using the Gini-Hirschman² and the intra-industrial trade by use of the Intra-Industrial Trade (IIT)³ coefficient. The greater the concentration of a country's exports to a region (country), the higher the Gini-Hirschman coefficient. In regard to the Intra-Industrial Trade coefficient, a coefficient of 100 shows that the import volume is equal to the export volume and a coefficient of 50 in an export surplus situation implies that one third of the export volume is imported (Sartorius Von Bach, 1993).

The tea producing countries, Uganda and Kenya show a Gini-Herschman coefficient of 49,0 and 44,1, respectively (see Table 6.1). This is higher than that shown by the leading tea re-exporters (United Kingdom, German and the Netherlands). The United Kingdom had the lowest Gini-Herschman coefficient. The results imply that Uganda's tea exports are not as diversified as those of the United Kingdom in terms of the destination markets.

² The Gini-Hirschman coefficient is defined as:

$$G_i = \left[\sum_{i=1}^n \left[\frac{X_{ij}}{X_i} \right]^2 \right]^{1/2} \times 100$$

Where:

X_{ij} = Exports from country i to country j

X_i = Total export volume of country i

³ The Intra-Industrial Trade coefficient IIT is defined as:

$$IIT = \frac{\left[(X_i + Y_i) - |X_i - Y_i| \right]}{(X_i + Y_i)} \times 100$$

Where:

X_i = Export volume of product i

Y_i = Import volume of product i

Table 6.1: Inter and Intra-industrial trade intensities (1996 –1999)

Year	Gini-Hirschman Coefficient				Intra-Industrial Trade Coefficient			
	1996	1997	1998	1999	1996	1997	1998	1999
Uganda	53,98	48,77	50,01	49,0	0,52	0,00	0,00	0,00
Kenya	43,60	42,25	43,45	44,14	0,00	0,35	0,01	0,18
United Kingdom	26,97	25,48	26,75	28,61	31,00	29,32	28,79	30,75
Germany	33,71	32,08	35,29	31,76	51,73	64,46	59,39	54,87
The Netherlands	40,53	37,07	37,25	36,34	61,32	54,91	55,24	61,91

The IIT coefficient shows that during 1999, the tea producing countries had no tea imports or very small quantities compared to the leading tea re-exporters. During 1999, the United Kingdom exported 19,5 percent of all her tea imports, Germany and the Netherlands on the other hand exported 42,3 and 45,4 percent, respectively.

The Gini-Herschman coefficient shows that the tea producing countries of Uganda and Kenya are not as diversified as the leading tea re-exporters in terms of export destinations. This is a weakness with regard to Uganda and Kenya but more so Uganda, which is even less diversified in terms of her tea exports markets. The tea producers in Uganda, particularly the smallholder farmers, need to explore ways in which to diversify their exports among the leading world tea importers. It is only with a diversified market that the farmers will be guaranteed stable prices for their product in the world's dynamic markets. The greater diversification depicted by the leading tea re-exporters is an opportunity for the tea producers to explore and find out how best they can supply these markets using the comparative advantage they hold as tea producers.

6.4.1.2 TradeMaps

The markets of the leading tea re-exporters are analysed using TradeMaps and data from the International Trade Centre (ITC), (2001). The nature of the Ugandan data could not permit a similar analysis of her export markets. The TradeMaps (bubble charts) presented in the following section compare the growth in exports of the United

Kingdom, Germany and the Netherlands with growth of demand of their leading trade partners.

The TradeMaps (bubble charts) were used because they are convenient and display all the basic information in regard to the market in one map. This includes the growth of imports in the importing country, growth of exports from the exporting country, an indication as to whether the exporter has maintained market share, etc. In the bubble charts, the diagonal line represents the line of constant market share, which divides the chart into two parts, for example the United Kingdom in Figure 6.3. Her exports are to the right of this line, and have grown faster than her partners' imports, thereby increasing her market share in the partner countries. The United Kingdom's exports to the countries shown on the left of the diagonal line have experienced an erosion of their market share. The diagonal (constant market share) and the horizontal reference line (growth of total world imports) are of particular interest from a trade development perspective. They divide the chart into four quadrants with different characteristics from a trade promotion and development perspective.

The "gains in dynamic markets" quadrant includes markets in which the United Kingdom exporters have performed very well. Trade promotion efforts for this product and these markets are less risky. Promotional efforts should aim at broadening the supply capacity.

The "losses in dynamic markets" quadrant represents particular challenges for trade promotion efforts in the United Kingdom. The United Kingdom's exports have either declined or grown less dynamically than partner demand. As a result, the United Kingdom has been losing market share although the partner demand has increased at above-average rates.

The "losses in declining markets" quadrant identifies markets with bleak export prospects. The partner demand for tea has increased at below-average rates or actually declined, and the market share of the United Kingdom has dropped.

The "gains in declining markets" quadrant is characterised by growing shares of the United Kingdom exporters in markets that are declining or growing below average. The size of the circles represents the share of target markets in world imports. A bubble representing 5 percent of the world's imports is shown as an indication of scale.

The market analysis is divided into two categories, packages exceeding 3 kg and packages not exceeding 3 kg. Uganda's traditional tea exports fall in the packages exceeding 3 kg category, but the not exceeding 3 kg category highlights international opportunities for the Ugandan producers to engage in blending operations aimed at the international market.

The United Kingdom

The United Kingdom made gains in terms of her market share in the following dynamic markets: Kenya, Hungary, India, Norway, Portugal, Australia, United States of America and Ireland. Losses in terms of market share were made in a number of dynamic markets too. These include Saudi Arabia, Poland and Canada (see Figure 6.3). Trade promotions in these markets would be less risky to United Kingdom exporters, thus an opportunity for the Ugandan and in particular smallholder farmers to explore these markets. The United States of America, despite its moderate growth in imports, appears to be the most attractive. It is equally attractive in terms of exports in packages not exceeding 3 kg. The United Kingdom made improvements to her market share in both packaging categories.

On the other hand, Kenya appears to be the United Kingdom's most dynamic market in terms of growth though it is small in terms of quantities. Its attractiveness is also negated by the fact that Kenya is one of the world's leading tea producers and exporters, characterised by a lower tea domestic consumption of only 0,41 kg per head in 1997 to 1999. However, this is higher than the consumption in the United States of America, which had a consumption of 0,31 kg per head in 1997 to 1999, but is made attractive because of the quantity imported and the future prospects of continued importation, being a non producer.

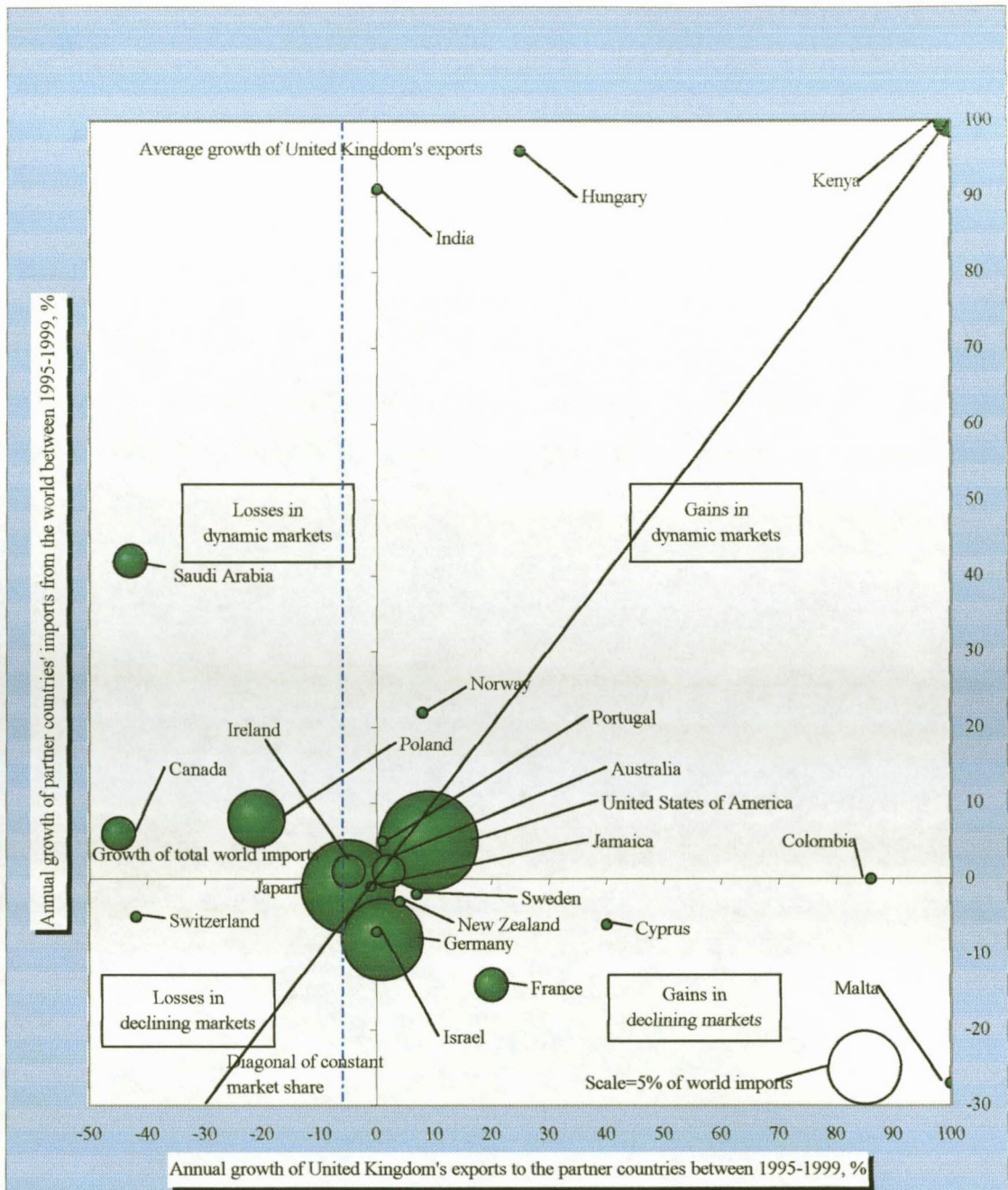


Figure 6.3: Growth in demand for tea in packages exceeding 3 kg exported from the United Kingdom (1995-1999)

Source: International Trade Centre (2001)

The United Kingdom's exports to Poland are declining and causing loss of its market share in a dynamic market. Ugandan smallholders need to identify the causes of the decline and position themselves to take full advantage of it.

Regarding the package market not exceeding 3 kg package market, the United Kingdom experienced losses in her major dynamic markets. Major gains were made only in the United States of America, Italy and in several other smaller markets in terms of world imports such as Argentina, Ireland, and Malta (see Figure 6.4).

