Market participation and profitability of cotton production in Malawi

Daniel M. Ghambi
Purdue University

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By Daniel M. Ghambi

Entitled
MARKET PARTICIPATION AND PROFITABILITY OF COTTON IN MALAWI

For the degree of Master of Science

Is approved by the final examining committee:

Jacob Ricker-Gilbert
Chair

Otto C. Doering III

Gerald Shively

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Approved by Major Professor(s): Jacob Ricker-Gilbert

Approved by: Gerald Shively 4/28/2015

Head of the Departmental Graduate Program
MARKET PARTICIPATION AND PROFITABILITY OF COTTON PRODUCTION IN MALAWI

A Thesis
Submitted to the Faculty
of
Purdue University
by
Daniel M. Ghambi

In Partial Fulfillment of the
Requirements for the Degree
of
Master of Science

May 2015
Purdue University
West Lafayette, Indiana
To Lostar lukali and Atughobokire Ghambi for your love, support, and inspiration.

Special dedication goes to my mother Ellen Sikwese Ghambi for the tireless effort and emphasis on discipline and hard work.

Not forgetting my uncle Ferton Felix Ghambi for your special love in my life. Rest in Peace.
ACKNOWLEDGEMENTS

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I would also like to thank fellow graduate students, more specially Francis Darko, Akua Akuffo, Wan Seoh Chang, George Omiat and Rodrigo Vasquez Panizza for their help throughout my time at Purdue University. I am thankful for your friendship, your love, help, suggestions, and the moral support and the many wonderful memories. I also give thanks to all my friends in the Agricultural Economics Department.

Finally I am thankful to the almighty God for the life and the blessings he continues to bestow on my life. To all of you I extend my deep and utmost appreciation.
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### KEY TO ABBREVIATIONS

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<tr>
<th>Abbreviation</th>
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<tr>
<td>ADD</td>
<td>Agriculture Development Division</td>
</tr>
<tr>
<td>ADMARC</td>
<td>Agricultural Development and Marketing Corporation</td>
</tr>
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<td>ASWAp</td>
<td>Agriculture Sector Wide Approach</td>
</tr>
<tr>
<td>CDT</td>
<td>Cotton Development Trust</td>
</tr>
<tr>
<td>CGA</td>
<td>Cotton Ginners Association</td>
</tr>
<tr>
<td>CDA</td>
<td>Cotton Development Association</td>
</tr>
<tr>
<td>COFAM</td>
<td>Cotton Farmers Association of Malawi</td>
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<tr>
<td>EPAs</td>
<td>Extension Planning Area</td>
</tr>
<tr>
<td>FISP</td>
<td>Farm Input Subsidy Program</td>
</tr>
<tr>
<td>FBO</td>
<td>Farmer Based organization</td>
</tr>
<tr>
<td>FUM</td>
<td>Farmers Union of Malawi</td>
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
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<td>GM</td>
<td>Gross Margin</td>
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<tr>
<td>GLCC</td>
<td>Great Lakes Cotton Company</td>
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<tr>
<td>IHS</td>
<td>Integrated Household Survey</td>
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<td>MGDS</td>
<td>Malawi Growth and Development</td>
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<tr>
<td>MRFC</td>
<td>Malawi Rural Finance Company</td>
</tr>
<tr>
<td>MT</td>
<td>Metric Tonne</td>
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<tr>
<td>MWK</td>
<td>Malawi Kwacha</td>
</tr>
<tr>
<td>NASFAM</td>
<td>National Smallholder Farmers Association of Malawi</td>
</tr>
<tr>
<td>NSO</td>
<td>National Statistical Office</td>
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<tr>
<td>STAM</td>
<td>Seed Traders Association of Malawi</td>
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<tr>
<td>Abbreviation</td>
<td>Full Form</td>
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<td>--------------</td>
<td>-----------</td>
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<tr>
<td>SSA</td>
<td>Sub-Saharan Africa</td>
</tr>
<tr>
<td>TR</td>
<td>Total Revenue</td>
</tr>
<tr>
<td>TVC</td>
<td>Total Variable Costs</td>
</tr>
<tr>
<td>MoA&amp;FS</td>
<td>Ministry of Agriculture and Food Security</td>
</tr>
<tr>
<td>UNCTAD</td>
<td>United Nations Conference on Trade and Development</td>
</tr>
<tr>
<td>US$</td>
<td>United States Dollar</td>
</tr>
<tr>
<td>WTO</td>
<td>World Trade Organization</td>
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ABSTRACT

Ghambi, Daniel M., M.S., Purdue University, May 2015. Market Participation and Profitability of Cotton in Malawi. Major Professor: Dr. Jacob Ricker-Gilbert.

Cotton is traditionally a cash crop for smallholder farmers in Malawi, supporting more than 100,000 families. According to the government of Malawi, the cotton sector is a key element in poverty reduction and growth strategy.

In the market liberalized economy, the functioning of the market plays a major role in the allocation of resources for increased productivity. This paper investigates the impacts of cotton subsidy and marketing reforms on farm productivity, a key element for poverty alleviation, in rural Malawi.

The main objective of this study is to explore whether changes in market participation coupled with government policies have had significant impacts on cotton yields and profitability at the farm level. It will be useful for our empirical approach to briefly discuss some of the main determinants of farm yields in relation to rural households’ behavior, their decisions and economic outcomes.

We evaluate the contribution of the cotton subsidy through Cotton up-scaling program to yields and profit using gross margin analysis. We also evaluate whether household market participation influences participation in the program. The study uses panel data collected in 2010 and 2011 from 215 households in 8 Districts of Malawi which are Neno, Karonga, Chikwawa, Nsanje, Balaka, Mangochi, Salima and Nkhotakot.
CHAPTER 1 INTRODUCTION

1.1 Agriculture in Malawi

Agriculture still remains the main driver of Malawi’s economy despite some growth in the industrial and manufacturing sector. Agriculture contributes about 36% of the country’s Gross Domestic Product (GDP) and employs about 85% of the Malawi’s population. Agriculture also accounts for about 90% of the country’s foreign export earnings predominantly from tobacco, tea, sugar and coffee (Edriss, 2003 and Government of Malawi, 2011). This is why Malawi’s policies are all focusing on the improvement of the agricultural sector.

Over 90% of the total agricultural value-added comes from about 1.8 million smallholders who on average own 1.0ha of land. Land pressure is particularly high in the southern region of Malawi where per capita average landholding sizes are less than 0.2 ha. About 1.1 million hectares of land is held in some 30,000 estates, with an average landholding size ranging from 10 to 500 hectares. (World Bank, 2009).

One of the key constraints to smallholder productivity in Malawi is the small landholding size. The Poverty and Vulnerability Assessment (PVA) indicates that average cultivable landholding is less than 1 hectare (0.90 ha) and just about 0.2 ha per capita. About 58 percent of the farmers cultivate on less than 1 ha, of which about 11 percent are near landless. Only 13 percent cultivate on more than 2 ha and the majority of these are in the north where population density is still very low (about 50 people per km²).

Malawi has a comparative advantage in producing some agricultural commodities especially coffee, tea, tobacco and sugar commodities in SADC region due to significantly low trade barriers. There are still revealed trade barriers with respect to
most of Malawi’s manufactured goods in SADC. The low values of the revealed trade barrier index probably reflect lack of capacity in Malawi, as much as trade barriers in the region. This shows that Malawi only has a narrow comparative advantage and does not produce many goods. The Malawian garment sector may remain under pressure in the coming years given the uncertainty surrounding the future of the South African market under the Malawi, Mozambique, the United Republic of Tanzania and Zambia – Southern African Customs Union agreement.(AfDB/OECD,2007).

Malawi cotton sector is very important to the economy. Cotton production in Malawi is characterized by low levels of productivity, low prices and low returns. Cotton farmers in Malawi are often no better off than their neighbors who do not grow cotton. Not surprisingly, many cotton farmers have switched to other crops such as soya beans, sesame and other crops. But the Government of Malawi and the Cotton Development Trust (CDT) are committed to improving the profitability of the cotton sector and encouraging new investments by international companies. (2011-2016 National cotton strategic plan for Malawi, 2011).

The cotton sector is the 4th largest contributor to agricultural GDP, after tobacco, sugar, and tea and as such, it is a critical source of foreign exchange for the country. It is mainly a smallholder crop, grown by approximately 100,000 to 200,000 smallholder farmers each year on around 80,000 hectares. (Agriculture Sector Wide Approach Malawi, Malawi Government, 2010).

Since the early 1980s, Malawi has been pursuing market liberalization policies. Market liberalization entailed allowing the private sector to participate in input and output marketing of smallholder produce. However, the participation of the private sector in the input and produce trading through the market liberalization policy implemented has had mixed results. While prices received by farmers have been more competitive than before, the high cost of factor inputs after removal of subsidies has made several crops and livestock enterprises less attractive relative to tobacco. Restructuring of Agricultural Development and Marketing Cooperation(ADMARC),
which was followed by closure of markets in remote areas created a vacuum, which private traders could not fill due to problems of liquidity, access and transportation to such places resulting in food security problems and a decline in household income (in real terms). (Nthara, 2004).

Cotton production and marketing were liberalized in 1991. In the market liberalized economy; the functioning of the market plays a major role in the allocation of resources for increased productivity (Crawford, 1997).

Malawi is predominantly an agricultural based economy and this is manifested in its export profile. The country exports mainly agricultural commodities to the world, tobacco, tea, and sugar being the main export commodities. With the export processing zones in textiles due to the AGOA initiative, Malawi has seen an increase in textile exports too. However, recently there has been a drop in textile exports following closures of some companies in the export processing zones and this may have something to do with the expiry of the MFA. Otherwise, Malawi’s exports of other goods other than agricultural commodities are generally low. This trend is expected to improve in the near future with the current Government’s pursuance of economic growth policies that favour export oriented manufactured goods. (TPR, Malawi). Malawi’s export regime is relatively open and its economy remains relatively weak and vulnerable to external commodity price movements and other shocks such as weather conditions. The economy is fragile with a narrow industrial base lacking in key social services and infrastructure. The size of the market and its landlockedness pose a particular challenge to meeting the needs of the private sector for high quality infrastructure at the lowest possible cost. The economic performance for the country has remained quite unsatisfactory for the past two decades. Relative stability and growth have been experienced but only to limited extent. The major reasons for this are numerous. They include both demand and supply-side challenges. (Diamond Chikhasu, 2007).

Currently, the agriculture sector is dominated by tobacco. In the face of the challenges such as declining demand due to anti-smoking lobby in many developed
countries to the tobacco sector in Malawi, other crop options are now being considered seriously to offer alternative enterprises. It is planned that the country will diversify and promote cotton among other crops.

Cotton is considered one of the priority crops by the Government of Malawi under the Malawi Growth and Development Strategy (MGDS) and under the Agriculture Sector Wide Approach (ASWAp), more especially as it is grown by a large number of smallholder farmers. Malawi provided 1.6 billion Malawian kwacha ($9.7 million) in subsidies for cotton farmers in the 2011-12 growing season. The government would like to promote the cotton in order to counter the worldwide anti-smoking lobby, and wanting cotton to become the country’s main foreign exchange earner. (Government of Malawi, 2011). The political environment at the moment is particularly in favor of developing the cotton sector. This is arising mainly from the decline in revenues from tobacco primarily from low prices resulting in low foreign exchange earnings.

From an institutional point of view, the sector has seen the emergence of the Cotton Development Trust (CDT) and the farmer organizations. Attempts to provide inputs to farmers at subsidized prices were first done by the Cotton Development Association (CDA) in 2003 when inputs were procured by the ginners and supplied to all cotton farmers at about 5% of the market value.

In recent years, the Malawi Government incorporated the cotton sector as a key element in its poverty reduction and growth strategy. Emphasis is on building vibrant integrated cotton and textile industry, which besides aiming at accelerated industrial growth, focuses on building a strong raw material base for the country’s production.

1.2 Overview of Malawi Cotton Sector

Malawi’s climate is ideally suited for cotton production, with a long, frost-free period; plenty of sunshine; moderate rainfall; and ideal temperatures of 32°C during the planting season. Nearly 50% of the cotton is traditionally produced in drought prone
areas of the country where cotton can provide a valuable source of cash when other crops fail.

From the late 1980s through the 1990s, cotton production declined in Malawi. This was the result of many factors including: the structure of the industry, the dominance of the public sector in the purchasing of cotton, decreasing productivity and inconsistent world market prices. The shrinking of the domestic textile industry since the late 1990s has further reduced the domestic demand for cotton lint. Production has been increasing since industry lows in the mid-90s, rising from 50,000 metric tons of seed cotton in 1998/99 to nearly 80,000 tons in 2007/08. However, a drought in 2008/09 and unattainable government minimum price requirements reduced production to a low of 27,000 tons in 2009/10 refer to Figure 1.2.

