

**ECONOMIC VIABILITY OF COTTON CULTIVATION IN
MAGU DISTRICT, TANZANIA.**

By

Berenatus Lupimo

**A Dissertation Submitted in Partial Fulfillment of the Requirement for Award
of the Degree of Master of Science in Accounting and Finance (MSc A&F) of
Mzumbe University.**

2013

CERTIFICATION

We, the undersigned, certify that we have read and hereby recommend for acceptance by Mzumbe University, a dissertation entitled; Economic Viability of Cotton Cultivation in Magu District, Tanzania, for partial fulfillment of the requirements for the award of degree of Master of Science in Accounting and Finance (MSc – A& F) of Mzumbe University.

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Internal Examiner

External Examiner

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DEDICATION

This dissertation is dedicated to my wife Jane John Mlyakalamu, my mother Lusia Bukelebe, late father Steven Mlyakalamu to my sons Steven, and John. Without their support, I would have not been able to mobilize the energy and motivation required to write this dissertation.

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MAY GOG BLESS YOU ALL

ACRONYMS AND ABBREVIATIONS

AProCA	-	the Association of African Cotton Producers
ECGZ	-	Eastern cotton growing zone
Enda diapol	-	Enda Prospectives Dialogues Politiques
LZARDI	-	Lake Zone Agricultural Research and Development institute
NCCR	-	Swiss National Centre of competence in research
NCU	-	Nyanza cooperative union
SHIRECU	-	Shinyanga regional cooperative union
TCB	-	Tanzania cotton board
WCGZ	-	Western cotton growing zone
CSDS II	-	The second cotton sector development strategy
CIIP	-	The cotton industry implementation plan
BEP	-	Break even point

ABSTRACT

The study on the economic viability of cotton cultivation in Magu district carried out in Magu district. The study will be significantly important to different stakeholders like the cotton farmers, the government, investors and researchers in making economic decisions.

The study presented into five chapters the introduction, literature review, research methodology, presentation of the research findings, data analysis and discussion, and summary, conclusion and recommendations. The objectives of the study includes study and analyze cotton production per hectare in Magu District, To study and analyze the cotton production costs in Magu district, To assess cotton production revenue in Magu District, and To find out Challenges facing cotton growers in Magu district.

The data on study variables like costs, price, area under cotton, yield in kg, and outputs were gathered from significant respondent's number of the population. Questionnaires were distributed to 120 cotton farmers' respondents, 4 district agricultural employees, 2 cotton board employees and 4 employees representing cotton buyers from the union cooperatives institutions. The obtained data were processed and analyzed using percentages, ratios, trends and break even points for establishing whether cotton production is economic viable.

The conclusion on the study were made objective wise. And that cotton production in Magu district face deep rooted challenges which includes cotton price volatility, buying agent cheating, lack of education among farmers, lack of reliable source of cotton seeds, Nonuse of modern agricultural implements due to lack of centralized facilities, and Lack of collateral for loan from financial institutions. The cotton production in Magu district is not economic viable. Cotton production involves both fixed and variable costs, of the fixed cost has constituted large share.

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CHAPTER ONE

INTRODUCTION

This chapter deals with the study background, statement of the problem, general objective, specific objectives, and research questions, rationale of the study, scope and limitation of the study.

1.1. Background of the study

Cotton was introduced to Tanzania at the turn of the 20th century by German settlers and was initially focused in the Eastern cotton growing zone (ECGZ). Over the 1920s and 30s better varieties were imported and production expanded into the Western Cotton Growing zone (WCGZ). According to Kabissa J at el (2012) “The majority of Tanzania’s cotton (99%) is grown in the Western Cotton Growing Area (WCGA), including Shinyanga (60%), Mwanza (25%), Mara (8%), Tabora (4%), Kagera (2%), Singida and Kigoma”. The Eastern Cotton Growing Region (ECGA), including Pwani, Morogoro, Iringa, Tanga, Manyara and Kilimanjaro, produces less than 1% of national production. According to Tanzania cotton board report 2007/2008, 100% of the cotton produced in Tanzania is rain fed and 95% of the farm size range between 0.5 to 50 hectares, and 5% between 50 to 100 hectares.