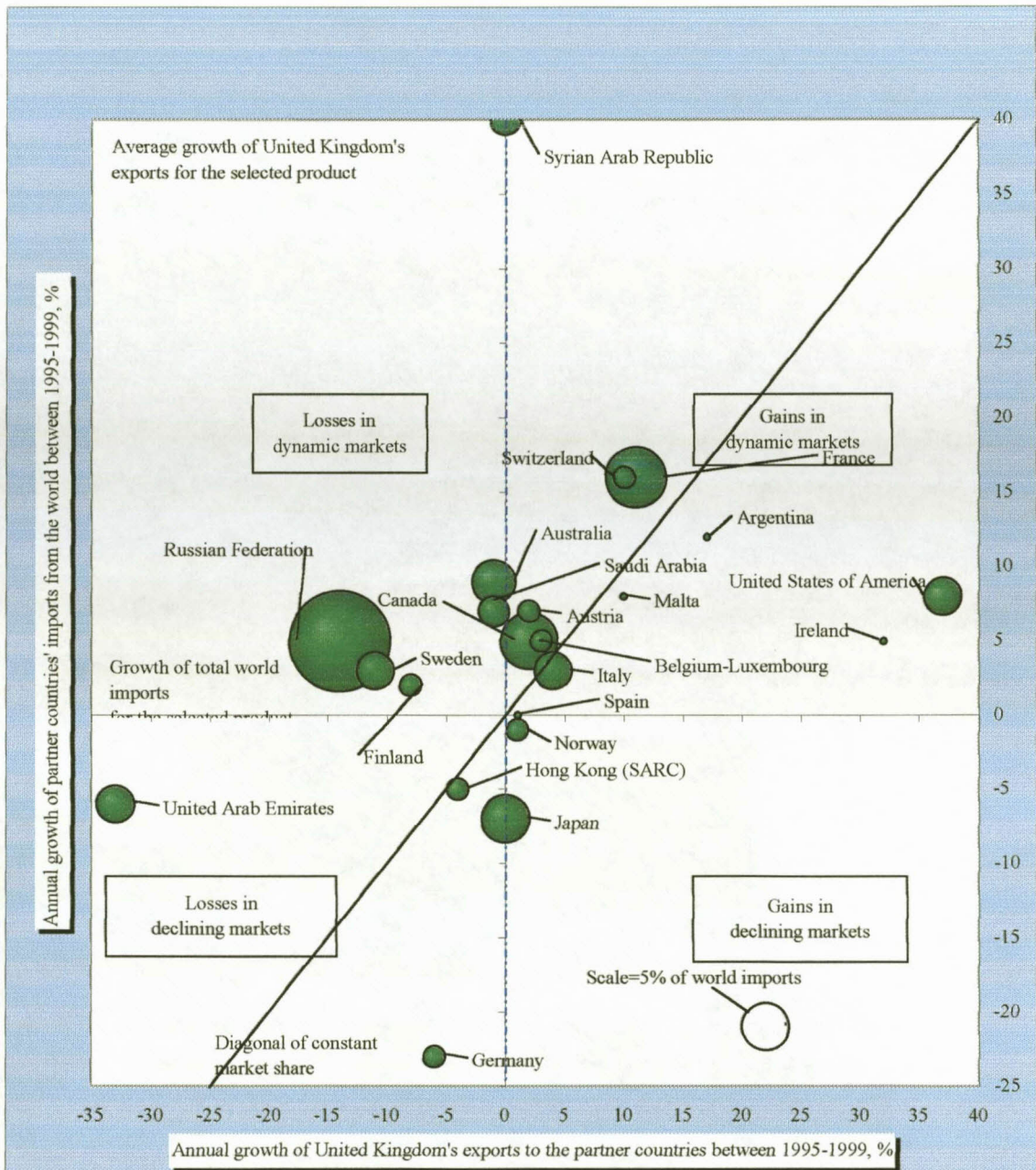


Figure 6.4: Growth in demand for tea in packages not exceeding 3 kg exported from the United Kingdom (1995-1999)

Source: International Trade Centre (2001)

This implies that the growth of the United Kingdom's exports in these markets was slower than tea import growth in these countries. The smallholder's opportunity in this lies in further investigating how the United Kingdom's losses could be exploited.

Germany

Germany's exports in the category exceeding 3 kg have experienced losses in terms of her market share in a number of the dynamic tea markets, namely Belgium-Luxembourg, the Russian Federation, Canada and the United Kingdom. Gains however, have been made in Poland, Norway, Australia and Ireland. As shown in Figure 6.5, the most significant market in which Germany has shown gains is Poland. Poland is also one of the leading markets for Ugandan producers and in particular the smallholder farmers. Uganda's exports to Poland have shown an annual growth rate of 83,3 percent between 1995 and 1999. To the German exporters, Poland falls in the category of less risky markets in which to carry out aggressive promotional drives aimed at broadening the supply capacity. This highlights an opportunity for the Ugandan smallholders to carry out a trade promotion in this market and make use of the comparative advantage they have over Germany as producers. It is important to note that Poland's demand for teas in packages not exceeding 3 kg has declined over the period 1995 to 1999 (see Figure 6.6), a change in favour of the producers, as the Ugandan smallholders' exports are in the category exceeding 3 kg packages. Germany is also not matching the growth in the Russian Federation tea imports in both the exceeding and less than 3 kg package categories, losing some of its market share during 1999.

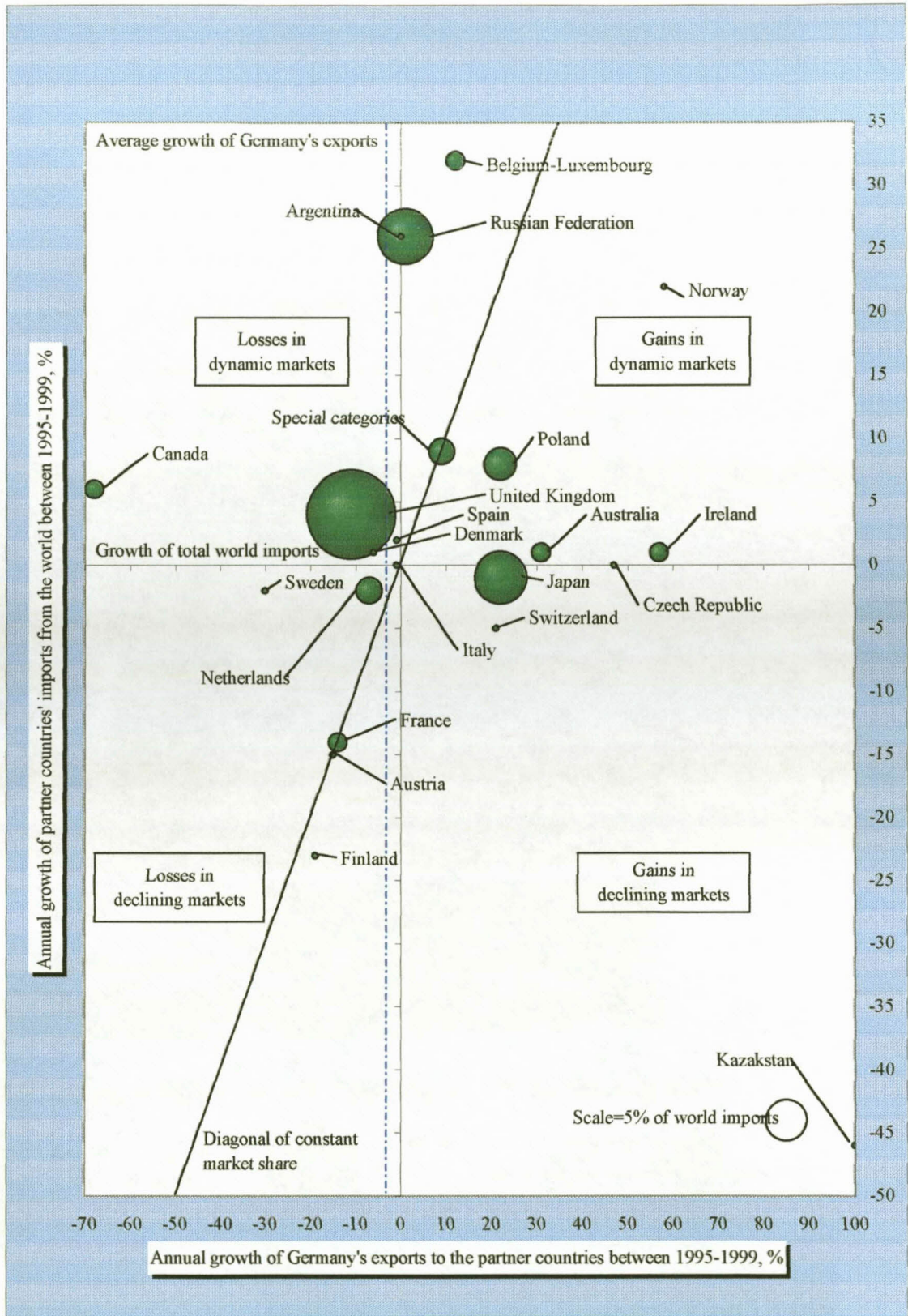


Figure 6.5: Growth in demand for tea in packages exceeding 3 kg exported from Germany (1995-1999)

Source: International Trade Centre (2001)

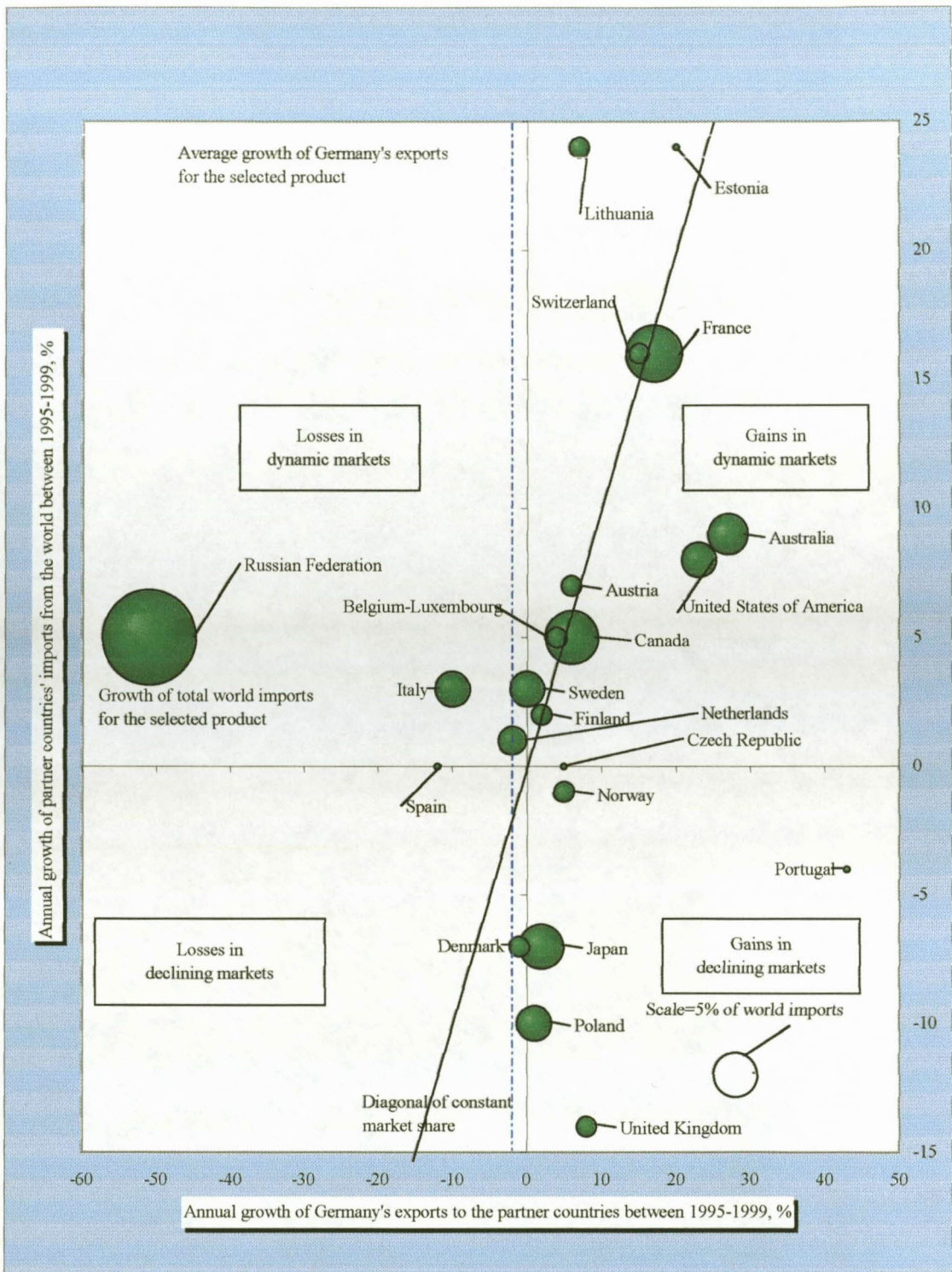


Figure 6.6: Growth in demand for tea in packages not exceeding 3 kg exported from Germany (1995-1999)

