FACTORS AFFECTING PRODUCTION OF TEA IN KENYA: A CASE OF TEA FARMERS IN OTHAYA DIVISION OF NYERI DISTRICT

BY

GITHINJI BEATRICE KANANI
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DECLARATION

This research project is my original work and has not been presented for a degree in any other university.

Githinji Beatrice Kanani
Department Of Business Administration

This research project has been submitted for examination with my approval as the university supervisor.

Mr. J.O. Mamba
Supervisor

Mr. P.Ocholla
Chairman, Department of Business Administration
DEDICATION

This work is dedicated to my dear parents for all the support. May God bless you.
ACKNOWLEDGEMENT.

I wish to express my heartfelt gratitude to my supervisor, Mr. Mamba for his continued guidance and dedicated support all through this research project.

Special thanks to all the extension officers of Chinga tea factory, Iriaini tea factory and Gitugi tea factory and staff of K.T.D.A at the Public Relations Department for their invaluable assistance.

I acknowledge my respondents for their responses.

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ABSTRACT

Growth in tea production in Kenya has slowed down in recent years. This slow growth led to this study. The objective was to establish the challenges small-scale tea farmers are facing.

The data for the study was generated both from primary and secondary sources. The population was stratified by the buying centres. Data analysis was done using SPSS. The major variables examined were extension services, labour cost, tea payment and prices, delivery services, cultural practices and infrastructure.

It was found out that the relative size of the farms and area under tea affects tea yields depending on labour availability and financial status of the family. The study recommended the expansion of the annual factory processing capacity; increase the number of buying centres, proper supply of gunny bags in buying centres and introduction of motorized plucking machines. The roads leading to the buying centres should also be tarmacked to increase efficiency in leaf transport.

The study found out that the tea producing zones with low tea quality receives lower tea prices and also realizes lower tea yields compared to others. It was recommended that KTDA improve infrastructure and delivery services to improve quality of tea.
CHAPTER ONE: INTRODUCTION

1.0 BACKGROUND OF TEA IN KENYA

Tea which is botanically known as Camellia Sinesis was first drunk in China more than 5000 years ago. The first tea bush was planted in Kenya in 1903 in Limuru and in Kericho in 1912. Kenyan tea is of Asian origin (India). (Source-Tea Board of Kenya.)

Commercial tea growing did not start until 1924 when extensive clearing of agricultural land in the former white highlands started. Tea was planted on the cleared lands, but the expansion of the industry was interrupted during the 2nd world war. After the war the expansion continued both in Limuru and Kericho and also in new areas east and west of the Great Rift Valley.

Other experimental farms followed and by 1928 Kenya was sending tea albeit of modest quantity for sale at the London auction. From these early beginnings, tea production in Kenya expanded rapidly.

The emergence of Kenya and East Africa as a major tea-producing region over the last 30 years has been a major development in the tea industry. Back in 1968, Kenya produced only 30 million kilos of tea and by 1998, this had increased to 294 million kilos.

1.1 The Tea Industry in Kenya

Historically the tea industry is one of the greatest success stories in Kenyan agriculture. Tea planting and production have expanded rapidly since Independence in 1963 from 18,000 tonnes and 21,448 hectares to over 294,631 tonnes and 131,581 hectares in 2001. (Source-Tea Board of Kenya.)

Smallholders expanded the most; their production rose from a mere 1.7% of the total amount of tea produced to the current amount of 59.7%.
In the world market Kenya ranks 2nd after Sri-Lanka in tea exports and is the 3rd major producer of tea in the world after India and Sri-Lanka.

1.1.1 Growing areas
Kenya has more than 110,000 hectares of land dedicated to tea. The main growing districts in Kenya are situated in or around the highland areas on both sides of the great Rift Valley. Kericho, the tea capital of Kenya is located in the Rift Valley. High ground temperature and high rainfall off the Lake Victoria make it an ideal region for tea production.

1.1.2 Seasons
Kenya enjoys two rainy seasons April/May (long rains) and October/November (short rains). March is the driest month while July is the coolest. During the rainy seasons tea production is very high and factories are usually unable to handle the volume.

1.1.3 Tea Laws
The specific laws governing the tea industry are spelled out in the Tea Act Chapter 343 and the KTDA Order established under the Agriculture Act cap 318 to control and regulate smallholder tea. Initially these acts and other related ones were based on government-controlled policies. Tea Board of Kenya remains the regulatory body for the industry and still intact are its restrictive powers over the entry and exit into the industry, through licensing of tea growers and factories.

1.1.4 Key Organizations in the Tea Industry
Tea production in Kenya is divided between tea estates owned by large proprietary groups and smallholdings owned by a very large number of small growers.

Small-scale farmers produce 59.7% of Kenyan tea while tea estates produce 40.3%.

The privately owned large plantations are Brooke Bond producing 16% of the total tea production, African Highlands (formerly James Finlay) producing 18% of the total tea produced and Eastern Produce Limited. There are other individual factories run by agents like George
1.1.4.1 The Tea Board of Kenya.

This is the apex body in the tea industry. It was established in June 1950 by an Act of Parliament (cap 343) as a state corporation under the ministry of Agriculture to regulate the entire sector. Its key functions include:

- Registration of tea growers
- Licensing of tea factories
- Regulation, control and improvement of the cultivation and processing of tea
- The control of pests and diseases through its technical arm, the Tea Research Foundation of Kenya.
- The promotion of Kenya tea in local and external markets.
- The investigation of and research into all matters relating to the tea industry.
- Advising the government on all policy matters regarding tea.

1.1.4.2 The Tea Research Foundation of Kenya (T.R. F. K.)

Situated at the heart of Kenya’s large scale tea growing area of Kericho, TRFK was established in 1950 to carry out research on control of pests and diseases and the improvement of planting material, husbandry, yields and quality. It advises producers on the best clone selection to suit the various ecological zones and on how to tend their tea to improve production and attain best quality.

1.1.4.3 Kenya Tea Development Authority (K.T.D.A.)

Established in 1964 as a state corporation with the mandate of promoting tea cultivation by the indigenous small-scale farmers.

It is the largest single tea selling organization under one management in the world. It represents
all the 45 tea factories that account for 56% of Kenyan tea exports.

It advises small holders on the best method of tea growing; it also collects leaf from small-scale farmers, processes and markets the tea on behalf of the farmers.

KTDA was privatised in 2002.

1.1.4.4 The Nyayo Tea Zones Development Corporation (N.T.Z.D.C.)

This state corporation was established in 1986 with the responsibility of managing government tea projects around the forest zones created to act as a buffer against human encroachment of gazetted government forests. Also spanning all tea growing districts, the project not only offers employment to many Kenyans but also contributes a sizable share of Kenya’s output annually.

1.1.4.5 The Kenya Tea Growers Association (K.T.G.A.)

It was established in 1931 by large-scale tea producers to promote common interests of members in the cultivation and manufacture of tea and to promote good industrial relations and sound wage policies for the workers.

Membership is open to the growers who maintain over 10 hectares of tea. It accounts for 40.3% of the entire tea production.

1.1.4.6 The East African Tea Trade Association

This is an association of tea producers, brokers, buyers and packers in East Africa. It promotes the best interest of tea trade in Africa, ensures the orderly marketing of tea, fosters closer relations within the trade and collects and circulates statistics to assist members in the conduct of their business.

