

**ROLE OF LABOUR SUPPLY AND CREDIT ACCESS ON FOOD SECURITY IN
SMALL SCALE TEA FARMING IN KENYA**

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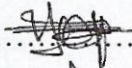
**A Thesis Submitted to the School of Business Management and Economics, in
Partial Fulfillment of the Requirement for the Award of the Degree of Master of
Business Administration of Dedan Kimathi University of Technology**

OCTOBER, 2013

DECLARATION

Candidates' Declaration

This is my original work and to my knowledge has not been presented for a degree award in any other University.

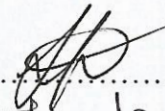
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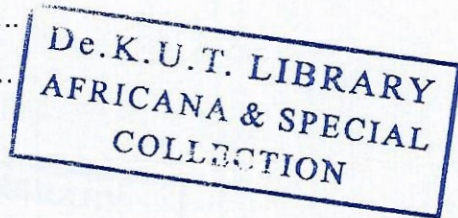
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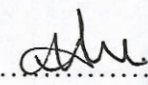
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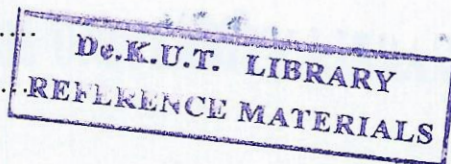
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DEDICATION

This work is dedicated to my dear family particularly to my wife Jane for her patience during the long hours she had to endure to allow me put up with my classes and studies. Thank you very much. To my sons Martin Gitahi and Evans Macharia, I appreciate your perseverance despite the harsh economic times as we shared the limited resources towards a shared family vision. God be with you all the time.

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ABSTRACT

The overall objective of the research was to analyze the role of labour supply and credit access on food security in small scale tea farming in Kenya. Labour supply and credit access were independent variables, while food security was the dependent variable and measured as a proportion of either income and/or consumption. The specific objectives of this study were both to evaluate the effect of labour supply by women and children and to assess the effect of credit access on food security among small scale tea farmers in Kenya. The study also analyzed the moderating effect of credit access on labour supply. A descriptive research design was employed in the study. Random samples were drawn from all tea growing Counties of Muranga, Kirinyaga, Nyeri and Kiambu strata which formed the sampling frame. A Proportion approach to sampling was utilized within the strata. A total of 65 respondents were picked through simple random techniques for each stratum using a table of random numbers. Both qualitative and quantitative data was collected from respondents. Data analysis was done through descriptive and inferential statistics. Content analysis was specifically utilized to analyze qualitative data. Statistical Package for Social Scientists (SPSS) version 19 was utilized to do the regression and correlation analysis with a 0.05 level of significance. Data interpretation and presentation was done through tables, bar graphs and pie charts. The results of the analysis indicated that both labour supply and credit access had a significant role in food security among small scale tea farmers at p value of 0.007 ($p < 0.05$). Among factors influencing both labour supply and credit access, only women labour, labour and non labour incomes and bureaucratic formalities were confirmed significant in the regression model. The coefficient of determination (adjusted r^2) indicated labour supply and credit access explain up to 23 % of factors affecting food security. Pearson correlation coefficient tests proved that the moderating effect of credit access on labour supply is not significant among small scale tea farming. It was therefore concluded that labour supply and credit access have a role in food security among small scale tea farmers in Kenya. Addressing the two variables by stakeholders in the sector should ensure tea sector performance improves and by extension reduces food poverty among the small scale tea farmers.

TABLE OF CONTENTS

Declaration.....	ii
Dedication.....	iii
Acknowledgement.....	iv
Abstract.....	v
Table of Contents.....	vi
List of Tables.....	x
List of Figures.....	xi
Abbreviations and Acronyms	xii
CHAPTER ONE: INTRODUCTION.....	1
1.1 Background of the Study.....	1
1.2 Statement of the Problem.....	5
1.3 Purpose of the Study.....	5
1.4 Objectives.....	6
1.4.1 Broad Objectives.....	6
1.4.2 Specific Objectives.....	6
1.5 Null Hypotheses.....	6
1.6 Justification.....	6
1.7 Assumptions of the Study.....	8
1.8 Limitation and Scope of the Study.....	8
1.9 Definitions of Terms.....	8
CHAPTER TWO: LITERATURE REVIEW.....	10
2.1 Introduction.....	10
2.2 Theoretical Literature Review.....	10
2.2.1 Structural Change Theory.....	10
2.2.2 Patterns of Development Theory.....	10
2.2.3 The New Growth Theory.....	11
2.2.4 Capabilities Approach Theory.....	11
2.2.5 Intra Household Bargaining Framework.....	11
2.2.6 Inter Household Bargaining framework.....	12
2.3 Empirical Literature Review.....	13

2.3.1 Introduction.....	13
2.3.2 Evaluation of Effect of Labour Supply	16
2.3.2.1 Effect of Gender, Women, Child Labour and Age	16
2.3.2.2 Effect of Wage Rate.....	18
2.3.2.3 Effect of Labour and Non Labour Incomes.....	18
2.3.2.4 Effect of Labour Migration	18
2.3.3 Assessment of Effect of Credit Access on Food Security.....	18
2.3.3.1 Effect of Credit Supply.....	19
2.3.3.2 Effect of Bargaining Strength.....	20
2.3.3.3 Effect of Bureaucratic Formalities.....	20
2.3.3.4 Effect of Asset Based Lending.....	20
2.3.3.5 Effect of Cost of Credit.....	21
2.3.3.6 Effect of Informal Tenancy Contracts.....	21
2.3.4 Analysis of Effect of Credit Access on Labour supply	21
2.4 Conceptual Framework.....	22
2.5 Operational Framework.....	23
2.6 Research Gap.....	24
2.7 Summary of Literature Review.....	24
CHAPTER THREE: RESEARCH METHODOLOGY.....	25
3.1 Introduction.....	25
3.2 Research Design.....	25
3.3 Target Population.....	25
3.4 Sampling Design.....	26
3.5 Data Collection Methods.....	27
3.6 Data Analysis.....	27
3.7 Ethical Considerations.....	29
3.8 Summary of Methodology.....	30
CHAPTER FOUR: DATA ANALYSIS AND PRESENTATION OF RESULTS...31	31
4.1 Introduction.....	31
4.2 Response Rate.....	31
4.3 Characteristics of Respondents.....	31

4.3.1 Respondents Mean Age and Gender Distribution.....	31
4.3.2 Respondents Mean Education Levels.....	33
4.3.3 Respondents Mean Labour Distribution.....	33
4.3.4 Respondents Mean Credit Access Levels.....	34
4.3.5 Respondents Mean Maize Production Levels.....	35
4.3.6 Respondents Mean Incomes from Tea.....	36
4.3.7 Respondents Mean Tea Income Expenditure Proportions	36
4.4 Results on Evaluation of Role of Labour Supply on Food Security	37
4.4.1 Results on Gender as a Factor of Food Security.....	38
4.4.2 Results on Age of Household Members as a Factor of Food Security.....	39
4.4.3 Results on Wage Rate as Factor of Food Security	40
4.4.4 Results on Labour and non Labour Incomes as a Factor of Food Security..	41
4.4.5 Results on Labour Migration as a Factor of Food Security	42
4.5 Results on Assessment of Role of Credit Access on Food Security.....	43
4.5.1 Results of Credit Supply as a Factor of Food Security.....	44
4.5.2 Results of Bargaining Strength as a Factor of Food Security.....	45
4.5.3 Results of Bureaucratic Formalities as a Factor of Food Security.....	46
4.5.4 Results of Asset Based Lending as a Factor of Food Security.....	47
4.5.5 Results of Cost of Credit as a Factor of Food Security.....	48
4.5.6 Results of Informal Tenancy as a Factor of Food Security.....	49
4.6 Results on Analysis on Moderating Effect of Credit Access on Labour Supply.....	51
4.7 Regression Model.....	53
4.7.1 Analysis of Variance.....	53
4.7.2 Mathematical Model Interpretation.....	56
CHAPTER FIVE: SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSION	
AND RECOMMENDATIONS.....	59
5.1 Introduction.....	59
5.2 Summary of Findings.....	59
5.2.1 Role of labour Supply on Food security.....	59
5.2.2 Role of Credit Access on Food Security.....	59
5.2.3 Moderating Effect of Credit Access on Labour Supply.....	59

5.3 Discussion of Results.....	60
5.3.1 The Role of Labour Supply by Women and Children on Food Security....	60
5.3.2 The Role of Credit Access on Food Security.....	61
5.3.3 Analysis of the Moderating Effect of Credit Access on Labour Supply.....	62
5.4 Conclusions.....	63
5.4.1 The Role of Labour Supply by Women and Children on Food Security....	63
5.4.2 The Role of Credit Access on Food Security.....	64
5.4.3 Analysis of the Moderating Effect of Credit Access on Labour Supply.....	64
5.5 Recommendation	65
5.6 Suggestion for Further Research.....	65
REFERENCES.....	66
Appendix I: Sample Frame by Tea Centre number.....	72
Appendix II: Kenya Tea Development Authority Registered Tea Factories in Kenya...	75

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LIST OF TABLES

Table 3.1 Sample Size Distribution by County	27
Table 4.1 Analysis of Variance Table on Role of Labour Supply in Food Security.....	38
Table 4.2 Analysis of Variance Table on Role of Credit Access in Food Security.....	44
Table 4.3 Correlation Coefficient of Credit Access on Labour Supply.....	51
Table 4.4 Correlation Coefficient of Credit Access on Labour Supply	52
Table 4.5 Analysis of Variance (ANOVA) Table for all Model Variables.....	53
Table 4.6 Analysis of Variance for Model Summary Table.....	54
Table 4.7 Table of Coefficients and Tolerance Levels.....	55

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LIST OF FIGURES

Figure 2.1 Conceptual Framework.....	22
Figure 2.2 Operational Framework.....	23
Figure 4.1 Age of Respondents in Years.....	32
Figure 4.2 Respondents Gender	32
Figure 4.3 Level of Respondents Education.....	33
Figure 4.4 Labour from Women in Food Production	33
Figure 4.5 Labour Children in Food Production	33
Figure 4.6 Labour from Women in Tea Production	34
Figure 4.7 Labour from Women in Tea Production	34
Figure 4.8 Proportion of Borrowers.....	34
Figure 4.9 Average Credit Borrowed.....	34
Figure 4.10 Credit Used in Food Production	35
Figure 4.11 Credit Used in Tea Production	35
Figure 4.12 Maize Production by Respondents	35
Figure 4.13 Respondents Income from Tea.....	36
Figure 4.14 Percentage of Income Earned From Tea Used in Household Food.....	37
Figure 4.15 Effect of Gender in Food Security.....	39
Figure 4.16 Effect of Age of Household Members in Food Security.....	40
Figure 4.17 Effect of Wage Rate in Food Security.....	41
Figure 4.18 Effect of Labour and non Labour Incomes in Food Security.....	42
Figure 4.19 Effect of Labour Migration in Food Security	43
Figure 4.20 Effect of Credit Supply in Food Security	45
Figure 4.21 Effect of Bargaining Strength on Food Security.....	46
Figure 4.22 Effect of Bureaucratic Formalities in Food Security	47
Figure 4.23 Effect of Asset Based Lending Policies in Food Security	48
Figure 4.24 Effect of Cost of Credit in Food Security	49
Figure 4.25 Effect of Informal Tenancy Arrangements in Food Security	50

ABBREVIATION AND ACRONYMS

The abbreviation and acronyms below will be utilized in the context of this study to mean as they are herein defined.

ASDSP	Agricultural Sector Development Support Program
ERSWP	Economic Recovery Strategy for Wealth and Employment Creation
GDP	Gross Domestic Product
HDDI	Household Dietary Diversity Index
KIPPRA	Kenya Institute of Policy Research and Analysis
KREP	Kenya Rural Enterprise Program
KTDA	Kenya Tea Development Agency
MAHFP	Months of Adequate Household Food Provisioning
MOA	Ministry of Agriculture
SACCO	Savings and Credit Co-operatives Organizations
SPSS	Statistical Package for Social Scientists
SRA	Strategy for Revitalization of the Agriculture Sector
UNDP	United Nations Development Program
WFT	Women Finance Trust

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Tea growing expanded fast among large scale estate farmers after it was introduced in Kenya in 1903 from India (Nyangito, 1999). Subsequent legislation that followed later resulted to establishment of the Kenya Tea Development Authority to promote small holder tea in the 1980's (Nyangito, 1999). This has resulted in large areas of the Kenya high potential and population density areas being put under tea with the intention of poverty reduction (Rono, 2005). Small scale tea growing which has been labour intensive has over shadowed food production such that most of the potential lands are currently taken over by tea (M'Imwre, 1999). These farmers have therefore resulted to dependence on tea incomes to meet their food security needs.

As a result of urban migration by men to seek off farm employment, women and children have become the main providers of labour on tea farms (Okinda, Mutuku, Wachira and Ogila, 2003). Similarly despite the growth in tea production volumes, incomes to tea households have not managed to address their food needs (Rono, 2005). The poverty eradication objective intended in the introduction of small scale tea farming has largely not been meet (Rono, 2005). The tea farmers have resulted to the aid from formal and informal credit sources to meet the household expenditure deficits (Mude, 2006).

The smallholder tea industry can be viewed as a complex value system (Bedford, 2002). The system interacts with other farm and off farm production systems to determine the strategic decisions by the house hold. The value chain analysis concept on competitive advantage (Porter, 1985) suggested that activities within an organization add value to the service and products that the organization produces. All these activities should be run at optimum level if the organization is to gain any real competitive advantage. If run efficiently, the value obtained should exceed the costs of running them. Michael Porter observed that value chains are part of a larger system that includes the value chains of other upstream suppliers and downstream channels and customers. Porter called this series of value chains the value systems.

The role of labour supply and credit access and its impact on food security forms the focus of this research. Credit and labour systems form part of the complex value systems that interact with the tea value chain. The credit value systems may be both formal and informal. While labour sources may be many and valid it has direct impact on the tea sub sector and the incomes thereof. Research has established that with the introduction of tea, the use of women labour has become an area of negotiation and tension particularly between wives' and husbands (Sorensen, 1990). Much has been done on the role of labour in agrarian societies in other parts of the world according to the World Bank. Not much empirical literature exists on the effect of labour with emphasis on women and children on food and nutritional security by small holder tea farmers in Kenya (Lagat, Ng'eno, Nyagweso and Korir, 2011). Credit access among smallholder tea also forms an area of concern given the poverty levels in this category.

Smallholders in tea trade needs to be treated separately since they are often entrepreneurs, employers, and workers themselves. Different types of smallholders have different expectations and concerns (Bedford, 2002). Their sheer number and geographical spread make existing social auditing technique difficult and expensive. Current social benchmark standards are of limited relevance or even potentially damaging to the smallholders. Socially responsible value chain management works effectively where the value chain is short and integrated or the supply base is narrow. In tea, value chains are long and weakly integrated which makes it difficult to implement socially responsible strategies (Bedford, 2002). It is important to identify what constitute good social performance, especially for smallholder tea (Bedford, 2002). Core labour standards may be relevant to an extent, but they do not cover other major issues such as land and environmental management. The criteria if used on issues touching on women, child labour and credit may also harm smallholders.

A study carried out in Kericho on structural adjustment programs on tea (Ongile, 1996) recommends that tea licenses should be given to women as well as men. It recommends that where the license is held by a male farmer his wife/s should receive part of the tea payment. The study suggested that female labour are an obstacle to adopting tea,

improving yields, and combining expansion of tea production with expansion in food production (Ongile, 1996).

Although the smallholder tea growers have been ignored by development agencies higher levels of poverty are prevalent according to Central Bureau of Statistics. The Central Bureau of Statistics reported cases of people living below rural poverty line to average at 50.3 % of those living in tea growing areas. Factors contributing to poverty among tea growers in Kenya are unknown. Intervention therefore must be based on salient facts which are reliable and predictive on the future (Nyangito, 1999). Collapse of other crop enterprises through persistent low farm gate prices however presents both challenge and lesson for the tea sector (Nyangito, 1999). Agriculture is the single most important sector in the economy, contributing approximately 25% of the GDP. It employs 75% of the national labour force as per the Strategy for Revitalization of Agriculture. It is instructive to note that a sizeable proportion of the rural labour force (over 51%) is engaged in small-scale agriculture. Women are the majority in this sector. It is in the rural areas that we find most of the hard core poor (Alemayehu, 2001). Agricultural performance slackened dramatically over the post independence years. It declined from an average of 4.7% in the first decade to below 2% in the 1990s. It culminated in a negative growth rate of -2.4% in 2000 and thus had far reaching implications in terms of employment and incomes, food security and poverty.

Tea growing in Kenya has expanded rapidly since its introduction in 1903 from India to become the country's leading export crop earner (Economic Review of Agriculture, 2007). It earned about Kenya Shillings 43 billion by 2006 increasing to 109 billion in 2011. Its earnings account for 4% of the country's Gross Domestic Product. The industry is composed of tea estates and the small holder growers (Nyangito, 2001). Tea growing in Kenya is in the countries highlands which has sufficient well distributed and reliable rainfall. The small holder tea farmers' produces 60% of the total tea produced in Kenya. This includes farmers who hold and manage less than eight hectares of tea farms (Nyangito, 2001).

The Kenya Tea Development Agency (KTDA) manages the small holder tea factories. Although small holder tea is reported as a leading export crop, high levels of financial and food poverty are prevalent (Nyangito, 1999). Kenya Central Bureau of Statistics 2005, reported cases of people living below poverty line (less US\$ 0.55) were on average 50.3% of those living in tea growing areas. It is generally viewed that in Kenya “Problems of smallholder tea started to emerge in the 1980’s due to the government intervention and KTDA institutional organization” (Nyangito, 1999). There was limited ownership and decision making by the small holder tea growers. These included reduced role in processing, marketing, and distribution of profit at factory level. However this failed to provide incentives to produce quality tea and reduce operational inefficiency. The liberalization process of 1999 had the sole aim of removing these constraints to industry growth. Increased tea productivity has been achieved through improved productivity and expansion. Poverty escalation among the small holder tea growers is however still high (Rono, 2005).