Source: International Trade Centre (2001)

The Netherlands

The Netherlands appears to be losing her position in the international trade of tea. Gains in dynamic markets in terms of market share during 1999 were only made in Denmark and Spain in the exceeding 3 kg category (see Figure 6.7). Gains were made in Sweden only in the not exceeding 3 kg category (see Figure 6.8). In most dynamic markets the Netherlands' exports have shown a growth rate lower than her average growth in tea exports. The smallholders' opportunity lies in determining what is happening to the world's earliest tea traders, so that they position themselves to expand into the Netherlands' major markets, especially in the exceeding 3 kg category.

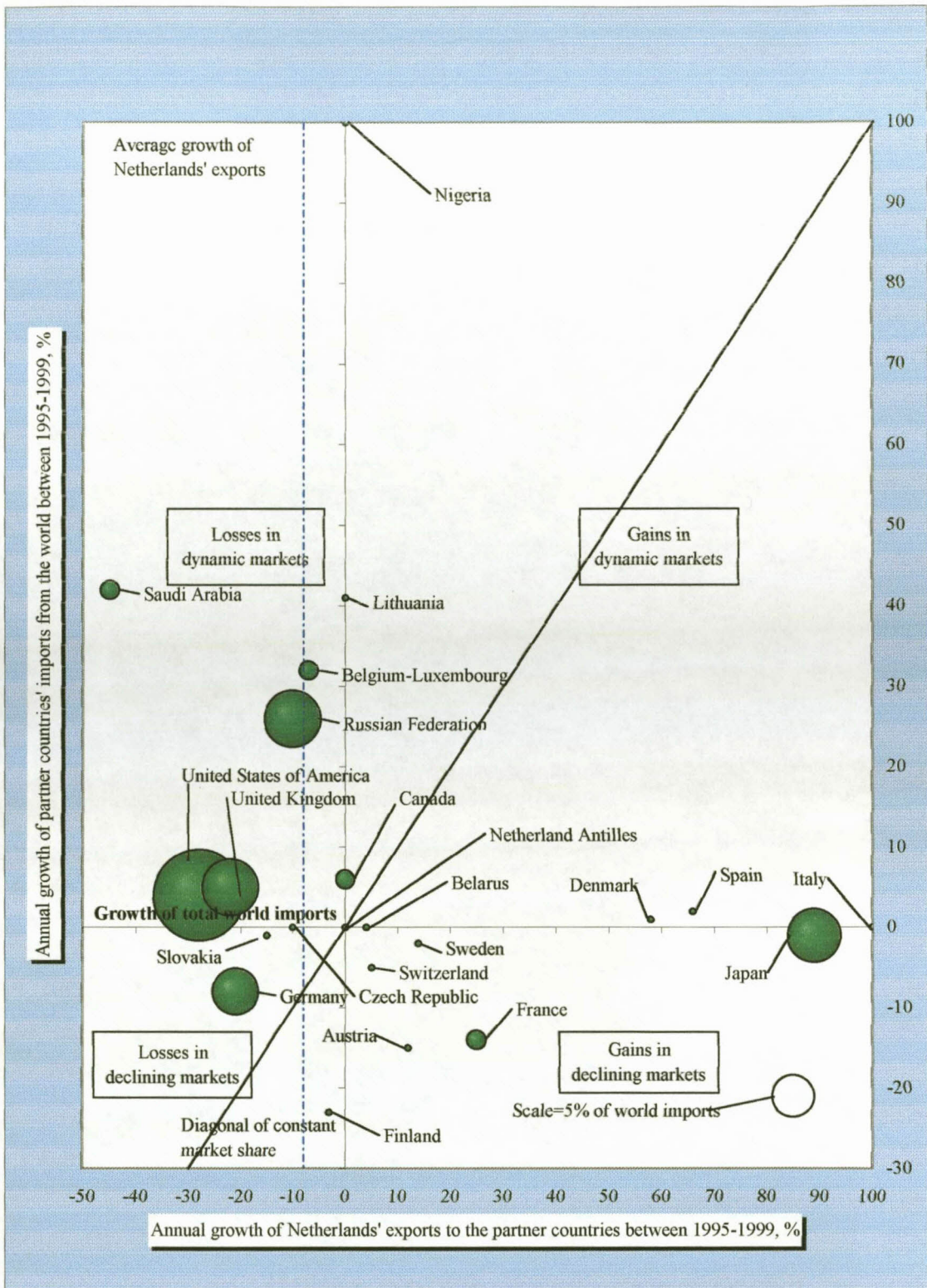


Figure 6.7: Growth in demand for tea in packages exceeding 3 kg exported from the Netherlands (1995-1999)

Source: International Trade Centre (2001)

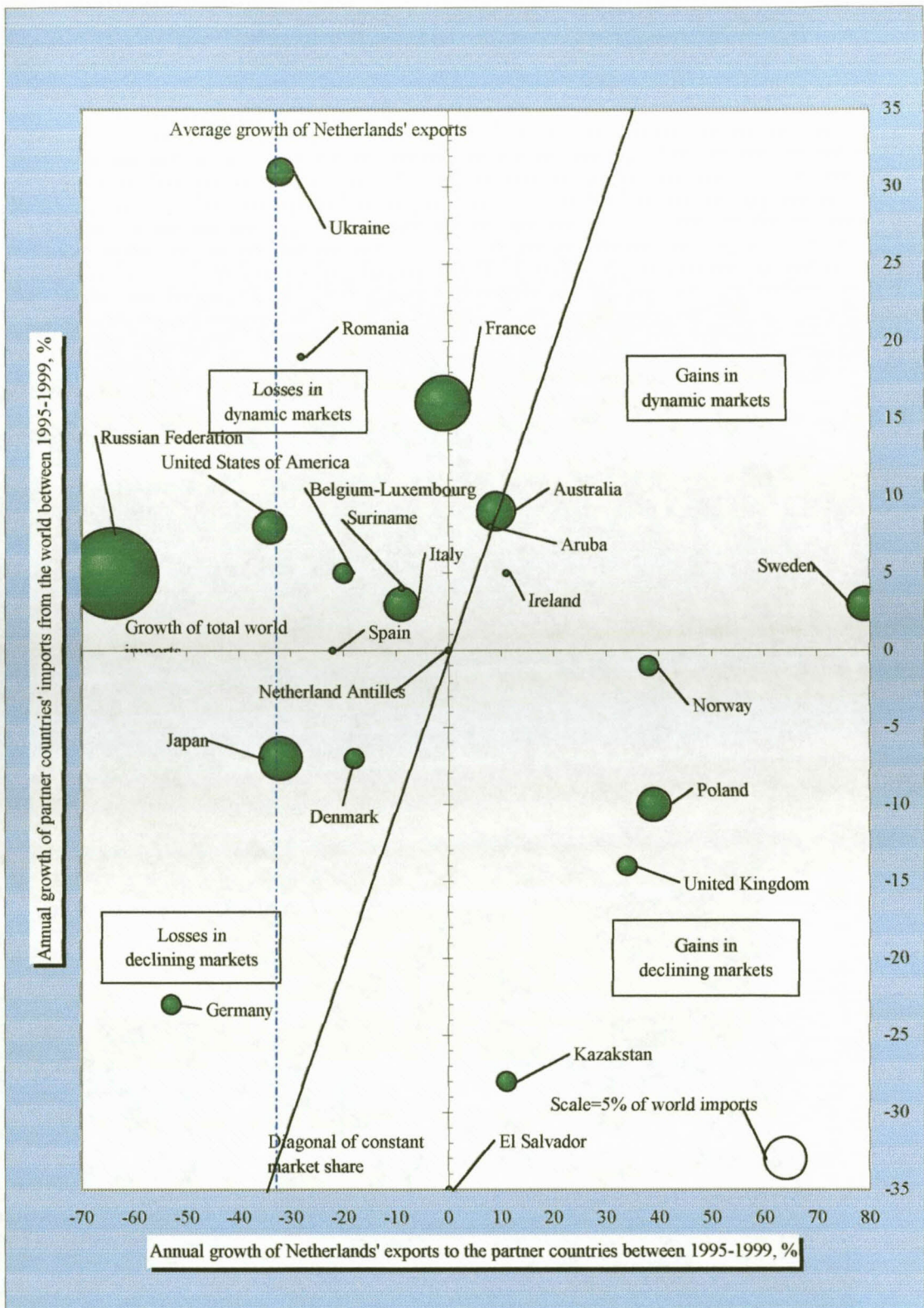


Figure 6.8: Growth in demand for tea in packages not exceeding 3 kg exported from the Netherlands (1995-1999)

Source: International Trade Centre (2001)

6.5 ENVIRONMENT CONDUCTIVE FOR MARKET GROWTH

Concentration is not necessarily always bear negative effects, provided it is not abused in the form of restrictive practices and price collusion (Darroch, 1992). The greatest and most effective way to operate in a market with such market share proportions is through increased sales promotion. Producers should try to sell a considerable amount of the product outside the auction through directly negotiated sales.

It is however important to note that despite the role played by agriculture in the Ugandan economy, little attention has been paid to the sector by government. The government recently embarked on a plan for the modernisation of agriculture. This is a holistic strategic framework for eradicating poverty through multi-sectoral interventions and enabling the subsistence farmers, who form the majority of Uganda's agricultural sector ,to improve their natural resource based livelihoods in a sustainable manner. The greatest challenge remains with the public sector to create an enabling environment. Government should basically respond to demand from the subsistence farmers and agriculture in general, other than trying to create what it thinks is lacking. There may be some basic needs, such as cost reducing technologies, but these should be provided to produce goods for which there is a ready market. All over the world today privatisation seems to be the norm, but developing countries may still need public bodies to create the initial structures necessary to guarantee a ready market for the subsistence farmer. The tea factories have been a clear example of how the public and private sector can work together to improve the entire agricultural sector.

