ESSAYS ON TOBACCO IN KENYA

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Declaration

This thesis is my original work and has not been presented for examination for a degree in any other University

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I

Dedication

This thesis is dedicated to my family. My father Meshack Magati, my mother Penina Moraa (now deceased) who dreamt with me of this moment, my sisters Prisca Nyakerario, Villa Mwatsama, Christine Ombaye, Ann Gesare and Karen Moraa. I also acknowledge my second mother Eunice Magati. Thank you for your support, prayers and encouragement. I especially owe this to my mother, who from an early age encouraged me to pursue studies to the very end. She, together with my father, sacrificed everything, denied themselves and fought to ensure I received the very best education.

I am particularly indebted to my dear wife Edna Chiru Magati. Many times you provided for our family, sometimes giving up your dreams so that I can concentrate on my studies. Many nights you endured loneliness, solely assumed responsibility at night to take care of our son while I tried to meet many deadlines; you have been my biggest fan throughout this journey. Together with our children Ethan Omariba Magati and Penina Dama Magati, you have been my biggest supporters.

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List of Abbreviations and Acronyms

ATSA	African Tobacco Situational Analysis
BAT	British American Tobacco
CPHO	Chief Public Health Officer
CSDH	Commission on Social Determinants of Health
DHS	Demographic and Health Survey
EMC	Emission Reduction Concepts
FCTC	Framework Convention on Tobacco Control
GATS	Global Adult Tobacco Survey
GDP	Gross Domestic Product
GPS	Geographic Positioning System
GYTS	Global Youth Tobacco Survey
IV	Instrumental Variable
ITC	International Tobacco Control
KIHBS	Kenya Integrated Household and Budget Survey
MOA	Ministry of Agriculture
MTK	Mastermind Tobacco Company of Kenya
NCDs	Non-Communicable Diseases
OLS	Ordinary Least Squares
QCES	Quadratic Conditional Engel Curves
QUAIDS	Quadratic Almost Ideal Demand System
KTCA	Kenya Tobacco Control Act
WHO	World Health Organization

Definition of Terms

Tobacco use – Habitual consumption of any product from tobacco leaf either through primary or secondary smoke.

Tobacco consumption – All processes in the use of tobacco to satisfy human wants.

Prevalence – Percentage of the population who use any type or form of tobacco product. These include cigarettes, snuff, cigars, shisha pipes, etc.

Smokeless tobacco – Non-combustible tobacco such as chewing tobacco, snuff and gutkha

Essential household expenditure items – Recurring living expenses in the households, e.g. transport, electricity, food, clothing, education, water etc. These are captured in the expenditure survey.

Tobacco contract farming – Tobacco leaf production where the farmer has a working and committed relationship with the tobacco leaf buying company. The farmer is given production inputs on credit and extension services and in turn agrees to commit land resources and time to provide agreed quantities.

Independent Tobacco farming – Tobacco leaf production that involves farmers sourcing for their own inputs such as fertilizers, pesticides, insecticides, etc. They also rely on their own skills, experience and knowledge passed on from contracted farmers to grow tobacco before selling directly to leaf buying companies, brokers or contracted tobacco farmers.

Revenues/Benefits – Income earned from selling of tobacco leaf.

Costs–Consists of the potential loss of taxes that result from tobacco use, e.g. VAT, Excise Tax and Income Tax; loss of income generated from tobacco farming by tobacco farming households, and loss of income by those employed in tobacco enterprises in the country.

Abstract

Despite Kenya being a signatory to the World Health Organization Framework Convention on Tobacco Control (WHO FCTC) and passing of the Kenya Tobacco Control Act (KTCA) of 2007 as a commitment to reducing consumption and production of tobacco in Kenya, tobacco is becoming important in household and individual decision making. This is seen by the growth in per capita consumption over time and increase in the number of farmers farming tobacco in Kenya. This thesis sought to understand household and individuals' interactions with tobacco at both production and consumption levels to inform policy makers on effective interventions to minimize the impact of the tobacco problem in Kenya. The thesis is organized into three essays. Essay one assesses the determinants of tobacco use in Kenya, where maginal effects were used to estimate the determinants of tobacco use. This essay concludes that tobacco use in Kenya is influenced by many factors, such as age of the smoker, marital status, gender, county of residence, access to media, and ethnicity. The second essay assesses the causal impact of tobacco expenditure on consumption of other goods in a household and concludes that tobacco use reduces consumption of many household goods. Finally, the third essay examines the cost and returns of tobacco farming in Kenya and suggests that tobacco farmers generally experience small margins per acre, with contract farmers operating at a loss. The results from these essays will help guide policy makers in allocating the country's resources to reduce tobacco use in accordance with legislation and commitments by the country. Some of the policy implications drawn from the thesis include the development of a multi-sectoral public policy team tasked with identifying initiatives for tobacco control. Another policy recommendation is to make tobacco control integral in poverty alleviation strategies by the government because results suggest that tobacco crowds out consumption of basic commodities such as food, education and housing by the poor. The Ministry of Agriculture should create legal mechanisms to minimize exploitation of farmers by multinationals through contracts, while county governments should increase efforts to build capacity of farmers on how to compute farming profit.

Introduction

1.1 Background Information

1.1.1 Tobacco Consumption in Kenya

It is estimated that at least 6 million deaths and almost 4% of global diseases are a direct result of tobacco use (Forouzanfar et al., 2015). In Kenya, tobacco related diseases contribute directly to deaths of at least 6,000 annually. Despite this, over 2,737,000 adults and more than 220,000 children use tobacco each day (Eriksen et al., 2015). Kenya realized the risk emanating from tobacco use and ratified the World Health Organization Framework Convention on Tobacco Control (WHO FCTC) in 2004. This treaty controls use of tobacco in a county while at the same time regulating production of tobacco through promotion of alternative livelihoods to farmers of tobacco. To operationalize the WHO FCTC, the Kenya Tobacco Control Act (KTCA) was accented by Parliament in 2007. The Act provides the legal framework that regulates production of tobacco leaf, manufacture of cigarettes, and the sale and advertisement of tobacco products (Republic of Kenya, 2007a).

While there has been progress in regulating tobacco use through the KTCA 2007, data suggests mixed results in consumption pattern. The Global Adult Tobacco Survey (GATS)[1] 2014 report suggests overall prevalence in consumption of cigarettes in Kenyan adults as 11.6%. This is an increase from the 2004 World Health Survey[2], which put the figure at 10.8%. Efforts to control consumption among the youth seem to bear fruit. Data from the Global Youth Tobacco Survey (GYTS)[3] 2013 suggests that cigarette consumption among students of ages 13-15 years has reduced to 9.9% of students compared to 18.6% in 2009.

Kenya ranks highest in tobacco consumption among other African countries where GATS has been undertaken. Similar studies have been undertaken by WHO in Nigeria, Uganda, Senegal and Cameroon, with results indicating that tobacco consumption in Nigeria stands at 5.6%, Uganda at 7.9%, Cameroon at 8.9% while Senegal stands at 6.0%. It therefore suggests that in

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[1] Global Adult Tobacco Survey (GATS) is a survey carried out at household level. It tracks use of tobacco and prevalence rates, both of which are useful to this work.

[2] See the WHO Report on the Global Tobacco Epidemic (WHO, 2009).

[3] Global Youth Tobacco Survey (GYTS) is a survey carried out in schools with the target respondents being between the ages of 13-15 years. It provides information on use of tobacco, prevalence and level of knowledge and attitude towards tobacco use and products.

future, Kenya is likely to incur a relatively higher cost in treating tobacco-related diseases and therefore needs to undertake steps to control the product.

Total consumption of cigarettes increased substantially between 2006 and 2015. Consumption of cigarettes in the year 2006 was 3.6 billion sticks, while by 2015 it was 6.5 billion sticks (Republic of Kenya, various Statistical Abstracts). This is illustrated in Figure 1-1, which suggests that households are increasingly using tobacco products, making tobacco an important product in household resource allocation. With at least 40% of the population in Kenya living below the poverty threshold, and with constrained resources and tobacco's addictive nature, this would suggest that consuming tobacco could impact negatively on consumption of the rest of household goods and services. The relationship between per capita consumption of cigarettes and GDP per capita is presented in Figure 1-1. The relationship suggests that as per capita income rises, so does cigarette consumption in Kenya. There are spikes on the per capita consumption especially in 2009/2010 and 2014/2015. This could be attributed to government efforts to reign in on illicit tobacco trade that is widespread in Kenya because of counterfeits and under-reporting by the tobacco industry players on sales (ERC Group 2009, 2015). Successful raids and exposure of illicit trade would result in higher recorded cigarette consumption than years where illicit trade was not exposed.

Figure 1-1: Per Capita Tobacco Consumption and Per Capita GDP in Kenya
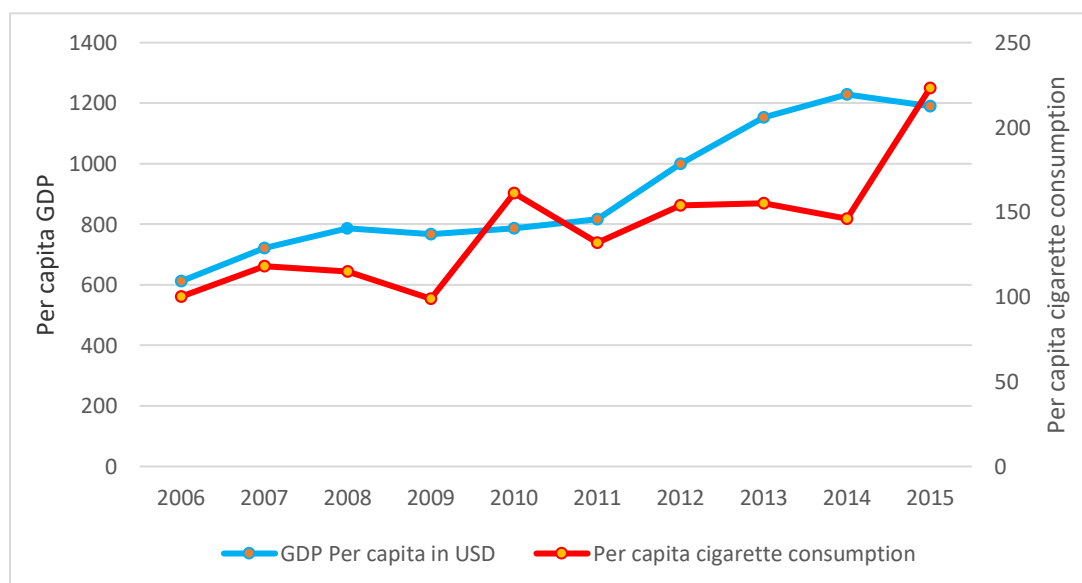
Source: Republic of Kenya, Statistical Abstracts 2007-2016

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1.1.2 Tobacco Production in Kenya

Three regions in Kenya grow tobacco for commercial purposes; that is, Migori County/South Nyanza region, Meru County/Eastern region and Bungoma and Busia counties/Western region (Figure 1-2). Generally, tobacco growing areas as per Gazette Notice of 1991 on tobacco farming rules by the Ministry of Agriculture are mainly limited to areas in Western, Eastern and South Nyanza (Republic of Kenya, 1991). However, South Nyanza (especially Kuria) has been the dominant growing zone, but massive deforestation has resulted to poor yields and productivity over time (Kibwage et al., 2008). This has resulted to the leaf companies expanding to the other gazetted areas for production (Kibwage, Netondo and Magati, 2014). Alliance One's foray into South Nyanza, and the high prices the company offers to farmers may be the reason British American Tobacco (BAT) and Mastermind Tobacco Kenya (MTK) have progressively moved operations to other regions. However, with Alliance One having exited the market in 2016 because of divesting from flue cured Virginia tobacco that is predominant in Kenya, it waits to be seen what impact this will have on the outgrower programmes of MTK and BAT in the South Nyanza region. Studies have shown that there are many households dependent on tobacco production, with the estimated number of tobacco growing households varying across time; 31,398 households in 1996, 29,000 in the year 2000 (World Health Organization, 2003), 35,000 in 2006 (Patel, Collin and Gilmore, 2007), and 55,000 households in 2011 (Kibwage, Netondo and Magati, 2014).

Figure 1-2: Regions Growing Tobacco in Kenya
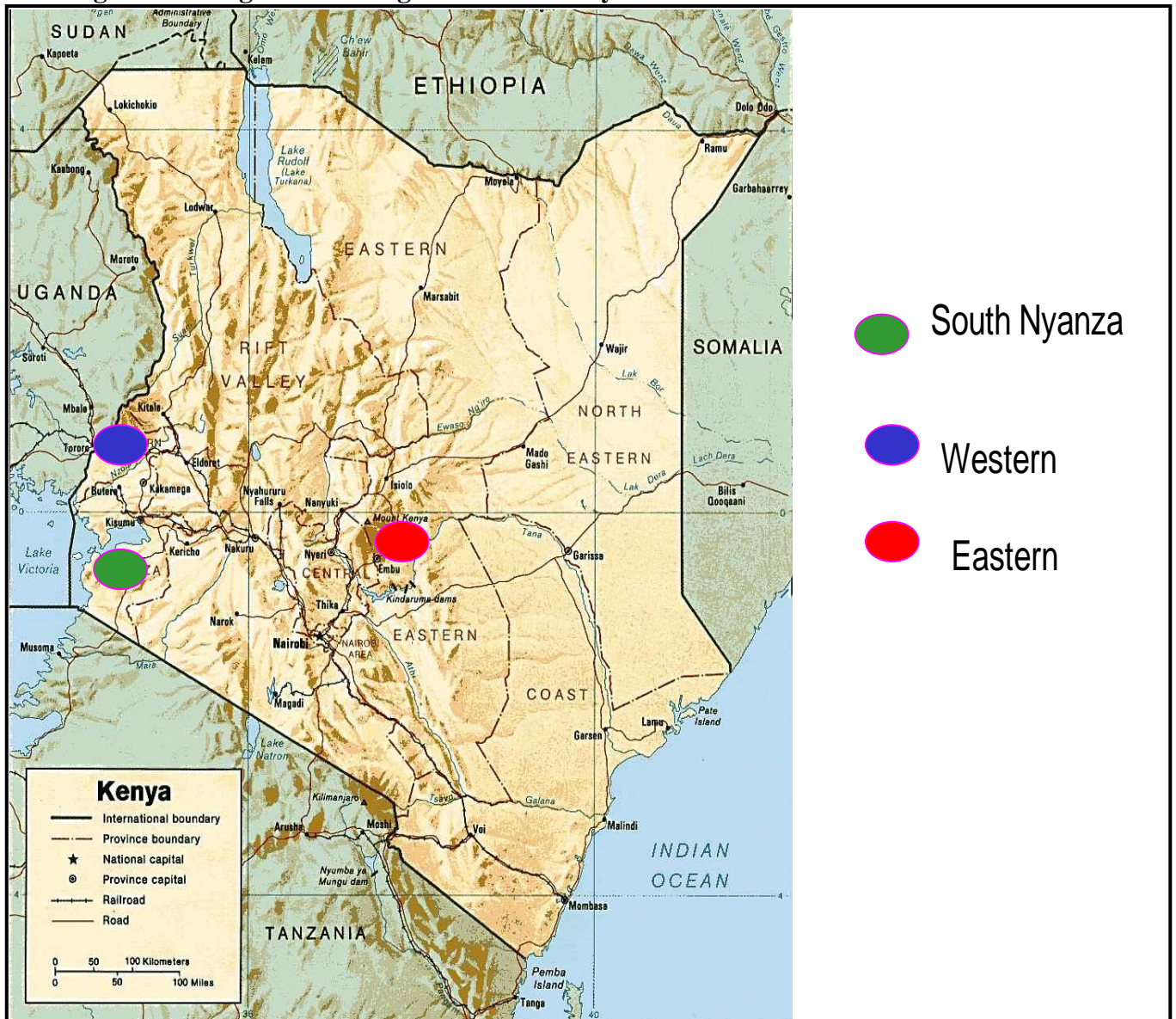
Source: Kenya Tobacco Control Research Group

Generally, tobacco is grown by smallholder farmers. The average holding for tobacco farming is one acre (Kibwage, Netondo and Magati, 2014) and farmers grow tobacco as either as independent or contract farmers. For contract farming, the three dominant tobacco firms in Kenya – BAT, Alliance One (until 2015) and MTK – assign themselves specific zones. In these zones, each provides extension services and inputs to contracted smallholder tobacco farmers on credit. Through this, the firms purchase outputs from farmers at predetermined prices at auction floors, with farmers not involved in determination of prices.

For independent farmers, tobacco growing involves farmers sourcing for their own inputs such as fertilizers, pesticides, and insecticides. They also rely on their own skills, experience and

knowledge passed on from contracted farmers as they do not benefit from extension services from the leaf buying companies. Afterwards, independent farmers deliver the tobacco leaf to the leaf collecting centers and get the opportunity to sell after contract farmers have already exhausted their leaf. Sometimes, leaf collecting companies ensure they also buy from independent farmers to encourage farmers in particular zones to grow tobacco. However, to avoid this uncertainty, most independent farmers get into informal contracts with contracted farmers whereby they supplement the contract farmers' leaf collection and receive a percentage of the sale. Most, however, sell their leaf to third parties known as brokers who have existing contracts as farmers with the leaf collecting companies. Brokers normally buy the leaf from independent farmers at very low prices (Magati et al., 2015). It is because of such uncertainties that most smallholder farmers get into contract agreements with the leaf buying companies.

The choice of contract farming offers several advantages for the smallholder tobacco farmers. These include the ability to deal with uncertainty in access to quality inputs, services and outputs by the smallholder farmers (Glover, 1984), access to newer technology (Goldsmith, 1985), and high incomes for the farmers (Minot, 1986). Contract farming also triggers a multiplier effect to the economies where tobacco is grown by creating employment, developing infrastructure and developing markets (Warning and Key, 2002).

The institutional arrangements between case of tobacco processing firms and smallholder tobacco farmers can have negative impacts. First, as analyzed by Benfica (2006), following Bardhan (1989), it is characterized by missing markets, information asymmetry, high transactional costs and market failures, thus justifying the presence of institutions that create efficiency in the distribution of resources (Cook and Chadaad, 2000). Second, as indicated above, the market for farmers to sell tobacco leaf is monopsonistic in nature, resulting in asymmetric bargaining where tobacco firms determine the price of the output and the contract conditions (Benfica, 2006). Sales would typically occur after farmers invested in specific assets for tobacco farming, such as the curing barns and stores and changed cropping pattern, which has caused many of these farmers to become more dependent on the crop. As a result of this dependence, the farmers further lose their bargaining power and find themselves accepting exploitative contract terms from the firms (Little and Watts, 1994). Also, because of weak legal systems in the rural areas and opportunistic behaviour of both parties, the cost of enforcing the contracts could be costly to both the firm and smallholder farmers, with instances where the contracted farmers are limited to those that are well off because the firms create a high bar for

volume and quality standard requirements, crowding out less endowed smallholder farmers (Benfica, Tschirley and Sambo, 2002).

The nature of growers that are contracted determine the level of success one would have in contract farming. For instance, if the firms contract primarily wealthier farmers, the likely effect is that contract farming arrangement will not directly benefit the poor farmers (Warning and Key, 2002). There is, however, a gap between the relationship between economic classification and contract farming, suggesting that further investigation is needed. The likely impact of tobacco contract farming as identified by Benfica (2006) is either a spillover effect on food crop farming because of availability of fertilizer use, or improvement in wage earnings. This is because tobacco, being a labour-intensive crop, results to an increase in wage demands and therefore a multiplier effect to the local economies because farmers tend to re-spend the cash earned from tobacco farming. It therefore makes sense to assess the spillovers in tobacco growing areas in Kenya.

1.1.3 Kenya Policy on Tobacco Production

Despite effort to regulate tobacco growing in Kenya through the WHO FCTC, agricultural policy has not been effective. Tobacco is classified as a non-scheduled crop by the Ministry of Agriculture (MOA). This classification means that no level of association takes place with the tobacco industry and no development resource is allocated to promote tobacco, including extension services. However, tobacco companies provide extension services to farmers contracted by them while other crops have not benefited from extension services since the onset of structural adjustment programmes in Kenya in the early 1990s (Kibwage et al., 2014). It therefore means that disassociation from tobacco has not impacted negatively on tobacco leaf production. Further, the Ministry of Agriculture (MOA) does not have a budget line towards tobacco control activity. This lack of attention has resulted in no funds being allocated towards building the capacity of farmers as advised in Article 17 and 18 of the WHO FCTC[4] and provisions of the Kenya Tobacco Control Act (KTCA)[5], where the government has undertaken to reduce tobacco production and promote alternative livelihoods. The farmers are therefore not informed of this commitment from the MOA, under which they operate. This can be

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[4] The WHO FCTC is a treaty developed to control tobacco epidemic. It places importance of demand reduction through various articles impacting on trade, prices and advertising strategies and supply issues as outlined in Article 17which looks at alternative livelihoods for tobacco farmers and producers.

[5] The Kenya Tobacco Control Act passed in 2007 is the law governing tobacco control in Kenya suggesting various implementation mechanisms to control tobacco use.

observed from MOA's classification of tobacco as an industrial crop, making it important in the agricultural sector development and leaving the leaf companies to expand to other regions in Kenya.

1.2 Statement of the Research Problem

Despite the provisions of the KTCA of 2007 and the WHO FCTC, which aim at reducing consumption and production of tobacco in Kenya, tobacco is becoming important in household and individual decision making. This is seen by the rise in cigarette consumption per person over time and the growth in the number of farmers growing tobacco. Results of the GATS 2014 suggest that up to 11.6% of Kenyan adults use tobacco products. Smallholder tobacco farmers have also been increasing over time, with Mureithi (2003) estimating the number in 2003 at 29,000; Patel, Collin and Gilmore (2007) having an estimate of 35,000 farmers and recent statistics by Kibwage, Netondo and Magati (2014) at 55,000. Understanding household and individuals' interactions with tobacco at both production and consumption level can inform policy makers in coming up with effective interventions to minimize the impact of the tobacco problem in Kenya.

1.3 General Objective of the Thesis

The general objective of this study was to assess the determinants of tobacco use, the impact tobacco use has on consumption of other goods, and returns of tobacco farming in Kenya.

1.4 Research Questions

The following research questions were addressed in this thesis:

a) How do socio-economic, demograhic and geographic factors influence tobacco consumption in Kenya?

b) Does tobacco consumption influence household consumption of other goods?

c) Does farming tobacco on contract impact positively on farmers' income?

1.5 Objectives of the Thesis

The study has four specific objectives:

a) To explore the socio-economic, demographic and geographic determinants of tobacco use in Kenya;

b) To determine effects of tobacco expenditure on household consumption in Kenya;

c) To examine the costs and returns of tobacco farmers in three tobacco growing regions in Kenya;

d) Draw conclusion and policy recommendations from the findings of (a) through (c).

1.6 Methodology

This section presents the methodology used and covers the conceptual and theoretical frameworks.

1.6.1 General Conceptual Framework

The conceptual framework developed in this section aims to reflect the tobacco ecosystem in Kenya and decisions made by tobacco users and the smallholder tobacco farmers. The structure of decision making and resulting outcome is shown in Figure 1-3.

The tobacco ecosystem in Kenya consists of tobacco consumers and producers. For consumers, use of tobacco is aimed at utility maximization, while for producers, *ceteris paribus*, production of tobacco is to maximize earnings from an economic activity. The decisions undertaken by the two economic groups have a direct bearing on economic or public health impact – two aspects that are important in examining how tobacco operates in Kenya.

Figure 1-3:Tobacco in Kenya: Conceptualization
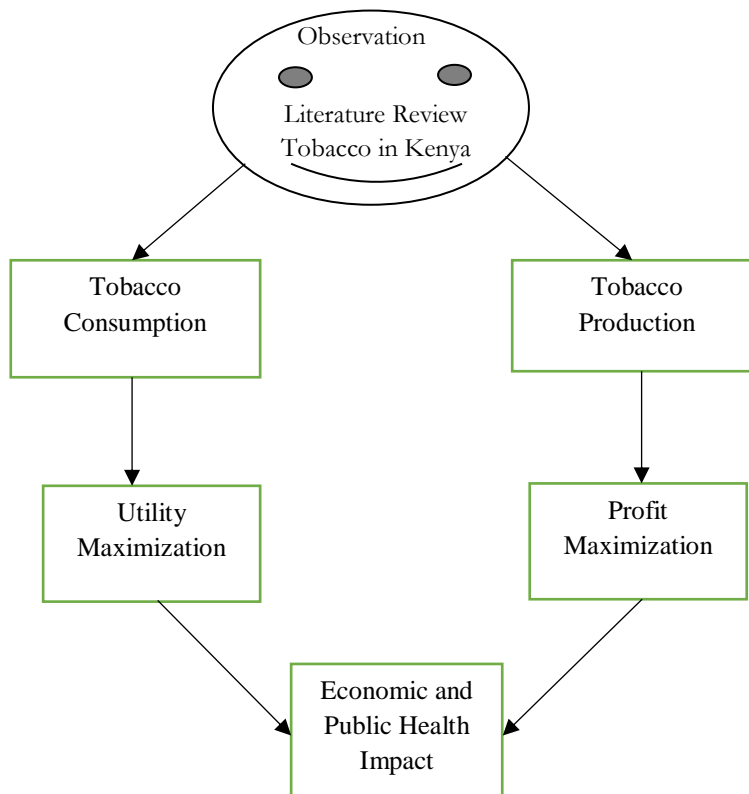
Source: Author's Conceptualization

1.6.2 Theoretical Framework

This thesis adopts three theoretical frameworks from relevant economic theories of each essay. Essay one and two deal with consumer theory while essay three deals with profit maximization. It follows, therefore, that the theoretical framework laid down for the first two essays is based on utility maximization while the third essay is based on profit maximization. The theoretical framework for Essay one is covered in Section 2.4 of this thesis, for Essay two in Section 3.4, while for Essay three in section 4.4.

1.6.3 Econometric Issues

Chapters 2 and 3 use the Kenya Demographic and Health Survey (KDHS) and the Kenya Integrated Household and Budget Survey (KIHBS) data sets, respectively, in addressing the objectives. However, there are econometric issues associated with the use of the data sets. First, missing values was the most common limitation in econometric analysis. Care was therefore placed to clean the data and ensure missing values did not create bias in the results. Another problem especially in addressing the second objective was endogeneity. The thesis, however,

made use of instrumental variables to correct for endogeneity and use of more explanatory variables in the model.

1.7 Contribution of the Thesis

Tobacco use and production are increasing in the country. Data suggests that there has been an increase in cigarette consumption, and prevalence from 2006 to 2015. In addition to this, leaf production has been rising. There is a major gap in the literature on resource allocation as pertains to tobacco – and to the best of my knowledge, no study has evaluated the economic decisions that tobacco consuming and/or producing households and individuals make in Kenya. There are a few scientific papers and works published in peer-reviewed journals or books about Kenya. These include Kibwage, Netondo and Magati (2014) that reviewed tobacco farming status in Kenya; Magati et al (2012) that evaluated costs and benefits of substituting bamboo for tobacco in South Nyanza, Kenya; Kibwage, Odondo and Momanyi (2008) that assesses assets and livelihood practices of both farmers that grow tobacco and those that grow other crops than tobacco in South Nyanza, Kenya; Patel, Collin and Gilmore (2007) evaluating political influence by tobacco firms in policy; and Kibwage, Momanyi and Odondo (2007) that assesses health and safety concerns of tobacco farmers. This research therefore seeks to contribute to the tobacco debate through evaluation of factors influencing tobacco use, assessing the extent to which tobacco consumption eliminates consumption of other household goods, and evaluate whether tobacco use impacts positively on farmers' income.

1.8 Organization of the Thesis

The rest of the thesis is organized into three essays. Essay one explores the socio-economic, demographics and geographic determinants of tobacco smoking in Kenya. The impact of tobacco expenditure on household spending patterns in Kenya is determined in essay two while essay three examines the economic analysis of tobacco farming livelihood in Kenya. Finally, chapter 5 gives policy implications and conclusion of the thesis.

Essay One: Determinants of Tobacco Use in Kenya

2.1 Introduction

2.1.1 Background

Despite making effort to control tobacco use in Kenya, cigarette consumption has continued to increase. Data shows that total consumption of cigarettes increased substantially between 2006 and 2015. Consumption of cigarettes in the year 2006 was 3.6 billion sticks, while by 2015 it was 6.5 billion sticks (Republic of Kenya, various Statistical Abstracts). Every year, more than 6,000 Kenyans die of tobacco-related diseases, while more than 220,000 children and more than 2,737,000 adults continue to use tobacco each day (Eriksen et al., 2015). Additionally, 79 men and 37 women are killed each week because of tobacco use (Eriksen et al., 2015).

There are many societal and economic factors that contribute to the initiation and continued use of tobacco. The WHO notes the importance of socio-economic factors in influencing tobacco use. In 2005, the WHO created the commission on social Determinants of Health (CSDH), which focuses on "social justice" on health investments. CSDH generally purposes to encourage investigation into "gradients of health", which refer to the large observable differences in health outcomes within and between countries that are determined by circumstances that can be avoided under the leadership of Ministries of Health but causes health inequalities. Understanding these determinants and factors is important when coming up with intervention policies, as scarce resources will be directed towards the factor and socio-economic dynamic that has the highest influence. This is more so because tobacco use starts as a social habit before an individual that consumes the product finds himself or herself dependent on it.

2.1.2 Research Problem

A comparison of smoking prevalence in Africa for countries where GATS has been undertaken suggests that prevalence in Kenya is high. The 2014 GATS report suggests that 11.6% of Kenyan adults use tobacco products. In Nigeria, it stands at 5.6%, Uganda at 7.9%, Cameroon at 8.9% while Senegal stands at 6.0%. Further, 370,000 Kenyans of between 30-70 years die of non-communicable diseases annually, with tobacco contributing highest in these numbers (WHO, 2014). Tobacco consumption patterns vary in regions, sub-groups, gender, education levels and other socio-demographic factors (Boffetta et al., 2008; Gajalakshmi et al., 2004). In Kenya, little is known about the determinants of tobacco use and tobacco consumption among different population groups. With this limited data, it becomes challenging to describe trends in

consumption and the role socio-economic dynamics have in tobacco use initiation and continued use.

The main objective of this paper, therefore, is to assess the determinants of tobacco use in Kenya to understand why prevalence is high, and the factors that contribute to this. Understanding these determinants and factors is important when coming up with intervention policies, as scarce resources will be directed towards the factor and socio-economic dynamic that has the highest influence.

2.1.3 Research Objectives

The general objective of this study is to assess the determinants of tobacco use in Kenya. The specific research objectives are:

a) To assess the determinants of tobacco use in Kenya to understand factors that contribute to tobacco use.

b) To draw conclusions and policy recommendations from the findings.

2.1.4 Contributions

As is illustrated in the conceptual framework in section 2.3 below, there are many societal and economic factors that influence the initiation and continued use of tobacco. To ensure effective interventions that minimize wastage of resources, understanding these determinants becomes important because of their contribution to utility of individuals. This is because resources, which are generally scarce, will be directed towards the factors that have the highest influence. Also, Kenya will be able to find the optimal resource allocation in tobacco control and public health intervention as the country can estimate the prevalence rate and the socio-economic determinants in tobacco use. Despite the need to study the factors that determine tobacco use, there are a few empirical studies that look at the determinants of tobacco use in Kenya. This study aims to fill this gap.

2.2 Literature Review

2.2.1 Theoretical Literature

Theory of "Bounded" Rational Addiction

This section relies on rational addiction model that assumes that an individual's addictive behaviour is "bounded rationally" (Suranovic et al., 1999). This follows the original rational

addiction theory based on the assumption that three things determine a smoker's utility at any given point in time; i.e. his addictive consumption at that point, his non-addictive consumption at the same time, and his stock of past addictive consumption (Becker and Murphy, 1988). However, Orphanides and Zervos (1995) relaxed the assumption of informational heterogeneity because of limitations regarding smoking risks, addiction and preferences that a smoker may presently have. Suranovic et al (1999) follow this latter version of the model.

While Becker and Murphy (1988) assume that individuals maximize life time utility, Suranovic et al. (1999) assume that a consumer chooses what to consume today without making 'inhuman' calculations or how the future that is not known presently should be reorganized to accommodate that desire. With such informational limitation, decisions are made by a consumer with short time horizons in mind, and without necessarily considering long term impacts of tobacco use. This is particularly important in the study because it has been established that among young smokers, initiation into cigarette use is a symbolic act of "maturity or rebellion". Jarvis (2004) concludes that by the time tobacco users reach 20 years, 80% of them regret the habit – an important observation that is not captured in Becker and Murphy (1988). Using the assumption that an individual's tobacco consumption is "bounded rationally", therefore, we would be able to use data from the 2014 DHS survey without having to review past and future consumption habits of households.

In conclusion, therefore, tobacco use can be influenced by any socio-economic, demographic and geographic factors identified in one data set, such as employment, education, marital status, advertisement, nature of occupation, religion or habits adopted in the period a survey is undertaken without necessary considering past or future changes.

Social Cognitive Theory

This theory attempts to explain how substance abuse, including tobacco use, is acquired, maintained and abused as suggested by the social learning theory (Bandura, 1977). It seeks to explain how addictive behaviour such as smoking is acquired, how it is maintained and how people abuse it. This theory is a component of behaviourism. It suggests that progressive but intense interaction between a person and their environment mediated through cognitive processes influence behaviour (Doku, 2011).

Bandura (1986) suggests that three cognitive factors are important predictors of behaviour. These are observational learning, perceived reward/punishment of the behaviour and self-efficacy. For observational learning, the implication is that people learn from observing others and the

consequences of their actions, a clear process of social learning or role modelling in people (Doku, 2011). It is through this process that people, especially the young, acquire tobacco smoking habits where they adopt behaviours of their parents and peers (Turner et al., 2004, Schepis and Rao, 2005; Gilman et al., 2009; Villanti et al., 2011). Self-efficacy has to do with the ability of an individual to believe in own ability to either take up or resist a habit. For non-smokers, for instance, this is exhibited by their resistance to temptation to start smoking or for smokers to have courage to quit smoking. It therefore follows that people with low self-efficacy, especially adolescents, have a lower probability of quitting smoking and higher probability of being initiated into smoking (Engels et al., 1998). Regarding reward/outcome of a behaviour, the ability to steer off initiation, continuous use of tobacco and quitting is exhibited (Tyas and Pederson, 1998; Rudatsikira et al., 2010).

In conclusion, therefore, the theory suggests that socialization of a person is an important determinant of tobacco use. Therefore, peer influence and upbringing are important determinants of an individual's decision to consume tobacco or not.

2.2.2 Review of Relevant Literature

Available literature on tobacco use in Kenya mainly covers the prevalence rates. GATS (2014) estimated that 2.5 million adults were using tobacco in 2014, with prevalence rates standing at 11.6% (19.1% male and 4.5% female). The GYTS (2013) estimated that 9.9% of students aged 13-15 years used some form of tobacco products in 2013 (12.8% being boys and 6.7% being girls). While both the GATS and GYTS have given indicative statistics on tobacco use in Kenya, they do not provide information on the determinants that initiate people into tobacco use.

The WHO suggests that 370,000 Kenyans of between 30-70 years die annually of non-communicable diseases, with tobacco use contributing the highest number in these cases (WHO, 2014). The number is based on the first ever international cohort study of tobacco use that uses a systematic evaluation to measure the behavioural and psychological impacts of the key WHO FCTC policies at population levels. While the study assesses the impacts and identifies determinants of effective tobacco control policies, it does not examine what initiates people to tobacco use.

Several studies have attempted to explain the factors that predispose an individual to tobacco use. John, Ross and Bleacher (2012) examine the determinants of smoking and estimate the extent tobacco use influences consumption of other household commodities. They used a

multivariate logistic regression to estimate the probability of smoking by individuals, given a set of socio-economic and demographic characteristics in the 2004 Cambodia Socio-Economic Survey. Their results suggest that smoking is influenced by factors such as gender, ethnicity, marital status of individuals, health and what people perceive as the consequences of smoking to their health.

Yawson et al. (2013) examined the socio-demographic characteristics, subjective well-being of tobacco uses and health risks among elderly persons in Ghana. The study used odds ratio (OR) to examine the relationship between tobacco consumption and socio-demographic, health risk, and life satisfaction. Further, the study conducted a logistic regression to determine the variables that predict tobacco use among elderly persons. The variables considered included sex, age, ethnicity, and marital status. The results showed that elderly men living in rural areas had high incidences of tobacco use, as was in those with reduced life satisfaction and chronic ill health. It also showed that elderly persons have stopped using tobacco – an observation attributed to effective public health intervention such as anti-smoking campaigns and improved access to health.

Reda et al. (2012) examined the determinants of cigarette use among adolescents in Ethiopia using a multivariate logistic regression. The results suggest that adolescents smoke cigarettes mainly for enjoyment and trial, with the main predictors for cigarette smoking being having a friend who smokes, sex and age. The study also suggests that smoking among adolescents is not necessarily associated with their being housed by people who smoke. This study suggests that there is need for education campaigns targeting adolescents, and early cost-effective interventions. Further, intervention targets should look beyond school settings and include homes because homes have been found to be a contributor to substance abuse.

Khanal et al. (2011), using data from the Nepal Demographic and Health Survey (NDHS), carried out an assessment of social determinants of smoking among Nepalese men. The study used multiple logistic regression and Chi-square test. The results indicate that men with no education, of older age group (36-49 years), and in manual occupation are more likely to smoke. Further, region of residence was found to influence tobacco use. The study therefore recommends raising awareness on anti-tobacco campaigns through different electronic and cultural media focusing on these vulnerable groups.

Boffetta et al. (2008) and Gajalakshmi et al. (2004) assess use of smokeless tobacco and other products and conclude that consumption patterns of tobacco may differ between regions and

within a country between population sub-groups, and is a function of area of residence, gender, education levels and other factors.

Martini and Sulistyowati (2005) used the Surabaya youth survey to examine the determinants of smoking behaviour among teenagers in East Java Province in Indonesia. They suggest that health empowerment programmes can influence the behaviour and environment positively by adopting educational and organizational strategies that focus on predisposing, enabling and reinforcing factors. They examined demographic and socio-economic variables such as gender, age, family structure, ethnicity, family size, and parental employment. The results from this study suggest that while cigarettes are accessible and affordable, those that perceived that cigarettes are difficult to obtain smoked less. Also, students living in homes where smokers lived are likely to smoke. It also found that homes where parents disapproved tobacco use were associated with lower smoking prevalence among teenagers. This suggests that smokers affirm personal and social reasons to smoke.

Studies such as Lovato et al. (2003) suggest that advertisement and promotion increases the probability of tobacco use, with advertisement avenues such as magazines, social media, and movies enhancing a positive attitude towards tobacco use and/or intention to use tobacco products, leading to initiation or continued use (Doku, 2011; Sargent et al., 2002; DiFranza et al., 2006; Wellman et al., 2006; Turner et al., 2004).

Accessibility and availability of tobacco products increases the probability of tobacco use especially among teenage smokers (Chaloupka, 2003). Given this fact, tobacco taxation raises prices and deters people from initiation, reduces use and encourages people to quit (Lantz et al., 2000; Carpenter and Cook, 2008; Turner et al., 2004; Tworek et al., 2010). This is because increase in prices reduces parental and peer effects and reduces availability of tobacco products at home or from friends because tobacco products are price elastic.

The place of residence influences tobacco use. While some studies suggest that adolescents living in rural areas are more likely to use tobacco than those in urban areas (Sarvela et al., 1997; Doescher et al., 2006; Plotnikoff et al., 2004; Lutfiyya et al., 2008), others have suggested the opposite (Fatoye and Morakinya, 2002; Volzke et al., 2006). However, it is suggested that the difference in association between tobacco use and area of residence could be because of the definition of the rural/urban and differences in sample sizes. Studies suggesting that adolescents living in urban areas tend to have higher tobacco use prevalence attribute this to stress, which compromises behaviours, including tobacco use, which is adopted as a coping mechanism (Colby

et al., 1994). Also, exposure to advertisement and promotion in urban areas serves as a contributor to tobacco use. Studies that suggest it is adolescents in rural areas that have a higher tobacco use prevalence attribute this to less exposure to health education and anti-tobacco messages than those in urban areas, and the fact that cultivation of tobacco makes tobacco products more accessible (Smith et al., 2005; Doescher et al., 2006).

Parental smoking and peer smoking also play a part in influencing tobacco use especially among adolescents. Parental smoking increases the probability of tobacco use among children (Gilman et al., 2009; Rainio and Rimpela, 2009; Filder et al., 2008). This result suggests that parents are role models to their children and should influence them positively. This is further cemented by results showing that children's smoking goes on even after parents decide to quit (Milton et al., 2004). Similar to parents' smoking, peer influence predicts smoking initiation and tobacco use (Taylor et al., 2004; Villanti et al., 2011; Schepis and Rao, 2005). Most young people smoke in the presence of other young people, suggesting adolescent smoking is driven by desire for affirmation and belongingness in a group.

Age is a big determinant of tobacco initiation and use. Most tobacco use initiation is at adolescent stage, with prevalence increasing as age increases (Rimpela et al., 2007; Khanal et al., 2011). Some research results conclude that if initiation does not begin when one is an adolescent, then it will likely never begin (Rimpela et al., 2007).

Gender difference also predicates tobacco use (Schnohr et al., 2008; Rimpela et al., 2007). For instance, boys were found to be likely to experiment with tobacco products than girls in Sweden, and there was a higher probability of girls experimenting and using tobacco products continuously (Galanti et al., 2001). Generally, however, use of tobacco is significantly lower among girls in developing countries than among boys, but this gap has been narrowing over the years (Schnohr et al., 2008).

Ethnicity and racial differences are associated with tobacco use. In South Africa, for instance, black youth had lower rates than all races across all ages (Swart et al., 2003). Research from the United States suggests that tobacco use among Caucasian students is more likely than in African American students (Muilenburg et al., 2006). Further, there is a high probability of use among white adolescents, followed by Hispanics, with African Americans having the lowest risk of use (Tyas and Pederson, 1998; Turner et al., 2004). These studies suggest that factors such as low unemployment and education levels account for lower levels among black South Africans (Tyas

and Pederson, 1998; Turner et al., 2004) while, among whites, smoking is a means of socialization, and peer influence is a huge contributor (Headen et al., 1991).