The cotton sector has seen quite a few developments over the past few years with the private and public institutions initiating interventions in the sector. The notable key developments are: amendments to the Cotton Bill, Private sector-led input

1.3 Cotton Production in Malawi

Malawi has been a cotton growing country since the colonial era. The cotton sector was vibrant for many years but started to slump in the early 1990’s due to among other reasons, the decline in global prices of the crop and the increasing cost of cultivation, which eroded the profitability of cotton particularly for small and marginal farmers.

Malawi’s economy is highly dependent on agriculture, with cotton contributing about 32 million dollars in foreign exchange earnings. The crop is the country’s fourth largest foreign exchange earner, after tobacco, sugar and tea. Tobacco contributes 60 percent of the country’s foreign revenue.

The public sector-led cotton input ‘subsidy’ program was first attempted at a universal cotton input access program by the CDA (Cotton Development Association) in 2002/2003 and was aimed at improving smallholder farmers’ productivity and increased incomes through access to quality pre-treated seed and chemicals for increasing yields and quality. The strategy was to make cotton production inputs easily accessible to cotton farmers so they could be universally applied through a heavy subsidy. By doing that, it was anticipated that the increased productivity would materialise into increased income so that with the gradual lifting of the subsidy cotton farmers would continue investing in the inputs, having tangibly realised the benefits of correct application of recommended inputs. The initiative had a resounding success. There was an increase in the number of farmers growing the crop, increased area planted to cotton, increased seed cotton production and increased lint output.

The program also had its problems: Coupons were generally distributed late. This also affected the timing and implementation of the conventional micro-financing activities for farmers that were not beneficiaries of the cotton input subsidy coupons. A
further impact was that the delayed recourse to micro-finance sources reduced the overall volume of loans disbursed. Whatever problems were faced though, it was generally a welcome intervention by government and was expected to continue. However, it was discontinued.

From the experiences on input subsidies, it has been proved that the subsidies contribute to improved yields and aggregate production; and is a factor to motivating farmers to grow cotton. Consequently, it is generally agreed that the subsidy should be maintained. Only certified seed and the very basic package of Dimethoate 40 EC and Cypermethrin 20 EC, or equivalent products were considered.

Cotton production has significantly increased in Malawi due to government effort of realizing some high yielding and drought tolerant varieties for commercial production. Yields are increasing for most varieties of cotton and that the area under cotton cultivation has significantly increased due to cotton subsidy (Government of Malawi, 2010). The crop is currently being grown in areas where it has never been grown before. Thanks partly to the subsidy program, the cotton price at the end of the selling season 2010-11 was 190 kwacha per kilogram (2.2 pounds), more than double the government-set price of 75 kwacha per kilogram.

Malawi provided 1.6 billion Malawian kwacha (US$9.7 million) in subsidies for cotton farmers 2011-12 growing season. The government would promote the crop to counter the worldwide anti-smoking lobby, and wanted cotton to become the country’s main foreign exchange earner. (2011-2016 National cotton strategic plan for Malawi, 2011).

Current policy direction appears to promote estate cotton production only in non-traditional cotton producing areas, but this will obviously have to be amended to allow for estate operation even in the traditional cotton growing areas. The estate cotton sector has high potential for expansion in the future, depending on the profitability compared to other crops.
Table 1.3: Cotton Production in Malawi

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</thead>
<tbody>
<tr>
<td>Area (Ha)</td>
<td>48,481</td>
<td>62,233</td>
<td>60,673</td>
<td>69,826</td>
<td>92000</td>
<td>47009</td>
<td>59626</td>
<td>242951</td>
<td>184513</td>
</tr>
<tr>
<td>Yield (Mt)</td>
<td>37,622</td>
<td>58,569</td>
<td>63,290</td>
<td>76,761</td>
<td>42000</td>
<td>27000</td>
<td>52456</td>
<td>196080</td>
<td>158826</td>
</tr>
</tbody>
</table>

Source: GoM Ministry of Agriculture and Food Security, 2013

Malawi’s annual cotton production has fluctuated between 13,500 and 50,000 metric tonnes over the last decade; refer to Table 1.3. However, with better farming practices and incentives, production levels currently hovering around 400 kg/ha can be increased to 3,000 kg/ha. (2011-2016 National cotton strategic plan for Malawi, 2011) The aim is to increase the area under cotton cultivation, which should lead to an increase in the yield. This government’s deliberate efforts to promote production of the cash crop.

1.4 Cotton Marketing in Malawi

Cotton marketing in Malawi was from independence to pre-market liberalization monopolized by the government parastatal, ADMARC. ADMARC was mandated to be the only buyer and supplier of cotton produce and inputs respectively. All smallholder farmers of cotton sold their farm produce and bought their farm inputs through ADMARC. However, from 1987, government through the structural adjustment programs (SAP) liberalized the pricing and marketing policies.

The liberalization allowed the private sector to play an active role in marketing of agricultural inputs and outputs; decontrolling of prices in agricultural inputs and output and removal of subsidies. Liberalization was expected to encourage efficient marketing through competition and increased efficiency of resource allocation and utilization by allowing market forces and prices to play a more dominant role in production and
consumption decision. The process started with the passage of legislation and a public clarification of the legal status of private trade in food crops to encourage entry. (Crawford, 1997).

Agricultural commercialization aims at increasing value addition to agriculture and productivity of farmers while reorienting smallholder sub-sector towards greater commercialization and international competitiveness. The government seeks to broaden participation of smallholders in cotton farming. This will be achieved by promoting contract farming (principally of tobacco, cotton and horticultural crops), out-grower schemes (e.g. sugar, tea, horticultural crops) and farmer cooperatives. Most of the export crops are grown on commercial estates and expansion of smallholder participation will ensure that the benefits to agricultural growth trickle down to the poor. (Agriculture Sector Wide Approach, Malawi Government, 2010)

According to Kumwenda and Madola. (May, 2005), Cotton farmers, ginners and other stakeholders are embroiled in an internal conflict, putting those who are for contract farming and those who are against it, subjecting the sub-sector to confusion only few weeks ahead of the onset of buying season. Farmers do not take control of marketing function either wholly or partly and they do not realize optimum income from their commodity. The national price of cotton is influenced by the forces of supply and demand in the international market. The national price is determined by the government ginners and other stakeholders at the beginning of the season.

1.5 Research Background and Questions

The overall goal of the Malawi government is to increase agriculture’s contribution to the economic growth not only by increasing production for food security but also by stimulating agro-processing and manufacturing for both domestic and export markets. The emphasis is on enhancing agricultural productivity, promoting food security and agro-processing of crops. However, the country in the past concentrated much of its efforts on the production of only two crops, namely maize and tobacco.
Most of the government policies worked toward increasing agricultural production (of only maize and tobacco) to achieve and maintain food-self-sufficiency, import substitution, internal income generation and foreign exchange earnings (Government of Malawi, 2008).

The productivity of maize and tobacco, however, has been low due to inadequate access to inputs by farmers, inadequate communication and adoption of technologies, inadequate access to credit, low output prices, land degradation and climate change. This has led to increasing poverty levels and food insecurity especially among smallholder farmers that mainly rely on agriculture for their livelihood. With this background, the country’s agricultural policies changed to emphasize the importance of agricultural diversification to expand and diversify both the food crop production and cash crop production.

The motivation of the paper is based on the question how socio-economic factors affect the profitability of among cotton smallholder farmers in Malawi?

Cotton is considered one of the priority crops by the Government of Malawi under the MGDS and under the ASWAp, more especially as it is grown by a large number of smallholder farmers. In demonstration of its commitment to cotton, the Government of Malawi committed MK 1.6 billion (US$ 10 million) to cotton in the 2011/2012 financial budget “…. to procure cotton fertilizers and seeds which will be distributed to smallholder cotton farmers on loan to be repaid at the time of selling their seed cotton to ginners. These resources will be given to ADMARC and other Malawian Cotton Ginners who will administer the loan to farmers. Our estimate is that these resources will assist smallholder cotton farmers who will cultivate over 200,000 hectares of cotton fields ….“ (2011/12 Budget Statement delivered in the National Assembly of the Republic of Malawi by the Minister of Finance on 03 June 2011).

According to Kumwenda and Madola (2005), cotton production is driven by cotton companies under the outgrower schemes. The companies contract small holder

---

1 At the exchange rate of MK 160/US$ 1.00
farmers, providing them with inputs of pesticides and herbicides. The main challenges to cotton production in Malawi are lack of fertilizer application, lack of information on cotton husbandry and government interference in seed cotton pricing. There is lack of authentic source of seed, hence poor crop establishment and low crop yields.

The low agricultural production and productivity has caused low profitability of smallholder agriculture influenced by weak links to markets, high transport costs, fewer farmer organizations, poor quality control and lack of information on markets and prices (Government of Malawi, 2006). In the market liberalized economy, the functioning of the market plays a major role in the allocation of resources for increased productivity.

Some of the buyers engage middlemen to buy for them. These middlemen do not only provide some essential services in terms of bulking, storage, transport etc. but also bring a high level of opportunistic informal traders (vendors). As such there is lack of transparency on marketing costs by the ginners/buyers which does not give opportunity for a more coordinated improvement in the primary marketing activities and also lead ineffective consultative processes between the cotton sector stakeholders and government resulting in well-intentioned but misguided interventions by government in using price support mechanism.

In the past, prices were decided unilaterally by the ginners. This created a problem for cotton production in Malawi due to deliberate exploitation of the farmers by the buyers which made cotton markets very volatile with high price fluctuations within and between seasons. In the 2008/09 season, the government, through the Ministry of Agriculture and food security took the initiative to announce the farm-gate price. Since then, prices are now based on negotiations between the grower representatives and the ginners, with oversight from the Ministry of Agriculture and food security. (2011-2016 National cotton strategic plan for Malawi, 2011).

Despite the potential of cotton production in enhancing income security, there is still a dearth of empirical evidence regarding the cotton value chain, let alone the value accruing to cotton producers’ in Malawi. Over time, cotton-related research has focused on the agronomic aspects of cotton (Government of Malawi, 2010), much to
the exclusion of other important aspects of cotton production such as resource use efficiency and enterprise profitability. The profitability of cotton production is influenced by several factors with the implication being that to ensure an effective policy framework targeting agricultural development, there is need to identify factors influencing the profitability of cotton production in Malawi. This is important because despite many factors having been identified as influencing profitability of cotton production elsewhere (Samboko, 2011, Tschering, 2002; Ishikawa, 1999; Reardon and Timmer 1997); it is unclear as to whether the same factors apply to Malawi as it presents a unique case.

Many studies have been conducted to determine the level of market participation and also on the possible marketing systems of major crops by smallholder farmers in Malawi such as maize, tobacco, beans and other pulses. However, the structure and conduct of the cotton markets in Malawi is largely unreported in literature. In the absence of adequate information on cotton marketing deriving from empirical studies, discussion of cotton marketing policy in Malawi will take place in an information vacuum.
CHAPTER 2 DATA AND STUDY AREAS

2.1. Chapter Overview

Malawi is divided into four administrative regions: North, Central, eastern and South. The cotton production data and price data will be extracted from IHS -3 Malawi 2011, Malawi government -Ministry of Economic Development and planning data bank in collaboration with the Malawi National Statistical Office (NSO) and Malawi cotton Development Trust. The sample comprised all households that completed the Integrated Household Survey -3 Malawi conducted in 2011. The study used 2011 cross-sectional household data in which a total of 215 households were used in the analysis. The variables were selected based on economic theory and literature as presented in the literature review and conceptual framework.

Data were collected on various household- and village-specific characteristics, crop production and input use, incomes and expenditures, Access to credit and households’ participation in Malawi’s cotton input subsidy program. In addition, data from the previous growing season were collected. Two separate questionnaires were also used, one for focus group discussion and another for ginners/representatives and other key informants. For the focus group discussion survey, the primary respondent in each household was the head. In some cases, spouses and other older household members were invited to participate in the interview to assist in information gathering regarding household activities.

For the buyer /ginners and other key informants who had knowledge about the cotton and its markets were interviewed on individual basis and group setting in some cases in order to obtain more cotton information.
In addition, Data for the study were supported by the secondary sources from journals, textbooks, conference paper, Internet, Malawi government documents etc.

The analytical tools employed for the study are descriptive statistics and gross margin analysis. Data obtained for this study were subjected to different types of analyses. In this study, the following tools were employed, namely: descriptive statistics, cost analysis and multiple regression analysis.