To attain increased market growth, the smallholder tea farmers need a number of issues addressed by the public sector, and on the other hand, the smallholder tea farmers as members of the private sector. Increased market growth will eventually result in increased production and increased market access. The areas that must be addressed to create an environment conducive to trade include the following:

- Infrastructure (main roads, feeder roads, electricity, communication, etc.).
- Financial services.

- Extension services and research.
- Competent technical staff.
- Quality of information collected.
- Flow of information within the tea industry.

Added to this, the tea industry and the smallholder in particular, need to find solutions to assist in forming an environment that can lead to greater market access.

6.5.1 INFRASTRUCTURE

The government needs to provide the entire agricultural sector with an efficient transport system. This should include main roads, feeder roads and rail transport. The feeder road network on which the tea factories depend for the transportation of their raw material is in a very poor state. Despite the impact this industry is having on the livelihoods of the people in the tea growing areas, the factories have to a large extent depended on European Union funding to carry out minor repairs between 1986 and 1999. In the absence of these funds the factories have had to carry out makeshift repairs using the facilities they have available.

The development of the main roads in Uganda has been slow, but it could be noted that improvement has been made. However the road main road to Mombasa through Kenya, i.e. Uganda's major export route, remains in a poor state, mainly on the Kenyan side of the border. This calls for a concerted effort from both governments to ensure the trade activities are not slowed down by deteriorating roads. The East African Community could be used to address this as one of the areas through which economic co-operation can be achieved. The absence of a railway transport system could be said to have a negative impact on the agricultural sector, more so when considered with regard to Uganda's dependence on the export of primary agricultural products such as coffee and tea, which could be transported by rail, if efficient. Electricity and communication services are being privatised, the communication company, The Uganda Telecommunications Company (UTL) has already been privatised and the Uganda Electricity Board (UEB) is in a process of being restructured. This follows an expansion

of its generation capacity to meet the growing demand. The government also gave support to an independent company which intends to construct a 250 Megawatt power station by 2004.

The smallholder tea sector should continue to lobby government through the Uganda Tea Association and local political leaders. It is important for the smallholder tea producers to take cognisance of the fact that they form a respectable section of organised agriculture in Uganda. The efforts taken to make minor repairs can only be upheld until such time that the government is able to adequately service its feeder road network.

6.5.2 FINANCIAL SERVICES

Most of the rural areas in which the tea factories operate lack financial institutions, this implies that in addition to being tea processing agents, the factories have to make arrangements to transport money to areas where the farmers have no access to a financial institution. This is costly and poses a security risk to the factory and its employees. In this regard there is need to exert pressure on government to find ways in which to implement the long awaited village banks. The smallholder factories have done this adequately for a number of years. It may be time for government to realise that someone has been doing what they have failed to do all these years and consider creating a joint venture with the private sector active in the rural areas which the mainstream financial institutions have shunned.

The financial services rendered by the factories in terms of ensuring that the farmers have access to their money in time, will continue to be of vital importance until the government is able to establish the village-banking scheme. These tea factories are the only source of regular and stable income in most of these rural areas. For example, the Kayonza Tea Growers Tea Factory could be described as the only tangible economic activity in Butogota, Rukungiri district.

6.5.3 EXTENSION SERVICES

The provision of extension services is still very poor, agricultural extension services were available to only 17 percent of the households in 1999 (Ministry of Finance, Planning and Economic Development, 2000). The smallholder tea sector's extension services were funded by the European Union and provided by the Uganda Tea Growers Corporation until 1999, when the project came to an end. Extension services are needed to train and assist the farmers in improving their agronomic practices. As was highlighted in Chapter 2, the agronomic practices and the handling of tea after harvest has a great impact on the quality of tea. Any improvement in the handling of tea at the farm level, i.e. plucking, pruning and fertiliser application, will ultimately lead to an increase in the quality of made tea, but this improvement can only be achieved with an efficient extension service. An extension service capable of educating the farmer not only in the agronomic practices of tea production, but also other spheres of life, will lead to an improvement in the farmers' quality of life.

By the time the project came to an end, each factory had established an extension service to take over from UTGC, thus putting the factories in charge of this expensive yet very important component of smallholder tea production for increased tea quality and quantity. The factories have taken over one of the government's key obligations in providing extension services to the population.

Research is one area that has been neglected by the public sector. At present there is no properly designed research programme for the tea sector as a whole. Individual factories or companies have to find alternative sources of planting material, improvement in agronomic practices, etc.

6.5.4 COMPETENT TECHNICAL STAFF

AGRIMAG, through factory supervisors and the marketing department, is responsible for ensuring maintenance and improvement of quality. This they can only achieve if the

staff is well trained and competent. It is through a competent team of employees that the factories will make major gains in improving tea quality and production efficiency.

To ensure maintained tea quality and improvement, the tea factories have to invest in a training program for their experienced and new employees. The smallholder factories will have their training activities adequately funded if they produce quality tea and command a greater share of the world market. This the smallholders could continue to do through visits to other factories and inviting employees from other factories to visit and work at the smallholder factories from time to time. A new employee mentor programme could be designed with other smallholder or commercial tea factories in Kenya and Uganda. Assuming the quality of leaf delivered to the factory is high, processing it into the best possible quality, given limitations due to the inherit quality attributes, the Production Manager has to ensure that detailed guidelines in the manufacturing process are followed. These include cleaning the factory and machinery after every manufacture, servicing machinery according to a regular time table, studying the weather and wither conditions to determine adequate fermentation, regular tasting of the tea along the production line and routine maintenance.

6.5.5 QUALITY OF INFORMATION COLLECTED

The internal quality control reports should not only be qualitative but should involve some quantitative aspect. For example, if a tea is burnt, an indication of how burnt it is on a scale of 1 to 10. This would, in turn, give the Production Managers an indication of the economic impact of the deviation from the set standard. The nature of the information puts the Production Managers in a situation where they have to make judgement based on individual perception, which varies widely within the industry. Quantitative measures would assist in narrowing the margin in which decisions have to be made, i.e. if mechanical failure on the CTC or sorting machinery is leading to uneven teas, at what level of economic loss should the Production Manager stop the process and ensure the failure is repaired.

Most of the aspects evaluated could not be measured according to a specified standard and were rated on a scale of 1 to 10. There is a great need for the tea industry and in particular AGRIMAG to create or generate a standard and easily measurable parameters that depict the quality of the product. For example, the density of tea is an important quality variable, reflecting on the degree of rolling, twisting and curling, and also the quality of the green leaf. In AGRIMAG's day to day management, average package weight is used as a proxy for density. But the density could be measured simply by a standard technique by all factories. The technique could involve a calibrated measuring cylinder, into which 100 g of the sample is poured and the volume read from the cylinder. The hedonic models developed in Chapter 5 found a negative relationship between the auction price and the factory's tea density indicator. This implies that packing more tea in a bag is associated with a reduction in quality.

To improve on the quantitative aspects of the data collected, the smallholder factories should implement the questionnaire used in this study as part of the quality control measures. This could later be improved upon as standard measurements are agreed upon among the smallholder factories. This will enable the factories to estimate the economic benefit or cost implication due to changes.

6.5.6 FLOW OF INFORMATION WITHIN THE TEA INDUSTRY

The tea industry possesses a lot of information, but unfortunately the information varies in both content and presentation. This implies that there is no uniform information sufficient for setting an efficient price. Literature shows that the foundation of sound decisions is relevant information. There is a need for adequate and accurate information on the product in the market (Houseman, 1990).

The information shared between the broker and producer is not available to the potential buyers, though the buyer is provided with a sample of the product in question and an evaluation price from the broker. This does not mean that their having the same sample and evaluation price will cause them to generate the same information on the product. An improvement in the quality of information will help boost the confidence of the

market in this information and it will also help to improve pricing efficiency. The Mombasa market or the East African Tea Traders Association in general should initiate a process that will make the market more open in regard to quality information from the brokers to the entire market. This must be done if the market is to achieve pricing efficiency. It could have a number of disadvantages and advantages.

The attainment of standardised information is important today, especially because of the greater importance of electronic media, thus electronic markets. The development of an electronic market for tea will have to start with efforts to standardise and distribute accurate information to all market participants.

The establishment of an efficient and fair price requires adequate flow of standardised information. To address the flow and nature of information, the envisaged flow of information is depicted in Figure 6.9. This would go a long way to ensuring that the same information or information from different sources with the industry can be compared, thus giving the market all the necessary information needed to generate an efficient price.

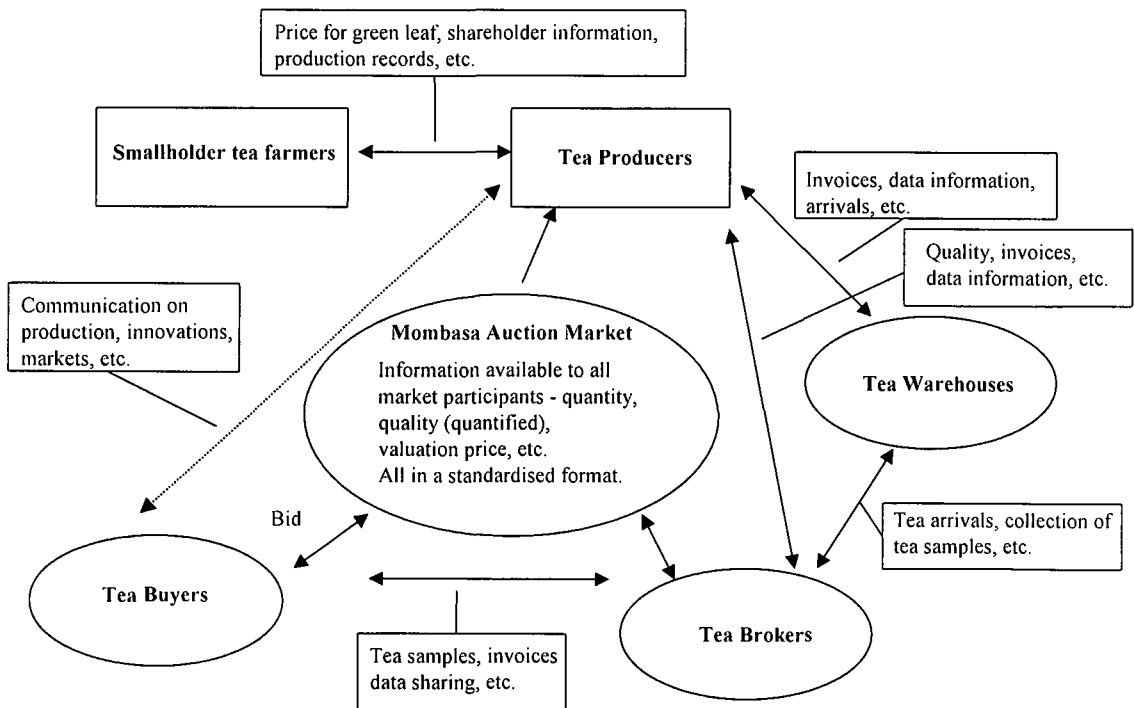


Figure 6.9: Ideal information linkages for the Mombasa auction market

6.5.7 ELECTRONIC MARKETS

Electronic markets have been suggested as one means of dealing with the problem of imperfect competition, price inaccuracies and price inefficiencies. Prices from a pilot electronic hog market were tested and found to be higher than prices achieved through the traditional markets (Rhodus, Baldwin and Henderson, 1989). Other researchers have noted that, on average, prices increased significantly when more competitive electronic or tele-auctions were introduced in markets that previously had little competition (Rhodus *et al*, 1989). Chen, Gilbert and Lent (1990) state that efficiency in pork pricing in Quebec improved following the introduction of an electronic marketing system.