There is also increasing body of evidence that genetics contributes to nicotine dependence and smoking (Hernandez and Blazer, 2006; Swan, 1999; Sullivan and Kendler, 1999). Sullivan and Kendler (1999) suggest that nearly 50% of the probability of smoking account to 70% of the differences in change from experimentation to addiction. While genetic predisposition to tobacco use is still being studied, studies such as Perry et al. (1999) suggest that neuronal nicotine receptors in human beings play a role in how one responds to nicotine. It therefore means that hereditary factors interact with the environment and influence smoking behaviour among individuals (Hernandez and Blazer, 2006).

2.3 Conceptual Framework

The conceptual framework below is modified from Doku (2011) and suggests that tobacco use is influenced by many societal and environmental factors that need to be assessed to understand the rationale behind tobacco use. Here, a variety of social and environmental factors influence a consumer's decision in using tobacco. Some of the societal and environmental factors determining tobacco use include mass media marketing, family and neighbourhood, peer influence, access to products, age, gender, religion, etc. Use of tobacco, however, increases health costs of those who consume the product.

Figure 2-1: Economic, Societal and Environmental Factors Influencing Tobacco Use

Source: Author's conceptualization

18
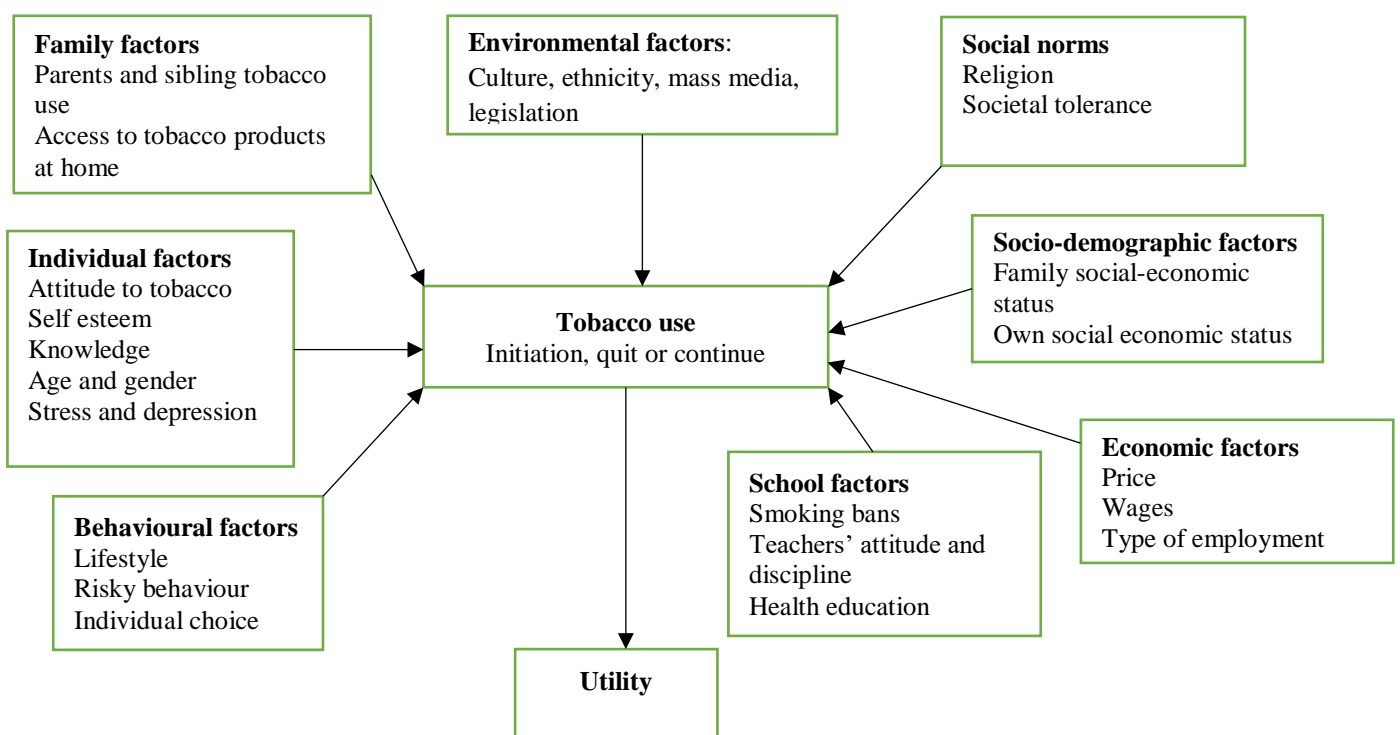
2.4 Theoretical Framework

Given that the essay uses one data set to estimate utility, the theoretical framework adopts the bounded rational addiction model as laid down by Suranovic et al. (1999). Here, it is assumed that a consumer chooses what to consume today without making 'inhuman' calculations or how the future that is not known presently should be reorganized to accommodate that desire. With such informational limitation, decisions are made by a consumer with short time horizons in mind, and without necessarily considering long term impacts of tobacco use. Therefore, the individual's current utility U_i, depends on consumption of tobacco, C_t, accumulated past consumption of past tobacco use, i.e. additive stock, A_t, and collection of all other factors affecting utility, Y_t. This is presented below:

$$U_i = f(C_t, A_t, Y_t) \tag{2-1}$$

We assume that current consumption of tobacco has a positive effect on utility, i.e. $U_c > 0$. This assumption illustrates withdrawal because when there is reduction of tobacco consumption by an individual, total utility falls. We also assume current consumption is impacted negatively by accumulated past consumption of tobacco use, i.e. $U_A < 0$. This is because of combined effects of tolerance and health impacts because of tobacco use. To incorporate tolerance in the model, we assume that marginal utility in the current consumption is increased by the addictive stock, i.e. $U_{CA} > 0$

Given the importance of tobacco as the addictive stock (A_t) in equation 2-1, we follow Becker and Murphy (1988) and Chaloupka (1990) and specify a simple investment function as:

$$A_t = C_t - \delta A_t \tag{2-2}$$

where δ is the depreciation rate of tobacco use over time, with the rate being constant. It is important to note that use of tobacco over a time t is thought of as gross investment of tobacco.

We also assume that utility is time additive and incorporate a constant rate of time preference, σ, and an infinite lifetime. Therefore, we specify the lifetime utility function in the following form:

$$U = \int_0^\infty e^{\sigma t} U[C_t, A_t, Y_t] dt \tag{2-3}$$

The assumption in this model is that the consumers are rational. The consumers therefore seek to maximize equation 2-3 subject to a lifetime budget. Following Chaloupka (1990), we ignore allocation of time over the lifetime and treat Y_t as a composite good meaning that price $P_y(t)$ as the standard measure of value and that markets are perfect. With these assumptions, the budget constraint becomes as follows:

$$U = \int_0^\infty e^{-rt}[Y_t + P_t C_t]dt \leq R(0) \tag{2-4}$$

where P_t is the price of tobacco at a time t, r is the interest rate in the market, which is assumed to be constant, and $R(0)$ is the discounted value of assets and income in an individual's lifetime.

It follows, therefore, that we maximize equation 2-3 subject to equation 2-2, 2-4 and the initial stock condition to achieve the following first order conditions:

$$U_y(t) = \mu e^{-(\sigma-r)t} \text{, and} \tag{2-5}$$

$$U_C(t) = \mu \pi_C(t) \tag{2-6}$$

where:

$$\pi_C(t) = P_t e^{-(\sigma-r)r} - \int_t^\infty e^{-(\sigma+\delta)(r-t)}U_A(r)dr \tag{2-7}$$

$\pi_C(t)$ in equation 2-7 is the full price of tobacco and, as observed, has two components, i.e. money price P_t that has been discounted, and the discounted future utility costs. We observe that the full price of tobacco use is greater than its actual cash price because $U_A(t)$ is always negative. Also, we observe that the discounted future utility costs rise as the level of tobacco stock increases because $U_{AA}<0$.

2.5 Econometric Model and Estimation Method

This paper uses a similar logistic regression model to John, Ross and Blecher (2012) where the probability of an individual in Cambodia smoking was estimated by a given set of socio-economic and demographic characteristics.

To construct the logistic regression model, we assume the choice variable, in our case the probability of using tobacco by an individual is a categorical variable, having either success or failure, i.e. one ends using tobacco ($Y=1$), given a set of independent variables or not ($Y=0$), i.e.:

$$Y_i = \begin{cases} 1 \, ifY^* > 0 \\ 0 \, ifY \le 0 \end{cases} = \alpha + \beta_1 X_{1i} + ... + \beta_p X_{pi} + U_i \qquad (2\text{-}8)$$

In this model, Y is the binary response variable with $Y_i=1$ if the trait is present in the observation and $Y_i=0$ if the trait is not present in the observation i. The model parameter estimates $(\alpha, \beta_1, \beta_2.....\beta_p)$ are obtained from the DHS survey and determined the extent to which they fit the data, i.e. the extent to which they are significant to this model (Agretsi, 2007).

The probability that an individual uses tobacco can be expressed as:

$$\Pr(Y = 1 \mid X_1.....X_p) = \Pr(Y^* > 0 \mid X_1........X_p)$$
$$= F(\alpha + \beta_1 X_{1i} + ...\beta_p X_{pi}) \qquad (2\text{-}9)$$

where $F(.)$ is the Cumulative Density Function (CDF) of U_i.

The set of independent variables includes residence (rural or urban), age group, marital status, gender, ethnicity, county/region, highest level of education, price, health status, occupation (whether unemployed, agriculture, service, casual labourer), wealth (based on asset index calculated by the DHS) and perception to smoking. The use of wealth index is an important variable in this essay. This is because the DHS does not include price as part of the information collected in the survey and needs a proxy for consumption expenditure given we are estimating a demand equation. Use of wealth index as a proxy for consumption expenditure where traditional economic measures such as consumption expenditure are not captured in socio-economic data has been used by Filmer and Pritchett (2001), Gwatkin et al. (2007) and Fotso and Kuate-Defo (2005). While not the optimal choice, use of wealth index is a useful proxy in datasets lacking alternative measures such as the DHS, because it permits quantification and qualification of comparison of socio-economic inequalities among respondents and therefore raising awareness of inequalities in health (Howe et al., 2009).

To calculate the wealth index, data that is easy to access (collect) on household's ownership of selected assets such as materials used for housing construction, televisions and bicycles, sanitation facilities and types of access to water are used. A uniform measure of wealth index is assumed in the analysis because there are no significant variations in prices of tobacco products, especially cigarettes, across Kenya and because cigarettes are subjected to uniform taxes. In

addition to this, because the DHS survey is collected within one period, variations because of time are not anticipated.

Another assumption made in the model is that the relationship between independent variables and logits are equal for all logits. Assuming U_i follows a logistic distribution, we obtain the logit model:

$$\Pr(Y = 1 \mid X_1 .... X_p) = \Lambda(\alpha + \beta_1 X_1 + \beta_2 X_2 + ... + \beta_p X_p) = \frac{e^{X\beta}}{1 - e^{Xp}} \tag{2-10}$$

where $\Lambda(.)$ is the logistic CDF and is monotonically non-decreasing, which means that if the coefficient $\beta > 0$, an increase in x_{ji} will lead to an increase in the probability of $y_i = 1$.
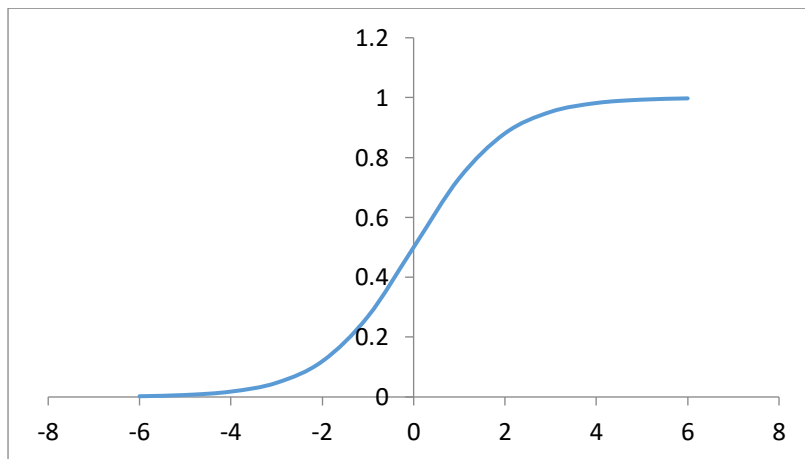
Source: Agretsi (2007)

Graph 2-1 above is the CDF of the logistic distribution with the probabilities between zero and one, with the probability of 0.5 being the point the tangent line is steepest.

The $\beta's$ from the logistic estimation can be used, regression can be used to estimate the marginal effects of the regressors (where regressors are continuous variables) or average effects (where regressors are categorical variables). Marginal and average effects show the quantitative impacts of the regressors and are an informative way of summarizing how change in tobacco use is related to change in an independent variable, holding all other independent variables equal. We observe from graph 2-1 that the marginal effects differ.

Furthermore, graph 2-1 shows that the marginal effects differ over different values of x.

The marginal effect is computed by taking the partial derivative of equation 2-10 with respect to the explanatory variable X_k whether continuous or categorical is:

$$\frac{\partial P(Y=1|X_1....X_p)}{\partial X_{iK}} = \lambda(x\beta)\beta_k = \frac{\exp(x\beta)}{[1+\exp(x\beta)]^2}\beta_k$$

(2-11)

$$=\Pr(y=1|x)[1-pr(y=1|x)]\,\beta_k$$

2.6 Data Source

The purpose of the paper is to analyze the socio-economic and demographic determinants of tobacco use (smoking and smokeless tobacco) using the 2014 DHS dataset. A total of 36,430 households were interviewed in this survey across all regions in Kenya. Of these, 22,516 households were in rural areas and 13,914 in urban areas. The men and women questionnaires are interlinked, with collection of data in the same household.

2.7 Variable Definition

This section defines and explains how variables in these empirical models in section 2.4 are measured.

Table 2-1: Variable Definition

Variables	Description	Measurement
Tobacco use	Tobacco smoking status	1=smokes; otherwise=0
15-19 years	Age category	1=15-19 years; otherwise=0
20-24 years	Age category	1=20-24 years; otherwise=0
25-29 years	Age category	1=25-29 years; otherwise=0
30-34 years	Age category	1=30-34 years; otherwise=0
35-39 years	Age category	1=35-39 years; otherwise=0
40-44 years	Age category	1=40-44 years; otherwise=0
45-49 years	Age category	1=45-49 years; otherwise=0
50-54 years	Age category	1=50-54 years; otherwise=0
Never married	Marital status	1=never; otherwise=0
Living together	Marital status	1=living together; otherwise=0
Married	Marital status	1=married; otherwise=0
Divorced/widowed/separated	Marital status	1=divorced/widowed/separated; otherwise=0
Education	Years of education	Number of years spent in school
Urban	Residential area	1=urban; otherwise=0
Rural	Residential area	1=rural; otherwise=0
No education	Education level	1=no education; otherwise=0
Primary	Education level	1=primary level; otherwise=0

Variables	Description	Measurement
Secondary	Education level	1=secondary level; otherwise=0
Higher level	Education level	1=higher than secondary level; otherwise=0
Poorest	Wealth category	1=lowest category; otherwise=0
Poorer	Wealth category	1=lower category; otherwise=0
Middle	Wealth category	1= average wealth category; otherwise=0
Richer	Wealth category	1= higher wealth category; otherwise=0
Richest	Wealth category	1= highest wealth category; otherwise=0
Unemployed	Employment status	1= unemployed; otherwise=0
Agriculture	Employment status	1= agriculture employed; otherwise=0
Service manual	Employment status	1= service manual employed; otherwise=0
Non-manual	Employment status	1= non-manual employed; otherwise=0
Muslim	Religious affiliation	1= Islam; otherwise=0
Protestant	Religious affiliation	1=protestant; otherwise=0
Catholic	Religious affiliation	1= catholic; otherwise=0
No religion	Religious affiliation	1= no religion; otherwise=0
Other religion	Religious affiliation	1=other religion; otherwise=0
Rift valley	Region of residence	1= Rift valley; otherwise=0
Nyanza	Region of residence	1= Nyanza; otherwise=0
Western	Region of residence	1= Western; otherwise=0
Eastern	Region of residence	1= Eastern; otherwise=0
Central	Region of residence	1= Central; otherwise=0
North-Eastern	Region of residence	1= North-Eastern; otherwise=0
Coast	Region of residence	1= Coast; otherwise=0
Nairobi	Region of residence	1= Nairobi; otherwise=0

2.8 Results

2.8.1 Socio-Demographic Characteristics of Respondents

The results of the socio-demographic characteristics of the respondents are presented in Table 2-2. A total of 12,819 men were included in the survey, with a total prevalence of tobacco use at 19.53%. The patterns of prevalence of tobacco use vary with regard to age, marital status, education level, region, religion and interaction with social and digital media. For instance, when it comes to age, the lowest prevalence is among male respondents between ages 15-19 years, rural respondents have higher tobacco use prevalence rates, and those with no health insurance have higher prevalence rates.

Table 2-2: Socio-demographic Characteristics of Tobacco Use of Male Respondents in Kenya

Characteristics	N	% of total	Tobacco Prevalence (% of total)
Total	12,819		2,504 (19.53)
Age Group			
15-19	2,811	21.93	65 (2.31)
20-24	1,981	15.45	230 (11.61)
25-29	1,942	15.15	408 (21.01)
30-34	1,701	13.27	480 (28.22)
35-39	1,486	11.59	436 (29.34)
40-44	1,198	9.35	337 (28.13)
45-49	895	6.98	287 (32.07)
50-54	805	6.28	261 (32.42)
Marital Status			
Never Married	5,400	42.12	505 (9.35)
Living Together	254	1.98	65 (25.59)
Married	6,439	50.23	1,571 (24.40)
Widowed/Divorced/Separated	726	5.66	363 (50)
Region[67]			
Coast	1,598	12.47	384 (24.03)
North Eastern	624	4.87	66 (10.58)
Eastern	2,302	17.96	745 (32.36)
Central	1,370	10.69	376 (27.45)
Rift Valley	3,673	28.65	598 (16.28)
Western	1,217	9.49	148 (12.16)
Nyanza	1,649	12.86	123 (7.46)
Nairobi	386	3.01	64 (16.58)
Residence			
Urban	4,915	38.34	928 (18.88)
Rural	7,904	61.66	1,576 (19.53)
Education Level			
No Education	766	5.98	253 (33.03)
Primary	6,550	51.10	1,547 (23.62)
Secondary	4,062	31.69	549 (13.52)
High Education	1,441	11.24	155 (10.76)
Wealth Quantiles			
Poorest	2,683	20.93	701 (26.13)

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[6] The prevalence rates per county are presented in Tables 2-4 and 2-5 below.

[7] Eastern region encompasses Marsabit, Isiolo, Meru, Tharaka Nithi, Embu, Kitui, Machakos, and Makueni counties. Coast region encompasses Kilifi, Kwale, Lamu, Tana River and Taita Taveta. Nyanza encompasses Homa Bay, Migori, Siaya, Kisii, Nyamira, and Kisumu. North Eastern encompasses Garissa, Mandera, and Wajir. Western encompasses Kakamega, Vihiga, Bungoma, Busia. Rift Valley encompasses Turkana, West Pokot, Samburu, Trans Nzoia, Uasin Gishu, Elgeyo Marakwet, Nandi, Baringo, Laikipia, Nakuru, Narok, Kajiado, Bomet. Central encompasses Nyandarua, Nyeri, Kirinyaga, Murang'a and Kiambu.

Characteristics	N	% of total	Tobacco Prevalence (% of total)
Poorer	2,578	20.11	554 (21.49)
Middle	2,636	20.56	509 (19.31)
Richer	2,758	21.51	445 (16.13)
Richest	2,164	16.88	295 (13.63)
Occupation			
Unemployed	2,294	21.46	66 (2.88)
Agriculture	3,109	29.08	776 (24.96)
Service-Manual	3,751	35.09	916 (24.42)
Non-Manual	1,536	14.37	206 (13.41)
Religion			
Muslim	1,564	12.20	321 (20.52)
No religion	482	3.76	183 (37.97)
Other	57	0.44	23 (40.35)
Protestant	7,983	62.29	1,253 (15.70
Roman Catholic	2,729	21.30	722 (26.46)
Health Insurance			
No	10,495	81.90	2,182 (20.79)
Yes	2,320	18.10	321 (13.84)
Frequency of Reading Newspaper			
Not at all	5,669	44.24	1,374 (24.24)
Less than once a week	2,741	21.39	429 (15.65)
At least once a week	4,403	34.36	701 (15.92)
Frequency of Listening to Radio			
Not at all	1,054	8.22	272 (25.81)
Less than once a week	1,311	10.23	232 (17.70)
At least once a week	10,452	81.55	1,999 (19.13)
Frequency of Watching TV			
Not at all	3,837	29.87	855 (22.34)
Less than once a week	2,428	18.95	453 (18.66)
At least once a week	6,559	51.19	1,195 (18.22)

Source: Author's Analysis using the Kenya Demographic and Health Survey 2014

Unlike GATS 2014 that shows female adult prevalence at 4.5%, results from the DHS indicate that overall prevalence of female respondents is low at 1.09%. As reported in Table 2-3, like their male counterparts, the patterns of prevalence of tobacco use vary with regard to age, marital status, education level, region, religion and interaction with social and digital media.

Table 2-3: Socio-demographic Characteristics of Tobacco Use of Female Respondents

Characteristics	N	% of Total	Tobacco Prevalence (% of Total)
Total	31,079		339 (1.09%)
Age Group			
15-19	6,078	19.56	16 (0.26)
20-24	5,405	17.39	43 (0.8)

Characteristics	N	% of Total	Tobacco Prevalence (% of Total)
25-29	5,939	19.11	65 (1.09)
30-34	4,452	14.32	55 (1.24)
35-39	3,868	12.45	51 (1.32)
40-44	2,986	9.61	46 (1.54)
45-49	2,351	7.56	63 (2.68)
50-54	-		
Marital Status			
Never Married	8,575	27.59	28 (0.33)
Living Together	1,285	4.13	32 (2.49)
Married	17,751	57.12	201 (1.13)
Widowed/Divorced/Separated	3,468	11.16	78 (2.25)
Region[9]			
Coast	3,902	12.56	47 (1.20)
North Eastern	1,664	5.35	1 (0.06)
Eastern	5,247	16.88	50 (0.95)
Central	3,114	10.02	5 (0.16)
Rift Valley	9,059	29.15	224 (2.47)
Western	2,840	9.14	3 (0.11)
Nyanza	4,254	13.69	2 (0.05)
Nairobi	999	3.21	7 (0.70)
Residence			
Urban	11,614	37.37	64 (0.55)
Rural	19,465	63.63	275 (1.41)
Education Level			
No Education	4,183	13.46	269 (6.43)
Primary	15,613	50.24	49 (0.31)
Secondary	8,595	27.66	13 (0.15)
High Education	2,688	8.65	8 (0.30)
Wealth Quantiles			
Poorest	7,262	23.37	282 (3.88)
Poorer	5,970	19.21	17 (0.28)
Middle	5,946	19.13	11 (0.18)
Richer	5,958	19.17	12 (0.20)
Richest	5,943	19.12	17 (0.29)

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[9]Eastern region encompasses Marsabit, Isiolo, Meru, Tharaka Nithi, Embu, Kitui, Machakos, and Makueni counties. Coast region encompasses Kilifi, Kwale, Lamu, Tana River and Taita Taveta. Nyanza encompasses Homa Bay, Migori, Siaya, Kisii, Nyamira, and Kisumu. North Eastern encompasses Garissa, Mandera, and Wajir. Western encompasses Kakamega, Vihiga, Bungoma, Busia. Rift Valley encompasses Turkana, West Pokot, Samburu, Trans Nzoia, Uasin Gishu, Elgeyo Marakwet, Nandi, Baringo, Laikipia, Nakuru, Narok, Kajiado, Bomet. Central encompasses Nyandarua, Nyeri, Kirinyaga, Murang'a and Kiambu.

Characteristics	N	% of Total	Tobacco Prevalence (% of Total)
Occupation			
Unemployed	5,630	45.67	159 (2.82)
Agriculture	3,226	26.17	33 (1.02)
Service-Manual	2,103	17.06	53 (2.52)
Non-Manual	1,369	11.10	15 (1.10)
Religion			
Muslim	4,161	13.40	42 (1.01)
No religion	506	1.63	39 (7.71)
Other	73	0.24	8 (10.96)
Protestant	20,072	64.66	90 (0.45)
Roman Catholic	6,229	20.07	159 (2.55)
Health Insurance			
No	12,493	84.80	325 (2.60)
Yes	2,240	15.20	14 (0.63)
Frequency of Reading Newspaper			
Not at all	20,391	65.65	318 (1.56)
Less than once a week	5,885	18.95	13 (0.22)
At least once a week	4,783	15.40	8 (0.17)
Frequency of Listening to Radio			
Not at all	6,879	22.14	227 (3.30)
Less than once a week	4,251	13.68	40 (0.94)
At least once a week	19,940	64.18	72 (0.36)
Frequency of Watching Tv			
Not at all	17,251	55.55	304 (1.76)
Less than once a week	4,261	13.72	9 (0.21)
At least once a week	9,545	30.73	26 (0.27

Source: Author's Analysis using the Kenya Demographic and Health Survey 2014

Kenya passed a new constitution in 2010, which created a two-tier government and passed many responsibilities such as health from the National Government to the County Governments. As per the constitution, therefore, the role of the two tiers of government is different in matters health. While the National Government is responsible for policy formulation on health issues, implementation of health policies lies with the County Governments. There is a general policy on the control of tobacco prevalence as enshrined in the Kenya Tobacco Control Act of 2006, and the tobacco control regulations that were gazetted in 2016. However, County Governments are responsible for implementing the policy and allocating resources to control tobacco use in their respective counties. It is, therefore, important that prevalence is broken down into counties so that each county has a clear idea of the amounts of resources it needs to set aside depending on the prevalence rates its residence may have. The Kenya Demographic and Health Survey

reports prevalence as per the previous regions prior to the new constitutional dispensation (8 provinces as is seen in Table 2-3) but collects data from counties.

Table 2-4 presents the male prevalence rates per county for both smoking and smokeless tobacco. The results suggest that smoking prevalence rates for men are high in Meru, Kitui, Isiolo, Kirinyaga and Embu counties, with all these recording a prevalence rate of above 30%. Most counties recording high prevalence rates are in the central, eastern and coastal counties as can be seen in Table 2-4. Nairobi, where a lot of anti-smoking campaigns take place, has a prevalence rate of 16%. The lowest smoking prevalence rates recorded are in Mandera and Kisii counties at 5.42% and 5.73%, respectively, followed by Nyamira and Wajir counties which have lower than 7%. Generally, counties in Nyanza, North Eastern and Rift Valley regions have the lowest prevalence rates. The results indicate that smokeless prevalence rate for men is 3.10%. However, Turkana, Marsabit and Samburu counties have very high smokeless prevalence rates of 31.82%, 22.58% and 23.31%, respectively. Relatively high rates considering the average of 3.1% countywide is reported in counties such as Elgeyo Marakwet, Isiolo, Baringo, Laikipia, Kajiado and Narok counties, suggesting that use of traditional products such as snuff is prevalent in these areas.

Table 2-4: Male Prevalence Rates of Tobacco Use, by County

Characteristics	N	Smoking Prevalence (%)	Smokeless Prevalence (%)	Dual Use (%)
Total	12,819	17.30	3.10	0.87
Counties				
Meru	348	38.79	0.86	0.57
Kirinyaga	273	32.23	0.00	0.00
Embu	289	31.83	1.04	0.69
Kitui	335	31.34	0.90	0.00
Isiolo	208	30.29	8.17	1.44
Makueni	311	29.26	2.89	1.61
Taita Taveta	261	28.74	0.00	0.00
Nyandarua	264	28.41	0.76	0.38
Laikipia	264	28.03	6.06	4.92
Machakos	358	27.65	3.35	2.79
Tharaka Nithi	236	26.69	0.85	0.00
Nyeri	306	25.82	2.94	1.31
Mombasa	280	25	1.07	0.71
Kiambu	255	24.71	1.18	0.39
Murang'a	272	22.43	1.10	0.37
Lamu	244	21.31	3.69	1.23
Kwale	260	20	3.08	0.77
Vihiga	274	19.34	1.09	0.36
Kilifi	326	19.33	2.45	0.92
Samburu	163	19.02	23.31	2.45
Nakuru	293	17.06	0.68	0.68
Nairobi	386	16.06	1.30	0.78
Garissa	216	15.74	6.94	4.17
West Pokot	245	13.88	3.67	2.04

Characteristics	N	Smoking Prevalence (%)	Smokeless Prevalence (%)	Dual Use (%)
Marsabit	217	12.90	22.58	3.23
Kajiado	237	12.66	7.59	0.00
Uasin Gishu	354	11.02	0.56	0.28
Baringo	241	10.37	8.71	0.41
Homabay	258	9.30	0.39	0.00
Narok	272	8.82	5.15	1.47
Bungoma	329	8.81	2.74	0.00
Busia	276	8.70	0.00	0.00
Trans Nzoia	335	8.66	3.28	0.30
Nandi	354	8.47	1.41	0.85
Bomet	297	8.42	1.01	0.67
Turkana	132	8.33	31.82	2.27
Kakamega	338	8.28	2.07	1.18
Elgeyo Marakwet	248	8.06	6.45	0.81
Kericho	238	7.98	1.26	0.84
Kisumu	286	7.69	0.00	0.00
Siaya	275	7.27	0.00	0.00
Nyamira	259	6.95	0.39	0.00
Migori	257	6.61	1.56	0.78
Wajir	205	6.34	0.98	0.00
Kisii	314	5.73	0.00	0.00
Mandera	203	5.42	1.48	1.48

Source: Author's Analysis using the Kenya Demographic and Health Survey 2014

Table 2-5 presents the female prevalence rates per county for both smoking and smokeless tobacco. Women generally have low smoking and smokeless prevalence rates as suggested by the data, with both standing at less than 1%. The highest smoking prevalence rates are in Turkana and Mombasa counties at 1.75% and 1.17%, respectively. However, there are counties with high smokeless prevalence rates, suggesting high use of traditional products such as snuff. The highest smokeless prevalence rates are in Samburu County at 16.58% and Turkana County at 14.59%. Higher than average national rates on prevalence are in Kilifi at 2.31%, Marsabit at 5.39%, Isiolo at 1.98%, Laikipia at 2.5%, and Kwale County at 1.34%.

Table 2-5: Female Prevalence Rates of Tobacco Use, by County

Characteristics	N	Smoking Prevalence (%)	Smokeless Prevalence (%)	Dual Use (%)
Total	31,079	0.18	0.93	0.02
Counties				
Mombasa	598	1.17	0.00	0.00
Kiambu	651	0.46	0.15	0.15
Kwale	671	0.45	1.34	0.00
West Pokot	534	0.37	0.56	0.19
Lamu	600	0.33	0.33	0.00
Kajiado	642	0.31	0.31	0.16
Siaya	654	0.31	0.00	0.00
Bomet	708	0.28	0.00	0.00
Kakamega	725	0.28	0.00	0.00
Kirinyaga	560	0.18	0.00	0.00
Baringo	598	0.17	0.67	0.17
Murang'a	633	0.16	0.00	0.00
Kericho	654	0.15	0.00	0.00

Characteristics	N	Smoking Prevalence (%)	Smokeless Prevalence (%)	Dual Use (%)
Trans Nzoia	695	0.14	0.14	0.00
Narok	702	0.14	0.85	0.00
Makueni	746	0.13	0.00	0.00
Kilifi	824	0.12	2.31	0.00
Bungoma	805	0.12	0.00	0.00
Tana River	686	0.00	0.58	0.00
Taita Taveta	523	0.00	0.00	0.00
Garissa	609	0.00	0.00	0.00
Wajir	532	0.00	0.19	0.00
Mandera	523	0.00	0.00	0.00
Marsabit	575	0.00	5.39	0.00
Meru	682	0.00	0.15	0.00
Tharaka Nithi	528	0.00	0.19	0.00
Embu	645	0.00	0.00	0.00
Kitui	747	0.00	0.00	0.00
Machakos	718	0.00	0.14	0.00
Nyandarua	562	0.00	0.00	0.00
Nyeri	708	0.00	0.00	0.00
Samburu	579	0.00	16.58	0.00
Elgeyo Marakwet	630	0.00	0.63	0.00
Nandi	742	0.00	0.00	0.00
Laikipia	631	0.00	2.54	0.00
Nakuru	741	0.00	0.00	0.00
Vihiga	634	0.00	0.00	0.00
Busia	676	0.00	0.00	0.00
Kisumu	696	0.00	0.00	0.00
Homabay	716	0.00	0.00	0.00
Migori	770	0.00	0.00	0.00
Kisii	794	0.00	0.00	0.00
Nyamira	624	0.00	0.00	0.00
Turkana	514	1.75	14.59	0.00
Isiolo	606	0.66	1.98	0.17
Nairobi	999	0.70	0.10	0.10

Source: Author's Analysis using the Kenya Demographic and Health Survey 2014

2.9 Econometric Results

This thesis assesses the marginal effects of the independent variables to assess the magnitude (quantitative impacts) and sign of independent variables on the probability of tobacco use. The results presented in Table 2-6 below suggest that most of the marginal effects of independent variables of male and female tobacco use are statistically significant.

Table 2-6: Estimates of Average Marginal Effects on the Probability of Tobacco Use

	Male Tobacco Marginal Effects	Standard Error	Female Tobacco Marginal Effects	Standard Error
Age Group				
15-19	1.00		1.00	
20-24	.0886881***	.0074887	.0005798**	.0006376
25-29	.1739274***	.0091744	.0018989**	.0008588
30-34	.2290561***	.0113546	.0024816	.0010761
35-39	.232064***	.012508	.0006183	.0007762

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	Male Tobacco Marginal Effects	Standard Error	Female Tobacco Marginal Effects	Standard Error
40-44	.2468733***	.0140599	.0006598*	.0008598
45-49	.2633847***	.0160446	.0022465	.0013009
50-54	.2630884***	.0169204		
Marital Status				
Single	1.00		1.00	
Living-together	.0037784	.0231687	.0008482	.0015949
Married	-.0229213***	.0098419	-.0008542	.0008511
Widowed/divorced/separated	.118245***	.0163816	.0014701	.0013317
Region				
Coast	1.00		1.00	
North Eastern	-.0987481***	.0184974		
Eastern	.046828***	.013695	-.0020344	.0010333
Central	.0337357***	.0158474	-.0012484	.0012756
Rift Valley	-.1091809***	.0120165	-.0006868	.0011471
Western	-.1177271***	.0139255	-.0016438	.0012563
Nyanza	-.1501718***	.0126761	-.0023436**	.00107
Nairobi	-.0451068 ***	.0222101	.0021784	.0023826
Residence				
Rural	1.00		1.00	
Urban	.0412853***	.0073538	.0013317	
Highest level of education				
No Education	1.00		1.00	
Primary	.0817541	.0120107	-.0006587	.0010108
Secondary+	.0374118***	.013132	-.0007623	.0011583
Higher	.0043025***	.0149343	4.11e-06***	.0015154
Wealth index (Price proxy)				
Poorest	1.00		1.00	
Poorer	.005968	.0111655	.0006477	.0008151
Middle	-.0165473	.0112447	.0004447	.0008067
Richer	-.0541952***	.0113175	.001155	.0009891
Richest	-.0830554***	.0123102	.0014475	.0013673
Religion				
Roman Catholic	1.00		1.00	
Protestant	-.0616698***	.0079859	-.0028995	.000856
Muslim	-.0484806***	.0133904	-.000861	.0015491
No religion	.0348529	.0179499	-.0025712	.0016315
Other	-.1207093***	.0328497		
Observations	**12,819**		**29,415**	

*** $p<0.01$, ** $p<0.05$, * <0.1

Source: Author's Analysis using Kenya Demographic and Health Survey 2014

The results of the marginal effects suggest that tobacco use increases with change in age for men, with the changes being statistically significant. For instance, starting with a reference point of

15-19 years, prevalence increases to between 8.86% and 26.3% for men between 20 and 54 years. All these changes in prevalence are statistically significant. Also, for men, the results suggest that change in the region of residence influences smoking, with all the changes being statistically significant. Using the coastal region as a reference point, we observe that there is a lower probability of tobacco use for those residing in Nyanza region, with prevalence of tobacco use reducing by 15% compared to Eastern and Central regions where it increases by 4.7% and 3.3%, respectively. Changing residence status to Rift Valley, Western, Nairobi and North Eastern region is likely to reduce smoking, with prevalence reducing by 10.91%, 11.77%, 4.5% and 9.87%. All these changes are statistically significant. In addition to this, it is more likely for men in urban areas to use tobacco when compared to those in rural areas. This is because tobacco use smoking prevalence increases by 4.1% for men in urban areas, with the increase in prevalence being statistically significant.

Changes in education levels for men is also an important variable in predicting tobacco use among men. Using those with no formal education as a base, we observe that tobacco use prevalence for men with secondary education increases to 3.7% while those with higher education increase smoking by just 0.4%. These changes are statistically significant. Regarding wealth index, which is the proxy for price here, the poorest have higher tobacco use prevalence compared to the wealthiest. Using the poorest as the category of reference, results suggest that tobacco use reduces to between 5.4% and 8.3% for those categorized as richer and richest in Kenya. This finding is consistent with other studies that show smoking rates being higher among the poor despite the heavier financial burden incurred to purchase cigarettes. Finally, the results indicate that change in marital status impacts tobacco use. Starting with a reference category of men who are single, results suggest that being married reduces the probability of tobacco use reducing by 2.3% but when divorced, the probability increases by 11.0%. Again, these changes are statistically significant.

The results suggest that smoking among women is very low with a prevalence rate of less than 1%. From Table 2-6, only two variables provide statistically significant results in tobacco use among women: region and education. Using women with no formal education as the reference point, when women are educated to the highest education level, the probability of smoking is high and statistically significant, with prevalence of those in women with highest education increasing. Also, with regard to region, using coast region as reference point, it is more likely that women living in other regions will have lower prevalence rates. Those who reside in Nyanza

region have the lowest smoking prevalence at 0.2%, with this change in residence from Coastal region being statistically significant.

2.9 Summary, Conclusion and Recommendations

This essay sought to assess the determinants of tobacco use in Kenya, where various socio-economic determinants were explored. The essay used a logistic regression to determine the factors influencing tobacco use in the country. The essay sought to examine whether socio-economic, demographic and the geographic environments that people live in are important in determining the decision on whether individuals use scarce resources in consumption of tobacco or not.

The results from essay one suggest that the elderly people are more likely to smoke than younger people, confirming the addictive nature of tobacco with intensity of use increasing as your age progresses. The relationship status is also an important determinant of use, with single people less likely to smoke than married people. However, the results also suggest that there could be a relationship between smoking and stress. This is because prevalence increases when one is divorced, widowed or separated. However, this relationship needs to be further investigated to determine whether people are unconsciously using tobacco to relieve stress, anxiety and depression. Results also show that tobacco use varies according to the geographical location of individuals. This is because certain counties record high prevalence rates compared to others. Individuals particularly in the Eastern, Central and Coastal counties are more likely to use tobacco than those coming from counties from the Rift Valley, Western and Nyanza regions. Further, the prevalence of smokeless tobacco is high in some counties in Rift Valley, specifically Samburu and Turkana for both men and women. It shows that traditional use of tobacco is still high in counties that are less developed, debunking the myth that only modern form of tobacco use is prevalent in all areas. Finally, the results suggest that less educated people in urban areas in all counties are more likely to have higher prevalence than those in rural areas, suggesting the target group that resources should concentrate on for successful control of tobacco.

The essay concludes that tobacco use in Kenya is influenced by many factors such as age of the smoker, marital status, gender, and region of residence of the smoker and perception about the health consequence of tobacco use. There is need to implement the tobacco control regulations in Kenya, since health is a devolved function as per Kenya's constitution. County Governments should allocate sufficient funds for tobacco control, including media monitoring, and promotion

of health campaigns. It therefore follows that resources devoted for tobacco control should not be generalized; counties should not just allocate a specific percentage of budget, but allocations should be based on prevalence rates. There is also need to incorporate tobacco control in the education policy. This is particularly important because the Ministry of Education is currently changing the educational curricular and system. Finally, the paper recommends development of a multi-sectoral group led by the Ministry of Health to strengthen tobacco control risk prevention factors.

2.91 Strengths, Limitations and Future Research

This essay has several strengths. First, it is based on the Kenya Demographic and Health Survey, which is a national level study and has a high response rate. The survey has accounted for sample weight, cluster effect and multi-stage sampling and provides for estimates with the confidence levels given. This means that results have high levels of precision and are representative of all counties in Kenya. The limitations, however, for the study include the fact that the survey is cross-sectional in nature, meaning that it prevents one from drawing causal inferences. Also, tobacco is associated with some social stigma, hence the likelihood that there was under-reporting of smoking especially among women. This could be the reason why the prevalence results in the Kenya Demographic and Health Survey differ from those of the Global Adult Smoking Survey where the prevalence rate of smoking among women was found to be much higher at 4.5% compared to 0.99% in this study. This is because the Global Adult Smoking Survey has factored the social stigma associated with smoking and collects data only on smoking pattern and use. This study recommends that future research could include exploring attitudes of people on the recently enacted tobacco control regulations and exploring the socio-economic and demographic determinants of smoking per county.

Essay Two: Impact of Tobacco Expenditure on Household Spending Patterns in Kenya

3.1 Introduction

3.1.1 Background

Tobacco consumption has adverse effects on households. First, it is estimated that at least 6 million deaths and almost 4% of diseases globally are directly attributed to tobacco use (Forouzanfar et al., 2015). It is estimated that by the year 2030, the highest burden of disability and premature mortality will be as a result of tobacco – higher than any other health risk factor. If not prioritized in control, tobacco use will produce the highest mortality. Research suggests that compared to other health risk factors, the highest burden will be in low and medium-income countries (Mathers and Loncar, 2006). Secondly, and more importantly to this study, tobacco use contributes to adverse effect on household nutrition, poverty and income. There are studies that suggest that households that consume tobacco have higher child stunting and generate lower income from assets (Wood et al., 2005). Tobacco use is also associated with higher poverty rates and lower spending on health care, clothing, education and on food (Efroymson et al., 2001; Pu et al., 2008; Koch and Tshiswaka-Kashalala, 2008; John, 2008).