Cotton is second export revenue earner in the country headed by coffee. It significantly contributes to GDP, employs most of the working populations and it’s the main source of income for cotton growing area producers. Baffes John (2002,p.1) highlighted “Cotton is Tanzania’s largest export crop after coffee. It contributes about \$90 million to export earnings and provides employment to about half a million rural households”.

Cotton is major important cash crop in Magu district where growers earn income for economic development and it contribute 20% of district revenue and makes up 5% of the total national cotton production. Cotton growing in Magu district started early in 1930 and was firstly inaugurated by German settlers as cash crop. From then cotton growth in the district has been facing challenges and experiencing several sectorial top administration changes that led to stagnant cotton growth development.

The period before independence in 1961, cotton production in study area was higher compared to post independence period where production went down after the emergence of cooperative unions that took control on cotton marketing and exporting activities, the result was highly bureaucratic. Baffes John (2002,p.2) disclosed that” Not surprisingly, they soon became large bureaucracies and failed to pay adequate attention to the needs of the sector” ,some of the cooperatives misused bank borrowed funds for buying cotton. Poulton and Maro (2009, Pp.4) reported that “However, many of cooperatives were soon beset with problems of corruption, poor management and, above all, financial mismanagement”, consequently farmers received low price and cotton was purchased on credit, and farmers were to wait for payment between 3month and 16months. (World Bank or Government of Tanzania, 2004), “pre-liberalization payments had sometimes been delayed for “several months”, this discouraged farmers to grow cotton hence production kept down. Cotton production improved following liquidation of cooperative unions in 1976 and government took over all cotton matters in the country till the end of 1986. Cotton yield per hectare reached kg 1020 due to sufficient close supervision over producers by agricultural experts and other inputs were regulated.

However after agricultural sector liberalization in Tanzania in 1994, the cotton sub sectors have been facing a lot of challenges like price instability, demand decline in world market, cotton low quality. Poulton and Maro (2009, P.3) stated that “The Tanzanian cotton sector has yet to make significant progress on restoring overall cotton quality to pre-liberalization levels”. However agricultural sector liberalization has made some improvements like high average world cotton price share paid to growers as compared to prior liberalization period. World Bank / Government of Tanzania, 2004(P.26) report that, “For cotton, average growers’ share of export prices increased, from 41 percent in six seasons prior to reform to 51 percent in six seasons following reform.” Competition among buyers increase cotton demand hence satisfactory price paid to growers. Poulton and Maro (2009,P.5) argues “Competition between ginners ensured that an increased share of the (higher) export price was passed onto producers and Competition also resulted in prompt payments being made for seed cotton”.

Despite of all efforts made to improve cotton sector, still cotton sector being in unsatisfactory conditions. Gibbon, (2001), reports that “while liberalization exposes producer countries and farmers to unstable world market prices, which for decades have been fluctuating but generally declining” world and local cotton prices indicates an unpredictable trend .(see table 1.1)

Table 1.1 Local and World Cotton Prices trend for 18 years (all prices are in TZS per kg)

Years	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
world cotton price in TZS	350	329	373	301	264	323	271	296	440	363	337	442	584	650				
Local cotton price in TZS	207	170	180	185	123	180	175	180	280	250	220	360	450	480	360	600	1100	660
% of world cotton price paid to growers	59	52	48	62	47	56	63	61	64	69	65	81	77	72				

Source: Tanzania cotton board www.cotton.or.tz

It can be observed from the table that both world and local cotton prices showed fluctuating tendencies. The price paid per KG in Tanzania constitutes 47% to 81% of world market prices between 1995 and 2008. The highest 82% was paid in 2006 and lowest 47% was paid in 1999.