In related studies done in Kenya on labour use and gender perspectives to food security, men producing maize, beans and cowpeas achieve higher gross value of output per hectare than women (Saito, Mekonnen and Spurling, 1994). The difference is accounted for by the difference in input use. In western Kenya, female headed households were found to have 23% lower yields than male headed households. The difference was caused by less secure access to land and lower education levels (Alene, 2008).

A study in the same region on small holder farmers found out that women’s maize yield were 16% lower than men’s (Ongaro, 1990). This was explained by substantial use of less fertilizer. The two studies by Saito *et., al.* (1994) and Ongaro (1990) therefore agree on the issues of low production in women headed households.

Women enterprises comprise fewer than 10% of farmers involved in small holder contract farming schemes in the western Kenyan fresh fruit and vegetables export market (Dolan, 2010). The study argues that the growth of high value horticulture supply chains has been detrimental to rural women in Kenya. Land and labour resources traditionally

used by women to cultivate vegetables have been appropriated by men for contract export vegetable production. This environment being in a rural setting may explain in part the scenario in the tea farms.

1.2 Statement of the Problem

Farmers growing tea on small scale in Kenya depend on the crops income for their food security. This is due to the fact that most of the land is under tea leaving little land for food production. Small scale tea growing in Kenya however has not solved the food security problem among the tea farming households. This is despite the crop being a major source of livelihood among these farmers.

Both credit access and labour supply affect food and nutritional security under small scale tea farming. Though labour forms the main cost in tea management, the proportion of this cost to overall profitability is an issue of concern. This is especially so as it affects women and children who are the main providers of labour in tea industry yet they are the recipient of food and nutritional insecurity.

Credit supply has been growing among small scale tea farmers over time. While tea deliveries receipts are used by farmers as collateral on credit, these farmers have created dependence on the same credit. Therefore this research seeks to analyze the role played by labour supply and credit access on food security in small scale tea farming in Kenya.

1.3 Purpose of the Study

This study aims to establish the role of labour supply and credit access as the independent variables on food security in small scale tea farming in Kenya. Emphasis is made on labour supply by women and children to tea farms on their food security status. The study is expected to provide useful information to the players in the sector specifically for policy formulation purposes as relates to development of community programs. It will benefit the KTDA in development of strategies aiming at sustainable growth of the small holder tea sector. The stakeholders in the credit supply chain will find the report valuable in their strategies targeting small holder tea farmers for sustainable access to credit.

The Ministry of Agriculture will be able to gain new insight into targeting of the vulnerable in their food security programs. Finally the findings will provide useful guide to scholars and researchers who would wish to carry out further research in the sector.

1.4 Objectives

1.4.1 Broad Objectives

Analyze the role of labour supply and credit access on food security in small scale tea farming in Kenya.

1.4.2 Specific Objectives

- i. To evaluate the role of labour supply by women and children on food security among small scale tea farmers in Kenya.
- ii. To assess the role of credit access on food security among small scale tea farmers in Kenya.
- iii. To analyze the moderating effect of credit access on labour supply.

1.5 Null Hypothesis

H_{01} : There is no significant difference between the levels of labour supply by women.

and children on food security among small scale tea farmers in Kenya.

H_{02} : There is no significant difference between the levels of credit access on food security among small scale tea farmers in Kenya.

H_{03} : There is no significant difference on the moderating effect of credit access on labour supply.

1.6 Justification

There are 163,734 tea households in the four Counties of Central region. This population depends on tea incomes as a source of livelihood. Tea is the country's lead export crop earner as per the Economic Review of Agriculture. It earned about Kenya Shillings (Kshs) 43 billion by 2006 and accounted for 4% of the country's Gross Domestic Product. Research has established that with the introduction of tea, the use of women labour has become an area of negotiation and tension particularly between wives' and husbands (Sorensen, 1990). The central bureau of statistics, 2005 reported cases of people living below rural poverty line to average at 50.3 % of those living in tea growing areas. Although small holder tea is reported as a leading export crop, high levels of

financial and food poverty are prevalent (Nyangito, 1999). Poverty eradication objective intended in the introduction of small scale tea farming in Kenya has largely not been met (Rono, 2005). Small scale tea farmers have resulted to dependence on formal and informal credit sources to meet the household expenditure deficits (Mude, 2006).

Policies on commercialization of agriculture have assumed that cultivation of cash crop would guarantee improved food security and subsequent reduction in poverty (Rono, 2005). It has been observed that most communities in Kenya growing cash crops are currently struggling to put food on the table, (Rono, 2005). At least 70% of tea farmers in sample area depend on farm incomes to sustain their food security needs according to Ministry of Agriculture reports. Gender studies have also shown that women are the main workers on the farm in areas growing either food crops or cash crops. However it is men who mainly have access to collateral needed to access credit (Ndegwa, Muthoka, Gathambiri, Kamau and Wacui, 2008). The access and control of farm resources among women is therefore limited. Research has established that the link between nutrition and poverty has not been strongly explored (Mukui, 2003). There is need to establish how labour supply affects food security situation among small holder tea farmers (Langat *et al.*, 2011).

Credit supply among tea farmers has factored mainly farm inputs supply for tea nutrition especially among marketing organization as KTDA. There are other numerous sources of credit accessible to farmers that are both formal and informal. Credit supply is expected to play a positive role in agricultural growth. The impact on this credit needs to be re-evaluated especially as it relates to food security needs of small holder tea farmers. A shift from food production for home consumption to cash crops presents a better opportunity to peasant's households to increase their income and household dietary needs (Rono, 2005). However persistent negative poverty indicators coupled with poor household nutrition underscores the need to identify the underlying causes.

1.7 Assumptions

It is assumed in this study that the respondents selected will comprise women in the household and will be accessing credit services supplied in the market and are also among the category constrained by labour supply.

1.8 Limitation and Scope of the Study

The study is expected to cover a wide area which possibly cannot be covered within the time limit and resource consideration. To address this, the target population will be focused on four counties out of the tea growing Counties in Kenya. In an effort to address failure by some respondents failing to respond to the study, advance briefs will be made through the tea extension officers under the KTDA who are likely to be more close confidants as they handle the tea farmers direct at the tea collection centers. The scope of this study will be limited to labour supply and credit access as independent variables with food security as the dependent variable. The respondents will be limited to small scale tea farmers with emphasis to women and child headed households in Murang'a, Kiambu, Kirinyaga and Nyeri Counties.

1.9 Definition of Terms

In the context of this study the terms below will be construed to mean as they are defined here below.

Bureaucratic Formalities: Bureaucracies' are very organized with high degree of formality in the way they operates. Refer to conditions or quality of being formal in accordance with required or traditional rules, procedures, conventionality and rigorous methodical character.

Credit Access: In the context of this research the term credit access shall be construed to mean the amount of credit respondents are able and willing to borrow for use in farm activities.

Credit Supply: Credit supply shall mean credit available in the market both in cash or kind and which can be easily accessed by respondent on willing buyer and seller basis.

Food Security: Exists when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life. It is defined as including both physical and economic access to food that meets people's dietary needs as well as their food preferences.

Household Dietary Diversity Index: Number of different foods or food groups consumed over a given reference summed through the food groups consumed (reference period, 7-8 days).

Labour Supply: In the context of this research labour supply shall be construed to mean amount of labour available in the market for farm activities.

Months of Household Adequate Food Provisioning (MHAFP): The ability to acquire sufficient quality and quantity of food to meet all household members' nutritional requirements for productive lives. It utilizes proxy indicators to measure MHAFP.

Respondent: Refers to women and children headed households in the context of this study who also are main supplies of labour in small scale tea farms.

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CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The literature review as covered in this chapter addresses both the theoretical and empirical literature in support of this study. It explores the theories in development in the field of labour, credit and incomes and anchors the empirical data from research done in other studies elsewhere in Kenya and the World over. The chapter also covers both the conceptual and operational framework that will guide the study.

2.2 Theoretical Literature Review

2.2.1 Structural Change Theory

In developing regions of the world there has historically been a high proportion of the economic sector devoted to subsistence agriculture. This is as compared to the industrial and service sectors which need to be developed. To explain this problem, development theorist began to focus on the structural change of these economies. They came to the conclusion that underdeveloped economies would benefit from changing their economic structures from one that places a focus on subsistence agriculture to a more modern, urbanized, and industrial and service oriented economy. To accomplish this, structural change theorists such as Arthur Lewis used the tools of neo-classical price and recourse allocation theories along with concepts of modern econometrics to decide how a shift such as this would eventually take place.

The basic idea of Lewis' Model is that the accumulation of capital and increased output will lead the modern sector to what Lewis describes as "self-sustaining growth", which will lead to employment expansion in the modern sector up until the point that all of the surplus labour from the rural sector has been transferred to the modern sector (Todaro, 2003). Lewis also accounts for two other factors that cause an increase in the supply of unskilled labour, they are women in the household and population growth. Surplus labour can be used instead of capital in the creation of new industrial investment projects, or it can be channeled into nascent industries.

2.2.2 Patterns of Development Analysis Theory

Another theory from the structural change theory school of thought is that of patterns of development analysis. Hollis Chenery was the main architect of this way of thinking

about development. Like the above mentioned Lewis model, the patterns of development analysis focuses on the process by which a developing economy shifts from a mainly agricultural economy to a more modern one allowing for new industries to take over the burden of economic growth. The difference however is that unlike the Lewis model in which savings and investment are the cornerstone, the patterns of development theory goes further to explain how virtually all economic functions need to be examined. This is in order to undertake a transformation, not just the accumulation of physical and human capital. These include transforming production, changes in the composition of consumer demand, trade institutional constraints, resource use and even changes in the socioeconomic realm in terms of urbanization and population distribution (Todaro, 2003).

2.2.3 The New Growth Theory

New growth theory brought with it a change of thinking from looking at development in simple economic terms to looking at the future of regions all together. The theory keeps the market reforms of other development theories and practices but adds seven points of focus when looking at development, one of which is a strong focus on poverty. New growth theory looks at the concepts of poverty alleviation, development that is not just successful in the short term but also is sustainable in the long term, its' effectiveness and accountability. New Growth theory is based on empowering the individuals in society.

2.2.4 Capabilities Approach Theory

A theory that deals specifically with empowerment is the capabilities approach by Amartya Sen. To Sen the key to his approach is defining capability itself. Sen describes capability as a persons' effective freedom to achieve very valuable states of beings and doings, the value to achieve important functioning's and as well the person's ability to forgo such functioning's if they so please.

2.2.5 Intra-Household Bargaining Framework

In the framework, child labour is an outcome of an optimization process. It places different weights on household members, for example children and the parents. The mother is considered to altruistically care for the children and the father to care for himself in addition to the family. The weight that each member receives can depend upon

his or her contribution to the family's resources. Collectively, child labour may be desirable as it contributes to the family income. It may also be desirable to the child because it increase his or her weight in the family decision function. Within this framework, the key variables are those that determine the relative bargaining strength of different members of the household. This could include wealth, the number, age, and gender of children, and earnings.

2.2.6 Inter-Household Bargaining Framework

The inter-household bargaining framework considers each household as a unitary entity. The motivation behind this approach is that women and children's bargaining power is inherently very limited. The parents and the employer bargain about the child's wage and the fraction of that wage to be paid as food to the child while women are disadvantaged as opposed to men. Within this framework, the key variables are those that determine the relative bargaining strength of the household vis à vis the employer. These also include household wealth variables, but also variables such as the access to credit.

The unitary model of the family, (a la Becker, 1964) is best suited to understand the role of borrowing constraints as a determinant of women and child labour. The basic intuition is that child labour creates a tradeoff between current and future income (Baland and Robinson, 2000). Putting children to work raises current income, but by interfering with children's human capital development, it reduces future income. The future income is realized by the children and not the parents.

The approach suggests that credit should be a factor that predicts the incidence of child labour to the extent that child labour competes with schooling in the time allocation decision. Jacoby (1994) examined the relationship between borrowing constraints and progression through school among Peruvian children. He concluded that lack of access to credit perpetuates poverty because children in households with borrowing constraints begin withdrawing from school earlier than those with access to credit.

Credit market imperfections represent an important source of inefficiency for the allocation of household resources to human capital investment (Baland and Robinson,

2000; Ranjan, 2001). This model implies that income does not matter as much if complete credit market exists. Economic theorists have been debating for decades on how much intervention should governments be imposing on the economic activities of society?. An Australian economist Fredrich Heyek believes that markets and markets alone should make economic decisions. Liberals such as John Maynard Keynes argue that it is necessary for governments to intervene in spheres that were not adequately addressed by the markets.

2.3 Empirical Literature Review

2.3.1 Introduction

Kenya has made marginal progress towards elimination of hunger according to global hunger index 2009. The report associates vulnerability to hunger with poverty and gender disempowerment. These may include credit access, food security and resource use.

A Study in Nandi South (Langat *et. al.*, 2011) proposed further research on “the impact of house hold labour with emphasis on women and children on the nutritional and households food security”. This research established that social economic factors have significant influence on household food security among small holder tea farmers. It also established that “House Hold Dietary Diversity Index (HDDI) was positively correlated with the scale of food production. HDDI had no significant correlation with scale of tea production or farm incomes (Langat *et. al.*, 2011). Food and nutrition security is influenced from literature by five broad variables (Langat *et. al.*, 2011). This can be categorized as below

- i. Supply side factors.
- ii. Household level characteristics.
- iii. Production characteristics.
- iv. Household resource allocation among enterprise.
- v. Environmental characteristics.

The effect of all supply side factors that includes scale of food production, gender of household head, education level of household head, the employment income, off farm Income, and farm geographic location have been determined. There is little empirical

evidence available in support of the effect of labour by women and children as supply side factors to household food and nutritional security (Langat *et. al.*, 2011).

Household dietary diversity index (HDDI) was found to have a positive correlation with the land size on maize and output (Langat *et. al.*, 2011). Months of household adequate food provisioning (MHAFP) also had positive correlation with tea income, output of maize and tea and their respective land sizes. Factor that were influencing household food security were land productivity, off farm income and land allocation to maize and tea. Others were household characteristics as education, gender, and employment. Optimal allocation of land between tea and maize production was found to guarantee household food security (Langat *et. al.*, 2011).

Langat *et. al.*, (2011) concluded therefore that strategies aiming at increasing household food security should therefore target increased access to inputs for food production and productivity of land and income diversification. This study lays emphasis on the existing gap in order to analyze the effect of both labour supply and credit access to determine their effect on food security.

Poverty problem generally goes beyond income measures. There is a relation between general poverty and the level of food poverty according to the United Nations definition. Poverty is multi dimensional and includes deprivation in knowledge, in life expectancy and quality of life. Poverty usually manifests itself in hunger, malnutrition, illiteracy, lack of shelter and failure to access essential social services such as basic education, health, water and sanitation (National Poverty Eradication Paper, 1999-2015).

Research on effect of agricultural specialization on quantitative poverty dynamic (Barrette ,Marenya, Minten, Oluoch and Wangira, 2006) confirmed generally low exit rates of poverty in Kenya. There was no evidence that rural poverty exit was correlated with agricultural activities, agro ecological potential or agricultural market access. Poverty determining factors included geographical location, family size, remittances and

access to credit and is associated with rural upward mobility (Brown, Stephen, Ouma, Muriithi and Barrette, 2006).

Small holder farming plays a crucial role in food production for both rural and urban population and remains a major source of income, employment and export earnings (Krishna, 1977). This seems to be evident in food production systems in most rural Kenya with decreasing emphasis among small scale commercialized coffee and tea mixed farming.

Research has indicated that “Despite household engaging in market production, they still experience a decline in food consumption and nutritional status” (Bear, 1984). Households who shift to commercial crop production realize incomes but household nutritional status does not improve considerably (Stockbridge, 2007; Kennedy, 1988). Despite a significant improvement in household incomes, commercialization of subsistence economies could dramatically challenge household food security through increased child labour, gender roles and land tenure” (Stockbridge, 2007).

High poverty levels in subsistence farming systems in Kenya have been contributed by the input costs, inflation and produce prices. Others are tenure, market, post harvest losses, technology, age and higher dependency (Batiano , Kemetu, Ikerra, Kimani Magedi and Sangigo, 2004). A number of avenues exist in improving farmers’ welfare by targeting maximization of returns from tea enterprises. The factors that may be targeted for improved returns from tea include tea productivity, population control and improved green leaf prices (Mwaura and Ogisa, 2007).

The provision of financial services in the rural areas of Kenya has historically been the role of marketing co operatives based on cash crops such as coffee, tea, dairy among others. With the gradual liberalization of marketing systems this sector has faced significant challenges. A major area of growth is the emergence of Front Office Services (FOSA). Formal banking liberalization has resulted in services being out of reach. Micro finances are trying to find their way into the operations of other financial institutions such as the Co-operative Banks, Equity Bank and Family Finance. There is evidence of extensive and increasing use of informal sector groups’ mechanisms in Kenya (Johnson,

2002). Evidence from Central Province indicates that women regularly make use of merry go round (ROSCA's). Over 45% are in at least one and some using as many as five (Kimuyu, 1999; Johnson, 2002).

2.3.2 Evaluation of the Effect of Labour Supply by Women and Children on Food Security among Small Scale Tea Farming in Kenya

Farm labour is a major source of employment opportunity for the rural labour force. Research conducted in South Africa indicated that declining farm labour supply is compounded by the fact that agricultural sector has the worst poverty conditions (Reuben and Van der Berg, 2001). Other studies indicate that shortage in farm labour supply results in low productivity. This is a major problem in developing countries (Gebremedhin and Switon, 2001).

2.3.2.1 Effect of Gender, Women, Child Labour and Age

A study by Food and Agricultural Organization (FAO) confirms that women have more difficulties than men in gaining access to resources such as land, credit and productive resources. Similar conclusions are made in a related study in Ethiopia (Kaske, 2009). The majorities of women in developing countries fall within the small scale subsistence sector. They farm and produce more than 80% of the food for the sub Saharan Africa (Irvine, 1996). Similarly women are the busiest people in the world; however they find time to grow half of the world's food requirements (FAO, 1993). Women are also described as the invisible agricultural producers in peasant society (Ellis, 1993). Nearly 85 % of women labour is spent in farming, which includes crop production and animal husbandry (Yeshe, 1997). Women in Ethiopia for example play multiple and overlapping roles, which have increasingly put pressure on their health, food security, productivity and potential contribution to improved human welfare and economic development (Senait, 2000).