3.1.2 Research Problem

Tobacco consumption in Kenya has been increasing progressively since 2006. Data suggests that per capita consumption of cigarette in Kenya has been rising (see Figure 1-1) and is expected to continue increasing based on the trend. Tobacco, being an addictive product, creates a situation where consumers allocate part of their resources towards its consumption. Results of the Global Adult Tobacco Survey (GATS) 2014 show that up to 11.6% of Kenyan adults (approximately 2.5 million) currently use tobacco. This therefore positions use of tobacco as important in expenditure decisions in households in Kenya. Given that households in Kenya face budget constraints, tobacco consumption may crowd out consumption of essential goods and services in a household. Despite this, however, no published study has assessed the causal impact tobacco use has in household expenditure patterns in Kenya – a gap that this paper seeks to address.

3.1.3 Research Objectives

The general objective of this study is to assess the causal impact of tobacco expenditure on household spending patterns. The specific objectives are:

a) To determine the impact of tobacco expenditure on household consumption of other goods in Kenya.

b) Draw conclusions and policy recommendations from the findings.

3.1.4 Contributions

This paper attempts to contribute to the growing evidence of literature on the effects of tobacco use on household's expenditure. First, the paper utilizes expenditure data from a country in the Sub-Saharan Africa region, which has a high poverty rate. The only studies that have utilized expenditure data to investigate the relationship between tobacco use and household expenditure in Sub-Saharan Africa that this research is aware of are Koch and Tshiswaka-Kashalala (2008) and Chelwa and VanWalbeek (2014). Secondly, this paper used proportion of male adults as the standard instrumental variable to assess the impact of tobacco use in household expenditure and allows it to be correlated to the error term. The study uses the proportion of male adults as the instrument of choice. This choice is motivated on the fact that tobacco prevalence in Kenya is mainly a male affair (KDHS, 2014).

3.2 Literature Review

3.2.1 Review of Relevant Studies

Globally, one of the first attempts to examine the relationship between tobacco use and poverty was Efroymsom et al. (2001). The study examined tobacco expenditure patterns in Bangladesh using several datasets. The results demonstrated that expenditure on tobacco, especially cigarettes, was a significant financial burden for poor Bangladeshis. The amount spent on cigarettes by male smokers was two times the amount spent on essential items such as clothing, households, health and education combined. If this amount of money is used on food, a household with one or two children would be healthier because an estimated 500 calories is added to their diet. However, the lack of econometric analysis means that the study did not take care of observable cofounders, risking the possibility of not considering variables that could influence expenditure allocation between smoking and non-smoking households. In addition to this, Efroymsom et al. (2001) did not factor the possibility of endogeneity in allocation decision of expenditure for tobacco in households. Not controlling for cofounders, whether observable or not, does not make it clear whether reducing expenditure on tobacco for a smoking household would elevate its consumption status to that of a non-smoking household.

A number of studies have attempted to address the issue of endogeneity. John (2008) estimated a system of quadratic conditional Engel curves from 10 broad group commodities in India. John (2008) pioneered the use of instrumental variable technique in accounting for endogeneity of

tobacco use in the demand system. The choice of instrumental variable used here was adult sex ratio, with the motivation of the choice being that tobacco use is dominated by males. The analysis went further and used the methodology in Vermeulen (2003), which controlled for any possible difference between the 2 categories of households; i.e. smoking and non-smoking households. In this method, corner solutions and abstentions were estimated by means of a tobit specification. Here, John (2008) found that not only did tobacco-consuming households in India have lower consumption rates of commodities such as education, milk, clean fuels and entertainment, but also a negative effect on per capita nutritional intake. A similar method was used by Pu et al. (2008) to assess the impact cigarette use has in expenditure patterns in Taiwan and found that tobacco use reduced expenditure on fuel, healthcare, transportation and clothing among other household expenditure items. In this study, tobacco and alcohol were treated as complements in the demand system. By doing this, the study was able to assess the impact of both items on household expenditure decisions. Other studies have used different instruments to estimate tobacco crowding of household expenditure. Koch and Tshiswaka-Kashalala (2008), for instance, used a composite methodology based on smoking prevalence rates for South Africa as estimated by Van Walbeek (2002). The results from this study suggest that tobacco use crowds out expenditure on clothing, healthcare, education and transportation when the full sample of smoking household is considered. However, in some data specifications, expenditure on tobacco was attributed to increased spending on food, housing, alcohol and entertainment.

These results resonate with those of Wang, Sindelar and Busch (2006) who used a frogit model to assess the relationship between tobacco spending and 17 other categories of household expenditures in China. The results conclude that human capital investments such as education and health are affected by tobacco consumption, which in turn impacts negatively on farming productivity and financial security in the future. Further, it also impacts negatively on expenditure of basic needs such as food.

There are a generation of studies that have not used instrumental variables in estimating the impact of tobacco use in households. For instance, Block and Webb (2009) estimated equations for tobacco child heights and food against a set of covariates to identify any causal impact of tobacco use on household expenditure. The reasoning behind this methodology was that if a common set of covariates reduces the allocation of tobacco, it could suggest crowding out. This empirical approach demonstrates that the same exogenous covariates are connected with improved nutritional quantity and quality, and also related to reduced allocation of resources by a household to tobacco. John, Ross and Blecher (2012) examined tobacco expenditures and its

implication on tobacco household resource allocation in Cambodia. The study estimated a linear model to assess the impact of tobacco consumption on the consumption of other goods in a household. The results suggest that spending on tobacco crowds out expenditures on education and clothing, and on food for low- and middle-income households.

Chelwa and Van Walbeek (2014) used the 2006 Zambian Living Standards Measurement Survey (LSMS) to estimate the impact of tobacco on household spending patterns in households. The study uses the choice of adult sex ratio as the choice of instrumental variable, but unlike John (2008) and Koch and Tshiswaka-Kashalala (2008), they relax the exclusion restriction and allow the instrumental variable to be correlated to the error term. The study concludes that tobacco-consuming households spend less on commodities such as food, clothing, schooling, transportation and equipment maintenance, with crowding out more severe for poorer households. They also find no evidence that tobacco consumption leads to allocation of expenditure towards a particular commodity. San and Chaloupka (2016) used similar methodology to determine the impact of tobacco use in household spending in Turkey. The study finds that almost 8% of monthly budget by households that use tobacco was spent on smoking, and non-smoking households averaged 9% more in spending on food, utilities and housing than smoking households. These nuanced findings between Chelwa and Van Walbeek (2014) and San and Chaloupka (2016) present a new generation of studies on crowding out effect but show different results. This demonstrates the need for country-specific studies to inform policy decisions on the impact of tobacco use.

3.2.2 Overview

The approach adopted in this research is associated with recent empirical studies on crowding out effect of tobacco expenditure on other household goods that use instrumental variable of adult sex ratio. In addition to using adult sex ratio as the instrument of choice, like the new generation of studies, this research estimates conditional Engel curves for various expenditure categories using Seemingly Unrelated Regression method.

3.3 Conceptual Framework

As illustrated in the conceptual framework (see Figure 3-1 below), household consumption is maximizing utility. This is achieved by utilizing income towards either tobacco expenditure and expenditure on other household goods. It therefore follows that reduction in tobacco use in households over time will result to an increase consumption of other essential goods in the household, such as food and clothing, and therefore increase the welfare of the household

members. This paper therefore seeks to test the hypothesis that tobacco consumption does not crowd out consumption of essential goods in the households.

Figure 3-1: Utility in Households through Consumption of Tobacco and Essential Household Goods
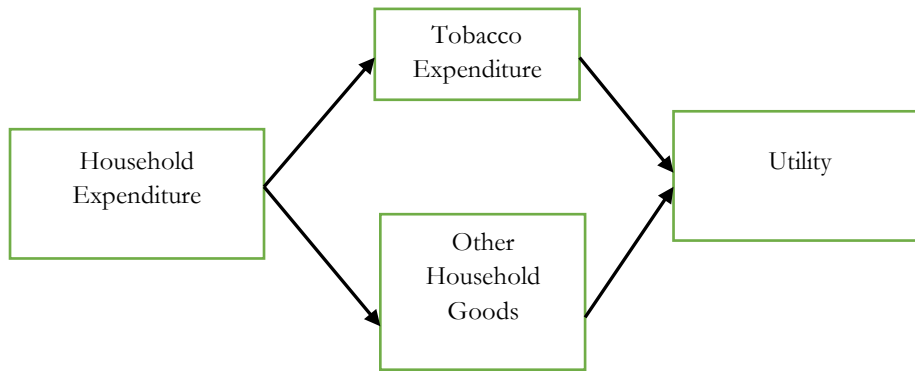
Source: Author's Conceptualization

3.4 Theoretical Framework

The essay follows the theoretical framework as laid down in John (2008). Here, we assume that a household seeks to maximize utility in the manner built by Samuelson (1956) and Becker (1974). Because of the challenge in incorporating intra-household interaction in the data, utility maximization in the households generally results in a set of z household Marshallian demand functions of the form $X_n = (p_n....p_z; Y, c)$ where x_n is quantity purchased of the nth commodity, p_n is the price of the nth commodity, Y is the total household income while c is a vector of household characteristics.

The assumption in the model is that a household that smokes tobacco is one in which any member smokes. The household pre-determines the quantity of tobacco that will be purchased before deciding on other commodities that will be purchased in the household. The rationale behind this approach is the addictive nature of nicotine, meaning that the maximization of the household's utility is subject to an expenditure amount that remains after the household has purchased tobacco. This situation, therefore, results to the optimization problem of utility maximization with a set of conditional demand functions of the form $x_n = b_n(p_n....p_z; M; c, d)$ where d is an indicator variable for tobacco expenditure in a household, and M is the income that remains after

the household has already spent on tobacco. Demand by the household on commodity n is subject to its smoking status. This suggests the possibility of comparison of conditional demand functions of smoking households and Marshallian demand functions for non-smoking households, with any difference in the quantities consumed being attributed to tobacco.

Assuming there are z number of goods in the market and tobacco is the zth good, the household will have no control over z-1 goods whose market prices are given as $\{ P_1,.....,P_{z-1} \}$. It follows, therefore, that the total expenditure of the household on these goods will be given by $M (M = M - P_t t)$ where $P_t t$ is the tobacco expenditure). The utility maximization problem assumes the following form:

$$\text{Max U} = U(x_1,...,x_z;c) \text{ s.t } \sum_{i=1}^{z-1} p_i x_i = M \qquad (3\text{-}1)$$

with the additional constraint $x_z = \bar{x}_z$ where $\bar{x}_z$ is the household's demand for tobacco.

3.5 Econometric Model and Estimation

Following the presentation of the theoretical model in section 3.3, this paper used the econometric model laid out in Chelwa and Van Welbeek (2014).

The study first compared the mean expenditures of various commodities in the household between the tobacco consuming and non-consuming households. Specifically, comparisons were made in the following expenditure categories: food, healthcare, alcohol, water, housing, lighting and electricity, alternative energy sources, transport and communication, entertainment and personal care, school, clothing and household operations. To document the differences in spending decisions between tobacco consuming and non-consuming households, a student t test was run and tested using regression analysis on whether the difference can be attributed to consumption of tobacco.

The second empirical strategy was to test corner solutions. The function b_n is the conditional demand on tobacco of the nth good in the function $x_n = b_n(p_n....p_z;M;c,d)$. It therefore means that one gets demand for other goods on the household as a function of price of that good, price of all goods except tobacco, which is the conditioning. To test whether having no expenditure on tobacco is because of abstaining from tobacco consumption or as a result of corner solutions, these conditional demand functions can be used. This is because there is possibility that some

households which do not report tobacco use especially in cross-sectional surveys cannot be all theoretically assumed is because of abstention only (John, 2008). There is possibility that the zero reporting by households is because of infrequent purchases, which can result to either corner solutions because of the budget constraint or sheer abstention. Corner solutions could suggest that once prices improve, there are consumers who will resume purchase of the product. It was therefore important to statistically test whether the zero reporting of tobacco use was due to abstentions or corner solutions. To establish this, we followed Vermeulen (2003) and used a simple t test where we augmented the conditional demand function with a binary variable that indicates if the household was a smoking household or a non-smoking household.

A necessary condition for non-reporting of tobacco expenditure and its correspondence to corner solution is that both non-users and users of tobacco behave according to the demand function $x_n = b_n(p_n....p_z; M; c, d)$. If this is the case, it means that there are households who do not set money aside for tobacco consumption because of budget constraints. We therefore test the null hypothesis for corner solution by following the test developed by Vermeulen (2003). The procedure involves testing whether the demand function depends on a binary variable d. This binary variable indicates whether we observe negative expenditure on tobacco (d=0) or positive expenditure on tobacco (d=1). A significant conditioning binary indicator in the demand for the other commodities by all households means both non-users and users of tobacco behave differently, and therefore null hypothesis is rejected, indicating that zero reporting by households is because of abstention. However, if the binary indicator d is insignificant, we would not have sufficient reason for rejecting zeros to be derived from abstentions (Vermeulen, 2003; John, 2008; Chelwa and Van Walbeek, 2014).

It is possible that both tobacco users and non-users have similar preferences on the rest of the goods in the commodity package in the household, which may result to a rejection of the null hypothesis. However, because tobacco use acts as a constraint in a tobacco users' utility function and not for a non-user, it is important that the test explores whether tobacco is weakly separable from the consumption of other commodities (Vermeulen, 2003). If there is separability of x_n from d (i.e. d is insignificant), it suggests that the household starts by first allocating money for tobacco. If this happens, it would generate an income effect but not a substitution effect on the rest of the household commodities.

The third empirical strategy in the paper was to test the hypothesis on whether tobacco expenditure crowds out consumption of the commodities chosen in the two sets of households.

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Because a quadratic expenditure is used, the Engel curve was estimated using a Quadratic Almost Ideal Demand System (QUAIDS). Estimating QUAIDS has an advantage in that it is consistent with utility theory and is consistent with Angus Deaton's Almost Ideal Demand System and allows one to make consideration of household income and model a commodity as a necessity or luxury (Banks et al., 1997). This being a non-parametric analysis of consumer expenditure pattern, Engel curves require quadratic terms in the logarithm of expenditure, something that is not possible in Almost Ideal Demand System (AIDS). This is because they have expenditure share Engel curves that are linear in the logarithm of total expenditure (Banks et al., 1997). For example, there are certain durable goods or clothing types that are regarded as necessities by higher income individuals while at the same time luxuries by lower income individuals.

The paper assumes that a household seeks to maximize a collective utility. The paper therefore estimated a system of Engel curves, each taking the following form:

$$W_{nh} = \alpha_{1n} + \alpha_{2n}d_h + \alpha_{3n}\ln M_h + \alpha_{4n}(\ln M)_h^2 + \alpha_{5n}FE + \gamma_n a_j + u_{nh} \tag{3-2}$$

Equation 3-2 represents the conditional Engel curves of the conditional demand functions discussed in the theoretical framework presented in section 3.3. In the equation estimated, W_{ih} is expenditure portion of commodity n in household h after deducting the expenditure portion of tobacco in the household. d_h is a binary dummy variable, which is represented by a value of 1 if household h reports a positive expenditure of tobacco in a month and zero if there is no expenditure of tobacco in the household. $\ln M_h$ is the natural logarithm of total monthly expenditure, excluding expenditure on tobacco. $(\ln M)_h^2$ is the square of $\ln M_h$ in household h. It is good to note that equation 3-2 is the empirical implementation of the Marshallian and conditional demand functions highlighted in section 3.5 above.

Because the KIHBS data is collected in clusters, and because of lack of information about price data in the survey, the Engel curves are augmented with cluster level fixed effects (FE), which work under the assumption that households within the same cluster experience similar prices for goods consumed. The paper makes a similar assumption to Chelwa and Van Walbeek (2014) that FE is exogenous in this specification because an individual household's demand is too small to be able to influence the determination and how cluster-level prices are structured.

a_{ih} is a vector of household characteristics that include natural logarithms of characteristics such as age of head of household, household size, average age of the adults in the household, years of schooling of the household head, sex of household head, principal source of household income,

and occupation of household head. Other characteristics include the proportion of adults in the household (household structure) and number of employed persons in the household. For the purpose of this paper, adults are defined as those above 18 years. The controls used in **a** are standard ones used in literature for crowding out effects of tobacco (Chelwa and Van Walbeek, 2014; John, 2008; Pu et al., 2008, John, Ross and Blecher, 2012; San and Chaloupka, 2016).

u_{nh} is the error term and is assumed to be normally distributed and having a mean value of zero. Crowding out was then established if the coefficient of d i.e. α_{2n} in equation (3-2) was negative and statistically significant.

There is a possibility d, $\ln M_h$ and $(\ln M)_h^2$ are endogenous; i.e. correlated to the error term u_{nh} .To take care of this, the study followed John (2008), Pu et al. (2008), Chelwa and Van Walbeek (2014) and San and Chaloupka (2016) by instrumenting for tobacco expenditure d. The use of an instrumental variable not only makes the estimates consistent but also ensure they are unbiased. The essay adopts Chelwa and Walbeek (2014) assumption that cov (x, ε) ≠0. It follows, therefore, the choice of the instrumental variable is very important because the instrumental variable chosen has to be one that influences W_{nh} only through its influence on tobacco. In addition to this, it has to influence W_{nh} only through its impact on $\ln M_h$. Given this scenario, the candidates for the instrumental variable were adult male and adult female ratio for tobacco and total household expenditure (which is used as a proxy income) for $\ln M_h$. Like John (2008), Pu et al. (2008) and Chelwa and Van Welbeek (2014), we instrumented for d with adult sex ratio. The rationale behind this choice of instrument is that male adult smoking prevalence is higher in Kenya than adult females, and therefore more likely to use tobacco (see prevalence rates in chapter 2). Here, results, which use the KDHS 2014, suggest that adult male consumption of smoking and smokeless tobacco is at 17.3% and 3.10% for men compared to 0.18% for smoking tobacco and 0.93% for smokeless tobacco in women. The study also makes an assumption that the instrumental variable of adult sex ratio is not correlated with the error term u_{nh} .To strengthen the case for the choice of the instrumental variable, we assessed the results of the coefficient of the F statistics reported in the first-stage probit for the regression of the instrumental variables, which were then evaluated to see if they were strong; i.e. F statistic was equal or greater than 10 (Stock, et al, 2002). This confirmed the validity of the choice.

It is also possible that another variable not specified in equation 3-2 might simultaneously influence a household's expenditure on tobacco and other commodities in the household. It is

important we account for this endogeneity to ensure that the coefficients specified in the demand system are both consistent and unbiased. The OLS procedure specified previously assumed d is exogenous; i.e. not related to the error term. Additionally, $\ln M_h$ and $(\ln M)_h^2$ are also likely to be endogenous in a similar manner. We therefore account for this possible endogeneity. To do so, we first estimate the first stage regressions involving the endogenous variables and potential instruments (Baltagi, 2008). The potential instruments assessed included total expenditure, household size, years of schooling of household head, household structure, age of household head, average household age, and average child age. Afterwards, in the second stage, the predicted values from the first stage regression are substituted for the endogenous variables in equation 3-2.

Because of the dichotomous nature of d, the first stage regression between d and adult sex ratio (instrument) will likely be non-linear. We therefore best estimate it using a probit. This ensures that the predicted values for $d, \hat{d}$ are bounded between 0 and 1, something that is not certain when one uses a linear estimation. However, using this estimation introduces the complication of forbidden regression, which is a situation where predicted values from the first stage are directly applied to a second stage, which is linear (Wooldridge, 2002). The challenge with this is that one risks non-zero correlation between $\hat{d}$ and the first stage residuals (Angrist and Pische, 2009). To prevent this from happening, we followed the suggestion by Heckman (1978), Wooldridge (2002), Angrist and Pische (2009) and use the predicted values from the first stage probit ($\hat{d}$), as an instrument for d.

To implement the instrumenting technique above, this essay adopts Chelwa and Van Walbeek (2014) approach where equation 3-2 is estimated using 3SLS combined with a Seemingly Unrelated Regression (SURE). This would in effect make it a four stage least squares procedure because the first two stages involve estimating a probit function for d and using the estimated function to generate the predicted values, $\hat{d}$, which are used as instruments for d in the third stage. The SURE method assumes the fourth stage because it corrects errors associated with regression coefficients for within household correlation with error term (Zellner, 1962).

3.6 Definition of Variables

Table 3-1: Variable Definition

Variables	Description	Measurement
Tobacco expenditure	Expenditure category	Dummy variable
Household expenditure	Expenditure category	Total household expenditure
Household size	Household composition	Total household size
Percentage of adults in the household	Household composition	Percentage of adults in the household (above 18 years)
Age of household head	Age category	Age of household head
Age of adults in the household	Age category	Average age of adults in the household
Age of children in the household	Age category	Average age of children in the household
Years of schooling of household head	Schooling status	Number of years spent in school
Number of employed people in the household	Employment status	Number of people employed in the household
Food	Expenditure category	Average expenditure in Ksh
Alcohol	Expenditure category	Average expenditure in Ksh
Health care	Expenditure category	Average expenditure in Ksh
School	Expenditure category	Average expenditure in Ksh
Clothing	Expenditure category	Average expenditure in Ksh
Water	Expenditure category	Average expenditure in Ksh
Housing	Expenditure category	Average expenditure in Ksh
Electricity	Expenditure category	Average expenditure in Ksh
Alternative Energy	Expenditure category	Average expenditure in Ksh
Transport and Communication	Expenditure category	Average expenditure in Ksh
Entertainment	Expenditure category	Average expenditure in Ksh
House care	Expenditure category	Average expenditure in Ksh
Personal care	Expenditure category	Average expenditure in Ksh

3.7 Data Description

The data for this paper comes from the 2005/2006 Kenya Integrated Household and Budget Survey (KIHBS) conducted by the Kenya National Bureau of Statistics. This survey was nationally representative and used a two-stage stratified cluster sampling whereby 1,343 clusters comprising of 482 urban clusters and 861 rural clusters where selected in the first stage. In the second stage, a total of 13, 430 households from the 1,343 clusters and divided into 8,610 rural households and 4,820 urban households were selected. The households were further classified for analysis by type of residential house where houses are classified as either shanties, bungalows or maisonettes. These are used in this paper to further suggest the income potential/status of households (stratum).

The Kenya Integrated and Household Survey collects data from the household head or someone with adequate information of the household and from the household and collects data over a 12-

month period, meaning that all possible seasons are captured in the data information. The households covered are in all parts of the country and are captured using the geographical positioning system (GPS), making it possible to identify the precise location of the household. The questionnaire captures data on the economic activities of members of the household who are 12 years and older over a 12-month period and includes the personal characteristics of all members living in the household.

The KIHBS survey collects a rich set of data on the living conditions of Kenyan households in the area of education, health characteristics, child nutrition, household income levels and transfers, employment status, income sources, food production and consumption, household expenditure patterns, access to clean water, household access to social amenities, access to credits and shocks, and many more. The expenditure section in the survey (section IJKL) asks each household to report the total expenditure of a commodity over time, ranging from per week to one month. Where the survey reports consumption over a period of seven days, this paper assumes a uniform consumption amount per week and multiplies the same by a four to estimate the monthly consumption of all the expenditures. In some cases, such as schooling, the households give an annual expenditure. In such cases, this annual expenditure is divided by twelve to give the monthly expenditure. In this paper, the expenditure, as stated earlier, focuses on the following commodities: Alcohol, tobacco, food, healthcare, entertainment, transport and communication, house care, personal care, electricity and lighting, rent, clothing and alternative energy.

The KIHBS questionnaire captures variables that are of use in the proposed study. Section I of the questionnaire looks at "consumption of food over the last one week" and among the items in this list is tobacco, cigarettes, tobacco-processed, tobacco-raw, cigars and snuffs. This can therefore enable the assessment of the causal impact of tobacco expenditure on household spending patterns in Kenya. The paper proposes to use the 2005/06 KIHBS for the essay analysis.

Using the survey data set, analysis carried out the full sample of area of data collection (provinces as per the KIHBS 2005/2006), whether they are classified as rural or urban and by expenditure category.

3.8 Results

3.8.1 Description of Results

Table 3-1 shows some of the summary statistics from the 2005/2006 KIHBS. The full sample consisted of 13,212 households with 1,775 households reporting positive tobacco use (13.43%).

The KIHBS survey suggests that the average household size of Kenyan households is 5.05, with adults generally comprising 49.60% of Kenyan households. For the purposes of this paper, adults are defined as those who are 18 years or older in a household. The adults have a general average age of 37.25 years and the average age of the head of the household in the survey is 44.52 years. Children in this paper are defined as those under the age of 18 years and the survey results indicate that the average age of children in the households is 3.68 years. The average years of schooling for the household head in the households surveyed was 18 years. Based on the percentage of adults in the households, the results suggest that the number of adults in the households is at an average of 2.52 and the average number of people employed in Kenyan households from the full sample is 1.61. Further analysis suggests that unemployment rates could be estimated at 63.89%.

Results from the survey suggests that households spend most of their income in food consumption with the general average being 54.07%. This is followed by entertainment at 22.62%, school at 14.11% and water 13.92%. Further analysis suggests that urban households spend 8.22% of their income in housing costs and 9.97% of the income in transport and communication. This is compared to rural households who spend 0.55% of their income in housing and 4.30% of the income in transport and communication. The relatively low spending of income in housing and transport and communication for rural areas compared to urban areas is because rural households generally live in their ancestral homes, and being mainly smallholder farmers (Kiriti and Tisdell, 2003) have lower costs in housing and transport. Households spend an average of 8.17% of their income in alternative energy such as paraffin, charcoal and firewood.

Table 3-2: Summary Statistics- Full Sample

Line No.	Statistic	Full Sample	Urban	Rural
1	Number of households	13,212	4,725	8,487
2	Percentage of households in urban areas	35.76%	100%	N/A
3	Percentage of households in rural areas	64.24%	N/A	100%

Line No.	Statistic	Full Sample	Urban	Rural
4	Average monthly tobacco expenditure (Ksh)	373.33	679.80	291.27
5	Percentage of households reporting positive tobacco expenditure	13%	11%	15%
6	Tobacco share among tobacco spending households	6.32%	6.70%	6.22%
7	Monthly household expenditure (Ksh)	8,342.25	14,937.22	6,091.94
8	Average household size	5.05	4.13	5.56
9	Percentage of adults in the household	49.90%	56.90%	47.12%
10	Average age of household head	44.52	39.16	47.50
11	Average age of adults in the household	37.25	35.24	38.37
12	Average age of children in the household	3.69	2.58	4.30
13	Average years of schooling of household head	10.16	11.46	9.21
14	Average number of employed people in the household	1.61	1.34	1.77
15	Percentage of people living in high-cost residences	55.76%	49.04%	59.45%
16	Percentage of people living in medium-cost residences	15.34%	33.53%	5.32%
17	Percentage of people living in low-cost residences	28.89%	17.33%	35.24%
18	Food	54.07%	45.36%	56.41%
19	Alcohol	4.37%	5.04%	4.19%
20	Health care	2.83%	1.94%	3.07%
21	School	0.05%	0.05%	0.05%
22	Clothing	6.16%	4.50%	6.60%
23	Water	1.28%	1.58%	1.20%
24	Housing	2.11%	8.22%	0.55%
25	Electricity	3.14%	2.11%	3.42%
26	Alternative Energy	6.49%	7.32%	6.26%
27	Transport and Communication	5.50%	9.97%	4.30%
28	Entertainment	0.79%	1.17%	0.69%
29	House Care	2.73%	2.13%	2.89%
30	Personal Care	4.20%	4.31%	4.17%

Source: Author's Computation using Kenya Integrated Household and Budget Survey 2005/2006

3.8.2 Corner Solutions

The second set of results was carried out to test whether having no expenditure on tobacco is because of having corner solutions or because the household abstains from using tobacco. To do this, the paper used the test developed by Vermeulen (2003). Here, the null hypothesis consisted on testing whether the demand function depends on a binary variable *d*, which indicates whether we observe positive expenditure on tobacco (*d*=1) or negative expenditure on tobacco (*d*=0). As suggested earlier, if the conditioning binary indicator is significant in the demand for the other commodities by all households, it would mean both users and non-users of tobacco behave differently and we would, therefore, reject the null hypothesis of zeros arising from corner solutions, and therefore support abstention as the reason for reporting zero use of tobacco. If, on the other hand, the binary indicator *d* is insignificant, we would not have sufficient reason for rejecting zeros to be derived from abstentions. The corner solutions for the full sample are presented in Table 3-3 below and show food, alcohol, transport and communication, electricity, alternative energy, personal care and house care are significant.

Table 3-3:Corner Solutions

Commodity	Chi-Square Full sample	Chi-Square Urban sample	Chi-Square Rural sample
Food	10.26**	1.93	0.17
Alcohol	182.48***	1.68	0.26
Health	2.65	1.25	0.22
Transport and communication	6.61*	6.70***	0.13
Clothing	4.40	2.72*	1.04
Housing	2.53	1.39	6.81***
Electricity	18.52***	6.43***	7.93***
Alternative energy	37.59***	4.78**	0.05
Entertainment	1.30	0.03	0.01
Personal care	14.41***	0.01	0.07
House care	18.00***	0.70	0.71

Significance levels [*** p<0.01, ** p<0.05, * <0.1]

Source: Author's Analysis using Kenya Integrated Household and Budget Survey, 2005/2006

3.8.3 Instrument Strength

The paper first tests for instrument strengths as explained in section 3.3, where we ran a regression of the tobacco expenditure against the proportion of adult males and a set of household characteristics in the full sample and both urban and rural areas. Overall results suggest that the proportion of adult males and household structure are statistically significant. This is presented in Table 3-4 below. For this essay, we use the proportion of male adults as the instrument of choice.

Table 3-4: Regression for Output of Tobacco Expenditure on Proportion of Adult Males and Other Household Characteristics

Independent Variable	Dependent Variable: Tobacco Expenditure		
	Full Sample	Urban Sample	Rural Sample
Proportion of male adults	42.562***	102.608***	16.921*
Log of household size	29.530	79.930	8.205
Log of years of schooling of household head	5.654	1.732*	4.967
Log of the highest level of education of household head	-9.632	-18.095	-7.357
Log of the age of the household head	13.702	31.835	12.737
Log of the average adult age	34.373	84.249*	10.937
Log of the average child age	-0.332*	1.092	-1.534
Household structure	45.112	144.923	-0.856
Total household employment	-2.418	10.167	1.342
Stratum			
Dummy 1 for household type	55.323**	71.357	49.676***
Dummy 2 for household type	94.281***	113.076	78.161***
Dummy 3 for household type	53.979***	84.426**	45.510***
Constant term	-280.163**	-667.452**	-123.10

Significance levels [*** $p<0.01$, ** $p<0.05$, * <0.1]

Source: Author's Analysis using KIHBS 2005/2006

Table 3-5: Regression for Output for Log M on Log of Total Expenditure and Other Household Characteristics

Independent Variable	Dependent Variable: Log M		
	Full Sample	Urban Sample	Rural Sample
Log of total expenditure	1.000***	1.000***	1.000***
Log of household size	-0.001	-0.0008	-0.0005
Log of years of schooling of household head	-0.0003	0.0015	-0.001
Log of the highest level of education of household head	0.003***	0.0014	0.003***
Log of the age of the household head	-0.003*	-0.006**	-0.002
Log of the average adult age	-0.004*	-0.0024	-0.005
Log of the average child age	0.001**	0.0009	0.002**
Household structure	0.001	0.002	0.0002
Total household employment	-0.0001	-0.0003	0.0001
Stratum			
Dummy 1 for household type	-0.007***	-0.004*	-0.010***
Dummy 2 for household type	-0.009***	-0.005**	-0.015***
Dummy 3 for household type	-0.010***	-0.006***	-0.012***
Constant term	0.023**	0.023	0.029***

Significance levels [*** $p<0.01$, ** $p<0.05$, * <0.1]

Source: Author's Analysis using KIHBS 2005/2006

3.8.4 Differences in Expenditure Shares

Table 3-6 shows the difference in expenditures between smoking and non-smoking households for the full, rural and urban samples. The presentation of results for both rural and urban areas is because the survey collects a rich set of data on living conditions, split into rural and urban households. Further analysis in this paper for both rural and urban areas is done by assessing expenditure patterns of the top 50% and bottom 50% of each categorization, with the top 50% referred to as 'richer' households and the bottom 50% as the 'poorer' households in this paper.

These differences are expressed in percentage points and when positive implies that smoking households allocate a greater share of their expenditure to that category item compared to non-smoking households. When it is negative, it implies that smoking households spend a lower proportion of their budgets on the category item than the smoking households. The results suggest that smoking households allocate less monies in food, healthcare, clothing, housing, electricity, alternative energy, transport and communication, entertainment, house care and personal care. The difference in health care, school, housing, electricity, alternative energy, transport and communication, entertainment, house care and personal care are statistically significant. Generally, smoking households allocate more funds in the consumption of alcohol and water than non-smoking households, with allocation to alcohol being statistically significant.

We observe that for rural sample, allocation on food by non-smoking households is significantly higher by 1.61% when compared to smoking households. Smoking households spend significantly on alcohol compared to non-smoking households in both rural and urban areas. In urban areas, smoking households spend 4.39% more in alcohol compared to non-smoking households, and this is statistically significant.

The results suggest that tobacco smoking households in urban areas spend 3.8% less on housing compared to non-smoking households, with the result being statistically significant at 1%. There is not much difference in rural areas, mainly because rural households normally live in ancestral lands where they do not pay rent. The results also suggest that tobacco smoking households spend less on electricity and alternative energy. Urban non-smoking households spend 0.65% less while rural non-smoking households spend 0.85% less of their income on electricity. The difference is statistically significant at 1%. On alternative energy, urban non-tobacco smoking households spend 1.52% less, and rural non-smoking households spend 2.15% less than tobacco smoking households, with the difference being significant at 1%. The results in Appendix C1

suggest that urban non-smoking households allocate aside 8.8% of their incomes towards alternative energy compared to 7.3% in smoking households while in rural areas, non-smoking households spend 8.4% compared to 6.3% by smoking households. This is not surprising since poorer and rural smoking households allocate more towards alternative energy sources such as kerosene and firewood, which are cheaper than electricity.

In summary, the information in Table 3-6 shows that there are differences in the way smoking and non-smoking households allocate their monthly expenditure, with the difference being statistically different in many cases. It is therefore important to investigate whether these differences and patterns observed are in any way related to the smoking status of the households.

Table 3-6: Difference in Mean Expenditures Shares between Smoking and Non-Smoking Households

Expenditure Share on	Full Sample	Urban Sample	Rural Sample
Food	-6.3%	0.07%	-1.61%**
Alcohol	1.52%**	4.39%*	0.83%
Health care	-0.53%**	-0.68%**	-0.55%*
School	-5.96%*	-8.86%***	-4.74%
Clothing	-0.52%*	-1.07%*	-0.47%
Water	0.03%	-0.37%**	0.2%
Housing	-1.45%***	-3.80%***	-0.09%
Electricity	-0.71%***	-0.65***	-0.81%***
Alternative Energy	-2.04%***	-1.52%***	-2.15%***
Transport and Communication	-1.85%***	-0.18%	-2.34%***
Entertainment	-0.37%*	-0.43%*	-0.34%
House Care	-0.44%***	-0.24%*	-0.55%***
Personal Care	-1.20%***	-1.29***	-1.16%***

Significance levels [*** $p<0.01$, ** $p<0.05$, * <0.1]

Source: Author's Analysis using KIHBS 2005/2006

Table 3-7 shows the expenditure shares of tobacco across expenditure quintiles for smoking households only. The paper first constructed expenditure quintiles on total expenditure across both urban and rural households to determine expenditure spend across smoking households. The results suggest that urban tobacco smoking households have a higher expenditure allocation for tobacco use across all quintiles compared to rural households, with those at the lower quintiles for both urban and rural households having a higher allocation. For instance, the 1st quintile for urban households allocates 11.83% compared to 4.71% for the 5th quintile. In the case of rural households, the 1st quintile allocates 10.04% compared to 4.67% for the 5th quintile. This could

suggest that poorer households, which have the lowest expenditures spend more in tobacco expenditure compared to fairly well of households.

Table 3-7: Tobacco Expenditure Shares across Expenditure Quintiles for Smoking Households

Quintile	1	2	3	4	5	Total
Urban	11.83%	7.71%	5.48%	4.78%	4.71%	6.70%
Rural	10.04%	6.56%	5.3%	5.25%	4.67%	6.22%

Source: Author's Analysis using KIHBS 2005/2006

3.8.4 Ordinary Least Squares

This section seeks to find out if the expenditure share differences between the smoking and non-smoking households are because of the smoking households allocating more expenditure towards tobacco.

The difference in expenditure patterns observed in Tables 3-6 could be as a result of confounding variables; i.e. characteristics other than the tobacco smoking status of the household. For example, the household structure or the household's socio-economic status may be the cause of the difference in the expenditure patterns. To control for these confounders, we can use ordinary least squares (OLS) where we regress expenditure shares on the household smoking status and a number of control variables that would represent the household structure and household socio-economic status. This would therefore mean that we estimate equation 3.1 by OLS and report the results of this in Table 3-8. However, we present only the results of the coefficient on d (smoking status) with the full results of the OLS estimation presented in an appendix later.

In Table 3-8, a negative coefficient on d suggests that smoking households allocate less expenditure in that category of expenditure item in the household when compared to non-smoking households when other variables are controlled. This table, to a great extent, replicates Table 3-6 from a qualitative perspective. The results suggest that for the full sample, crowding out occurs for housing, alternative energy, transport and communication, and personal care with all the instances being statistically significant at 1%. It also occurs for home care with a statistical significance of 5%. For the urban sample, crowding out occurs for alternative energy, transport and communication and personal care (all with statistical significance of 1%) and for house care at 5% statistical significance. In the rural sample, it occurs for housing and alternative energy (1% statistical significance), clothing (5% statistical significance) and personal care (10% statistical significance). Finally, we observe that it is commodities of the top 50% of the sample that experience most crowding out compared to those of the bottom 50%.

Table 3-8: Ordinary Least Squares (OLS) Estimates for the Coefficient on *d*

Coefficient on d in:	Full Sample	Urban H/holds	Rural H/holds	Top 50%	Bottom 50%
Food	0.011(0.007)	0.0112(0.009)	0.006(0.011)	0.044(0.014)***	0.006(0.009)
Alcohol	0.037(0.002)***	0.033 (0.003)***	0.045(0.004)***	0.029(0.004)***	0.042(0.003)***
Health care	-0.003(0.003)	-0.003 (0.004)	-0.002(0.004)	-0.005(0.004)	0.002(0.004)
School	-0.001(0.001)	-0.001(0.001)	-0.001(0.003)	-0.0003(0.001)	0.175 (0.355)
Clothing	-0.001(0.004)	-0.007 (0.005)	-0.019(0.007)**	0.002(0.007)	-0.003(0.006)
Water	0.101 (0.088)	0.002 (0.001)	-0.001(0.002)	0.001(0.002)	-0.0003(0.001)
Housing	-0.007(0.003)***	-0.0005 (0.001)	-0.019(0.007)***	-0.013(0.005)***	-0.007(0.004)*
Electricity	-0.002(0.001)	-0.001(0.002)	-0.003(0.002)	-0.005(0.003)*	-0.002(0.002)
Alternative Energy	-0.014(0.003)***	-0.012(0.004)***	-0.015(0.005)***	-0.015(0.005)***	-0.014(0.004)***
Transport and Communication	-0.010(0.004)***	-0.01(0.004)***	-0.007(0.007)	-0.016(0.006)***	-0.008(0.005)
Entertainment	-0.001(0.001)	-0.002(0.002)	-0.0005(0.002)	-0.003(0.002)*	-0.001(0.002)
House Care	-0.002(0.001)**	-0.003(0.001)**	-0.0004(0.002)	-0.005(0.002)*	-0.001(0.001)
Personal Care	-0.007(0.002)***	-0.008(0.002)***	-0.006(0.003)*	-0.015(0.004)***	-0.006(0.002)***
Observations	9,281	5,388	3,870	3,887	5,371

Significance levels [*** $p<0.01$, ** $p<0.05$, * <0.1]

Source: Author's Analysis using Kenya Integrated Household and Budget Survey 2005/2006

3.8.5 Three-Stage Least Squares (3SLS)

The results presented in Table 3-8 assume that d is exogenous, i.e. not correlated to the error term. However, it is likely that *d* in equation 3-2 is endogenous, for instance in a situation where a household decides to spend on tobacco only after making other household expenses or where we have a variable not specified in the equation but contained in the error term, and which influences a household's decision on tobacco spending simultaneously with the spending on other commodities. In addition to this, previous studies have suggested that $\ln M_h$ and $(\ln M)_h^2$ are likely to be endogenous in the same way (Vermeulen, 2003; John, 2008; Pu et al, 2008).

To account for possible endogeneity of *d,* $\ln M_h$ and $(\ln M)_h^2$ prevent biased and inconsistent coefficient estimates in the demand system, this paper estimated equation 3-2 using 3SLS. The first two stages involved estimating a probit function for *d* and using the estimated function to generate the predicted values , $\hat{d}$, which are used as instruments for *d* in the third stage. These results are presented in Table 3-9 below. The table only reports estimates of the coefficient on d, with the full set of the 3LS results reported in tables B1-F1 in the appendix.

The results suggest that food is given a smaller expenditure allocation in the full sample and rural households, with the results from the full sample suggesting that the results are statistically significant at 1% level, and the results from rural households being at 5% significance level. Expenditure on health care by households in urban areas that use tobacco is less when compared to those that don't non-smoking households, with the difference being only statistically significant at 10% with the bottom 50% of the survey being the ones mainly impacted. Also, expenditure on electricity and alternative energy by rural smoking is less than non-smoking households, with results being statistically significance at 5% for electricity and 10% for alternative energy. In the full sample, expenditure by smoking households on electricity and alternative energy is higher when compared to non-smoking households, with results being statistically significant at 5% for electricity and 1% for alternative energy. Also, expenditure by smoking households in rural areas is less in-house care, with results being statistically significant at 10%. The results, however, suggest that it is the top 50% of the sample that experience this crowding out of house care compared to the bottom 50%. In the full sample, the smoking households allocate less in-house care, with results being statistically significant at 1%.