1.1.5 Export

Kenya exports 95% of its tea. The domestic market is relatively small. The major tea market is the Mombasa tea auction under auspices of the East African Tea Trade Association comprising of
In addition to the Mombasa auction, KTDA sells tea in the London auction, in the direct overseas sales by private contract and through factory outlets from estate sales. The direct overseas and London auction sales are coordinated through KTDA’s overseas agents and brokers. But sales through this market have been reduced because of high costs. The ten key export destinations for Kenyan tea, in descending order, are U.K. 24.86%, Pakistan 23.9%, Egypt 18.82%, Afghanistan 6.68%, Sudan 4.26%, Yemen 3.35%, U.A.E. 3.29%, U.S.A. 2.08%, Canada 1.75% and Poland 1.39%.

India, the world largest producer of tea ranks 13th among the tea exporters of Kenyan tea accounting for 0.96%. Sri Lanka, the world’s number one exporter of black tea ranks 21st among the exporters of Kenyan tea.

1.1.6 Nyeri district

According to the Nyeri District Development Plan 1997-2001, Nyeri is one of the districts of central province and it is situated between longitude 36 degrees and 38, East and between the equator and latitude 0 degrees and 38’ south. It borders Laikipia to the north, Kirinyaga to the west, Meru-North to the east. It has an area of 3,266 square kilometres. The district experiences equatorial type of climate with 2 rainfall seasons. Long rains are experienced between March and May and short rains from October to December. The higher slopes of Mt. Kenya and Aberdare ranges trap the moisture-laden winds hence the increase in rainfall. Mean and annual temperatures on the higher slopes of Aberdares are less than 13 degrees but rises to 17 degrees. The coldest months in the district are June and July where temperature falls as low as 8 degrees while hottest months are between January and March where temperatures rise up to 28 degrees. Rainfall and temperature have a strong influence on agricultural patterns in the district. The rainy seasons favour the growth of tea with the highest production during the two seasons.
According to K.T.D.A (2003) Othaya division is in Nyeri District. The division has five locations namely Iriaini, Chinga, Mahiga, Karima and Mumwe. The division is the richest growing tea region in the district. It has three factories out of 45 factories in the country these are Chinga, Iriaini, and Gitugi tea factories.

1.2 The Statement of Research Problem.

Tea is the leading foreign exchange earner contributing 28% of Kenya’s total exports.

Kenya produces 20% of the total marketed black tea in the world and ranks 2\textsuperscript{nd} after Sri-Lanka in tea exports and is the 3\textsuperscript{rd} world major producer of tea in the world after India and Sri-Lanka.

Small-scale farmers produce 59.7% of tea in Kenya. Successes in developing smallholder sub sector began to slow down in the 1990s. The average yield per hectare for smallholder farms, for instance, stagnated at about 2500kg of manufactured tea per hectare and sometimes declined.

This has been partly attributed to poor husbandry on farms and lower tea quality as a result of poor management of tea collection from buying centres to processing at the factory and poor infrastructure.

Despite the fact that the small-scale farmers grow tea on 76% of the total land under tea, they only account for 59.7% of tea produced in Kenya.

While the area planted by smallholder in hectares continues to increase, production in the sub sector continues to fluctuate (mostly declining).

| Planted area by sub sector in hectares and production in kilograms in Kenya. |
|------------------|---------------|---------------|---------------|---------------|---------------|
| Planted area     | 92,800        | 90,890        | 90,317        | 85,657        | 84,657        |
| Production       | 181,725,815   | 145,546,258   | 153,855,368   | 175,627,855   | 129,707,792   |

(Source - Tea Board of Kenya 2003)
Thus, a potential exists of increasing production on smallholder farms using the current area if the constraints facing the small-scale farmers are relaxed.

Studies in the areas of tea production are relatively few and limited in scope. There is no evidence of comprehensive study assessing the status of production of tea in Kenya. Etherington (1973) while looking at the production function for tea looked at land size, the climate, cultural practices in the farm, the distance from the farm to the buying centres and the hours spent in plucking tea. Oluoch-Konsura (1978) revisited the production issue and looked at labour cost as factor of production. Kiprop (1991) while studying the economic factors affecting tea farmers in Kericho pointed following challenges to be facing the small scale farmers: high cost of labour, low factory capacities, long distances to the buying centres, poor weather, and low technological advancement. Neither Etherington (1973) nor Oluoch-Konsura (1978) nor Kiprop (1991) has looked at the tea prices diseases and pests that are a challenge to the tea farmers, the management of the tea factories, the state of the tools (weighing bags and weighing machines) used at the buying centres, the distance from the buying centres to tea factories and the nature of vehicles used to transport the leaves to the factories. They also did not look at the services rendered by K.T.D.A extension officers to the farmers.

No study on challenges facing tea farmers in Nyeri which in 1998/99 produced a record of 15
million kilogram has been done and there has been no study that has been done in the recent past, with the most recent one having been done twelve years ago.

1.3 Research Objectives

The broad objective of this study was to establish the challenges facing small-scale farmers in Kenya.

The specific objectives were:

1. To investigate the challenges facing the small-scale tea farmers in Nyeri district.
2. To recommend possible solutions to the challenges.

1.4 Justification and significance of the study

From National Development Plans it is revealed that agriculture is the mainstay of the Kenyan economy and accounts for about one third of the Gross Domestic Product (G.D.P.). The tea sector in Kenya employs more than two thirds of the labour force accounting for approximately 70% of the total export earnings.

"More than 80% of Kenyans depend on agriculture for their livelihood.” Kirwa (2003).

The study will help:

- Farmers to: improve tea production thus increasing their earnings and improving their standards of living, generate employment and increase foreign exchange.
- The government in formulation of agricultural policies on tea production
- Key organisations in the tea industry identify the challenges facing the sub-sector.
- The researcher enhance her skill in the research field.
- Other scholars and researchers use the data gathered as a source of reference.
A few studies have been done on the tea industry in the less developed countries. An analysis of the smallholder tea production in Kenya was done by Etherington (1973) who derived a model for predicting the production function for tea. In his study he considered a set of explanatory variables to be the number of stumps of a certain area, land quality and quantity, farm microclimate, the present and past cultural practices in the farm, the distance to the buying centres, the man-equivalent hours sent in plucking tea on any farm in a given year.

Labour was considered as jointly determined by other inputs which management can embrace and therefore was not considered as an important explanatory variable in the production of tea.

The statistical yields he derived were better in predicting tea production when compared to KTDA predictions. He pointed out further that with technology advancement, fertilizer usage in tea production and vegetative propagation would only modify the production of tea. He also suggested that higher yields of larger tea farms are due to the skills of these farmers.

Small-scale farmers were faced with domestic constraints and poor infrastructure thus reducing their tea production levels.

Oluoch-Konsura (1978) revisited the production of tea in an attempt to include labour under the hypothesis that at the margin there may be some substitution between the labour and tea prices when analyzing the utilization in the smallholder sector. He found out that farmers who rely most entirely on hired labour with little supervision because of high absence of the owner tend to get relatively less output.

He contented that the relative cost of labour compared with tea prices may enhance the constraints of labour. He also asserted that the distance to the buying centres from the farms is not a constraint in tea production.
Some of the variables considered by Etherington (1973) and Oluoch –Konsura (1978) respectively such as distance to the buying centres and labour would be investigated in an attempt to determine their effects on tea production and also give general guidelines for the study.