Empirical studies have found evidence suggesting that households that are credit constrained increase child labour hours in response to economic shocks. Women and children constitute the bulk of farm labor especially in smallholder agriculture. Children in households that borrow for household enterprise were more likely to work than children in households that did not borrow according to a study done in Peru (Ursula,

2006). The study found the opposite effect on relationship for households that borrowed for the farm. The result of this study suggests that micro enterprise loans may cause children to be drawn into credit stimulated household enterprises.

Women enterprises comprise fewer than 10% of those involved in small holder contract farming schemes fresh fruit and vegetables export in western Kenya (Dolan, 2010). In a different study it was indicated that small holder tea was established with the hope that family units would manage their farms (M'Imwre, 1999). Indeed most of the decisions on the small holder tea farms are made by the key members of the family unit, mainly men and women (Owuor ,Karui and Side, 2005; Kavoi , Oluoch, Owuor and Siere, 2003).

The main use of labour in the tea farms is harvesting. Although most small holder tea farmers use male and female workers, there are some farms hiring females only as they are easier to control (Okinda *et. al.*, 2003). Women therefore play a vital role in tea production in Kenya. Unlike hired labour females are dominant source of family labour and with much support from the children. The small holder tea farmers in general are unwilling to subdivide the tea holdings to their children past high school age (Kavoi *et. al.*, 2003). In district where there are fewer alternatives to tea however the labour use efficiency is high (Kavoi *et. al.*, 2003). In retrospect, a lot of research has been done in the tea sub sector as pertains poverty and food security. Not much empirical research however has been focused on labour by women and children in Kenya (Langat *et al.*, 2011).

A study on factors affecting rural household farm labor supply in South Africa (Francis, 2011) concluded that farm operators years of farming experience was positively correlated with labour supply. Old and experienced farmers preferred to work on the farm rather than seek off farm employment. The result suggested that experienced farmers would increase their expected supply of labour by 11.1% for every unit change of farm labour supply. The number of prime age persons working off farm in the household had a negative effect on the total labour supply. According to Anderson (2002) the decision to work on or off farm by a prime age household member depends on the household

composition and behavioral participation of other family members. The same study indicated a positive and significant relationship between gender and farm labour supply.

2.3.2.2 Effect of Wage Rate

The real wage rate was shown to have a negative effect on farm labour supply according to Francis, (2011). The study indicated low farm employment at higher real wage rate. Similar relation has been obtained by a study in India (Goodwin and Mishra, 2004; Kanwar, 1998). The extent to which rural households seek off farm and not on farm employment is therefore dependent upon non-farm wage.

2.3.2.3 Effect of Labour and Non Labour Incomes

Off farm employment of farm household members is an important phenomenon throughout the world. It seems to alter farm labour supply (Anderson, 2002). In rural Sudan studies indicate that men migrate to urban centers' and cities in search of job opportunities (Babikir, 2007). A study by Krishna (2004) and Kristjanson (2004) emphasized the importance of income diversification. They emphasized strategies on diversification out of agriculture into additional off farm income but also into livestock that are beneficial to poverty exiting households.

2.3.2.4 Effect of Labour Migration

According to Ahearn, El-Osta and Dewbre (2006) individuals household who have recently moved into a farming community are more likely to be involved in off farm rather than on farm work. They are also slow in adopting any recommended technology in the area. Several factors may affect labour migration among which includes macro and micro conditions. This may include national unemployment rates, land tenure issues, existence of micro climate factors for specific crops that need intensive labour during peak seasons in some areas.

2.3.3 Assessment of the Effect of Credit Access on Food Security among Small Scale Tea Farming in Kenya

Agricultural savings and credit societies (Sacco's) were hailed as the perfect channels for raising savings in rural areas deserted by mainstream banks in the retrenchment and restructuring wave of the late 1990's (World bank, 2008). Five years down the line, poor lending decisions and poverty have made it difficult for the lenders of small scale farmers

(Mude, 2006). Agricultural Saccos' are now prevalent in tea growing areas where farmers have regular monthly income before the final payment for the year (Bonus).

2.3.3.1 Effect of Credit Supply

There are several recurring problems with financial services especially credit, which appears in the empirical literature. One is that credit is only advanced for the contracted crop whereas farmers may need the money to settle non crop expenses like school fees. This has been found to be a major complaint amongst coffee farmers in Kenya who have taken loans to finance non coffee expenditures (Nyoro and Whittaker, 1986). The author suggests that this will happen whether it is officially sanctioned or not, so it is better to build it into the system for providing credit services. In Pakistan, credit was found to be an important instrument as it enables farmers to acquire command over the use of work capital, fixed capital and consumption goods (Saboor, Maqsood and Madiha, 2009). The study established that credit plays an important role in increasing agricultural productivity. Timely availability of credit enables farmers to purchase the required inputs and equipment for farm operations.

Micro credit enabled farmers in Ogun State, Nigeria to buy inputs they needed to increase their agricultural productivity. However the sum of credit obtained by the farmer did not contribute positively to the level of output (Nosira, 2010). This was a result of non judicious utilization, or distraction of credit obtained to other uses apart from the intended farm enterprises. Dantawala, (1989) estimated the demand or Access and supply of credit and its role in poverty alleviation in India. He emphasized on supply of credit and an increase on technical assistance to farmers in order to increase agricultural productivity.

Money lending is present and growing but relative to the volume of funds in the informal sector groups appears to be much less important (Johnson, 2002). At the same time there is evidence in the form of managed merry go round (RASCA) programs (Johnson, 2002) with some 27,000 women participating in them. These programs involve a private company management service groups funds for a fee, so offering a more sophisticated set of services which at the same time offering a greater confidence.

2.3.3.2 Effect of Bargaining Strength

Farmers are often trapped into a debt cycle due to deterioration debt situation. Growers do enter into contractual arrangement with financial institutions and end up into such condition due to variable interest terms. This forces the borrower to stick to same financier despite other options or in financial managerial mercy or agribusiness normalization (Glover and Kusterer, 1990). Farmers who specialize on fewer enterprises tend to perform with more efficiency. Developing production and marketing expertise needed for profitability offer farmers a competitive edge (Bucheneau, 2003). Developing enterprise cash flows is essential as indicators of debt capacity. The lower bargaining strength however of small farmers vis avis the large farmer inhibit access to credit from formal institution. Dominance of large farmers in decision making bodies of farmer institutions appears to influence the disbursement in their favour (Adams, 1985).

2.3.3.3 Effect of Bureaucratic Formalities

The borrowers' time, travel expenses and costs incurred for getting a guarantor or a consigner can be substantial. Many small and new borrowers are required to visit the formal institutions several times to negotiate the loan, withdraw a part of the loan, and make payments in installments according to a study on credit constraints done in India (Francis, 2011). The visits often involve waiting hours and travel time. Bureaucracy discourages borrowers especially new of small scale farmers.

2.3.3.4 Effect of Asset Based Lending

It is widely acknowledged that the risk factor is an important component in determining whether a farmer will access finance. A number of studies have emphasized the role risks aversion plays in slowing down the adoption of new technology. Small scale farmers have no margin of error because there is little or no production surplus. Crop failure or death of animals may be a disastrous loss according to Robert Chambers (Roling, 1985).

The transaction costs difference, the typical lack of collateral as well as the higher perceived risk of the small farmers because of lack of diversified resources, lead to a high biases against them in credit allocation according to a study in India (Braverman and Guasch, 1988). In India the perception by lenders is that plenty of land enhances the probability that enough output will be produced for the farmer to repay the loan.

2.3.3.5 Effect of Cost of Credit

Farmers always consider formal credit to be expensive than Sacco loans. To counter problems of high cost of dealing to smallholder it is recommended to consider promotion of farmer groups or farmers controlled enterprises (co operatives) in conjunction with contract farming. Co operatives can bargain and negotiate prices and the terms of the contract on behalf of farmers (Cook and Chaddad, 2000). The author has established aspects to be taken into account to ensure that co operatives provide the necessary benefits to producers in contractual arrangements. Formal lenders generally ration credit to small borrowers in order to reduce their transaction costs. The cost is high for serving several small borrowers, compared to large borrowers (Gonzalez, 1981). The higher borrowing cost incurred by small and potential small borrowers discourages them from approaching the formal credit institutions (Adam and Nehman, 1979). Small and marginal farmers have to incur extra costs beside the nominal rate of interest in the process of obtaining a loan from formal institutions (Gonzalez, 1981).

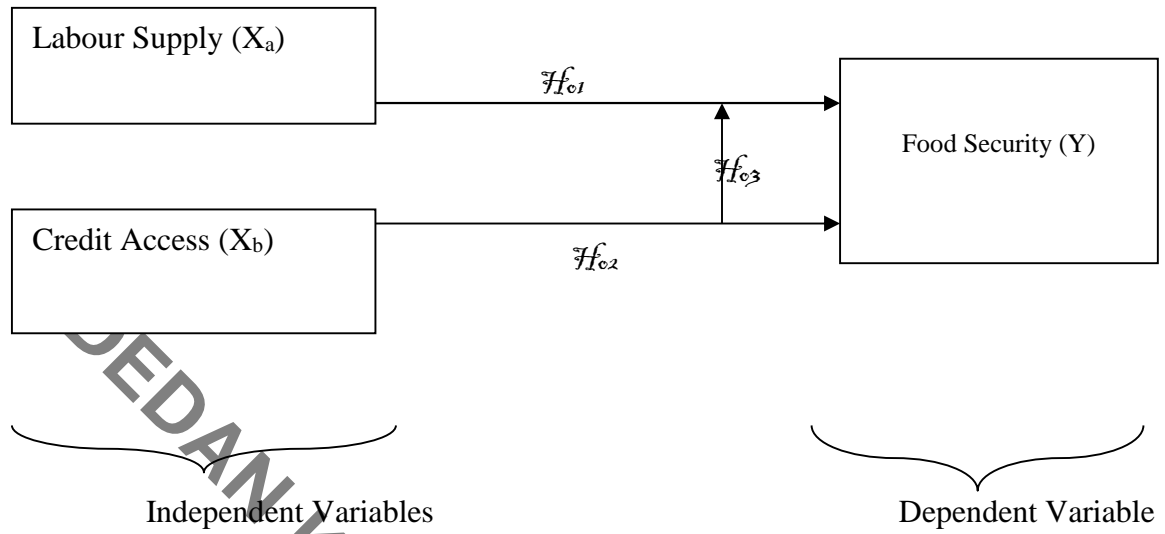
2.3.3.6 Effect of Informal Tenancy Contracts

Among small scale tea growers in central Kenya tenancy issues are brought about by land sub division within the household that do not by themselves own land titles (Mwaura *et. al.*, 2007). Informal arrangements among family members cannot qualify for collateral in formal lending institutions. Lending institution prefer land as collateral as credit to small scale farmers is considered risky.

2.3.4 Analysis of the Effect of Credit Access on Labour Supply among Small Scale Tea farming in Kenya

Research in Peru indicates that children in households that borrow credit for household use were more likely to work than children in households that did not borrow (Ursula, 2006). The study found the opposite effect on relationship for households that borrowed for the farm and that women labour decrease with credit access for farm based enterprises. The result of this study suggests that micro enterprise loans may cause children to be drawn into credit stimulated household enterprises.

2.4 Conceptual Framework



Where $Y = f\{ X_a, X_b\}$.

Y is the dependent variable, while X_a and X_b are the independent variables.

Figure 2.1: Conceptual Framework

2.5 Operational Framework

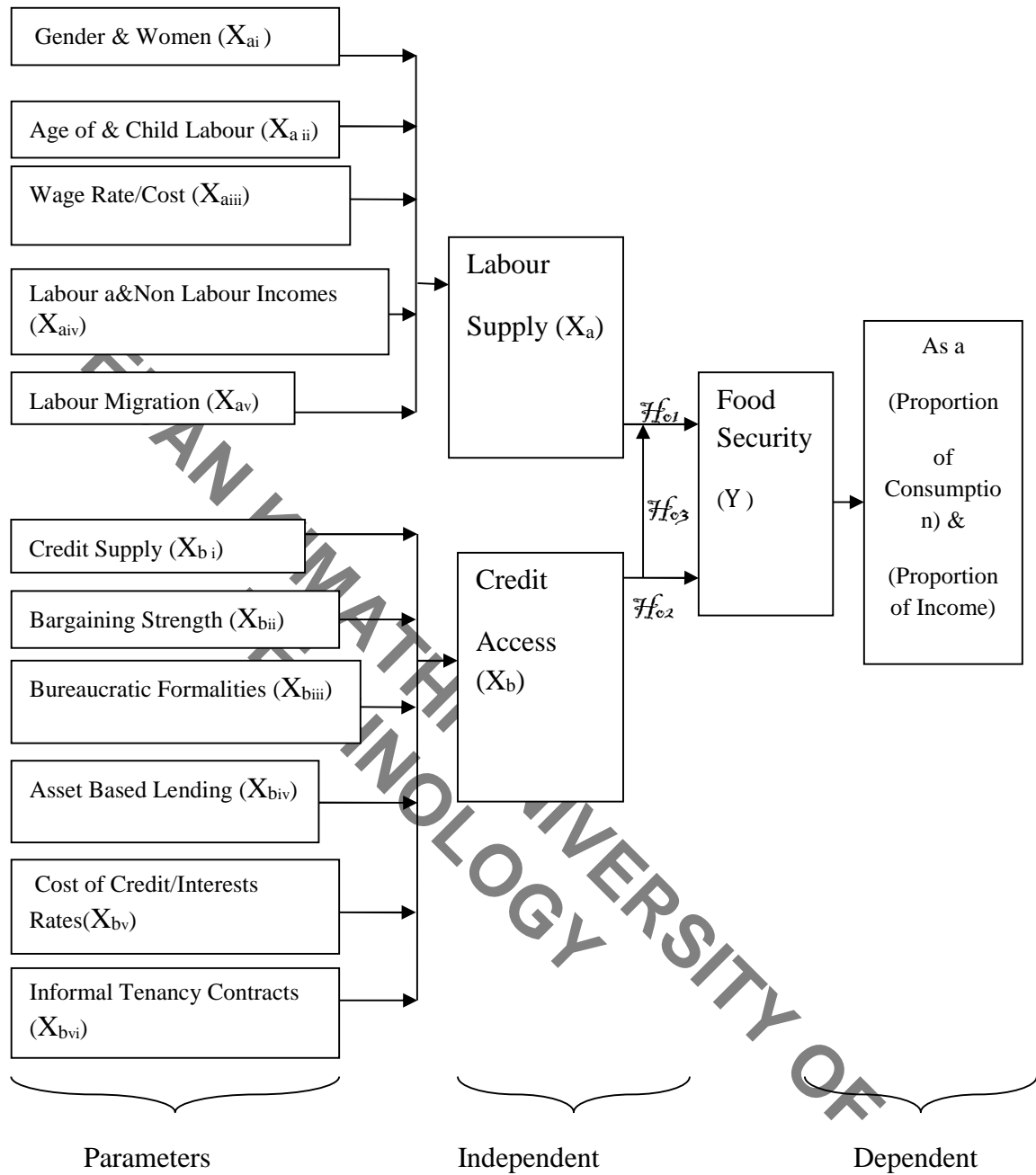


Figure 2.2: Operational Framework

2.6 Research Gap

The effect of labour supply and credit access on food security among small scale tea farmers requires further research. Labour supply as an independent variable has been emphasized with regard to women and child labour. Credit access also as an independent variable and its moderating effect on labour supply has been identified as an area of further research.

2.7 Summary of Literature Review

The reviewed literature strongly brings out the existence of poverty among smallholder tea farmers. Food poverty stands out despite investments in the tea enterprise and the resultant growth in productivity of the smallholder tea. Labour supply as an important variable in production in smallholder agriculture and specifically relation of labour from women and children in relation to food security has also been emphasized in research (Langat *et. al.*, 2011) as a research gap. Dependence on credit by smallholder tea farmers against land and tea bonus payments as collateral has persisted. This has influenced farm incomes and by extension the food security situation. A conceptual framework indicating the dependent variables Y as it relate to the independents variables X_a that represents labour supply and X_b representing credit access is captured on the operational framework (figure 2.1).

The dependent variable (Y) representing food security is influenced from literature by five broad variables (Langat *et. al.*, 2011) that can be categorized as supply side factors, house hold level characteristics, production characteristics, house hold resource allocation among enterprises and environmental characteristics most of whose effects are known. This research intends to analyze only two of the supply side factors which represent a research gap. These are labour supply with emphasis on women and children and credit access.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter provides the methodology of the study and covers the research design, generation of the target population, sampling design, data collection methods, data analysis, the limitation of the study and ethical consideration.

3.2 Research Design

The study adopted descriptive design as supported by Cooper and Schindler, (2006). This involved visiting the respondents in their working environment to administer the questionnaire in person or through trained research aids. Access to the respondents was made through the permanent tea growers' number issued through KTDA. Small scale tea farmers who were randomly selected were the respondents. The design adopted was appropriate as it intended to explain the relationship and associations between labour supply and credit access as the independent variables and their influence on food security as the dependent variable among the small scale tea farmers within the study area.

3.3 Target Population

Five out of eight previous provinces which included Central Kenya, Rift valley, Eastern, Western and Nyanza grow tea on either small or large scale. Central Kenya which has the highest concentration of small scale based tea factories (KTDA report, 2012) was selected. A total of 30 factories are in Central province out of slightly over 60 in Kenya (Appendix ii). Four out of five Counties that previously used to constitute Central provinces predominantly grow tea on small scale level (KTDA report, 2012). These Counties in Central Kenya were therefore purposively selected and used to generate proportions out of the 163,734 small scale tea farmers. Only 78 small scale tea farmers who had tea credit valuation records with Ministry of Agriculture local offices out of a total of 163,734 of tea farmers in Central Kenya (36.38% of small scale tea growers in Kenya) were therefore taken to constitute the population through proportional sampling. The Counties covered were Kirinyaga, Kiambu, Muranga and Nyeri. Nyandarua County does not grow tea (MOA Nyandarua report, 2012). Subsequently random sampling from the list of 78 small scale tea farmers with credit records within the 30 factories was done. All these farmers were captured under the Ministry of Agriculture records at the District level as having sought crop valuation for credit reference. These enabled the researcher to

increase the likelihood of sampling farmers who had accessed credit. The Counties were used as the sampling frame to enable stratified random sampling based on tea farmers' population per County to allocate the 78 tea farmers.