2.2. The Study Areas

Data used in this thesis come from villages in eight districts of Malawi which are Neno, Karonga, Chikwawa, Nsanje, Balaka, Mangochi, Salima and Nkhotakota covering five Agricultural Development Divisions (ADD) in all administrative regions covering four cotton major ecological areas in Malawi, as shown in Table 2.2. Cotton is produced largely by the smallholder sector, with very small estate production. The production of cotton is largely rain fed and the growing season last from December to May. Cotton is mainly grown in the lower shire valley and the lake shore areas. The lower Shire valley accounts 50% of the production, southern region uplands around 36% and the lake shore areas the remaining 14%. The numbers of smallholder cotton growers has fluctuated a great deal, mainly due to effects of drought and access to inputs.

Table 2.2: Ecological Areas for Cotton Production in Malawi

<table>
<thead>
<tr>
<th>Area</th>
<th>Districts</th>
<th>Altitude masl</th>
<th>Average rainfall mm p.a.</th>
<th>Average temp. °C</th>
<th>Average prod. MT</th>
<th>Proportion of crop %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low altitude</td>
<td>Nsanje, Chikwawa</td>
<td>50-100</td>
<td>500-600</td>
<td>40</td>
<td>31,000</td>
<td>50</td>
</tr>
<tr>
<td>Lakeshore</td>
<td>Salima, Nkhotakota, Karonga</td>
<td>100-500</td>
<td>600-800</td>
<td>35</td>
<td>8,500</td>
<td>14</td>
</tr>
<tr>
<td>Medium Altitude, Upper Shire valley</td>
<td>Blantyre, Balaka, Machinga, Mangochi, Mwanza/Neno</td>
<td>500-1000</td>
<td>800-1,000</td>
<td>30</td>
<td>23,000</td>
<td>37</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>62,500</strong></td>
<td></td>
</tr>
</tbody>
</table>

Source: Cotton strategic Plan Malawi, 2011-2016
There are four major cotton producing regions in Malawi. The survey was implemented in four regions of the Malawi: South, North, Centre and Eastern. The southern region had 83 farmers, central region had 56 farmers, and eastern region had 50 farmers while the northern region had the least with 26 farmers making total sample size being 215. This shows that about thirty nine percent were from the southern region, 26 percent from Central region, 23 percent from the Eastern region and 12 percent from the Northern region.

Malawi has comparative advantage in terms of land, suitable weather for cotton production and room to expand production in both the smallholder and estate sector. There is need to improve the competitiveness of Malawi cotton. The ecological areas where cotton is grown in Malawi are weather risk areas. This is the comparative advantage for cotton in such areas compared to other crops. There are years however that can be severe even for cotton.

Besides that, these are the district where cotton up-scaling program has been working for at least three years distributing cotton inputs (among other inputs) to the smallholder farmers.
CHAPTER 3 DETERMINING THE FACTORS THAT AFFECT PROFITABILITY OF COTTON

3.1 Chapter Overview

This chapter presents a description of the research methodology used in achieving the stated objectives, and the data used in the analysis as well as the actual empirical models used. The study employed a two-step analysis. In the first step, a gross margin analysis was conducted to determine total sales value of cotton production. In the second step, a multiple regression model was employed to identify factors influencing profitability of cotton in which farmers allocate resources in cost efficient way.

The analysis of this chapter is motivated by the question how do socio-economic factors affect the profitability of cotton among smallholder farmers in Malawi? It also presents a theoretical and empirical model for determining the market value of cotton ensuing to farmers and the factors correlated with it. It also seeks to understand whether access to government policies and credit affects profitability.

Discussions on the study findings dwell on results of the gross margin analysis and its correlation with social economic factors of the household. Finally, the chapter ends with a discussion on the factors influencing profitability of cotton.

There are several determinants that have been identified to influence agricultural profitability at farm level. These factors are the farm gate price, government price policies, production costs, variety of seed used, farm size, land tenure, education level of the household head, age of household head, gender of household head, household size, off farm income received, extension services, experience in production of crop and distance to market which also influences and impacts on yield, (Rearden, et al. 1997 and Samboko, 2011). Crop prices, level of output, and production costs
analytically influence net efficiency for farmers in Africa and elsewhere (Samboko, 2011, Odhiambo, Kristanson and Kashangaki, 1996). One of the major constraints to cotton productivity is the capacity to apply the recommended production packages

Sulumbe, et al., (2010) reported that farming experience was inversely related to the cotton output while family size, income and extension were positively related to cotton output based on the profitability of cotton production under sole-cropping in Nigeria.

Erbaugh et al., (2008) found that farm size, production costs, farm location, interaction between production costs and farm gate price as well as the interaction between the varieties used and fertilizer applied were significant in explaining the observed sorghum gross margins. However, contrary to literature, farm size was found to negatively influence the gross margins. Their view on the relationship between farm size and gross margins was in contrast with findings elsewhere such as those by Sulumbe et al., (2010) and Ibro, (2008) who found positive relationships between gross margins and farm size.

The most common method in determining profitability of an enterprise involves a gross margin analysis in which variable costs of production are deducted from the total revenue (Samboko, 2011; Sulumbe et al., 2010; Ishikawa, 1999; Tschering, 2002; Olayiwolaa, 2008; and Erbaugh et al., 2008). In these studies, gross margins served as proxies for profitability.

The econometric method used to identify factors influencing profitability involves regressing the observed yields on a set of hypothesized explanatory variables (Bagamba, 1998; Olayiwoola 2008) and another tactic involves regressing the computed gross margin on a set of hypothesized variables (Sulumbe et al., 2010; Ishikawa, 1999; Tschering, 2002; and Erbaugh et al., 2008).

From the reviewed literature, it is clear that cotton profitability analyses have been conducted elsewhere but no study is recorded as having been conducted in Malawi. It is unblemished that factors that influence profitability elsewhere may not
have the same effect in Malawi. It should be noted that some facets have not been tackled and therefore merit further research.

### 3.2 Conceptual Framework

This study aims to maximize selected objective function bearing in mind the assumption of producers’ optimization behavior while focusing on a set of limitations available using the concept of a Gross Margin and its relation to production costs and gross revenue. The model was developed using the components of gross margin.

The term gross margin generally refers to the remaining income from an enterprise after the variable costs are deducted. A gross margin budget is a fairly detailed estimate of the output, cost, and profitability of individual crop. The gross margin budget includes all costs involved in producing the enterprise. For instance, it is an indication of the profitability of an enterprise. Gross margin and enterprise output like variable cost are expressed in monetary terms.

Gross margin measures the relative profitability of the enterprise. It guide farmers on which enterprise to engage in, given the resources available. Similarly, it can be used to calculate the potential profitability of growing an entirely new crop if a farmer wishes to diversify her products.

The basic formula for calculating a gross margin is:

\[
\text{Gross Margin} = \text{Gross Revenue} - \text{Cost of Production}
\]

Where Gross margin is the difference between Gross revenue (price multiplied by yield) and Cost of production thus total variable costs incurred in production.

The gross margin analysis was used under the assumption that fixed costs of production are negligible. (Olukosi and Erhabor, 1988 and Samboko, 2011). Using the income as the dependent variable, the contribution of other control variable to income was done and the correlation among the variable cost of production were done.
Hazell, (1971) reported that gross margin is gross output (price multiplied by yield) less variable or direct costs. Kay et al., (2004) defined gross margin as the difference between income and variable costs. To compute the gross revenue (total revenue), output in kilograms per hectare for each household will be multiplied by the highest price at which a household sold the cotton. All variable costs per hectare associated with cotton production will be identified (the cost of labor, implements, and inputs). The variable inputs used in this study include the cost of land rent, labor, planting, seeds, herbicides, insecticides, and transportation. The monetized value of these inputs will be subtracted from the gross revenue (GR) to compute the gross margin. The gross margin will then be computed as the difference between the total revenue and the total variable costs.

A variable cost in gross margin must be specific to the enterprise and vary to the proportion to the size of the enterprise. Furthermore, a variable cost can be avoided if the enterprise is discontinued. The main two uses of the gross margin are to check efficiency and to change the farming system thus the use of gross margin in farm planning. (Guide to Agricultural Production, 2012).

For crops, gross margin analysis is usually done on a per hectare basis if land is the most limiting resource. In many cases, another resource such as family labour might be of greater concern.

The literature suggests that farmers may be motivated to produce on the basis of their attitude towards risk; the utility derived from production; and for profit reasons (Knight 1923; Bioca 1997, Samboko, 2011). According to Figure 3.2, it is observed that different farm and physical characteristics among farmers are expected to influence on the profits through their effect on the volume of production, price received per unit of a commodity and the cost structure.
Social economic characteristics such as age, gender, household size and education as well as production characteristics. These characteristics such as cost of fertilizer, insecticides, ploughing, seeds, transportation, labor (planting, weeding, fertilizer application, spraying of insecticides) were included to explain why profitability in a particular differs among cotton farmers. In addition, institutional and technological attributes was also included such as membership of social organization and whether access to credit or not.

Social economic characteristics were presented and followed by the results of the gross margin analysis. Using the GM as the dependent variable, the contribution of other predictor variable to profitability was done using stepwise multiple regression analysis (Steel and Torrie, 1980 and Samboko, 2011).

*Source: Adapted From Engel E. (2000)*

Figure 3.2. Conceptual Analysis of Profitability.
3.3 Determinants Influencing Profitability Using Multiple Regression

The multiple regression models accommodate many explanatory variables that may be correlated. Multiple regression analysis can be used to build better models for predicting the dependent variable. An additional advantage of multiple regression analysis is that it can incorporate fairly general functional form relationships.

The multiple regression models is still the most widely used vehicle for empirical analysis in economics and other social sciences. Likewise, the method of ordinary least squares is popularly used for estimating the parameters of the multiple regression models. (Wooldridge, 2004). Multiple regression analysis is more amenable to ceteris paribus analysis because it allows us to explicitly control many other factors which simultaneously affect the dependent variable.

The multiple regression models is a model in which there is more than one explanatory variable, and show how the method of OLS can be extended to estimate the parameters of such models. Multiple regression analysis allows many observed factors to affect dependent variable thus allowing for much more flexibility. Multiple regression analysis is also useful for generalizing functional relationships between variables. (Gujarat, 2006).

Multiple regression technique was used to determine the relationship between cotton output and the selected exploratory variables. A multiple regression model will also be used to determine the factors and constraints that affect the volume of cotton production and marketing and also their profitability. The gross margin was modeled as the function of age, gender, household size, Farm size, farmer membership to organization, yield, education level, access to credit, total cost of production and off farm income. The technique was used to determine the profitability of the cotton production.

A multiple regression was subjected to STATA based on the hypothesized variables i.e. regressing the observed gross margin for each producer on the hypothesized variables in order to ascertain the factors influencing profitability to cotton farmers.
The dependent variable was the computed gross margin for each household. A number of predictor variables were identified and included in the model. Off farm income was measured in Malawi Kwacha for each household; another variable included was the yield measured in kilograms per hectare. Other variables included; whether or not the household received credit in any form, Association or cooperative membership; total cost of production; and farmer characteristics that included the age of household-head, gender and the education level. The dependent variables act as proxies for profitability. The gross margin was regressed on the hypothesized variables in identifying profitability of explanatory variables.

The general multiple linear regression model is also called the multiple regression model. Multiple regression analysis can also incorporate fairly general functional form relationships. Generally, the implicit form of regression for this analysis can be stated as:

\[ Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \ldots + \beta_k X_k + \mu \]

Where \( Y \) is Gross Profit Margin (in Kwacha) and \( x \)'s are the explanatory variables and the betas are the partial effects.

3.4. Empirical Model Specification

The empirical model specification is as shown in equation below.

\[ GM = f (\text{Age, Hhsize, Gender, Education, Farm size, Yield, offfarminc, Gross_Cost, Farmermembership, Credit}) \]

Where: \( GM \) is the computed gross margin for household \( i \).

\begin{itemize}
  \item **Age**: Age of household head in years.
  \item **Gender**: Gender dummy for the household head (equal to 1 if male and zero otherwise).
  \item **Hhsize**: Size of the household.
  \item **Education**: Dummies for the education level of the farmer.
  \item **Farm size**: Size of the land devoted to cotton production in hectares.
  \item **Yield**: the yield (in Kilograms per hectare) realized by the household in question.
  \item **Offfarminc**: Value of non-farm Income received in Malawi Kwacha.
\end{itemize}
Gross_ Cost = Farm total variable production costs in Malawi Kwacha.
Credit=Credit dummy (equal to 1 if the farmer received any credit services and equal to zero otherwise).

3.5 Testing Validity of the Model

A number of regression diagnostics were conducted to guarantee that the regression model was correctly specified as well as being in line with assumptions of ordinary Least squares (OLS).

The estimates of the Breusch-Pagan/Cook-Weisberg test initially suggested the presence of heteroskedasticity. The cross-sectional data was subject to the white Test for Heteroskedasticity aimed at correcting standard errors for OLS estimators to avoid drawing erroneous conclusions. (Gujarati 2006). The coefficient of determination $R^2$ (multiple regression) is a summary measure that tells how well the sample regression line fits the data.