Table 3-9: Three Stage Least Squares (3SLS) Estimates for the Coefficient on *d*

Coefficient on d in:	Full Sample	Urban H/holds	Rural H/holds	Top 50%	Bottom 50%
Food	-1.019 (0.556) **	1.423 (1.261)	-1.870 (0.885) **	-2.143(2.36)	-1.297 (1.643)
Alcohol	-0.05 (0.149)	-1.375 (0.322)***	0.210 (0.240)	0.408 (0.614)	-1.717 (0.451) ***
Health care	-0.180 (0.231)	-0.869 (0.509)*	0.046 (0.367)	-0.681 (0.728)	-1.294 (0.795) *
School	-0.064 (0.092)	-0.058 (0.310)	-0.051 (0.118)	-0.009 (0.114)	0.175 (0.355)
Clothing	-0.327 (0.341)	-0.359 (0.720)	-1.953 (0.547)	-0.262 (1.318)	0.053 (1.078)
Water	0.101 (0.088)	-0.221 (0.226)	0.069 (0.133)	-0.441 (0.399)	0.121 (0.248)
Housing	0.166 (0.183)	0.681 (0.768)	-0.016 (0.106)	-0.410 (0.449)	0.465 (0.659
Electricity	0.264 (0.108) ***	0.034 (0.271)	0.338 (0.167) **	1.624 (0.521)***	0.365 (0.280)
Alternative Energy	0.561 (0.222) ***	0.411 (0.582)	0.584 (0.331) *	0.199 (0.912)	1.16 (0.672) *
Transport and Communication	0.133 (0.283)	0.679 (0.751)	-0.045 (0.425)	0.402 (0.983)	0.962 (0.938)
Entertainment	-0.006 (0.102)	-0.086 (0.269)	0.098 (0.154)	-0.067 (0.335)	-0.176 (0.346)
House Care	-0.226 (0.904) ***	0.012 (0.177)	-0.265 (0.149) *	-0.745 (0.477)*	0.088 (0.202)
Personal Care	-0.053 (0.148)	-0.198 (0.378)	-0.074 (0.227)	-0.460 (0.627)	0.162 (0.441)
Observations	5,542	1,688	3,854	2,298	3,244

Significance level [*** p<0.01, ** p<0.05, * <0.1]

Source: Author's Analysis using Kenya Integrated Household and Budget Survey 2005/2006

3.9 Summary, Conclusions and Policy Implications

This essay assessed the extent to which tobacco use in the household crowds out consumption of other basic goods and services. Here, the 2005/2006 Kenya Integrated Household and Budget Survey was utilized to compare how households that use tobacco and those that do not use tobacco allocate their limited resources. First, the essay compared the expenditure patterns of households that use tobacco and non-smoking households to document differences. Afterwards, the essay uses a Quadratic Almost Ideal Demand System to estimate a system of Engel curves to check whether the differences in expenditure between the two types of households is because of tobacco use. To control for confounders, such as the household economic status or structure that could be the cause of the expenditure difference, the paper uses the Ordinary Least Squares (OLS) and Three Stage Least Squares (3SLS).

The results suggest that food is given a smaller expenditure allocation in the full sample and rural households, with the results from the full sample suggesting that the results are statistically significant at 99% level, and the results from rural households being at 95% significance level. Also, urban smoking households allocate less expenditure in health care compared to non-smoking households, with the difference being only statistically significant at 10%, with the bottom 50% of the survey being the ones mainly impacted. Rural smoking households allocate more resources in electricity and alternative energy than non-smoking households, with results being statistically significant at 5% for electricity and 10% for alternative energy. We also find that smoking households in rural areas allocate less in-house care, with results being statistically significant at 90%. In the full sample, smoking households allocate more in electricity and alternative energy compared to non-smoking households, with results being statistically significant at 95% for electricity and 99% for alternative energy.

The econometric analysis carried out in essay two suggest that tobacco crowds out the consumption of food, alcohol health care, schooling clothing, entertainment, house care and personal care. In the general sample, the crowding out is statistically significant on food and house care. The study also suggests that the magnitude and pattern of crowding out of tobacco on other household expenditure items is subject to geographical location and socio-economic standing of households. The study concludes that tobacco crowds in consumption of goods such as water, electricity, alternative energy, transport and communication and housing for the general housing, albeit with a mixed pattern where crowding in is subject to the geographical location and socio-economic standing. For instance, tobacco crowds in consumption of water

and housing for those who are poor but seems to crowd out consumption of water and housing among the richer households. However, tobacco crowds in consumption of all households for electricity, alternative energy and transport and communication. Given the results from the essay, one of the policy implications is that tobacco control should be integral in government poverty alleviation strategy because the results show that poorer households in Kenya will benefit from reducing their tobacco consumption, since they would have higher disposable income that could be spent in the purchase of food, education and clothing.

3.11 Strengths, Limitations and Future Research

This essay is important because it uses expenditure data from Kenya, which is a low-income country. Most of the research done on economics of tobacco control and relationship with poverty are in high income countries. Secondly, this paper also uses the method of instrumental variables as is the standard method in literature, but goes further and uses less stringent assumptions on the instruments, which suggests that the positive associations between tobacco and goods such as water, electricity, alternative energy, transport and communication and housing are causal relationships, rather than correlations.

However, there are limitations in this essay. The paper uses cross-sectional data, meaning that because of unmeasurable sources of heterogeneity, it is difficult to draw definitive causal conclusions. Panel datasets are ideal in the sense that they allow one to compare the expenditure profile of the same household at different points in time, therefore controlling for unobserved heterogeneity. Unfortunately, Kenya does not collect panel data, thus making this difficult. Further research could make use of the 2015/2016 dataset that is not yet available to see if the causal relationships hold. Research could also be conducted to conclude if there is a relationship between tobacco use and poverty. This problem can be solved by using panel data because it would allow us to compare the expenditure profile of the same household at different periods, enabling the researchers to control for unobserved heterogeneity. Lastly, as pointed out in Chelwa and Van Walbeek (2014), Wang et al. (2006), John, Ross and Blecher (2012) and Block and Webb (2009) who point out that broader accounting for tobacco consumption costs in households should also include costs associated with under-nutrition and under investment in education.

There are also more limitations in essay two. While the paper gives an indication on how tobacco consuming households allocate resources, there are limitations that can improve policy making decisions with respect to tobacco control in the country. First, the dataset available for

this paper is the Kenya Integrated Household and Budget Survey for 2005/2006. A similar study should be conducted using the yet to be released Kenya Integrated Household and Budget Survey for 2015/2016, so that we can have a clear indication on how tobacco consuming households allocate limited resources. The tobacco prevalence has increased since 2006 to 17.3% (DHS 2014), and one may question how policy decisions can be influenced using old data. Also, the paper uses cross-sectional data where, while one is using an exhaustive list of controls among expenditure profiles of two identical households, there are unmeasurable sources of heterogeneity between the two identical households that cannot be accounted for, making it quite difficult to draw definitive causal relationships.

Essay Three: Economic Analysis of Tobacco Contract Farming in Kenya

4.1 Introduction

The emergence, promotion and expansion of tobacco leaf cultivation in many low-and middle-income countries (LMICs) have been supported by the narrative that tobacco production is lucrative for the economy, including benefits to government and tobacco farmers (Warner and Fulton, 1994; Otanez and Graen, 2014; Makoka et al., 2016). This narrative is deployed against tobacco control measures, with arguments that such measures result in loss of export earnings (Ekhardt, Holden and Callard, 2015; Otanez and Graen, 2014), jobs for cigarette manufacturing workers (Chavez, Drope and Lencucha, 2014), tax earnings to governments as a result of reduction of tobacco consumption (Ekhardt, Holden and Callard 2015; Chavez, Drope and Lencucha, 2014) and, more pertinent to this research, that control measures can negatively affect the economic livelihoods of farmers dependent on tobacco as a cash crop (Makoka et al., 2016). These arguments resonate with some governments, such as Malawi's and Zambia's, which have even challenged novel tobacco control efforts in international economic fora (Lencucha, Labonté and Drope, 2016; WTO-TBT, 2013), thus creating a major barrier to tobacco control in many countries where tobacco is grown.

4.1.1 Background

While the actual number of tobacco farmers in Kenya is not known with certainty, several reports have put forward varying numbers. The most recent estimate (Kibwage, Netondo and Magati 2014) suggests that there are 55,000 smallholder farmers. In contrast, the estimate by Patel, Collin and Gilmore (2007) was 29,000 while Mureithi (2003) suggested that the number of tobacco farmers in the country in 2003 had dropped to 29,000 from 31,000 in 1996 (WHO, 2003).

Smallholder tobacco farmers engage in tobacco production as contract farmers or independent farmers. As independent farmers, they are required to source for their inputs and sell the output to the leaf buying companies. When operating as contract farmers, they get inputs and extension services from the tobacco companies, who will upon harvest buy the output after deducting the cost of inputs supplied from the earnings. In Kenya, slightly more farmers (50.4%) are contracted farmers (Kibwage, Netondo and Magati, 2014).

4.1.2 Research Problem

Expansion of tobacco leaf cultivation in many low-and middle-income countries (LMIC) have been supported by the tobacco industry narrative that contract farming is beneficial to farmers when compared to leaf cultivation as independent farmers. (Lee, Ling and Glantz 2012; Otanez and Graen 2015; Gilmore et al 2015). This support for contract farming arrangement for smallholder tobacco farming is based on a number of benefits. They include the argument that contract farming increases production output and hence sales because of extension services provided and certainty of inputs necessary for farming. Smallholder farmers thus gain access to ready markets at country, regional and global markets (Key and Rusten, 1999; Warnings and Key, 2002; Minot and Roy, 2006; Minot, Miyata and Dinghuan, 2007)

Although there is a small emerging literature suggesting that smallholder tobacco farmers do not make adequate returns from tobacco farming and is associated with exploitation and market failure (Little and Watts, 1994; Makoka, Drope, Appau et al 2016; Naher 2007; Magati et al 2012; Kibwage, Netondo and Magati 2014) and that the contribution of tobacco earnings to GDP in most LMICs is small (Drope et al 2018; Patel et a; 2007), there is still a paucity of empirical evidence across countries and time to systematically counter the tobacco industry's prosperous livelihood narrative on contract farming. Country-specific empirical studies are important because of a need to build a wide and deep body of evidence, and policy makers' increasing demand for country-specific evidence to justify enhancing tobacco control to their constituencies. Accordingly, the paper has two objectives. First, it seeks to estimate the costs, revenues and profits among tobacco farmers, comparing contract and independent farmers. Second, it will evaluate decision and characteristics that are associated with the farmer's choice as a contract farmer.

4.1.3 Research Objectives

The general objective of this essay is to provide understanding on determinants of contract participation among smallholder tobacco farmers in Kenya. The following are the specific objectives:

a) To determine the factors influencing a smallholder tobacco farmer's choice to enter market participation as a contract farmer.

b) To determine the effect of participation in contract farming on smallholder farmer's income.

4.1.4 Contributions

Although there is a small emerging literature suggesting that smallholder tobacco farmers do not make adequate returns from tobacco farming (Makoka et al., 2016; Magati et al., 2012; Kibwage, Netondo and Magati, 2014) and that the contribution of tobacco earnings to GDP in most LMICs is small (Drope et al., 2018; Patel et al., 2007), there is still a paucity of empirical evidence across countries and time to contribute to this debate on farming livelihood. Country-specific empirical studies are important because of a need to build a wide and deep body of evidence, and policy makers' increasing demand for country-specific evidence to justify enhancing tobacco control to their constituencies.

This essay provides household-level economic assessment of tobacco farming in Kenya using a nationally representative sample to survey farmers and follow-up focus groups drawn from the sample. It builds on earlier work in Kenya (Magati et al., 2012; Kibwage, Netondo and Magati, 2014). Unlike previous research that covered only one region and was not based on an extensive household survey, this essay uses original data from households in the three regions and over four counties where tobacco is most widely grown and making results nationally representative. The essay also differs because it further elaborates the value chain that makes tobacco an attractive commodity in regions where it is grown.

In conclusion, this essay makes three contributions to the emerging literature about tobacco farming. First, it uses analysis of nationally representative data on tobacco farming to inform national policy making tobacco farming in Kenya. Second, and unusual in such studies, it accounts for production costs more comprehensively by incorporating a monetized cost of family labour. Finally, it examines both contract and independent farmers to help determine if there are differences in economic livelihoods between these groups.

4.1.4 Organization of Paper

The rest of the essay is organized into 4 sections. Section 4.1 introduces the research, including background, research problem and contributions. Section 4.2 and 4.3 presents the theoretical framework and conceptual framework, respectively. Section 4.4 provides the econometric and empirical models. Finally, section 4.5 highlights the research methods while section 4.7 the results from the research.

4.2 Review of Literature

4.2.1 Empirical Literature

Tobacco Farming and Environment

An early assessment of tobacco farming in Kenya (Kweyuh, 1997) examined the relationship between tobacco production and losses in environment and livelihood. Using interviews and impact stories, the study illustrated that tobacco increased poverty in Malakisi in Western Kenya and in Kuria in Nyanza. The study also suggested that Migori District was dependent on tobacco farming, with farmers using an average of four out of six acres to farm tobacco. Kweyuh (1997) argued that the tobacco industry was deceptive in its dealing with farmers and contributed to food insecurity in the two regions because tobacco growing was not only labour-intensive but farmers dedicated most of their land to tobacco growing at the expense of food crops. Deforestation in the regions was also high because of the curing process in tobacco farming, meaning that trees were used in the process while the chemicals applied in nurseries that are along river banks compromised the quality of water in the area. The research attributes poverty to tobacco growing and recommends that the tobacco industry be held accountable especially on deforestation and need to re-educate farmers on the negative effects of tobacco production, with the government investing in alternative livelihoods.

Tobacco Farming, Livelihood and Poverty

Chacha (2000) examined the relationship between tobacco farming and poverty. The results suggest that poverty rates had increased in Kuria District since the introduction of tobacco farming in the region. Tobacco farming resulted to cutting down of trees as a result of the curing process, shifted labour to tobacco farming from other food farming and using chemicals on nurseries which are usually along river banks. This reduced land productivity, negatively affecting food security and earnings of farmers in the region, resulting to increased poverty rates. The research demonstrated that the general situation of individuals in Kuria District was worse because of tobacco farming with food insecurity rising, incomes dropping and a negative ecological balance ensuing as a result of tobacco farming. The study recommended regulation of tobacco farming in the region due to the worsening economic and environmental situation in the region. This study was the first novel attempt to examine the relationship tobacco farming has with poverty but relied heavily on third party interviews from among others the tobacco

industry and from farmers. There was no analytical assessment and scientific methodology in its assessment.

Ochola and Kosura (2007) examined various scenarios of enterprise budget outcomes of alternative crops in the Nyanza region of Kenya. The results showed that tobacco farming was less profitable than commercial production of other cash crops in the area. They examined interview results of farmers who had shifted to other alternatives and were deemed to be better off economically. The study is a good attempt to expose stakeholders to the expected performance of various crops compared to tobacco farming. This study, however, had many shortcomings. First, it was desktop research that relied heavily on secondary information on various crops, including tobacco. This means that earnings were based on optimal performance of inputs and weather, and that farmers sold all their produce. Secondly, some crops that were considered did not necessarily grow under the same ecological conditions as tobacco.

There are studies that have attempted to demonstrate that the socio-economic status of tobacco growing households in the Nyanza region is poor compared to non-tobacco growing households. These include Kibwage, Momanyi and Odondo (2007), Kibwage, Netondo and Magati (2014), and Kibwage, Odondo and Momanyi (2008).

Kibwage Momanyi and Odondo (2007) suggested that there was an increase in child labour among tobacco-growing households due to the labour intensity in tobacco farming, and the inability of households to afford wages of workers required to sustain the labour requirements. Families resulted to using children in tobacco growing activities, resulting in children missing school during planting and curing stages, which typically leads to poorer academic performance when compared to children from non-tobacco farming households. The study also attempts to demonstrate a relationship between polygamy and tobacco farming in Kuria District, with tobacco growing households having larger families due to the need for non-paid labour among household members. It, however, does not indicate the total time and activities each family member, including children is involved in with regard to tobacco production. This study bridges this gap and attempts to show how family members utilize their labour in tobacco production.

Kibwage, Odondo and Momanyi (2008) examined the livelihood, assets and strategies among tobacco growing households compared to non-tobacco growing households in South Nyanza region. The study used two approaches – a multi-stage and stratified random sampling in which 210 tobacco farmers and 230 non-tobacco farmers were selected, and four focus group discussions from which livelihood mapping was carried out. The study concluded that non-

tobacco farmers had better access to financial resources from banks because of better income, had higher personal salaries and few depended on remittances from other family members employed in formal sectors locally and abroad. The study also concluded that there were no considerable differences in assets such as livestock between the two groups.

Kibwage et al. (2014) and Magati et al. (2012) performed a cost-benefit analysis of substituting bamboo for tobacco in South Nyanza. The study showed that bamboo farmers would earn up to six times more than tobacco farmers in a well-managed system. Tobacco farming, however, had a more established value chain with farmers assured of a market to sell their output despite the low incomes. Bamboo, on the other hand, while having a lucrative market potential, had no established market or value chain. There was also little technology transfer in making bamboo products. In addition to this, the market potential was hampered by an existing policy that banned harvesting bamboo trees in forests. This study used data from only one region, a reason used by policy makers as a gap in coming up with a comprehensive country policy on tobacco production control. This research, therefore, analyses data from the main tobacco growing regions to make a collective conclusion that can be used in coming up with a national tobacco growing policy.

Smallholder Tobacco Production and Contract Farming

The preferred institutional arrangement in tobacco farming is contract farming. The choice of contract farming offers several advantages for the smallholder tobacco farmers. These include the ability to deal with uncertainty in access to quality inputs, services and outputs by the smallholder farmers (Glover, 1984), access to newer technology (Goldsmith, 1985), and high incomes for the farmers (Minot, 1986). Contract farming also triggers a multiplier effect to the economies where tobacco is grown by creating employment, developing infrastructure and market development (Warning and Key, 2002).

This essay relies on the centralized model of contract farming (Eaton and Shepherd, 2001). In this model, there exists a centralized buyer that procures farm produce from many small-scale traders. In this model, the relationship is vertically integrated and involves provision of services such as pre-financing of inputs, extension services and transport to the farmers for delivery upon harvest. The model captures the relationship tobacco farmers in Kenya have with the tobacco firms (Wainaina et al., 2012). This is because tobacco contract farming assumes a combination of the three modalities of contract farming, which include "market specification", "provision of resources" and "management of production process". This is captured in Figure

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4-2, which shows the functional relationship between tobacco farmers and the tobacco companies. The association also provides for the provision of farming inputs, which is under the 'resource providing' modality with cost recovery upon farm product delivery. Finally, tobacco farming also has features of production management as seen by provision of extension services where contract growers agree to follow precise technological guidance on how to produce.

Figure 4-1: Centralized Model of Contract Farming
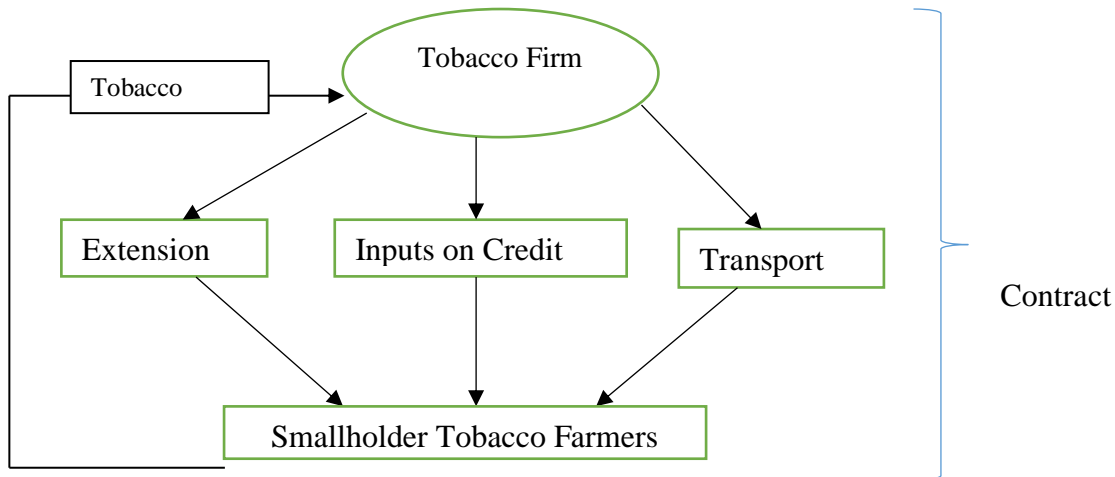
Source: Author's illustration adapted from Eaton and Shepherd (2001)

4.2.2 Overview of Literature

While the studies examined in section 4.5.1 have enabled researchers and policy makers in understanding the ecosystem under which tobacco production takes place in Kenya, there are some shortfalls. Papers such as Kweyuh (1997) and Chacha (2000) relied on primary material, for example interviews with farmers, company officials of British America Tobacco (BAT) Ltd and Mastermind Tobacco Ltd (MTK), government reports to monitor food production, interviews extracted from newspapers and books and observations in the two regions, but it did not systematically examine farmers' livelihoods empirically. Others such as Ochola and Kosura (2007), Kibwage, Odondo and Momanyi (2007), Magati et al. (2012) and Kibwage, Netondo and Magati (2014) used information from one part of the country, a reason used by policy makers as a gap in coming up with a comprehensive country policy on tobacco production control in line with Article 17 and 18 of the WHO FCTC (Kibwage, Netondo and Magati, 2014).

4.3 Conceptual Framework

The conceptual framework is presented in Figure 4-1 below. There are many factors that drive smallholder tobacco farmers towards contract participation. These include provision of inputs, pricing of tobacco, production dynamics such as technology and extension services. Also, moderating variables such as government policy and experience are important considerations. Ultimately, these factors attract the farmers into contract arrangement and, therefore, resulting to higher income than smallholder tobacco farmers who do not enjoy such previleges.

As it is indicated in Fig. 4-1, the model is parsed into three main parts; independent variables, moderating variables and dependent variablesdemographics are an independent variable in relation to the contractual arrangement and the contractual arrangement is an independent variable in relation to perceptions.

Figure 4-2: Conceptual Framework of Economic Decision of Tobacco Farming

Independent Variables	Moderating Variables	Dependent variables
Production cost Labour cost Cost of farm inputs Operational costs Opportunity cost Transitional costs	**Farmers' attitude** Farmers' satisfaction Production background Farmers' experience	**Tobacco farming** Contract farming Independent farming Profit Utilization of land Availability of household food Job creation
Market competition Contractual protection Market information Production technology dynamics Extension services	**Government Policy**	
Product Pricing Quality of tobacco leaf Price volatility Price sensitivity		

Source: Author's Conceptualization

Drawing from the reviewed literature and in view of the above conceptual model, the essay expects farmers to perceive contract farming as having more advantages compared to

independent farmers due to receiving full package of services offered under contract that include extension services and production of inputs (Hypothesis # 1). Also, the essay anticipates that independent farmers will perceive more disadvantages of the contract system than contracted farmers due to not receiving full package of services offered under contract (Hypothesis # 2)

4.4 Theoretical Framework – Participation in Contract Farming

The decision on whether a smallholder tobacco farmer opts to enter into a contractual arrangement with leaf growing companies is considered under the framework of utility or profit maximization (Samuelson and Nordhaus, 2005; Schultz, 1964). This approach suggests that maximization of profit has both a behavioural and technical-economic content (Mendola, 2007; Onoja et al., 2012). It means, therefore, that there is motivation to do business, which is what is the behavioural content in the business and the economic performance of the business enterprise that shows the technical-economic context of farm management. Here, smallholder tobacco farmers' decision is based on the perceived net benefit or utility they would gain in engaging in tobacco farming as either contract farmers of independent farmers. While utility is not directly observable, it is the actions by tobacco farmers that highlights the satisfaction. Supposing that household utility of the two choices available to tobacco farmers is represented by U_m and U_n and also denoted by Y_m and Y_n, the specification of the linear utility model is as shown below:

$$U_{im}(\beta_m X_i + e_m) > U_{in}(\beta_n X_i + e_n), n \neq \forall_i \qquad (4\text{-}1)$$

Where U_m and U_n are the perceived utilities of contract and independent tobacco farming, X_i the vector of explanatory variables that influence a farmers desire to engage in either arrangement, B_m and U_n utility shifters, e_m and e_n are error terms, which we make an assumption that they are independent and identically distributed (Greene, 2000).

If a smallholder tobacco farmer opts to contract by choosing option *m*, it means that the farmer perceives the benefit they will get from contract farming is greater than that he would get from engaging as an independent farmer (option *n*) as shown in equation 4-2 below:

$$U_{im}(\beta_m X_i + e_m) > U_{in}(\beta_n X_i + e_n), m \neq \forall_i \qquad (4\text{-}2)$$

The probability that a tobacco farmer will chose to contract (*m*) instead of growing as an independent farmer (*n*) is defined as:

$$P(Y = 1 | X) = P(U_{im} > U_{in})$$

$$(4\text{-}3)$$

$$P(\beta_m X_i + e_m - \beta_n X_i + e_n > 0 | X)$$

$$(4\text{-}4)$$

$$P(\beta_m X_i - \beta_n X_i + e_m - e_n > 0 | X)$$

$$(4\text{-}5)$$

$$P(X^* X_i + e^* > 0 | X = F(\beta^* X_i)$$

$$(4\text{-}6)$$

Where: P is a probability function U_{im}, and U_{in} and X_i are as defined above.

$e^*(e_m - e_n)$ is a random disturbance term.

$\beta_m^*(\beta_m - \beta_n)$ is a vector of unknown parameters that can be interpreted as a net influence of the vector of independent variables influencing participation, and $F(\beta^* X_i)$ is the cumulative distribution function of e^* evaluated at $\beta^* K_i$. The exact distribution of F depends on the distribution of the random disturbance term e^*. Depending on the assumed distribution that the random disturbance term follows, several qualitative choice models can be estimated (Greene, 2000).

To make profit, cost considerations in pricing decisions by firms pursuing profit (FAO, 1997) are important. Factors such as input prices, labour, capital and technological advancements determine the efficiency levels of a farm and production costs (Samuelson and Nordhaus, 2005). Costs are categorized as either fixed costs or variable costs. Fixed costs do not vary with the level of production in any business enterprise, and include costs such as insurance, salaries of administrative staff, rents and depreciation of capital equipment. Variable costs, on the other hand, refer to costs that vary directly with the production level. Examples include costs of raw material, hourly labour wages and packaging costs. When ascertaining the profitability of farmers, it is preferable to obtain the Gross Margin (GM), which is the amount realized after deducting variable expenses from the total sales (Johnson, 1982; Kay, 1986). This is because of limited information on depreciation and net inventory changes and household consumption, which make use of Net Farm Income (NFI) that is obtained after adjusting net cash revenue from the farm for depreciation, net inventory and value of products consumed at home difficult.

Gross Margin = Total Revenue (TR) - Total Variable Costs (TVC)   (4-7)

4.5 Econometric Model and Estimation

The decision to enter a contract arrangement with the leaf buying companies is a function of personal attributes of the farmer, the characteristics of the household, product pricing, marketing arrangements and production costs. These factors are captures in the conceptual framework in Figure 4-2 above. The empirical model is specified below.

For the third essay, we adopt a logistic regression whose primary objective is to determine the various factors that cause a farmer to choose whether or not to operate as a contract farmer or independent farmer. This is because the objective of regression analysis is to determine various factors that result to a variation of the dependent variable. The model specification is presented in equation 4-8 as:

$$CFA_i = \beta_0 + \beta_1 Age + \beta_3 Gender + \beta_4 Marital + \beta_5 Edu + \beta_5 Lab + \beta_6 Exp$$
$$+ \beta_7 Lanzi + \beta_8 Exte + \beta_9 Inp + \beta_{10} \Pr ice + \varepsilon_i \tag{4-8}$$

Where:

CFA_i is the contract farming participation, *Age* denotes age in years of household head, *Gender* denotes gender of household head, *Marital* denotes marital status of the household head, *Edu* denotes education of the household head, *Lab* denotes availability of labour, *Exp* denotes farmers' experience, *Lanzi* denotes farm size, *Ext* denotes extension services available, *Inp* denotes inputs access by farmer, while *Price* denotes price per kilogram of tobacco leaf.

There are a number of hypothesis with regard to the variables that are made. These priori expectations influence the outcome of decisions made by the farmer with regard to contract arrangements and include:

Age: Older farmers are more likely to enter contract arrangement because they are less mobile and prefer a marketing arrangement that is readily available. It is therefore expected that age will have a positive effect on decision.

Gender: Generally, farming in Kenya is a male-dominated activity (Kiriti and Tisdell, 2003). It follows that women are disadvantaged when it comes to access to capital and therefore less likely to adopt production of cash crops. Male farmers are therefore more likely to enter contract arrangement than female farmers.

Experience: It is expected that farmers' experience can give them confidence or even erode the same. In the case of tobacco farming, experience over the years can make a farmer less averse to the risk that comes with contract farming. This variable is expected to have either a positive or negative effect towards contract farming arrangement.

Land size: Land is generally an indicator of wealth or an indicator of the social status a farmer has in the society. It is expected to have a positive effect in contract farming.

Education: Access to and level of education of household head increases his or her access to information relevant to contract farming. It is therefore expected that the probability of participation in contract farming increases with the level of education.

Access to labour: Tobacco is a labour-intensive crop. Therefore, households with more access to surplus labour are more likely to enter the contract farming arrangement.

Access to inputs: Given that most smallholder farmers are capital poor at the beginning of a farming season, access to inputs by farmers is likely to increase the probability of entering into contract farming

Access to extension services: It is expected that this will increase the quality of farming practice and therefore probability to get into contract farming.

To estimate the gross profit margin, the model specification is presented in equation 4-9 below:

$$GM = \sum TR_i - TVC_i$$
(4-9)

Where GM is Gross Margin per acre

TR is Total Revenue per acre

TC is Total Variable Costs per acre

4.6 Methods

4.6.1 Research Design

The study was implemented in each of the three main tobacco growing regions (Migori, Busia/Bungoma and Meru), with an assumption that there was no large regional differences in tobacco growing in Kenya. This is because the same firms are involved in contracting smallholder farmers across the country. These regions were purposefully selected based on

production data from the Kenya Ministry of Agriculture. Data were collected in Migori County, specifically in Kuria West and Kuria East sub-Counties, in Bungoma and Busia Counties (in Bungoma County, households in Sirisia and Bumula were interviewed; in Busia County, the survey was carried out in Amagoro and Teso North), and Meru County (Imenti Central and Imenti North) in Eastern region. The first step was to identify the main tobacco growing areas in each region based on production records and government agricultural staff. Four administrative units (counties) were selected from the regions and between 4 and 32 villages from each county selected. Enumerators randomly selected a tobacco farming household in each selected village and then, moving along a predetermined transect route that eventually converged to the village center, selecting every other tobacco farming household along the route. Because of lack of availability of data on the actual tobacco farming households in a village, selection also depended on the concentration of tobacco farming households witnessed by enumerators, and the number of tobacco-growing villages identified by the government agricultural staff.

The survey interviews were implemented by one team across all counties over a period of one month. The team of 10 enumerators was trained on data collection, interviewing approach, and ethics in data collection to standardize the data collection. The enumerators were supervised during data collection to ensure correct implementation of protocols. The data from the completed questionnaires were inputted into Stata software.

4.6.2 Study Areas and Sampling Procedure

To examine the economic conditions of tobacco growing in Kenya, the study implemented a quantitative household-level economic survey supplemented by qualitative focus groups in 2017. The research implemented a survey of 474 tobacco farmers designed to solicit an understanding of the different social and economic factors in the three counties where tobacco is most widely grown in Kenya (Migori, Meru and Bungoma/Busia). The choice of study sites was based on the Tobacco Farming Rules of 1991, where regions allowed to grow tobacco were gazetted (Republic of Kenya, 1991).

The sample size was based on Abramson and Abramson (1999), while the adjusted sample size on Slovin's formula, which allows for the minimum sample size calculation (Stephanie, 2003). Here, the study first defined the population size (N) of tobacco farmers in Kenya as 55,000 (Kibwage, Netondo and Magati, 2014). It then used a simple random sampling process adopting the sample proportion represented in equation 4-10 below. Also adopted was a standard

deviation $\hat{p}$ as 0.5, confidence level to be 95% (Z=1.96), with the allowed margin of error e of 4.5% (Mugenda and Mugenda, 2003).

$$n_1 = \frac{z^2 \hat{p}(1-\hat{p})}{e^2} \tag{4-10}$$

Based on equation (4-10), the study established that the unadjusted sample size as 494. The study then adjusted for population size, as considered in equation (4-11).

$$n_2 = n_1 \frac{N}{N+n_1} \tag{4-11}$$

As the population size is large, the adjusted sample size remained at 494. The reduction to 444 in 2018 was as a result of natural attrition to the original sample as a result of migration, death or non-traceability of respondents.

To collect the household data, one administrative location with the highest concentration of tobacco farmers was chosen in each county, with Kuria East and West sub-counties in Migori; Imenti central sub-county in Meru; and Malakisi - a town center at the border of Bungoma and Busia counties. The village centers in these locations was identified, with enumerators moving along a predetermined selected transect route that converged back to the village center. Data for the survey was collected from every other two (2) households that fell in the transect route. Alternatively, where identification of tobacco farmers was difficult, snowballing technique was used, with tobacco farmers helping to identify each other. In Malakisi, the Mastermind Tobacco Leaf Center is located on the Bungoma side and, generally, its farmers have been reducing in number because of non-payment or delayed payment, while BAT's leaf center is located at the Busia side and has more farmers. It follows that farmers on the Bungoma side are predominantly contracted to Mastermind, with those on the Busia side predominantly contracted to BAT. Because of this reason, most of the respondents in this study site were from the Busia site as observed in Table 4-1. The county border in this area is particularly difficult to identify and using the strict transect walk to collect the data randomly led to this dynamic.

Armed with this information, sub-samples of the survey were done. Table 4-1 below shows the sub-sample size collected in the select counties. Distribution across the counties was determined by time, with similar time allocated for data collection.

Table 4-1: Survey Sample Sizes

County/Region	N=444	Percentage
Bungoma/Busia	169	5.30%
Migori	166	27.86%

County/Region	N=444	Percentage
Meru	109	36.75%

Source: Author Computations from the Kenya Tobacco Survey

Qualitatively, the survey implemented key informant interviews, with the Ministry of Agriculture extension officers and relevant county government officials in all three regions. Focus Group Discussions (FGDs) were held in all the three survey regions where 10 participants were invited, drawing a mix of experience in tobacco farming and gender. Questions in the FGDs included the historical timeline of farming in the area, seasonal and daily schedules of household members, livelihood mapping, historical resource analysis, resource flow matrix analysis, and stakeholder analysis.

The FGDs took place in a village center or school in a randomly-selected village with a high concentration of tobacco farming households. A sub-sample of surveyed farmers were randomly selected from the area (n=10-15 farmers per FGD). An FGD tool was developed by the research team based considerably on previous work in Malawi.

4.6.4 Data Collection Instruments

The survey questionnaire had the following sections: household attributes; way of life, earnings and assets; land ownership and farm production; tobacco production generally; tobacco production under contract farming; tobacco marketing; farmer debt and credit; household food security; and the future of tobacco production. The questionnaire used is found in Appendix B at the end of the thesis.

4.6.5 Measurement of Variables

Table 4-2: Variable Definition

Variables	Description	Measurement
Bungoma	Region	1=Bungoma; otherwise=0
Meru	Region	1=Meru; otherwise=0
Busia	Region	1=Busia; otherwise=0
Migori	Region	1=Migori; otherwise=0
Male	Gender	1=Male; otherwise=0
Female	Gender	1=Female; otherwise=0
<21 years	Age category	1=<21 years; otherwise=0
25-35 years	Age category	1=25-35 years; otherwise=0
36-60 years	Age category	1=36-60 years; otherwise=0
>61 years	Age category	1=61+ years; otherwise=0
Not yet or no schooling	Education level	1=No schooling; otherwise=0
Elementary school	Education level	1=Elementary school; otherwise=0

Variables	Description	Measurement
Junior primary	Education level	1=Junior primary; otherwise=0
Senior primary (std 5– std 8)	Education level	1=Senior primary; otherwise=0
Secondary	Education level	1=Secondary; otherwise=0
Vocational	Education level	1=Vocational; otherwise=0
College or university	Education level	1=College/university; otherwise=0
Divorced	Marital status	1=Divorced; otherwise=0
Married	Marital status	1=Married; otherwise=0
Single	Marital status	1=Single; otherwise=0
Widowed	Marital status	1=Widowed; otherwise=0

4.6.6 Data Analysis

For the first objective, analysis was based on the fact that smallholder tobacco farmers have another choice on whether to grow tobacco or not. This choice determines the level of interaction they will have with tobacco firms, including access to inputs and market, thereby possibly affecting the level of gross margins earned. Accordingly, we first compared perceived and real average annual tobacco-specific gross margins between contract and independent farmers.

The research then further examined the social-economic factors associated with farming under a contract. The dependent variable is a dichotomous variable called contract farming. Specifically, participants who indicated that they had a written contract or some kind of marketing agreement were defined as contract farmers. Logistic regression was used to estimate the association between contract farming and the social-economic characteristics of farmers. To select covariates for analysis, this research drew from Makoka et al. (2016). The FGD data was also considered to inform variables that may have been overlooked. Focus group data were analyzed systematically for salient themes pertaining to the daily lives of tobacco farmers, including their reflections on the social and economic aspects of tobacco growing.

The second objective of this research is to estimate the cost and returns from engaging in tobacco farming as a contract farmer and as an independent farmer. A t-test is then used to test whether there is any significant gross margin difference between the contract and independent farmers. Gross margins are determined by computing the total income from the sale of the tobacco crop and deducting the total variable costs, except household labour. Computing gross margins is a useful tool in farm budgeting decisions and in estimating returns or losses from a farming venture.

4.7 Results

4.7.1 Socio-Demographic Characteristics of Respondents

Table 4-3 presents the socio-demographic descriptive characteristics of the respondents from the survey[10]. The survey had a total of 444 respondents interviewed. Overall, majority of tobacco farmers are middle-aged males, usually older than the general population and with primary level education. From the table, we observe that the majority of respondents are male across all categories of farming (contract, independent and former farmers), are between 36 and 60 years of age, and have primary education as their highest level (less than 8 years of education). Having majority of the respondents in the survey as male is not surprising because economic decisions, including concerning both production and using income, in agricultural-based households are made by the household head who is more typically male in Kenya (Kiriti and Tisdell, 2003). It is also noteworthy that tobacco farming is a family affair with both males and females participating in tobacco growing.

Table 4-3: Socio-Demographic Characteristics of Survey Respondents

	Contract Farmer (n=201)		Independent Farmer (n=25)		Former Farmer (n=218)	
Region	N	Percentage	N	Percentage	N	Percentage
Bungoma	36	17.91%	1	4.00%	9	4.13%
Busia	76	37.81%	7	28.00%	40	18.35%
Meru	38	18.91%	5	20.00%	66	30.28%
Migori	51	25.37%	12	48.00%	103	47.25%
Gender						
Male	186	92.54%	21	84.00%	197	90.37%
Female	15	7.46%	4	16.00%	21	9.63%
Age (years)						
<21	2	1.00%	0	0.00%	2	0.92%
21-35	57	28.36%	4	16.00%	61	27.98%
36-60	142	70.65%	21	84.00%	155	71.10%
61+	2	1.00%	2	8.00%	7	3.21%
Education						
Not yet or no schooling	0	0.00%	0	0.00%	1	0.46%
Elementary school	19	9.45%	3	12.00%	35	16.06%
Junior Primary	107	53.23%	13	52.00%	99	45.41%
Senior Primary (std5 - 8)	43	21.39%	5	20.00%	41	18.81%
Junior Secondary	0	0.00%	0	0.00%	0	0.00%
Vocational	0	0.00%	0	0.00%	5	2.29%
College or University	11	5.47%	1	4.00%	9	4.13%
Completed Secondary	19	9.45%	1	4.00%	21	9.63%

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[10] Preliminary results from wave 1 can be found in Magati et al. (2016).

	Contract Farmer (n=201)		Independent Farmer (n=25)		Former Farmer (n=218)	
Region	N	Percentage	N	Percentage	N	Percentage
Marital Status						
Divorced	3	1.49%	2	8.00%	5	2.29%
Married	180	89.55%	21	84.00%	188	86.24%
Single	9	4.48%	0	0.00%	13	5.96%
Widow	9	4.48%	2	8.00%	12	5.51%

Author Computations from the Kenya Tobacco Survey

4.7.2 Other Characteristics of Tobacco Farming Households

In addition to the socio-economic characteristics, information on land, production and prices is presented in Tables 4-4, 4-5 and 4-6. Each season, farmers make important decisions about the amount of land they will cultivate, which will include land that they own (if they own land) and then tracts of additional land that they rent to cultivate. In Table 4-4, we observe that with exception of Meru County, contract farmers in other regions cultivate more land than independent farmers.

Table 4-4: Total Land Cultivated by Tobacco Farmers, by County in Acres

County	Independent Farmers	Contract Farmer
Migori	2.25	3.5
Busia	1.825	3
Bungoma	1.5	2.65
Meru	2.98	2.775

Source: Author Computations from the Kenya Tobacco Survey

Once farmers decide how much land in total to cultivate, they then must decide how much to allocate to tobacco leaf. We observe in Table 4-5 that with exception of Busia County, contract farmers across all counties allocated larger cultivable land areas, on average, to growing tobacco. Greater allocation of land to tobacco was mainly by contract farmers working under the guidance of the extension staff of the tobacco companies. The companies predetermine the quantity of tobacco they believe they will require in a farming year, and this is likely to be a major factor influencing the farmers' eventual contractual obligations.