Cotton yield in kg per hectare for twelve years is presented in table 1.2.

Table 1.2. Seed Cotton yield, area under cotton and production for 12 years

Years	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Cotton yield in kg per hectare	458	403	430	642	530	535	538	408	640	479	458	431	601
Cotton growth in hectares	28,370	36,139	24,857	53,855	46,901	18,120.30	35,840.10	42,026.80	30,658.90	29,249.40	34,000	36,742	36,848
production in tonnes (000)	13	15	11	36	25	10	19	17	20	14	16	16	22

Source: Tanzania Cotton Board and Magu district council.

The table 2 shows fluctuation tendency in cotton yields in KGs per hector, area under cotton cultivation and production in tones during the study period of 2000-2012. Cotton yield in Kgs per hector has gone up from 458 in 2000 to 640 in 2008. Subsequently came down to 431 in 2011. In 2012 it has gone up to 601, demarcating on the whole decrease. The area under cotton cultivation in hectors gone up from 28,370 in 2000 to 42027 in 2007 and subsequently came down to 34000 in 2005 and highest is observed in 2012. However from 2011 the situation is encouraging again. The total output during the same period varied between 10000 tons to 22000 tons.

Other cotton growth pitfalls in Magu district include world cotton price fluctuations, upward trend in cotton production inputs costs and high bank interest rate.

Economic Viability of cotton cultivation depends on numerous underlying factors like remunerative price for the output, Economical and affordable production cost, availability of financial facilities with reasonable bank interest rate, weather conditions, national macroeconomic policy and general inflation level in the local market where farmers' cotton revenue consumed. Slight variations in one or aggregate of the above identified factors effect definitely cotton growth both economically and financially.

1.2. Statement of the problem

The following observations of various researchers motivates to study the economic viability of farmers

- i) Kone and Lanting (2011) observed that among the obstacles facing African cotton sector is the continuing decline in cotton yields whereas input prices have been continuously increasing, they further revealed that there is disproportional cotton selling price increase and cotton production costs in the recent years, cotton production costs increases at bite higher rate as compared to cotton revenue.
- ii) Ratter at el, (2005) highlighted "African cotton selling price is affected by subsidies paid by the USA, European Union and China that undermine world market prices through overproduction" (p.3)

- iii) Many African smallholders experienced low margins or no economic viability consequently driven out of cotton altogether choosing alternative cash crops (PAN UK, 2003; Ton, 2002a).
- iv) Bargawi (2008), “Almost all producers in Mwangala village of Magu Tanzania admitted to reducing or stopping cotton production in part due to low prices, but also due to other factors relating to the post-liberalization environment” (p.19)
- v) Tanzania cotton board CIIP: 2010-2015, (2010), expresses that the cotton sector is facing deep-rooted problems which need to be addressed meaningfully and consistently in order to realize its potential. “ cotton problems include domestic and external challenges some are ... poor infrastructure, as well as high taxes and utility tariffs which escalate production costs, falls in cotton price, foreign countries subsidies hold down world cotton market” (p.15)

Having looking at these comments from different researcher’s works, the researcher realized that there is need to conduct a study on economic viability of cotton cultivation in Tanzania choosing one district.

For the purpose Magu district is selected. Though convenience played significant role in selection the following points further motivates the study:

- The district contributes high cotton output and has large area under cotton compared to other districts of the Mwanza region. [Tanzania cotton board CIIP:2010-2015; (2010)]
- It is among the Tanzania lake zone major cotton growing districts. According to Tanzania cotton board, 2010,(P.8)“... the major cotton growing districts are Bariadi, Magu, Maswa and Meatu”.
- Magu contributes 35% of the cotton produced in Mwanza region and it’s the first large cotton producing district in Mwanza and third large cotton producing district in the country.

1.3. General objective

The general objective of this study is to assess the Economic viability of cotton cultivation in Magu district.