To ensure that the assumption of no correlation between variables was not violated, a multicollinearity test was also done. The results showed and depicted no problem in multicollinearity. The results suggested non-normality in the error term constant when normality tests were also conducted.

Ramsey reset was used to check specification of the model as well as assuming the expected correct functional form. It was also used to check whether the model have no omitted variables. If significant at 1% might reject the null hypothesis.

VIF shows how the variance of an estimator is inflated by the presence of multicollinearity. Thus giving a meaning that as the extent of collinearity increases, the variance of an estimator increases, and in the limit it can become infinite. It is observed that when there is no collinearity between variables VIF is 1. The rule of the thumb is that if the VIF if greater than 10, which corresponds to $R^2 > 90\%$ then be concerned about the multicollinearity. (Gujarati 2006).

The validity of a multiple regression was tested by checking the coefficient of the determination i.e. $R^2$, F statics and t statics values. The coefficient of determination
measures the proportion of the total variation in the dependent variable that has been accounted for by regressing the dependent variable on the whole set of regression.

Adjusted R² is the correction for the degree of freedom in a regression with K+1 variable. The t statistic is used to test whether regressors or independent variables explain the behavior of the dependent variables. In other words the f statistics is the overall test of explanatory variables while the t statistics is the test of significance of each explanatory variable included the constant in the model (Woodridge, 2012).
CHAPTER 4 RESULTS AND DISCUSSION OF DETERMINANTS OF PROFITABILITY OF COTTON

4.1 Socio-economic Characteristic of Sample Household

This highlights the major socioeconomic characteristics of farmers under study. Emphasis was placed on age of household head, gender of the household, household size, yield, farm size, education, off farm income, access to farm credit, membership to farmer based organization etc.

4.1.1. Age of the Household

The descriptive statistics showed that the sample had the head of the household whose minimum age was age 15 years and the maximum age of 71 years old with the overall average age of 33.27 years old.

One important observation from the Table 4.1.1 is that the overall age among farmers is lower than the life expectancy age at birth is 56 years in Malawi. Further analysis showed that participating farmer in cotton production was relatively younger with the mean age of 33.27 years.

Agricultural activities in Malawi are labor intensive due to lack of mechanization. Age and health status, are some of the factors influencing labor availability. According to Government of Malawi (2010), 44% of the population is below the age of 14, leaving 56% as the source of the country’s effective labor.
Table 4.1.1: Shows Age Distribution of Household Head

<table>
<thead>
<tr>
<th>Age group</th>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-29</td>
<td>57</td>
<td>26.51</td>
<td>26.51</td>
</tr>
<tr>
<td>30-49</td>
<td>142</td>
<td>66.05</td>
<td>92.56</td>
</tr>
<tr>
<td>50-59</td>
<td>14</td>
<td>6.51</td>
<td>99.07</td>
</tr>
<tr>
<td>&gt;60</td>
<td>2</td>
<td>0.93</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>215</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

The results above in Table 4.1.1 showed that most farmers in cotton production representing 92.56% are younger and this could be well explained by the fact that production of cotton is labor intensive and those that are becoming advanced in age may not cope up with cotton production. Young people therefore have an advantage to exploit the economic opportunities available in cotton production and marketing.

Most of the sampled household accounted for 99.07% was between age range 15 and 59 years old. This result shows that majority of farmers were economically active age group (15-59 years) as shown in Figure 4.1.2. Economically active individual are those people who can efficiently and effectively engage in and contribute significantly to farm production and its outputs.
4.1.2 Gender of the Household Head

The Table 4.1.2 show the sample households consist of 75.81% male and 24.19% female heading the household. The percentage of female headed household is much lower than the national average of 30%. The study therefore show an area in Malawi with fewer incidences of females heading the households.
Table 4.1.2: Shows the Proportion of the Sample Households by Gender of Household Head

<table>
<thead>
<tr>
<th>Gender of household head</th>
<th>Household Identity</th>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td>163</td>
<td>75.81</td>
<td>75.81</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td>52</td>
<td>24.19</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>215</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

The results in Table 4.1.2 show that most farmers in cotton production are males than females. It should be noted that most district selected are largely a patriarchal society. This observation has to do with security of land tenure system in neutral and patriarchal system as men feel more secure than in matriarchal system.

The results from the sampled farmers can be supported by the study of micro entrepreneurship in Malawi indicated that men in general see themselves as greater risk takers as they are usually the main breadwinners for the family. Women are generally less confident about going into business and have far greater barriers to overcome. The majority of women may find it very difficult to operate bicycles to the market, unlike their male counterparts. (Edriss A.K., 2003)
4.1.3. Level of Education of the Household Head

Education is the key factor of development. Education also provides a platform for them to freely interact with professional field staff.

Table 4.1.3: Reflects the proportion of the sampled farmers by education attainment.

<table>
<thead>
<tr>
<th>Highest education qualification attainment</th>
<th>Household Identity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education Level</td>
<td>Frequency</td>
</tr>
<tr>
<td>Standard 1-6</td>
<td>121</td>
</tr>
<tr>
<td>Standard 7-8</td>
<td>52</td>
</tr>
<tr>
<td>Form 1-2</td>
<td>30</td>
</tr>
<tr>
<td>Form 3-4</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>215</td>
</tr>
</tbody>
</table>

The sample household shows the low level of education for the entire population of the sample by education level. The study categorized the education levels as follows: Standard 1-6, Standard 7-8, Form 1-2 and Form 3-4.

The results in Table 4.1.3 show that majority of the respondent had little education. The percentage shows that low literacy level were observed in cotton production represented by 56.28% followed by 24.19% representing standard 6-8. It can be concluded that majority of the farmers had little/low education. The average education level in the smallholder sector is usually junior primary education (Standard 1 to Standard 6). The low education levels impact on the extension approaches which need to be simple, hands-on, on-site training and mostly in the vernacular.
This low literacy level among farmers gives a clear explanation that most of them are not able or find it difficult to read agricultural extension materials and other agricultural booklets related to cotton production and marketing. This also has implication on how they keep agribusiness records and handle business transactions due lack of basic literacy and numeric skills.

The study depicts that the education attainment is predominantly with little education. At this level the choice behavior in pursuit of a livelihood strategy are likely to be the same.

Finally, none of the respondents attained tertiary education level refers to Figure 4.1.3.

4.1.4 Household Size

The overall mean of household size in the sample is 6 members per household whose minimum household size was 3 members and the maximum household size was 13 members.
Table 4.1.4: Show the Proportion of Household Size Distribution

<table>
<thead>
<tr>
<th>Size of the Household</th>
<th>Households Identity</th>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1-5</td>
<td>84</td>
<td>39.07</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6-10</td>
<td>125</td>
<td>58.14</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt;10</td>
<td>6</td>
<td>2.79</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>215</td>
<td>100</td>
</tr>
</tbody>
</table>

Those with large families are more likely to be vulnerable to economic hardships because of many mouths to feed. This is expected since households with more dependent children have more consumption needs. On the contrary, large families do provide the opportunity of family labour to agricultural activities.
4.1.5. Farm Size

At present, Land is one of the scarcest resources in agricultural production in Malawi. The problem of land scarcity in Malawi is due to high level of population growth pegged at 3.5% per annum. Productive agricultural land is diminishing, creating a land scarcity problem for agriculture with the increase in population growth. About 78% of rural households cultivate less than one hectare of land (EIU, 2004).

Land is a basic factor of production and an important source of livelihood. It is also a source of income, nation’s wealth; and provides cultural identity and shelter. The smallholder cotton sector is characterized by many growers with small parcels of land averaging between 0.5 to 1 acre (0.2 to 0.4 ha under customary tenure). Almost all the smallholder cotton land is under customary tenure, and that land cannot be used as collateral for accessing production financing. It should be noted that the national landholding size for Malawi is about 1 hectare. There is competition between cotton and other farm enterprises on small and fragmented land holding size likely limit increased cotton output.
Access to land for farming provides a basis for meeting subsistence requirements in most smallholder farmers. Farmers with large farm land size may be more willing to grow more cotton than those with small landholding size, as it would be easier to spread risks.

In this study, Farm size (land holding size) as the most precious and valuable asset for the household was considered.

Table 4.1.5: Presents Sample Distribution by Farm Size

<table>
<thead>
<tr>
<th>Farm size of household</th>
<th>Household Identity</th>
<th>Land Area (ha)</th>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-0.1</td>
<td></td>
<td>139</td>
<td>64.66</td>
<td>73.95</td>
<td></td>
</tr>
<tr>
<td>1.1-1.5</td>
<td></td>
<td>36</td>
<td>16.74</td>
<td>81.4</td>
<td></td>
</tr>
<tr>
<td>1.51-2.0</td>
<td></td>
<td>22</td>
<td>10.23</td>
<td>91.63</td>
<td></td>
</tr>
<tr>
<td>&gt;2.0</td>
<td></td>
<td>18</td>
<td>8.37</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>215</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The study results showed an average land holding size of 1.14 hectares per household in the entire sample. This therefore shows that the overall average farm size is greater than the national average per smallholder farmer of 1.0 hectares which means that land at the time of study was not a critically scarce resource in the area of study. It should be noted that cotton is grown as a cash crop in Malawi.
4.1.6. Land Acquisition

The major form of land acquisition is through inheritance represented by 63.26% followed by allocation by the local leaders 17.67 % and the rest through other forms like given as bride price, purchased with or no title, purchase, rent, short-term borrowing for free and moved in w/o permission.

Table 4.1.6: Reflects the proportion of the sampled farmers by land acquisition.

<table>
<thead>
<tr>
<th>Ability of household to acquire the land</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Granted by local leaders</td>
<td>38</td>
<td>17.67</td>
<td>17.67</td>
</tr>
<tr>
<td>Inherited</td>
<td>136</td>
<td>63.26</td>
<td>80.93</td>
</tr>
<tr>
<td>Bride Price</td>
<td>7</td>
<td>3.26</td>
<td>84.19</td>
</tr>
<tr>
<td>Purchased with title</td>
<td>2</td>
<td>0.93</td>
<td>85.12</td>
</tr>
<tr>
<td>Purchased with no title</td>
<td>4</td>
<td>1.86</td>
<td>86.98</td>
</tr>
<tr>
<td>Rent short-term</td>
<td>21</td>
<td>9.77</td>
<td>96.74</td>
</tr>
<tr>
<td>Borrowed for free</td>
<td>2</td>
<td>0.93</td>
<td>97.67</td>
</tr>
<tr>
<td>Moved in w/o permission</td>
<td>4</td>
<td>1.86</td>
<td>99.53</td>
</tr>
<tr>
<td>Other (Specify)</td>
<td>1</td>
<td>0.47</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>215</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

The study noted that sale of land is not common since rules and regulation governing customary land tenure system in Malawi is prohibitive. Being communal land the village head has the authority to allocate land to his or her subjects when available. It is clear that unused land should be handed back to the village head who in turn reallocates it to those who require it.
4.1.7 Access to Credit

Access to credit is very important for poor resource endowed household to move out of the fangs of poverty trap. Access to credit also plays a fundamental role for farmers to achieve their objectives.

Access to credit therefore provides the household a facet to widen economic opportunities. Credit is also essential to help households access more farm inputs.

Capital is usually one of the constraints to agricultural production as such farmer credit is required. Farm credit in cotton smallholder sector in Malawi is administered by cotton registered ginners and Malawi government through cotton up scaling programme.

Table 4.1.7: Reflects the proportion of the Sampled Farmers to Access to Credit

<table>
<thead>
<tr>
<th>Access to credit (=yes if member received credit and no otherwise)</th>
<th>Household Identity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>Percent</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Yes</td>
<td>185</td>
</tr>
<tr>
<td>No</td>
<td>30</td>
</tr>
<tr>
<td>Total</td>
<td>215</td>
</tr>
</tbody>
</table>

According to Table 4.1.7, the study indicated that majority of sampled household representing 86.05% have had access to credit in form of equipment such as sprayer and inputs like seed and agrochemicals as well as cash. In Malawi, most farmers have poor access to lending institutions. This is because these institutions demand high collateral requirements and high interest rates (Lwesya, 2004).

Although there are a number of lending and micro finance institutions in Malawi, most of them do not provide agricultural credit or loans due to high default rate. Such
malpractice hinders these institutions in providing specialized and low cost services to agriculture.

Farmers do also get informal credit from friends and relatives with or without collateral.

4.1.8 Farmer Membership

Farmer groups use their size as leverage to secure financing and credit (Lwesya, 2004 and Government of Malawi, 2011). Most of the smallholder cotton farmers form clubs to develop social capital that provides the collateral of collective responsibility for loans on a ‘one for all and all for one’ basis. It is clear that farmer based organization are usually created to help farmers market their crop.