Table 4-5: Land Allocated to Tobacco Farming by Farmers, by County in Acres

County	Independent Farmers	Contract Farmer
Migori	1.125	2.7
Busia	2.956	2.706
Bungoma	0.75	3
Meru	0.95	2.684

Source: Author Computations from the Kenya Tobacco Survey

Tobacco yields can vary across seasons; therefore, even if a farmer dedicates the same amount of land to tobacco farming, the actual number of kilograms per acre produced can vary markedly from season to season. In Table 4-6, we observe that the number of kilograms produced per acre by contract farmers is larger than independent farmers. Given that contract farmers allocate more land towards tobacco production as a result of contractual obligations, the resulting yield is not surprising.

Table 4-6: **Average Tobacco Production in Kilograms per acre, by County**

County	Independent Farmers	Contract Farmer
Migori	537.5	800
Busia	442.5	400
Bungoma	360	375
Meru	347	327

Source: Author Computations from the Kenya Tobacco Survey

Tobacco leaf prices, like many agricultural commodities, are vulnerable to fluctuations in prices between seasons, within seasons (leaf is not necessarily sold all at once) and across geographical areas. In Table 4-7, we observe significant variation between the two classes of farmers, with contract farmers receiving higher prices in all regions. Also, the prices vary across all regions in the same season. It is not clear what explains the differences among counties in the same time periods, though tobacco leaf buyers would suggest that quality is the main driver of price. However, these measures failed the difference of means test and less than 20% of farmers were willing to report the price.

In FGDs, farmers reported consistently a lack of transparency in determining leaf prices on the auction floor. Because of the non-interactive nature of the process with outsiders and lack of clarity including to the tobacco farmers, it is reasonable to infer that price is based largely on a target that is pre-set by the buyers before the auctioning process.

Table 4-7: **Tobacco Leaf – Average Price per Kilogram (Ksh) by County**

County	Independent Farmers	Contract Farmer
Migori	150	170
Busia	112	122
Bungoma	150	127
Meru		153

Source: Author Computations from the Kenya Tobacco Survey

Generally, most of tobacco growing by smallholder farmers in Kenya operates in contractual arrangement with the tobacco companies (Kibwage, Netondo and Magati, 2014). Figure 4-3 shows the different types of farmers across the counties, confirming that most of the farmers contracted by the leaf companies. In Bungoma, contracted farmers were 93.10% compared to 6.90%. In Busia, contract farmers consisted of 86.71% of the farmers while independent farmers were 13.29% while in Migori, the contracted farmers consisted of 77.62% while independent farmers were 22.38%. Lastly, in Meru, contract farmers were 85.53% and contract farmers were 14.47%.

Figure 4-3: Type of Tobacco Farmer Interviewed by County
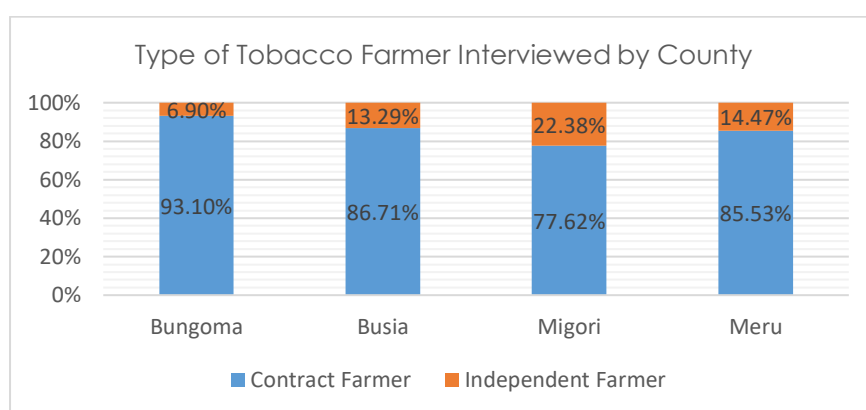
Source: Author Computations from the Kenya Tobacco Survey

As shown in Table 4-8 below, British American Tobacco is the most dominant firm at 71.71% followed by Mastermind Tobacco at 19.52% while East Tobacco has taken an overall market share of 8.37%.

Table 4-8: Market Share, by Firm

Tobacco Firm	N	Percentage
BAT	180	71.71%
Alliance One	1	0.40%
Mastermind	49	19.52%
East Tobacco	21	8.37%

Source: Author Computations from the Kenya Tobacco Survey

Further analysis of regional distribution of the leaf companies shows that BAT is the dominant firm in all the counties. The dominance of BAT in Migori County coincided with BAT entering the market after the exit of Alliance One and taking over the mantle as the most dominant firm at 43% in Migori County.

Table 4-9: Regional Distribution of Contracted Households, by Firm

County	BAT	Mastermind	East Tobacco	Total
Bungoma	45	6	0	51
Busia	67	14	0	81
Meru	36	8	0	44
Migori	32	21	21	74
Total	180	49	21	250

Source: Author Computations from the Kenya Tobacco Survey

4.7.3 Tobacco Gross Margin

More important than just production or gross income, it is more meaningful to calculate tobacco farmers' actual profits because it permits a better evaluation of the households' economic livelihoods. Because farmers do not incorporate monetary value of time household members spend working on their farm or attach a monetary value to it, we calculate and present two types of gross margins-per-acre; one that includes personal and family labour that we name actual gross margin, and one that does not include this set of cost that we name perceived gross margin. It therefore follows, that perceived gross margin per acre refers to the profit retained by the tobacco farmer after deducting expenses such as input costs, levies and costs of hired labour. Actual gross margin on the other hand refers to the profit retained after deducting expenses the include input costs, levies, costs of hired labour and value of family labour that was used by members of the household in production of tobacco.

To compute the value of family labour, the survey first listed all activities that are essential in production of tobacco from nursery preparation to selling. Thereafter, the survey asked the respondent to estimate the time allocated by each member of the household to each activity so that the total time spent in tobacco production by family members can be computed. Table 4-10 lists activities that are normally undertaken in tobacco production.

Table 4-10: List of Activities in Tobacco Production

Activities
Nursery Management
Land Preparation
Ridging
Planting
Weeding
Applying fertilizer

Activities
Applying Agrochemicals
Manual desuckering
Manual pest control
Harvesting
(Tying on curing sticks)
Transporting to the barn
Transporting to the barn
Curing
Sorting/Grading
Balling
Packing

Source: Author Compilation from the Kenya Tobacco Survey

To compute the value of labour for both hired and family, the 2017/2018 monthly agricultural minimum wage measures from the Ministry of Labour office was used[11].

Table 4-11 presents the Mean gross margin per acre from tobacco production. The results suggest that the perceived gross margin for contract farmers as Ksh 16,508 and for independent farmers as Ksh 48,102. Once we include family labour in the computation, the actual gross margins in households drop significantly, with results showing losses of Ksh 72,736 for independent farmers, while for contract farmers, they incur a loss of Ksh 90,392.

Table 4-11: Mean Household Gross Margins (Loss) Per Acre in Ksh

	Independent farming	Contract farming
Tobacco Income (A)	**64,955**	**51,636**
Seed	409	440
Watering can	127	231
Herbicides	507	870
Pesticides	803	1150
Hoes	219	432
Fertilizer	2,449	5,937

[11] Kenya daily minimum wage for farm foreman or farm clerk from legislative supplement #57 is 370 hourly minimum rate.

	Independent farming	Contract farming
Hessian sacks	619	902
Shredding material	391	296
Plastic material	642	1,483
Curing wood	6,947	14,520
Hired labour	3,204	6,134
Tobacco levies	208	2030
Transport cost	238	704
Total Input Cost (B)	**16,763**	**35,128**
Perceived Gross Margins (Loss) (A-B)	**48,192**	**16,508**
Less		
Family Labour	**120,928**	**106,900**
Real Gross Margins (Loss)	**(72,736)**	**(90,392)**

Source: Author Computations from the Kenya Tobacco Survey

Earlier, we noted that not all tobacco that is harvested by farmers is sold. For contract farmers, this situation is of concern because the amount of tobacco produced is determined by, among other factors, the inputs they have been supplied by the tobacco companies. It means that farmers generally expect to sell all harvested tobacco to the companies. The research results indicate that the tobacco companies first buy harvested tobacco to the extent they recover the cost of inputs supplied before later returning to purchase additional tobacco harvested. Generally, it is observed that tobacco firms meet leaf target in the first purchase where they recover inputs, leaving farmers with unsold produce and therefore putting them at a potentially significant financial risk.

The results suggest that farmers in contractual relationships with tobacco companies generate limited actual gross margins, particularly when compared to their perceived gross margins. The contract farmers also indicate significant dissatisfaction with the price that they receive for the leaf that they sell, with less than a third reporting that they believe they are receiving a fair price. This could be because the assignment of leaf grade and price is at the discretion of an official from the tobacco companies at the leaf buying centers, with the farmers or farmer representatives to the tobacco companies having no part in the decision. Evidence from Malawi has shown that prices are persistently and systematically lowered, with very little recourse for tobacco farmers (Otanez, Mamudu and Glantz, 2012). Where a particular farmer voices

disagreement with the grade and price allocated, the tobacco officials simply reject their produce, creating a situation where the farmer could either fail to sell his crop altogether or have his earnings delayed. The FGD participants indicated that contract farmers are given inputs at higher prices than they would ordinarily buy from shops, consistent with the survey findings, said one FGD participant: "The contract price for fertilizer was Ksh 4,000 compared to Ksh 2,000 per bag in the retail shops". This finding is also consistent with previous research that has demonstrated instances where the price for contracting farmers was higher than retail shops (Otanez, Mamudu and Glantz, 2007; Jad-Chabbaan, 2015).

4.8 Participation in Tobacco Contract Farming

To explore the determining factors of participation of tobacco farmers as contract farmers, the paper run logistic regression models highlighting whether or not a farmer elects to become a tobacco contract farmer. The results are presented in Table 4-12 and present the odds ratios.

Table 4-12: Odds Ratios of Participation in Contract Farming

VARIABLES	N=444
Education of Head of Household (Years)	1.042
	(0.0507)
Gender (male) of Head of Household	1.272
	(0.447)
Age of Household Head	0.996
	(0.0163)
Marriage Status	
Married Monogamously (vs. single)	3.199***
	(1.437)
Married Polygamous (vs. single)	2.738
	(2.000)
Other (vs. single)	0.797
	(0.565)
Household Size	1.118*
Land Size (acres)	1.111
	(0.115)
Land Entitlement	
With Deed (vs. freehold)	1.504
	(0.603)
Other (vs. Freehold)	0.406
	(0.256)
Need Credit	3.825***
	(1.082)
Experience	1.090***
	(0.0307)
Constant	0.142**

VARIABLES	N=444
	(0.129)
Statistical significance *** p<0.01, ** p<0.05, * <0.1	

Source: Author Computations from the Kenya Tobacco Survey

One of the most pronounced relationships between variables is that of marital status. Those who are married monogamously are at least three times more likely to grow tobacco as contract farmers than single individuals, with the coefficient positive and statistically significant. Larger households were also more likely to engage in tobacco farming as contract farmers compared to relatively smaller households, with results suggesting that this is statistically significant. This finding likely indicates the importance of family labour in tobacco farming. Experienced farmers are more likely to be contract farmers, with the coefficients being positive and statistically significant, suggesting that as a tobacco farmer increases growing experience by one year, the likelihood of him or her deciding to be a contract farmer increases. Statements from FGD participants speculated about this relationship:

> "We have fixed expenses like school fees for the children. Having certainty in income, however low is better than no income at all."

> "Tobacco is the only crop in the area where farmers are assured of some income. Other crops in the area have no money or cannot sustain a family consistently. To draw income from tobacco you need to be a contract farmer."

Legal entitlement of the farmer to the farm is also an important variable and its coefficient is positive and statistically significant. The coefficient for the need of credit is also positive and significant, suggesting that those who do not have access to existing capital to finance agricultural activities are between three and four times more likely to become contract farmers.

Generally, both contract and independent farmers earn low gross margins from tobacco farming. Once accounting for family labour, independent farmers have slightly higher earnings than contract farmers. Three factors help explain the difference in the adjusted gross margins between the two categories of farmers: a) non-labour inputs; b) family labour; and c) tobacco leaf prices at the collection areas. The average tobacco price per kg for contract farmers is 12.8% higher than that of independent farmers. This suggests that tobacco companies might be encouraging all tobacco farmers to become contract farmers by purchasing their crop at higher prices, consistent with a finding from a study of tobacco farming in Malawi (Otanez, Mamudu and Glantz, 2007). The logic of contract farming is also tied to efficiency and quality gains,

where companies introduce structural supports – for example, by helping farmers with effective chemical applications (e.g. fertilizer, pesticide, herbicide, etc.) – to ensure that farmers are growing a higher quality product (Wainaina, Okello and Nzuma, 2012). At the same time, tobacco companies appear to be exploiting the farmers by downgrading the quality of tobacco leaf while also increasing the gross margins on their sale of inputs to contracted farmers.

The results suggest that farmers who have more experience in growing tobacco and who have the legal and permanent title to their farms are more likely to be contract farmers, possibly explained by a greater awareness of their likelihood of selling their crop compared to that of independent farmers.

Opportunity costs also appear to play a part in the contracting decision of farmers. Notably, older farmers are less likely to be contract farmers, while those with higher education levels are likely to be contract farmers. Older farmers generally not only typically have larger land sizes but also more experience in growing other crops, which helps in income diversification, affording them financial security outside tobacco growing. This can be seen particularly in Meru County, the most fertile tobacco growing area, where farmers participate in other economic activities that generate sizeable amounts of income when compared to tobacco, and where they reported relatively fewer complaints about the tobacco companies during the FGDs. With more education, farmers are generally more likely to be rational in making economic decision on farming tobacco as opposed to other crops. This is because tobacco growing areas are characterized by unstable markets for other alternative crops, while farming tobacco ensures a guaranteed buyer.

Family labour forms a critical part of tobacco growing, as it does with other crop farming. However, tobacco is a particularly labour-intensive crop that would generally be expensive to engage in if one depended purely on hired labour. Many household members actively contribute considerable time towards tobacco growing activities, an aspect generally not considered when tobacco farmers or researchers compute the costs of tobacco production. By monetizing family labour as we have done in this study, we imply that tobacco only becomes minimally profitable through use of 'free' family labour when compared to actual paid labour. Our findings in this regard are particularly strong because our monetizing of this household labour is conservative and likely underestimates its value.

These findings illustrate an important labour dynamic. Tobacco companies are exploiting what amounts to "free" (to the companies) or at least unaccounted for – by the farmers – labour in

smallholder tobacco growing. Because farmers do not incorporate household labour into their cost calculations in any way, their perceived gross margins are much higher than if they were to incorporate even a fraction of such costs into their cost calculations. At the same time, the exclusion of household labour costs in rural low and medium-income countries is not unusual[30]. This is particularly true when other sources of employment and other income opportunities are scarce. This is an important point for tobacco control proponents who are targeting the control of tobacco supply, whereby the local economy, which is often tied to the global economy, must be considered a key factor in policy interventions aimed at creating opportunities for other sources of income. Research has found that local opportunities are a key determinant of farmers' decisions to pursue non-farm employment (Barret et al., 2012).

4.8 Summary, Conclusion and Policy Implications

This essay looks at the economics of tobacco farming in Kenya. A quantitative household-level economic survey was conducted in 2018 and supplemented by qualitative focus groups. The paper had two objectives. First, the paper sought to estimate the costs and returns of tobacco farming and, secondly, the paper looked at exploring influences tobacco contract farming attributes have on tobacco farming. To address the first objective, the essay used a gross margin, where gross revenues were compared to costs of growing tobacco as reported in the survey. The second objective used a logistic regression to suggest the relationship between contract farming and the social-economic characteristics of farmers.

Results from the essay suggest that when you subtract the total cost of physical inputs from farmers' tobacco sales, most experience only a small mean gross margin of Ksh 35,128 for contract farmers and Ksh 16,763 for independent farmers. Importantly and unfortunately, these perceptions of gross margin are an illusion because they do not account at all for the cost of the farmers' labour. With labour included, Mean contract farmers experience an average net loss of Ksh 90,392, while Mean independent farmers experience a loss of Ksh 72,736. The results from the third essay also find that most farmers enter into contracts with leaf buying companies because they are attracted by the fact that they have a "guaranteed" buyer for their tobacco leaf and because they receive the necessary agricultural inputs (fertilizer, seeds, herbicides, etc.) without paying cash up-front. But the contracts frequently plunge these farmers into an increasing and deepening cycle of debt because the cash payments plus their revenue at harvest are not sufficient. More than 40% of surveyed farmers remained in debt after selling their tobacco. Contractually, they had to grow tobacco again to repay the leaf-buying companies

despite having just experienced serious financial loss growing tobacco. Most farmers indicated significant dissatisfaction with the price that they received for the leaf that they sold. In fact, less than a third of farmers felt that they were receiving a fair price. Farmers must sell to their contractor – in other words, there is no price competition – therefore, it is perhaps little surprise that the economic rewards are so poor. The third essay therefore suggests that for most farmers, the living from tobacco growing is certainly not lucrative given the gross margins. Furthermore, the cultivation of tobacco is very input-intensive (fertilizer, pesticide and herbicide), putting enormous burden on the land and the surrounding environment.

The essay demonstrates that tobacco farming is not very profitable for both independent and contract farmers. Most farmers are making only a tiny margin at best. Moreover, once the monetary value of family labour is incorporated, their actual gross margins reduce drastically, suggesting that tobacco farming is even less lucrative than farmers generally conceptualize. Earnings from tobacco faming are typically low and unlikely to help most farmers move out of poverty. This 'free' family labour also indirectly contributes to high earnings for the tobacco firms. It is therefore important that the government aggressively explore viable alternative livelihoods in line with Article 17 of the WHO FCTC. This includes improving supply and value chains for other agricultural products that the farmers grow locally, increasing farmers' access to credit, and improving agrarian and farm-management education for these households. There is also need for policy by the Ministry of Agriculture that facilitates access to credit by smallholder farmers. The Agricultural Finance Corporation (AFC), the Youth Fund and Women Funds should educate and encourage smallholder farmers to get credit that will be utilized to enhance farming, including input purchase, transportation and marketing. The County Governments should also increase efforts of agricultural extension services to maximize the cultivation of other crops. This is because tobacco companies have invested heavily in extension services, meaning that there is a bias by smallholder farmers to grow tobacco because of the expert advice they receive. Through elaborate extension services, farmers will understand crop dynamics, including seasons and input use and exposed to modern technology that improves productivity and output. Finally, although it is not possible to immediately provide a similar production model as one for the tobacco industry, farmers could organize themselves into formal groups and tap into existing agricultural development programmes and demand services that would facilitate income generation and diversification of their production systems.

4.9 Strengths, Limitations and Future Research

Essay three is important because it is the first elaborate review of the status of tobacco farming in Kenya where primary data is used. Previous work (Kibwage, Netondo and Magati, 2012) relied on secondary information where estimates of costs and revenue of tobacco farming is used or collection of information from focus group discussions, which is not necessarily representative of a variety of farmers from all tobacco growing regions in Kenya. Most of tobacco farming research is collected from farmers in Kuria region in Kenya, an aspect that has created reservation in coming up with a national policy on tobacco control because of paucity of information from other regions. This weakness has been addressed in this paper, making it easier for tobacco control advocates to push for a national policy on tobacco in Kenya. There are, however, certain limitations that can be addressed in future research. First, there is need to collect panel data, where farmers interviewed in the wave of this survey can be re-interviewed. Collecting panel data will have the advantage in that costs and revenue profile and decision making of the same household at a different time can be collected, bring certainty on performance of the tobacco crop. Collecting information from one season, as we have done in this cross-sectional analysis, can have a weakness in that a poor season that has resulted in poor returns is used to push for a national policy. Comparison of performance in different seasons, and from the same households brings more certainty on tobacco growing performance and exploitation. There is also need to compare performance of tobacco with other crops grown in the same households or same regions. This will help in understanding the value chains and performance of other crops, enabling policy makers make decisions on crops, which would ensure better returns to smallholder farmers if more resources are invested in improving value chains. Finally, there is need to look at impact climatic conditions have on tobacco production, and incorporating environmental costs of tobacco production such as curing.

Conclusion and Recommendations

5.1 Summary and Conclusion of Essays

Kenya is a signatory to the World Health Organization Framework Convention on Tobacco Control (WHO FCTC) and passed the Kenya Tobacco Control Act 2006 to regulate both consumption and production of tobacco in the country. The main objective of this work was to highlight the economics of tobacco production and consumption in Kenya, because this will help guide policy makers in allocating the country's resources aimed at reducing the tobacco epidemic in the country.

To understand household decisions on tobacco use and/or production, the research sought to answer three research questions:

a) How do socio-economic, demographic and geographic factors influence tobacco consumption in Kenya?

b) Does tobacco consumption influence consumption of other goods in a household?

c) Does farming tobacco on contract impact positively on farmers' income?

Essay one looked at the first research question where, using the Kenya Demographic and Health Survey, various socio-economic determinants of tobacco use in Kenya were explored. The essay used a logistic regression to determine the factors influencing tobacco use in the country. The essay sought to examine whether socio-economic, demographic and the geographic environments that people live in are important in determining the decision on whether individuals use scarce resources in consumption of tobacco or not.

Essay two looked at the extent to which tobacco use in the household crowds out consumption of other basic goods and services. Here, the 2005/2006 Kenya Integrated Household and Budget survey was utilized to compare how households that use tobacco and those that do not use tobacco allocate their limited resources. First, the essay compared the expenditure patterns of households that use tobacco and non-smoking households to document differences. Afterwards, the essay uses a Quadratic Almost Ideal Demand System to estimate a system of Engel curves to check whether the differences in expenditure between the two types of households is as a result of tobacco use. To control for confounders such as household economic status or structure that could be the cause of the expenditure difference, the paper uses the Ordinary Least Squares (OLS) where we regress expenditure shares on tobacco

household shares and a number of control variables that represent a household socio-economic status and household structure.

Essay three looks at the economics of tobacco farming in Kenya. A quantitative household-level economic survey was conducted in 2015 and supplemented by qualitative focus groups. The survey was implemented in 2018 in three regions spread over the four Kenyan counties where tobacco is most widely grown. The paper had two objectives. First, the paper sought to estimate the costs and returns of tobacco farming and, secondly, the paper looked at exploring influences tobacco contract farming attributes have on tobacco farming. To address the first objective, the essay used a gross profit margin, where gross revenues were compared to costs of growing tobacco as reported in the survey. The second objective used a logistic regression to suggest the relationship between contract farming and the social-economic characteristics of farmers.

5.2 Conclusions

Results from essay one suggest that older people are more likely to smoke than younger people, confirming the addictive nature of tobacco with intensity of use increasing as age progresses. Relationship status are also an important determinant of use, with single people less likely to smoke than married people. However, the results also suggest that there could be a relationship between smoking and stress. This is because prevalence increases when one is divorced, widowed or separated. However, this relationship needs to be further investigated to determine whether people are unconsciously using tobacco to relieve stress, anxiety and depression. Results also show that tobacco use varies according to the geographical location of individuals. This is because certain counties record high prevalence rates compared to others. Individuals particularly in the Eastern, Central and Coastal counties are more likely to use tobacco than those coming from counties from the Rift Valley, Western and Nyanza regions. Further, the prevalence of smokeless tobacco is high in some counties in Rift Valley, specifically Samburu and Turkana for both men and women. It shows that traditional use of tobacco is still high in counties that are less developed, debunking the myth that only modern form of tobacco use is prevalent in all areas. Finally, the results suggest that less educated people, and urban areas in all counties are more likely to have higher prevalence than those in rural areas, suggesting the target group that resources should concentrate on for successful control of tobacco.

Essay two results suggest that food is given a smaller expenditure allocation in the full sample, and rural households with the results from the full sample suggesting that the results are

statistically significant at 99% level and the results from rural households being at 95% significance level. Also, urban smoking households allocate less expenditure in health care compared to non-smoking households, with the difference being only statistically significant at 10% with the bottom 50% of the survey being the ones mainly impacted. Rural smoking households allocate more resources in electricity and alternative energy than non-smoking households, with results being statistically significant at 5% for electricity and 10% for alternative energy. We also find that smoking households in rural areas allocate less in house care, with results being statistically significant at 90%. In the full sample, smoking households allocate more in electricity and alternative energy compared to non-smoking households, with results being statistically significant at 95% for electricity and 99% for alternative energy.

Finally, results from essay three suggest that when you subtract the total cost of physical inputs from the farmers' tobacco sales, most experience only a small Mean gross margin of Ksh 35,128 for contract farmers and Ksh 16,763 for independent farmers. Importantly and unfortunately, these perceptions of gross margin are an illusion because they do not account at all for the costs of the farmers' labour. With labour included, Mean contract farmers experience an average net loss of Ksh 90,392, while Mean independent farmers experience a loss of Ksh 72,736. The results from the third essay also find that most farmers enter into contracts with leaf buying companies because they are attracted by the fact that they have a "guaranteed" buyer for their tobacco leaf and because they receive the necessary agricultural inputs (fertilizer, seeds, herbicides, etc.) without paying cash up-front. But the contracts frequently plunge these farmers into an increasing and deepening cycle of debt because the cash payments plus their revenue at harvest are not sufficient. More than 40% of surveyed farmers remained in debt after selling their tobacco. Contractually, they had to grow tobacco again to repay the leaf-buying companies, despite having just experienced serious financial loss growing tobacco. Most farmers indicated significant dissatisfaction with the price that they received for the leaf that they sold. In fact, less than a third of farmers felt that they were receiving a fair price. Farmers must sell to their contractor – in other words, there is no price competition – therefore it is perhaps little surprise that the economic rewards are poor. The third essay therefore suggests that for most farmers, the living from tobacco growing is certainly not lucrative given the gross margins. Furthermore, cultivation of tobacco is very input-intensive (fertilizer, pesticide and herbicide), putting enormous burden on the land and surrounding environment.

5.3 Policy Implications

The first essay concludes that tobacco in Kenya is influenced by many factors such as age of the smoker, marital status, gender, county of residence, access to media such as television, radio and television, ethnicity of the smoker and perception about the health consequence of tobacco use. There is need to implement the tobacco control regulations in Kenya, and since health is a devolved function as per Kenya's constitution, County Governments should ensure that there is a budget component for tobacco control, including monitoring of media, advertisement and selling of tobacco, with the intensity dependent on the prevalence rates of tobacco use. It therefore follows that resources devoted for tobacco control should not be generalized; that is, counties devoting a specific percentage determined by the National Government, but by the prevalence rates. There is also need for the National Government, through the Ministry of Education to ensure that the education policy incorporates tobacco control and non-communicable disease. This is because initiation takes place during high school, and the addictiveness increases with age, suggesting it is difficult to quit smoking. This is particularly important because the Ministry of Education is currently reviewing the educational curricular and system. Finally, the paper recommends that the government, under the stewardship of the Ministry of Health should develop a multi-sectoral public policy that establishes and strengthens tobacco control and other NCD risk prevention factors. This will ensure that measures to reduce risk factors to NCDs, such as tobacco use, unhealthy diet, physical inactivity and alcohol use are controlled in a cost-effective manner.

The econometric analysis carried out in essay two suggests that tobacco crowds out the consumption of food, health care, schooling clothing, entertainment, house care and personal care. In the general sample, the crowding out is statistically significant on food and house care. The study also suggests that the magnitude and pattern of crowding out of tobacco on other household expenditure items is subject to geographical location and socio-economic standing of households. The study concludes that tobacco crowds in consumption of goods such as water, electricity, alternative energy, transport and communication and housing for the general housing, albeit with a mixed pattern where crowding in is subject to the geographical location and socio-economic standing. For instance, tobacco crowds in consumption of water and housing for those who are poor but seems to crowd out consumption of water and housing among the richer households. However, tobacco crowds in consumption of all households for electricity, alternative energy and transport and communication. To have a conclusive suggestion on whether tobacco crowds out consumption of household goods and services, the

paper, however, recommends that tobacco control be integral in governments poverty alleviation strategy because the results show that poorer households in Kenya will benefit from reduction in tobacco consumption, since they would have higher disposable income that could be spent in the purchase of food, education and clothing.

Essay three demonstrates that tobacco farming is not a particularly lucrative enterprise for most smallholder tobacco farmers in Kenya, either independent or contract. Most farmers are making only a tiny profit at best. Moreover, once even a conservative estimate of the value of their own and family labour is incorporated, their actual profits diminish, suggesting that tobacco farming is even less lucrative than farmers generally conceptualize. Earnings from tobacco farming are typically low and unlikely to help most farmers move out of poverty. This 'free' family labour also indirectly contributes to high earnings for the tobacco firms. It therefore makes considerable economic sense for the government to aggressively seek viable alternative livelihoods in line with Article 17 of the WHO Framework Convention on Tobacco Control. This includes improving supply and value chains for other agricultural products that the farmers grow locally, increasing farmers' access to credit and improving agrarian and farm management education for these households. There is also need for policy by the Ministry of Agriculture that facilitates access to credit by smallholder farmers. The Agricultural Finance Corporation (AFC), the Youth Fund and Women Funds should educate and encourage smallholder farmers to get credit that will be utilized to enhance farming, including input purchase, transportation and marketing. The County Governments should also increase efforts of agricultural extension services to maximize the cultivation of other crops. This is because tobacco companies have invested heavily in extension services, meaning that there is a bias by smallholder farmers to grow tobacco because of the expert advice they receive. Through elaborate extension services, farmers will understand crop dynamics, including seasons and input use and will be exposed to modern technology that improves productivity and output. Finally, although it is not possible to immediately provide a similar production model as one for the tobacco industry, farmers could organize themselves into formal groups and tap into existing agricultural development programmes and demand services that would facilitate income generation and diversification of their production systems.

5.4 Strengths, Limitations and Future Research

Essay one has a number of strengths. First, it is based on the Kenya Demographic and Health Survey, which is a national level study and has a high response rate. The survey has accounted

for sample weight, cluster effect and multi-stage sampling and provides for estimates with the confidence levels given. This means that results have high levels of precision and are representative of all counties in Kenya. The limitations for the study include the fact that the survey is cross-sectional in nature, meaning that it prevents one from drawing causal inferences. Also, tobacco is associated with some social stigma, hence the likelihood that there was under reporting of smoking especially among women. This could be the reason why the prevalence results in the Kenya Demographic and Health Survey differ from those of the Global Adult Smoking Survey where prevalence rates of smoking among women was found to be much higher at 4.5% compared to 0.99% in this study. This is because the Global Adult Smoking Survey factors the social stigma associated with smoking and collects data only on smoking pattern and use. This study recommends that future research could include exploring attitudes of people on the recently enacted tobacco control regulations and exploring the socio-economic and demographic determinants of smoking per county.

Essay two is important because it uses expenditure data from Kenya, which is a low income country. Most of the research done on economics of tobacco control and relationship with poverty are in high income countries. Secondly, this paper also uses the method of instrumental variables as is the standard method in literature, but goes further and uses less stringent assumptions on the instruments, which suggests that the positive associations between tobacco and goods such as water, electricity, alternative energy, transport and communication and housing are causal relationships, rather than correlations. However, there are limitations in this study. The paper uses cross-sectional data, meaning that because of unmeasurable sources of heterogeneity, it is difficult to draw definitive causal conclusions. Panel datasets are ideal in the sense that they allow one to compare the expenditure profile of the same household at different points in time, therefore controlling for unobserved heterogeneity. Unfortunately, Kenya does not collect panel data, making this difficult. Further research could make use of the 2015/2016 dataset that is not yet available to see if the causal relationships hold. Research could also be conducted to conclude if there is a relationship between tobacco use and poverty.

Finally, essay three is important because it is the first elaborate review of the status of tobacco farming in Kenya where primary data is used. Previous work (Kibwage, Netondo and Magati 2014) has relied on secondary information where estimates of costs and revenue of tobacco farming is used, or collection of information from focus group discussions which is not necessarily representative of a variety of farmers from all tobacco growing regions in Kenya. Most of tobacco farming research is collected from farmers in Kuria region in Kenya, an aspect

that has created reservation in coming up with a national policy on tobacco control because of paucity of information from other regions. This weakness has been addressed in this paper, making it easier for tobacco control advocates to push for a national policy on tobacco in Kenya. There are, however, certain limitations that can be addressed in future research. First, there is need to collect panel data, where farmers interviewed in the wave of this survey can be re-interviewed. This is because households can be identified using GPS and telephone details that were captured. Collecting panel data will have the advantage in that costs and revenue profile and decision making of the same household at a different time can be collected, thus bringing certainty on performance of the tobacco crop. Collecting information from one season, as we have done in this cross-sectional analysis can have a weakness, in that a poor season that has resulted in poor returns is used to push for a national policy. Comparison of performance in different seasons, and from the same households, brings more certainty on tobacco growing performance and exploitation. There is also need to compare performance of tobacco with other crops grown in the same households or same regions. This will help in understanding the value chains and performance of other crops, enabling policy making on crops that would ensure better returns to smallholder farmers if more resources are invested in improving value chains. Finally, as future research, and to see whether results will be consistent because of unobserved characteristics, a logit or probit model can be run to determine decisions to contract. Afterwards, in the next stage, using the net revenue as the dependent variable, run a two stage model to determine how much revenue one would generate by making the choice to contract. This will help address problems of unobserved characteristics which affect both the choice of whether to join a contract or not as well as revenue generated. Alternatively, because there may be bias in selection of survey sample and variables, bias correction approaches such as Heckman's (1979) two stage selection model or bias correction approach is by Bourguingnon, Fournier and Gurgand (2007) may be used.

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Appendices

Appendix A: Supplementary Tables for Essay Two

Table A1: Mean Expenditure Shares in Percentages between Smoking and Non-Smoking Households

Variable	Full Sample	Urban H/holds	Rural H/holds	Top 50%	Bottom 50%
Food	(54.70,54.07)	(45.30,45.40)	(58.02,56.41)	(49.06,50.34)	(60.27,57.64)
Alcohol	(0.99,4.37)	(0.99,5.04)	(0.99,4.19)	(1.07,5.44)	(0.92,3.35)
Health care	(3.36,2.83)	(2.62,1.94)	(3.62,3.07)	(3.82,3.09)	(2.90,2.58)
School	(0.25,0.05)	(0.6,0.05)	(0.13,0.05)	(0.44,0.10)	(0.07,0.00)
Clothing	(6.68,6.16)	(5.57,4.50)	(7.07,6.60)	(8.31,7.08)	(5.07.5.28)
Water	(1.25,1.28)	(1.95,1.58)	(1.01,1.20)	(1.34,1.25)	(1.16,1.31)
Housing	(3.56,2.11)	(12.02,8.22)	(0.64,0.55)	(5.33,3.30)	(1.82,0.98)
Electricity	(3.85,3.14)	(2.76,2.11)	(4.23,3.42)	(2.75,2.32)	(4.94,3.93)
Alternative Energy	(8.52,6.49)	(8.84,7.32)	(8.41,6.26)	(8.46,6.52)	(8.58,6.46)
Transport and Communication	(7.25,5.50)	(10.33,9.97)	(6.16,4.30)	(9.95,7.43)	(4.58,3.65)
Entertainment	(1.10,0.79)	(1.44,1.17)	(0.98,0.69)	(1.43,1.11)	(0.78,0.49)
House Care	(3.15,2.73)	(2.37,2.13)	(3.42,2.89)	(2.36,2.17)	(3.93,3.26)
Personal Care	(5.40,4.20)	(5.60,4.31)	(5.33,4.17)	(5.77,4.66)	(5.04,3.75)

Source: Author's Analysis using Kenya Integrated Household and Budget Survey 2005/2006

Note: The pairs in each cell in Table A1 above are the mean expenditure shares in percentage for smoking and non-smoking households. In each pair, the first number is the mean expenditure for non-smoking households reported by the non-smoking household, then followed by the smoking household. Figures reported in column 1 are the ones that were used to construct the percentage point difference reported in Table 3-5.

Table B1: Three Least Squares (3LS) Results, Full Sample

Variable	Food	Alc	Health	School	Clothing	Water	Housing	Electricity	Alt Energy	Tprt & Comm	Ent	Hse Care	Pers Care
lnM	0.515 ***	0.002	-0.07 ***	-0.015 ***	0.051 ***	0.008 *	-0.102 ***	-0.135 ***	-0.060 ***	-0.066 ***	-0.025 ***	-0.109 ***	0.005
	(0.029)	(-0.08)	(0.012)	(0.005)	(0.018)	(0.005)	(0.010)	(0.006)	(0.012)	(0.015)	(0.005)	(0.005)	(0.008)
lnM2	-0.032 ***	-0.0001	0.004 ***	0.001 ***	-0.002 *	-0.0004	0.007 ***	0.007 ***	0.003 ***	0.005 ***	0.002 ***	0.005 ***	-0.0004
	(0.002)	(0.0004)	(0.0007)	(0.0003)	(0.001)	(0.0003)	(0.001)	(0.0003)	(0.0007)	(0.0008)	(0.0003)	(0.002)	(0.0004)
lnhhsize	0.057 ***	-0.006	0.004	0.002	-0.005	-0.0008	-0.023 ***	0.002	-0.134 ***	-0.011 **	-0.002	0.005 ***	-0.006 **
	(0.01)	(0.003) **	(0.004)	(0.002)	(0.006)	(0.002)	(0.003)	(0.002)	(0.004)	(0.005)	(0.002)	(0.002)	(0.003)
lnheadsch	-0.09 *	0.0002	0.001	0.002 ***	-0.003	-0.001	0.005 ***	0.0004	0.003 *	-0.0001	0.002 *	0.0009	-0.0006
	(0.05)	(0.001)	(0.002)	(0.0008)	(0.003)	(0.0008)	(0.002)	(0.001)	(0.002)	(0.003)	(0.001)	(0.0008)	(0.001)
lnmosteduc	-0.042 ***	0.001	-0.009 ***	0.003 ***	-0.007 ***	0.001	0.007 ***	0.003 ***	0.010 ***	0.02 ***	0.004 ***	0.002 ***	0.007 ***
	(0.004)	(0.001)	(0.002)	(0.001)	(0.003)	(0.0007)	(0.001)	(0.001)	(0.002)	(0.002)	(0.0008)	(0.0007)	(0.001)
lnheadage	-0.018	0.012 ***	0.013 ***	-0.005 **	-0.035 ***	-0.0004	-0.010 **	0.008 ***	0.016 ***	0.013 **	0.007 ***	0.002	-0.003
	(0.124)	(0.003)	(0.005)	(0.002)	(0.008)	(0.002)	(0.004)	(0.002)	(0.005)	(0.006)	(0.002)	(0.002)	(0.003)
lnadultage	0.016	0.003	-0.005	0.005 **	0.0001	0.003	-0.007 *	0.001	-0.001	0.0003	-0.04 *	-0.0008	-0.008 **
	(0.013)	(0.004)	(0.005)	(0.002)	(0.008)	(0.002)	(0.004)	(0.003)	(0.005)	(0.007)	(0.002)	(0.002)	(0.003)
lnchildage	-0.125 ***	-0.0006	-0.003 *	0.00	0.003	0.00	-0.002 *	0.003 ***	0.0004	0.005 ***	0.003 ***	0.0004	-0.003 ***
	(0.004)	(0.001)	(0.002)	(0.0006)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.0007)	(0.0006)	(0.001)
House Structure	-0.029 *	-0.014 ***	-0.001	0.003	-0.034 ***	0.007 **	0.006	0.006 *	0.017 ***	0.029 ***	-0.008 ***	0.001	0.20 ***
	(0.017)	(0.005)	(0.007)	(0.003)	(0.011)	(0.003)	(0.006)	(0.003)	(0.007)	(0.009)	(0.003)	(0.003)	(0.005)
Total Employment	-0.009 ***	0.0006	-0.002 **	0.0002	0.003 ***	-0.0007 **	-0.003 ***	0.0005	0.004 ***	0.003 **	0.0002	0.0004	0.002 ***
	(0.002)	(0.0006)	(0.001)	(0.0003)	(0.001)	(0.003)	(0.001)	(0.0004)	(0.0008)	(0.001)	(0.0004)	(0.0003)	(0.006)
Stratum 1	0.034	0.007	0.034	0.003	-0.0944	0.012	0.035	0.012	0.022	-0.031	-0.01	0.005	-0.027
	(0.101)	(0.027)	(0.042)	(0.017)	(0.062)	(0.016)	(0.033)	(0.20)	(0.04)	(0.051)	(0.018)	(0.016)	(0.027)
Stratum 2	(0.029)	0.003 *	0.021	0.003	-0.113	0.019	0.083 **	0.013 **	0.02	-0.037	-0.011	0.004	-0.032
	(0.101)	(0.027)	(0.042)	(0.017)	(0.062)	(0.016)	(0.033)	(0.02)	(0.04)	(0.051)	(0.018)	(0.016)	(0.027)
Stratum 3	0.065	0.013	0.034	0.004	-0.085	0.012	0.038	0.007	0.004	-0.041	-0.012 *	-0.0001	-0.039
	(0.101)	(0.027)	(0.042)	(0.017)	(0.062)	(0.016)	(0.033)	(0.02)	(0.04)	(0.051)	(0.018)	(0.016)	(0.027)
Variable	**Food**	**Alc**	**Health**	**School**	**Clothing**	**Water**	**Housing**	**Electricity**	**Alt Energy**	**Tprt & Comm**	**Ent**	**Hse Care**	**Pers Care**
Cons	-1.500 ***	-0.048	0.243	0.043 *	0.003	-0.053 **	0.426 ***	0.639 ***	0.285 ***	0.197 **	0.097 ***	0.554 ***	0.112 ***
	(0.173)	(0.046)	(0.072)	(0.029)	(0.106)	(0.028)	(0.057)	(0.034)	(0.069)	(0.088)	(0.032)	(0.028)	(0.046)
Observations	5542	5542	5542	5542	5542	5542	5542	5542	5542	5542	5542	5542	5542
R-Squared	0.230	0.058	0.023	0.025	0.038	0.019	0.268	0.196	0.063	0.167	0.055	0.210	0.041

Source: Author's Analysis using Kenya Integrated Household and Budget Survey 2005/2006