1.4. Specific objectives

The specific objectives include the following:

- i) To study and analyze the cotton production per hectare in the study area.
- ii) To study and analyze the cotton production costs in the study area.
- iii) To assess cotton production revenue in the study area.
- iv) To find out Challenges facing cotton growers in the study area.

1.5. Research questions

- i) What is the production of cotton per hectare in the area of study?
- ii) What are the costs involved in cotton cultivation in the area of study?
- iii) What is the cotton production revenue in the area of the study?
- iv) What are the challenges faced by the cotton growers in Magu district?

1.6. Scope of the study

There are many cotton cultivation issues as outlined in the background of the study; however this study is confined to analyze the cotton production trend, cotton production costs, and examine and analyze economic viability of cotton growth apart from surveying cotton growing challenges faced by primary cotton producers in Magu district. However the study concentrated on marginal cotton farmers rather on the medium, large farmers because marginal farmers form more than 70% of total cotton growers in Magu district. Tanzania cotton board CSDS II 2009-2015, (2010) discloses “95% of the farm sizes range between 0.5 – 50ha; 5% between 50 – 100ha” pp.11.

1.7. Rationale of the study

- It enables to bring out cost factors in economic viability of cotton cultivation. In turn it may help growers to plan how to minimize such costs.
- It may also help them to decide whether keep on growing cotton or swap to other crops where they found higher surplus.
- The study provided input information to the government in establishing microeconomic policies in favor cotton farmers and general cotton growth in Magu district and the country as whole.
- The study not only contributed to the body of knowledge but also provided input for further areas of research.
- The study findings provided solutions to critical cotton growing challenges facing cotton farmers in Magu district and the country as the whole.

1.8. Limitations of the study

- Since the study used primary data for costs and expected revenues collecting from cotton growers the results reflect their perceptions. Self-administered questionnaires and personal interview were adopted to overcome the limitation as only relevant information to meet the accepted standard was taken down.
- Secondary data used for analyzing the trends in cotton growth, crop area, production etc., collecting from different secondary sources which resulted into overlap of data.
- Researchers input resources hindrance like available time, financial resources and also cooperation of the respondents and organizations also came in the way of this study. Average costs were meet, inter alia from stationary, access of internet, communication costs (telephone interview) and computer and current literature review material. However in reaching high ranking officers busy executives, the researcher concentrated this limitation by using other data collection approach such as telephone interview and questionnaires.

- Barrier of communication among respondents as most of farmers are illiterate, poor farmers' cotton records keeping also limited the study. The researcher used language translators who interpreted local language (sukuma) to national Swahili language and then converted into English, on other hand raw cotton buyers' entities were consulted for costs information provision where farmers were unable to give.
- Mixed crops practices by the growers limited their perceptions about costs allocation. The researcher concentrated on cotton producers with whole farms planted cotton.

CHAPTER TWO

LITERATURE REVIEW

2.0. Introduction

The chapter deals with researchers' works related to this study both in theoretical and empirical in terms of their observations on various costs, revenues economic viability and challenges faced by cotton growers. It also comes out with conceptual frame work on the bases of earlier studies. So the chapter will detail theoretical and empirical parts of the study while conceptual frame works finalize the chapter by giving in summary all matters provided in the chapter.

2.1. Cotton production costs

Hornby (2010) defined Cost as "the amount of money that you need in order to buy, make or do something" (p.330). Cotton production costs therefore are the amount of money or resources spent on growing cotton. "Cost is incurred when a resource is used for some purpose" Blocher, at el (2005) p.61. Cotton cultivation involves numerous resources right from farm preparation until cotton gets sold, thus, there many and different costs incurred in cotton cultivation. Avec un glossaire and Con glosario (2001) discloses that "cotton farmer go through such costs pre sowing cost, sowing costs, growing cost, and finally harvesting cost" (p.16).According to office of gene technology regulator (2002) reveals "Cotton farming activities include soil preparation, planting in managing weeds, pests and watering during the growing season, defoliation, picking and transportation for processing"(p.5).