Membership to farmer based organization is one of the most elements that help household to have access to credit facility. This development helps to provide a solution to inadequacy of credit facilities and risk consideration among smallholder farmers as it act as collateral at the same time as a simple means of disseminating extension messages.

The farmer membership is useful for various purposes: but mainly for monitoring developments, planning purposes and to guide interventions along the cotton value chain.
**Table 4.1.8: Reflects the Proportion of the Farmer Membership to Farmer Based Organization**

<table>
<thead>
<tr>
<th>Household Identity</th>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>185</td>
<td>86.05</td>
<td>86.05</td>
</tr>
<tr>
<td>No</td>
<td>30</td>
<td>13.95</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>215</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

The study indicated that most of the sample households reflecting 86.05% are members of farmer based organization that are linked to government and ginners that offer credit facilities. Furthering to that on the level of credit facilities proved that the higher proportion of the sample household were affiliated to farmer based organization . This give a possible explanation that farmers who benefit farm credit are at a greater advantage to grow more cotton than those who fail to get credit.

The study also shows that farmer based organization should be encouraged to help increase the commercialization of smallholder agricultural production.

It was observed that members of farmer based organization have had some contact with field extension staff. Being members of FBOs helped to ease transmission of new and improved agricultural techniques from research institution to farmers. It also provide a platform for communication of farmer experiences and problems to researchers, ginners and cotton related institution for scrutiny and refinement of existing technologies of search for new technologies to solve existing problems.
4.1.9 Transportation

Transportation creates spatial utility as farm produce is being ferried to where it is wanted.

Table 4.1.9: Reflects the Proportion of the Sampled Farmers by Mode of Transport.

<table>
<thead>
<tr>
<th>Mode of Transport to the market Household Identity</th>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bicycle Taxi</td>
<td>10</td>
<td>4.65</td>
<td>4.65</td>
</tr>
<tr>
<td>Buyer picked up the crop</td>
<td>57</td>
<td>26.51</td>
<td>31.16</td>
</tr>
<tr>
<td>On Foot</td>
<td>88</td>
<td>40.93</td>
<td>72.09</td>
</tr>
<tr>
<td>Other (Specify)</td>
<td>5</td>
<td>2.33</td>
<td>74.42</td>
</tr>
<tr>
<td>Own Bicycle or Oxcart</td>
<td>49</td>
<td>22.79</td>
<td>97.21</td>
</tr>
<tr>
<td>Truck / Bus / Minibus</td>
<td>6</td>
<td>2.79</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>215</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Majority of farmers represented by 40% were walking (went “on foot”) to the market point on foot as the common means of transporting cotton to the market points. Other modes of transport used were buyer picking up the crop, Bicycle Taxi, Own Bicycle or Oxcart and Truck / Bus / Minibus. The observation is not surprising for majority of farmers to walk to the market points on foot because most of them are cash constrained. It should be noted that most farmers do transport small quantities of produce to be traded and at the same time they do not move long distances to the nearest farm gate market.

It should be noted that distance to the market point; time factor, Capital, weight and bulk of goods are the main determinants affecting the mode of transport to use.
### 4.1.10: Summary of Descriptive Statistics on Continuous Variables

Table 4.1.10: Summary of Descriptive Statistics on Continuous Variables (averaged over samples).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs.</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Years)</td>
<td>215</td>
<td>33.27</td>
<td>9.82186</td>
<td>15</td>
<td>71</td>
</tr>
<tr>
<td>Farm size (ha)</td>
<td>215</td>
<td>1.1433</td>
<td>0.39309</td>
<td>0</td>
<td>2.5</td>
</tr>
<tr>
<td>Hhsize (Person)</td>
<td>215</td>
<td>6.2837</td>
<td>2.11105</td>
<td>3</td>
<td>13</td>
</tr>
<tr>
<td>gross_cost (Mk)</td>
<td>215</td>
<td>6829.5</td>
<td>12117.7</td>
<td>0</td>
<td>106600</td>
</tr>
<tr>
<td>gross_margin (MWK)</td>
<td>215</td>
<td>39366</td>
<td>42953.2</td>
<td>0</td>
<td>272600</td>
</tr>
<tr>
<td>yield (Kgs)</td>
<td>215</td>
<td>495.24</td>
<td>499.408</td>
<td>0</td>
<td>2200</td>
</tr>
<tr>
<td>Distance (Km)</td>
<td>215</td>
<td>17.47</td>
<td>14.3393</td>
<td>0</td>
<td>40</td>
</tr>
<tr>
<td>Off farm income (MWK)</td>
<td>215</td>
<td>5627.9</td>
<td>11190.6</td>
<td>0</td>
<td>100000</td>
</tr>
</tbody>
</table>

*Source: Own Analysis 2014.*

Table 4.1.10 presents some of the descriptive statistics of the continuous variable. It specifically focuses on age of respondents, household size, yield of cotton, the area under cotton production, the value of Off-farm income received, total production cost distance to the nearest ideal market point, and total gross margin. The mean distance to the nearest ideal market point is 17.47 Km and it ranged between 0 and 40 km.
The average total gross margin was 39,366 Malawi Kwacha with a minimum of MWK 0 and a maximum of MWK 272,600.00. If an enterprise does not have a positive gross margin, then that enterprise is not profitable. The average value of off-farm income received by the households amounted to MWK 5,627.9. Mean total costs of production amounted to MWK 6,829.50 per hectare with a minimum and maximum of MWK 0 and MWK 106,600 respectively. The average yield was 495.24 kilograms per hectare (Kgs per hectare) with a minimum of 0 (Kgs per hectare) and a maximum of 2200 (Kgs per hectare).

4.1.11 Gross Margin Analysis

The results in Figure 4.1.11 show a summarized mean of gross margins of cotton per each district in the sample. The overall mean gross margin of cotton was MK39366. There were differences in the mean gross margins of cotton per district. Salima indicated the highest mean gross margin of MK 56,182.58 per hectare followed by Balaka district. The least mean gross margin of cotton was MK 24,500 per hectare from Chikwawa district. The possible explanation can be due to the fact that this district has sugar estates which offer non-farm employment opportunities that sway other cotton farming activities.
Figure 4.1.11. Average Gross Margin by District
4.2. Results from the Model of Gross Margin Analysis

Table 4.2: Shows the Multiple Regression Results on Factors influencing Profitability to Cotton Farmers

<table>
<thead>
<tr>
<th></th>
<th>Coef.</th>
<th>Std. Err.</th>
<th>[95% Conf. Interval]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross_margin (MWK)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (years)</td>
<td>-77.84507</td>
<td>-277.258</td>
<td>121.5679</td>
</tr>
<tr>
<td>Hhsize (persons)</td>
<td>-168.114*</td>
<td>-1090.84</td>
<td>754.6146</td>
</tr>
<tr>
<td>yield (Kgs)</td>
<td>59.08414***</td>
<td>47.18139</td>
<td>70.98688</td>
</tr>
<tr>
<td>Farm size (ha)</td>
<td>5813.848**</td>
<td>-1393.91</td>
<td>13021.6</td>
</tr>
<tr>
<td>Female_dummy</td>
<td>-2201.247*</td>
<td>-5750.65</td>
<td>1348.15</td>
</tr>
<tr>
<td>Off_farminc (MWK)</td>
<td>1.012146***</td>
<td>0.819481</td>
<td>1.204812</td>
</tr>
<tr>
<td>gross_cost (MKW)</td>
<td>0.9644949**</td>
<td>0.015678</td>
<td>1.913312</td>
</tr>
<tr>
<td>farmermember_org</td>
<td>8034.207*</td>
<td>-560.58</td>
<td>16628.99</td>
</tr>
<tr>
<td>Sec_dummy (3071.744)</td>
<td>-176.7099</td>
<td>-6233.33</td>
<td>5879.906</td>
</tr>
<tr>
<td>Noedu_dummy (2624.613)</td>
<td>4534.229**</td>
<td>-640.77</td>
<td>9709.227</td>
</tr>
<tr>
<td>Credit_dummy (3468.42)</td>
<td>6918.672**</td>
<td>79.92267</td>
<td>13757.42</td>
</tr>
<tr>
<td>_cons</td>
<td>-22095.69</td>
<td>-36561.6</td>
<td>-7629.74</td>
</tr>
</tbody>
</table>

Number of observation = 215
F(11, 203) = 116.75

Robust standard errors parentheses denote ***, **, *, p<0.01, p<0.05, p<0.1 respectively.

Source: Own Analysis
The multiple regression results show that about 84.26 percent of the variation in the gross margin is explained by the regressors in Table 3.2. Generally, there is statistical significant relationship between the observed gross margins and the regressors in the model.

Household size, gender of the household head, yield, farm size, off farm income, production costs, farmer membership, junior primary education dummy and credit dummy are statistically significant in explaining the worth earned by cotton farmers as indicated by estimates of the regression output.

The regression results in the model show that yield and off farm income are both the most important variables in explaining the observed gross margins with the former making the great impact.

The regression results show a negative correlation between household size and the observed gross margin at 10% level of significance. The possible explanation can be that as the household size grows reasonably larger, there are more mouths to feed as such emphasis dwell much on cultivating food crops rather than cash crops. This also shows that there is transfer of labor from cash crops to food crops among smallholder household. This findings are similar to Sulumbe et al., 2010 but inconsistent with findings elsewhere by Samboko, 2011.

There is a positive and high significant relationship between yields and gross margin at level of significance of 1%. This expected correlation can be explained based on the fact that as yield increases while holding other factors constant, total revenue increases which in turn sways gross margin positively upwards. Similar findings in other countries were reported by Ishikawa, 1999, Tschering, 2002 and Samboko, 2011.

The variable farm size was significant in explaining the observed gross margin at 5% level of significance. The results suggest a positive relationship between gross margin and farm size as expected in most findings and literature. The observed relationship with good land management and conservation allows the farmer to grow more on the farm leading to more yield. The results are contrary to the findings by Samboko et al. (2011).
As expected, the regression results show a negative correlation between the dummy for gender of the household head and observed gross margin though highly insignificant at 0.1 alpha level. The possible explanation can be that female headed households can give less gross margin than male headed household because of spending more on communal roles such as funerals, weddings and household chores i.e. cooking, fetching water and firewood rather than doing productive roles.

The off farm income depicted a thought provoking result that farmer with opportunities of earning income outside household are at the advantage of producing higher gross margins than those with little or no opportunities as far as cotton farming is concerned in Malawi. The observed relationship is due to the fact that off farm incomes in form of remittances and cash from friends and relatives tend to support other agricultural activities in the household as well as household expenses among smallholder farmers in Malawi. The another possible explanation can be that most farmers within the economic productive age group along the cotton growing areas in Malawi are engage in other profitable activities such as fishing, bicycle taxi and working in sugar plantations. It was expected that the farmers in the economic productive age group would report higher gross margins than those advanced in age due to pool of energies and access to information on new and modern technologies. The results are different to the findings elsewhere by Olayiwolaa, 2008 and Samboko, 2011 as they dwell much on food crops rather than cash crop.

Gross total cost variable was significant in explaining the observed gross margins at 0.05 alpha level. It can be explained that farmers who benefitted from inputs such seed, agrochemical and sprayers reduced variable cost incurred in cotton farming than those who did not benefit while holding other factors constant because the observed impact of reduced production cost is reflected in gross margin. It is expected that farmers who benefitted from inputs, practiced modern technologies of farming and had access to credit to have a comparable higher the gross margins. (Kabwe, 2006 and Erbaugh, 2008).
Farmer membership was significant in explaining the observed gross margins at 0.1 alpha level. The results show that affiliation to farmers’ based organization provide incredible success of input and loan access as well as extension service delivery system. (Anna Lwesya, 2004). It is observed that coordinating farmers into groups within a farmer’s organization has shown many benefits including: reducing transaction costs; increased productivity through access to inputs, extension services, and information sharing schemes; and enhanced market power. As they grow in number, farmer organizations will also play an increasing role in input distribution and extension services. (MoAFS, 2011).

The regression results show a positive correlation between farmers with junior primary education and the observed gross margin with 10% level of significance. The possible explanation can be that education in Malawi provides greater and more opportunities for formal employment as well as improving peoples social status. It is expected that farmers with little education to have higher gross margins than those with high education. However; secondary education was statistically insignificant in showing the negative correlation with the observed gross margins. It seems that the more education a farmer gets the less likely to engage themselves in cotton production. Low literacy levels of farmers have also been hampering the scope of production, as farming is less perceived as an entrepreneurship activity.