Electronic marketing involves the use of advanced communication facilities to create a centralised trading area. There has been increased interest in electronic markets by the U.S. farm sector due to the need for efficiency and competitiveness in agricultural markets. Electronic markets provide the following benefits:

- improved market information,
- increased market efficiency,
- improved pricing accuracy,
- increased competition,
- higher prices and
- improved market access (Purcell and Smith, 1988).

It should however be noted that for an electronic marketing system to be successful, a range of conditions have to be met. These include the development and introduction of standard product descriptions that could be reliably used as a basis for electronic trading (Smith, Tran and Ruello, 1995).

The buyer is unlikely to help the producer establish an electronic tea market because, as highlighted, the tea producer stands to gain the most. In addition, it is important to note that African nations still have the most impoverished economies, producing a number of

products mainly consumed by the developed economies. Yet literature shows that these economies are dissatisfied with the traditional markets and want to achieve pricing efficiency for the farm sector (Purcell and Smith, 1988). In light of this the onus is on the producers and the tea brokers within the region to begin with the groundwork of setting up an electronic market. Africa has the potential to improve her peoples' welfare and eradicate poverty through better market access of her agricultural products.

The producers, brokers and the management of EATTA should investigate alternative market forms that take advantage of electronic communication media, by trying to establish the applicability and the requirements for establishment.

6.5.7.1 *Other forms of electronic marketing*

The tea producers and in particular the smallholder tea factories of Uganda should develop a market strategy aimed at increased international awareness of their product with options for electronic retailing. Initial efforts could focus on trying to increase international market awareness of the factory companies, and through their management agent, invest in e-competency and prepare themselves to be leaders in the industry as the initiative develops. This strategy would have to be aimed at markets with a high per head consumption of tea and with a fairly high level of Internet connectivity.

Despite the fact that the advance of electronic media is in the interests of the producers due to increased market efficiency and greater market access, most firms in developing countries, irrespective of industry, are not making an effort to become e-competent. Three International Trade Centre surveys conducted during 2000 found that few small and medium sized enterprises in developing countries are connected to the Internet. Those connected frequently use it as a basic communication tool and not as a tool to boost exports (Domeisen, 2001). This is in addition to the fact that the distribution of Internet access among countries is severely unequal. Despite rapid growth in the developing countries, industrial countries still account for the majority of Internet subscribers. In the United States of America more than 30 percent of her residents had access, compared to 0,5 percent in sub-Saharan Africa in 1999. Given the

enormous investment required for telephone lines and the continued dominance of the telephone industry by inefficient monopolies in some countries, hopes to narrow the digital divide rest largely on the spread of alternative means of accessing the Internet (World Bank, 2001).

6.5.8 FORMATION OF TRADE ALLIANCES

The formation of strategic alliances could serve to address a number of the problems that confront the smallholder factories in improving on their quality and expanding their present markets. The strategic alliance could serve to conduct promotion activities in new markets and develop a mentorship-training programme at the various factories of the alliance members. However, caution would have to be exercised, as strategic alliances are known to collapse after a period of time, thus a need to weigh the pros and cons (Whipple and Frankel, 1998). But alliances are growing at an annual rate of 25 percent and as many as 20 000 alliances were formed in the United States of America between 1988 and 1992 (Day, 1995).

The time is right for producers to become aggressive in marketing their product. Trading relationships could also be investigated between producers and large retail chains in the developed economies, through which some of the tea could be sold at a negotiated price. Tea producers have to develop an ideal marketing strategy for the product, just as pharmaceutical and computer industries have done.

6.6 CONCLUSION

The market structure is not conducive to generating an efficient price. Producers must consider other options that will ensure that an efficient price is generated on the market. This could be through increased promotion for contract sales.

Clearly smallholder producers need to investigate the markets of the leading tea re-exporters in both the not exceeding 3 kg category and in the exceeding 3 kg category, to ensure increased growth in their exports. It should however be noted that any

investment in the not exceeding 3 kg category would require investment in a packing and blending operation in close proximity to a sea or airport. Mombasa would appear to be the most suitable location for such an operation being a seaport; it has an airport and hosts a tea auction market, which would be an important source of tea for blending purposes. However, the smallholders would have to investigate the viability of such an operation further.

The most important market for the smallholders to explore is Poland, in which Uganda's exports have grown at an annual rate of 83,3 percent between 1995 and 1999. Poland is one of Germany's leading dynamic markets and its market share is on the increase. On the other hand, the United Kingdom is losing its share in this dynamic market.

The government needs to play its part in the fight against poverty, by aiding these factories through the improvement of feeder roads, main roads, provision of an efficient railway system, etc. It is however clear that the tea factories will have to continue providing some public services for their farmers until such time that the government can take over or agreement is reached regarding the smallholder factories role in providing services that should be provided by government, and trying to find ways in which government can subsidise the operation. It would be cheaper for the government to subsidise these services compared to the government running these services, i.e. extension in these areas.

7.1 INTRODUCTION

This study focussed mainly on the Mombasa auction market and the modelling of the relationships between the prices of different tea grades and their quality attributes. The Mombasa auction was analysed and various measures of concentration used to determine the market's efficiency, as this has a bearing on the market's generation of the correct market signals to the producers. Hedonic price models were formulated for selected tea grades produced by Uganda's smallholder factories. These were estimated using ordinary least squares.

A summary and conclusion of the most important findings follows in the next two sections. The latter section of this chapter highlights areas for further research.

7.2 SUMMARY OF FINDINGS OF THE STUDY

The most important findings of the study are summarised under three headings namely market structure, model estimation and strategy for market growth.

7.2.1 MARKET STRUCTURE

The Mombasa auction market had 124 buyers between 1987 and 1999, but has had a maximum of only 65 active buyers in any single year during this period. At the end of 1999 the top four firms on the Mombasa auction had purchased 57,5 percent of all the tea sold at the auction. Three measures were used to determine the trend in concentration, namely the Concentration ratio, Herfindal index and Lorenz curves. All these measures revealed that the concentration in the Mombasa auction market was increasing over time.

The number of active firms appears to have a great influence on the level of concentration. A higher average price may result in increased concentration in the market due to the positive linear relationship that exists between the level of concentration and the average auction price. This leaves the producers in a conflicting situation, because if higher prices are received, it is likely that there will be less competition on the auction market. Clearly, it appears that financial resources are a barrier to entry in this industry and therefore the smallholder producers need to explore alternative market outlets.

Entry and exist of firms into and out of active participation in the market is highest among small firms, which purchase between 150 000 and 500 000 kg per annum. Gains or losses in market share are also highest among these firms. Dropping out of the auction market among firms that purchase more than 5 000 000 kg per annum has mainly been as a result of mergers or changes in trading names to those of sister companies. A linear relationship exists between the rankings held by the 13 firms that have actively participated on the auction market between 1987 and 1999.

7.2.2 MODEL ESTIMATION

The hedonic price models formulated for the Broken Pekoe, Pekoe Fannings 1, Pekoe Dust and Fannings were estimated using ordinary least squares. The model formulation was tested using partial and residual regressions to ensure that the attributes explained the variation in price and that none of the attributes included explained the error term.

The study establishes liquor brightness as the price leader when compared to the degree of pungency. An increase in the ratio of pungency to liquor brightness leads to a price decrease in the Broken Pekoe, Pekoe Fannings and Pekoe Dust grades. An increase in the degree of tea evenness is associated with a price increase. The degree of rolling, twisting and curling is the price leader when compared to the degree of tea evenness. An increase in the degree of brightness of the infusion is associated with an increase in the price of the Pekoe Fannings. Similarly an increase in the degree of pungency of the Fannings is associated with an increase in its price. The average per bag as a proxy for

the tea density does not augur well for the smallholder factories, as an increase in the average package weight is associated with a decrease in price. The cleanness of a tea is the price leader compared to the degree of rolling, twisting and curling and an increase is associated with an increase in the price of Pekoe Fannings and Fannings.

The Broken Pekoe 1 is significantly different from the Broken Pekoe and so too is the Fannings 1 from the Fannings in the relationship of their attributes to the price. The Broken Pekoe produced by Igara and Kayonza is significantly different and superior to that produced by the other smallholder factories. Similarly the Pekoe Dust produced by Igara and Mpanga is significantly different and superior to that produced by the other smallholder factories. The Kayonza produced Pekoe Fannings are inferior in their relation to price when compared to the other smallholder factories and the Igara produced Fannings are superior to the rest of the smallholder factories.

The models estimated enable the Ugandan smallholder tea producer to predict the effect of changes in the attributes due the manufacturing process on price. This is ideal especially in situations where management has to make some decisions with regard to production, more so in periods of high and low production. Added to this the models estimated could be used to forecast prices and could therefore be used to determine the asking price on the local and contract markets, but management would have to regularly update the database to make forecasts possible. This would have to be done as the models estimated are not dynamic and would require updated data to forecast, based on the prevailing demand and supply conditions in the market.

7.2.3 STRATEGY FOR MARKET GROWTH

The present market structure is conducive for collusion, which would bias the market towards a monopsony. The Mombasa auction market in its present structure may not be well structured to generate the best price for tea. The producers need to become more aggressive in marketing their product and investigate trading relationships with alternative outlets such as large retail chains in developed economies.

World tea exports have grown at an annual rate of 1,56 percent, this is higher than the annual growth in world production of 1,02 percent between 1986 and 1999. Tea export opportunities continue to exist, and there is considerable tea exportation by non-producing countries such as the United Kingdom, Germany and the Netherlands. India, the world's largest tea producer, continues to consume most of her production, with the effect that India's exports have declined at an annual rate of 1,3 percent over the period 1985 to 1999.

Uganda's tea exports are not as diversified as the leading tea re-exporters (United Kingdom, Germany and the Netherlands). The markets of the non-producers highlight potential markets for the tea producers. The United Kingdom has an opportunity for expansion in a number of dynamic markets such the United States of America, Ireland, Saudi Arabia, Poland, Canada etc. These are also market opportunities for the Ugandan producer to further explore.

The Polish market is less risky for German promotional activities to increase supply and is one of the smallholder farmers' leading market outlets. Clearly, AGRIMAG needs to conduct promotional activities in this market if they are to maintain the high growth rate that was experienced in this market between 1994 and 1999.

The Netherlands is losing market share in almost all her dynamic markets. AGRIMAG needs to position the smallholders so that they can take advantage of the losses being made by the Netherlands on the international market.

Some of the market opportunities may require additional investment, for example the markets in the not exceeding 3 kg packages would require investment in packaging and blending operations. For logistical purposes this would have to be done close to the sea or airport and the tea auction market.

The changes happening on the international scene require foresight and adequate planning on the part of the smallholder tea factories but more so the managing agent, AGRIMAG, to establish some of the strategies needed to meet the changes. The

questionnaire used in this study would have to be implemented to improve on the qualitative nature of the data collected in their day to day operations. Improvements should be made once the managing agent has determined an agreeable measure for the tea's density.