2.1.1 Cotton variable and fixed costs

In the production of cotton different types of inputs are involved. These are fixed and variable costs. According to ACCA (2006) explains "Costs may also be measured as the sum of variable costs and fixed costs" (p.23). A variable cost is a cost that tends to vary, in total amount, with the level of activity. According to Blocher, at el (2005) defined variable cost as "the change in total cost associated with each change in the quantity of the cost driver" (p.67). Fixed cost refers to the portion of the total cost that does not change with a change in the quantity of the cost driver within the relevant range. According to ACCA (2006) "A fixed cost is an item of cost relating

to a particular period of time and which, within certain activity levels, is unaffected by changes in the level of activity during that time period” (p.26). In a nutshell cotton cultivation inputs are categorized into fixed and variable in which own puts falls in either of the two. Khan, at el (2011) allude “Among fixed inputs the rent of land and abiana paid as revenue to government are the fixed inputs” (p.32).whereas Ferreira W. N. (2010) highlights “Fixed costs include: depreciation, taxes, insurance, and interest on machinery investment and irrigation system, these costs are considered to be fixed because they generally remain the same within a production period and do not vary with output” (p.6). Among variable inputs the cost of cultivation, seed, fertilizer, irrigation and plant production measures are the variable inputs. Similarly own inputs also included the family labor, and owned land used for cotton cultivation.

According to Ramakrishna, at el (2007) “Variable production costs included hired labor costs, input costs for seeds, fertilizers and manures, and pest management items, and other costs for renting equipment, fuel and variable irrigation expenses”. (p.32).

Some of the cotton growing inputs are own while other are purchased from the local markets. According to Khan,at el (2011), “Some of the input like seed used are own while other were purchased from the local markets” (p.23), for instance seeds pesticides purchased from local markets while family labor is an example of owned cotton production inputs.

2.1.2. Rent cost

Rent cost refers to an expense incurred on utilizing a land not owned by a producer. According to Ferreira (2010) defined rent cost “as an estimate of the cost of using the land resource” (p.7). Farmers own no or small land that want extend into many hectares enter into agreements with people own vast land for paying rent charges per growing season. Rent charges in Magu district ranges from TZS 30,000to TZS 60,000 per acre depending numerous factors such as soil fertility and land location. However most of farmers own land and therefore cultivate their own land. Lake Zone Agricultural Research and Development institute (2010) explained in its cost

benefit analysis report that, “land is owned by farmers it is not common in Tanzania lake zone to hire a land”.

2.1.3. Farm preparation cost

Farm preparation costs are pre sowing costs incurred on land plough by utilizing either a machine like tractor or households work force. According to Vargas, at el (2003) “The ground is ripped or sub soiled in two passes, 2 to 3 feet deep, to break up compaction, which affects root penetration and water infiltration”(p.3). Most of land preparations in Magu district conducted through use of hand hoe. According to Lake Zone Agricultural Research and Development institute (2009) report on farmers’ cerebration day (Nane Nane) “the land preparation is done using hand hoes because ridging is easier with hand hoes, the common practice is oxen”. The farm preparation costs are labor intensive.

2.1.4. Seed and sowing costs

Seed cost involves the cost of obtaining viable cotton seeds from the market, sowing seeds in the farm. Shao (2002) highlights “The cotton production cycle involves land preparation, planting the seed” (p.12). Quantity of the seed to be purchased depends on size of the farm, anticipated approaches of maintaining the farm and harvesting. Some soil requires special chemicals and fertilizers to reach the optimum pH level for cotton growing, on other hand Fertilizers and special chemicals adoption on sowing results into high cotton yield, which is an additional sowing cost. For farmers with large plantations should anticipate the costs of special planting equipment such as tractors, tillage systems and labor costs if people are involved in cotton planting. According to Khan, at el (2011) “Among variable inputs the cost of cultivation, seed, fertilizer, irrigation and plant production measures are the variable inputs” (p.135)