Table C1: Three Stage Least Squares (3SLS) Results, Urban Sample

Variable	Food	Alc	Health	School	Clothing	Water	Housing	Electricity	Alt Energy	Tprt & Comm	Ent	Hse Care	Pers Care
lnM	0.433 *** (0.067)	0.024 (0.017)	-0.019 (0.027)	-0.021 (0.016)	0.076 ** (0.038)	0.004 (0.012)	-0.160 *** (0.041)	-0.123 *** (0.014)	-0.158 *** (0.030)	-0.029 (0.040)	-0.007 (0.014)	-0.061 *** (0.009)	0.039 ** (0.020)
lnM2	-.028 *** (0.003)	-0.001 (0.001)	0.001** (0.001)	0.001 (0.001)	-0.003 (0.002)	-0.0002 (0.001)	0.010 *** (0.002)	0.006 *** (0.001)	0.008 *** (0.002)	0.004 * (0.002)	0.001 (0.001)	0.003 *** (0.0004)	-0.002 ** (0.001)
lnhhsize	0.092 *** (0.015)	-0.005 (0.004)	0.009 * (0.006)	-0.001 (0.004)	0.005 (0.009)	0.002 (0.003)	0.681 (0.768)	0.001 (0.003)	-0.02 *** (0.007)	-0.042 *** (0.009)	-0.007 ** (0.003)	0.002 (0.002)	-0.001 (0.005)
lnheadsch	-0.010 (0.008)	-0.001 (0.002)	0.002 (0.003)	0.009 *** (0.003)	-0.003 (0.005)	0.001 (0.002)	-0.142 (0.161)	-0.002 (0.002)	-0.003 (0.004)	0.003 (0.005)	0.000 (0.002)	0.001 (0.001)	-0.003 (0.003)
lnmosteduc	-0.043 *** (0.006)	0.001 (0.002)	-0.006 (0.003)	0.003 ** (0.001)	-0.006 (0.004)	-0.002 (0.001)	0.007 (0.008)	0.003 * (0.001)	0.008 *** (0.003)	0.014 *** (0.004)	0.005 *** (0.001)	0.001 (0.001)	0.007 *** (0.002)
lnheadage	0.004 (0.021)	0.007 (0.005)	0.003 (0.008)	-0.010 (0.005)	-0.032 *** (0.012)	-0.001 (-0.190)	-0.034 *** (0.009)	0.008 * (0.004)	0.014 * (0.009)	0.037 *** (0.012)	0.010 ** (0.004)	0.0002 (0.003)	-0.009 * (0.006)
lnadultage	0.011 (0.021)	0.006 (0.005)	-0.011 (0.008)	0.004 (0.005)	-0.008 (0.012)	0.007 ** (0.004)	0.007 * (0.005)	0.008 * (0.004)	0.026 *** (0.009)	-0.022 * (0.012)	-0.006 (0.004)	0.002 (0.003)	-0.015 ** (0.006)
lnchildage	-0.015 *** (0.005)	0.001 (0.001)	-0.001 (0.002)	0.001 (0.001)	-0.001 (0.003)	0.002 * (0.001)	0.015 *** (0.004)	0.002 (0.001)	0.0003 (0.002)	0.007 ** (0.003)	0.005 *** (0.001)	0.0001 (0.0007)	0.004 ** (0.002)
House Structure	-0.004 * (0.026)	-0.009 (0.005)	0.002 (0.011)	-001 (0.006)	-0.047 *** (0.015)	0.009 (0.005)	-0.030 (0.012)	0.02 *** (0.006)	0.033 *** (0.012)	0.001 * (0.016)	-0.011 ** (0.005)	0.001 (0.004)	0.016 *** (0.008)
Total Employment	-0.015 *** (0.004)	-0.0002 (0.007)	-0.001 (0.002)	-0.000 (0.001)	0.005 ** (0.002)	-0.001 (0.001)	-0.003 (0.013)	0.00 * (0.001)	0.004 *** (0.002)	0.008 *** (0.002)	-0.000 (0.000)	0.002 *** (0.001)	0.004 *** (0.001)
Stratum 1	0.037 (0.105)	0.007 (0.007)	0.036 (0.042)	0.003 (0.026)	-0.134 *** (0.060)	0.021 (0.019)	-0.0003 (0.003)	0.0134 (0.023)	0.038 (0.048)	-0.03 (0.062)	-0.010 (0.022)	0.009 (0.015)	-0.044 (0.031)

Stratum 2	0.033 (0.105)	0.004 (0.004)	0.029 (0.042)	0.005 (0.026)	-0.140 *** (0.060)	0.021 (0.019)	-0.003 (0.003)	0.010 (0.023)	0.029 (0.048)	-0.027 (0.062)	-0.017 (0.022)	0.007 (0.015)	-0.048 * (0.031)
Stratum 3	0.050 (0.105)	0.007 (0.007)	0.034 (0.042)	0.004 (0.026)	-0.134 *** (0.060)	0.025 (0.019)	0.033 (0.016)	0.009 (0.023)	0.036 (0.048)	-0.038 (0.062)	0.018 (0.022)	0.012 (0.015)	-0.051 * (0.031)
Cons	-1.206 *** (0.347)	0.152 * (0.009)	0.057 (0.140)	0.071 (0.085)	-0.102 (0.198)	-0.045 (0.062)	-0.005 (0.002)	0.562*** (0.075)	0.694 *** (0.160)	0.021 (0.207)	0.027 (0.070)	0.315 *** (0.049)	-0.007 * (0.104)
Observations	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688
R-Squared	0.376	0.084	0.022	0.032	0.056	0.016	0.173	0.088	0.064	0.238	0.009	0.077	0.047

Table D1: Three Stage Least Squares (3SLS) Results, Rural Sample

Variable	Food	Alc	Health	School	Clothing	Water	Housing	Electricity	Alt Energy	Tprt & Comm	Ent	Hse Care	Pers Care
lnM	0.558 *** (0.042)	-0.005 (0.011)	-0.155 *** (0.017)	-0.021 *** (0.005)	-0.005 (0.026)	0.007 (0.006)	-0.004 (0.005)	-0.135 *** (0.008)	-0.042 *** (0.015)	-0.060 *** (0.020)	-0.023 *** (0.007)	-0.119 *** (0.007)	0.004 (0.011)
lnM2	-0.035 *** (0.003)	0.0003 (0.0007)	0.010 *** (0.001)	0.001 *** (0.0005)	0.002 * (0.002)	-0.0003 (0.0004)	0.0004 * (0.0003)	0.007 *** (0.0004)	0.002 * (0.001)	0.005 *** (0.001)	0.001 *** (0.0004)	0.006 *** (0.0004)	-0.0004 (0.0006)
lnhhsize	0.040 *** (0.012)	-0.008 ** (0.003)	-0.002 (0.005)	0.003 * (0.002)	-0.018 *** (0.008)	0.0002 (0.002)	-0.007 *** (0.001)	0.001 (0.002)	-0.008 * (0.005)	-0.001 (0.006)	0.001 (0.002)	0.005 *** (0.002)	-0.008 (0.003)
lnheadsch	-0.009 (0.007)	0.0006 (0.002)	0.002 (0.003)	0.004 *** (0.001)	-0.001 (0.004)	-0.002 * (0.001)	0.001 (0.001)	0.001 (0.001)	0.004 * (0.002)	-0.001 (0.002)	0.002 (0.002)	0.001 (0.001)	0.001 (0.002)
lnmosteduc	-0.042 *** (0.005)	0.002 (0.001)	-0.009 *** (0.002)	0.003 *** (0.001)	-0.006 * (0.003)	0.001 (0.001)	0.001 * (0.001)	0.002 *** (0.001)	0.011 *** (0.002)	0.024 *** (0.003)	0.004 *** (0.002)	0.003 *** (0.001)	0.006 *** (0.001)
lnheadage	-0.025 * (0.015)	0.013 *** (0.004)	0.017 *** (0.006)	-0.005 *** (0.002)	-0.039 *** (0.010)	0.001 (0.002)	-0.003 * (0.002)	0.009 *** (0.003)	0.019 *** (0.006)	0.004 (0.007)	0.005 * (0.003)	0.003 (0.003)	-0.001 (0.004)
lnadultage	0.016 (0.017)	0.001 (0.005)	-0.003 (0.007)	0.005 ** (0.002)	0.003 (0.010)	0.0004 (0.002)	-0.005 *** (0.002)	-0.002 (0.003)	-0.012 * (0.006)	0.009 (0.008)	-0.004 * (0.002)	-0.002 (0.003)	-0.005 (0.004)
lnchildage	-0.012 *** (0.005)	-0.001 (0.001)	-0.004 * (0.002)	-0.0004 (0.001)	0.005 * (0.003)	-0.001 (0.001)	-0.000 (0.001)	0.004 *** (0.001)	0.001 (0.002)	0.004 * (0.002)	0.002 *** (0.001)	0.001 (0.001)	0.003 ** (0.001)
House Structure	-0.024 (0.022)	-0.017 *** (0.006)	-0.004 (0.009)	0.004 * (0.003)	-0.030 ** (0.013)	0.005 * (0.003)	-0.002 (0.003)	-0.001 (0.004)	0.009 (0.008)	0.042 *** (0.010)	-0.005 (0.003)	0.001 (0.004)	0.021 *** (0.006)
Total Employment	-0.008 *** (0.003)	0.001 (0.001)	-0.002 * (0.001)	0.0002 (0.003)	0.002 (0.002)	-0.0001 (0.0003)	-0.001 *** (0.0003)	0.001 * (0.0004)	0.005 *** (0.001)	0.0003 (0.001)	0.0004 (0.0004)	0.0001 (0.0004)	0.002 ** (0.001)
Stratum 1	0.022 * (0.184)	0.010 (0.050)	0.018 (0.076)	0.002 (0.024)	-0.048 (0.113)	0.008 (0.028)	0.004 (0.022)	0.009 (0.035)	-0.003 (0.069)	-0.032 (0.088)	0.001 (0.032)	-0.001 (0.031)	0.007 (0.047)

Stratum 2	0.023 *	0.004	0.011	0.003	-0.056	0.022	0.023	0.015	-0.005	-0.043	-0.001	-0.001	0.003
	(0.184)	(0.050)	(0.076)	(0.024)	(0.113)	(0.028)	(0.022)	(0.035)	(0.069)	(0.088)	(0.032)	(0.031)	(0.047)
Stratum 3	0.058	0.018	0.020	0.003	-0.036	0.008	0.004	0.003	-0.024	-0.043	-0.002	-0.008	-0.005
	(0.184)	(0.050)	(0.076)	(0.024)	(0.113)	(0.028)	(0.022)	(0.035)	(0.069)	(0.088)	(0.032)	(0.031)	(0.048)
Variable	**Food**	**Alc**	**Health**	**School**	**Clothing**	**Water**	**Housing**	**Electricity**	**Alt Energy**	**Tprt & Comm**	**Ent**	**Hse Care**	**Pers Care**
Cons	-1.619 *** (0.265)	-0.022 (0.072)	0.569 *** (0.110)	0.059 (0.035)	0.175 (0.164)	-0.037 (0.040)	0.047 * (0.031)	0.6544 *** (0.050)	0.261 *** (0.099)	0.161 (0.127)	0.084 (0.046)	0.604 *** (0.045)	0.065 (0.068)
Observations	3854	3854	3854	3854	3854	3854	3854	3854	3854	3854	3854	3854	3854
R-Squared	0.130	0.057	0.046	0.0282	0.056	0.020	0.068	0.225	0.071	0.126	0.0314	0.219	0.044

Source: Author's Analysis using Kenya Integrated Household and Budget Survey 2005/2006

Table E1: Three Stage Least Squares (3SLS) Results, Top 50% Full Sample

Variable	Food	Alc	Health	School	Clothing	Water	Housing	Electricity	Alt Energy	Tprt & Comm	Ent	Hse Care	Pers Care
lnM	0.558 *** (0.042)	-0.005 (0.011)	-0.155 *** (0.017)	0.002 (0.004)	-0.005 (0.026)	0.007 (0.006)	-0.004 (0.005)	-0.135 *** (0.008)	-0.042 *** (0.015)	-0.060 *** (0.020)	-0.000 (0.011)	-0.119 *** (0.007)	0.004 (0.011)
lnM2	-0.035 *** (0.003)	0.0003 (0.0007)	0.010 *** (0.001)	-0.0001 (0.0002)	0.002 * (0.002)	-0.0003 (0.0004)	0.0004 * (0.0003)	0.007 *** (0.0004)	0.002 * (0.001)	0.005 *** (0.001)	-0.000 (0.001)	0.006 *** (0.0004)	-0.0004 (0.0006)
lnhhsize	0.040 *** (0.012)	-0.008 ** (0.003)	-0.002 (0.005)	-0.001 * (0.001)	-0.018 *** (0.008)	0.0002 (0.002)	-0.007 *** (0.001)	0.001 (0.002)	-0.008 * (0.005)	-0.001 (0.006)	0.0002 (0.002)	0.005 *** (0.002)	-0.008 (0.003)
lnheadsch	-0.009 (0.007)	0.0006 (0.002)	0.002 (0.003)	0.000 (0.0003)	-0.001 (0.004)	-0.002 * (0.001)	0.001 (0.001)	0.001 (0.001)	0.004 * (0.002)	-0.001 (0.002)	0.0002 (0.001)	0.001 (0.001)	0.001 (0.002)
lnmosteduc	-0.042 *** (0.005)	0.002 (0.001)	-0.009 *** (0.002)	0.0002 (0.001)	-0.006 * (0.003)	0.001 (0.001)	0.001 * (0.001)	0.002 *** (0.001)	0.011 *** (0.002)	0.024 *** (0.003)	0.003 *** (0.001)	0.003 *** (0.001)	0.006 *** (0.001)
lnheadage	-0.025 * (0.015)	0.013 *** (0.004)	0.017 *** (0.006)	-0.001 (0.001)	-0.039 *** (0.010)	0.001 (0.002)	-0.003 * (0.002)	0.009 *** (0.003)	0.019 *** (0.006)	0.004 (0.007)	0.001 (0.003)	0.003 (0.003)	-0.001 (0.004)
lnadultage	0.016 (0.017)	0.001 (0.005)	-0.003 (0.007)	-0.001 (0.001)	0.003 (0.010)	0.0004 (0.002)	-0.005 *** (0.002)	-0.002 (0.003)	-0.012 * (0.006)	0.009 (0.008)	-0.004 (0.003)	-0.002 (0.003)	-0.005 (0.004)
lnchildage	-0.012 *** (0.005)	-0.001 (0.001)	-0.004 * (0.002)	0.001 *** (0.0003)	0.005 * (0.003)	-0.001 (0.001)	-0.000 (0.001)	0.004 *** (0.001)	0.001 (0.002)	0.004 * (0.002)	0.002 *** (0.001)	0.001 (0.001)	0.003 ** (0.001)
Variable	**Food**	**Alc**	**Health**	**School**	**Clothing**	**Water**	**Housing**	**Electricity**	**Alt Energy**	**Tprt & Comm**	**Ent**	**Hse Care**	**Pers Care**
House Structure	-0.024 (0.022)	-0.017 *** (0.006)	-0.004 (0.009)	0.0003 (0.001)	-0.030 ** (0.013)	0.005 * (0.003)	-0.002 (0.003)	-0.001 (0.004)	0.009 (0.008)	0.042 *** (0.010)	-0.003 (0.004)	0.001 (0.004)	0.021 *** (0.006)
Total Employment	-0.008 *** (0.003)	0.001 (0.001)	-0.002 * (0.001)	-0.0002 (0.0002)	0.002 (0.002)	-0.0001 (0.0003)	-0.001 *** (0.0003)	0.001 * (0.0004)	0.005 *** (0.001)	0.0003 (0.001)	0.001 (0.0004)	0.0001 (0.0004)	0.002 ** (0.001)
Stratum 1	0.022 * (0.184)	0.010 (0.050)	0.018 (0.076)		-0.048 (0.113)	0.008 (0.028)	0.004 (0.022)	0.009 (0.035)	-0.003 (0.069)	-0.032 (0.088)		-0.001 (0.031)	0.007 (0.047)

Stratum 2	0.023 *	0.004	0.011	-0.000	-0.056	0.022	0.023	0.015	-0.005	-0.043	-0.003	-0.001	0.003
	(0.184)	(0.050)	(0.076)	(0.001)	(0.113)	(0.028)	(0.022)	(0.035)	(0.069)	(0.088)	(0.002)	(0.031)	(0.047)
Stratum 3	0.058	0.018	0.020	0.001	-0.036	0.008	0.004	0.003	-0.024	-0.043	-0003 ***	-0.008	-0.005
	(0.184)	(0.050)	(0.076)	(0.0004)	(0.113)	(0.028)	(0.022)	(0.035)	(0.069)	(0.088)	(0.001)	(0.031)	(0.048)
Cons	-1.619 *** (0.265)	-0.022 (0.072)	0.569 *** (0.110)	0.005 (0.014)	0.175 (0.164)	-0.037 (0.040)	0.047 * (0.031)	0.6544 *** (0.050)	0.261 *** (0.099)	0.161 (0.127)	-0.020 (0.042)	0.604 *** (0.045)	0.065 (0.068)
Observations	3854	3854	3854	3854	3854	3854	3854	3854	3854	3854	3854	3854	3854
R-Squared	0.130	0.057	0.046	0.0076	0.056	0.020	0.068	0.225	0.071	0.126	0.0214	0.219	0.044

Source: Author's Analysis using Kenya Integrated Household and Budget Survey 2005/2006

Table F1: Three Stage Least Squares (3SLS) Results, Bottom 50% Full Sample

Variable	Food	Alc	Health	School	Clothing	Water	Housing	Electricity	Alt Energy	Tprt & Comm	Ent	Hse Care	Pers Care
lnM	0.558 ***	-0.005	-0.155 ***	0.030	-0.005	0.007	-0.004	-0.135 ***	-0.042 ***	-0.060 ***	0.01	-0.119 ***	0.004
	(0.042)	(0.011)	(0.017)	(0.022)	(0.026)	(0.006)	(0.005)	(0.008)	(0.015)	(0.020)	(0.02)	(0.007)	(0.011)
lnM2	-0.035 ***	0.0003	0.010 ***	-0.001	0.002 *	-0.0003	0.0004 *	0.007 ***	0.002 *	0.005 ***	-0.000	0.006 ***	-0.0004
	(0.003)	(0.0007)	(0.001)	(0.001)	(0.002)	(0.0004)	(0.0003)	(0.0004)	(0.001)	(0.001)	(0.001)	(0.0004)	(0.0006)
lnhhsize	0.040 ***	-0.008 **	-0.002	0.005 *	-0.018 ***	0.0002	-0.007 ***	0.001	-0.008 *	-0.001	-0.003	0.005 ***	-0.008
	(0.012)	(0.003)	(0.005)	(0.003)	(0.008)	(0.002)	(0.001)	(0.002)	(0.005)	(0.006)	(0.003)	(0.002)	(0.003)
Variable	**Food**	**Alc**	**Health**	**School**	**Clothing**	**Water**	**Housing**	**Electricity**	**Alt Energy**	**Tprt & Comm**	**Ent**	**Hse Care**	**Pers Care**
lnheadsch	-0.009	0.0006	0.002	0.004 ***	-0.001	-0.002 *	0.001	0.001	0.004 *	-0.001	-0.003 **	0.001	0.001
	(0.007)	(0.002)	(0.003)	(0.001)	(0.004)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)
lnmosteduc	-0.042 ***	0.002	-0.009 ***	0.004 ***	-0.006 *	0.001	0.001 *	0.002 ***	0.011 ***	0.024 ***	0.004 ***	0.003 ***	0.006 ***
	(0.005)	(0.001)	(0.002)	(0.001)	(0.003)	(0.001)	(0.001)	(0.001)	(0.002)	(0.003)	(0.001)	(0.001)	(0.001)
lnheadage	-0.025 *	0.013 ***	0.017 ***	-0.008 **	-0.039 ***	0.001	-0.003 *	0.009 ***	0.019 ***	0.004	0.012 ***	0.003	-0.001
	(0.015)	(0.004)	(0.006)	(0.003)	(0.010)	(0.002)	(0.002)	(0.003)	(0.006)	(0.007)	(0.003)	(0.003)	(0.004)
lnadultage	0.016	0.001	-0.003	0.010 ***	0.003	0.0004	-0.005 ***	-0.002	-0.012 *	0.009	-0.004	-0.002	-0.005
	(0.017)	(0.005)	(0.007)	(0.004)	(0.010)	(0.002)	(0.002)	(0.003)	(0.006)	(0.008)	(0.004)	(0.003)	(0.004)
lnchildage	-0.012 ***	-0.001	-0.004 *	-0.0003	0.005 *	-0.001	-0.000	0.004 ***	0.001	0.004 *	0.003 ***	0.001	0.003 **
	(0.005)	(0.001)	(0.002)	(0.001)	(0.003)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
House Structure	-0.024	-0.017 ***	-0.004	0.004	-0.030 **	0.005 *	-0.002	-0.001	0.009	0.042 ***	-0.01 **	0.001	0.021 ***
	(0.022)	(0.006)	(0.009)	(0.005)	(0.013)	(0.003)	(0.003)	(0.004)	(0.008)	(0.010)	(0.004)	(0.004)	(0.006)
Total Employment	-0.008 ***	0.001	-0.002 *	0.0005	0.002	-0.0001	-0.001 ***	0.001 *	0.005 ***	0.0003	0.000	0.0001	0.002 **
	(0.003)	(0.001)	(0.001)	(0.0006)	(0.002)	(0.0003)	(0.0003)	(0.0004)	(0.001)	(0.001)	(0.0005)	(0.0004)	(0.001)
Stratum 1	0.022 *	0.010	0.018	0.002	-0.048	0.008	0.004	0.009	-0.003	-0.032	-0.01	-0.001	0.007
	(0.184)	(0.050)	(0.076)	(0.021)	(0.113)	(0.028)	(0.022)	(0.035)	(0.069)	(0.088)	(0.021)	(0.031)	(0.047)
Stratum 2	0.023 *	0.004	0.011	0.002	-0.056	0.022	0.023	0.015	-0.005	-0.043	-0.01	-0.001	0.003
	(0.184)	(0.050)	(0.076)	(0.021)	(0.113)	(0.028)	(0.022)	(0.035)	(0.069)	(0.088)	(0.021)	(0.031)	(0.047)
Stratum 3	0.058	0.018	0.020	0.003	-0.036	0.008	0.004	0.003	-0.024	-0.043	-0.01	-0.008	-0.005
	(0.184)	(0.050)	(0.076)	(0.021)	(0.113)	(0.028)	(0.022)	(0.035)	(0.069)	(0.088)	(0.021)	(0.031)	(0.048)
Cons	-1.619 ***	-0.022	0.569 ***	-0.195 *	0.175	-0.037	0.047 *	0.6544 ***	0.261 ***	0.161	-0.01	0.604 ***	0.065
	(0.265)	(0.072)	(0.110)	(0.111)	(0.164)	(0.040)	(0.031)	(0.050)	(0.099)	(0.127)	(0.021)	(0.045)	(0.068)
Observations	3854	3854	3854	3854	3854	3854	3854	3854	3854	3854	3854	3854	3854
R-Squared	0.130	0.057	0.046	0.030	0.056	0.020	0.068	0.225	0.071	0.126	0.0572	0.219	0.044

Source: Author's Analysis using Kenya Integrated Household and Budget Survey 2005/2006

Appendix B: Questionnaire used for Essay Three

<table>
<tr><td colspan="3" align="center">**KENYA TOBACCO FARMER SURVEY**</td></tr>
<tr>
<td>ENUMERATOR : _____ ⊔⊔⊔

SUPERVISOR   : _____ ⊔⊔⊔</td>
<td align="center">**CONFIDENTIAL**</td>
<td>ROUND ⊔⊔

B</td>
</tr>
</table>

TOBACCO FARMING KENYA QUESTIONNAIRE
SECTION: COV, RS, SC, CP

Respondent is primary farmer, the most responsible farmer in tobacco farming according to member of households

<table>
<tr>
<td>**COV 1:** NAME OF RESPONDENT: _____ ⊔⊔⊔ PID</td>
<td>**COV 3:** NAME OF PRIMARY FARMER: _____ ⊔⊔⊔ PID</td>
</tr>
<tr>
<td>**COV 2:** RESPONDENT IS: 1. HEAD OF HOUSEHOLD
    2. SPOUSE HEAD OF HOUSEHOLD
    3. OTHER HOUSEHOLD MEMBER
    4. NOT HOUSEHOLD MEMBER</td>
<td>**COV 4:** FARMER ABLE TO BE INTERVIEWED?

1. YES   3. NO</td>
</tr>
<tr>
<td></td>
<td>**COV5** Respondent category : 1. Original Tobacco farmer   2. Former tobacco farmer (currently not growing and not in the previous wave) 3.Former tobacco farmer(currently not growing but grew in the previous wave) 4.New tobacco farmer (Replacement)</td>
</tr>
</table>

	a. FIRST VISIT	**b. SECOND VISIT**	**c. THIRD VISIT**
DATE	⊔⊔ / ⊔⊔ / ⊔⊔⊔	⊔⊔ / ⊔⊔ / ⊔⊔⊔	⊔⊔ / ⊔⊔ / ⊔⊔⊔
TIME BEGIN	⊔⊔ : ⊔⊔	⊔⊔ : ⊔⊔	⊔⊔ : ⊔⊔
TIME END	⊔⊔ : ⊔⊔	⊔⊔ : ⊔⊔	⊔⊔ : ⊔⊔

RESULT OF VISIT

COV6. RESULT OF VISIT	COV7. OBSERVATION BY SUPERVISOR
1. Completed 2. Partially completed,_____ 3. Not Completed,_____	YES NO a. Observed .... 1 3 b. Checked .... 1 3 c. Verified 1 3

CONSENT FORM time start ⌴⌴⌴ : ⌴⌴⌴

Research: KENYA TOBACCO FARMER SURVEY

DO NOT READ SECTION TITTLE (IN CAPITAL)
INTRODUCTION & VERBAL CONSENT

Good morning/afternoon! My name is _____, I am from _____, based in _____. We are conducting a survey that is part of a research project to understand better the economics of tobacco farming in Kenya/Malawi/Zambia. You have been selected because of your experience tobacco farming. The survey will run for about an hour and whatever will be discussed will remain confidential and will only be used for this research.

CONSENT

FP01. Do you agree to take part in this survey?	1. Yes 3. No ➔ END INTERVIEW
FP02. Is respondent able to read and write?	1. Yes ➔ SIGNATURE COLUMN 3. No ➔ ORAL CONSENT (Enumerator)

RESPONDENT SIGNATURE RESPONDENT SIGN HERE TO CONSENT	ORAL (Enumerator) ORAL CONSENT BY RESPONDENT
(....)	(....)
Date ⌴⌴⌴ / ⌴⌴⌴ / ⌴⌴⌴⌴	Date ⌴⌴⌴ / ⌴⌴⌴ / ⌴⌴⌴⌴

RESPONDENT SCREENER

RS1	Did you or anyone in your household grow tobacco during the 2015/16 tobacco-growing season?	1 Yes 0 No
RS2	Were you or any member of your family interviewed during the previous round (2014 in Malawi; 2015 in Kenya; 2015 in Zambia)?	1 Yes ➔ RS4 0 No

RS3	**[If No to RS2],** did you grow tobacco in 2013/14 season?	1 Yes 0 No
RS4	Did you grow tobacco in 2014/15 season?	1 Yes 0 No ➔**RS4**

SECTION SC (SAMPLING INFORMATION) time start ⌞⌞⌟ : ⌞⌞⌟

SAMPLING INFORMATION		CODE
SC01. PROVINCE/COUNTY:	_____	⌞⌞⌟
SC02. DISTRICT/SUB-COUNTY:	_____	⌞⌞⌟
SC03. TRADITIONAL AUTHORITY/CHIEF/DIVISION:	_____	⌞⌞⌞⌟
SC04. GROUP VILLAGE:		
SC05. VILLAGE/HEADMAN:	_____	⌞⌞⌞⌟
SC06. GPS COORDINATE OF HH (loaded automatically)	a. LATITUDE : ⌞☐⌟ ⌞⌞⌟° ⌞⌞⌟ , ⌞⌞⌞⌟ ` b. LONGITUDE ☐ : ⌞⌞⌟ ⌞⌞⌞⌟° ⌞⌞⌟ , ⌞⌞⌞⌟ ` c. ELEVATION : ⌞⌞⌟ . ⌞⌞⌞⌟ METER DPL d. ACCURACY : ⌞⌞⌟ METER	

SECTION A: (HOUSEHOLD ROSTER)

HOUSEHOLD (HH):	is a person or group of persons who occupy a part of or an entire building and who usually live together and eat from the same kitchen. What is meant by eating from one kitchen is that the arrangement to fulfill daily necessities is jointly managed.
HEAD OF HOUSEHOLD (HHH):	is a person among the group of householders who is responsible for satisfying daily necessities of the household or a person who is regarded/assigned as the head of the household.
HOUSEHOLD MEMBER (HHM):	is anyone who usually lives in the household, whether she/he is at home during the survey or is temporarily absent. A householder who has been away for 6 or more months, and a householder who has been away for less than 6 months but plans to move out/be away for 6 or more months is not regarded as a householder. A guest who has stayed in the household for 6 or more months or a guest who has stayed in the household for less than 6 months but plans to stay for 6 or more months is regarded as a householder. (**THE NAME OF A HOUSEHOLDER IS TO BE WRITTEN ON ONE LINE ONLY**.)

A00.	I would like to know the names of all the people who live in this household. Please list all the people that stay here, eat and cook together in the household. **(NOTE WITH REFERENCE TO THE ROSTER: THE NAMES THAT ARE RECORDED HERE ARE ONLY THE PEOPLE WHO USUALLY STAY IN THIS HOUSEHOLD: ADULTS, CHILDREN, AND INFANTS. LIST THE HOUSEHOLD HEAD, THE SPOUSE (HUSBAND OR WIFE) OF THE HOUSEHOLD HEAD, THEIR CHILDREN (BIRTH, STEP, ADOPTED), PARENTS, IN-LAWS, SIBLINGS, SIBLINGS IN-LAW, GRANDCHILDREN, GRANDPARENTS, AUNTS AND UNCLES, NIECES AND NEPHEWS, COUSINS, BOARDERS, AND SERVANTS (NON-FAMILY MEMBERS).** ➜ **WRITE NAMES OF HHM AND ASK QUESTION A02 – A15**

SECTION A (HOUSEHOLD ROSTER) time start └──┴──┘ : └──┴──┘

May we know all the members of your household or those living and eating in the same house? [START WITH THE HOUSEHOLD HEAD. INIDICATE CODES;]

A00ID	A01	A02	A03	A04		A05	A06	A07
PID	Names of Household Members	PID of person answering the questions	Relationship to head of household	Gender 1. Male 2. Female		Actual Age	Highest school level completed	What time of day does [NAME] attend school? (if under 18)
01		└──┴──┘	└──┴──┘	1	2	└──┴──┘ years		1. Morning 3. Afternoon
02		└──┴──┘	└──┴──┘	1	2	└──┴──┘ years		1. Morning 3. Afternoon
03		└──┴──┘	└──┴──┘	1	2	└──┴──┘ years		1. Morning 3. Afternoon
04		└──┴──┘	└──┴──┘	1	2	└──┴──┘ years		1. Morning 3. Afternoon
05		└──┴──┘	└──┴──┘	1	2	└──┴──┘ years		1. Morning 3. Afternoon

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| 06 | | └─┴─┘ | └─┴─┘ | 1 | 2 | └─┴─┘ years | | 1. Morning
3. Afternoon |
| 07 | | └─┴─┘ | └─┴─┘ | 1 | 2 | └─┴─┘ years | | 1. Morning
3. Afternoon |

<table>
<tr><td>CODES FOR A03:
01. Head of Household
02. Husband/wife
03. Child
04. Son/Daughter in law
05. Grandchild
06. Parent/parent in law
07. Other family
08. Housemaid
09. Other-non family</td><td>CODES FOR A06:
00 Not yet/no schooling
01. Elementary school
02. Junior Primary
03. Senior Primary
04. Junior Secondary
05. Senior Secondary
06. Vocational
07. College/University</td></tr>
</table>

SECTION B. Marketing Partnership/Contract

Now, I would like to ask you about your partnership contract/agreement in tobacco farming

B01.	Did you have a partnership contract?	1. Yes 3. No ➔ **B03**
B02.	Is the contract written?	1. Yes, have copy of contract➔**B05** 2. Yes, no copy of contract ➔**B05** 3. No➔**B05**
B03.	Do you have any kind of marketing agreement with an individual?	1. Yes 3. No ➔ **B08**
B04.	Is the agreement written?	1. Yes, have copy of agreement 2. Yes, no copy of agreement 3. No
B05.	With whom do you have partnership contract/agreement? (individual/company)	Name:_____
B06.	Marketing/contract partner	1. Individual middleman/supervisor 2. Company collector 3. Independent warehouse 4. Cigarette company warehouse 5. Cigarette company 6. Other, specify 8. DON'T KNOW
B07.	How long have you been in contract/agreement with the current partner?	**1.** └─┴─┴─┘ **1.** Months **2.** Years **2.** └─┴─┴─┘ tobacco seasons
B08.	**INTERVIEWER CHECK: COV5 IS RESPONDENT A FORMER TOBACCO FARMER?**	1. YES ➔ **SECTION C** 2. NO
B09.	Are you a member of a farmer group/cooperative?	1. Yes, tobacco farmer group ➔**B11** 2. Yes, other farmer group ➔**B11** 3. No

B10.	Why are you not a member of any farmer group?	1. Non-existence area 2. Lack of trust 3. Lack of value 5. Other, specify _____ ➔ SECTION C	

d.	Helping members with loan payments when they fall behind	1. Yes 3. No ↓	1. Optional 2. Required

B11.	Who established the farmer group/cooperative?	1. Cigarette company partner 2. Farmers 3. Cigarette company 4. Individual middleman/collector 5. Other_____
B12.	What is your membership status in the farmer group/cooperative?	1. Head 2. Official 3. Member
B13.	Is the membership optional or compulsory	1. Optional 2. compulsory
B14.	What is the name of the group?	_____
B15.	How many members are in this farmer's group/cooperative?	└─┴─┴─┘ members

		B16.	B17.
		Does your group/cooperative has any of the following features?	Is the feature optional or required?
a.	Shared-buying of inputs	1. Yes 3. No ↓	1. Optional 2. Required
b.	Shared-selling of tobacco leaves	1. Yes 3. No ↓	1. Optional 2. Required
c.	SACCO-shared credit scheme	1. Yes 3. No ↓	1. Optional 2. Required

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SECTION C. LABOR/CURRENT ACTIVITY

C00	C01	C02.	C03.	C03a	C04.	C04a.	C05.	C05a.	C06.	C06a.	C08.	C09.	C10.	C11.
PID	Name	*PID of person answering the questions*	In the last 7 days did [NAME] work for a wage, salary, commission or any payment in kind, from work in agriculture or non- agriculture, and including doing paid domestic work, even if it was for only one hour?	Did [NAME] do any of work described in C03 in the **last 12 months**?	In the **last 7 days,** did [NAME] run a business of any size, for themselves or another house-hold member, even if it was for only one hour?	Did [NAME] do any of work described in C04 in the **last 12 months**?	In the last 7 days, did [NAME] help without being paid in any kind of business run by this household, even if it was only for one hour?	Did [NAME] do any of work described in C05 in the **last 12 months**?	In the last 7 days, did [NAME] work on this household's farm?	Did [NAME] do any of work described in C05 in the **last 12 months**?	**CAPI CHECK:** **ANY OF C03, C04, C05, C06, OR** **C03a, C04a, C05a, C6a** **= 1** 1. YES➜C09 2. NO ➜C31 (JOB SEARCH)	**CAPI CHECK:** **ANY OF C06 OR C06a =1** **(HOUSEH OLD FARM)?** 1. YES→C10 3. NO →C12	Did [NAME] participate in **tobacco farm activities** in this household in the last 12 months?	Did [NAME] participate in **non-tobacco farm activities** in this household the last 12 months?
		└┴┴┘	1. Yes ➜C04 3. No	1. Yes 3. No	1. Yes ➜C05 3. No	1. Yes 3. No	1. Yes ➜C06 3. No	1. Yes 3. No	1. Yes ➜C08 3. No	1. Yes 3. No	1. Yes 3. No➜C31	1. Yes 3. No➜C12	1. Yes 3. No	1. Yes 3. No
		└┴┴┘	1. Yes ➜C04 3. No	1. Yes 3. No	1. Yes ➜C05 3. No	1. Yes 3. No	1. Yes ➜C06 3. No	1. Yes 3. No	1. Yes ➜C08 3. No	1. Yes 3. No	1. Yes 3. No➜C31	1. Yes 3. No➜C12	1. Yes 3. No	1. Yes 3. No
		└┴┴┘	1. Yes ➜C04 3. No	1. Yes 3. No	1. Yes ➜C05 3. No	1. Yes 3. No	1. Yes ➜C06 3. No	1. Yes 3. No	1. Yes ➜C08 3. No	1. Yes 3. No	1. Yes 3. No➜C31	1. Yes 3. No➜C12	1. Yes 3. No	1. Yes 3. No
		└┴┴┘	1. Yes ➜C04 3. No	1. Yes 3. No	1. Yes ➜C05 3. No	1. Yes 3. No	1. Yes ➜C06 3. No	1. Yes 3. No	1. Yes ➜C08 3. No	1. Yes 3. No	1. Yes 3. No➜C31	1. Yes 3. No➜C12	1. Yes 3. No	1. Yes 3. No
		└┴┴┘	1. Yes ➜C04 3. No	1. Yes 3. No	1. Yes ➜C05 3. No	1. Yes 3. No	1. Yes ➜C06 3. No	1. Yes 3. No	1. Yes ➜C08 3. No	1. Yes 3. No	1. Yes 3. No➜C31	1. Yes 3. No➜C12	1. Yes 3. No	1. Yes 3. No
		└┴┴┘	1. Yes ➜C04 3. No	1. Yes 3. No	1. Yes ➜C05 3. No	1. Yes 3. No	1. Yes ➜C06 3. No	1. Yes 3. No	1. Yes ➜C08 3. No	1. Yes 3. No	1. Yes 3. No➜C31	1. Yes 3. No➜C12	1. Yes 3. No	1. Yes 3. No
		└┴┴┘	1. Yes ➜C04 3. No	1. Yes 3. No	1. Yes ➜C05 3. No	1. Yes 3. No	1. Yes ➜C06 3. No	1. Yes 3. No	1. Yes ➜C08 3. No	1. Yes 3. No	1. Yes 3. No➜C31	1. Yes 3. No➜C12	1. Yes 3. No	1. Yes 3. No

MAIN JOB (C12-C20)

Note The main occupation is considered to be the occupation where the respondent spent the most part of time working during the last 12 months

C00	C12.	C13.		C14.		C15.	C16.	C17.	C18.		
PID	**CAPI CHECK:** **IS C03 OR C03A=1 (WAGE WORKER)** **1. YES** **3. NO→C31 (Job search)**	What are the main goods/services produced or its main function at [NAME]'s place of work in the last **12 months**?		What kind of work does [NAME] usually do in the job/business that [NAME] had during the **last 12 months?**		What is your employment status? 1. Government employee/worker 2. Private employee/worker 3. Casual worker in agriculture 4. Casual worker in non-agriculture	Do you have a contract for this job? 1. Yes, written 2. Yes not written 3. No	IS [NAME]'s position... 1. permanent and pensionable 2. An open ended appointment 3. A fixed Term	How much was [NAME]'s last cash payment and the estimated value of what [NAME] last received in kind for the main job? What period of time did this payment cover? CASH PAYMENTS SHOULD INCLUDE SET RATE, COMMISSIONS, TIPS ANDF CASH ALLOWANCES. IF NOT CASH OR IN-KIND PAYMENT WAS RECEIVED, RECORD '0' C18a.		
		DESCRIPTION	E	DESCRIPTION	E				**C18a**. Cash	**C18b.** Estimated cash value of in-kind payments	**C18c. Time** **CODE:**
	1. YES 3. NO→C31		⊔		⊔	1 2 3→C18 4→C18	1 2 3	1 2 3	⌴,⌴⌴⌴,⌴⌴⌴	⌴,⌴⌴⌴,⌴⌴⌴	⊔
	1. YES 3. NO→ C31		⊔		⊔	1 2 3 →C18 4→C18	1 2 3	1 2 3	⌴⌴,⌴⌴⌴,⌴⌴⌴	⌴⌴,⌴⌴⌴,⌴⌴⌴	⊔
	1. YES 3. NO→C31		⊔		⊔	1 2 3→C18 4 →C18	1 2 3	1 2 3	⌴⌴,⌴⌴⌴,⌴⌴⌴	⌴⌴,⌴⌴⌴,⌴⌴⌴	⊔
	1. YES 3. NO→ C31		⊔		⊔	1 2 3 →C18 4→C18	1 2 3	1 2 3	⌴⌴,⌴⌴⌴,⌴⌴⌴	⌴⌴,⌴⌴⌴,⌴⌴⌴	⊔
	1. YES 3. NO→C31		⊔		⊔	1 2 3→C18 4 →C18	1 2 3	1 2 3	⌴⌴,⌴⌴⌴,⌴⌴⌴	⌴⌴,⌴⌴⌴,⌴⌴⌴	⊔
	1. YES 3. NO→ C31		⊔		⊔	1 2 3 →C18 4→C18	1 2 3	1 2 3	⌴⌴,⌴⌴⌴,⌴⌴⌴	⌴⌴,⌴⌴⌴,⌴⌴⌴	⊔

CODES FOR C25:

01.	Agriculture - tobacco	21.	Restaurant, food sale
02.	Agriculture – non-tobacco	22.	Industry: food processing/production
03.	Farming, forestry, animal husbandry, fishing, and hunting	23.	Industry: clothing
04.	Electricity, gas, water(utilities)	24.	Industry: other
05.	Mining and quarry	25.	Sale: non food
06.	Electricity, gas, water(utilities)	31.	Service : government
07.	Construction/building	32.	Service : teacher
08.	Transport, storage, communications	33.	Service : professional
		34.	Service: Transportation
09.	Financial services, real estate, leasing, corporate services	35.	Service: other
		95.	Other, specify

CODES FOR C26.