The credit dummy of the household was significant at 5% level in explaining the observed gross margins. Higher access to credit is expected to increase gross margins. The results indicate that farmers with access to credit such as production inputs (seed, fertilizers, pesticides, packing materials) and chemicals as well as sprayers had higher comparative advantage to have relatively higher gross margins with the estimated better marginal effect. It is expected that access to credit influences households in their decision making when engaged in production activities contrary to low access to credit exacerbated by high borrowing cost and high default rate in Malawi.
Table 4.3: Showing Variance-inflating Factor (VIF)

<table>
<thead>
<tr>
<th>Variable</th>
<th>VIF</th>
<th>1/VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yield</td>
<td>1.53</td>
<td>0.655676</td>
</tr>
<tr>
<td>Noedu_dummy</td>
<td>1.5</td>
<td>0.664699</td>
</tr>
<tr>
<td>Secondary_dummy</td>
<td>1.5</td>
<td>0.667875</td>
</tr>
<tr>
<td>gross_cost</td>
<td>1.45</td>
<td>0.69032</td>
</tr>
<tr>
<td>Farmsize</td>
<td>1.09</td>
<td>0.917422</td>
</tr>
<tr>
<td>Age</td>
<td>1.09</td>
<td>0.920248</td>
</tr>
<tr>
<td>Hhsize</td>
<td>1.09</td>
<td>0.920467</td>
</tr>
<tr>
<td>non_farminc</td>
<td>1.05</td>
<td>0.953897</td>
</tr>
<tr>
<td>Female_dummy</td>
<td>1.04</td>
<td>0.957339</td>
</tr>
<tr>
<td>Credit_dummy</td>
<td>1.04</td>
<td>0.959761</td>
</tr>
<tr>
<td>farmermembership_org</td>
<td>1.03</td>
<td>0.973756</td>
</tr>
<tr>
<td>Mean VIF</td>
<td>1.22</td>
<td></td>
</tr>
</tbody>
</table>

The results in Table 4.3 show that when there is no collinearity between variables. Variance inflation factor is 1. The rule of the thumb of the VIF was achieved. There is no need to be concerned with the multicollinearity.
CHAPTER 5 ANALYSIS OF MARKET PARTICIPATION AMONG COTTON FARMERS

5.1 Chapter Overview

This chapter identifies what role do socio-economic characteristics play on market participation and at the same time also determining the level of market participation in the study area. The chapter also assesses the impediments to market participation. The model specification is followed by a discussion of the main determinants of market participation. Main determinants to market participation include both production cost and production cost related variables.

The study examined market participation in rural Malawi with a focus on selected districts of rural communities of Malawi. Considering the prominent role agriculture plays in the livelihood of these people, strategies aimed at reducing poverty and hunger centered on rapid growth in this cotton sector becomes imperative so as to sustain increased agricultural output and raise their income.

This paper uses a logit regression analysis to estimate the factors influencing marketing decisions among cotton growers in eight districts of Malawi focusing on Age of the household head, Dependency ratio, Farm size, own transport, Distance to the nearest market, market information, credit access, education level and regions of Malawi.

A logistic regression model is used as research tool to assess the effect of factors influencing market participation. A logistic regression was also used to predict the level of market. This model has the capacity to determine the effect of variables on the probability of market participation. It yields the highest predictive accuracy possible. (Randela, 2008).
Agricultural marketing is the principal determinant of agricultural growth and contributes to overall development (Dittoh 1994; Timma 1996; Balint et al. 1998; Timma 1997). Domestic markets and export oriented markets can be achieved by strengthening linkages of farmers to markets by connecting rural communities to both of them. The expected outcomes and key strategies in improving the functioning of agricultural markets have been recognised and taken into consideration in the development of the cotton sector.

The cotton market is one of the most volatile commodity markets, and ongoing changes in weather and growing conditions combine to create uncertainty and volatility in price based on their corresponding influence on planting and yield (Benfica, 2006).

Market access is one of the development tools that has the potential to contribute meaningfully to both the overall economy and alleviation of poverty. From the late 1980s through the 1990s, cotton production declined in Malawi. This was the result of many factors including: the structure of the industry, the dominance of the public sector in the purchasing of cotton, decreasing productivity and inconsistent world market prices (MoA&FS, 2011).

Boughton et al. 2007 and Barrett 2008 reported that market participation is both a cause and a consequence of development. It is clear that increased agricultural productivity coupled with favorable markets for the predominantly smallholder sector will contribute most to poverty reduction.

Market access plays a remarkable role in ensuring better income and welfare for smallholder farmers through diverse channels. The income and economic welfare of the farmers are determined by agricultural prices which in turn influences their farm investment and production decision (Benfica, 2006).

Markets increase purchasing power as well as creating demand for consumer good thereby improving maximum farmer welfare through levitation of incomes, hence stimulating development (Boughton et al. 2007). Input and output market failures affect farmer’s capacity in effectively producing good yields.
Smallholder farming and effective market participation are a sure pathway of pulling rural people out of poverty hence improving their income and food security. (Rosegrant et al. 2005). Individual smallholder farmers are often ineffectively linked to input and output markets and faced with reduced productivity due to lack of access to technology and capital.

It is observed that strengthening the marketing information systems for growers help to empower the growers to negotiate with buyers from a position of strength. Consequently, an efficient and responsive marketing system for agricultural products is a sign for development process. (Abbot 1993).

Output market access is not particularly an issue as all seed cotton that is produced can be bought by the current buyers. The issue is that there are many buyers, with an aggregate surplus ginning capacity. Due to the low volume of production, there is high competition to procure as much seed cotton as possible per buyer, and hence there are compromises on quality and high rate of side-selling. Some of the buyers engage middlemen to buy for them; hence there is a high level of opportunistic informal traders (vendors).

Access to marketing information is skewed in favor of the technologically endowed buyers. There is need to build capacity of the growers so that they have the necessary information and ability to use it in the interfaces with buyers. This will be particularly useful in establishing farm gate prices. Access to market information helps also to get information necessary for production. Access to market information increases the capability of farmers to evaluate whether market conditions are appropriate to sell their crops.

The longer the distance of the farm from the nearest market, the lower the marketed produce. Longer distances to transportation networks imply that the costs of marketing a crop are higher. Therefore, farmers in remote areas have a lower level of market participation.
Barrett (2008) provides a detailed literature review about evidence on smallholder market participation in eastern and southern Africa, focusing in staple food-grains markets.

Other authors who are of the view that poor infrastructure often increases the transaction costs of smallholder market participation are Bellemare and Bareth (2006), and Lapar et al. (2003). The descriptive analysis influence of institutional factors on market participants (Holloway et al. 2000; Mukhura 2001; Renkow et al. 2002; Lapar et al. 2003; Balint 2006), show that high transaction cost which is the major institutional factor, emerges as a result of inadequate restructuring of the input and output markets, reinforced by low production factor endowment, which hinder sales.

Market availability and access to market information are some of the aspects that households have little control over them. It is not surprising to suggest that lack of market information also affect farmer’s ability to operate rationally in the market. Poor transport services is one of the limiting factor in accessing these markets.

In the marketing season of 2009, despite the multilateral negotiations, the Government of Malawi announced the farm-gate price of MK 75.00/kg (47¢/kg) in April, although the international market price dictated a farm-gate price ranging from MK 43.00 (27¢) to MK 45.00/kg (28¢/kg) of seed cotton. (Cotton strategic plan for Malawi 2011-2016). At that time, the verifiable international lint prices incorporated into ginner pricing model were as follows: Jan 42¢/lb; April 63¢/lb; June 62¢/lb; now July 61¢/lb, and the farm gate prices in the region ranged from MK 30-36/kg. Subsequently, the ginners were unable to buy the seed cotton at any price below MK 75.00. There were delays in the opening of the cotton buying season resulting in prolonged storage, delayed sales, fire hazards and theft, loss of weight, loans accumulating interest rates and there was high credit delinquency and due to involuntary sale of maize, farmers were exposed to inadvertent food security risks. Intermediary buyers bought the seed cotton at about MK 20.00/kg making windfall profits after selling to the ginners at about MK 45/kg. One of the largest ginners, Cargill Malawi closed its operations in Malawi. As a consequence of that, very few farmers planted cotton in the 2009/2010 season,
resulting in the lowest volume of seed cotton over the past 30 years, refer to Figure 5.1. (Malawi Government 2011).


Figure 5.1. Cotton “A” index (1990-2010)

Cotton is sold to ginners. The ginners are also one of the most important hubs in the cotton sector and will need to be organized as well to create order in the marketing and processing of cotton. There are a large number of ginning companies competing for cotton in Malawi. There are currently 11 ginning companies in Malawi with a combined ginning capacity of 150,000MT per annum. Great Lakes Cotton Company is the market leader with an estimated 50% market share, but Malawi Cotton Company has gained share recently. Additionally, there have been many new entrants to the industry, with Toleza, Nadhi, and Woget all adding ginning capacity in the past year. Due to low cotton production levels, all ginners are estimated to be operating at 20-40% capacity. New
entrants into the ginning industry are ADMARC with an estimated projected installed capacity of 45 000 MT.

Table 5.1: Ginning Companies in Malawi and their Locations

<table>
<thead>
<tr>
<th>No.</th>
<th>Ginning Company</th>
<th>Ginnery Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Great Lakes Cotton Company</td>
<td>Ngabu, Balaka</td>
</tr>
<tr>
<td>2</td>
<td>Malawi Cotton Company</td>
<td>Balaka, Salima</td>
</tr>
<tr>
<td>3</td>
<td>Cotton Ginners Africa Ltd</td>
<td>Bangula</td>
</tr>
<tr>
<td>4</td>
<td>Toleza Cotton Ginnery</td>
<td>Balaka</td>
</tr>
<tr>
<td>5</td>
<td>Iponga Cotton Company</td>
<td>Zalewa</td>
</tr>
<tr>
<td>6</td>
<td>Woget</td>
<td>Lunzu</td>
</tr>
<tr>
<td>7</td>
<td>Afrisian</td>
<td>Lunzu</td>
</tr>
<tr>
<td>8</td>
<td>Mapeto DWS</td>
<td>Salima</td>
</tr>
<tr>
<td>9</td>
<td>Export and Trading Group</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Nadhi</td>
<td>Karonga</td>
</tr>
<tr>
<td>11</td>
<td>ADMARC</td>
<td>Karonga</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Balaka</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ngabu</td>
</tr>
</tbody>
</table>

Research works on market participation are scanty; more especially in developing countries where important functions make this question paramount. (Bellemare and Barrett 2006). The factors, drawing from literature on the determinants of market participation and sales, include transaction costs (distance to roads, markets and towns, transport availability, labour and population density), human capital (age, education, gender, extension training), physical capital (number of livestock producing stock, farmland) and financial capital (crop income, non-farm income, credit).
Agricultural market participation is, therefore, the integration of subsistence farmers into the input and output markets of agricultural products with a view to increasing their income level hence reduce poverty (Ehui and Holloway 2002).

Unfortunately, little research has been conducted to substantiate the major factors responsible for miserable market participation by farmers, especially those in developing economies. This study aims to fill this research gap and also help to contribute areas for further research

5.2 Specification of the Model

The logistic regression model is one of the popular models used to analyze and model binary choice and is widely used in choice studies. The aim was to interpret the dependent variable as the likelihood of making the choice, dichotomous logistic regression model techniques is appropriate to regress market participation on a set of independent variables. The independent variable is dichotomous and therefore limited to 1 if the farmer is participating in the market and to 0 otherwise.

Many researchers have used the logistic regression model to examine similar issues in different areas for various concepts and technologies (Gujarati, 2006).

A logistic regression model was used to estimate factors affecting market participation. Chi-square tests were also used. Chi-square is used when testing categorical data that is recorded as classes. Observed frequency associated with a class is compared to an expected frequency. The logistic regression framework model is chosen, firstly because of its ability to determine the effect of variables on the probability of market participation. Secondly, it yields the highest predictive accuracy possible with a given set of predictors. (Aldrich & Nelson, 1984).

The logistic regression model is based on the cumulative logistic probability function and is by Gujarati (2006) given by:

\[
P_i = E(Y=1|X) = \frac{1}{1+ e^{- ( \beta_1 X_1 + \beta_2 X_2 )}}
\]
Where $P_i$ is the probability that an individual will take a particular choice (participating or not participating) given the information of $X_i$. $P_i$ ranges from 0 to 1 and it is nonlinear.

The dependent variables are all dummy variables of either 0 or 1 with 1 being the yes alternative. The more negative the log-likelihood (0) is, the better is the predictability. $B_1$ and $B_2 X_i$ explain how much parameter $X_i$ is affecting the dependent variable.

Where $P$ is the probability that $y=1$ and $\chi_i$ is a set of independent variables (variables such as household characteristics, social economic variables (e.g. Farm size) and costs variables i.e. market information). The more negative the sign the less the parameter is affecting the dependent variable. The $P$-values indicate how much the explanatory variables can explain the variation in the dependent variable.