Chowdhurry (1974) when reviewing the tea industry in Bangladesh points out that growers would supply more tea through coarse plucking and application of more intensive modes of cultivation and input usage such as fertilizer application in response to a price rise. Similarly, he argues that management was an important factor that influences tea yields very much. Farmers who took their tea to poorly managed factories had poor production levels as compared to those who were satisfied with the management of their tea factories.

Kiprop (1991) when reviewing the economic analysis of factors affecting tea production in the smallholder sector pointed out the tea farmers faced the following challenges: high plucking costs, poor transport system, and the annual processing factories capacity, the distance to the buying centres, the cost of fertilizers, cultural factors, weather conditions, low technological advancement over time and enterprise competition.

He found out that over time plucking costs have been rising relatively faster compared to tea prices which have seemed to stagnate. The distance to the buying centres, the costs of fertilizer and the man-hours per hectare variables were significant on explaining tea yields in the smallholder sector. This is because the tea received by KTDA is far below what a farmer could actually deliver due to many problems the farmer faces.

There was evidence that labour was a constraint in affecting tea yields in the smallholder.

In his study certain infrastructural facilities such as the factories capacity have been found to be the major challenges facing the tea farmers.
He recommends that the issues of transportation of tea could be solved if the smallholders were encouraged to form farmer’s cooperative unions, which have a banking facility for all tea growers. The farmers should be allowed to choose their leaders democratically.

Since hired labour was a challenge to the farmers, it could be made to stay for long periods in the farms if KTDA is urged to increase the number of plucking hours in the farms by buying and collecting green leaf more than once in a given day. Delay in payments to farmers was also a challenge he found out.

Kiprop (1991) did not look at the nature of weighing bags, the source of planting materials, the extension services the farmers got from KTDA and the diseases and pests that were a challenge to the farmers. These will be looked into in this study.

Gregory Bernad Nyombi (1977), in his study, “The establishment and growth of small holder tea industry in Tanzania,” attributed the poor production of tea to the recruitment of small holder tea growers which was undertaken by various officials and some of the methods used in recruitment were uncalled for and unsuitable, some tea growers cultivated tea on patterns that were not of their choice.

Farmers also faced problems of extension services because the tea grower’s agricultural training centres were neglected by the government, they were no incentives to tea growers, the few tea extension workers available lacked understanding of the objectives and policies of the government in as far as agricultural development and policies were concerned.

Gregory Bernad Nyombi (1977) did not look at individual farmers, as it will be done in this study; he looked at the ujamaa villages.

M.V.DE Silva (1972) in his study of smallholdings in Ceylon attributes the challenges facing the
farmers as poor soil conservation modes, lack of supply of good planting material, lack of supervision of pickers.

Economic conditions combined with insufficient attention to their holdings have been the chief causes of backwardness of the smallholder tea, leaf prices also hindered production.

M.V DE.Silva (1972) didn’t look at the nature of roads, the nature of weighing bags, factory management and the plucking costs. These are some of the factors that this study will look into.

Evans Ombiro (1996) gave the key challenges facing the farmers as extension service bottlenecks, the quality and availability of appropriate planting material, registration deficiencies, inadequate vehicles, and unreliable credit facilities. He also found out unfavourable climate as another factor, which reduces production.

However, problems linked to marketing have the greatest impact on production and general development of the sub sector. Marketing of tea determines the payment to farmers.

According to the Managing Director of K.T.D.A, Eustauce Karanja (1996), poor husbandry and harvesting practices are to blame for the low yields by smallholders and the low application of inputs. He says some farmers may not apply fertilizer the right way while others fail to apply any even when they have obtained it from KTDA.

Farmers are also experiencing a problem in paying the tea pickers. The farmers complain that the pickers take more than 56% of the pay.

He also found that the farmer also face a problem of genetic material of the clones that have been planted, majority of the farmers are still using old clones which they used during their first planting.

New growers had problems in registration at the factories where they had to walk for long distances to the factories.
Mwaniki (1996) found out that majority of farmers interviewed in Kiambu complained of low bonuses payments as the most contentious issue. Most demanded more explanations on how the amounts they were given were reached at. They also complained of the high taxes and poor states of the roads.

The farmers do not understand how the tax figures are reached or how the revenues are used. Farmers are also demoralised by the practice of cheating them on their actual deliveries. Insufficient factory processing capacity, and lack of enough vehicles for transporting leaf leads to tea rotting or loosing quality as corruption in some factories means farmers are denied the full benefits of their sweat.

Kipsang (1996) in his report, “Nakuru Tea produce drops by 15%” found that the farmers were faced with these challenges, which caused the reduction of tea production: poor roads in the district and inadequate tea factories. Due to poor roads and inadequate factories, most of the farmers had abandoned tea farming to venture into other viable economic activities.

Neither Mwaniki nor Kipsang looked into the nature of weighing bags, farmers’ satisfaction on the factory management, extension services rendered by staff from KTDA to the farmers and the diseases and pests that were a challenge to the farmers; these are among the factors that this study will look into.

Gitu’s (1998) report on 2020 vision network for East Africa (country note for Kenya.) outlined the following challenges to be facing the farmers in Kenya:
Unfavourable macroeconomic policies

The high explicit and implicit taxation rates as a result of overvalued exchange rates and inappropriate fiscal policies which lead to high inflation and interest rates have impacted negatively on the agricultural sector by reducing the farmers' earnings. The decline in government investments in agriculture has also reduced incentives for increased production.

Inadequate rural infrastructure

Agricultural production is particularly affected during the wet seasons when increased output is accompanied by reduced access to markets due to poor transport systems. This leads to on-farm wastage and reduced production by farmers in the subsequent season. Other infrastructure constraints include inadequate electrification, irrigation, and telecommunications.

High dependence on rain fed production

Kenyan agricultural production is largely weather determined to the extent that any year characterized by poor rains is also a poor agricultural year. There has been a low ability to exploit the availability of water and of land for irrigation estimated at about 320,000 hectares. Furthermore, although small-scale irrigation has proved to be useful particularly in horticultural production, the potential has yet to be fully exploited.

Access to inputs

The sector is not adequately served in the provision of inputs. Accessibility to purchasable inputs such as seeds, chemicals, and machinery is constrained by many factors, which include high costs and lack of funds. Access to land, which is a major primary input, is limited by inappropriate policies regarding ownership while access to water is limited by natural conditions and poor conservation and utilization policies.

Access to credit

The agricultural sector credit demand is estimated at approximately K£8 billion yet the sector
receives only 10 percent of the total lending in the economy with only 2 percent going to the smallholders, with a further bias towards the traditional cash crops.

**Low research priority**

Research and development geared towards production of more appropriate crop and animal production technologies has slowed down tremendously in the last 10 years. Agricultural research expenditure in Kenya is still below the 2% of agricultural G.D.P recommended by the World Bank. In addition, this expenditure is highly biased towards personnel costs rather than operational costs; the ratio of these costs was 79:21 in 1989/90 and not much change has occurred since.

**Poor coordination of policy reforms**

The implementation of policy reforms focusing on markets liberalization has been characterized by a stop-go stance, mistiming, and poor sequencing. This has created confusion and uncertainty on the part of producers and private-sector investors resulting in poor performance of the agricultural sector.

Wamalwa (2003) attributed the fall of the Nyayo Tea Zones Development corporation to mismanagement and corruption at the factories. He also said the workers were poorly paid thus lacking the incentive to work.
CHAPTER 3: RESEARCH METHODOLOGY

3.1 Target Population

The target population for the study were small-scale farmers in Nyeri. The target population size was 90 farmers but only 61 farmers were interviewed. This was due to poor means of transport and the heavy rains during the time of the study.