AGRIMAG, on behalf of the smallholder tea factories, should take a leading role in lobbying for free movement of information in the Mombasa auction market. This could be done through the Uganda Tea Association, by encouraging the East African Tea Traders' Association to allow a free movement of information, especially in regard to tea quality in addition to the evaluation prices provided by the tea brokers. All market players should know what quality changes are taking place among the tea producers. This could mark the beginning of electronic trading at the Mombasa auction. Tea producers in the region need to ensure that the lead to electronic trading is taken by the EATTA or other producer organisations in tea producing countries and not in a non tea-producing country.

The smallholders need to lobby government to ensure a conducive environment for continued growth by providing some of the public services that are lacking such as extension, strategic planning for the region in terms of main roads, etc. The smallholders could consider lobbying government to subsidise their current extension services which are actually assisting the government in meeting some of its strategies towards poverty alleviation.

7.3 CONCLUSION

Rogers and Sexton (1995) state that markets for raw agricultural products are likely to be structural oligopsonies and concentration in the first handler markets will often exceed concentration in the affiliated finished product markets. They also state that monopsony/oligopsony issues deserve strong consideration in food policy debates, but to date this has not been the situation. There is buyer concentration in the Mombasa auction market and a positive linear relationship exists between the average auction price and the level of buyer concentration. This corresponds with a number of studies

on concentration. For example, Brester and Musick (1995) state that the market concentration appears to be associated with relatively small increases in lamb market margins. The price formation in the Mombasa auction market could be described as one resulting from stable price-leadership as the larger firms buy a large proportion of the tea available on the market, bearing in mind that the market share rankings are generally stable. This is in agreement with Kwoka (1979), who stated that if the market share distribution reflects clear leadership or similar market share positions there is no relevance of fights for leadership.

The study was not able to estimate the relationship between price and concentration market, but it could be concluded that during a period of reduced supply of tea the price of tea increases due to the maintained levels of demand. This implies that due to the nature of the product, certain tea attributes may be in shorter supply, but with a maintained level of demand. Other attributes or attribute levels cannot easily substitute for these attributes sought at specific levels by the buyers without affecting the retail market. This therefore leads to an even greater divergence between the demand and supply, thus the higher price, and as was earlier highlighted, this could easily be passed on to the consumer by the large firms. The buyer concentration is expected as the large firms continue to meet their requirements at whatever cost, as opposed to the smaller firms. As a result of lower tea quantities on the market there is less thin trading due to the reduced tea quantity and some of the smaller firms may drop out of the market during such times and return the following year when demand and supply are evenly matched, thus creating more opportunities for thin trading.

Some of the rules and regulations of the East African Tea Trade Association could be encouraging the high level of concentration. This in effect creates barriers to entry, thereby contriving one of the most important requirements for an efficient market. An efficient buyer operation at the Mombasa auction market may require a well developed retail network, a strong customer base which is built over time, considerable per capita investment, etc. All these would also serve as barriers to new intending tea buyers. This view is strengthened by the fact that there is a high rate of movement into and out of the Mombasa auction market in the small buyer category, implying that the capital or

financial requirements needed to run an adequate tea buying operation are rather high. The smaller buyers may have to consider mergers amongst themselves if they are to exert any influence on the Mombasa auction market.

If they are to take full advantage of the market, the managing agent should design a strategy that will lead to an improvement in quality measurements. This could be initiated by implementing the questionnaire used in this study (see Appendix A) into the factory tea quality records. All the tea attributes that were measured and used in this study have an impact on the price received for each grade but some have a considerable impact in compared to others. It is therefore very important for the managing agent that each of the price leaders is adequately addressed in the production process.

The estimated regression models for the grades of Broken Pekoe, Pekoe Fannings1, Pekoe Dust and Fannings provide an opportunity for management of the smallholder factories to estimate a price for the product in question, though this would require continued updating of the data used, as the models are not dynamic. This will also help in the assessment of product quality and allow easier comparison between the different factories from a technical and non-technical point of view. The availability of an internally generated valuation price will also guide management in establishing an asking price for the local market and the contract market.

AGRIMAG's ability to predict prices for these grades will assist in assessing the market in terms of its ability to achieve the expected price. This should ease planning on the part of management, through finding ways of trying to encourage local sales, provided it is assured of attaining the expected price. There exists a need on the part of the managing agent to investigate the reasons why an increase in the average package weight is associated with a decrease in price. Some of these measures must be tested practically under the working conditions at each of the factories, to determine for example whether tea quality is affected when the tea is compacted in a package.

The managing agent should lobby government to assist in gaining access to some of the dynamic markets in which the United Kingdom, Germany and the Netherlands are

playing a leading role. This could be achieved through the export promotional council. This should initially be in the exceeding 3 kg packages before moving on to the smaller package weights and blending operations. However, the Polish market could be further exploited through a collaborative promotional campaign to increase supply. This market has been described as being less risky, and the tea farmers would most definitely benefit from such an activity. The formation of trade alliances with other tea producers would particularly have a greater impact in the Polish market. However, any formation of alliances will have to be well documented, defining the rules that govern the alliance, ways in which the alliance can be terminated, obligation in regard to information after the alliance is terminated, etc.

7.4 RECOMMENDATIONS FOR FURTHER RESEARCH

Further research on the following aspects is necessary:

- a) **The relationship between the price offered by a specific buyer and the tea attributes the buyer seeks:** The different tea buyers supply to different markets and each market has its unique tastes. It is important to know the extent to which each of the various attributes influence the price offered by the buyer. This would better assist the buyer in determining how best to discount a tea. Such research would be similar to this study but would entail using data generated by the buyer.

- b) **The viability of electronic tea trading in the East African region:** Electronic communication takes a leading role in all forms of communication today and is having considerable influence on trade. This would drastically increase the number of likely buyers, and thus increase competition for the producers' product, but literature shows that the use of the electronic media is not fully utilised in developing countries. The study would entail finding out how best the tea producers in East Africa could organise themselves to increase their market access, what would be the limiting factors and how best these could be addressed.

- c) **Barriers to entry into the Mombasa auction market:** The firms that enter and exit the market are mainly in the small firm categories (less than 150 000 kg). The study has suggested that some of the rules and regulations may be serving as barriers to entry and encouraging exit from this market. There is a need to determine whether reform is necessary on the part of the East African Tea Traders' Association.
- d) **The viability of tea packing and blending operations for the Ugandan smallholder factories:** The world market is clearly divided into two categories, the not exceeding 3 kg and the exceeding 3 kg packages. The Ugandan produce is mainly aimed at the exceeding 3 kg market but a number of international opportunities do exist in the not exceeding 3 kg category. To enter this market, the Ugandan producers would have to adopt a completely new type of operation and different mode of operations on the international market. This would entail a feasibility study for a tea packing plant with developed countries as the main focus.
- e) **The impact of tea production on smallholder households:** Tea probably has an impact on the smallholder households but this has neither been quantified with regard to the households nor has a qualitative description of the improvements effected in the household quality of life been done. Uganda's tea exports are growing at an annual rate of 19,9 percent; to sustain this new tea farmers, both smallholder and commercial, will have to be encouraged to grow tea, thus the need to fully understand the impact of tea on the household economies.

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APPENDIX A

TEA TASTING EVALUATION REPORT

To enable the assessment of the tea, please complete each of the following questions, either with a cross or a brief statement as may be required. The rating scale is such that 1 is the lowest score and 10 the highest. For example, a tea scoring 10 on rating for evenness is very even and one scoring 1 is not even at all.

Example: To rate as 10 simply cross 10 in the table provided.

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	---------------

FACTORY:

Invoice Number:

Grade:

1. What is the colour of the leaf?

Black	Grey	Brown
-------	------	-------

2. Is the leaf well rolled, twisted and curled?

Yes	No
-----	----

3. How would you rate the degree of rolling, twisting and curling?

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

4. Is the tea even?

Yes	No
-----	----

5. How do you rate the evenness of the tea?

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

6. Is the leaf true to the grade?

Yes	No
-----	----

7. Is the leaf free of fibre and dust?

Yes	No
-----	----

8. How do you rate the cleanness of the tea?

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

9. Aroma of the tea is free of over firing or burning of the tea?

Yes	No
-----	----

Section B.

10. Is the infusion bright?

Yes	No
-----	----

11. If No to Question 10, would you describe the infusion as Dull or Dark?
(Please tick which is applicable)

Dull	Dark
------	------

12. If Yes to Question 10, does the infusion have a coppery appearance?

Yes	No
-----	----

13. How do you rate the brightness?

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

14. Does the infused leaf contain any specks of green leaf?

Yes	No
-----	----

15. Does the infused leaf have any taints?

Yes	No
-----	----

SECTION C.

16. Is the liquor brisk?

Yes	No
-----	----

17. How would rate the degree of pungency?

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

18. Is the liquor bright?

Yes	No
-----	----

19. How would you rate the brightness?

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

20. Briefly describe the effect it gives, where the liquor touches the bowl?

.....

.....

21. Does the liquor become opaque as it cools down?

Yes	No
-----	----

22. Is a cream (precipitate) formed as the liquor cools down?

Yes	No
-----	----

23. Is the cream (precipitate) bright Or Dull?

Bright	Dull
--------	------

24. Any other (brief) description of the precipitate,

.....

.....

25. Is the liquor free of any undesirable taints?

Yes	No
-----	----

SECTION D.