It is based on the cumulative logistic regression model estimated thus:

$$L_i = \ln \left( \frac{P_i}{1-P_i} \right) = Z_i = b_0 + bX_i \ldots \ldots B_nX_n + e$$

Where

- $Z_i = \text{Logit or log of odds.}$
- $P_i = \text{Participation in market by the ith farmer (1)}$
- $1-P_i = \text{Non-participation by the ith farmer (0)}$
- $i-n = \text{Set of predictor variable}$

The implicit form of the model which was used to determine the probability of cotton market participation by the household was modeled as: $Pmpt = f (\text{Age + Farm size + Dependency ratio} + \text{Distance} + \text{OWNTRANS + Credit_Access + Market information + nonfarmincome_Access + hhedu + Region + u})$.

In explicit form the model is given by $Pmpt = \beta_0 + \beta_1 \text{Age} + \beta_2 \text{Farm size} + \beta_3 \text{Dependency ratio} + \beta_4 \text{Distance} + \beta_5 \text{OWNTRANS} + \beta_6 \text{Market information} + \beta_7 \text{Credit_Access} + \beta_8 \text{nonfarmincome_Access} + \beta_9 \text{hhedu} + \beta_{10} \text{Region} + u$.

Where $Pmpt$ are probabilities of market participation ranging from 0 to 1.

The model analyses the relationship between household market participation and costs of production, household characteristics and social economic variables. The dependent variable is the household market participation level. It can take any value.
from zero to one. The model applied a method of qualitative choice to determine the relationship between socio-economic characteristics of farmers and their participation to the market. This was done by estimating logit models to identify characteristics that differentiated farmer participating in the market.

### 5.3 Determinants of Market Participation

Several explanatory variables were identified to appraise the anticipated values of the explained variables.

The variables used is largely attributed to research findings by Govereh and Jayne (1999), Strassberg et al. (1999), Heltberg and Tarp (2001), Lapar et al. (2003), Randela, 2008 who broadly studied factors influencing farmers to participate in marketing. The anticipated signs of the independent variable are presented in Table 5.3.

The chosen independent variables theoretically estimated to stimulate market participation were taken from household characteristics, farm characteristics and social economic characteristics.
Table 5.3: Variables Associated with Market Participation

<table>
<thead>
<tr>
<th>Variables</th>
<th>Description of Variable</th>
<th>Expected Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of the house head (years)</td>
<td>Continuous</td>
<td>−</td>
</tr>
<tr>
<td>Dependency ratio</td>
<td>Continuous</td>
<td>−</td>
</tr>
<tr>
<td>Education of the head</td>
<td>Continuous</td>
<td>+</td>
</tr>
<tr>
<td>Own Transport dummy</td>
<td>Own transport = 1, 0</td>
<td>+</td>
</tr>
<tr>
<td>Farm size (ha)</td>
<td>Continuous</td>
<td>+</td>
</tr>
<tr>
<td>Access to non-farm income dummy</td>
<td>Access to non-farm income = 1, 0 otherwise</td>
<td>+</td>
</tr>
<tr>
<td>Distance to market (km)</td>
<td>Continuous</td>
<td>−</td>
</tr>
<tr>
<td>Access to market information dummy</td>
<td>Have access to market information = 1, 0 otherwise</td>
<td>+</td>
</tr>
<tr>
<td>Access to credit dummy</td>
<td>Have access to credit = 1, 0 otherwise</td>
<td>+</td>
</tr>
<tr>
<td>Region</td>
<td>Participating region =1,0</td>
<td>+/-</td>
</tr>
<tr>
<td></td>
<td>otherwise</td>
<td>Indeterminate</td>
</tr>
</tbody>
</table>
Age, education, and dependency ratio (correlated with household size) are household characteristics taken into account and also social economic and institutional variables such as farm size (ha), own transport, access to non-farm income, distance to market (km), access to market information, access to credit and region were included.

The age of a farmer can influence market participation. It should be noted that the variable age was measured in number of years. The negative relationship between age and market participation is anticipated contingent to economic productive group of the economy. Younger farmers have opportunities of improving their education levels as well easily obtaining information from the outside world. With the basic tool of a hand held hoe, this puts a lot of strain on the labor especially for land preparation, weeding and harvesting. Being in the economic productive age group reduces cost of production because the youth may be more willing to use their pool of energy in handling most of the agricultural activities which are labor intensive. In addition, younger farmers are expected to comprehend new and modern farming technologies faster in order to leap fruits and the benefits of commercial agriculture. Conversely, as farmers advance in age farming is regarded as a subsistence means of survival contrary to the motivating influence of entrepreneurship.

Dependency ratio is correlated with household size also represents labour endowment showing those involved who are directly indulging in agricultural activities. The size of the household represents the number of people who are productive as well as those consuming in the household. (Makhura, 2001). The relationship between the dependency ratio and the dependent variable is hypothetically negative. It is expected that the higher the household dependency ratio the lower level of market participation. A household’s dependency ratio is calculated by dividing the number of individuals under 15 years of age plus the number of individuals over 60 years of age by the total number of individuals in the household. The higher the ratio, the higher is the dependency burden meaning a livelihood status worsening off. It is expect that a household with lower dependency ratio can produce more produce for the market or store it for household consumption. Lapar et al. (2003) and Randela et.al (2008).
Education level regarded as human intellectual capital gives a positive hypothetical expectation of influencing market participation. Farmers with formal education are competent to decide the objectives of agricultural production. Adequate and more education level is important to farmers because it helps to reduce the cost of finding and analysis of information. Conversely, the inverse expectation may occur with high education when employment opportunities arise that require professional skills with rewarding economic benefits. (Lapar et al., 2003 and Randela, 2008). This allows farmers to participate and determine the required information needed for market participation. Education also provides farmers with the simple skills that help the diffusion of technical knowledge and keeping farm records thereby improving rational decision of farmers. Vulnerable and resource-poor farmer with little education are unable to handle business transaction effectively mainly outside their domain. It is expected that such farmers would face high transaction costs in both factor and product markets outside their own area. (Matungula et al., 2001 and Randela, 2008).

Access of credit by the household head has the effect on marketing decision of the household. Access of credit was coded as 1 for received and 0 otherwise. It is hypothetically expected that handiness of credit influences negatively on farmers’ propensity to participate in markets. It is expected that there is a higher probability of market participation if the head of the household had access to credit. Additionally, it seems farmers who have access to credit have more of a tendency to participate in marketing than those without access. It is clear that many farmers are participating in marketing when there is more access to credit (MoA&FS, 2011). Credit is considered as another form of capita and is also essential to help households access more farm inputs.

Higher access to credit is expected to increase production levels as well as increased market participation level. Credit can offer avenue of sustainable farmer commercialization needed for long term productive agriculture. (Lwesya et al 2004).

Owning low-cost mode of transportation is likely to cause positive relationship on market participation. This possible indication can be supported with the fact that those who own transport could easily ferry their produce to the nearest local markets.
for sale. It is expected that expenditures in transportation is likely to be higher to those farmers who do not own their own transport means than those who does. World Bank et al. 2007 suggested that rural households may still face many limitations to actively participate in markets and satisfy part of the demand for food if transportation cost is considered as one of the constraint.

Access to market information also affected farmer’s ability to operate rationally in the market. The hypothesized relationship contributed positively towards market participation in the study. The more access of market information; the easier it is for better market participation. Market information should be available to farmers to enable them transact profitably in their entrepreneurships. Access to market information as a factor can enhance or limit household access to and use of resources. Access to market information helps to get information necessary for production. The existence of markets and their performance influence on access to resources.

The distance to the nearest market is one of the important aspect which influences cost of transaction. Poor transport services are a limiting factor in accessing these markets. There is hypothetically negative relationship between distance to the market and participation giving the possible explanation that the longer the distance to the market the more difficult and expensive it is for the farmer to transport his /her marketed output. Poor roads in the remote areas make transportation cost to escalate. There are poor road and communication infrastructures in many of the high cotton producing areas which in turn causes high costs of production, limited adequate infrastructure and also limited road network creates a limited competitiveness of cotton commodity on the international markets.

Access to land is an essential component in market participation. This variable farm size is measured in hectares and determines the cultivatable land for the household. Farm size contributes significantly towards marketed output .Households access land differently, which also affects output levels which in turn affect marketed output. It is expected that the more land a household have, the more the production levels which in turn likely to cause the higher the level of market participation. The
larger the landholding, the more likely a household can grow more produce for the market. Households with large holdings have a higher potential of increased production, which enable them to invest and gain more from new and modern farming technologies. It is clear that population growth can also affect land access and availability.

Access to non-farm employment help farmers earn extra income that can be used to support the household as well other farming activities. Households also receive remittances from their children or relatives. Such employment opportunities provide households with more incomes to improve their livelihoods. Access to non-farm income may lead to increased tendency of producing higher risk cash crops such as cotton, tobacco etc. for the market. It should be noted that household heads often migrated during the dry season when there are few agricultural activities. Non-farm income employment activities are maintenance and construction works. Private businesses included Fishing handcraft and brewery.

Regional variable was also considered in the study to capture marketing costs, ginnery access, biophysical and agroclimatic characteristics as well as production patterns. Geographical and political factors have a significant impact on small-scale Malawian Cotton farmers’ decision to participate in market because it helps to ascertain the differences in the regions in terms of agronomic and economic risks. Some of risks can be based on market information, distance to the preferred marketing channel, level of training, extension services and access to ginners. It should be noted that high risky areas do give low cotton profitability because farmers are more likely to produce a lower quantity of their produce for the market. Differences in regions can give explanations on numerous reasons in farm-level constraints and cotton prices. This would be particularly true if the government and ginners’ price support system for cotton are in place aiming at improving the market.
### Table 5.4.: The Empirical Results of the Estimated Logistic Regression Model

<table>
<thead>
<tr>
<th>Market Participation</th>
<th>Coefficient</th>
<th>[95% Conf. Interval]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Std. Error</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-0.025896</td>
<td>-0.0636598 0.0118681</td>
</tr>
<tr>
<td>Farmsize</td>
<td>-0.243429*</td>
<td>-1.344931 0.8580723</td>
</tr>
<tr>
<td>(0.562001)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dependency_ratio</td>
<td>-0.631989</td>
<td>-1.378861 0.1148832</td>
</tr>
<tr>
<td>(0.3810642)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distance</td>
<td>-0.014833*</td>
<td>-0.0413461 0.0116806</td>
</tr>
<tr>
<td>(0.0135275)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OWNTRANS</td>
<td>0.3384631</td>
<td>-0.5985918 1.275518</td>
</tr>
<tr>
<td>(0.478098)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market_information</td>
<td>0.8880594***</td>
<td>-0.1200936 1.896212</td>
</tr>
<tr>
<td>(0.5143732)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Credit_Access</td>
<td>0.3490775</td>
<td>-0.6029636 1.301119</td>
</tr>
<tr>
<td>(0.4857442)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>nonfarmincome_Access</td>
<td>-0.021512**</td>
<td>-0.7703038 0.7272804</td>
</tr>
<tr>
<td>(0.3820438)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hhedu</td>
<td>1.065167***</td>
<td>0.2799556 1.850378</td>
</tr>
<tr>
<td>(0.4006253)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RegSouth_dummy</td>
<td>14.94628</td>
<td>-4350.059</td>
</tr>
<tr>
<td>(2227.139)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RegCentre_dummy</td>
<td>14.19097</td>
<td>-4350.922 4379.304</td>
</tr>
<tr>
<td>(2227.139)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RegNorth_dummy</td>
<td>12.3997</td>
<td>-4352.713 4377.513</td>
</tr>
<tr>
<td>(2227.139)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RegEastern_dummy</td>
<td>14.24572</td>
<td>-4350.867 4379.358</td>
</tr>
<tr>
<td>(2227.139)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>_cons</td>
<td>-12.33493</td>
<td>-4377.448 4352.778</td>
</tr>
<tr>
<td>(2227.14)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Number of obs 215
LR chi2(13) 58.32
Prob > chi2 0.002
Pseudo R2 0.1427

*Source: IHS -3 Malawi (2011)* indicates significant at the 10% level, **5% level, and ***1% level.
The Model Chi-Square was used as a measure of goodness of fit. This means that there should be no statistically significant difference between observed and predicted values if the model is a good one (Field, 2005 and Gujarat 2006). The results show the likelihood –ratio chi-squared is -97.87682 and the McFadden pseudo-R² is also approximately 14.27, indicating that variations in probabilities of participating in cotton marketing in the sample surveyed was explained by about 14.27 percent of the covariates in the logistic model. The Model Chi-Square statistic in the model is 58.32 explaining the possible difference of the values of the two log likelihood functions, that is, the null model and the full model. It should be noted that there were 207 participating farmer and 8 non-participating farmers involved in Market Participation.

The result shows in Table 5.4 that age, farm size, dependency ratio, own transport, education, nonfarm income access, distance to the nearest market point, market information, credit access and region were considered among the ten factors for the model.