3.2 Sampling

Farmers were stratified by buying centres. From each factory random sample of buying centres were generated. From Gitugi a sample of three centres was used six farmers were interviewed from all the selected centres, from Iriaini tea factory a sample of 4 centres was visited whereby 5 farmers were interviewed from each, from Chinga a total of 4 centres were visited; from 3 centres a sample of six farmers was used while from one centre a sample of five farmers was interviewed. The computer was used to generate the random samples. The lists of the tea farmers from each factory and buying centres were obtained from the respective tea factories.

3.3 Data Collection

Both primary and secondary data were collected. Primary data was collected from field surveys using questionnaires, observations, and interviews.

The researcher and the research assistant administered the questionnaires to the farmers at the buying centres. Observation was done at the buying centres, at the collection points on the roads and at the factories by the researcher and the research assistant. Interviews were carried out where the farmers had a problem in the language used in the questionnaire. Otherwise, interviews were part of the questionnaire.
Secondary data was collected from the internet, library, government publications and publications of Kenya Tea Development Agency and Tea Board of Kenya. Secondary data for other tea growing districts was also used to remove bias.

3.3 Modelling and Data Analysis

3.3.1 Modelling

Determinants of tea production can be obtained using a simple relationship. The assumption is that tea production (T.P) is a function of: land planted (k), input and labour cost (l), infrastructure (r), tea delivery services (t), distances (d), management of the tea factories (m), KTDA services (s) and diseases and pests (p)

Expressed as an equation this becomes

\[ T.P = F(k, l, r, d, m, s, p) \]

It was thus expected that;

- The land planted with tea can be increased if infrastructure (r) is improved and the costs of inputs is reduced.
- Farmers’ satisfaction in the management of tea factories, efficient deliveries services at the buying centres and at the factories will boost the farmers’ morale in production
- Efficient and prompt services by KTDA will enable the farmers to control the diseases and pests and also meet the cost of labour and thus increase production
- Increase in the number of factories will reduce the distances from the buying centres to the factories thus preventing over deliveries in some factories

3.3.2 Data Analysis Techniques

Data analysis was done using both qualitative and quantitative methods. Frequencies and cross tabulations were used to analyze data using the SPSS computer packages.
CHAPTER 4: FINDINGS

This section presents the results according to the study objectives. Below is a model summary and a regression analysis.

Table 1: summary model

<table>
<thead>
<tr>
<th>Mod</th>
<th>R</th>
<th>R²</th>
<th>Adjusted R²</th>
<th>Std. Error</th>
<th>Change</th>
<th>R</th>
<th>Chang</th>
<th>F</th>
<th>df1</th>
<th>df2</th>
<th>Sig. F</th>
<th>Durbin-Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.34</td>
<td>.12</td>
<td>.04</td>
<td>.61</td>
<td>12</td>
<td>.150</td>
<td>5</td>
<td>.55</td>
<td>.20</td>
<td>1.74</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), common diseases and pests, number of visits to farmers by agricultural officers, factory, hectares of land, nature of
b. Dependent Variable:

The table above is a model summary of the findings. The standard error of estimate is 0.61. This means that the variables above are 61% significant to the production trend. At 1.73 level of Durbin Watson regression the dependent variables are thus significant to the independent variable.

The table below shows the coefficient of determination of each variable in the model.

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
<th>95% Confidence Interval for</th>
<th>Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
<td>Lower Bound</td>
<td>Upper</td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>-1.66E-4</td>
<td>.491</td>
<td>-0.034</td>
<td>.973</td>
<td>-1.000</td>
</tr>
<tr>
<td>hectares of</td>
<td>3.69E-4</td>
<td>.091</td>
<td>.059</td>
<td>406</td>
<td>.656</td>
<td>-1.145</td>
</tr>
<tr>
<td>nature of weighing</td>
<td>5.49E-4</td>
<td>.057</td>
<td>.063</td>
<td>950</td>
<td>.169</td>
<td>.180</td>
</tr>
<tr>
<td>distance from centres to factory</td>
<td>.177</td>
<td>.087</td>
<td>.285</td>
<td>2.026</td>
<td>.048</td>
<td>.002</td>
</tr>
<tr>
<td>number of visits farmers by officers</td>
<td>2.15E-4</td>
<td>.089</td>
<td>.035</td>
<td>241</td>
<td>.810</td>
<td>.157</td>
</tr>
<tr>
<td>common diseases pests</td>
<td>-8.18E-4</td>
<td>.158</td>
<td>-1.229</td>
<td>.224</td>
<td>-.213</td>
<td>.051</td>
</tr>
</tbody>
</table>

a. Dependent Variable: production

From the above table, we can derive a linear relationship from the model.

Pt=0.59L+.010b +.285d + 0.035v- 0.158dp

where L is the size of land, b represents nature of bags, d represents distance, v represents number of visits and dp represents diseases. From the table above an increase in the land size leads to a positive trend in production (an increase), an improvement in nature of weighing bags will lead to a positive trend in production, an increase in number of visits by extension officers
will lead to a positive trend in production while an increase in number of diseases will lead to a decline in the production trend.

**Production trend**

The table below demonstrates the production trend of tea farmers interviewed. Most farmers recorded a decline in the last three years as can be seen.

**Table 1: Production trend**

<table>
<thead>
<tr>
<th>production trend</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid declining</td>
<td>34</td>
<td>55.7</td>
<td>55.7</td>
<td>55.7</td>
</tr>
<tr>
<td>increasing</td>
<td>23</td>
<td>37.7</td>
<td>37.7</td>
<td>93.4</td>
</tr>
<tr>
<td>fluctuating</td>
<td>4</td>
<td>6.6</td>
<td>6.6</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>61</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

The declining trend had the last frequency as can be seen from the table. 55.7% of the farmers have recorded a decline for the last three years. Those who recorded a fluctuation had both the decline and the increase.

**Table 2: Land under tea**

The table below shows the land size under tea in the area.

<table>
<thead>
<tr>
<th>Hectare</th>
<th>frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above 2.1</td>
<td>9</td>
</tr>
<tr>
<td>1.5-2</td>
<td>11</td>
</tr>
<tr>
<td>0.5-1.4</td>
<td>25</td>
</tr>
<tr>
<td>0.25-.49</td>
<td>16</td>
</tr>
<tr>
<td>Total</td>
<td>61</td>
</tr>
</tbody>
</table>

From the table most farmers have planted their tea on a range of between 0.5-1.4 hectares.

The average land under tea was 0.95ha. This was beyond the KTDA set standard of
0.4ha. Thus, about 80% of the other land is left for other enterprises such as maize and livestock.

It was found out that 79% of the farmers surveyed had no intentions of increasing area under tea in their farms. As will be seen later in the study.

From secondary sources it was found out that those farmers with less than 0.4ha and between 0.5-1.4ha of land under tea realized better yields. This could be due to the ability of these farmers to use family labour. At this juncture it suffices to note that the level of tea output in the smallholder sector would depend on the percentage level of the farmers who fall under certain farm sizes. It also depends on the area under tea in each farm. This can be explained by the fact that those smallholders with smaller farm sizes or tea areas have adequate family labour which they can utilize more efficiently to produce more tea which would ensure secure financial situation for purchasing basic essentials and payments of other services.