26. The tea is packed in

Cadi Sacks	Poly Bags
-------------------	------------------

27. What is the average weight per bag?

28. How many bags make up this invoice?.....

APPENDIX B

Table B.1: Active tea buyers during 1999 and 1998

1999				1998			
Rank	Active buyers	Rank	Active buyers	Rank	Active buyers	Rank	
1	Lipton Ltd.	35	Bhaijee	1	Lipton Ltd.	35	Accolade Ltd.
2	James Finlay Plc.	36	Chikwe Enterprises	2	James Finlay Plc.	36	Ken-Elbagara
3	Global Tea And Commodities	37	Diamond Tea Exporters	3	Van Rees Bv.	37	Afrimex Global Ltd.
4	Van Rees Bv.	38	Uneximp Limited	4	Global Tea And Commodities	38	Mella Corporation
5	E.A. Tea Exporters Ltd.	39	A. & J Teas Ltd.	5	E.A. Tea Exporters Ltd.	39	Khaku Exports
6	Juja Coffee Exporters Ltd.	40	Mella Corporation	6	Stansand (A) Ltd.	40	Prodex Ltd.
7	Stansand (A) Ltd.	41	Afrimex Global Ltd.	7	Alibhai Ramji (Msa) Ltd.	41	Kambugi Supplies Ltd.
8	L. A .B International	42	El-Reza Tea Exporters	8	Cofftea Agencies Ltd.	42	Independent Tea Packers
9	Cofftea Agencies Ltd.	43	Ken-Elbagara	9	Tanjai Investments Ltd.	43	Excellence Investments
10	Mombasa Coffee Exporters	44	Khaku Exports	10	M. J. Clarke Ltd.	44	Kigless Ltd.
11	Abbas Traders Ltd.	45	Al Yameen Trading Company	11	Juja Coffee Exporters Ltd.	45	Shigog Investments
12	M. J. Clarke Ltd.	46	Star Tea Ltd.	12	L .A. B International	46	Kipkebe Ltd.
13	Tanjai Investments Ltd.	47	Anchor (A) Ltd.	13	Abbas Traders Ltd.	47	Telo Food Ltd.
14	Alibhai Ramji (Msa) Ltd.	48	Carina Drinks	14	Al Emir Ltd.	48	Janish Tea Ltd.
15	Phillips Kenya Tea Ltd.	49	Janish Tea Ltd.	15	Phillips Kenya Tea Ltd.	49	Kilindini Warehouse
16	Al Emir Ltd.	50	Kilindini Warehouse	16	Mombasa Coffee Exporters	50	Offshore Tea
17	Shakab Import Export	51	Prodex Ltd.	17	Devchand Keshavji	51	Unitrad Ltd.
18	Mombasa Packers Ltd.	52	Al-Thyibat	18	Mombasa Packers Ltd.	52	Golden Foods Ltd.
19	Devchand Keshavji	53	Commodity House Limited	19	Fin Tea Ltd.	53	Anchor (A) Ltd.
20	Bico Ltd.	54	Lutex Ltd.	20	Economic Carriers	54	Chikwe Enterprises
21	Economic Carriers	55	Royal Tea	21	Mount Kenya Coffee Ltd.	55	Meadowm Trading
22	Gakal Merchants	56	Telo Food Ltd.	22	Shakab Import Export	56	Al-Itihad
23	Fin Tea Ltd.	57	Bretty	23	Unitea Ltd.	57	Mara Forwarders
24	Oriental Tea Exporters Ltd.	58	Excellence Investments	24	Gakal Merchants	58	Al Yameen Trading Company
25	Rauf Coffee Ltd.	59	Offshore Tea	25	El-Reza Tea Exporters	59	Teawise E.A Ltd.
26	Pegasus Tea Ltd.	60	Mount Kenya Coffee Ltd.	26	Oriental Tea Exporters Ltd.	60	Diara Limited
27	Unitea Ltd.	61	Nyaga A & C	27	Elamin Trading Company Ltd	61	Uneximp Limited
28	Jakal Ltd.	62	Kipkebe Ltd.	28	Pegasus Tea Ltd.		
29	Accolade Ltd.	63	Chai Ltd. (Nbi.)	29	Diamond Tea Exporters		
30	Elamin Trading Company Ltd	64	Al-Tawakul	30	Bico Ltd.		
31	Kigless Ltd.	65	Caspian Tea	31	Seyffert & Company Ltd.		
32	Unitrad Ltd.			32	Jakal Ltd.		
33	Shigog Investments			33	Rauf Coffee Ltd.		

Rank is derived from market shares, 1 is highest

Table B.2: Active tea buyers during 1997 and 1996

1997				1996			
Rank	Active buyers	Rank	Active buyers	Rank	Active buyers	Rank	Active buyers
1	Lipton Ltd.	35	Anchor (A) Ltd.	1	Lipton Ltd.	35	Oriental Tea Exporters Ltd.
2	Van Rees Bv.	36	M.S. Bawazir & Company	2	Van Rees Bv.	36	Al Emir Ltd.
3	African Highlands Produce Ltd.	37	Excellence Investments	3	African Highlands Produce Ltd.	37	Elamin Trading Company Ltd.
4	Global Tea And Commodities	38	Kipkebe Ltd.	4	Global Tea And Commodities	38	Al-Tawakul
5	E.A. Tea Exporters Ltd.	39	Gakal Merchants	5	E.A. Tea Exporters Ltd.	39	Khaku Exports
6	Stansand (A) Ltd.	40	Independent Tea Packers	6	Juja Coffee Exporters Ltd.	40	Independent Tea Packers
7	Tanjai Investments Ltd.	41	Al-Tawakul	7	Brooke Bond Mombasa	41	Unitrad Ltd.
8	Phillips Kenya Tea Ltd.	42	Prodex Ltd.	8	Phillips Kenya Tea Ltd.	42	Wanjoo Ltd.
9	Juja Coffee Exporters Ltd.	43	Al-Nakhil Ltd.	9	Stansand (A) Ltd.	43	Shakab Import Export
10	Alibhai Ramji (Msa) Ltd.	44	Diamond Tea Exporters	10	Al-Nakhil Ltd.	44	Rauf Coffee Ltd
11	Cofftea Agencies Ltd.	45	Khaku Exports	11	Tanjai Investments Ltd.	45	Nairobi Tea Packers Ltd.
12	M. J. Clarke Ltd.	46	Golden Foods Ltd.	12	Al Yameen Trading Company	46	Kigless Ltd.
13	Devchand Keshavji	47	Shigog Investments	13	Fin Tea Ltd.	47	Commodity House Limited
14	Mombasa Coffee Exporters	48	Kigless Ltd.	14	M. J. Clarke Ltd.	48	Uneximp Limited
15	Al Emir Ltd.	49	Kambugi Supplies Ltd.	15	Devchand Keshavji	49	M.S. Bawazir & Company
16	Fin Tea Ltd.	50	Telo Food Ltd.	16	Abbas Traders Ltd.	50	Kenya Bestea Packer
17	Abbas Traders Ltd.	51	Diara Limited	17	Mombasa Coffee Exporters	51	Femo Works
18	L. A. B International	52	Lopez International Ltd.	18	Cofftea Agencies Ltd.	52	International Tea Packers
19	Shakab Import Export	53	Leaf & Bean Ltd.	19	Prodex Ltd.		
20	Economic Carriers	54	Al Yameen Trading Company	20	L. A. B International		
21	Unitea Ltd.			21	El Nasr Import & Export		
22	Mella Corporation			22	Economic Carriers		
23	Jakal Ltd.			23	D. J. Lowe		
24	Bico Ltd.			24	Seyffert & Company Ltd.		
25	Elamin Trading Company Ltd.			25	Anchor (A) Ltd.		
26	Pegasus Tea Ltd.			26	Mella Corporation		
27	Seyffert & Company Ltd.			27	Bico Ltd.		
28	Oriental Tea Exporters Ltd.			28	Jakal Ltd.		
29	El-Reza Tea Exporters			29	Shigog Investments		
30	Unitrad Ltd.			30	Pegasus Tea Ltd.		
31	D. J. Lowe			31	Kambugi Supplies Ltd.		
32	Chai Exports (K) Ltd.			32	Chai Exports (K) Ltd.		
33	Rauf Coffee Ltd.			33	Mombasa Packers Ltd.		
34	Mombasa Packers Ltd.			34	Unitea Ltd.		

Rank is derived from market shares, 1 is highest

Table B.3: Active tea buyers during 1995 and 1994

1995				1994			
Rank	Active buyers	Rank	Active buyers	Rank	Active buyers	Rank	Active buyers
1	Lipton Ltd.	36	Pegasus Tea Ltd.	1	Lipton Ltd.	36	Bico Limited
2	Van Rees Bv.	37	Shigog Investments	2	Van Rees Bv.	37	Uneximp Ltd.
3	African Highlands Produce Ltd.	38	Kambugi Supplies Ltd.	3	African Highland Produce	38	Agro-Marine Products
4	Brooke Bond Mombasa	39	Jakal Ltd.	4	Brooke Bond Mombasa	39	Diamond Tea Exporters
5	Global Tea And Commodities	40	Anchor (A) Ltd.	5	Al Emir Ltd.	40	Rooh Ltd.
6	Juja Coffee Exporters Ltd.	41	Elamin Trading Company Ltd	6	Stansand (A) Ltd.	41	Adex (K) Ltd.
7	E.A. Tea Exporters Ltd.	42	Nairobi Tea Packers Ltd.	7	Global Tea Commoities Ltd.	42	Rauf Coffee & Tea Exporters
8	Al Emir Ltd.	43	Rooh Limited	8	Devchand Keshavji (K) Ltd.	43	Afrimex Global Ltd.
9	Stansand (A) Ltd.	44	M.S. Bawazir & Company	9	Juja Coffee Exporters Ltd.	44	Gulleid Kenya Industries Ltd.
10	M. J. Clarke Ltd.	45	Diara Limited	10	M. J. Clarke	45	Continental Marketing
11	Alibhai Ramji (Msa) Ltd.	46	El Nasr Import & Export	11	Alibhai Ramji (Msa) Ltd.	46	Mountain Produce
12	Phillips Kenya Tea Ltd.	47	Agro-Marine Products	12	Al-Nakhil Ltd	47	Pegasus Tea Ltd.
13	Abbas Traders Ltd.	48	Uneximp Limited	13	Abbas Traders	48	Al Yasin Trading
14	Devchand Keshavji	49	Wanjoo Ltd.	14	E.A. Tea Exporters Ltd.	49	Unitrad Ltd.
15	Prodex Ltd.	50	Diamond Tea Exporters	15	Tanjali Investment Ltd.	50	Diara Ltd.
16	Tanjali Investments Ltd.	51	Adex (Kenya) Limited	16	Prodex International Ltd.	51	Commodity House Ltd.
17	Fin Tea Ltd.	52	Commodity House Limited	17	Seyffert & Co.	52	Wanjoo Trading Ltd.
18	Economic Carriers	53	Femo Works	18	Mombasa Packers Ltd.	53	Al Noor Feisal & Co.
19	Seyffert & Company Ltd.	54	Telo Food Ltd.	19	Phillips International Ltd.		
20	El-Reza Tea Exporters			20	El Reza Tea Exporters		
21	Cofftea Agencies Ltd.			21	D. J Lowe		
22	Mombasa Coffee Exporters			22	Mombasa Coffee Exporters		
23	Unitea Ltd.			23	Cofftea Agencies		
24	D. J. Lowe			24	Chai Exporters		
25	Kenya Bestea Packer			25	Economic Carriers		
26	Al-Nakhil Ltd.			26	Mella Corporation		
27	Chai Exports (K) Ltd.			27	Khaku Exporters		
28	Oriental Tea Exporters Ltd.			28	Anchor (A) Ltd.		
29	Mella Corporation			29	Unitea Ltd.		
30	Khaku Exports			30	Al Yameen Trading Company		
31	Gullied (K) Industries			31	Kambugi Supplies		
32	Bico Ltd.			32	Kenya Bestea Packer		
33	Al Yameen Trading Company			33	Fin Tea		
34	Unitrad Ltd.			34	M.S. Bawazir & Company		
35	Mombasa Packers Ltd.			35	Oriental Tea Exporters Ltd.		