The reason for use of stratified random sampling was

- i. It allowed the researcher to obtain estimates of known precision for certain sub division of the population by treating each sub division as a stratum.
- ii. It afforded every individual in the entire population an equal and unbiased chance of participating in the study.

3.4 Sampling Design

From a population of the 78 farmers who had sought credit, a random sample of 65 respondents based on factory number was obtained for this study. The sample size was selected through computer based computations that use simple random sampling techniques (Cooper and Shindler, 2006). Stratified random sampling was first used because the population under study was heterogeneous while simple random sampling was used to give each respondent an equal chance of selection. Proportion approach of computing sample size was applied where the mean and standard deviation were not known as supported by Cooper and Shindler, (2006). The 65 sample members were picked using simple random techniques through use of the table of random numbers (Snedecor and Cochran, 1989).

Table 3.1: Sample Size by County Based on Ministry of Agriculture Credit Records

County Name	Tea Factories by County	Farmer Population	Per Centage Proportion of Population	Target Population	Sample computation	Sample size
Kirinyaga	4	34,916	21.32	17	0.2132x65	14
Nyeri	7	34,604	20.9	16	0.2090x65	13
Muranga	10	66,567	40.9	32	0.4090x65	27
Kiambu	9	27,647	16.88	13	0.1688x65	11
Nyandarua	0	0	0	0	0.0000x65	0
Totals	30	163,734	100	78	1x65	65

3.5 Data Collection Methods

Primary data was collected by administration of questionnaires in person or through trained aids. A test run of ten questionnaires was undertaken before the actual data collection exercise in order to establish its validity and reliability. The questionnaires were administered to the selected respondents within the sample frame per each target sample constituting the random sample of all 65 respondents. Care was taken to ensure the respondents understood the questions put to them through question and answer session and thorough induction of the research aids as to ensure non collection of biased information and higher response rate. Random supervision among the aids was conducted during the questionnaire administration. A letter of introduction was delivered to each respondent selected explaining the purpose of the study and assuring them of confidentiality of the information given out. Secondary information was collected from tea institutions especially the Kenya Tea Development Authority (KTDA), tea factories, farmers tea Sacco's and farmers community based organization on tea. Formal and informal interviews were conducted with the key informants from the sector to add value to the secondary data.

3.6 Data Analysis

The completed questionnaires were first edited for completeness. Where the questionnaires were incomplete and the respondents had indicated willingness to be

followed up by giving their telephone contacts, the research aids were sent back to collect and the fill gaps. Collected data was coded and then analyzed using Statistical Package for Social Scientists (SPSS Version 19). Both quantitative and qualitative data were collected. Qualitative data was analyzed through content analysis. Pearson's correlation analysis was used to establish the magnitude, extent of relationship and associations. Quantitative data was also exposed to regression analysis to determine the strength and significance of the relationship between the dependent variables and the independent variables. Means were separated by use of z statistic in test of Null hypothesis. This quantitative study was guided by the regression model as defined by dependent variable Y and independent variables X_a and X_b . The dependent variable Y was generated from either consumption data gathered from respondents and/or proportions of incomes spent of food in households. Consumption data was gathered against the background of standards as set by World Food Programs and from publications by local and international journals and articles (Appendix ii). The regression is defined by the function

$$\text{Food Security (Y)} = f\{X_a, X_b\}$$

Given that

Constant gamma (γ) represents the intercepts

X_a (a=i to v) as labour supply factors affecting food security

X_b (b=i to vi) as credit access factors affecting food security

Both X_a and X_b are supply side variables.

These study regression model which considers only two variables of the supply side factors, labour supply and credit access is therefore basically represented as

$$Y = \gamma_0 + \gamma_{xa} X_a + \gamma_{xb} X_b + \epsilon$$

Where

Y = Food Security (Dependent variable measured by level of consumption).

γ_0 = Constant (The intercept which explains the level of consumption).

Given where

$$X_a = X_b = 0$$

$\gamma_{xa} = (\gamma_{xa1} + \gamma_{xa2} + \dots + \gamma_{xa5})$ or Representing Intercepts for all Factor of Labour.

$\gamma_{xb} = (\gamma_{xb1} + \gamma_{xb2} + \dots + \gamma_{xb6})$ or Representing Intercepts for all Factor of Credit.

= Error Term Which Represents the Disturbance Factor

When all variables of labour and credit are factored in the equation, the regression is represented as

$$Y = \theta_0 + (\alpha_1 X_{ai} + \alpha_2 X_{aii} + \alpha_3 X_{aiii} + \alpha_4 X_{aiv} + \alpha_5 X_{av}) + (\beta_1 X_{bi} + \beta_2 X_{bii} + \beta_3 X_{biii} + \beta_4 X_{biv} + \beta_5 X_{bv} + \beta_6 X_{bvi}) + \epsilon$$

Where

X_a = Level of Labour Supply

And

$$X_a = (X_{ai} + X_{aii} + \dots + X_{av})$$

Where

X_{ai} = Effect of Gender and Women Labour on the Labour Supply.

X_{aii} = Effect of Age of Family Members & Child Labour on the Labour Supply.

X_{aiii} = Effect of Wage Rate/ Cost of Labour on the Labour Supply.

X_{aiv} = Effect of Labour and Non Labour Incomes on the Labour Supply.

X_{av} = Effect of Labour Migration on the Labour Supply.

And

X_b = Level of Credit Access.

Where

$$X_b = (X_{bi} + X_{bii} + \dots + X_{bvi})$$

X_{bi} = Effect of Credit Supply on Credit Access.

X_{bii} = Effect of Bargaining Strength on Credit Access.

X_{biii} = Effect of Terms of Credit/ Bureaucratic Formalities on Credit Access.

X_{biv} = Effect of Asset Based Lending/ Own Capital on Credit Access.

X_{bv} = Effect of Cost of Credit/ Interest Rate on the Credit Access.

X_{bvi} = Effect of Informal Tenancy Contracts on Credit Access.

3.7 Ethical Considerations

This research took the obligation to respect the rights, needs, values and desires of the respondents. As per Grant, (2005) the respondents were informed of all data collection devices and activities. Their wishes were considered first when choices were to be made regarding collection and reporting of information.

3.8 Summary of Methodology

The study adopts an exploratory and descriptive design. Both quantitative and qualitative data was collected while combining a purposive population targeting with random sampling to arrive at a target sample. A questionnaire was utilized for data gathering through interviews while regression and correlation analysis were utilized for data analysis.

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CHAPTER FOUR: DATA ANALYSIS AND PRESENTATION OF RESULTS

4.1 Introduction

This chapter analyzes the output from the raw data feed into the Statistical Package for Social scientist (SPSS) version 19) and presents the results in tables, bar graphs and pie charts. Both descriptive and inferential statistics are used in result presentation. The results presented addresses the objective of this study which was to analyze the role of labour supply and credit access on food security in small scale tea farming in Kenya. The presentation is done in the order of the three specific objectives which were

- i. To evaluate the role of labour supply by women and children on food security among small scale tea farmers in Kenya.
- ii. To assess the role of credit access on food security among small scale tea farmers in Kenya.
- iii. To analyze the moderating effect of credit access on labour supply.

Data analysis on the respondents' characteristics is presented first, the result on the role of labour supply on food security and then the result of the role of credit access on food security. The results of the Pearson correlation are presented and then a presentation and interpretation of the mathematical regression model is done. A summary of the chapter is then presented at the end of this chapter.

4.2 Response Rate

All the 65 questionnaire distributed were returned fully filled out representing 100 per cent response rate. There were therefore zero chances of non response from the sample.

4.3 Characteristics of the Respondents

4.3.1 Respondents Mean Age and Gender Distribution

The survey carried out indicated that 85% or respondents were female. The 15% male respondents were however accompanied by their female spouses during the interview but gender influence prevented direct engagement with females (Figure 4.1). The average age

of respondents was highest at 38% in the age bracket of 46 to 55 years. Only 5% of the respondents were at youthful age of below 35 years. Approximately 15% was above 67 years of age (Figure 4.2). Another 20% was between 56 to 66 years of age. The age was an indication of the aging farming population and therefore the energy and experience available for family farm labour.

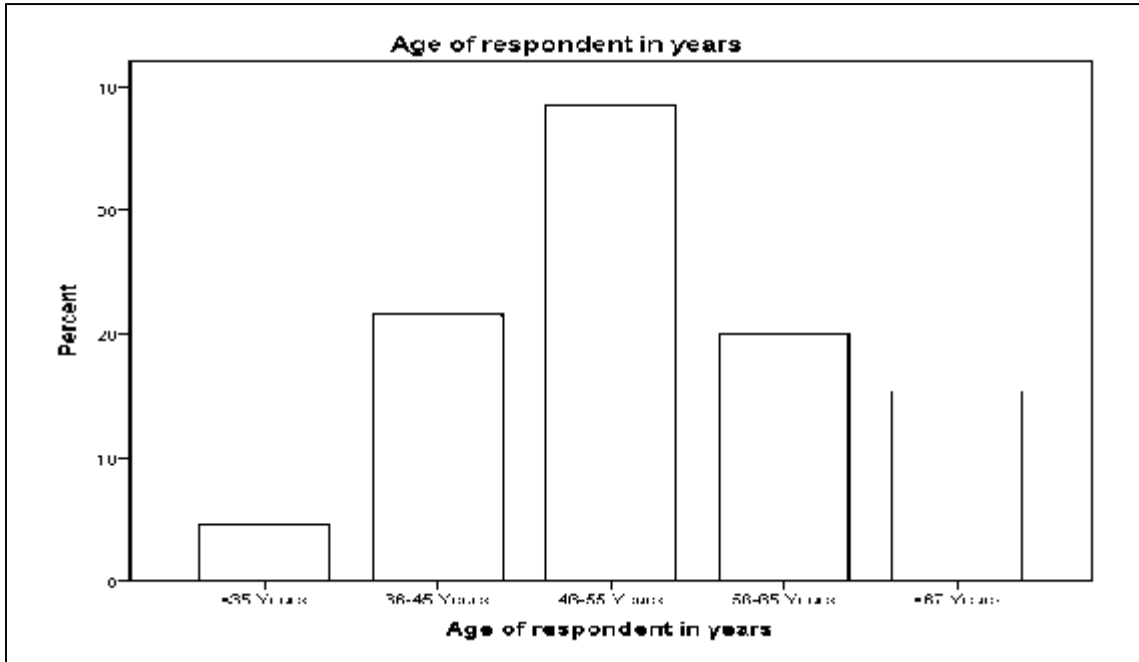


Figure 4.1 Mean Age of Respondent in Years

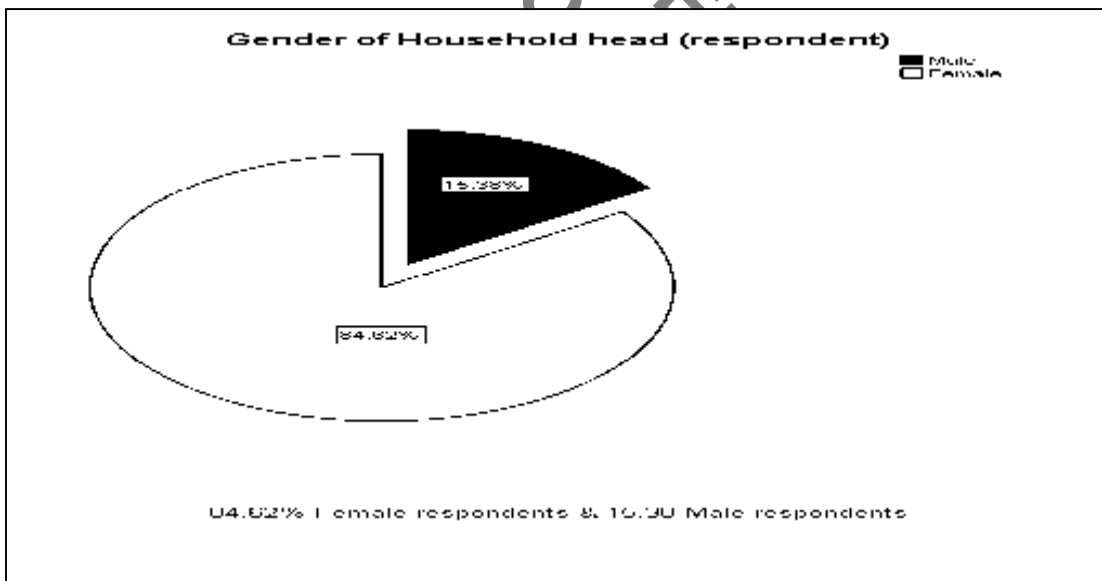


Figure 4.2 Mean of Respondent's Gender

4.3.2 Respondents Mean Education Levels

On average the respondents' education level was 47% at secondary level, 42.5% at primary level, 7% at certificate level and only 3% among others (Figure 4.3). Skilled labour was absent among the respondents.

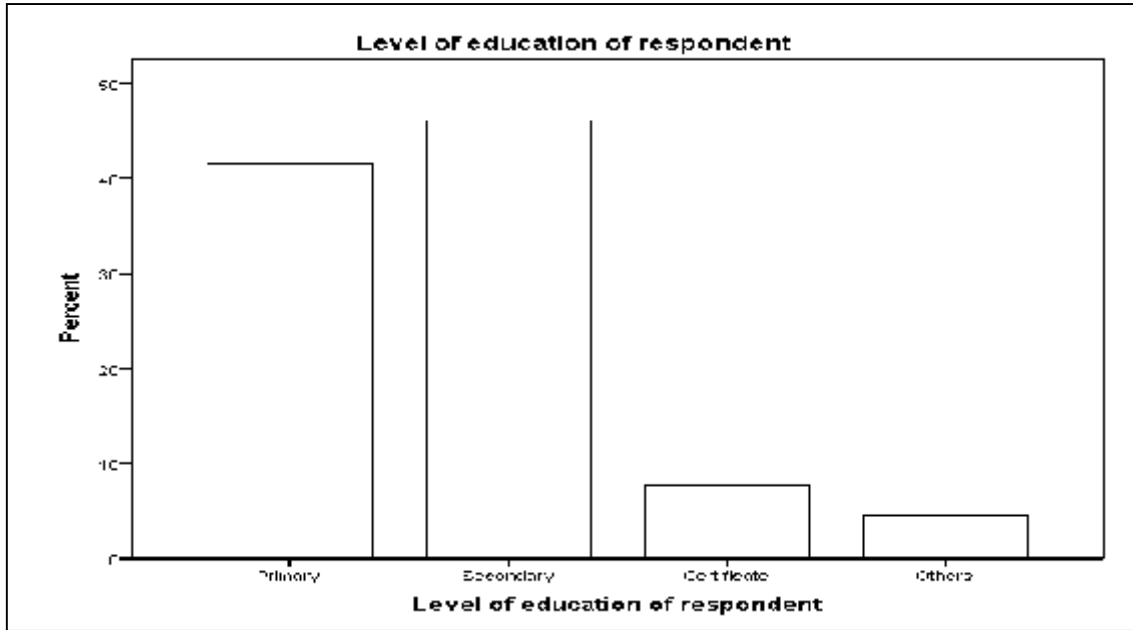


Figure 4.3 Mean Level of Respondents' Education

4.3.3 Respondents Mean Labour Distribution Approximately 55% of respondents indicated that 40-80% of women labour is used in food production (Figure 4.4), while 81.5% indicated that only about 20% on of child labour is used in food production (Figure 4.5).

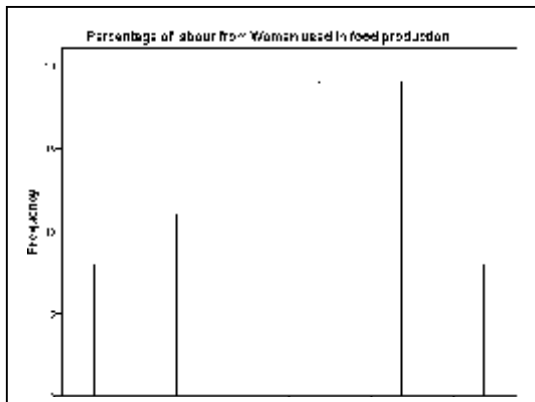


Figure 4.4: % Women Labour in Food

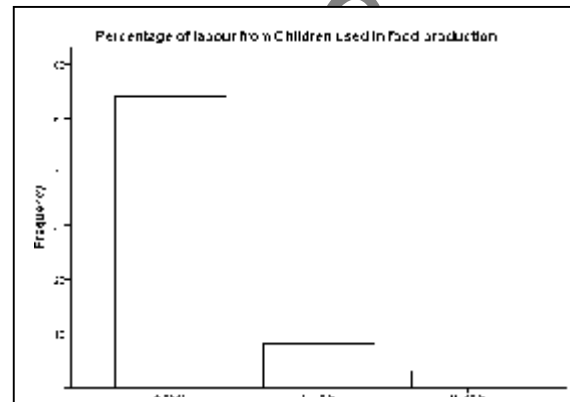


Figure 4.5 Mean % Child Labour in Food

Approximately 80% of respondents indicated 60-100% of women labour is used in tea production (Figure 4.6), while 84.6% indicated that only about 20% on of child labour is used in tea production (Figure 4.7)

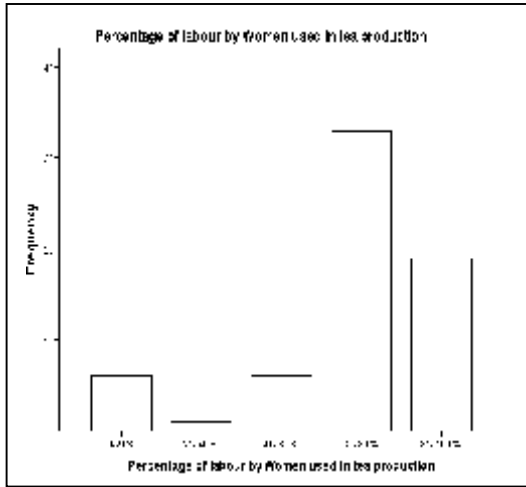


Figure 4.6: % Women Labour in Tea

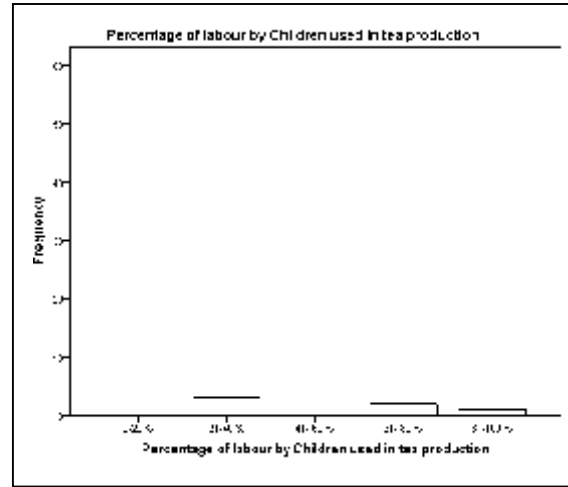


Figure 4.7 Mean % Child Labour in Tea

4.3.4 Respondents Mean Credit Access Levels

Respondents indicated that 69.2% of small scale tea farmers had accessed credit in the last one season (Figure 4.8). Of the respondents interviewed 44 out of 65 respondents (67.6%) borrowed an average of shillings 50,000 (Figure 4.9). Another less than 12 out of 65 respondents (18.46%) borrowed between shillings 50,000 to 100,000.