As farm sizes with tea get bigger, the family labour becomes overstretched and unable to cope with tea operations resulting in lower tea yields although the farmers may be guaranteed adequate cash incomes for their domestic needs. On the other hand as the farm sizes with tea get bigger beyond a certain point, the tea yield per unit increases. This is due to the ability of the farmer to hire more labour to harvest tea.

**EXTENSION SERVICES**

Below is a table on the frequency rate of visits by the extension officers to the tea farms.

<table>
<thead>
<tr>
<th>number of visits to farmers by agricultural officers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>Valid</td>
</tr>
<tr>
<td>none</td>
</tr>
<tr>
<td>one</td>
</tr>
<tr>
<td>two</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

from the table above, about 40% of farmers had not been visited by the agriculture extension officers while the remaining 60% had been visited once. All the farmers have been attending field
days in their factories and sometimes beyond. The factories have made them compulsory and the farmers inattentitude have to register. They are also allowed to purchase processed tea for their families without showing their pay slips otherwise a farmer can only purchase the processed tea only once in a month on the presentation of their pay slip. The number of visits to the farms had been curtailed by lack of means of transport by the extension officers. Two factories had bought motorcycles for the officers but one factory was yet to purchase motorcycles.

The wood rot disease caused by poor pruning was found in 50% of the farmers interviewed. Farmers are taught how to prune by the extension officers during the visits. This calls for several visits and follow ups.

The table below shows the relationship between the number of visits and the presence of diseases.

Table 1: Relationship between the most common diseases and agricultural officers visits to farmers

<table>
<thead>
<tr>
<th>number of visits to farmers by agricultural officers</th>
<th>none</th>
<th>one</th>
<th>two</th>
<th>more than two</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>common root rot</td>
<td>10</td>
<td>5</td>
<td>2</td>
<td>4</td>
<td>21</td>
</tr>
<tr>
<td>wood rot</td>
<td>6</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>root rot + wood rot</td>
<td>5</td>
<td>7</td>
<td>2</td>
<td>2</td>
<td>16</td>
</tr>
<tr>
<td>scale insects</td>
<td>3</td>
<td>1</td>
<td></td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>root rot + scale insects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
<td>24</td>
<td>5</td>
<td>8</td>
<td>61</td>
</tr>
</tbody>
</table>

As can be seen from the table the lower the number of visits the, the higher the presence of the diseases in the farms.

CULTURAL PRACTICES OF TEA FARMERS

The cultural practices looked into in this study were the source of tea cuttings and the fertilizer usage by the farmers.
The table below shows the source of tea cuttings.

**Table 1: Source of tea cuttings**

<table>
<thead>
<tr>
<th>source of tea</th>
<th>Frequency</th>
<th>Percen</th>
<th>Valid</th>
<th>Cumulativ Percen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid farm</td>
<td>38</td>
<td>62.3</td>
<td>62.3</td>
<td>62.3</td>
</tr>
<tr>
<td>factory</td>
<td>23</td>
<td>37.7</td>
<td>37.7</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>61</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

From the table they were only two sources of planting materials - the factory and the farms. More than 62% of the farmers received their planting materials from their farms by establishing their own nurseries using materials acquired from the factories and from their own farms. The rest of the farmers got their cuttings direct from the factories at a fee. The farmers who had nurseries in their farms complained they could not afford to purchase a large number of cuttings at once on cash basis. They also used so much time looking after the nurseries, time which could have been saved if they got their cuttings direct from the factories.

Similarly almost all the farmers used the fertilizer N.P.K: 25:5:5:5S supplied by KTDA to them on credit. The issue of fertilizer has been made compulsory to the farmers by the factories. The fertilizer is supplied by KTDA on credit to every tea grower.

About 97% of the farmers pruned their tea in bushes after every three years. Although cultural practices are followed in most cases to the standard requirements by KTDA, the yields in this area are low compared to the smallholder in the neighboring districts like Kirinyaga and Embu.
FERTILIZER EXPENDITURE

The table below shows the farmers’ views on the price of fertilizer.

Table 1: Farmers’ view on price of fertilizer

<table>
<thead>
<tr>
<th>View</th>
<th>Frequency</th>
<th>percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expensive</td>
<td>36</td>
<td>59</td>
</tr>
<tr>
<td>Fair</td>
<td>16</td>
<td>26.2</td>
</tr>
<tr>
<td>Affordable</td>
<td>9</td>
<td>14.8</td>
</tr>
<tr>
<td>Total</td>
<td>61</td>
<td>100</td>
</tr>
</tbody>
</table>

From the table, cost of fertilizer was found to be a constraint to the farmers as most of them felt it was expensive even though it is availed to them on credit basis as can be seen from the study.

Of the farmers interviewed 59% felt that the fertilizer cost was on the higher side. 26.2% felt the fertilizer was fair while the remaining 14.8% felt it was affordable to them.

The table below shows the trend of fertilizer prices for the last three years.

Table 2: The trend of fertilizer prices

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost per bag in shillings</td>
<td>918.2</td>
<td>1040</td>
<td>1072</td>
</tr>
</tbody>
</table>

Source: Chinga tea factory

From the table the prices have been rising with time, the rise in price and the high labour cost have been caused a financial constraint to the farmers.

PLUCKING COST

It was found out that tea pickers are paid either kshs4.50 per kilo without lunch or shs4.00 per kilo with lunch. The payments have been rising steadily as compared to monthly tea payments.

Therefore the high plucking cost compared to tea prices erode the profit margin of the smallholder. The higher the relative rates of rise in plucking costs compared to prices, the less of
the hired labour the farmer would employ. Thus the farmer would then be forced to rely more on the family labour. This condition results in low tea harvest because family labour is not adequate to harvest all tea. Farmers are bound to lose a lot of crop. Conversely if the plucking costs are low, higher production levels would be expected since more labour can be employed in plucking tea leaves.

At kshs.4.50 the farmer gets only 40% of the monthly payments while the tea picker gets 60%. At kshs4.00 the farmer only gets 47% while the tea picker gets 53% of the tea monthly payments this not taking into consideration the food expenses the farmer incurs on the tea picker per month.

**DISTANCE**

Secondary sources used in the study showed that the distance to the factory has a negative impact on tea yields. If the buying centre is far from the farm, the farmers have to take their tea to the centre earlier than those just next to the factories. Thus the farmers have to leave their farms earlier so as to have their tea leaves collected by the lorries on time thus in effect losing the time that could have been used for plucking the tea leaves.

It is possible for those buying centres which are far away from the factory to reduce the number of days that they could have delivered tea to the buying centres in a week. Similarly, they have to lose hours when delivering their tea to the buying centres since KTDA requires that the leaf has to be in the factory within six hours of plucking given that these farmers have to walk for a distance to the buying centres.

The farmers located next to the buying centres have to wait for hours for their tea to be collected waiting for the lorry to come from the buying centres located farthest on their collection route thus wasting a lot of time. This time could have been used for other activities.
DISEASES

The study found out that farmers faced common diseases and one pest was reported for the first time in one region. These diseases reduce the farmers produce.

The table below shows the prevalence of diseases among the farmers interviewed.

Table 1: Common diseases and pests

<table>
<thead>
<tr>
<th>common diseases and pests</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid root rot</td>
<td>21</td>
<td>34.4</td>
<td>34.4</td>
<td>34.4</td>
</tr>
<tr>
<td>wood rot</td>
<td>14</td>
<td>23.0</td>
<td>23.0</td>
<td>57.4</td>
</tr>
<tr>
<td>wood rot + root rot</td>
<td>16</td>
<td>26.2</td>
<td>26.2</td>
<td>83.6</td>
</tr>
<tr>
<td>scale insect</td>
<td>5</td>
<td>8.2</td>
<td>8.2</td>
<td>91.8</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>8.2</td>
<td>8.2</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>61</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

From the table all the farmers interviewed reported at least one incident at which their tea had been affected by the above diseases or pest in the last three years.