01	Professional or technical worker
02	Management or administrative worker
03	Clerical personnel and the like
04	Sales personnel
05	Service personnel
06	Farm, forestry, game hunting, fishery worker;
07	Production line worker
08	Transportation vehicle operator;
09	Blue collar worker

CODES FOR C18c.

1	Hour
2	Day
3	Week
4	Months
5	Other

C00	C19.			C20.		C21.
PID	a. During the last 12 months for how many months did [NAME] work in this activity? b. During the last month for how many weeks did [NAME] work in this activity? c. During the last week how many hours did [NAME] work in this activity?			When did [NAME] start to work for this employer?		Do you have any other work for a wage, salary, commission or any payment in kind, from work in agriculture or non-agriculture, and including doing paid domestic work, even if it was for only one hour? 1. Yes ➔ (JOB 2) 3. No ➔ C03, NEXT ROW
	C19a. Months	**C19b.** Weeks per month	**C19c.** Hours per week	YEAR	MONTH	
	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┴─┴─┘	└─┴─┘	1. Yes 3. No➔C03, NEXT ROW
	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┴─┴─┘	└─┴─┘	1. Yes 3. No➔C03, NEXT ROW
	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┴─┴─┘	└─┴─┘	1. Yes 3. No➔C03, NEXT ROW
	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┴─┴─┘	└─┴─┘	1. Yes 3. No➔C03, NEXT ROW
	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┴─┴─┘	└─┴─┘	1. Yes 3. No➔C03, NEXT ROW
	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┴─┴─┘	└─┴─┘	1. Yes 3. No➔C03, NEXT ROW

	└─┴─ ┘	└─┴─ ┘	└─┴─ ┘	└─┴─┴─ ┘	└─┴─ ┘	1. Yes 3. No➔**C03, NEXT ROW**
	└─┴─ ┘	└─┴─ ┘	└─┴─ ┘	└─┴─┴─ ┘	└─┴─ ┘	1. Yes 3. No➔**C03, NEXT ROW**

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SECOND JOB (C22-C33)

C00	C22.		C23.		C25.	C26.	C27.	C28.		
PID	What are the main goods/services produced or its main function at [NAME]'s place of work in the **last 12 months?**		What kind of work does [NAME] usually do in the job/business that [NAME] had during the **last 12 months?**		What is your employment status? 1. Government employee/worker 2. Private employee/worker 3. Casual worker in agriculture 4. 4. Casual worker in non-agriculture	Do you have a contract for this job? 1. Yes, written 2. Yes not written 3. No	IS [NAME]'s position... 1. permanent and pensionable 2. An open ended appointment 3. A fixed Term	How much was [NAME]'s last cash payment and the estimated value of what [NAME] last received in kind for the main job? What period of time did this payment cover? CASH PAYMENTS SHOULD INCLUDE SET RATE, COMMISSIONS, TIPS ANDF CASH ALLOWANCES. IF NOT CASH OR IN-KIND PAYMENT WAS RECEIVED, RECORD '0' C18a.		
	DESCRIPTION	DE	DESCRIPTION	E				**C28a**. Cash	**C28b.** Estimated cash value of in-kind payments	**C28c. Time** **CODE:**
		⊔		⊔	1 2 3 →C28 4 →C28	2 3	1 2 3	⌊_⌋,⌊_ _ _⌋.⌊_ _ _⌋	⌊_ _ _⌋,⌊_ _ _ _⌋,⌊_ _ _⌋	⊔
		⊔		⊔	1 2	2 3	1 2 3	⌊_ _ _⌋,⌊_ _ _ _⌋.⌊_ _ _⌋	⌊_ _ _⌋,⌊_ _ _ _⌋,⌊_ _⌋	⊔

				3 ➔C18 4 ➔C28				
	⎣⎦		⎣⎦	1 2 3 ➔C28 4 ➔C28	2 3	1 2 3	⎣⎦,⎣⎦,⎣⎦	⎣⎦,⎣⎦,⎣⎦	⎣⎦
	⎣⎦		⎣⎦	2 2 3 ➔C18 4 ➔C28	2 3	1 2 3	⎣⎦,⎣⎦,⎣⎦	⎣⎦,⎣⎦,⎣⎦	⎣⎦
	⎣⎦		⎣⎦	1 2 3 ➔C28 4 ➔C28	2 3	1 2 3	⎣⎦,⎣⎦,⎣⎦	⎣⎦,⎣⎦,⎣⎦	⎣⎦
	⎣⎦		⎣⎦	3 2 3 ➔C18 4 ➔C28	2 3	1 2 3	⎣⎦,⎣⎦,⎣⎦	⎣⎦,⎣⎦,⎣⎦	⎣⎦

Code for C22:

01.	Agriculture - tobacco	21.	Restaurant, food sale
02.	Agriculture – non-tobacco	22.	Industry: food
03.	Forestry, animal		processing/production
	husbandry, fishing, and hunting	23.	Industry: clothing
04.	Electricity, gas, water(utilities)	24.	Industry: other
05.	Mining and quarry	25.	Sale: non food
06.	Electricity, gas, water(utilities)	31.	Service : government
07.	Construction/building	32.	Service : teacher
08.	Transport, storage,	33.	Service : professional
	communications	34.	Service: Transportation
09.	Financial services, real estate,	35.	Service: other
	leasing, corporate services	95.	Other, specify

Code for C26.

01	Professional or technical worker
02	Management or administrative worker
03	Clerical personnel and the like
04	Sales personnel
05	Service personnel
06	Farm, forestry, game hunting, fishery worker;
07	Production line worker
08	Transportation vehicle operator;
09	Blue collar worker
95	Other, specify

CODES FOR C28c.

1	Hour
2	Day
3	Week
4	Months
5	Other

SECTION E. LAND (ALL Pieces/Plots/PARCELS)

Now, I would ask about the land that you may have cultivated in the past 12 months

E00. Did you or anyone in this household **cultivate or own** any land in the last 12 months? f	1. Yes 3. No ➔ **SECTION NON-LABOR INCOME**	
E01. Did you cultivate any tobacco in **2016?**	1. Yes➔ **E03** 3. No	
E02. When did you last cultivate tobacco?	Month_____ to Month _____ in year ⌐⊥⊥⊥⌐ ➔ **E04**	
E03. What were the months in **2016** when you most recently cultivate tobacco?	Month_____ to Month _____ **CAPI RECORD THESE MONTHS AS THE MOST RECENT TOBACCO FARMING SEASON**	
E04. How many **pieces/plots/**parcels that you own or cultivate **in the last 12 months**? **INTERVIEWER: MAKE SURE ALL PARCELS ARE ACCOUNTED FOR, NOT ONLY THOSE USED FOR TOBACCO**	⌐⊥⊥⊥⌐ parcels	

Please list all piece/plot/parcels owned or cultivated by anyone in your household during the last 12 months

E05	E06	E07	E09	E11	E12	E13	E14	E15
PARCEL ID	PARCEL NAME	PID of respondent	TOTAL AREA OF PARCEL (RESPONDENT'S ESTIMATE) KODES FOR UNIT: 1. ACRE 2. OTHER,_____	What is the ownership status of this parcel? 01. **Freehold/inherited/purchased ➔E13** 02. **Communal ➔ E13** 03. **Leasehold** 04. **Owned with title deed ➔ E13** 05. **Owned with allotment letter->E13** 06. **Settlement scheme by government->E13** 07.OTHER, SPECIFY➔ **E13**	In the last 12 months, how much rent did you pay for this parcel? CODES PERIOD: 1. SEASON 2. YEARLY 3. MONTHLY 4. WEEKLY 5. OTHER,_____	In the last 12 months, how was this piece/plot/parcel used? 1. CULTIVATED➔E15 2. PASTURE ↓ 3. FALLOW ↓ 4. FOREST ↓ 5. RENTED OUT 6. OTHER,____ ↓ **IF 2, 3, 4 OR 6: SKIP TO NEXT piece/plot/PARCEL ↓**	In the last 12 months, how much did your household receive from renting out this piece/plot/parcel? ESTIMATE THE VALUE OF IN-KIND RECEIPTS PERIODE CODE 1. WEEKLY 2. MOUNTHLY 3. YEARLY 5. OTHER,____ **SKIP TO NEXT PARCEL**	How much of the piece/plot/parcel was cleared and planted/cultivated during the most recent season **[CAPI: MONTHS FROM E03]**? CODES FOR UNIT 1. ACRE 2. OTHER,____
		⌐⊥⊥⌐⊥	⌐⊥⊥⌐.⌐⊥⊥⌐ 1 2 3 5___	01 02 ⌐⊥⊥⌐ 04 95 ➔ **E13** 03	⌐⊥⊥⌐.⌐⊥⊥⌐.⌐⊥⊥⌐ 1 2 3 4 5_____	02 03 04 06 ↓ 01➔**E15** 05	⌐⊥⊥⌐.⌐⊥⊥⌐.⌐⊥⊥⌐ 1 2 3 4 5_____	⌐⊥⊥⌐.⌐⊥⊥⌐ 1 2 3 5___

└┴┘ └┘	└┴┴┘.└┴┴┘ 1 2 3 5___	01 02 └┴┘ 04 95 → **E13** 03	└┴┴┘.└┴┴┴┘.└┴┴┘ └┘ 1 2 3 4 5_____	02 03 04 06 ↓ 01→**E15** 05	└┴┴┘.└┴┴┴┘.└┴┴┘ └┘ 1 2 3 4 5_____	└┴┴┘.└┴┴┘ 1 2 3 5___
└┴┘ └┘	└┴┴┘.└┴┴┘ 1 2 3 5___	01 02 └┴┘ 04 95 → **E13** 03	└┴┴┘.└┴┴┴┘.└┴┴┘ └┘ 1 2 3 4 5_____	02 03 04 06 ↓ 01→**E15** 05	└┴┴┘.└┴┴┴┘.└┴┴┘ └┘ 1 2 3 4 5_____	└┴┴┘.└┴┴┘ 1 2 3 5___
└┴┘ └┘	└┴┴┘.└┴┴┘ 1 2 3 5___	01 02 └┴┘ 04 95 → **E13** 03	└┴┴┘.└┴┴┴┘.└┴┴┘ └┘ 1 2 3 4 5_____	02 03 04 06 ↓ 01→**E15** 05	└┴┴┘.└┴┴┴┘.└┴┴┘ └┘ 1 2 3 4 5_____	└┴┴┘.└┴┴┘ 1 2 3 5___

05.	E06.	E16		E17	E18	E19	E20	E21	E22	E22	E23
PARCEL ID	CROP ID	Crop		During the last completed tobacco farming season **[CAPI: PRELOAD MONTHS FROM E03]**, was the area planted with [CROP] on this piece/plot/parcel pure stand (mono-crop) or mixed? 1. Pure stand →**E18** 2. Mixed 3. Mixed, border	Approx-imately how much of the piece/plot/parcel was planted with [CROP]?	At the time of planting, what was your planned use of the crop? 1. Only for sale/barter 2. Mainly for sale/barter, but some for own/family use 3. Mainly for own/family use, but some for sale/barter 4. Only for own/family use	What was the source of the seeds/seedlings used ON [CROP] the most recent season **[CAPI: MONTHS FROM E03]**?	What was the total cost (in **KSh/ MWK/ ZKW**)?	Did you harvest any [CROP] on this parcel during the last completed farming season? 1. Yes 3. No	What was the quantity of [CROP] harvested from this piece/plot/parcel during the last completed farming season? CODE FOR UNIT 1. Kilogram 2. Unit lain ____	
		NAME	CODE	CODE	%					QUANTITY	UNIT
1			└┘	1 →**E18** 2 3	└┴┴┘ ⌐%	1 2 3 4	└┴┘	└┴┴┘.└┴┴┴┘.└┴┴┘ └┘	1 3	└┴┘.└┴┴┴┘ ⌐	└┘
2			└┘	1 →**E18** 2 3	└┴┴┘ ⌐%	1 2 3 4	└┴┘	└┴┴┘.└┴┴┴┘.└┴┴┘ └┘	1 3	└┴┘.└┴┴┴┘ ⌐	└┘
3			└┘	1 →**E18** 2 3	└┴┴┘ ⌐%	1 2 3 4	└┴┘	└┴┴┘.└┴┴┴┘.└┴┴┘ └┘	1 3	└┴┘.└┴┴┴┘ ⌐	└┘

4			⎍	1 →E18 2 3	�__⎍ ⎤%	1 2 3 4	⎍	⎍⎍.⎍⎍⎍.⎍⎍ ⎤	1 3	⎍.⎍⎍⎍ ⎤	⎍
5			⎍	1 →E18 2 3	⎍_⎍ ⎤%	1 2 3 4	⎍	⎍⎍.⎍⎍⎍.⎍⎍ ⎤	1 3	⎍.⎍⎍⎍ ⎤	⎍

<table>
<tr><td colspan="4">CODES FOR E14</td></tr>
<tr><td>A.</td><td>Tobacco</td><td>F.</td><td>Cassava</td></tr>
<tr><td>B.</td><td>Maize</td><td>G.</td><td>Pigeonpeas</td></tr>
<tr><td>C.</td><td>Groundnut</td><td>H.</td><td>Beans</td></tr>
<tr><td>D.</td><td>Soybean</td><td>I.</td><td>Others, specify _____</td></tr>
<tr><td>E.</td><td>Sweetpotato</td><td></td><td></td></tr>
</table>

<table>
<tr><td colspan="2">CODES FOR E17</td></tr>
<tr><td>A.</td><td>Marketing/Contract partner</td></tr>
<tr><td>B.</td><td>Retailer/distribution</td></tr>
<tr><td>C.</td><td>Farmer union or cooperative</td></tr>
<tr><td>D.</td><td>Government</td></tr>
<tr><td>V.</td><td>Other, specify</td></tr>
</table>

E05	E06	E24	
PARCEL ID	CROP ID	Has the whole crops been harvested?	sold
1		1. Yes➔ **E26** 3. No	
2		1. Yes➔ **E26** 3. No	
3		1. Yes➔ **E26** 3. No	
4		1. Yes➔ **E26** 3. No	
5		1. Yes➔ **E26** 3. No	

SECTION F. TOBACCO CROPS - SALES

CAPI CHECK RESPONDENT IS CURRENT TOBACCO FARMER (COV5=1):   1. YES   3. NO ➔ SKIP TO SECTION J

INTERVIEWER: FOR EACH TOBBACO TYPE, USE EACH ROW TO RECORD SALES OF TOBACCO OF A SINGLE GRADE TO A SINGLE BUYER. USE THE NEXT ROW TO RECORD SALES OF TOBACCO OF A DIFFERENT GRADE TO THE SAME BUYER, IF APPLICABLE. AFTER ALL GRADES SOLD TO THE FIRST BUYER HAVE BEEN RECORDED, ASK THE SALES OF TOBACCO TTYPES O THE NEXT BUYER, IF APPLICABLE.

F01. Type of tobacco (local names)	F02. Variety of tobacco INTERVIEWER: SHOW PICTURES OF TOBACCO VARIETY, ASK RESPONDENT TO POINT WHICH ONE IS CLOSEST TO THE ONE REPORTED IN F01	F03. NAME OF BUYER	F04. TYPE OF BUYER	F05. Quantity Sold (Kg)	F06. Sold in what kind? 1. Wet leaves 2. Sliced dried-leaves 3. Oven dried-leaves (*krosok*) 4. Sun dried-leaves	F07. Grade	F08. price/Kg (Ksh/MWK/ZKW)	F09. Total Rp received (DO NOT CALCULATE FROM F05 AND F08)
_____	└─┘		└─┘	└┴┴┴┘ └┴┴┘	1 2 3 4	└─┘	└┴┴┘.└┴┴┴┘.└┴┴┘	└┴┴┘.└┴┴┴┘.└┴┴┘
_____	└─┘		└─┘	└┴┴┴┘ └┴┴┘	1 2 3 4	└─┘	└┴┴┘.└┴┴┴┘.└┴┴┘	└┴┴┘.└┴┴┴┘.└┴┴┘
_____	└─┘		└─┘	└┴┴┴┘ └┴┴┘	1 2 3 4	└─┘	└┴┴┘.└┴┴┴┘.└┴┴┘	└┴┴┘.└┴┴┴┘.└┴┴┘
_____	└─┘		└─┘	└┴┴┴┘ └┴┴┘	1 2 3 4	└─┘	└┴┴┘.└┴┴┴┘.└┴┴┘	└┴┴┘.└┴┴┴┘.└┴┴┘
_____	└─┘		└─┘	└┴┴┴┘ └┴┴┘	1 2 3 4	└─┘	└┴┴┘.└┴┴┴┘.└┴┴┘	└┴┴┘.└┴┴┴┘.└┴┴┘
_____	└─┘		└─┘	└┴┴┴┘ └┴┴┘	1 2 3 4	└─┘	└┴┴┘.└┴┴┴┘.└┴┴┘	└┴┴┘.└┴┴┴┘.└┴┴┘
_____	└─┘		└─┘	└┴┴┴┘ └┴┴┘	1 2 3 4	└─┘	└┴┴┘.└┴┴┴┘.└┴┴┘	└┴┴┘.└┴┴┴┘.└┴┴┘
				└┴┴┴┘ └┴┴┘	1 2 3 4		└┴┴┘.└┴┴┴┘.└┴┴┘	└┴┴┘.└┴┴┴┘.└┴┴┘

_____	⊔		⊔				⊔		
_____	⊔		⊔	└⊥⊥⊥┘ └⊥⊥┘	1 2 3 4		⊔	└⊥⊥┘.└⊥⊥⊥┘.└⊥⊥┘	└⊥⊥┘.└⊥⊥⊥┘.└⊥⊥┘

CODES FOR F02	CODES FOR F04	
01. Virginia	01. Individual middleman/collector	05. Cigarette company warehouse
02. Burley	02 Other famers	06. Cigarette company
03. **Northern Division Dark Fired (NDDF)**	03. Contract representative	95. Other, specify
04. **Sun/Air cured**		
05. **Southern Division Fire-Dured (SDF),**		
06. Other, specify _____	04. Company collector	I. Coconut

SECTION G. TOBACCO CROPS - INPUTS

I would like to ask you about inputs used on your tobacco crops

G00	G01.	G02.	G03.	G04	G05
FIRST ASK Q1 FOR ALL ITEMS BEFORE MOVING ON TO FOLLOW-UP QUESTIONS	Did you use this input on your tobacco crops?	What is the source? (CODES BELOW)	What quantity did you use?	Do you know the price paid for […]?	What was the total cost (in Ksh/MWK/ZKW) of the amounts used?
a. Seed	3. No ↓ 1. Yes	A B C D V_____	∟_∟_∟ Kg	1. Yes 3. No → **G06**	Rp. ∟_∟_∟.∟_∟_∟.∟_∟_∟
b. Water Cans	3. No ↓ 1. Yes	A B C D V_____	∟_∟_∟ Kg	1. Yes 3. No → **G06**	Rp. ∟_∟_∟.∟_∟_∟.∟_∟_∟
c. Pesticides (chemicals)	3. No ↓ 1. Yes	A B C D V_____		1. Yes 3. No → **G06**	Rp. ∟_∟_∟.∟_∟_∟.∟_∟_∟
d. Herbicides	3. No ↓ 1. Yes	A B C D V_____		1. Yes 3. No → **G06**	Rp. ∟_∟_∟.∟_∟_∟.∟_∟_∟
e. Hoes	3. No ↓ 1. Yes	A B C D V_____		1. Yes 3. No → **G06**	Rp. ∟_∟_∟.∟_∟_∟.∟_∟_∟
f. Fertilizer	3. No ↓ 1. Yes	A B C D V_____		1. Yes 3. No → **G06**	Rp. ∟_∟_∟.∟_∟_∟.∟_∟_∟
g. Hessian Sacs	3. No ↓ 1. Yes	A B C D V_____			
h. Shedding Material (Grass, poles, etc.)	3. No ↓ 1. Yes	A B C D V_____			
i. Plastic Material	3. No ↓ 1. Yes	A B C D V_____			
j. Flue Curing wood	3. No ↓ 1. Yes	A B C D V_____		1. Yes 3. No → **G06**	Rp. ∟_∟_∟.∟_∟_∟.∟_∟_∟
n. Others, Specify _____	3. No ↓ 1. Yes	A B C D V_____			
v. Others, Specify _____	3. No ↓ 1. Yes	A B C D V_____		1. Yes 3. No → **G06**	Rp. ∟_∟_∟.∟_∟_∟.∟_∟_∟

CODES FOR G02
A. Marketing/Contract partner
B. Retailer/distribution
C. Farmer association or cooperative
D. Government
V. Other, specify

INPUT ITEM	G06 CAPI CHECK G02=A (ANY INPUT FROM PARTNER) **1. YES** **3. NO** ↓	G07 Did you pay more, less, or the same as market price? **1. Less** **2. The same** **3. More** **6. NA G04=3**	G08 Was the quantity provided enough? **1. Yes** **3. No**	G09 Was it provided in a timely manner? **1. Yes** **3. No**	G10 Did you use any of this input for non-tobacco crops? **1. Yes** **3. No → G12**	G11 How much was this input use for non-tobacco crops? [QUANTITY & UNIT]	G12 Did you sell some of the input provided? **1. Yes** **3. No** ↓	G13 How much did you sell?	G14 How much did you sell it for? [Ksh/MWK/ZKW]
a. Seed	3 ↓ 1	1 2 3 6	1 3	1 3	1 3 → G12	└┴┴┘ ___Unit	3 ↓ 1	└┴┴┘ ___Unit	└┴┴┴┘.└┴┴┘
b. Water Cans	3 ↓ 1	1 2 3 6	1 3	1 3	1 3 → G12	└┴┴┘ ___Unit	3 ↓ 1	└┴┴┘ ___Unit	└┴┴┴┘.└┴┴┘
c. Pesticides (chemicals)	3 ↓ 1	1 2 3 6	1 3	1 3	1 3 → G12		3 ↓ 1	└┴┴┘ ___Unit	└┴┴┴┘.└┴┴┘
d. Herbicides	3 ↓ 1	1 2 3 6	1 3	1 3	1 3 → G12		3 ↓ 1	└┴┴┘ ___Unit	└┴┴┴┘.└┴┴┘
e. Hoes	3 ↓ 1	1 2 3 6	1 3	1 3	1 3 → G12		3 ↓ 1	└┴┴┘ ___Unit	└┴┴┴┘.└┴┴┘
f. Fertilizer	3 ↓ 1	1 2 3 6	1 3	1 3	1 3 → G12		3 ↓ 1	└┴┴┘ ___Unit	└┴┴┴┘.└┴┴┘
g. Hessian Sacs	3 ↓ 1	1 2 3 6	1 3	1 3	1 3 → G12				
h. Shedding Material	3 ↓ 1	1 2 3 6	1 3	1 3	1 3 → G12				
i. Plastic Material	3 ↓ 1	1 2 3 6	1 3	1 3	1 3 → G12				
j. Flue Curing wood	3 ↓ 1	1 2 3 6	1 3	1 3	1 3 → G12		3 ↓ 1	└┴┴┘ ___Unit	└┴┴┴┘.└┴┴┘
k. Others, Specify _____	3 ↓ 1	1 2 3 6	1 3	1 3	1 3 → G12		3 ↓ 1	└┴┴┘ ___Unit	└┴┴┴┘.└┴┴┘

1. Others, Specify _____	3 ↓	1	1 2 3 6		1 3					

G15.	CAPI CHECK: IF ANY OF THE TOBACCO INPUTS SOURCE=A, **[G06=1] and not know the price of each item** ASK THE FOLLOW UP QUESTIONS:	1. YES 3. NO ➜ **SECTION H**
G16.	You listed some items as being provided by contract company, but for which you did not know the individual price. What was the total cost of this package / production loan provided by the contract company?	1. Rp ⎣_⎦_⎦ . ⎣_⎦_⎦_⎦ . ⎣_⎦_⎦_⎦ 2. ⎣_⎦_⎦ . ⎣_⎦_⎦_⎦ Kg
G17.	Do you still owe any money/balance from a previous year's contract/ production loan? Yes/No if so, amount	1. Yes, Rp ⎣_⎦_⎦ . ⎣_⎦_⎦_⎦ . ⎣_⎦_⎦_⎦ 3. No

HA. TOBACCO CROPS – HOUSEHOLD LABOR INPUTS

We are also interested to know about the labor used in tobacco production in the **recent season [CAPI PRELOADS MONTHS FROM E03].** This includes post-harvest activities like curing, drying, selling/marketing of the tobacco products.

PID (HH Member ID)	H00. (CAPI PRELOAD NAMES AND PID LISTED IN COLUMN C10)	H01. Did [NAME] participate in **tobacco farming** activities during this season? 1. Yes 3. No	H02a. Nursery preparation 1. Yes 3. No	H02b. Sowing – nursery 1. Yes 3. No	H02c. Fertilizer application – nursery 1. Yes 3. No	H02d. Chemical application – nursery 1. Yes 3. No	H02e. Watering of nursery 1. Yes 3. No	H02f. Land preparation 1. Yes 3. No	H02g. Planting 1. Yes 3. No	H02h. Chemical application 1. Yes 3. No	H02i. Fertilizer application1 1. Yes 3. No	H02j. Weeding 1. Yes 3. No	H02k. Drying shed preparation 1. Yes 3. No	H02l. Fertilizer application 2 1. Yes 3. No
															H02. Which *tobacco farming* activities did [NAME] participate in?
1		3 ☐ 1	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3
2		3 ☐ 1	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3
3		3 ☐ 1	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3
4		3 ☐ 1	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3
5		3 ☐ 1	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3
6		3 ☐ 1	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3
7		3 ☐ 1	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3
8		3 ☐ 1	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3
9		3 ☐ 1	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3

| 10 | | 3 ☐ | 1 | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 3 |

Which tobacco farming activities did [NAME] participate in? (continue)							How much time did [NAME] spend on all of these tobacco farming activities?				
H02m. Banding 1. Yes 3. No	H02n. Chemical application 1. Yes 3. No	H02o. Harvesting 1. Yes 3. No	H02p. Drying/curing 1. Yes 3. No	H02q. Grading 1. Yes 3. No	H02r. Baling/Packaging 1. Yes 3. No	H02s. Other, specify_____ 1. Yes 3. No	Number of months on all tobacco activities [Months]	Average Days per month [Days]	Average hours per day [Hours]	For children <15 years, do they work in morning or afternoon ? 1. Morning 2. Afternoon CAPI CHECK:	*PID of person answering the questions*
1　3	1　3	1　3	1　3	1 3	1　3	1　3	└─┴─┘	└─┴─┘	└─┴─┘	1　2	└─┴─┘
1　3	1　3	1　3	1　3	1 3	1　3	1　3	└─┴─┘	└─┴─┘	└─┴─┘	1　2	└─┴─┘
1　3	1　3	1　3	1　3	1 3	1　3	1　3	└─┴─┘	└─┴─┘	└─┴─┘	1　2	└─┴─┘
1　3	1　3	1　3	1　3	1 3	1　3	1　3	└─┴─┘	└─┴─┘	└─┴─┘	1　2	└─┴─┘
1　3	1　3	1　3	1　3	1 3	1　3	1　3	└─┴─┘	└─┴─┘	└─┴─┘	1　2	└─┴─┘
1　3	1　3	1　3	1　3	1 3	1　3	1　3	└─┴─┘	└─┴─┘	└─┴─┘	1　2	└─┴─┘
1　3	1　3	1　3	1　3	1 3	1　3	1　3	└─┴─┘	└─┴─┘	└─┴─┘	1　2	└─┴─┘

1 3	1 3	1 3	1 3	1 3	1 3	1 3	└─┴─┘	└─┴─┘	└─┴─┘	1 2	└─┴─┘
1 3	1 3	1 3	1 3	1 3	1 3	1 3	└─┴─┘	└─┴─┘	└─┴─┘	1 2	└─┴─┘
1 3	1 3	1 3	1 3	1 3	1 3	1 3	└─┴─┘	└─┴─┘	└─┴─┘	1 2	└─┴─┘

HB. TOBACCO CROPS – NEIGHBOUR LABOR INPUTS

We are also interested to know about the labor used in tobacco production in the **recent season [CAPI PRELOADS MONTHS FROM E03].** This includes post-harvest activities like curing, drying, selling/marketing of the tobacco products.

Number	H00.	H01.	H02.												
			Which *tobacco farming* activities did [NAME] participate in?												
	(**CAPI PRELOAD NAMES AND PID LISTED IN COLUMN C10**)	Did [NAME] participate in **tobacco farming** activities during this season?	H02a. Nursery preparation	H02b. Sowing – nursery	H02c. Fertilizer application – nursery	H02d. Chemical application – nursery	H02e. Watering of nursery	H02f. Land preparation	H02g. Planting	H02h. Chemical application	H02i. Fertilizer application1	H02j. Weeding	H02k. Drying shed preparation	H02l. Fertilizer application 2	
		1. Yes 3. No	1. Yes 3. No	1. Yes 3. No	1. Yes 3. No	1. Yes 3. No	1. Yes 3. No	1. Yes 3. No	1. Yes 3. No	1. Yes 3. No	1. Yes 3. No	1. Yes 3. No	1. Yes 3. No	1. Yes 3. No	

Adults		3 □ 1	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3
Children		3 □ 1	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3

Which tobacco farming activities did [NAME] participate in? (continue)							How much time did [NAME] spend on all of these tobacco farming activities?				
H02m. Banding 1. Yes 3. No	H02n. Chemical application 1. Yes 3. No	H02o. Harvesting 1. Yes 3. No	H02p. Drying/curing 1. Yes 3. No	H02q. Grading 1. Yes 3. No	H02r. Baling/Packaging 1. Yes 3. No	H02s. Other, specify_____ 1. Yes 3. No	Number of months on all tobacco activities [Mounths]	Average Days per month [Days]	Average hours per day [Hours]	For children <15 years, do they work in morning or afternoon ? 1. Morning 2. Afternoon CAPI CHECK:	*PID of person answering the questions*
1 3	1 3	1 3	1 3	1 3	1 3	1 3	└─┴─┘	└─┴─┘	└─┴─┘	1 2	└─┴─┘
1 3	1 3	1 3	1 3	1 3	1 3	1 3	└─┴─┘	└─┴─┘	└─┴─┘	1 2	└─┴─┘
1 3	1 3	1 3	1 3	1 3	1 3	1 3	└─┴─┘	└─┴─┘	└─┴─┘	1 2	└─┴─┘
1 3	1 3	1 3	1 3	1 3	1 3	1 3	└─┴─┘	└─┴─┘	└─┴─┘	1 2	└─┴─┘
1 3	1 3	1 3	1 3	1 3	1 3	1 3	└─┴─┘	└─┴─┘	└─┴─┘	1 2	└─┴─┘
1 3	1 3	1 3	1 3	1 3	1 3	1 3	└─┴─┘	└─┴─┘	└─┴─┘	1 2	└─┴─┘

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				1 3						1 2	
1 3	1 3	1 3	1 3	1 3	1 3	1 3	⌞⌞⌟	⌞⌞⌟	⌞⌞⌟	1 2	⌞⌞⌟
1 3	1 3	1 3	1 3	1 3	1 3	1 3	⌞⌞⌟	⌞⌞⌟	⌞⌞⌟	1 2	⌞⌞⌟
1 3	1 3	1 3	1 3	1 3	1 3	1 3	⌞⌞⌟	⌞⌞⌟	⌞⌞⌟	1 2	⌞⌞⌟
1 3	1 3	1 3	1 3	1 3	1 3	1 3	⌞⌞⌟	⌞⌞⌟	⌞⌞⌟	1 2	⌞⌞⌟

HC. TOBACCO CROPS – HOUSEHOLD LABOR INPUTS TO NEIGHBOR'S FARM (S)

We are also interested to know about the labor used in tobacco production in the **recent season [CAPI PRELOADS MONTHS FROM E03].** This includes post-harvest activities like curing, drying, selling/marketing of the tobacco products.

Number	H00.	H01.	H02.												
			Which *tobacco farming* activities did [NAME] participate in?												
	(**CAPI PRELOAD NAMES AND PID LISTED IN COLUMN C10**)	Did [NAME] participate in **tobacco farming** activities during this season?	H02a. Nursery preparation	H02b. Sowing – nursery	H02c. Fertilizer application – nursery	H02d. Chemical application – nursery	H02e. Watering of nursery	H02f. Land preparation	H02g. Planting	H02h. Chemical application	H02i. Fertilizer application1	H02j. Weeding	H02k. Drying shed preparation	H02l. Fertilizer application 2
		1. Yes 3. No	1. Yes 3. No	1. Yes 3. No	1. Yes 3. No	1. Yes 3. No	1. Yes 3. No	1. Yes 3. No	1. Yes 3. No	1. Yes 3. No	1. Yes 3. No	1. Yes 3. No	1. Yes 3. No	1. Yes 3. No
Adults		3 ☐ 1	1　3	1　3	1　3	1　3	1　3	1　3	1　3	1　3	1　3	1　3	1　3	1　3
Children		3 ☐ 1	1　3	1　3	1　3	1　3	1　3	1　3	1　3	1　3	1　3	1　3	1　3	1　3

Which tobacco farming activities did [NAME] participate in? (continue)							How much time did [NAME] spend on all of these tobacco farming activities?				*PID of person answering the questions*
H02m. Banding 1. Yes 3. No	H02n. Chemical application 1. Yes 3. No	H02o. Harvesting 1. Yes 3. No	H02p. Drying/curing 1. Yes 3. No	H02q. Grading 1. Yes 3. No	H02r. Baling/Packaging 1. Yes 3. No	H02s. Other, specify_____ 1. Yes 3. No	Number of months on all tobacco activities [Months]	Average Days per month [Days]	Average hours per day [Hours]	For children <15 years, do they work in morning or afternoon ? 1. Morning 2. Afternoon CAPI CHECK:	
1 3	1 3	1 3	1 3	1 3	1 3	1 3	└─┴─┘	└─┴─┘	└─┴─┘	1 2	└─┴─┘
1 3	1 3	1 3	1 3	1 3	1 3	1 3	└─┴─┘	└─┴─┘	└─┴─┘	1 2	└─┴─┘
1 3	1 3	1 3	1 3	1 3	1 3	1 3	└─┴─┘	└─┴─┘	└─┴─┘	1 2	└─┴─┘
1 3	1 3	1 3	1 3	1 3	1 3	1 3	└─┴─┘	└─┴─┘	└─┴─┘	1 2	└─┴─┘
1 3	1 3	1 3	1 3	1 3	1 3	1 3	└─┴─┘	└─┴─┘	└─┴─┘	1 2	└─┴─┘
1 3	1 3	1 3	1 3	1 3	1 3	1 3	└─┴─┘	└─┴─┘	└─┴─┘	1 2	└─┴─┘
1 3	1 3	1 3	1 3	1 3	1 3	1 3	└─┴─┘	└─┴─┘	└─┴─┘	1 2	└─┴─┘
1 3	1 3	1 3	1 3	1 3	1 3	1 3	└─┴─┘	└─┴─┘	└─┴─┘	1 2	└─┴─┘

1	3	1	3	1	3	1	3	1 3	1	3	1	3	⌞⌟	⌞⌟	⌞⌟	1	2	⌞⌟
1	3	1	3	1	3	1	3	1 3	1	3	1	3	⌞⌟	⌞⌟	⌞⌟	1	2	⌞⌟

I. TOBACCO CROPS – HIRED LABOR INPUTS

I01	Did your household hire laborers / other people to assist you with **tobacco farming and production** during **the 2016 tobacco farming season [CAPI: MONTHS FROM E03]**	1. Yes 3. No ➔ **SECTION J**

	HIRED LABOR TYPE	I02
		How many people did you hire for tobacco-related activities? CAPI: IF I02 FOR AN ACTIVITY=0, SKIP I03 FOR THE CORRESPONDING ACTIVITY

	HIRED LABOR TYPE	I02a. Nursery preparation	I02b. Sowing – nursery	I02c. Fertilizer application – nursery	I02d. Chemical application – nursery	I02e. Watering of nursery	I02f. Land preparation	I02g. Planting	I02h. Chemical application	I02i. Fertilizer application1	I02j. Weeding	I02k. Drying shed preparation	I02l. Fertilizer application 2	I02m. Banding	I02n. Chemical application	I02o. Harvesting	I02p. Drying/curing	I02q. Grading	I02r. Baling/Packaging	I02s. Other, specify____
a.	Adult – Male	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔⊔	⊔⊔⊔
b.	Adult – Female	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔⊔	⊔⊔⊔
c.	Child (<18 yr old)	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔	⊔⊔⊔	⊔⊔⊔

	HIRED LABOR TYPE	I03																			I04
		On average, **how many days** did these laborers work?																			What was the **average daily wage** for these laborers? [Ksh/MWK/ZKW]
		I03a. Nursery preparation	I03b. Sowing – nursery	I03c. Fertilizer application – nursery	I03d. Chemical application – nursery	I03e. Watering of nursery	I03f. Land preparation	I03g. Planting	I03h. Chemical application	I03i. Fertilizer application1	I03j. Weeding	I03k. Drying shed preparation	I03l. Fertilizer application 2	I03m. Banding	I03n. Chemical application	I03o. Harvesting	I03p. Drying/curing	I03q. Grading	I03r. Baling/Packaging	I03s. Other, specify_____	
a.	Adult – Male	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┴─┘	└─┴─┘	└─┴─┴─┴─┘.└─┴─┘
b.	Adult – Female	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┴─┘	└─┴─┘	└─┴─┴─┴─┘.└─┴─┘
c.	Child (<18 yr old)	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┘	└─┴─┴─┘	└─┴─┘	└─┴─┴─┴─┘.└─┴─┘

I05.	(CAPI CHECK IF I02c > 0)	1. Yes
		3. No ➔ **SECTION J**
I06.	May we know when these children usually helped with farming?	
a.	Morning	1. Yes 3. No
c.	Afternoon	1. Yes 3. No

NOTE FOR INTERVIEWER: THIS IS THE END OF QUESTIONS ON TOBACCO FROM THE MOST RECENT TOBACCO SEASON.

INTERVIEWER READ:

"WE WILL NOW ASK YOU SOME QUESTIONS ABOUT <u>THE NON-TOBACCO CROPS</u> THAT YOU CULTIVATED DURING THE MOST RECENT TOBACCO SEASON, THAT IS, THE CRIPS YOU CULTIVATED BETWEEN THE MONTHS OF [CAPI: MONTHS FROM E03]"

J. NON-TOBACCO CROPS – DISPOSITION – RECENT FARMING SEASONS

J00.	Did you plant any non-tobacco crop during the most recent tobacco farming season, that is the months of **[CAPI: PRELOAD MONTHS FROM E03]**	1. Yes 3. No ➔ **SECTION N**

J01.	J02.		J03.	J04.	J07.		J08.
CROP ID	**CROP**		Did you sell any of the [CROP] 1. Yes 3. No➔**J09**	Who in this household makes decision on what to do with the proceeds? (up to 2 PIDs)	How much of the harvested [CROP] was sold in total during the months of **[CAPI PRELOADS MONTHS FROM E03]**		What was the total value of all [CROP] sales? ESTIMATE THE VALE OF IN-KIND PAYMENTS
	NAME	CODE			J05a. Quantity	J05b. Unit	
		└─┘	1 3➔**J09**	└─┘ └─┘	└─┴─┴─┘	└─┘	└─┴─┴─┘.└─┴─┘
		└─┘	1 3➔**J09**	└─┘ └─┘	└─┴─┴─┘	└─┘	└─┴─┴─┘.└─┴─┘
		└─┘	1 3➔**J09**	└─┘ └─┘	└─┴─┴─┘	└─┘	└─┴─┴─┘.└─┴─┘
		└─┘	1 3➔**J09**	└─┘ └─┘	└─┴─┴─┘	└─┘	└─┴─┴─┘.└─┴─┘
		└─┘	1 3➔**J09**	└─┘ └─┘	└─┴─┴─┘	└─┘	└─┴─┴─┘.└─┴─┘

CODES FOR J02				CODES FOR J05b, J07b, J07d, J7f	
A.	Maize	F.	Pigeon peas	1.	Kilograms
B.	Groundnut	G.	Potato	2.	25 kg bags
C.	Soybean	H.	Green vegetables	5.	Other, specify
D.	Sweet potato	I.	Banana		
E.	Cassava	J.	Others, Specify		

J01.	J02.		J09.						J010.
CROP ID	**CROP**		How much of the [CROP] harvested during the months of **[CAPI PRELOADS MONTHS FROM E03]** was (or Will be used for):						Who in the household makes decision on what to do with the harvest? (up to 2 PIDs)
			Household Consumption		**Loss (rotting, insects, theft)**		**In-kind wages, payments**		
	NAME	CODE	**J07a. Quantity**	**J07b. Unit**	**J07c. Quantity**	**J07d. Unit**	**J07e. Quantity**	**J07f. Unit**	
		⎵	⎵_⎵_⎵	⎵	⎵_⎵_⎵	⎵	⎵_⎵_⎵	⎵	⎵ ⎵
		⎵	⎵_⎵_⎵	⎵	⎵_⎵_⎵	⎵	⎵_⎵_⎵	⎵	⎵ ⎵
		⎵	⎵_⎵_⎵	⎵	⎵_⎵_⎵	⎵	⎵_⎵_⎵	⎵	⎵ ⎵
		⎵	⎵_⎵_⎵	⎵	⎵_⎵_⎵	⎵	⎵_⎵_⎵	⎵	⎵ ⎵
		⎵	⎵_⎵_⎵	⎵	⎵_⎵_⎵	⎵	⎵_⎵_⎵	⎵	⎵ ⎵

K. NON-TOBACCO CROPS – INPUTS – RECENT FARMING SEASON

Now I would like to ask you about the inputs used on all of your non-tobacco crops.