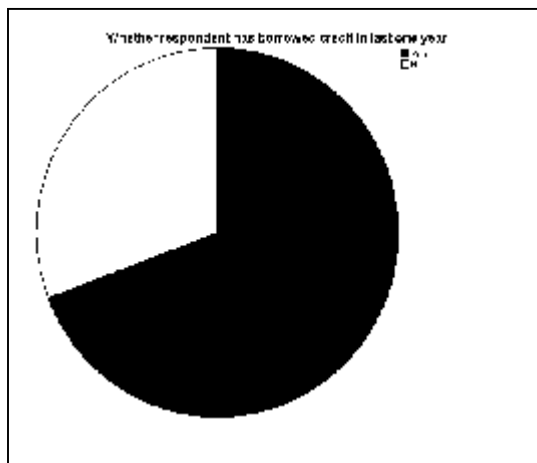


Figure 4.8 Proportion of Borrowers

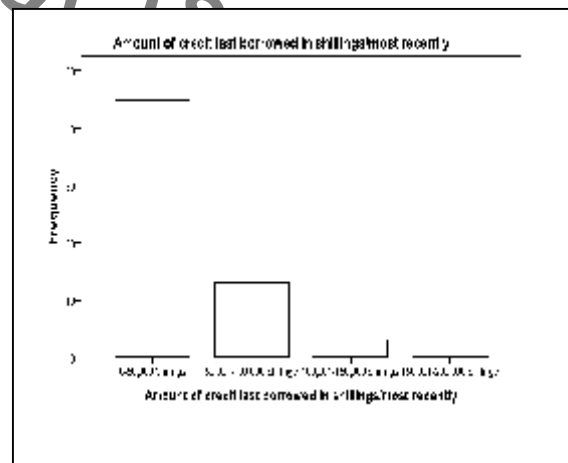


Figure 4.9 Average Credit Borrowed

Slightly more credit goes to food production as compared to tea. On average 64.6% of respondents indicated that they use up to 20% credit on food (Figure 4.10) against 46% at the same rate on tea (Figure 4.11).

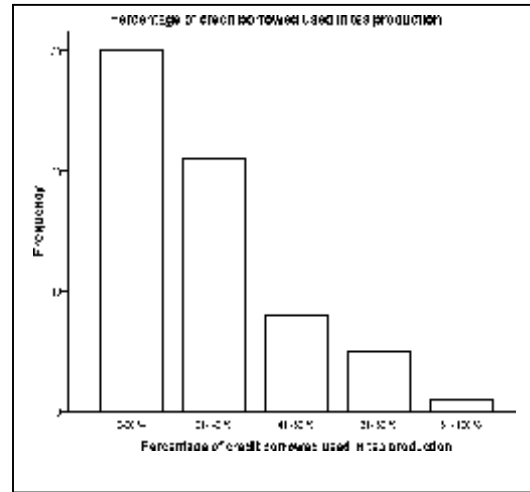
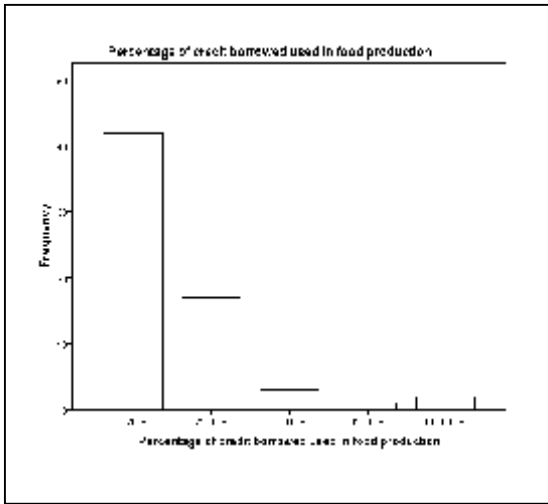


Figure 4.10: % Credit in Food Production Figure 4.11: % Credit in Tea Production

4.3.5 Respondents Mean Maize Production Levels

A total 57.5% of the respondents produced less than 1 bag (90Kgs) of maize in the last one season and another 30% at 1-3 (90Kgs) bags (Figure 4.12). On average family sizes were between 3-7 members, which would require 3-7 (110kgs) bags maize per year.

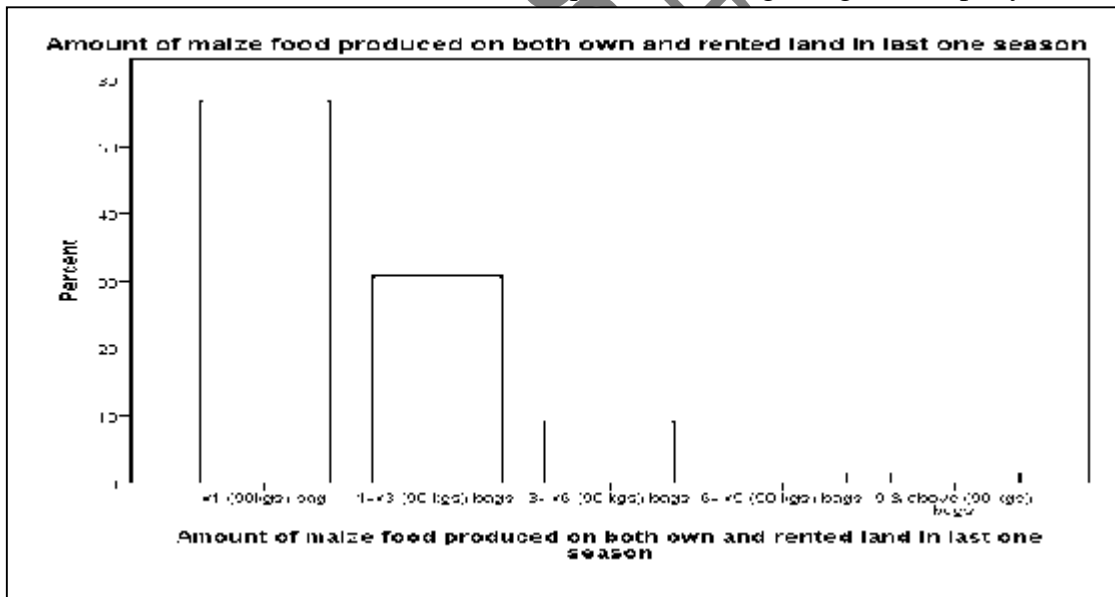


Figure 4.12: Mean Maize Production by Respondents

4.3.6 Respondents Mean Incomes from Tea

When tea incomes for the respondents were considered, 9% earned below shillings 10,000, 35% earned shillings 10,001 to 63,000 while 26% earned between shillings 63,001-116,000. Only 30% of the respondents earned above shillings 116,000-222,000 (Figure 4.13).

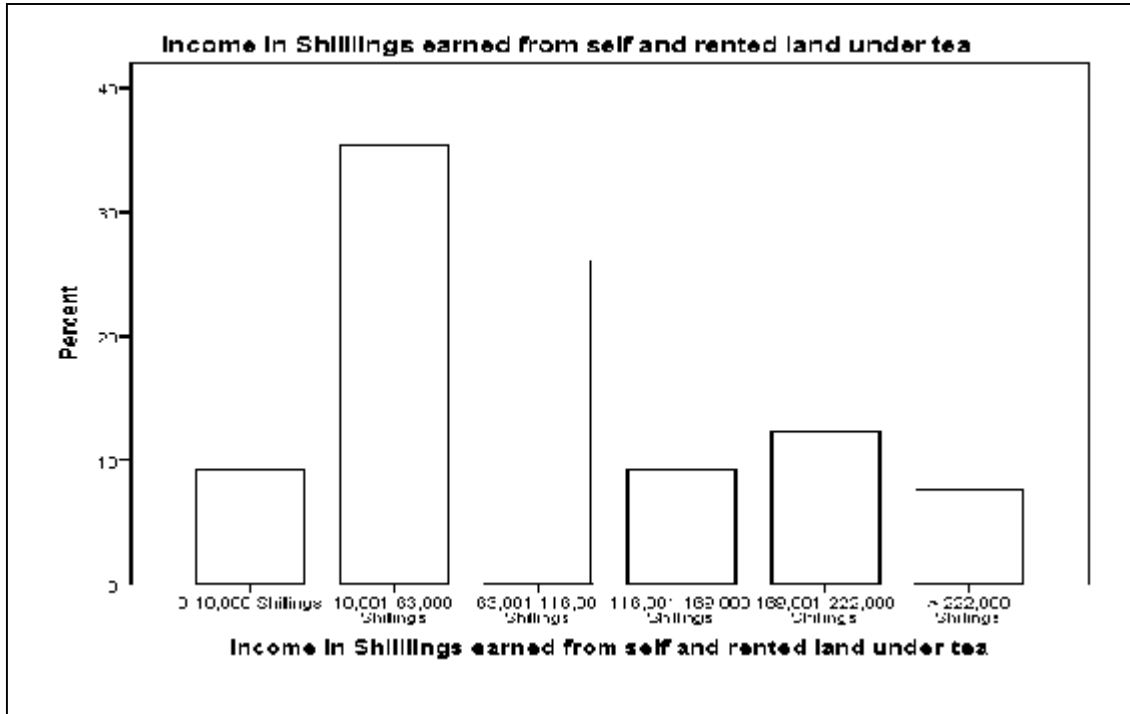


Figure 4.13 Respondents Mean Income from Tea in Shillings

4.3.7 Respondents Mean Tea Incomes Expenditure Proportions.

On the proportion of income from tea spent on food respondents indicated that 37% of respondents spent between 41-60% of their tea income on food, 23% spent 21-40% of their tea income on food, while 20% spent 20% and below of their tea income on food. Only about 15% of respondents spent above 61% of their income on food and about 5% spent beyond 81% of income on food (Figure 4.14).

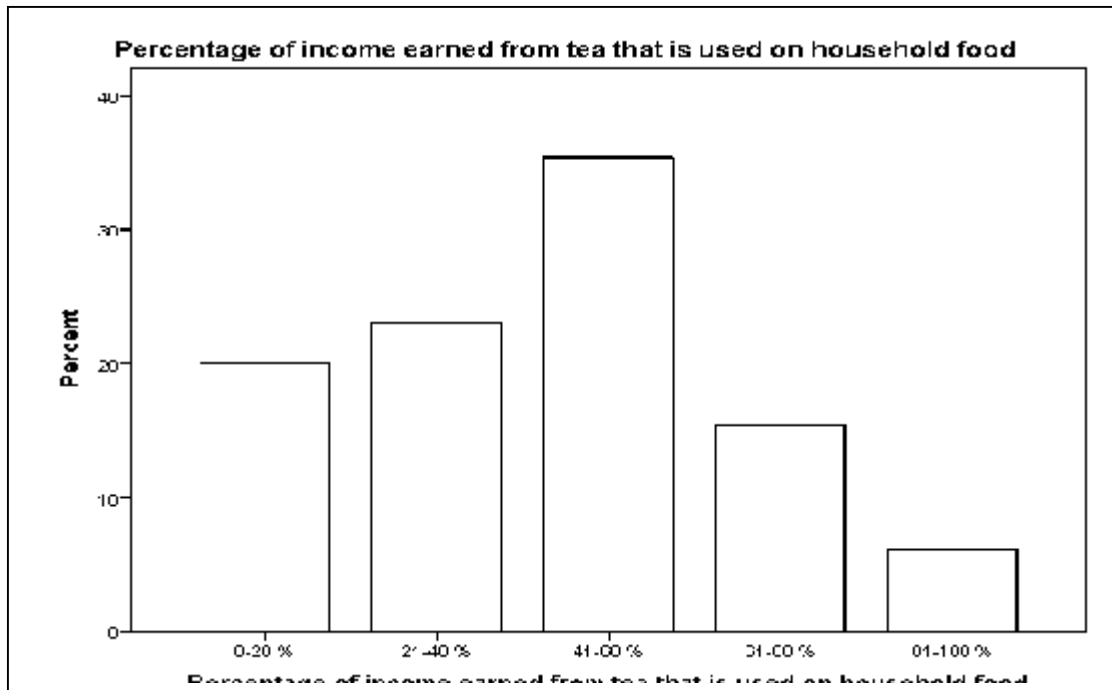


Figure 4.14 Mean % Income Earned from Tea used in Food

4.4 Results on Evaluation of the Role of Labour Supply by Women and Children on Food Security among Small Scale Tea farming in Kenya

Table 4.1 below indicates the significance levels from the one way Analysis of Variance (ANOVA) of the factors that influence labour supply and therefore food security among small scale tea farmers in Kenya. The test was run with size of house hold as the controlling factor. The sample was from 65 respondents that were interviewed.

Table 4.1 Analysis of Variance Table on Role of Labour Supply on Food Security

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Whether gender as a factor of labour supply affect food security	Between Groups	3.911	4	.978	.675	.612
	Within Groups	86.950	60	1.449		
	Total	90.862	64			
Whether women labour as a factor of labour supply affect food security	Between Groups	12.305	4	3.076	3.196	.019
	Within Groups	57.757	60	.963		
	Total	70.062	64			
Whether age of household members as a factor of labour supply affect food security	Between Groups	11.414	4	2.853	2.310	.068
	Within Groups	74.125	60	1.235		
	Total	85.538	64			
Whether use of child labour as a factor of labour supply affect food security	Between Groups	9.253	4	2.313	1.193	.323
	Within Groups	116.347	60	1.939		
	Total	125.600	64			
Whether wage rate or cost of labour as a factor of labour supply affect food security	Between Groups	9.346	4	2.336	2.230	.076
	Within Groups	62.870	60	1.048		
	Total	72.215	64			
Whether labour and non labour incomes as a factor of labour supply affect food security	Between Groups	15.181	4	3.795	2.124	.089
	Within Groups	107.219	60	1.787		
	Total	122.400	64			
Whether labour migration as a factor of labour supply affect food security	Between Groups	9.800	4	2.450	2.138	.087
	Within Groups	68.753	60	1.146		
	Total	78.554	64			

4.4.1 Gender as a Factor of Food Security

The ANOVA (Table 4.1) indicated that gender as a parameter affecting food security was not significant. The significance level () was greater than the confidence level of the study at 0.05 (= 0.612 > 0.05). When women labour was considered as separate from

gender, the parameter was significant with the significance level () being less at 0.019 than the confidence level in the study of 0.05 (0.019 < 0.05).

Respondents' response on a Likert scale of 1-5 (Figure 4.15) indicated that a mean of 47.7% agreed that gender affects food security while 21.5% strongly agreed. This was a total of 69.2% in favour with a 15.4% undecided among the respondents. The total response in favour for women labour as affecting food security was 75.3%. The result was in conformity for women labour with the ANOVA that indicated that women labour was significant.



Figure 4.15 Mean % Effect of Gender on Food Security

4.4.2 Age of Household Members as a Factor of Food Security

Age of household members as a parameter affecting food security was not significant from the ANOVA (= 0.068 > 0.05). The significance level was greater than the set confidence level of 0.05 (Table 4.1). When child labour was considered separately from age the factor was also not significant as the significance level () was 0.323 hence greater than the confidence level at 0.05.

Respondents' response on a Likert scale of 1-5 (Figure 4.16) indicated that 43.1% agreed that age affects food security while 27.7% strongly agreed. This was a total of 70.8% in favour with a 15.4% undecided among the respondents on age. The total response in favour for child labour as affecting food security was 38.5%. The result did not conform to the ANOVA that indicated that both age and child labour was not significant.

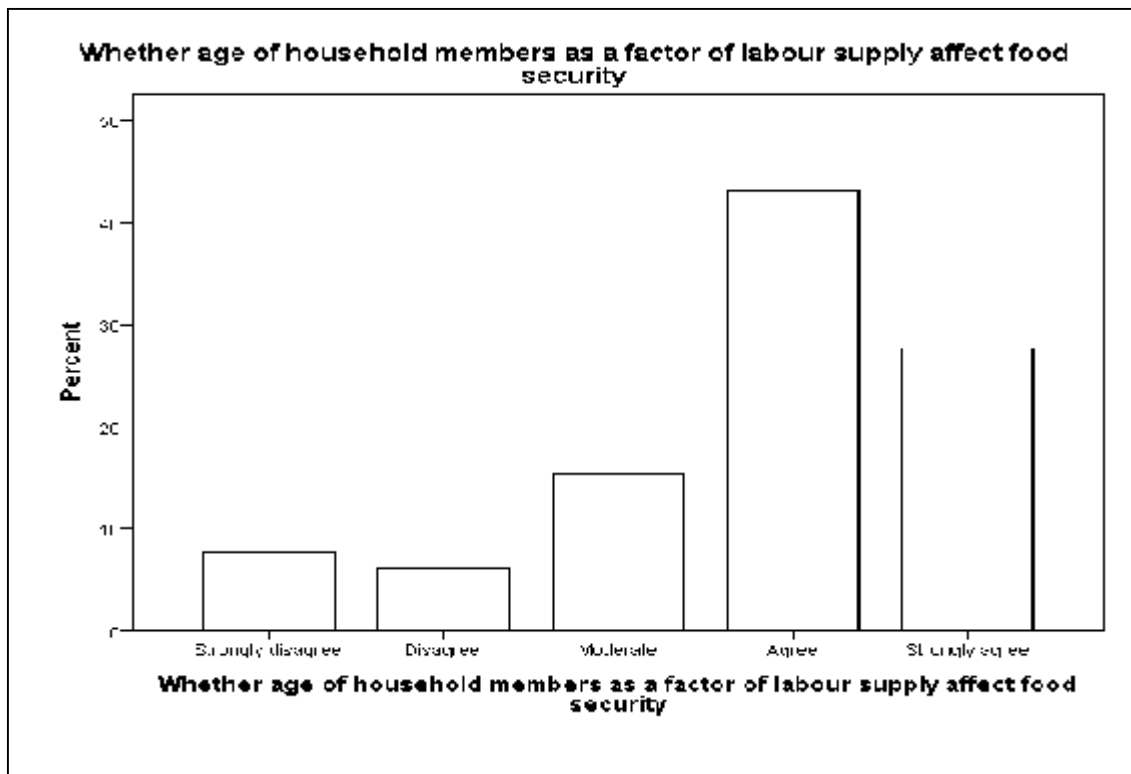


Figure 4.16 Mean % Effect of Age of Household Members on Food Security

4.4.3 Wage Rate as a Factor of Food Security

The wage rate as a parameter affecting food security was not significant from the ANOVA ($p = 0.076 > 0.05$). The significance level (p) was greater than the confidence level of 0.05 in the study (Table 4.1).