It should be noted that participation in cotton market is influenced greatly by the following five factors: Farm size, nonfarm income, distance to the nearest marketing point, market information and education level. These five variables were statistically significant factors of market participation in the study. In contrast, the other remaining five (5) factors were disregarded from the equation in the model.

The change in the predicted logged odds associated with a unit change in independent variables is indicated by the value of coefficients. A great deal of manipulation is essential to calculate the effect of the independent variables on the probability to participate in cotton market. This is so because there are differences in the interpretation of logit coefficients from typical linear regressions (Field, 2005 and Gujarati and Sangeetha, 2006).

The size of the farm is important because farmers will farm on land sizes that match their productive capacity due to the fact that transaction costs on fixed assets are widely spread across more output on relatively large farms. According to Table 5.4, it is noted that for a unit increase in farm size is expected to cause the logit of market
participation to decrease by 0.24, holding all other variables constant. The result implies that for each additional hectare of farm land the logit is expected to decrease by 0.24.

The variable distance has the expected negative coefficient at 10% level of significance, that is, when you travel more distance with your cotton lower the logit for market participation. It is observed that distance to the ideal marketing point is negatively and significantly correlated to the probability of marketing cotton. Therefore, this issue of distance to the market point has implication on transportation cost when selling cotton over long distances as such need for thorough study of it. It should be noted that cotton bales is not charged per distance travelled, but by the number of bales transported by ginners ta high subsidized at a given time.

Access to market information contributed significantly to increased market participation of cotton at 0.1 alpha levels. It was also indicated that market information significantly influenced market participation in the study. The coefficient for access to market information has the expected sign. A possible explanation is that there are fewer costs incurred by the household when more information on marketing is at her disposal thereby increasing market participation. It should be noted that marketing information had a stronger influence on initial market entry decisions of most agricultural producers and marketers. Market information should be available to farmers to enable them transact profitably in their entrepreneurship.

The sign of the coefficient for nonfarm income access is negative and in the expected direction at 0.05 alpha level. The explanation for this surprising result is that smallholder farmers depend more on non-farm income weakening the influence of farm size. It can also indicate that small holder farmers are more likely to grow food crops such as maize, sorghum, millet etc. The result implies that for each additional unit in access to nonfarm income, we expect the logit of marketing participation to reduce by 0.021, holding all other variables constant.

With reference to Table 5. 4, a positive and significant relationship at 0.01 alpha level was found between education level and the probability of participating in the market channel indicating the likelihood of market participation increasing with
increases in modern cotton production and marketing. This means that as the level of education is being increased more farmers are able to read and speak/understand English giving household ability to process information and have better understanding and interpretation of information. High education level is important because it reduces drudgery, time and cost to find and acquire information.

The results probably confirm that there is no region in Malawi that provide risks in terms cotton production and deter farmers from participating in market

In order to determine the impact of changes in the relevant statistically significant variables on the probability to take part in cotton marketing, the partial marginal effects on conditional probabilities can be used while holding all other exogenous variables constant.

Table 5.5: Marginal Effects for the Significant Continuous Variables

<table>
<thead>
<tr>
<th>Determinants</th>
<th>Marginal Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm Size</td>
<td>-0.036</td>
</tr>
<tr>
<td>Distance to the nearest marketing point</td>
<td>-0.022</td>
</tr>
<tr>
<td>Nonfarm income Access</td>
<td>-0.031</td>
</tr>
<tr>
<td>Market information</td>
<td>0.16</td>
</tr>
<tr>
<td>Education level</td>
<td>0.15</td>
</tr>
</tbody>
</table>

With reference to Table 5.5, the marginal effect of a unit change in farm size on the probability of market participation of the household is -0.036. This means that each additional one hectare increase in farm size, the probability of market participation decreases by 0.036. This negative relationship implies that farmers with comparably large farm size have large propensity to low level of market participation. The results in show negative relationship between farm size and level of market participation in contrast with priori expectation. The statistically significant negative relationship between farm size and market participation probably indicates that increased market
participation is also a function of land productivity. This suggests that productivity of viable land is one of the determinants of market participation.

From Table 5.5, the marginal effect show that each unit increase (1km) in distance, the probability to participate in marketing will decrease by 0.022. It is expected that poor quality road between the village and preferred market point negatively affected the quantity of cotton sold. This gives possible explanation that the closer the households are to the market point the easier to sell their cotton than those living far away. Similar findings are also reported by Bartha and Bauer, 2007 and Onoja, 2012 indicating significant influence of distance to market in this study.

Access to non-farm income has increased inclination to engage in very big risk activities such producing edible crop such as maize, sorghum, millet etc. as well as selling them at the market. There are either professional or non-professional non-farm employments available in nearby towns and sugar estates which influence households in non-farm activities. Similar findings were also reflected by Randela, 2008. The result of marginal effect show that access to non-farm income decreases the probability of participating in marketing by about 0.031 for households, holding all other variables at their means.

The variable market information access is positively and significantly related to the probability of selling cotton. It is observed that marginal effect of each unit increase in the marketing information, the probability to participate in the marketing channel will increase approximately by 0.16. It was also indicated that market information significantly influenced market participation in the study. This result also indicates that more access to market information is useful for the commercialization of agricultural production.

The result in Table 5.5 implies that education level increases the probability of market participation by about 0.14 for household, holding all other variables at their means. This shows that additional Knowledge and skill in modern Cotton production and marketing, the probability of market participation increases by about 0.14, holding all other variables. Finally, as modern and improved knowledge and skill in Cotton is
increased, the likelihood of market participation increased as well indicating marginally significant positive factor due to modest marginal impact on market participation. It is expected that a fairly educated head of household have the potential to understand and adopt new and improved technologies thereby likely to make informed decisions on the market participation of cotton.

The remaining variables show that holding everything else constant, age of household head, dependency ratio, own transport, credit access and region do not have a significant impact on the market orientation of the household.
CHAPTER 6 RECOMMENDATIONS

The timely availability of production inputs (e.g. seed, chemicals, sprayers) is a proven factor in increasing cotton productivity and profitability.

The cost of hybrid cotton seed is typically much higher than traditional seeds. The government should make great effort by negotiating with cotton seed producers to reduce the price of cotton seed in Malawi so that the cotton seed should be more affordable to farmers thereby reducing production costs as well as improving farmer access to certified seed.

There is need for national registration exercise for all cotton farmers in Malawi in order to include non-members as farmer based organizations maintain a registry of their own members only.

The low education levels impact on the extension approaches which need to be simple, hands-on, harmonized cotton demonstration program, on-site training and mostly in the vernacular. In addition, there is need to adopt farmer business school concept in the area under study.

There is need to develop a strong national farmers’ organization that will fully manage input fund and maintain the registries used for the distribution of inputs. It will also help in delivery of extension services. In order to achieve such levels, support in form of financing and personnel for national expansion will be required. A strong farmer based organizations can participate effectively and constructively in the pricing and marketing processes as well as providing proper guidance to legal contract marketing system.
Market information should be available to farmers to enable them conduct profitably in their agribusiness entrepreneurships.

Micro finance and Banks with the assistance and support of farmer organizations should develop tangible financial services delivery to ensure the loan programs are efficiently disbursed and loan recovery is at acceptable levels.
CHAPTER 7 CONCLUSION

The study provided insight into cotton production in Malawi. The private cotton ginneries in collaboration ministry of Agriculture and Food security were involved in the distribution of certified seed to registered cotton growers. The private cotton ginneries also provided credit, sprayers, insecticides and extension services to registered cotton growers who are organized in groups. Unfortunately these cotton ginneries instead of competing to buy seed cotton, they collude and in the process offer low farm gate prices contrary to the government recommended minimum price.

The improved certified and treated seed planted by farmers were imported from other countries such as Cheruza, Zambian variety and SZ 9314 from Zimbabwe for use in Malawi which had different agronomic and climatic condition to Malawi. In 2009 the ginners’ association imported such varieties. This was so because there is no official seed multiplication program in Malawi. It should be noted that most soils in the study area have good fertility. We therefore recommend that research on cotton varieties that are high yielding; low nutrient requirement, pests and diseases tolerant amongst other traits should be emphasized to address low productivity issues.

The cotton development council should be put in place to ensure promotion of a transparent and productive pricing mechanism for cotton and cotton products along the value chain acceptable to and trusted by relevant stakeholders.

Cotton continues to be a profitable crop to grow though the cost of variable inputs in cotton production was high which increased the cost of production thereby impacting economic benefit of cotton production. It can be managed by reducing the production costs and increasing yields per unit area. It is a known fact that when prices
fall, growers shy away in the ensuing season. Price interventions by the Government of Malawi, while done with good and paternalistic intentions, are likely to result in unforeseen consequences as experienced in the unpredictable marketing season.

The paper also examined the factors influencing cotton market participation. Distance to the nearest market point, access to market information, farm size, nonfarm income and education level were the determinants that showed to have significant influence on farmers’ decisions to participate in market.

The results that distance to the market point impacted on the farmers’ decision to participate in marketing of their produce triggers the need to develop the market systems and infrastructure suitable for cotton farmers. The government can attain this sustainable development by improving rural road network and infrastructure.

Markets can be the engine for wealth creation among farmers participating in the market regardless of production impediments and the costs of market participation. Interventions to support agricultural production and marketing are essential in order to effectively help vulnerable and poor households. The consistent pattern of the results indicate that broad-based objective of profitability increases with increased market participation among cotton smallholder farmers. Male headed households indicated to participate more in the marketing of cotton in the study area.

The conceptual framework for analyzing factors influencing market participation of smallholder farmers helped to ascertain aspects of raising farmer incomes and reduce poverty. The study found that yield, non-farm income and credit access were statistically significantly and positively associated with smallholder household incomes. An important harmonizing finding from our analysis is that increased access to credit, yield and non-farm income enabled farmers to benefit from market opportunities triggering a deliberate effort of reducing poverty levels as agricultural market development strategy.
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Appendix A Questionnaire for Focus Group Discussion

1. For how long have you cultivated cotton in this district (years)?

2. Do you sell any of your farm products?
   If sell, where do you sell? (Indicate the distance)

3. Do you buy farm inputs?
   1) Yes
   2) No

4. If yes where do you buy?

5. If no, why do you not buy?

6. Do you access credit?
   1) Yes
   2) No

7. If yes, where do you get the credit?

8. In what form is the credit?

9. Why do you take up the credit?

10. What are the conditions required to access the credit?

11. If do not access credit, why?

12. What kind of assets do you have?
13. What problems do you face with the group membership?

14. Have you improved in your livelihood as a result of growing cotton than before?
   1) Yes
   2) No

15. If yes how

16. If you have not improved in the livelihood explain why (specify reason)

17. Do you get information from extension workers?
   1) Yes
   2) No

18. If no why
   1) No extension worker visits the area.
   2) Not interested in getting new information
   3) Other (specify)

19. In what way is the information provided?
   1) Individual meetings
   2) Group meetings
   3) Mass media (specify)
   4) Others (specify)

20. If the information is provided through meetings, who take the leading role in the discussions?
   1) Government Extension workers
   2) Ginners
   3) Local chiefs/ cultural leader
4) Political leaders
5) Other (specify)

21. How often do extension workers visit you?

22. Are you satisfied with the frequency of extension workers’ visits?

23. How does receiving subsidized cotton inputs in past years affected your household livelihood?

24. How much did you spend on farm activities for the last growing season?
Appendix B Questionnaire for Ginners

1. Name of Ginners

2. Number of years spent in cotton industry

3. Length of professional experience

4. Which extension system do you use in promoting modern cotton farming technologies?

5. How do you compare the block extension system to the demand driven extension system in terms of delivery of services?

6. What kinds of farmers are particularly good in adoption of modern cotton farming technologies?

7. Has there been any improvement in livelihood levels among households who are growing cotton?
   1) If yes, what are the indicators?
   2) If no why?

8. Who are the vulnerable groups to cotton subsidized program?
   1) The landless
   2) Female-headed households
   3) Under-five children
   4) The elderly
   5) Other (specify)

9. What key constraints do you face in efficiently and effectively deliver your cotton marketing services?
10. What different strategies does your organization have on cotton farmers with respect to marketing choices?

11. How have cotton farmers marketing strategies changed the past five years and what are key reasons?

12. What services do you promote to improve cotton yield/income of farmers?

13. What are the main factors affecting profitability of cotton in Malawi?

14. What types of programs are needed to support farmers to increase cotton production?

15. What types of policies are required to help farmers to have access to cotton marketing channels?

16. What business strategies do you apply to help cotton farmers make good decisions in the agricultural sector environment?

17. What do you think are key constraints for improved livelihood in the cotton production and marketing?

18. What are the main factors influencing household level cotton production?

19. What are the farmers’ views on changes or improvements needed for marketing channel in the future?