	Input Item FIRST ASK NT01 FOR ALL ITEMS BEFORE MOVING ON TO FOLLOW-UP QUESTIONS	K01. Did you use this input on your non-tobacco crops? **1. Yes** **3. No ↓**	K02. Was any of this surplus from the tobacco inputs, as previously indicated? 1. Yes, all 2. Ya, some 3. No, none	K03. What additional quantity did you use? REPORT ONLY QUANTITY BEYOND WHAT WAS REPORTED FROM TOBACCO QUANTITY	UNIT	K04. What was the total cost (in Ksh/MWK/ZKW) of this additional amounts used? ESTIMATE VALUE IF PROVIDED IN-KIND
a.	Fertilizer non-organic	3 ↓ 1	1 ↓ 2 3	⌊_⌊_⌊_⌋	⌊__⌋	⌊_⌊_⌊_⌋.⌊_⌊_⌊_⌋.⌊_⌊_⌊_⌋
b.	Fertilizer organic	3 ↓ 1	1 ↓ 2 3	⌊_⌊_⌊_⌋	⌊__⌋	⌊_⌊_⌊_⌋.⌊_⌊_⌊_⌋.⌊_⌊_⌊_⌋
c.	Pesticides (chemicals)	3 ↓ 1	1 ↓ 2 3			⌊_⌊_⌊_⌋.⌊_⌊_⌊_⌋.⌊_⌊_⌊_⌋
d.	Gasoline for tobacco farming equipment	3 ↓ 1	1 ↓ 2 3			⌊_⌊_⌊_⌋.⌊_⌊_⌊_⌋.⌊_⌊_⌊_⌋
e.	Oil	3 ↓ 1	1 ↓ 2 3			⌊_⌊_⌊_⌋.⌊_⌊_⌊_⌋.⌊_⌊_⌊_⌋
f.	Firewood/Fuel wood	3 ↓ 1	1 ↓ 2 3			⌊_⌊_⌊_⌋.⌊_⌊_⌊_⌋.⌊_⌊_⌊_⌋
g.	Bamboo, bamboo sticks rice hay, descuke-ride	3 ↓ 1	1 ↓ 2 3			
h.	Knapsack Sprayer	3 ↓ 1	1 ↓ 2 3			
i.	Drums	3 ↓ 1	1 ↓ 2 3			
j.	Sprinkler	3 ↓ 1	1 ↓ 2 3			⌊_⌊_⌊_⌋.⌊_⌊_⌊_⌋.⌊_⌊_⌊_⌋
k.	Rental of equipment/livestock	3 ↓ 1	1 ↓ 2 3			⌊_⌊_⌊_⌋.⌊_⌊_⌊_⌋.⌊_⌊_⌊_⌋
l.	Transportation (to market)	3 ↓ 1	1 ↓ 2 3			
m.	Water pump	3 ↓ 1	1 ↓ 2 3			

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n.	Mattock, sickle	3 ↓ 1	1 ↓ 2 3			
v.	Others, Specify _____	3 ↓ 1	1 ↓ 2 3			. ⌊_⌊_⌊_⌋ . ⌊_⌊_⌊_⌋ . ⌊_⌊_⌊_⌋

L. NON-TOBACCO CROPS - HOUSEHOLD LABOR INPUTS RECENT FARMING SEASON

We are also interested to know about the labor used in farming other non-tobacco crops recent farming season **[CAPI: MONTHS FROM E03].** This includes post-harvest activities like curing, drying, selling/marketing of the crops.

PID	L00.	L01.	L02.							L03.	L04.	L05.	L06.	L07.	L08
		Did [NAME] participate in **non-tobacco farming** activities during this most recent farming season?	Which ***non-tobacco farming*** activities did [NAME] participate in?							How much time did [NAME] spend on all of these tobacco farming activities?			**CAPI CHECK A06 (AGE) <15?** **1. YES** **3. NO↓**	Do they work in morning or afternoon?	Who provided the information for this household member?
	(**CAPI PRELOAD NAMES AND PID LISTED IN COLUMN C11**)		L02a. Nursery	L02b. Land Preparation & Trans-planting	L02c. Field tending	L02d. Harvest	L02e. Post-harvest (incl. curing)	L02f. Selling & marketing	Number of months on all tobacco activities	Average Days per month	Average hours per day		1. Morning 2. Afternoon	(PID)
HH Member ID		1. Yes 3. No ↓	1. Yes 3. No	1. Yes 3. No	1. Yes 3. No	1. Yes 3. No	1. Yes 3. No	1. Yes 3. No	[Months]	[Days]	[Hours]			
01		3 ↓ 1	1 3	1 3	1 3	1 3	1 3	1 3	⌞⌞⌟	⌞⌞⌟	⌞⌞⌟	3 ↓ 1	1 2	⌞⌞⌟
02		3 ↓ 1	1 3	1 3	1 3	1 3	1 3	1 3	⌞⌞⌟	⌞⌞⌟	⌞⌞⌟	3 ↓ 1	1 2	⌞⌞⌟
03		3 ↓ 1	1 3	1 3	1 3	1 3	1 3	1 3	⌞⌞⌟	⌞⌞⌟	⌞⌞⌟	3 ↓ 1	1 2	⌞⌞⌟
04		3 ↓ 1	1 3	1 3	1 3	1 3	1 3	1 3	⌞⌞⌟	⌞⌞⌟	⌞⌞⌟	3 ↓ 1	1 2	⌞⌞⌟
05		3 ↓ 1	1 3	1 3	1 3	1 3	1 3	1 3	⌞⌞⌟	⌞⌞⌟	⌞⌞⌟	3 ↓ 1	1 2	⌞⌞⌟
06		3 ↓ 1	1 3	1 3	1 3	1 3	1 3	1 3	⌞⌞⌟	⌞⌞⌟	⌞⌞⌟	3 ↓ 1	1 2	⌞⌞⌟
07		3 ↓ 1	1 3	1 3	1 3	1 3	1 3	1 3	⌞⌞⌟	⌞⌞⌟	⌞⌞⌟	3 ↓ 1	1 2	⌞⌞⌟
08		3 ↓ 1	1 3	1 3	1 3	1 3	1 3	1 3	⌞⌞⌟	⌞⌞⌟	⌞⌞⌟	3 ↓ 1	1 2	⌞⌞⌟

| 09 | | 3 ↓ | 1 | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 3 | └─┴─┘ | └─┴─┘ | └─┴─┘ | 3 ↓ | 1 | 1 | 2 | └─┴─┘ |
| 10 | | 2 | 3 ↓ | 1 | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 3 | └─┴─┘ | └─┴─┘ | └─┴─┘ | 3 ↓ | 1 | 1 | 2 | └─┴─┘ |

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M. NON-TOBACCO CROPS – HIRED LABOR INPUTS - RECENT FARMING SEASON

M01	Did your household hire laborers / other people to assist you with **non-tobacco farming and production** during **the 2016 tobacco farming season [CAPI: MONTHS FROM E03]**	1. Yes 3. No ➜ **SECTION N**

		M02						M03						M04
	HIRED LABOR TYPE	**How many people** did you hire for tobacco-related activities? **CAPI: IF M02 FOR AN ACTIVITY=0, SKIP M03 FOR THE CORRESPONDING ACTIVITY**						On average, **how many days** did these laborers work?						What was the **average daily wage** for these laborers? (Ksh/MWK/ZKW)
		M02a. Nursery	M02b. Land Preparation & Trans-planting	M02c. Field tending	M02d. Harvest	M02e. Post-harvest (incl. curing)	M02f. Selling & marketing	M03a. Nursery	M03b. Land Preparation & Trans-planting	M03c. Field tending	M03d. Harvest	M03e. Post-harvest (incl. curing)	M03f. Selling & marketing	
a.	Adult – Male	⌊_|_|_⌋	⌊_|_|_⌋	⌊_|_|_⌋	⌊_|_|_⌋	⌊_|_|_⌋	⌊_|_|_⌋	⌊_|_|_⌋	⌊_|_|_⌋	⌊_|_|_⌋	⌊_|_|_⌋	⌊_|_|_⌋	⌊_|_|_⌋	⌊_|_|_⌋.⌊_|_⌋
b.	Adult – Female	⌊_|_|_⌋	⌊_|_|_⌋	⌊_|_|_⌋	⌊_|_|_⌋	⌊_|_|_⌋	⌊_|_|_⌋	⌊_|_|_⌋	⌊_|_|_⌋	⌊_|_|_⌋	⌊_|_|_⌋	⌊_|_|_⌋	⌊_|_|_⌋	⌊_|_|_⌋.⌊_|_⌋
c.	Child (<18 yr old)	⌊_|_|_⌋	⌊_|_|_⌋	⌊_|_|_⌋	⌊_|_|_⌋	⌊_|_|_⌋	⌊_|_|_⌋	⌊_|_|_⌋	⌊_|_|_⌋	⌊_|_|_⌋	⌊_|_|_⌋	⌊_|_|_⌋	⌊_|_|_⌋	⌊_|_|_⌋.⌊_|_⌋

M05.	**(CAPI CHECK IF M02c > 0)**	1. Yes 3. No ➜ **SECTION** N

M06.	May we know when these children usually helped with farming?		
a.	Morning	1. Yes	3. No
c.	Afternoon	1. Yes	3. No

INTERVIEWER READ:

"NEXT WE WILL NOW ASK YOU SOME QUESTIONS ABOUT YOUR FARMING ACTIVITIES FROM THE OTHER SEASONS, THAT IS THE SEASONS BEFORE THE MOST RECENT TOBACCO SEASON. "

Q. *CURING METHOD [during the most recent tobacco season]*

We would like to ask you more questions about the tobacco that you harvested during the recent tobacco season **[CAPI PRELOAD MONTHS FROM EO3]**

Q01.	Do you dry or cure tobacco before selling it	1. Yes 3. No ➔ **SECTION R**
Q04.	Do you dry them naturally, use heat naturally or heat inside a structure? [PROBE; AS IN BRIEFING]	1. Air (dry) curing 2. Sun (dry) curing 3. Flue curing/oven 4. Fire curing
Q05.	Do you cure using a shed (no walls)?	1. Yes 3. No ➔**Q08**
Q06.	Where is the shed located?	1. Backyard, Near Home 2. Farm 5. Others, specify _____
Q07	Did everything fit in the shed?	1. Yes 3. No
Q08.	Do you cure using a barn (with walls)?	1. Yes 3. No ➔**Q12**
Q09.	Where is it?	1. Backyard / Near Home 2. Farm 5. Others, specify _____
Q10.	Did everything fit in the barn?	1. Yes 3. No
Q11.	ENUMERATOR CHECK: Q05 and Q08 = 3.NO	3. NO 1. YES ➔ **SECTION R**
Q12.	If NO to **Q05** and **Q08**, how do you cure your tobacco without a curing shed or barn?	_____ _____

R. TOBACCO PRODUCTION - CONTRACT FARMING

R00.	CAPI CHECK: DOES RESPONDENT HAVE PARTNERSHIP CONTRACT? B01=1 or B03==1	**1. Yes** **3. No ➔SECTION S**
R01.	How were you recruited to the contract growing program or marketing agreement?	1. Through company's extension workers 2. Through government extension workers 3. Through farmer-leaders 5. Others, specify, _____
R02.	Were you adequately informed of the whole process involved in your contract?	1. Yes 3. No
R03.	At the time of contract/agreement negotiation or discussion, do you think your bargaining position relative to the contract/agreement partner is weak or strong?	1 2 3 4 Very weak very strong
R04.	Does the tobacco company that you are contracted to undertake any tree planting activities in this community?	1. Yes 3. No ➔**R06**
R05.	Have you ever participated in the tree planting exercise?	1. Yes 3. No
R06.	On the overall, how satisfied are you with the tobacco contract arrangements?	4. Very Satisfied 3. Satisfied 2. Dissatisfied 1. Very Dissatisfied
R07.	Why this rating? [PROBE]	_____ _____

S. TOBACCO LEVIES [ASK ALL TOBACCO FARMERS]

*Now, we will talk about the tobacco that you **sold** for the 2016 season.* We would like to know about any fees, taxes, or other amounts deducted from your tobacco sales in 2016.

S01.	What amount of government tax was deducted from tobacco sales? OPTIONS IN PERCENTAGE, OR PRICE. TOTAL OR PER KG	1. └─┴─┴─┘ % 2. └─┴─┘.└─┴─┴─┘.└─┴─┴─┘ Rp. 3. └─┴─┴─┘ Total per Kg. 6. NO TAX ➔H03
S02.	What is your opinion regarding this amount?	5. Very High 4. High 3. Just right 2. Low 1. Very Low
S03.	. What amount of fees did you pay to the Bandol? OPTIONS IN PERCENTAGE, OR PRICE. TOTAL OR PER KG, RUPIA OR IN KIND	1. └─┴─┴─┘ % 2. └─┴─┘.└─┴─┴─┘.└─┴─┴─┘ Rp. 3. └─┴─┴─┘ Total per Kg. 6. NO FEES
S04	What amount of fees did you pay for the warehouse? OPTIONS IN PERCENTAGE, OR PRICE. TOTAL OR PER KG, RUPIA OR IN KIND	1. └─┴─┴─┘ % 2. └─┴─┘.└─┴─┴─┘.└─┴─┴─┘ Rp. 3. └─┴─┴─┘ Total per Kg. 6. NO FEES
S05	Going back to your activities in selling the tobacco, did you encounter any problems with the on-farm weight compared to the weight in the selling point?	1. Yes 2. No ➔**H08** 3. Did not transport to selling point ➔**H08** **6 . NA**
S06	How satisfied were you with the resolution of this	4. Fully satisfied 3. somewhat satisfied

	problem? [READ ANSWERS ALOUD]	2. Somewhat dissatisfied 1. Not satisfied at all
S07	. Explain your satisfaction level chosen above	_____ _____

S08.	Overall, how satsified are you with the rating given to your toabcco?	4. Very Satisfied 3. Satisfied 2. Dissatisfied 1. Very Dissatisfied
S09.	Why this rating?	_____ _____
S10.	What improvements would you like to see with the grading system?	_____ _____
S11	Overall how satisfied were you regarding the amount you received from tobacco sales in the 2016 season?	4. Very Satisfied 3. Satisfied 2. Dissatisfied 1. Very Dissatisfied
S12.	Why this rating?	_____ _____

T. NON-LABOR INCOMES

Now we would like to ask about your household's other sources of income.

TYPE	T01.	T02.	T03.	T04.
INCOME SOURCE	During the past 12 months, did your household receive any income from […]?	How much income did your household receive from […]? RECORD'S RECEIVED INCOME. ALLOW RESPONDENT TO MENTION IN UNIT MOST FAMILIAR TO THEM	Payment period 1. Per day 2. Per week 3. Per month 4. Per year 5. Quarterly 6. Occasionally	How many times you receive the payment in the last 12 months?
h. Crop production (Tobacco)	3. No ☐　1. Yes		1 2 3 4	└─┴─┴─┘
i. Crop production (other crops)	3. No ☐　1. Yes		1 2 3 4	└─┴─┴─┘
J. Livestock production	3. No ☐　1. Yes		1 2 3 4	└─┴─┴─┘

k.	Natural resources sales (charcoal, firewood, timber etc.)	3. No ☐ 1. Yes		1 2 3 4	└──┴──┴──┘
n.	Formal employment	3. No ☐ 1. Yes		1 2 3 4	└──┴──┴──┘
o.	Casual labour (*ganyu*)	3. No ☐ 1. Yes		1 2 3 4	└──┴──┴──┘
p.	Beer brewing	3. No ☐ 1. Yes		1 2 3 4	└──┴──┴──┘
q.	Petty trading/business (shops/poshomills, etc.)	3. No ☐ 1. Yes		1 2 3 4	└──┴──┴──┘
r.	Land rentals	3. No ☐ 1. Yes		1 2 3 4	└──┴──┴──┘
s.	Gifts/Remittances	3. No ☐ 1. Yes		1 2 3 4	└──┴──┴──┘
t.	Pension	3. No ☐ 1. Yes		1 2 3 4	└──┴──┴──┘
u.	Artisanal skills (weaving, brewing, carpentry etc.)	3. No ☐ 1. Yes		1 2 3 4	└──┴──┴──┘
v.	Other (specify)	3. No ☐ 1. Yes		1 2 3 4	└──┴──┴──┘

B5	Was the total amount of income received in the past year sufficient to sustain your family?	4. Very Sufficient 3. Sufficient	2. Insufficient 1. Very Insufficient

U. DEBTS AND CREDITS (ask all farmers) time start └─┴─┘ : └─┴─┘

Now, we will talk about your loans and need for cash or money

U01	During the **last 12 months**, did you or any of the household members need credit to help with any expenses?	1. Yes 3. No
U02.	Did you apply for a loan in the last 12 months?	1. Yes 3. No ➜ **U04**
U03.	How many times did you apply for a loan in the last 12 months	1 └─┴─┘ times➜ **U05**
U04.	Why did you not apply for a loan? [AND THEN SKIP TO NEXT SECTION]	01. No lenders in the area for this purpose 02. Borrow-ing is risky 03. Interest rate is too high 04. Lenders do not provide amount needed 05. Do not have or lack collateral 06. Too much paper-work 95. Others, specify _____ ➜ **SECTION V**
U05.	Did you receive (any of) the loans?	1. Yes ➜**U07** 3. No
U06	[ASK ALL APPLIED FOR], What were the reasons for you not receiving the loan that you applied for? [AND THEN SKIP TO NEXT SECTION]	01. Lender denied because of high risk 02. I declined offer because interest rate was too high 03. Lender denied because of lack of collateral 95. Others, specify _____ ➜ **SECTION V**
U07.	Do you have any outstanding loans that were	1. Yes 3. No

acquired more than 12 months ago?	

Now I would like to ask you some information on each of the loans you received.

LOAN ID	U07. What was the primary use of the loan?	U08. From where / whom did you get the loan or money?	U09. What was the total amount of the loan? (Ksh/MWK/ZKW)	U10. When did you acquire the loan?	U11. Have you paid it off?	U12. When will you pay it back?	U13. Total amount to be paid back or have been paid back?	U14. How would you rate the interest rate for this loan? READ OPTIONS	U15. Why do you think it is [U14]
ENUMERATORS: COMPLETE A NEW LINE FOR EACH LOAN RECEIVED.	01. Inputs for Tobacco Farming 02. Land for Tobacco Farming 03. Inputs for Farming Other Crop 04. Land for Farming Other Crop 05. Schooling 06. Purchasing house 07. Purchase vehicle 08. Investing in business 09. Special Occasions (wedding, etc.) 95. Other, specify _____	01. Relatives 02. Neighbours (not a farmer) 03. Fellow Farmer 04. Farmers Organization 05. Tobacco Company 06. BMT 07. Local Money Lender 08. Microfinance Institution 09. Rural Bank 10. Commercial Bank 95. Other, Specify_____ **CAPI CHECk: U07=1 AND U08=5 IS AN INVALID COMBINATION**			1.Yes 3.No ➔**U13**			4. Very High 3. High 2. Low 1. Very Low	
Loan 1 _____	01 02 03 04 05 06 07 08 09 95_____	01 02 03 04 05 06 07 08 09 95_____	⌐⌐,⌐⌐⌐,⌐⌐⌐	Month: ⌐⌐ Year ⌐⌐⌐⌐	1 3 ➔**U13**	Month: ⌐⌐ Year ⌐⌐⌐⌐	⌐⌐,⌐⌐⌐,⌐⌐⌐	4 3 2 1	_____
Loan 2 _____	01 02 03 04 05 06 07 08 09 95_____	01 02 03 04 05 06 07 08 09 95_____	⌐⌐,⌐⌐⌐,⌐⌐⌐	Month: ⌐⌐ Year ⌐⌐⌐⌐	1 3 ➔**U13**	Month: ⌐⌐ Year ⌐⌐⌐⌐	⌐⌐,⌐⌐⌐,⌐⌐⌐	4 3 2 1	_____
Loan 3 _____	01 02 03 04 05 06 07 08 09 95_____	01 02 03 04 05 06 07 08 09 95_____	⌐⌐,⌐⌐⌐,⌐⌐⌐	Month: ⌐⌐ Year ⌐⌐⌐⌐	1 3 ➔**U13**	Month: ⌐⌐ Year ⌐⌐⌐⌐	⌐⌐,⌐⌐⌐,⌐⌐⌐	4 3 2 1	_____
Loan 4 _____	01 02 03 04 05 06 07 08 09 95_____	01 02 03 04 05 06 07 08 09 95_____	⌐⌐,⌐⌐⌐,⌐⌐⌐	Month: ⌐⌐ Year ⌐⌐⌐⌐	1 3 ➔**U13**	Month: ⌐⌐ Year ⌐⌐⌐⌐	⌐⌐,⌐⌐⌐,⌐⌐⌐	4 3 2 1	_____

| Loan 5 _____ | 01 02 03 04 05 06
07 08 09 95_____ | 01 02 03 04 05
06
07 08 09
95_____ | ⌐—,—,—⌐ | Month: ⌐—⌐
Year ⌐—,—⌐ | 1
3
→U13 | Month: ⌐—⌐
Year ⌐—,—⌐ | ⌐—,—,—⌐ | 4 3 2
1 | ____
____ |

V. BANK ACCOUNTS

Now, here are a few questions about your bank accounts:

V00.	Does anyone in this household have a bank account	3. No → **SECTION W** 1. Yes

	V01.	**V02.**	**V03.**
	Institution 01. Private Bank 02. Public Bank 03. Micro-finance Bank 04 Mobile Bank 06. SACCOs 07. Other Formal Financial Institution 08. Other Informal Financial Institutions (Merrygo round 96. N/A ↓	Active	Is this bank account at the same institution as any of the loans reported earlier?
Account 1	01 02 03 04 05 06 96 ↓	1. Yes 3. No	1. Yes 3. No
Account 2	01 02 03 04 05 06 96 ↓	1. Yes 3. No	1. Yes 3. No
Account 3	01 02 03 04 05 06	1. Yes 3. No	1. Yes 3. No

	96 ↓		
Account 4	01 02 03 04 05 06 96 ↓	1. Yes 3. No	1. Yes 3. No
Account 5	01 02 03 04 05 06 96 ↓	1. Yes 3. No	1. Yes 3. No

W. FOOD SECURITY

Our last few sections will now focus on your household

INTERVIEWER: ASK THIS SECTION TO HH MEMBER WHO'S RESPONSIBLE OR WHO'S MOST KNOWLEDGEABLE ABOUT COOKING AND FOOD IN THE HOUSEHOLD

W00	Respondent for this section	└─┴─┘ PID _____
W01	Is maize meal your household's staple food?	1. Yes ➜ **W03** 3. No
W02	What is your household's staple food?	_____
W03	Do you produce your own [STAPLE FOOD]	1. Yes 3. No ➜**W05**
W04	About how long does your [STAPLE FOOD] production last for your household?	└─┴─┘ 1. Days 2. Months
W05	If you do not produce or when yourun out of home-produced, how do you usually get [STAPLE FOOD]?	1. Buy 2. Get for free (Raskin) 3. Work for food 4. Beg 5. Others, specify ,_____

Now let us talk about access to food.

W06	How would you rate your household's access to food?	4. Always has sufficient food 3. Usually has sufficient food 2. Usually lacks sufficient food 1. Always lacks sufficient food
W07	CAPI CHECK COV 5: FORMER TOBACCO FARMER?	1. COV5 =1 ➜**W10** 3. COV5=2
W08	How would you rate your access to food the last time you were tobacco farming?	4. Always has sufficient food 3. Usually has sufficient food 2. Usually lacks sufficient food 1. Always lacks sufficient food
W09	Compared to when you were tobacco farming, how would you compare your households current access to food?	1. Better 2. Same 3. Worse

W10	Now comparing tobacco farmers and farmers who do not grow tobacco, how would you compare these 2 groups' ability to provide food for the household? FOR EVERYONE	1. Tobacco farmers have better access to food 2. Non-tobacco farmers have better access to food 3. Both groups have the same access to food

W11	In the last 12 months, have you been faced with a situation when you did not have enough food to feed the household?	3. No →**SECTION X** 1. Yes

W12	In which months of the last 12 months did you experience this incident? **MARK IN EACH COLUMN FOR 2015, 2016**	**2015**	**2016**
			A. January
			B. February
			C. March
			D. April
			E. May
			F. June
			G. July
			H. August
			I. September
		J. October	J. October
		K. November	K. November
		L. December	L. December
W13	What was the cause of this situation?	└──┘; └──┘; └──┘; ────── ────── ──────	

X. ASSETS

Now we would like to ask about some of your household assets i.e. appliances and equipment…

	ITEM	X01. Do you or anyone in your household own any of the following items?	X02. How many [ITEM] does your household own?	X03. How long have you own this [ITEM] CAPI: IF X03b=3 ▢X05			X04. How much did the [ITEM] cost when you first purchased it?	X05. How much do you think the current value of the [ITEM] (if you could sell it)?
				[INTERVIEWER: IF MORE THAN ONE ITEM, ASK ABOUT HIGHEST VALUE				
				X03a.		X03b.		
a.	Radio	3. No ▢ 1. Yes	⌐_⌐_⌐	⌐_⌐_⌐		⌐_⌐	⌐_⌐_⌐.⌐_⌐_⌐.⌐_⌐_⌐	⌐_⌐_⌐.⌐_⌐_⌐.⌐_⌐_⌐
b.	Cell-phone	3. No ▢ 1. Yes	⌐_⌐_⌐	⌐_⌐_⌐		⌐_⌐	⌐_⌐_⌐.⌐_⌐_⌐.⌐_⌐_⌐	⌐_⌐_⌐.⌐_⌐_⌐.⌐_⌐_⌐
c.	TV set	3. No ▢ 1. Yes	⌐_⌐_⌐	⌐_⌐_⌐		⌐_⌐	⌐_⌐_⌐.⌐_⌐_⌐.⌐_⌐_⌐	⌐_⌐_⌐.⌐_⌐_⌐.⌐_⌐_⌐
d.	Chairs	3. No ▢ 1. Yes	⌐_⌐_⌐	⌐_⌐_⌐		⌐_⌐	⌐_⌐_⌐.⌐_⌐_⌐.⌐_⌐_⌐	⌐_⌐_⌐.⌐_⌐_⌐.⌐_⌐_⌐
e.	Bed	3. No ▢ 1. Yes	⌐_⌐_⌐	⌐_⌐_⌐		⌐_⌐	⌐_⌐_⌐.⌐_⌐_⌐.⌐_⌐_⌐	⌐_⌐_⌐.⌐_⌐_⌐.⌐_⌐_⌐
f.	Mattress	3. No ▢ 1. Yes	⌐_⌐_⌐	⌐_⌐_⌐		⌐_⌐	⌐_⌐_⌐.⌐_⌐_⌐.⌐_⌐_⌐	⌐_⌐_⌐.⌐_⌐_⌐.⌐_⌐_⌐
g.	Table	3. No ▢ 1. Yes	⌐_⌐_⌐	⌐_⌐_⌐		⌐_⌐	⌐_⌐_⌐.⌐_⌐_⌐.⌐_⌐_⌐	⌐_⌐_⌐.⌐_⌐_⌐.⌐_⌐_⌐
h.	Bicycle	3. No ▢ 1. Yes	⌐_⌐_⌐	⌐_⌐_⌐		⌐_⌐	⌐_⌐_⌐.⌐_⌐_⌐.⌐_⌐_⌐	⌐_⌐_⌐.⌐_⌐_⌐.⌐_⌐_⌐
i.	Refrigerator	3. No ▢ 1. Yes	⌐_⌐_⌐	⌐_⌐_⌐		⌐_⌐	⌐_⌐_⌐.⌐_⌐_⌐.⌐_⌐_⌐	⌐_⌐_⌐.⌐_⌐_⌐.⌐_⌐_⌐
j.	Motor Cycle	3. No ▢ 1. Yes	⌐_⌐_⌐	⌐_⌐_⌐		⌐_⌐	⌐_⌐_⌐.⌐_⌐_⌐.⌐_⌐_⌐	⌐_⌐_⌐.⌐_⌐_⌐.⌐_⌐_⌐
k.	Motor vehicle	3. No ▢ 1. Yes	⌐_⌐_⌐	⌐_⌐_⌐		⌐_⌐	⌐_⌐_⌐.⌐_⌐_⌐.⌐_⌐_⌐	⌐_⌐_⌐.⌐_⌐_⌐.⌐_⌐_⌐
l.	Posho mill/kiosk/shop	3. No ▢ 1. Yes	⌐_⌐_⌐	⌐_⌐_⌐		⌐_⌐	⌐_⌐_⌐.⌐_⌐_⌐.⌐_⌐_⌐	⌐_⌐_⌐.⌐_⌐_⌐.⌐_⌐_⌐
m.	Other, specify_____	3. No ▢ 1. Yes	⌐_⌐_⌐	⌐_⌐_⌐		⌐_⌐	⌐_⌐_⌐.⌐_⌐_⌐.⌐_⌐_⌐	⌐_⌐_⌐.⌐_⌐_⌐.⌐_⌐_⌐

Please tell me about livestock your household owns.

X06.	X07.	X08.

Type of livestock	Does the household own […]?	How many […] does the household own?	What is the current value of **all** […]? (Ksh/MWK/ZKW)
a. Large livestock (cow, buffalo, horse, etc.)	3. No ↓ 1. Yes	␣␣␣	␣␣␣␣.␣␣␣␣.␣␣␣
b. Small livestock (goat, sheep, pigs, etc.)	3. No ↓ 1. Yes	␣␣␣	␣␣␣␣.␣␣␣␣.␣␣␣
c. Poultry (chickens, ducks, geese, quail, etc.)	3. No ↓ 1. Yes	␣␣␣	␣␣␣␣.␣␣␣␣.␣␣␣

Now we would like to ask you about agriculture and farming goods.

ITEM	X09 Does the household have […]?	X10 How many […] does the household have?	X11 How long has the household owned [ITEM]? CAPI: IF X11b=3 →X13		X12 How much did the [ITEM] cost when you first purchased it?	X13 What is the current value of total […]
			[INTERVIEWER: IF MORE THAN ONE, ASK ABOUT THE HIGHESTVALUE]			
			X11a	X11b (Code)		
a. Wagon	3. No ↓ 1. Yes	␣␣␣	␣␣␣		␣␣␣	␣␣␣␣.␣␣␣␣.␣␣␣
b. Plough	3. No ↓ 1. Yes	␣␣␣	␣␣␣		␣␣␣	␣␣␣␣.␣␣␣␣.␣␣␣
c. Tractor	3. No ↓ 1. Yes	␣␣␣	␣␣␣		␣␣␣	␣␣␣␣.␣␣␣␣.␣␣␣
d. Jake	3. No ↓ 1. Yes	␣␣␣	␣␣␣		␣␣␣	␣␣␣␣.␣␣␣␣.␣␣␣
v1. Other, specify	3. No ↓ 1. Yes	␣␣␣	␣␣␣		␣␣␣	␣␣␣␣.␣␣␣␣.␣␣␣
v2. ANY OTHER ITEM?	3. No ↓ 1. Yes	␣␣␣	␣␣␣		␣␣␣	␣␣␣␣.␣␣␣␣.␣␣␣

CODES FOR X11b,		
1 Months	2. Years	3. Inherited

Health Section (A12-A15)

A00 PID	A13 During the **last farming season,** did [NAME] suffer from any illness or injury? 1. YES 3. NO	A14 For how many days did [NAME] suffer due to illness or injury during the **past 30 days**?	A15 For how many days did [NAME] have to stop doing [NAME]'usual activities due to illness or injury during **the past 30 days?**	A16 Can you describe the symptoms that [NAME] primarily suffered due to the **major** illness or injury during the **past 30 days**? *RECORD UP TO 4 SYMPTOM CODES* LIHAT DAFTAR KODE DI *SEE CODES AT RIGHT*
01	3 ↓ 1	└──┴──┘ Days	└──┴──┘ Days	└──┘, └──┘, └──┘, └──┘
02	3 ↓ 1	└──┴──┘ Days	└──┴──┘ Days	└──┘, └──┘, └──┘, └──┘
03	3 ↓ 1	└──┴──┘ Days	└──┴──┘ Days	└──┘, └──┘, └──┘, └──┘
04	3 ↓ 1	└──┴──┘ Days	└──┴──┘ Days	└──┘, └──┘, └──┘, └──┘
05	3 ↓ 1	└──┴──┘ Days	└──┴──┘ Days	└──┘, └──┘, └──┘, └──┘
06	3 ↓ 1	└──┴──┘ Days	└──┴──┘ Days	└──┘, └──┘, └──┘, └──┘
07	3 ↓ 1	└──┴──┘ Days	└──┴──┘ Days	└──┘, └──┘, └──┘, └──┘

CODES FOR A16

A. Diarrhoea (acute)

B. Diarrhoea (chronic, 1 month or more)

C. Weight loss (major)

D. Fever (acute)

E. Fever (recurring)

F. Wound

G. Skin rash

H. Severe headache

I. Fainting

J. Chills (feeling hot and cold)

K. Vomiting

L. Cough

M. Productive cough

N. Coughing blood

O. Pain on passing urine

P. Genital sores

Q. Mental disorder

R. Abdominal pain

S. Sore throat

T. Difficulty breathing

U. Burn

AA. Fracture

AB. Dizziness

AC. Insomnia

AD. Increases perspiration/sweating

AE. High heart rate

AF. Increased salivation

AG. Whole body dull pain

V. Other (specify)_____

Y. FUTURE REQUIREMENTS

		Y01.	Y01a.
	Influencers	Looking back at the time you started tobacco cultivation, what factors influenced you to start?	Rank (w/ enum instruction) TOP THREE
a.	Existence of ready market	1. Yes 3. No	
b.	It was the only viable cash crop	1. Yes 3. No	
c.	Inherited it from parents	1. Yes 3. No	
d.	Availability of land	1. Yes 3. No	
e.	Influenced by other tobacco producers	1. Yes 3. No	
f.	Good incentives from the tobacco companies	1. Yes 3. No	
g.	It was a highly lucrative enterprise	1. Yes 3. No	
v.	Others, specify_____	1. Yes 3. No	

CAPI CHECK: COV5 = 1? **(RESPONDENT IS A CURRENT TOBACCO FARMERS)?**	1. **YES, COV5 = 1** 3. **NO→ Y09**

		Y02	Y02a.
	Influencers	(TOBACCO FARMERS ONLY) Next, kindly give the reasons why you are currently growing tobacco.	Rank (w/ enum instruction) TOP THREE
a.	Existence of ready market	1. Yes 3. No	
b.	It was the only viable cash crop	1. Yes 3. No	
c.	I am used to growing tobacco	1. Yes 3. No	
d.	Availability of land	1. Yes 3. No	
e.	Influenced by other tobacco producers	1. Yes 3. No	
f.	Good incentives from the tobacco companies	1. Yes 3. No	
g.	It was a highly lucrative enterprise	1. Yes 3. No	
h.	To repay outstanding debts from the tobacco company	1. Yes 3. No	
v.	Others, specify_____	1. Yes 3. No	

Y03	Have you ever considered switching to the production of crops other than tobacco?	1. Very Serious - Already planning to switch next season 2. Serious - researched other options	3. Not so serious – thought about it 4. No, not at all ➔**Y05**

Y04 What crops did you consider and why?

Y04a.CROP		Y04b. Reason	
Name	Code	Reason	Z04a. Code
1	└─┴─┘	1	└─┴─┘
2	└─┴─┘	2	└─┴─┘
3	└─┴─┘	3	└─┴─┘

CODES FOR Y04a.

A.	Maize	F.	Pigeonpeas	K.	Northern Division Dark Fired (NDDF)
B.	Ground nut	G.	Chili	L.	Sun/Air cured
C.	Soybean	H.	Beans	M.	Southern Division Fire-Dured (SDF)
D.	Sweat Potatp	I.	Burley	N	Other, specify

CODES FOR Y04b.

A.	A. Existence of ready market
B.	B. It was the only viable cash crop
C.	C. It was a highly lucrative enterprise
D.	D. Easier to crop

| E. | Cassava | J. | Virginia |

| E. | E. Good incentives from the tobacco companies/government |

| V. | V. Other, specify |

| **Y05** | Have you ever considered switching to other livelihood sources? | 1. Very Serious - Already planning to switch next season
 2. Serious - researched other options | 3. Not so serious – thought about it
 4. No, not at all ➔**Y07** |

Y06. What other livelihood did you consider and why?

Y06a. Other Livelihood		Y06b. Reason	
Jobs	Code	Reason	Z06b. Code
1	└─┴─┘	1	└─┴─┘
2	└─┴─┘	2	└─┴─┘
3	└─┴─┘	3	└─┴─┘
		➔ Y08	

CODES FOR Y06a.

01.	Non-tobacco ag.	06.	Commercial, restaurants, hotel, accommodations
02.	Forerstry, animal husbandry, fisheries	07.	Transport, storage, communications
03.	Mining and quarrying	08.	Financial services, real estate, leasing, corporate services
04.	Manufacturing	09.	Community or social or personal services
05.	Electricity gs, water	95.	Other, _____

CODES FOR Y06b.

A.	A. Existence of ready market
B.	B. It was the only viable cash crop
C.	C. It was a highly lucrative enterprise
D.	D. Easier to crop
E.	E. Good incentives from the tobacco companies/government
V.	V. Other, specify

Y07	Is there anythng that would make you consider switching?	A. Existence of ready market B. It was the only viable cash crop C. It was a highly lucrative enterprise D. Easier to crop	E. Good incentives from the tobacco companies/government V. Other, _____ W Woud not consider at all ➔Z09
Y08	What will make you switch to other crops or other livelihood sources?	A. Existence of ready market B. It was the only viable cash crop C. It was a highly lucrative enterprise D. Easier to crop	E. Good incentives from the tobacco companies/government V. Other, _____

Questions Y09-Y15 are only for former tobacco farmers

Y09.	CAPI CHECK: COV5 = 2 AND E00==1? (RESPONDENT IS A FORMER TOBACCO FARMER WHO IS CURRENTLY GROWING OTHER CROPS)?	1. NO, COV5=1 AND/OR E00==2 ➔ SECTION Z 3. YES , COV5=2 AND E00==1	
Y10.	Why did you switch from growing tobacco to your current crop(s)?	A. Low prices B. Unfair grading C. Inability to sell crop or part of crop D. More attractive alternatives	E. Effect on land F. Relationship with contracting company G. Extension services V. Other_____
Y11.	How many years did you grow tobacco?	⌞__⌞__⌟ years	
Y12.	For how many years have you been growing your current main crop(s)?	⌞__⌞__⌟ years	
Y13.	Do you receive assistance from any agricultural extension services?	1. Yes 3. No	
Y14	Do you see yourself growing tobacco again in the future?	1. Very likely 2. Somewhat likely 3. Not likely ➔ **SECTION CP** 4. Very unlikely ➔ **SECTION CP**	
Y15.	If yes, why?	A. Higher income; B. Access to credit ; C. Lack of market for alternatives V. Others	

Questions Y16-Y18 is only for former tobacco farmers

Y16	Are there (other) nearby villages, towns or cities where the family members who work on your farm could seek employment?	1. Yes 3. No	A. Existence of ready market B. It was the only viable cash crop C. It was a highly lucrative enterprise D. Easier to crop	E. Good incentives from the tobacco companies/government V. Other,_____ W Woud not consider at all ➔**Z09**
Y17	Have you or any household members sought work or considered seeking work in one of these places recently?	1. Yes 3. No	A. Existence of ready market B. It was the only viable cash crop C. It was a highly lucrative enterprise D. Easier to crop	E. Good incentives from the tobacco companies/government V. Other,_____
Y18	If No, why haven't you sought work outside the farm?	A. Too far. B. No easy transportation. C. Jobs not easy to find. D. Jobs do not pay enough.		

Z. AWARENESS AND PERCEPTION (CURRENT TOBACCO FARMERS ONLY)

Z01	Did you also plant tobacco in **2015**?	1. Yes 3. No ➔**Z09**
Z02	What type of tobacco did you grow in **2015**?	Type _____ ⌴⌴
Z03.	What was the main grade of the tobacco you planted in **2015**?	A B C
Z04	Compared to the previous season (**2015**), is the yield or volume now higher (CODE 1) or lower?	1. Higher 2. Same 3. lower
Z05.	**CAPI CHECK: IS TYPE OF TOBACCO IN [Z02 AND Z03] ALSO IN F01?**	3. NO ➔**Z09** 1. YES
Z06	Compared to the previous season (**2015**), is the price per kg higher or lower?	1. Higher 2. Same 3. Lower

Z07	What was the price per kg in **2015**?	Rp └──┴──┴──┘ . └──┴──┴──┘ . └──┴──┴──┘
Z08	Compared to the previous season (**2015**), were your total sales higher or lower?	1. Higher 2. Same 3. Lower
Z09	Did you grow tobacco 5 years ago?	3. NO ➔AA10 1. YES
Z10	Did you grow more in **2016** compared to 5 years ago?	1. More 2. Same 3. Less
Z11	Why did you grow more/less	└──┴──┘
Z12	To complete our questions regarding tobacco farming, are there other ways that you can suggest or comment on about tobacco farming?	_____ _____

CODES FOR Z11.	
A.	Existence of ready market
B.	It was the only viable cash crop
C.	It was a highly lucrative enterprise
D.	Easier to crop
E.	Good incentives from the tobacco companies/government
V.	Other, specify

SECTION CP (INTERVIEW SESSION NOTES)

			LANGUAGE CODE:		
CP1.	WHAT WAS THE LANGUAGE USED IN THE ENTIRE/MOST OF THE INTERVIEW?	⊔⊔⊐ OTHER_____	00. INDONESIA	04. MINANG	08. BANJAR
CP2.	WERE THERE ANY OTHER LANGUAGE USED (IF ANY)?	⊔⊔⊐ OTHER_____	01. JAVANESE 02. SUNDANESE	05. MUSI 06. MANADO	95. OTHER,
CP3.	USE INTERPRETER	1. YES 3. NO	03. MADURANESE	07. BUGIS	_____ 96. NONE

CP4.	WHO ELSE (ANOTHER PERSON) OTHER THAN THE RESPONDENT WAS PRESENT DURING THE INTERVIEW? (**MULTIPLE ANSWER**) A. NONE B. CHILD < 5 YEARS C. CHILD ≥ 5 YEARS D. HUSBAND/WIFE E. ADULT, HOUSEHOLD MEMBER F. ADULT, NOT HOUSEHOLD MEMBER	**CP5.** HOW WOULD THE ENUMERATOR ASSES THE APPROPRIATENESS OF THE RESPONDENT'S ANSWERS? 1. VERY GOOD 2. GOOD 3. ADEQUATE 4. NOT GOOD 5. VERY POOR	**CP6.** HOW WOULD THE ENUMERATOR ASSESS THE SERIOUSNESS OF THE RESPONDENT'S ANSWERS? 1. VERY GOOD 2. GOOD 3. ADEQUATE 4. NOT GOOD 5. VERY POOR

NOTES:

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