Respondents' response on a Likert scale of 1-5 (Figure 4.17) indicated that 32.3% agreed that wage rate affects food security while 56.9% strongly agreed. This was a total of 89.2% in favour with a 3.1% undecided among the respondents on wage rate. The result

did not conform with the ANOVA that indicated that wage rate was not significant factor in food security.



Figure 4.17 Mean % Effect of Wage Rate on Food Security

4.4.4 Labour and non Labour Incomes as a Factor of Food Security

Labour and non labour incomes as a parameter affecting food security was not significant from the ANOVA ($p = 0.089 > 0.05$) as the significance (p) was greater than the confidence level at 0.05 (Table 4.1).

Respondents' response on a Likert scale of 1-5 (Figure 4.18) indicated that 40% agreed that labour and non labour incomes affects food security while 16.9% strongly agreed. This was a total of 56.9% in favour with a 30.8% undecided among the respondents on labour and non labour incomes. The result did not conform with the ANOVA that indicated that labour and non labour incomes were not significant factor in food security.

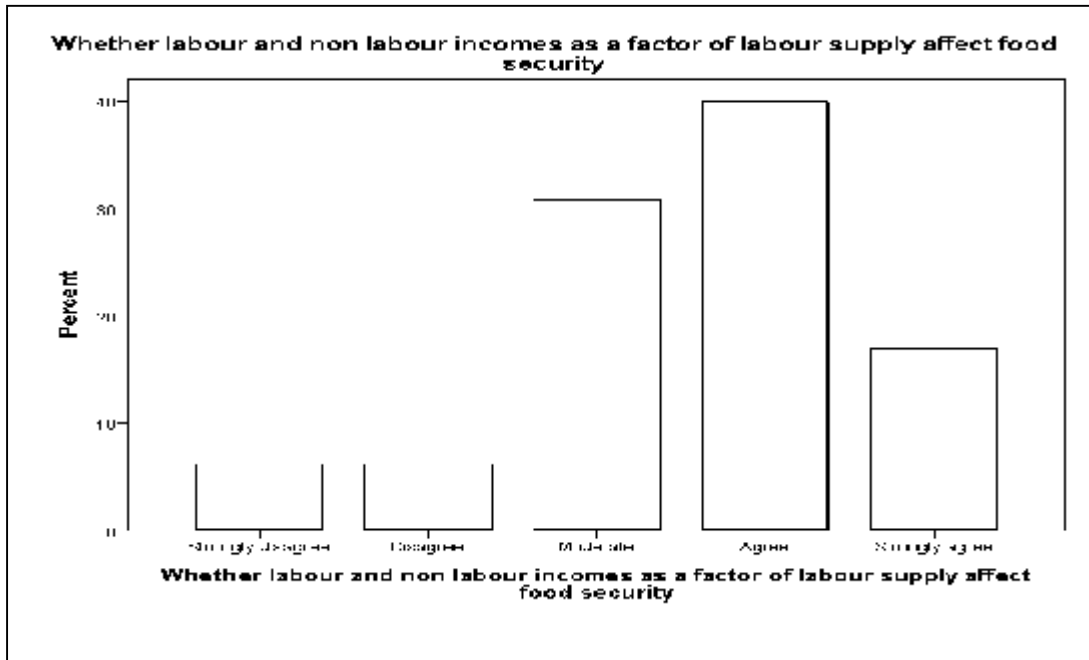


Figure 4.18 Mean % Effect of Labour and non Labour Incomes on Food Security

4.4.5 Labour Migration as a Factor of Food Security

Labour migration as a parameter affecting food security was not significant from the ANOVA as the significance level () was greater than the level of confidence set for the study (= 0.087 > 0.05). The significance level () was greater than the confidence level at 0.05 (Table 4.1).

Respondents' response on a Likert scale of 1-5 (Figure 4.19) indicated that 32.3% agreed that labour migration affects food security while 18.5% strongly agreed. This was a total of 50.8% in favour with a 18.5% undecided among the respondents on labour migration. The factor was the second lowest in total score after child labour.

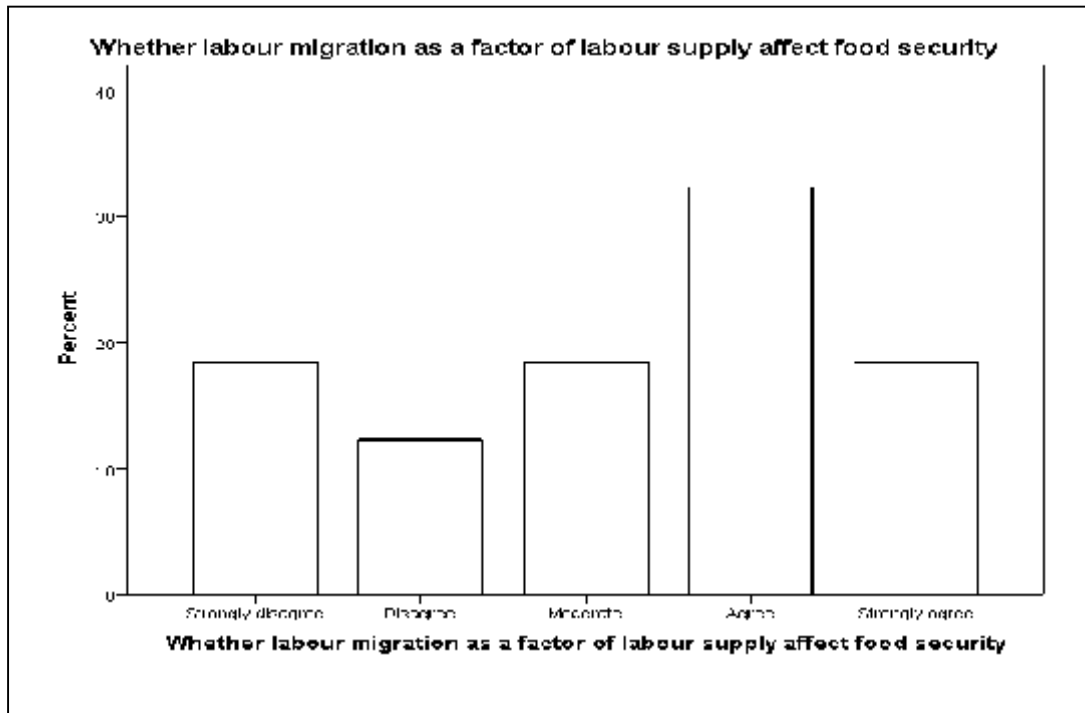


Figure 4.19 Mean % Effect of Labour Migration on Food Security

4.5 Results on Assessment of the Role of Credit Access on Food Security among Small Scale Tea farming in Kenya

The table below indicates the significance levels from the ANOVA on the factors that influence credit access and therefore food security among small scale tea farmers in Kenya. The test was done with size of household as the controlling factor. The analysis results were from 65 respondents that were interviewed.

Table 4.2 Analysis of Variance Table on Role of Credit Access on Food Security

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Credit supply as a determinant of credit access and hence food security	Between Groups	4.131	4	1.033	.685	.605
	Within Groups	90.423	60	1.507		
	Total	94.554	64			
Bargaining strength as a determinant of food security	Between Groups	5.454	4	1.363	.888	.477
	Within Groups	92.146	60	1.536		
	Total	97.600	64			
Bureaucratic formalities by lenders as a determinant of food security	Between Groups	14.680	4	3.670	2.890	.030
	Within Groups	76.182	60	1.270		
	Total	90.862	64			
Asset based lending policies as a determinant of food security	Between Groups	7.788	4	1.947	1.425	.237
	Within Groups	81.966	60	1.366		
	Total	89.754	64			
Cost of credit/interest rates as a determinant of food security	Between Groups	12.365	4	3.091	2.459	.055
	Within Groups	75.420	60	1.257		
	Total	87.785	64			
Informal tenancy arrangements as a determinant of food security	Between Groups	9.688	4	2.422	1.247	.301
	Within Groups	116.527	60	1.942		
	Total	126.215	64			

4.5.1 Credit Supply as a Factor of Food Security

The ANOVA (Table 4.2) indicated that credit supply as a parameter affecting food security was not significant. The significance level () was greater than the confidence level in the study at 0.05 (= 0.605 > 0.05).

Respondents' response on a Likert scale of 1-5 (Figure 4.20) indicated that 40% agreed that credit supply affects food security while 33.8% strongly agreed. This was a total of 73.8% in favour with a 16.9% undecided among the respondents. The result did not conform to the ANOVA that indicated that credit supply was not significant in food security.

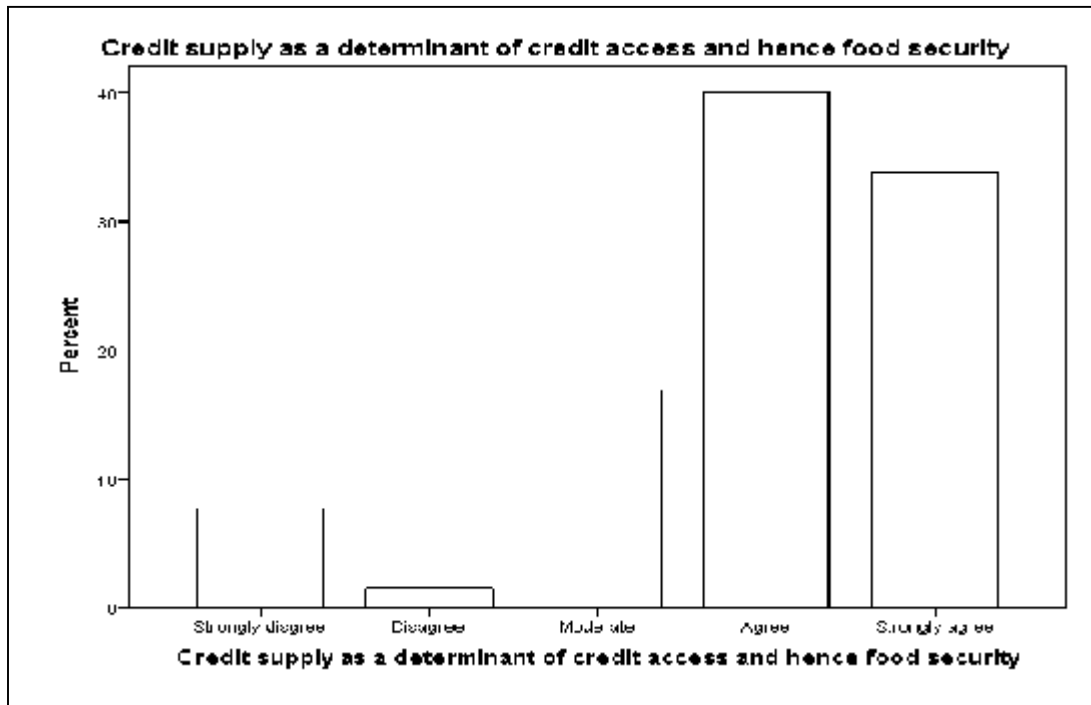


Figure 4.20 Mean % Effect of Credit Supply on Food Security

4.5.2 Bargaining Strength of Small Scale Farmers as a Factor of Food Security

The ANOVA (Table 4.2) indicated that bargaining strength as a parameter affecting food security was not significant. The significance level (F) was greater than the confidence level of the study at 0.05 ($F = 0.477 > 0.05$).

Respondents' response on a Likert scale of 1-5 (Figure 4.21) indicated that 44.6% agreed that bargaining strength affects food security while 23% strongly agreed. This was a total of 67.7% in favour with a 10.8% undecided among the respondents. The result did not conform to the ANOVA that indicated that bargaining strength was not significant in food security among small scale tea farmers.

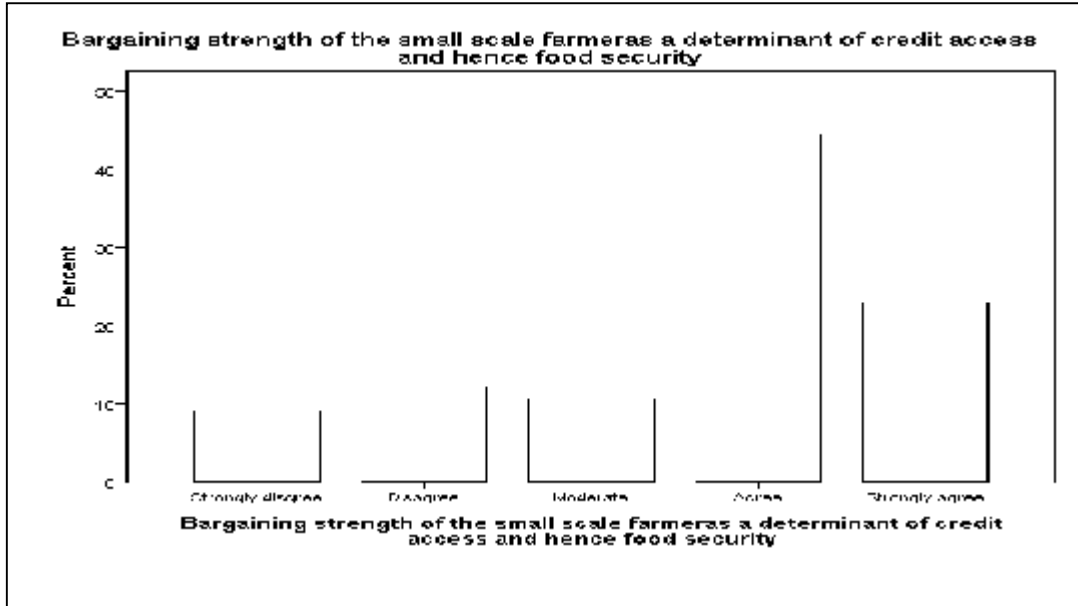


Figure 4.21 Mean % Effect of Bargaining Strength on Food Security

4.5.3 Bureaucratic Formalities as a Factor of Food Security

The ANOVA) (Table 4.2) indicated that bureaucratic formality as a parameter affecting food security was significant. The significance level () was less or equal to the confidence level of the study at 0.05 (= 0.030 < 0.05).

Respondents' response on a Likert scale of 1-5 (Figure 4.22) indicated that 43.1% agreed that bureaucratic formality affects food security while 23.1% strongly agreed. This was a total of 66.2% in favour with a 10.8% undecided among the respondents. The result was in conformity with the ANOVA that indicated that bureaucratic formality was a significant factor of food security among small scale tea farmers.

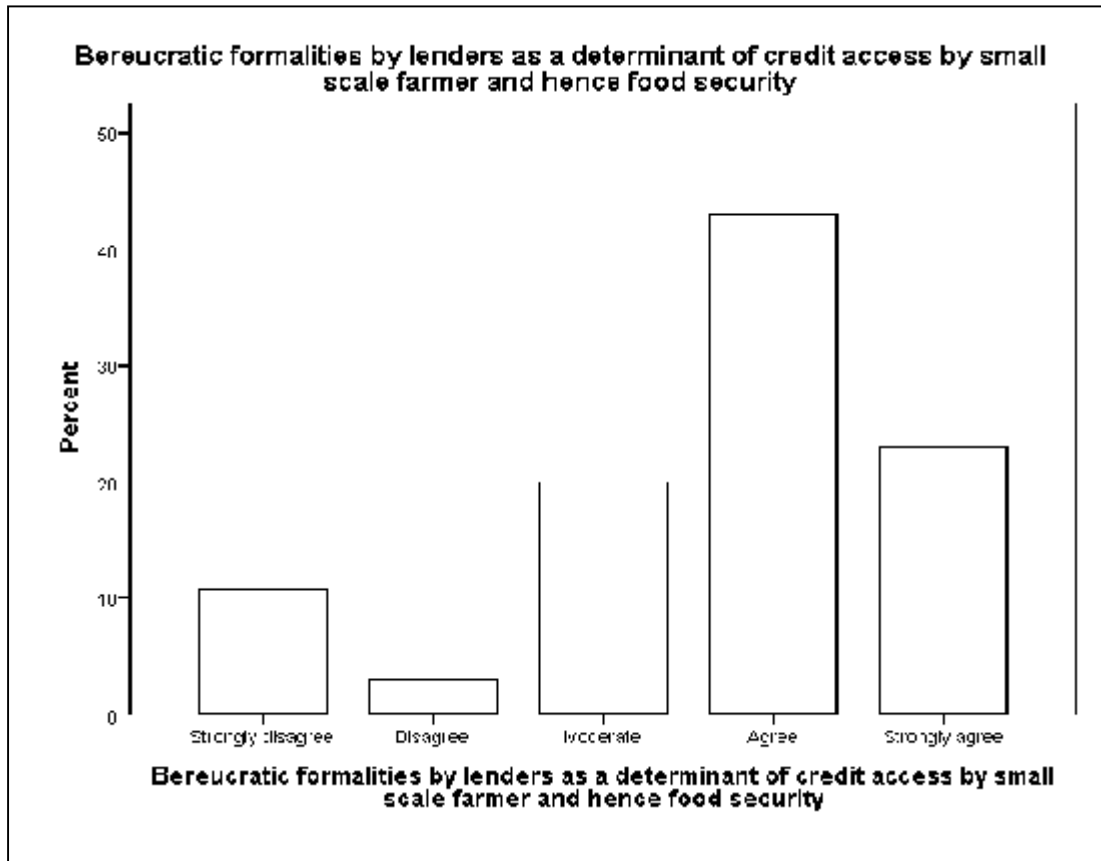


Figure 4.22 Mean % Effect of Bureaucratic Formalities on Food Security

4.5.4 Asset Based Lending as a Factor of Food Security

The ANOVA (Table 4.2) indicated that asset based lending as a parameter affecting food security was not significant. The significance level () was greater than the confidence level of the study at 0.05 (= 0.237 > 0.05).