Rank is derived from market shares, 1 is highest

Table B.4: Active tea buyers during 1993 and 1992

1993				1992			
Rank	Active buyers	Rank	Active buyers	Rank	Active buyers	Rank	Active buyers
1	Lipton Ltd.	36	Mecaf Exporters Limited	1	Lipton Ltd.	36	Husein & Co.
2	African Highland Produce	37	Continental Marketing	2	James Finlay Plc.	37	Gulleid Kenya Industries Ltd.
3	Van Rees Ltd.	38	Adex (K) Ltd.	3	Van Rees Ltd.	38	Bico Ltd.
4	Brooke Bond Mombasa	39	Agro-Marine Products	4	Brooke Bond Mombasa	39	Rauf Coffee & Tea Exporters Ltd.
5	Stansand (A) Ltd.	40	Nairobi Tea Packers Ltd.	5	Stansand (A) Ltd.	40	Armatrading Ltd.
6	Juja Coffee Exporters Ltd.	41	Husein & Co.	6	Juja Coffee Exporters Ltd.	41	Almeta Impex Co. (K) Ltd.
7	Al Emir Ltd.	42	Rauf Coffee & Tea Exporters	7	Alibhai Ramji (Msa) Ltd.		
8	E.A. Tea Exporters Ltd.	43	Ken-U-Tan Exports Ltd.	8	Phillips International Ltd.		
9	Phillips International Ltd.	44	Diamond Tea Exporters	9	E.A. Tea Exporters Ltd.		
10	Cofftea Agencies	45	Kwacha Ltd	10	Unitea Ltd.		
11	Alibhai Ramji (Msa) Ltd.			11	Al Emir Ltd.		
12	Al-Nakhil Ltd			12	Mombasa Coffee Ltd.		
13	D. J. Lowe			13	D.J. Lowe		
14	Abbas Traders			14	M.J. Clarke		
15	Unitea Ltd.			15	Kenya Bestea Packers Ltd.		
16	M. J. Clarke			16	M. S. Bawazir & Co.		
17	Devchand Keshavji (K) Ltd.			17	Abbas Traders		
18	El Reza Tea Exporters			18	Chai Exports (K) Ltd.		
19	Global Tea Commoities Ltd.			19	Uneximp Ltd.		
20	Mombasa Coffee Exporters			20	Prodex International Ltd.		
21	Seyffert & Co.			21	Devchand Keshavji (K) Ltd.		
22	Mella Corporation			22	El Reza Tea Exports		
23	Khaku Exporters			23	Seyffert & Co.		
24	M.S. Bawazir & Company			24	Mombasa Packers Ltd.		
25	Chai Exporters			25	Khaku Exports		
26	Tanjali Investment			26	Mella Corporation		
27	Kenya Bestea Packer			27	Oriental Tea Expo Ltd.		
28	Anchor (A) Ltd.			28	Al Barakah Trading Co.		
29	Mombasa Packers			29	Kambugi Supplies Ltd.		
30	Al Yasin Trading			30	Kenya Tea & Produce Ltd.		
31	Oriental Tea Exporters Ltd.			31	Agro-Marine Products Ltd.		
32	Kambugi Supplies			32	Cofftea Agencies		
33	Uneximp Ltd.			33	Nairobi Tea Packers Ltd.		
34	Fin Tea			34	Ken-U-Tan Exports Ltd.		
35	Bico Limited			35	Adex (K) Ltd.		

Rank is derived from markets share, 1 is highest

Table B.5: Active tea buyers during 1991 and 1990

1991				1990			
Rank	Active buyers	Rank	Active buyers	Rank	Active buyers	Rank	Active buyers
1	Lipton Ltd.	36	Al Noor Feisal & Co.	1	Lipton Ltd.	36	Vishal Tea Exporters
2	Van Rees Ltd.	37	Kenya Bestea Packers Ltd.	2	James Finlay Plc.	37	M.G Habib & Co.
3	Brooke Bond Mombasa	38	Meka Trading Co. Ltd.	3	Van Rees Ltd.	38	Green Gulf Enterprise
4	James Finlay Plc.	39	Armatrading Ltd.	4	Brooke Bond Mombasa	39	International Freighters Ltd.
5	Phillips International Ltd.	40	Contea Ltd.	5	Phillips International Ltd.	40	Contea Ltd.
6	E.A. Tea Exporters Ltd.			6	M.S.Bawazir & Co.		
7	M.S.Bawazir & Co.			7	Stansand (A) Ltd.		
8	Stansand (A) Ltd.			8	Al Emir Ltd.		
9	Alibhai Ramji (Msa) Ltd.			9	Seyffert & Co.		
10	Juja Coffee Exporters Ltd.			10	E.A. Tea Exporters Ltd.		
11	Al Emir Ltd.			11	Chai Exports (K) Ltd.		
12	Chai Exports (K) Ltd.			12	Unitea Ltd.		
13	Devchand Keshavji (K) Ltd.			13	D.J. Lowe		
14	Unitea Ltd.			14	Alibhai Ramji (Msa) Ltd.		
15	Uneximp Ltd.			15	Devchand Keshavji (K) Ltd.		
16	Mombasa Coffee Ltd.			16	Juja Coffee Exporters Ltd.		
17	Seyffert & Co.			17	M. J. Clarke		
18	Abbas Traders			18	Mombasa Coffee Ltd.		
19	Prodex International Ltd.			19	Tasty Tea Ltd.		
20	M. J. Clarke			20	Uneximp Ltd.		
21	D. J. Lowe			21	Abbas Traders		
22	El Reza Tea Exports			22	Ken-U-Tan Exports Ltd.		
23	Khaku Exports			23	Prodex International Ltd.		
24	Kenya Tea & Produce Ltd.			24	Khaku Exports		
25	Kwacha Ltd.			25	El Reza Tea Exports		
26	Ken-U-Tan Exports Ltd.			26	Kenya Tea & Produce Ltd.		
27	Mecaf Exporters Ltd.			27	Husein & Co.		
28	Agro-Marine Products Ltd.			28	Afrique Trading & Shipping Co. Ltd.		
29	Mombasa Packers Ltd.			29	Mombasa Packers Ltd.		
30	Mella Corporation			30	Agro-Marine Products Ltd.		
31	Gulleid Kenya Industries Ltd.			31	Gulleid Kenya Industries Ltd.		
32	Husein & Co.			32	Mount Kenya Coffee Ltd.		
33	Almeta Impex Co. (K) Ltd.			33	Mella Corporation		
34	Mount Kenya Coffee Ltd.			34	Almeta Impex Co. (K) Ltd.		
35	Adex (K) Ltd.			35	Kwacha Ltd.		

Rank is derived from market shares, 1 is highest

Table B.6: Active tea buyers during 1989 and 1988

1989				1988			
Rank	Active buyers	Rank	Active buyers	Rank	Active buyers	Rank	Active buyers
1	James Finlay Plc.	36	Green Gulf Enterprise	1	James Finlay Plc.	36	Jethabhai Enterprises Ltd.
2	Brooke Bond Mombasa	37	Tea Sales E.A Ltd.	2	Brooke Bond Mombasa	37	Sun Trading Ltd.
3	Phillips International Ltd.	38	Al Noor Feisal & Co.	3	Juja Coffee Exporters Ltd.	38	Al Noor Feisal
4	Lipton Ltd.			4	E.A. Tea Exporters Ltd.		
5	Van Rees Ltd.			5	Van Rees Ltd.		
6	Stansand (A) Ltd.			6	Lipton Ltd.		
7	E.A. Tea Exporters Ltd.			7	Stansand (A) Ltd.		
8	Juja Coffee Exporters Ltd.			8	Phillips International Ltd.		
9	D. J. Lowe			9	D. J. Lowe		
10	Al Emir Ltd.			10	Alibhai Ramji (Msa) Ltd.		
11	Chai Exports (K) Ltd.			11	Uneximp Ltd.		
12	Unitea Ltd.			12	M.S.Bawazir & Co.		
13	Alibhai Ramji (Msa) Ltd.			13	Al Emir Ltd.		
14	Devchand Keshavji (K) Ltd.			14	Chai Exports (K) Ltd.		
15	M. J. Clarke			15	Unitea Ltd.		
16	Seyffert & Co.			16	M. J. Clarke		
17	Tasty Tea Ltd.			17	Devchand Keshavji (K) Ltd.		
18	M.S.Bawazir & Co.			18	Ken-U-Tan Exports Ltd.		
19	Uneximp Ltd.			19	Seyffert & Co.		
20	Ken-U-Tan Exports Ltd.			20	Gulleid Kenya Industries		
21	Khaku Exports			21	Abbas Traders		
22	Gulleid Kenya Industries Ltd.			22	Tasty Tea Ltd.		
23	El Reza Tea Exports			23	Khaku Exports		
24	Mombasa Coffee Ltd.			24	Mombasa Coffee Ltd.		
25	Coastal Growers & Packers Ltd.			25	Coastal Growers & Packers		
26	Agro-Marine Products Ltd.			26	Shriti Traders		
27	Kenya Tea & Produce Ltd.			27	Dinkie Impex Ltd.		
28	Abbas Traders			28	Wanyo Ltd		
29	Afrique Trading & Shipping Co. Ltd.			29	Prodex International Ltd.		
30	Husein & Co.			30	Husein & Co.		
31	Prodex International Ltd.			31	Contea Ltd.		
32	Contea Ltd.			32	Al Reza Tea Exports		
33	Wanyo Ltd.			33	Almeta Import & Export Co.		
34	Almeta Impex Co. (K) Ltd.			34	Prime Commodities Ltd.		
35	M.G Habib & Company			35	Green Gulf Enterprises		

Rank is derived from market shares, 1 is highest

Table B.7: Active tea buyers during 1987

1987			
Rank	Active buyers	Rank	Active buyers
1	James Finlay Plc.	36	Dinke Impex Ltd.
2	Brooke Bond Mombasa	37	L.A.B Trading (U.K.) Ltd.
3	Van Rees Ltd.	38	Contea Ltd.
4	E.A Tea Exporters Ltd.	39	Chai Ltd. (Nbi.)
5	Lipton Ltd.	40	Malde & Co.
6	Juja Coffee Exports Ltd.	41	Trade Traffic Int.
7	D.J. Lowe	42	Al Noor Feisal & Co.
8	Stansand (A) Ltd.		
9	M.S. Bawazir		
10	Alibhai Ramji (Msa) Ltd.		
11	Phillips, Harrisons & Crosfield		
12	Uneximp Ltd.		
13	Chai Exports (K) Ltd.		
14	Al Emir Ltd.		
15	M.J Clarke		
16	Devchand Keshavji (K) Ltd.		
17	James Noble Tea Co. Ltd.		
18	Abbas Traders		
19	Shiriti Traders		
20	Khaku Exports		
21	Prodex International Ltd.		
22	Ken-U-Tan Exports Ltd.		
23	Seyffert & Co. Ltd.		
24	Almeta Import Export Co.		
25	Gullied Kenya Industries		
26	Unitea Ltd.		
27	Down Town Traders Ltd.		
28	Wanyo Ltd.		
29	Mombasa Coffee Ltd.		
30	Jethabhai Enterprises Ltd.		
31	Prime Commodities Ltd.		
32	Husein & Co.		
33	Coastal Growers & Packers		
34	H.M. Adam & Co.		
35	International Shipping Co..Ag.		

Rank is derived from market shares, 1 is highest

APPENDIX C

Table C.1: The world's leading tea exporting countries (1999)

Country	Tea Exports (Tonnes)	Proportion of World Exports
Sri Lanka	268,330	19,5
Kenya	245,716	17,9
China	209,496	15,3
India	180,000	13,1
Indonesia	97,847	7,1
Argentina	52,144	3,8
Vietnam	37,300	2,7
Malawi	30,000	2,2
United Kingdom	29,509	2,1
Uganda	22,102	1,6
Bangladesh	21,494	1,6
Tanzania	21,390	1,6
Iran	18,331	1,3
Zimbabwe	15,722	1,1
Germany	14,802	1,1
Netherlands	10,155	0,7
Rwanda	9,953	0,7
Papua New Guinea	8,200	0,6
Georgia	7,500	0,5
Burundi	6,396	0,5

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