From the table above the most common disease in the area is the root rot disease. This disease is caused by old stamps and roots beneath the soil on which tea bushes are planted. The disease has no cure and the farmer has to uproot the tea bushes affected. It causes the tea bushes to dry.

The wood rot disease is caused by poor pruning habits. The farmers are taught how to prune by the agriculture extension officers. This is a fungal disease caused by poor cultural practices especially where farmers use their knives for pruning, this they do due to lack of knowledge and ignorance. Lack of knowledge emanates from inadequate visits to farmers in their farms by the extension officers.

The scale insect was reported only in one region. It was the first time it was reported in Othaya.
TEA DELIVERY SERVICES

The table below shows the nature of weighing bags used in the factories.

<table>
<thead>
<tr>
<th>nature of weighing bags</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>19</td>
<td>31.1</td>
<td>31.1</td>
<td>31.1</td>
</tr>
<tr>
<td>torn</td>
<td>19</td>
<td>31.1</td>
<td>31.1</td>
<td>31.1</td>
</tr>
<tr>
<td>not enough</td>
<td>11</td>
<td>18.0</td>
<td>18.0</td>
<td>49.2</td>
</tr>
<tr>
<td>torn and not enough</td>
<td>21</td>
<td>34.4</td>
<td>34.4</td>
<td>83.6</td>
</tr>
<tr>
<td>well maintained</td>
<td>10</td>
<td>16.4</td>
<td>16.4</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>61</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

From the table only 16% of the farmers interviewed reported that their weighing bags were well maintained the rest were either torn, inadequate or both.

The lack of enough bags would make the farmers to scramble for them, each compressing the tea leaves in the bags thus causing leaves breakage and bruising while waiting to sell the tea leaves at the buying centres. This sets the process of fermentation and lowers the quality of tea.

The torn sacks pour the leaves on the way from buying centres to the factory thus reducing the amount of production of tea from those buying centres.

The inadequate space at the buying centres forces the farmers to spread their leaves on the ground making the floor congested forcing farmers to walk on other farmers tea. This bruises the leaves lowering the quality of the tea.

ROADS

The state of roads from the buying centres to the factories determines the time the leaves take to reach the factory. This also determines the number of hours the farmers spend in the farms. From observation none of the roads leading to the three factories is tarmacked and most of them are in poor conditions. This forces the lorries ferrying the leaves to the factories to spend more time on
the road thus they have to leave the farthest buying centres earlier. The poor state of roads and the torn bags lead to a lot of waste of leaves on the way.

In the regions west of the rift valley that is districts like Kisii and Keroka during the rainy seasons, the roads get so bad that the leaf vehicles sometimes get stuck in the mud or skip collecting the tea leaves. The lorries then have to come to the buying centres the following day to collect the overnight delayed tea leaves implying that if processed would result in poor quality made tea.

**PAYMENTS**

The most common problem among the farmers was financial constrain due to poor payments.

The table below shows the common problems the tea farmers are facing.

<table>
<thead>
<tr>
<th>Common Problems to Tea Farmers</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid payment</td>
<td>25</td>
<td>41.0</td>
<td>41.0</td>
<td>41.0</td>
</tr>
<tr>
<td>bags</td>
<td>17</td>
<td>27.9</td>
<td>27.9</td>
<td>68.9</td>
</tr>
<tr>
<td>disease</td>
<td>8</td>
<td>13.1</td>
<td>13.1</td>
<td>82.0</td>
</tr>
<tr>
<td>fertilizer</td>
<td>6</td>
<td>9.8</td>
<td>9.8</td>
<td>91.8</td>
</tr>
<tr>
<td>inadequate extension services</td>
<td>5</td>
<td>8.2</td>
<td>8.2</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>61</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

From the table payment was the most common problem the others were: inadequate and torn bags, the diseases, and the inadequate extension visits.

Payment was a major factor determining the production of tea.
The table below shows the reason as to why farmers will plant more tea.

**Table 2: Reason for the possibility of planting more tea**

<table>
<thead>
<tr>
<th>reason for above answer</th>
<th>farm size</th>
<th>poor pay</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>possibility of putting more land under tea no</td>
<td>24</td>
<td>24</td>
<td>48</td>
</tr>
<tr>
<td>yes</td>
<td>5</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>29</td>
<td>32</td>
<td>61</td>
</tr>
</tbody>
</table>

From the table the farm size and poor pay were equally given as to why farmers will not add more tea.

According to the quality of tea from each factory, the farmers are paid.

Payments are made twice. The first one is the monthly payment made uniformly in the whole country, currently at Kshs7.50 per kilogram. The bonus payment differs from factory to factory depending on the quality of tea from each factory.

The following table shows the last bonus payments in the area under study.

**Table 3: Factory payment rates**

<table>
<thead>
<tr>
<th>Factory</th>
<th>Bonus Payment per kilo in Kshs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gitugi</td>
<td>10.46</td>
</tr>
<tr>
<td>Iriaini</td>
<td>11.15</td>
</tr>
<tr>
<td>Chinga</td>
<td>12.50</td>
</tr>
</tbody>
</table>

To attain high quality tea, green leaf must reach the factory within a specified time after harvesting. Similarly strict cultural practices especially in plucking must be followed; and processing with modern machineries and packaging practices all contribute to having a desirable quality with flavor, strength, briskness and colour depending on the blender of tea. The quality attainment is tailored to capture the world market and the value attained from sales of tea would be reflected back to the smallholder in terms of the second payments.
The table below shows the 2\textsuperscript{nd} tea payment per districts

**Table 4: 2\textsuperscript{nd} payment to farmers per district**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Kisii</td>
<td>19.23</td>
<td>13.52</td>
<td>7.27</td>
</tr>
<tr>
<td></td>
<td>Kitale</td>
<td>16.38</td>
<td>14.00</td>
<td>9.13</td>
</tr>
<tr>
<td></td>
<td>Maragoli</td>
<td>16.38</td>
<td>13.48</td>
<td>7.74</td>
</tr>
<tr>
<td></td>
<td>Kericho</td>
<td>20.49</td>
<td>14.44</td>
<td>10.62</td>
</tr>
<tr>
<td></td>
<td>Embu</td>
<td>25.57</td>
<td>19.96</td>
<td>13.08</td>
</tr>
<tr>
<td></td>
<td>Kiambu</td>
<td>22.8</td>
<td>16.14</td>
<td>12.92</td>
</tr>
<tr>
<td></td>
<td>Nyeri</td>
<td>24.09</td>
<td>18.12</td>
<td>12.34</td>
</tr>
<tr>
<td></td>
<td>Meru</td>
<td>26.2</td>
<td>19.37</td>
<td>13.24</td>
</tr>
<tr>
<td></td>
<td>Kirinyaga</td>
<td>24.58</td>
<td>21.52</td>
<td>13.7</td>
</tr>
</tbody>
</table>

Source: KTDA Annual Reports and Statements of Accounts 2001/2002

From the table, the districts in the Western Rift Valley have been receiving relatively low 2\textsuperscript{nd} payments than those in the East of the Rift Valley. The poor payments in the west have been attributed to low quality which could in most cases is a factor of poor collection and transportation of tea leaves from buying centres to factories. These conditions are worsened by the inadequate annual factory processing capacity as can be seen from these tables.