2.1.5. Weeding cost

Cotton weeding costs are the outcomes of eradicating weeds in cotton farms through the use of machine, chemicals (herbicides) or labor. The cost magnitude rests on type of method selected. Weeds are dangerous to cotton plant. According to Meister (2004) “Weeds in cotton can reduce yield, interfere with harvest and reduce lint

quality”. Weeding in Magu district is labor intensive, hand hoe is commonly used and for attaining better cotton yield three times weeding required. According to Tanzania cotton board on cotton production costs report named as “Gharama Za Uzalishaji Pamba Kwa Ekari” available on the internet shows cotton weeding cost per acre is TSH. 45,000/=.

2.1.6. Fertilizers and manure costs

Technical cotton advice advocates that fertilizers and manure adopting increases the cotton yield especially when appropriate methods of fertilizers application are followed. According to Mayberry (2000) “Short-season cotton yields are highest when ample nutrients are applied early in the season” (p.4). Fertilizers costs incurred if and only if fertilizers consumed or added on the soil. They are purchased at the market in kilograms. Manures are available at free cost. Manure transport from homes to farm is only the cost incurred when they apply manure. However in Magu district almost all cotton farmers apply neither fertilizers nor manure on farming. (LZARDI), 2012 in its annual cotton report disclose “cotton farmers never apply fertilizers or manure”. Application of fertilizers and manure should be used with great care because excessive application leads to other cost like increase vegetative growth hence increase pest management cost. According to Vargas Ron, et al (2003) “Cotton is very responsive to nitrogen, but excessive applications can cause rank or vegetative growth and lead to increased pest problems, poor defoliation, lower yields, and nitrate leaching” (p.4).

2.1.7. Plant protection cost

These are the costs of preventing harmful insects, fungi, herbs to the cotton plants, they include pesticides (chemicals) purchase price, spray equipment purchase price and labor costs. Without cotton plant protection cotton yield comes down, cotton quality also is low. Bell (1999) states that “Diseases in cotton may affect the quality of the fibre and seed, as well as the yield and cost of production of the cotton crop”(p.581). Cotton insects attack increases with monoculture “Cotton is vulnerable to pests, especially when grown as a monoculture” [Ferrigno, et al 2005] p.05 .Chemical consumption depends on cotton plant available predators; if a variety of

cotton predators exist many different chemicals are required in combating plant infections. The other factor that influences chemical consumption is number of sprays, as the frequency of chemical nosegays increases, chemical consumption goes up too. According to Vargas, et al (2003)“Pest control costs can vary considerably each year depending upon local conditions and pests in any given year” (p.4). Definitely plant protection costs have direct proportional relationship with times of sprays, farm size, and types of predators existing. According to Meister (2004) the estimated insecticide costs could be higher or lower depending upon the levels of infestation and required control measures. In Magu district average cotton farmers manage to spray twice per season while others never use pesticides at all, however cotton policy directs 6 times spray for better outcomes.

2.1.8. Harvesting cost

Harvesting costs are the cotton output picking. If cotton picking is done by using machines the costs include fuels, maintenance services, depreciations and spare parts etc. Machine and stripper cotton harvesting systems are commonly used in large plantations, Nelson, Misra, and Brashears (2000), indicates that “Of the cotton produced in Texas, 85% is stripper harvested; the remaining 15% is machine picked” (p.3). The main challenges with the two methods are choosing less cost effective method. Based on cost analysis cotton growers need to understand harvesting method of their choice to avoid large costs, Nelson, Misra, and Brashears (2000), pinpoint “Cotton growers need accurate cost information for the various harvesting methods”(p.2). In Magu district, however cotton harvesting is done by hand picking parse. Harvesting cost unit being a basket or tin of 20ltr volume, when cotton is full and pressed in the basket payment ranges between TSH. 100/= and TSH.300/=per basket of cotton.