Respondents' response on a Likert scale of 1-5 (Figure 4.23) indicated that 36.9% agreed that asset based lending affects food security while 44.6% strongly agreed. This was a total of 81.5% in favour with a 6.2% undecided among the respondents. The result did not conform to the ANOVA that indicated that asset based lending was not a significant factor.

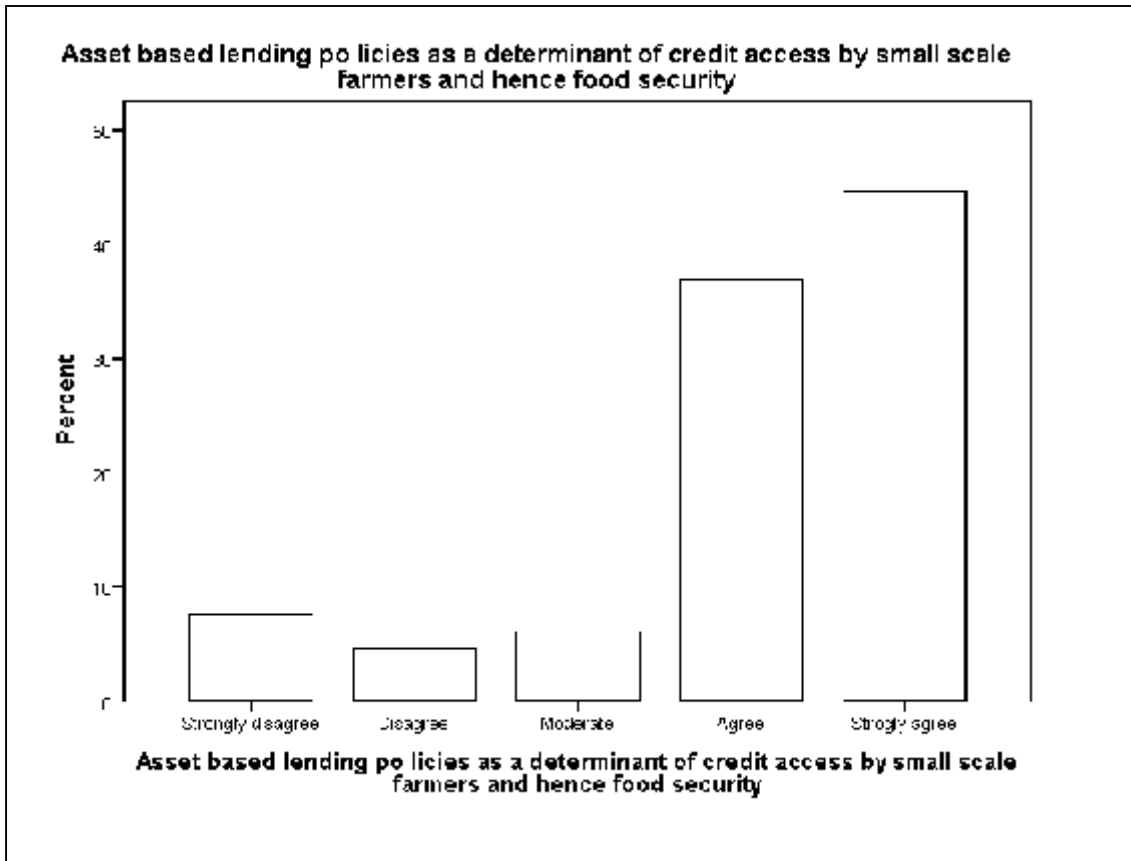


Figure 4.23 % Mean Effect of Asset Based Lending Policies on Food Security

4.5.5 Cost of Credit as a Factor of Food Security

The ANOVA (Table 4.2) indicated that cost of credit as a parameter affecting food security was not significant. The significance level () was greater than the confidence level of the study at 0.05 (= 0.055 > 0.05).

Respondents' response on a Likert scale of 1-5 (Figure 4.24) indicated that 21.5% agreed that cost of credit affects food security while 69.2% strongly agreed. This was a total of 90.7% in favour with a 0% undecided among the respondents. The result did not conform with the ANOVA that indicated that cost of credit did not affect food security.

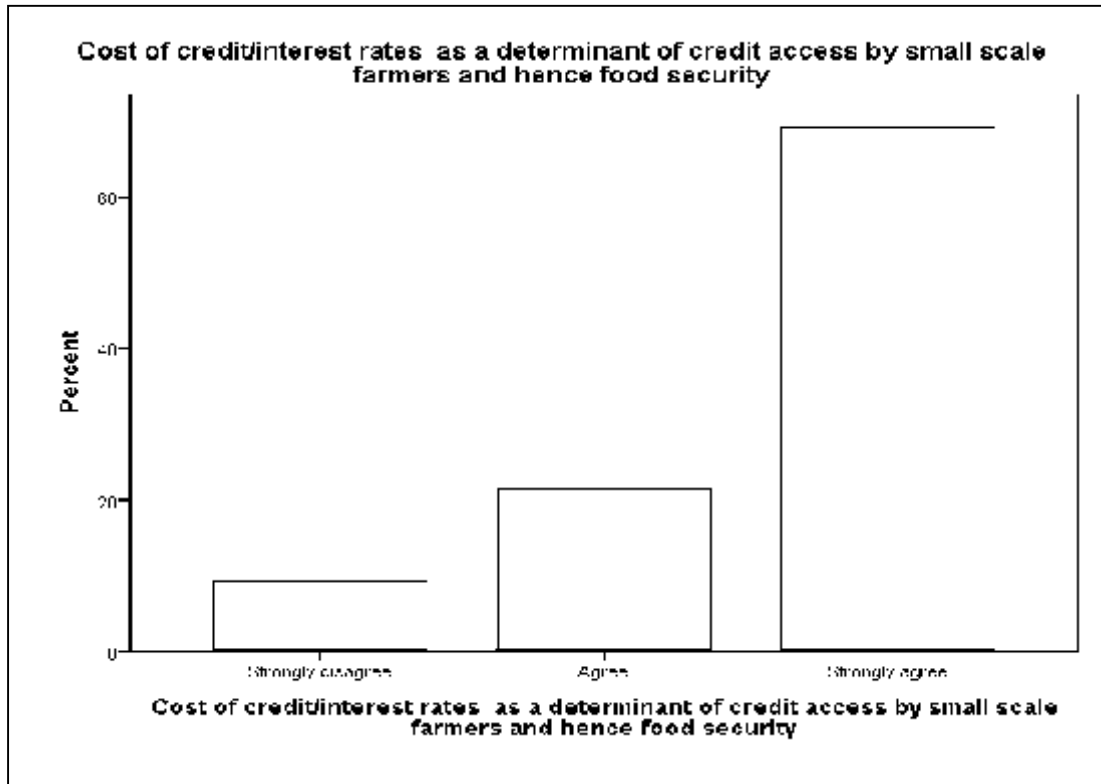


Figure 4.24 Mean % Effect of Cost of Credit on Food Security

4.5.6 Informal Tenancy as a Factor of Food Security

The ANOVA (Table 4.2) indicated that informal tenancy as a parameter affecting food security was not significant. The significance level (F) was greater than the confidence level of the study at 0.05 ($F = 0.301 > 0.05$).

Respondents' response on a Likert scale of 1-5 (Figure 4.25) indicated that 32.3% agreed that informal tenancy affects food security while 23.1% strongly agreed. This was a total of 55.4% in favour with a 15.4% undecided among the respondents. The result did not conform with the ANOVA that indicated that informal tenancy did not affect food security.

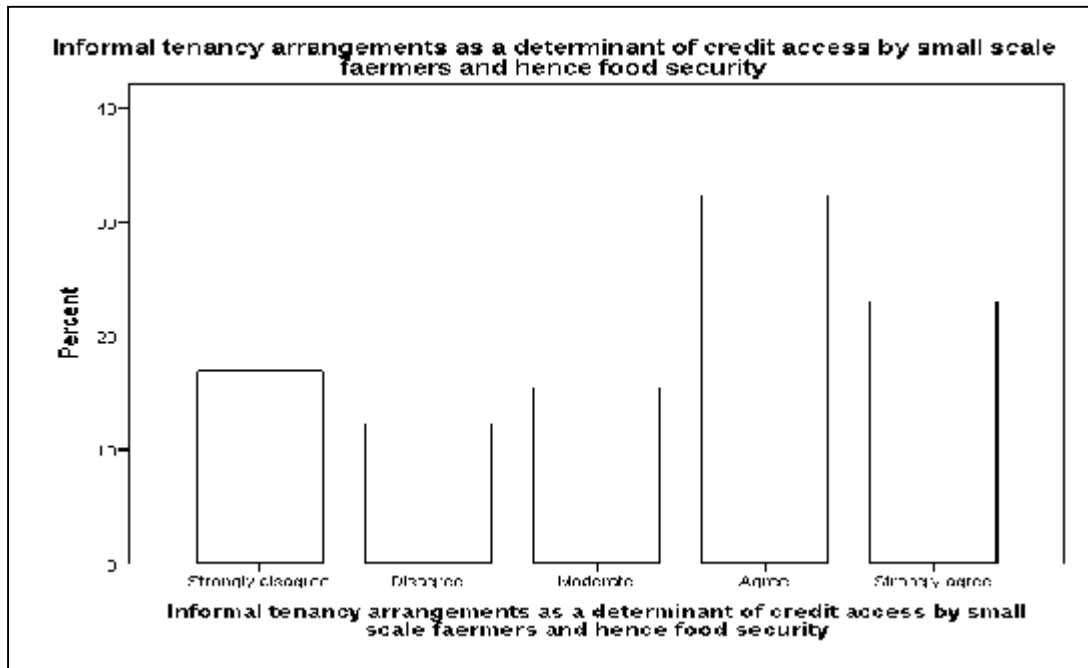


Figure 4.25 Mean % Effect Informal Tenancy Arrangements on Food Security

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4.6 Results of the Analysis on Moderating Effect of Credit Access on Labour Supply among Small Scale Tea farming in Kenya

Table 4.3 Result of Pearson Correlation between Credit Access and Labour Supply

Correlations				
		Percentage of labour from Women used in food production	Percentage of labour from Children used in food production	Percentage of credit borrowed used in food production
Percentage of labour from Women used in food production	Pearson Correlation	1	-.018	.126
	Sig. (2-tailed)		.886	.315
	Sum of Squares	93.015	-.723	8.815
	Covariance	1.453	-.011	.138
	N	65	65	65
Percentage of labour from Children used in food production	Pearson Correlation	-.018	1	-.011
	Sig. (2-tailed)	.886		.932
	Sum of Squares	-.723	16.985	-.323
	Covariance	-.011	.265	-.005
	N	65	65	65
Percentage of credit borrowed used in food production	Pearson Correlation	.126	-.011	1
	Sig. (2-tailed)	.315	.932	
	Sum of Squares	8.815	-.323	52.215
	Covariance	.138	-.005	.816
	N	65	65	65

A Pearson correlation coefficient test on moderating effect of credit on either proportion of labour supply to food production and proportion of labour supply to tea production indicated for all cases analyzed a weak correlation ($r_{x_{ai}-x_{bi}} = 0.4$), where x_{ai} represents labour Supply and x_{bi} stands for credit access (Table 4.3 and 4.4).

Correlation coefficients for percentage credit impact on percentage of labour from women in food production was 0.126 and percentage of labour from children in food production at -0.011 were all not significant at 0.315 and 0.932 respectively as they were

greater than 0.05. This implies that credit access factor had no moderating effect on labour supply in food production for small scale tea farming. The covariance for women labour at +0.138 was greater than that of child labour at -0.005, an indication of dispersion from their means.

Table 4.4 Pearson Correlation of Credit Access and Labour Supply

Correlations				
		Percentage of labour by Women used in tea production	Percentage of labour by Children used in tea production	Percentage of credit borrowed used in tea production
Percentage of labour by Women used in tea production	Pearson Correlation	1	-.012	-.081
	Sig. (2-tailed)		.925	.520
	Sum of Squares	82.246	-.738	-5.969
	Covariance	1.285	-.012	-.093
	N	65	65	65
Percentage of labour by Children used in tea production	Pearson Correlation	-.012	1	-.074
	Sig. (2-tailed)	.925		.557
	Sum of Squares	-.738	46.215	-4.092
	Covariance	-.012	.722	-.064
	N	65	65	65
Percentage of credit borrowed used in tea production	Pearson Correlation	-.081	-.074	1
	Sig. (2-tailed)	.520	.557	
	Sum of Squares	-5.969	-4.092	65.754
	Covariance	-.093	-.064	1.027
	N	65	65	65

Correlation coefficients for percentage credit impact on percentage of labour from women in tea production was -0.081 and percentage of labour from children in tea production at -0.074 were all not significant at 0.520 and 0.557 respectively which were greater than 0.05. This implies that credit access factor had no moderating effect on labour supply in tea production for small scale tea farming. The covariance for women labour at -0.093 was smaller than that of child labour at -0.064.

It was also noted from the regression output (Table 4.7) that labour and credit co linearity test indicated a high tolerance (t) of 0.259 to 0.629 > (0.1 or 0.2) and a low Variance Influencing Factor (VIF) of between 1.591 and 3.8 < (5 or 10) both indicating that no co linearity exists. Co linearity exists when $t < 0.1$ or 0.2 or/and $VIF > 5$ or 10 .

4.7 Regression Model

4.7.1 Analysis of Variance

A regression analysis done on all parameters of labour supply and credit access affecting consumption of food as the dependent variable reveals that the results as presented in the ANOVA (Table 4.5) are valid at p value of 0.007 which is less or equal to the significance level ($\alpha = 0.007$). The significance level in the study was set at 0.05 hence p 0.05. When model is run with dependent variable Y as proportion of income from tea and as proportion of cumulative income from tea and other enterprises the overall results were invalid as p value was 0.936 which is greater than 0.05 and p value of 0.341 which is greater than significance level in the study of 0.05 respectively.

Table 4.5: Analysis of Variance (ANOVA) Table for all Model Parameters

		ANOVA ^a				
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	64.018	11	5.820	2.741	.007
	Residual	112.536	53	2.123		
	Total	176.554	64			

The dependent factor was the percentage of food produced from own and/or rented land or bought that is consumed by the household, while the independent factors included those that affect labour supply and were women labour, child labour, wage rate, labour and non labour incomes and labour migration as factors affecting labour supply. Others were those affecting credit access and included credit supply, bargaining strength, bureaucratic formalities, asset based lending policies, cost of credit and informal tenancy as factors that affect credit access.

Table 4.6: Analysis of Variance Model Summary Table

Model Summary							
R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
			R Square Change	F Change	df1	df2	Sig. F Change
.363	.230	1.457	.363	2.741	11	53	.007

The coefficient of determination adjusted (r^2) shows that the variables tested do explain up to 23% of their role on food security (Table 4.6). The standard error () on the parameters tested stood at 1.457.

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Table 4.7: Coefficients and Tolerance Levels

Coefficientsa								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-1.004	1.021		-.984	.330		
	Women labour affect food security	.647	.225	.407	2.868	.006	.596	1.677
	Child labour as a factor of labour supply affect food security	.179	.162	.151	1.106	.274	.643	1.555
	Wage rate or cost of labour as a factor of labour supply affect food security	.194	.230	.124	.844	.403	.554	1.805
	Labour and non labour incomes as a factor of labour supply affect food security	-.332	.162	-.277	-2.046	.046	.657	1.522
	Labour migration as a factor of labour supply affect food security	.097	.227	.065	.430	.669	.526	1.902
	Credit supply as a determinant of credit access and hence food security	.134	.273	.091	.489	.627	.349	2.867
	Bargaining strength of the small scale farmer as a determinant of credit access and hence food security	.111	.198	.082	.559	.578	.557	1.795
	Bureaucratic formalities by lenders as a determinant of credit access by small scale farmer and hence food security	.599	.219	.430	2.740	.008	.489	2.047
	Asset based lending policies as a determinant of credit access	-.043	.221	-.031	-.195	.846	.485	2.063

Cost of credit/interest rates as a determinant of credit access	-.065	.289	-.046	-.22 5	.823	.290	3.451
Informal tenancy arrangements as a determinant of credit access	-.363	.197	-.307	-1.842	.071	.433	2.310

The regression model results (Table 4.7) indicated that women labour was significant at significance level () = 0.006, labour and non labour incomes significance () = 0.046 and bureaucratic formalities significance () = 0.008 were the only significant parameters in the study. This significance () levels were below the study confidence levels of 0.05. The model confirms the results of the one way ANOVA on both women labour and bureaucratic formalities by lenders except for labour and non labour incomes indicated by the regression to be significant.

4.7.2 Mathematical Model Interpretation

Given the adjusted coefficients (Table 4.7) the regression model on dependent variable (Y) measured as proportion of food consumption would thus be represented as below.

$$Y=0.77+0.407X_{ai}+0.151X_{aii}+0.124X_{aiii}-0.277X_{aiv}+0.065X_{av}+0.091X_{bi}+0.082X_{bii}+0.430X_{biii}-0.031X_{biv}-0.046X_{bv}-0.307X_{bvi}+1.457$$

The coefficients for factors that were significant indicated that

- i. For every positive unit change of women labour there will be a significant positive change in consumption by the household with a factor of 0.407. This is a direct positive association.
- ii. For every positive unit change of labour and non labour incomes there will be a significant negative change in consumption by the household with a factor of 0.277. This is a direct inverse association.
- iii. For every positive unit change in bureaucratic formalities there will be a significant positive change in consumption by the household with a factor of 0.430. This is a direct positive association.