The table below shows the capacity of the factories located west of the rift valley.

**Table 5: Factories west of the Rift Valley**

<table>
<thead>
<tr>
<th>Factories in Kericho</th>
<th>factory capacity (in kilograms)</th>
<th>green leaf received (in kilograms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tegat</td>
<td>10,000,000</td>
<td>12,125,364</td>
</tr>
<tr>
<td>Kapset</td>
<td>10,000,000</td>
<td>11,214,173</td>
</tr>
<tr>
<td>Mogogosiek</td>
<td>10,000,000</td>
<td>10,894,711</td>
</tr>
<tr>
<td>Letein</td>
<td>10,000,000</td>
<td>11,351,662</td>
</tr>
<tr>
<td>Kapkoros</td>
<td>10,000,000</td>
<td>11,162,582</td>
</tr>
</tbody>
</table>

Source: KTDA annual reports
From the table all the factories received above capacity. This indicates a loss of the capacity above.

The table below shows the leaf received and capacities of factories found in Othaya.

**Table 6: Factories in Othaya**

<table>
<thead>
<tr>
<th>Factories in Othaya</th>
<th>Factory capacity (in kilograms)</th>
<th>Green leaf received (in kilograms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iriaini</td>
<td>10,000,000</td>
<td>10,620,329</td>
</tr>
<tr>
<td>Gitugi</td>
<td>10,000,000</td>
<td>13,302,748</td>
</tr>
<tr>
<td>Chinga</td>
<td>10,000,000</td>
<td>16,341,247</td>
</tr>
</tbody>
</table>

From the table all the factories received above capacity.

The annual processing factory capacity in Kenya has been surpassed by green leaf delivered to each factory. The small factory capacity could sometimes be surpassed by the supply of tea from the buying centres. Thus calling for rescheduling of tea transport to nearby tea factories which in effect, reduces the volume of tea that could have been bought and brought from buying centres by that vehicle. It is possible for some lorries to have mechanical problems and as such affects the transport fleet. These factors reduce the actual tea output that could reach the factory.

Yield increase in Kenya can only be achieved through massive investments on infrastructure as well as reducing distances to buying centres to increase farmers’ harvesting time. Similarly improved infrastructure will lead to high quality tea to be produced which implies a higher producer price, a strong incentive in the factory.

The first payment is an important payment incentive because it determines the immediate amount of money the farmer has available for additional labour and his or her cash security. The smaller the amount of first payment the less labour the farmer would employ and would therefore use family labour. This limits tea production in the farm.
This discussion suggests that if payments are favorable, farmers would put more efforts to realize more yields. The efforts include the adoption of new technologies, hiring more labour for plucking tea and using recommended fertilizer. The farmers’ efforts in increasing tea yields are judiciously weighted against the costs and the tea prices involved in tea production. If the tea yields and annual tea payments are compared overtime the two are seen to be moving together. This shows that the current year’s tea output per unit hectare is determined by previous year’s tea payments.

The table below shows the impact of previous payment on the current production levels.

**Table 7: Payments and production**

<table>
<thead>
<tr>
<th>Year</th>
<th>Total annual payments in Kshs.</th>
<th>Production in kilograms</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996/1997</td>
<td>15.31</td>
<td>144,070,863</td>
</tr>
<tr>
<td>1997/1998</td>
<td>22.53</td>
<td>129,707,792</td>
</tr>
<tr>
<td>1998/1999</td>
<td>19.63</td>
<td>175,627,855</td>
</tr>
<tr>
<td>1999/2000</td>
<td>28.56</td>
<td>153,855,368</td>
</tr>
<tr>
<td>2000/2001</td>
<td>23.99</td>
<td>165,546,258</td>
</tr>
<tr>
<td>2001/2002</td>
<td>18.64</td>
<td>181,725,815</td>
</tr>
</tbody>
</table>

Source KTDA annual Reports

From the total annual tea payment is a function of first payments plus the bonus payment. The higher the previous year’s bonus payments, the higher that year total annual payments and the subsequent year’s yield. The converse occurs with previous years poor payments. This is so because farmers are anticipating the same bonus payments in the following year and could therefore use more or less of family or hired labour or both. The bonus payment tends to fill the gaps of cash security which are left by the 1st payment normally used for hired labour.

Investment on tea production would therefore depend on how the 1st payments are supplemented by the bonus payments to cover the major costs of tea operations and other social costs.
TEA PRICES

Tea prices affect production in that they affect tea payment.

The table below shows the prices for the last two years in dollars

Table 1: Tea prices in dollars

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2000/2001</td>
<td>2.11</td>
<td>2.10</td>
<td>2.11</td>
<td>1.97</td>
<td>1.98</td>
<td>1.92</td>
<td>1.87</td>
<td>1.72</td>
<td>1.67</td>
<td>1.44</td>
<td>1.46</td>
<td>1.43</td>
</tr>
<tr>
<td>2001/2002</td>
<td>1.53</td>
<td>1.48</td>
<td>1.39</td>
<td>1.38</td>
<td>1.40</td>
<td>1.43</td>
<td>1.46</td>
<td>1.50</td>
<td>1.54</td>
<td>1.49</td>
<td>1.39</td>
<td>1.45</td>
</tr>
</tbody>
</table>


From the table the prices of tea have declined from the prices last year.

On average tea prices declined during the period under consideration. The selling prices declined during the period above. The selling price dropped by 18.07% from Kshs.148.34 in the previous year to Kshs.121.53 in the year 2001/2002. There was a marginal increase in green leaf production of 0.5% this marginal increase is attributed to the favourable weather conditions.

The total payment to farmers declined by 21.95% from Kshs.17.2billion in the year 2000/2001 to Kshs.13.4billion in 2001/2002. This was a direct consequence of the decline of tea prices in the world market.

LAND AVAILABILITY.

The table below shows the reasons why farmers will not plant more tea.

Table 1: Reason for the possibility of planting more tea

<table>
<thead>
<tr>
<th>reason for above answer</th>
<th>farm size</th>
<th>poor pay</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>possibility of putting more land under tea</td>
<td>no</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>yes</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>29</td>
<td>32</td>
<td>61</td>
</tr>
</tbody>
</table>

from the table 48% of the farmers attributed the lack of land as a factor hindering them from adding more tea this is as a result of the population pressure on land which is highly felt in this region and most farmers have a limited number of options which are currently competitive to tea
production. Other than the dairy farming, the farmer will grow maize and beans for their consumption.
CHAPTER 5: SUMMARY, CONCLUSION AND RECOMMENDATION

The study has attempted to determine the major factors affecting tea yields in the smallholder sector and the major challenges the farmers are facing with a view of making some policy guidelines to increase tea yields.

The major challenges pointed out were torn and inadequate weighing bags, financial constraints due to poor payment, high cost of fertilizers, diseases, inadequate extension services to farmers and poor roads leading to the factories.

The tea prices were also significant in explaining the tea yields. This is because the tea received by KTDA is far below what a farmer could actually deliver due to many problems he or she faces.

There was evidence that labour cost was a constraint. Tea payments were found to have statistical significant effects on the farmers’ yields. The study noted that different payments rates in tea growing districts and recommended a mode of payment with less disparities in price differentials.

Infrastructure facilities such as poor roads, factory capacities have been a major drawback in the sector.

RECOMMENDATIONS.