2.1.9. Uprooting and burning stalks costs

Uprooting and burning stalks costs are the post harvesting costs incurred on uprooting and disposing off cotton plants after harvest. In Magu district such practices done by hired or owned labour and cost incurred on labour wages. Uprooting cotton plant after harvest aids killing harmful insects. One has to ensure

control of such insects to help the subsequent cotton season. Uprooting and burning stalks costs in Magu district measured according to the amount of work completed normally paid per acre or hectare. Lake Zone Agricultural Research and Development institute (LZARD) on its annual cost benefit analysis reports states that uprooting and burning stalks costs per acre for five seasons are TSH.5,000, 7,500, 12,500, 12,500 and TSH.20,000 for the cotton seasons 2007/2008, 2008/2009, 2009/2010, 2010/2011 and 2011/2012 respectively.

2.1.10. Labour costs

Labour costs involve employing labour on different cotton production activities. Frank, Ramakrishnan and Paul (2007) express “labor are needed for weeding and for applying fertilizers or manures”(p.30).Labour costs are measured by number of hours spend or amount of work completed; the latter is more commonly used in Magu district. According to Vargas (2003) “Labour are paid based on number of hours worked and basic hourly wages for workers is \$9.51 per hour for machine operators and \$8.23 per hour for non-machine workers”.(p.9)

2.2. Marginal, small, medium and large farmers

Farmers categorized into marginal, small, medium and large farmers depending on farm size under cultivation. According to Haque (2010)“cotton farmers classified as marginal, small, medium and large farmers with respect to acreage cultivated” (p.22). Marginal farmers are the cotton growers manage a 0.5 to 1 acre farm size. Mahendra (2012), defined marginal farmers as cotton growers operates a farm of 0-1 hectares”(p.19), small farmers run farm size above 1 up to 2 acre, while medium and large farmers own above 2 acre farm size. According to Haque (2010) Medium and large farmers defined as those operating area more than 2 hectares. In Magu district the proportion of marginal farmers is higher than small and medium and large farmers.

2.3. Selling price

Selling price as longer cotton farmers are concerned is that price which is paid to farmers per kilo of raw cotton. According to the national council of America monthly report on cotton price Farm Price-or Average Price Received by Farmers “as the price paid to grower by cotton buyers”. Cotton price has been a major determinant of cotton growth in Tanzania. Cotton statistics unfolds that raise in raw cotton selling price in a season leads to high production in the subsequent year. Tanzania is not a cotton price setter rather than being price taker from the announced world cotton price in which it is obliged to sell. In Tanzania Lake Zone average price received by farmers has been unstable as it fluctuates in tune with World cotton price. According to Marco Mtunga managing director TCB in the interview with IPP media “We at the TCB are not to because we do not control the world market, the widely seen dramatic drop of cotton price in the country is a result of supply and demand currently characterizing this business” . This signifies that Tanzania cotton board has no control on the cotton price in the world market and that any adverse movement in world cotton price directly affect cotton price received by Lake Zone cotton producer. “The International Food Policy Research Institute (IFPRI) reports that a 40% decline in farm level cotton prices between January 2001 and May 2002 increased rural poverty in the short term by 8% in west Africa” [Minot and Daniels, 2002, pp. 23]

2.4. World cotton selling price

Any world cotton price alteration, impacts in Magu district cotton producers both positively and negatively depending upon increase and decrease in price. Tanzania as other countries in the world is liberated that means whatever happens in the world economy impacts the Tanzania local economy. “While liberalization exposes producer countries and farmers to unstable world market prices, which for decades have been fluctuating but generally declining [Gibbon 2001, pp.28].