The coefficients in the model can be interpreted as

θ_0 representing a value of 77% of factors that affect food security but were not among those in the model. θ_0 is the value of the intercept on the Y axis on a X/Y axis plot or value of consumption that represents zero levels in the all variables X_{ai-v} and X_{bi-vi} .

x_{a1} with a value of positive 0.407 is the coefficient of women labour as factor of gender indicating the rate of change of consumption with each unit of change in women labour. It indicates a direct relationship of women labour with consumption.

x_{a2} with a value of positive 0.151 is the coefficient of child labour as factor of age indicating the rate of change of consumption with each unit of change in child labour. It indicates a direct relationship of child labour with consumption that is not significant.

x_{a3} with a value of positive 0.124 is the coefficient of wage rate indicating the rate of change of consumption with each unit of change in wage rate. It indicates a direct relationship of wage rate as a parameter of labour supply with consumption that is not significant.

x_{a4} with a value of negative 0.277 is the coefficient of labour and non labour incomes indicating the rate of change of consumption with each unit of change in labour and non labour income. It indicates an inverse relationship of labour and non labour incomes with consumption.

x_{a5} with a value of positive 0.065 is the coefficient of labour migration indicating the rate of change of consumption with each unit of change in labour migration. It indicates a direct relationship of labour migration with consumption that is not significant.

x_{b1} with a value of positive 0.091 is the coefficient of credit supply indicating the rate of change of consumption with each unit of change in credit supply. It indicates a direct relationship of credit supply as a parameter of credit access with consumption that is not significant.

x_{b2} with a value of positive 0.082 is the coefficient of bargaining strength indicating the rate of change of consumption with each unit of change in bargaining strength. It indicates a direct relationship of bargaining strength as a parameter of credit access with consumption that is not significant.

x_{b3} with a value of positive 0.430 is the coefficient of bureaucratic formalities indicating the rate of change of consumption with each unit of change in bureaucratic formalities. It indicates a direct relationship of bureaucratic formalities as a parameter of credit access with consumption.

x_{b4} with a value of negative 0.031 is the coefficient of asset based lending policies indicating the rate of change of consumption with each unit of change in asset based

lending policies. It indicates a inverse relationship of asset based lending policies as a parameter of credit access with consumption that is not significant.

x_{b5} with a value of negative 0.046 is the coefficient of cost of credit indicating the rate of change of consumption with each unit of change in cost of credit. It indicates a inverse relationship of cost of credit as a parameter of credit access with consumption that is not significant.

x_{b6} with a value of negative 0.307 is the coefficient of informal tenancy arrangements indicating the rate of change of consumption with each unit of change in informal tenancy arrangements. It indicates a inverse relationship of informal tenancy arrangements as a parameter of credit access with consumption that is not significant.

with a value of 1.457 is the disturbance factor in the study.

DEPAW KIMATHI UNIVERSITY OF TECHNOLOGY

CHAPTER FIVE: SUMMARY OF FINDINGS, DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The chapter deal with the discussion of results from the analysis of the data collected on the role of labour and credit and their interactions, makes conclusions from the analysis and derives recommendations from the findings.

5.2 Summary of Findings

Among factors affecting food security only 23% could be explained by the factors that were tested in the regression model. 77% of the factors are those that had been intentionally omitted as they had already been researched on intensively in previous research cited elsewhere. Labour supply and credit access had an overall significant effect on food security among small scale tea farmers in Kenya as the results were significant at a p value of 0.007 which was less than the set confidence level of 0.05 in the study.

5.2.1 The Role of Labour Supply on Food Security

When the factors affecting labour supply were tested in the regression the results indicated that labour supply by women was significant as per Irvine (1996), Yeshe (1997) and Ongile (1996). Labour and non labour incomes were also significant as per Anderson (2002) and Babikir (2007).

5.2.2 The Role of Credit Access on Food security

Only bureaucratic formalities among all factors tested in credit access as a variable was significant as supported by Francis (2011).

5.2.3 The Moderating Effect of Credit Access on Labour Supply

Credit access did not have a moderating effect on labour supply among the respondents. This disagrees with the study by Ursula (2006) that found out that credit access affected

child labour. Credit borrowed for nonfarm enterprises increased child labour while credit targeted at farm enterprises tended to reduce child labour.

5.3 Discussions of Results

5.3.1 Evaluation of the Role of Labour Supply by Women and Children on Food Security among Small Scale Tea Farming in Kenya

Respondents ranked wage rate the highest among factors of labour supply impacting on food security on the Likert scale. This was followed closely by labour from women. The findings on women labour were in agreement with the one way ANOVA result and the regression analysis that also indicated women labour to be significant. Women labour was significant at 0.006 from the results of regression which agrees with Ongile (1996) among other gender studies on role of women labour.

Labour migration was ranked second from last by the respondents on a Likert scale which did not conform to the one way ANOVA test that indicated the factor as not significant. The regression analysis also indicated labour migration as not significant. Others that were not significant were gender, age of household members, wage rate and child labour.

Respondents considered child labour as least important on the Likert scale at 38.4%, This was indicated as not significant by the ANOVA. Child labour was also confirmed by the regression analysis as not significant.

The regression analysis that indicated a coefficient of positive 0.124 for wage rate was in conformity the findings by Francis (2011) that found out that wage rate had a negative effect on farm employment. It was also scored highly by the respondents as affecting food security. The findings were in also in agreement with Goodwin and Mishra (2004) and Kanwar (1989) which found out that the extent to which household seek off farm employment and not farm employment is dependent on nonfarm wage rate. Findings by Yeshe (1997) conform to the above findings that show as high as 75.3% of women labour as affecting food security. Yeshe had indicated that 85% of women are in farming, while Senait (2000) indicated women labour puts pressure on food security.

Labour and non labour incomes although scored at fifth position were found to be significant by the regression analysis. This was in agreement with Anderson (2002) who indicated that incomes alter farm labour supply.

Among the factors in the regression, women labour had the second strongest relationship to food security (Adjusted coefficient of 0.407) after bureaucratic formalities.

Child labour was found not to be significant and was ranked low by respondents. The regression indicated a positive relationship of child labour with food security.

5.3.2 Assessment of the Role of Credit Access on Food Security among Small Scale Tea Farming in Kenya

Cost of credit was ranked highest by respondents on a likert scale followed by asset based lending policies. Informal tenancy arrangement was ranked least. Although credit supply was ranked third it was found not to be significant. The rankings were in conformity with the one way ANOVA test. The regression analysis indicated a direct relationship of credit supply with food security towards food production and a direct relationship between credit supply and food security in tea production which were both not significant. The study indicated that 20% to 40% of credit borrowed is spent on either food or tea production, which agrees with Nyoro and Whittaker (1986). The study by Nyoro and Whittaker had found out that small scale farmers divert credit to other household activities.

Cost of credit discourages farmers from borrowing. The fact that cost of credit was ranked highly by respondents was in conformity with the findings that on average respondents borrowed as low as Shillings 50,000 and agrees with Adams and Nehman (1979) and Gonzalez (1981) who indicated that small scale farmers are discouraged from borrowing from formal institutions by cost of credit. The coefficient of cost of credit was negative 0.046. Asset based lending was also ranked highly and had a coefficient of negative 0.031. Land is key in access of credit by small scale farmers. Informal tenancy also had an inverse relationship with food security.

The findings on credit supply for food production in regression analysis was in conformity with Ursula, (2006) study in Peru, that indicated a inverse relationship of child labour in households that borrow credit for farm production. Bureaucratic formalities were found significant in both one way ANOVA and regression at a 0.430 coefficient. This agrees with Francis (2011). It implies less commitment to credit and hence higher consumption as per Angels law. The law stipulates that food consumption decreases with increase in income. Credit essentially reduces income in the short run. The positive relationship of credit with child labour in small scale tea production could be explained by Jacoby (1994) study in Peru that concluded that credit constraints increases child labour. This is also in line with the inter household bargaining framework.

Yields of food maize were on average at one (90kgs) bag per household from the study despite access to credit. This agrees with Nosira (2010) in a study in Nigeria that indicated that credit did not positively contribute to levels of farm output.

On average only 41% to 60% of tea incomes is spent on food while the study indicates that own food produced does not meet household requirements. The findings are in agreement with Bear (1984) and Stockbridge (2007) that separately found out that despite household engaging in market production they still experience decline in food consumption.

5.3.3 Analysis of the Moderating Effect of Credit Access on Labour Supply

Correlation analysis establishes the direction and degree of association between any two variables. The coefficient of correlation varies between negative one and positive one (-ve 1 $r_{x_{ai},x_{bi}}$ +ve +1). Credit access had correlations of less than 0.4 for all factors tested in the study ($r_{x_{ai},x_{bi}}$ 0.4) with labour supply. All the coefficients were negative except for women labour in food production This agrees with Ursula (2006), a study in Peru that indicated an inverse relationship especially for child labour in household that borrow credit for farm production.

5.4 Conclusions

5.4.1 Evaluation of the Role of Labour Supply by Women and Children on Food Security among Small Scale Tea Farming in Kenya

There was an overall significant difference between labour supply and food security, hence the Null hypothesis, H_0 was rejected. When separately analyzed women labour and labour and non labour incomes as independent variables affect food security in small scale tea farming.

Small scale tea industry in Kenya has experienced increasingly high labour constraints. Currently labour costs up to 70% of the tea monthly advances per each Kilogram picked and delivered to collection centers. It is the high labour scarcity caused by human migration that has greatly pushed the costs up. Women and children who are inadvertently left behind by men migrating to urban centers for nonfarm labour driven by higher real wage rates are essentially the providers of manual labour in either small or large scale tea farming. Their occupation with tea has left them with little time for food production. Much of the income earned from labour goes to food. Poverty and malnutrition remains high in the tea areas. It is women and children who suffer the impact of this fate. Addressing labour issues will hence help relieve the much needed labour from women required for food production. The one sure way to reduce labour demand on women is to make the tea enterprise attractive to enable it meet labour cost and break even, contain the rising labour demands in line with international labour laws and even encourage use of technology in supply of labour. One way to utilize technology in labour demands is introduction and integration of tea picking machines but in a way that is acceptable to all stakeholders to avoid backlash from labour unions. Increasing non labour incomes through diversification in enterprises that are gender friendly and which have high value for scarce labour. In totality this approaches calls for improved management of the tea enterprise and investment in the rural areas in order to attract investments that discourage reverse migration and hence labour supply. Ensuring access to credit for farm investment has been shown to reduce child labour and increase insurance for future earnings in households. The stakeholders could therefore address the complex web of credit supply to indirectly address child labour.

5.4.2 Assessment of the Role of Credit Access on Food Security among Small Scale Tea Farming in Kenya

There was a significant difference between credit access and food security, hence the Null hypothesis, H_{e2} is rejected. Separately bureaucratic formalities as a factor affect credit access and hence food security. Small scale tea farmers in Kenya have been shown to record the highest poverty levels at 51% on average. Despite the rosy picture on performance of the tea sector nationally, the small scale tea farmers continue to experience low levels of well being and investments. The complex web of credit supply and access especially as it pertains to the informal sources put the tea farmers in a vicious cycle. Farmers earn to pay debts. Advances on credit are available to the small scale tea farmers from both formal and informal sources. It is the informal sources that dominate the sources and this could partly explain the why small scale farmers are in a vicious debt cycle due to the high costs of credit. Addressing the credit access variable in its relation to food security could guarantee that small scale tea farmers spread their risks while borrowing against cheaper and secure sources. Government could therefore ensure viable private public partnerships in provision of credit that is sustainable. Similarly Government could play a positive role in legislation that reduces bureaucracies that hinder credit access and also increases costs of credit.

5.4.3 Analysis of the Moderating Effect of Credit Access on Labour Supply among Small Scale Tea Farmers in Kenya

There was no significant effect on the moderating effect of credit access on labour supply. The Null hypothesis, H_{e3} fails to be rejected. Since the correlation coefficients ($r_{x_{ai}, x_{bi}}$) for all factors affecting labour supply and credit access were below 0.4 they are considered weak and not important ($r_{x_{ai}, x_{bi}} < 0.4$). Only correlations above 0.7 are considered significant. Although other studies indicate that credit access is inversely correlated to labour supply especially for women and child labour the relation under small scale tea farming environment seems to be different. Ursula (2006) indicates that credit borrowed for nonfarm enterprises increase both women and child labour. In reverse credit borrowed for farm enterprises reduces both child and women labour. The informal

rules on credit provision operating under small scale tea sector underscores the inconsistency observed. Controlling credit provision and by extension providing cheaper affordable and accessible credit to tea farmers to cushion them from exploitation could ensure that credit plays a positive role in the growth of the sector and provides opportunities for food security among the tea farmers.

5.4 Recommendations

There is need to address issues of women labour and labour and non labour incomes as factors determining labour supply from this study findings. Bureaucratic formalities as a factor of credit access also needs to be addressed among factors determining food security for small scale tea farmers by the stakeholders in order to effectively deal with food security challenges as addressed in this study. Bureaucracy has been shown to increase costs of credit through increasing costs of processing credit. Tea farmers may require integration of services under one roof and reduction of requirements for credit access. There is need to have new legislations that regulates players of credit supply in the tea sector while introducing special credit terms that are consistent with good industry practice.

5.6 Suggestions for Further Research

Labour and non labour income was only significant in the regression but not in the one way analysis of variance as pertaining labour supply. It is important to further investigate this factor of labour supply as it relates to either or both genders. Labour and non labour incomes form a key component of revenues in small scale tea households and cannot therefore be ignored.

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APPENDICES

Appendix I: Sample Frame for Kirinyaga, Kiambu, Murang'a and Nyeri Counties.

	County	District	Factory	No of growers	Per cent of Growers	Sample size per factory
1	Kirinyaga	Kirinyaga Central	Mununga	8801	5.3%	4
			Kangaita	5918	3.6%	2
		Kirinyaga East	Kimunye	8697	5.3%	3
			Thumaita	11,500	7.0%	5
		Subtotal Kirinyaga County				34,916
2	Nyeri	Mathira East	Ndima	2764	1.6%	1
			Ragati	7438	4.5%	3
			Ragati	1	0%	0
		Tetu	Gathuthi	7324	4.4%	3
		Nyeri South	Chinga	6388	3.9%	2
			Iriani	5734	3.5%	2
			Gitugi	4955	3.0%	2
		Subtotal Nyeri County				34,604

3	Muranga	Muranga West	Kanyeyaini	9083	5.5%	4	
		Mathioya	Kiru	7386	4.5%	3	
			Gatunguru	7424	4.5%	3	
		Kigumo	Ikumbi	6334	3.8%	3	
			Gacharage	5034	3.7%	2	
			Makomboki	5666	3.4%	2	
		Kahuro	Githambo	8892	5.4%	3	
		Kandara	Nduti	5482	3.3%	3	
		Gatanga	Ngere	7341	4.4%	3	
			Njunu	3934	2.4%	1	
Subtotal Muranga County				66,567	40.9%	27	
4	Kiambu	Limuru	Unilever	142	0.0%	0	
			“	Karirana	376	0.2%	0
			“	Maraba	231	0.1%	0
		Gatundu South	Theta	7601	4.64%	3	
		Gatundu North	Mataara	3927	2.39%	1	
			Gacege	4244	2.59%	2	
			Gakoe	1	0.0%	0	

		Githuguri	Kambaa	4800	2.93%	2
		Lari	Kagwe	6325	3.86%	3
Subtotal Kiambu County				27,647	16.88%	11
5	Nyandarua	N/A	N/A	0	0	0
Sample totals				163,734	100%	65

Source: Kenya Tea Development Authority 2011 Registers

DEDAN KIMATHI UNIVERSITY OF TECHNOLOGY

Appendix II: Kenya Tea Development Authority Registered Tea Factories in Kenya

Weru Tea Factory	Mundete Tea Factory	Kinoro Tea Factory
Tombe Tea Factory	Mumul Tea Factory	Kimunye Tea Factory
Tirgaga Tea Factory	Mogogosiek Tea Factory	Kiegoi Tea Factory
Thumaita Tea Factory (kirinyaga)	Michimikuru Tea Factory	Kiamokama Tea Factory
Theta Tea Factory (Kiambu)	Mataara Tea Factory (Kiambu)	Kebirigo Tea Factory
Tegat Tea Factory	Maraba Tea Factory (Kiambu)	Kathangariri Tea Factory
Sanganyi Tea Factory	Makomboki Tea Factory (Muranga)	Kapset Tea Factory
Rukuriri Tea Factory Co Ltd	Litem Tea Factory Co Ltd	Kapsara Tea Factory
Ragati Tea Factory Co Ltd- KTDA (Nyeri)	Kiru Tea Factory Co Ltd (Muranga)	Kapkoros Tea Factory
Ragati Tea Factory Co Ltd- Private (Nyeri)	Kionyo Tea Factory	Kapkatet Tea Factory
Ogembo Tea Factory Co Ltd	Githongo Tea Factory	Kanyenyaini Tea Factory (Muranga)
Nyansiongo Tea Factory Co Ltd	Githambo Tea Factory (Muranga)	Kangaita Tea Factory (Kirinyaga)
Nyankoba Tea Factory	Gianchore Tea Factory	Karirana Tea Factory (Kiambu)
Nyamache Tea Factory	Gatunguru Tea Factory (Muranga)	Kambaa Tea Factory (kiambu)

Njunu Tea Factory (Muranga)	Gathuthi Tea Factory (Nyeri)	Kagwe Tea Factory (Kiambu)
Ngere Tea Factory (Muranga)	Gachege Tea Factory (Kiambu)	Iriani Tea Factory (Nyeri)
Nduti Tea Factory (Muranga)	Gacharage Tea (Muranga)	Imenti Tea Factory
Ndimba Tea Factory Co Ltd (Nyeri)	Chinga Tea Factory Co Ltd (Nyeri)	Ikumbi Tea Factory (Muranga)
Mununga Tea Factory (Kirinyaga)	Chebut Tea Factory	Gakoe Tea Factory (Kiambu)
Mungania Tea Factory	Unilever Tea Factory-Private (Kiambu)	Gitugi Tea Factory

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