- Hired labour could be made to stay for long periods in the farms if KTDA is urged to increase plucking hours in the farms by buying and collecting leaf more than once in a day.
- Untapped and misallocated labour will be used to increase tea yields if proper annual factories processing capacity is expanded.
- Issue of labour shortage in the sector could be mitigated if smallholder could utilize small motorized machines for plucking tea as they are time saving.
• Providing production, processing and marketing services a KTDA monopoly should be liberalized to allow many commissioned management agents however, guidelines must be set to prevent agents from exploiting farmers. This would ensure that farmers would have proper supply of weighing bags to match tea output from every buying centre and that the fertilizer was made cheap to the farmer. This could also see the expansion of buying centres to create more space for spreading the leaf.

• The factories should increase the number of collecting vehicles to avoid wasting time waiting for the lorries to come from the farthest centre in their route.

• Quality tea is intended capture the world market but other forms of tea blends could be tried to capture the eastern markets.

• Both private and public sectors should be encouraged to invest in new factories. Tea board of Kenya can help in identifying catchments areas where new factories can be established.

• A registered tea growers association completely separate from KTDA should be established to monitor the industry and protect the small scale farmer.

• Continuous maintenance of tea quality should be observed at all levels of production so that the present and future prices of tea which are dictated by the world market forces are secured for longer periods.

• KTDA should adopt a policy through which farmers are paid per their buying centres’ quality of tea instead of paying per the factory.

• The government should assist the farmers by adding funds to the cess funds to tarmack the roads from the buying centres to the factories.
• The number of visits to the tea farms should be increased. This will help reduce the disease.

Increase in production of tea is possible as the study found out that the prevailing weather conditions in the region is favorable even for commercial tea growing.
APPENDIX 1

REFERENCES


www.googles.com


Ombiro Evans. Daily Nation September 1996

Mwaniki Onesmus. Kenya times July 1996

QUESTIONNAIRE

Specimen letter to respondents

Dear respondent,

I am a student at Kenyatta University pursuing a Masters Degree in Business Administration.

I am carrying out a research on “Factors affecting the production of tea. A case of Othaya division of Nyeri district.”

This questionnaire is aimed at eliciting information, which will be useful in the above-mentioned research as a part of Masters of Business Administration Degree requirements.

You have been selected as one of the respondents in this study. The information supplied will be used strictly on academic purposes only and will be treated with utmost confidentiality.

Your cooperation will be highly appreciated.

Thank you.

Beatrice Kanani Githinji
Instructions.
Please provide the answers in the spaces provided by ticking [ ] where necessary and where other is provided please specify

1. To which buying centre and factory do farmers in your area take their tea
   buying centre ______________________
   factory ______________________
2. Approximately how many hectares of land have you planted your tea on
   ______________________
3. Where do farmers in your area get their tea seedlings from
   ______________________
4. Which pests and diseases are common in tea in your area
   Diseases ______________________
   pests ______________________
   ______________________
   ______________________
5. Which fertilizers, pesticides, and other inputs do you apply to your tea
   ______________________
   ______________________
   ______________________
6. Who provides these inputs to you
   K.T.D.A. [ ] [ ]
   Others (specify) ______________________
7. How would you describe the prices of fertilizers
   Affordable [ ] fair [ ] expensive [ ]
8. In a month how many visits do you receive from agricultural extension officers
   1 [ ] 2 [ ] more than 2 [ ] none [ ]
9. On average how many kilos do you harvest per week
   ______________________
10. Do you hire tea pickers
   yes [ ]      no [ ]

11. On average how much are tea pickers paid per kilo in your area

12. How would you describe your production for the last three years
   declining [ ]
   increasing [ ]

13. What would you attribute to the changes above

14. What is the nature of the weighing bags at your buying centre
   torn [ ]
   well maintained [ ]

15. What is the nature of the vehicles that collect tea from your buying centre

16. Are farmers satisfied with the management of your tea factory
   yes [ ]
   no [ ]

17. Please indicate reason for above answer

18. How far is your buying centre to your factory
   Less than 10 kilometres [ ]
   10 kilometres [ ]
   20 kilometres [ ]
   more than 21 kilometre [ ]
19. How would you describe the road from your buying centre to your factory
   poor [ ]       good [ ]

20. On average how much are you paid for each kilogram of tea delivered

21. Are you satisfied with the rate of payment you receive
   yes [ ]       no [ ]

22. After how long are you paid for your tea

23. Have you of late considered the possibility of putting more land under tea
   yes [ ]       no [ ]

24. Please give the reason for the above answer

25. Which problems do farmers in your area encounter in tea production

26. Which suggestions would you give to these problems
## APPENDIX 111

### PROJECT PLAN

<table>
<thead>
<tr>
<th>Phase</th>
<th>Description</th>
<th>Weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pilot study</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Adjustments</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Proposal writing</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>Data collection</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>Data coding</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>Data analysis</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>Report writing</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>Compilation</td>
<td>1</td>
</tr>
</tbody>
</table>

**Total** 12
# APPENDIX IV

## Time Table of events

<table>
<thead>
<tr>
<th>Phase</th>
<th>Description</th>
<th>Number of weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pilot study</td>
<td>1 week</td>
</tr>
<tr>
<td>11</td>
<td>Adjustments</td>
<td>1 week</td>
</tr>
<tr>
<td>111</td>
<td>Proposal writing</td>
<td>2 weeks</td>
</tr>
<tr>
<td>1V</td>
<td>Data collection</td>
<td>3 weeks</td>
</tr>
<tr>
<td>V</td>
<td>Data coding</td>
<td>1 week</td>
</tr>
<tr>
<td>VI</td>
<td>Data analysis</td>
<td>1 week</td>
</tr>
<tr>
<td>V11</td>
<td>Report writing</td>
<td>2 weeks</td>
</tr>
<tr>
<td>V111</td>
<td>Compilation</td>
<td>1 week</td>
</tr>
</tbody>
</table>
## APPENDIX V

### BUDGET

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount in Kshs.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Proposal cost</strong></td>
<td></td>
</tr>
<tr>
<td>Printing</td>
<td>960</td>
</tr>
<tr>
<td>32 pages @ ksh.30/=</td>
<td></td>
</tr>
<tr>
<td>Photocopy</td>
<td>300</td>
</tr>
<tr>
<td>5 copies</td>
<td></td>
</tr>
<tr>
<td>Binding</td>
<td>500</td>
</tr>
<tr>
<td>5 copies</td>
<td></td>
</tr>
<tr>
<td>Travelling expenses</td>
<td>2000</td>
</tr>
<tr>
<td><strong>Sub-total</strong></td>
<td>3760</td>
</tr>
<tr>
<td><strong>Project cost</strong></td>
<td></td>
</tr>
<tr>
<td>Travel</td>
<td>7000</td>
</tr>
<tr>
<td>Typing and Printing</td>
<td>4000</td>
</tr>
<tr>
<td>Photocopy</td>
<td>600</td>
</tr>
<tr>
<td>5 copies</td>
<td></td>
</tr>
<tr>
<td>Binding</td>
<td>2000</td>
</tr>
<tr>
<td>5 copies</td>
<td></td>
</tr>
<tr>
<td>Computer time</td>
<td>1800</td>
</tr>
<tr>
<td>30 hours @ ksh.60</td>
<td></td>
</tr>
<tr>
<td><strong>10% contingency</strong></td>
<td>1540</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td>20,700</td>
</tr>
</tbody>
</table>