2.5. Real Tanzania cotton selling price

Once the world cotton price for specific cotton season announced, Tanzania cotton board meet with cotton stockholders in the country to discuss cotton price to cotton producers

“The process of setting the price is managed by the TCB, in conjunction with a number of stakeholders. Currently, the TCB board of directors is made up of a number of stakeholders, including one member each from the TCA (Ginners), Cotton Farmers Association, Ministry of Agriculture, and two to three members from local government. The textile industry is not represented on the Board, although some are represented by the TCA if they are ginnery operators themselves” [Kabissa, at el 2011, pp.6]. Real world cotton price being used as base for establishment of the local price, it’s obvious, that real Tanzania cotton price is determined by the world cotton market price. According to Tulip and Ton (2002), “in East Africa, cotton prices tend to be fixed by the market” (p.19). Groups involved in the meeting are Tanzania cotton board, cotton cooperatives and companies, and cotton farmers association. Each party presents its price proposal to cotton growers in respect of production costs for cotton producers, purchasing and selling costs and interest costs for cooperatives and companies. They arrive at a consensus on the price and will be the cotton selling price to cotton producers all over the country including the area under study for respective cotton season. ‘Tanzania cotton board report on price to cotton growers and the world cotton price for last 20 years (i.e. from 1989/1990 to 2009/2010)’ reveals that cotton world price and real Tanzania cotton selling price shows a positively perfect correlation relationship. For example cotton price to producer increased from TSHS 96 in 1989/1990 season to TSHS. 207 in 1995/1996 season followed by fall in price to TSHS.170 in the adjacent season 1996/1997. Accordingly world cotton selling price increased from TSHS.96 in 1989/1990 season to TSHS.350 in 1995/1996. It is followed by great price fall to TSHS.329. Similar price trend had been experienced to the end of 2009/2010 season as per Appendix three.

Looking at the price trend as shown in ‘Tanzania cotton board report appendix (3)’ it can be understood that the cotton producers received only 29% of the TSHS.96 and

46% of world cotton price in the 1989/1990 and 1999/2000 cotton season prices respectively. The balance of the world price earned by the local companies that purchase, process and export cotton to the world market and also the government receives fees and tax from the balance too. "Prices are usually set below world prices to subsidize the state sector and allow it to compete against artificially low international market prices caused by subsidies elsewhere" [Watkins (2002)] pp.13. Real Tanzania cotton price not predictable and it randomly fluctuates. Appendix three (3) shows cotton price per kg as TSH. 120, 207, 170, 180, 183 and TSHS.123 for cotton seasons 1994/1995, 1995/1996, 1997/1998, 1998/1999, and 1999/2000 respectively. Further when price is higher in one season farmers went for more cropping area and which resulted into fall in price in subsequent season. For instance, the price was TSHS.207 in 1995/1996 cotton season consequently the cropping area went up anticipating higher price in subsequent cotton season. Unfortunately it was not the case the price dropped dramatically by 18% to a price of TSHS. 170 in the season followed.

The unpredictable selling cotton price trend in Tanzania makes cotton farmers unable to plan for forthcoming cotton seasons revenues resultantly became very cumbersome to ascertain what exactly revenue to be earned for planned farm size for cotton planting. Unfortunately price brought to their attention made them to suffer loss consequences as price announced by Tanzania cotton board was at the end of the season more often in June or July where farmers have already or continuing harvesting cotton. Unlike other food crops cotton has no alternative economic use in the hands of farmer rather than selling at whichever price announced irrespective of loss incurred. In Senegal, farmers' cotton income fails to cover household expenses. According to SODEFITEX (the Senegalese part privatized Cotton Company) even though price to cotton producer in the Tanzania lake zone has been so dynamic, cotton production costs have never declined. "They spent on an average of US\$97 per hectare on insecticides in 2001 and many made losses as cotton prices remained almost static" [Ferrigno, at el 2005] pp.5. It has been noticed that cotton production costs increases disproportional with the cotton selling price, that is the percentage

increase in selling price per cotton season is less compared actual percentage increase in production costs consequently farmers fail to break even or incur losses.

2.6. Cotton revenue

Cotton crop yield is based on amount of kilograms produced per acre multiplied by kg price. Tanzania cotton board in its 2012 cotton production costs report stated cotton revenue of TSH. 600,000/= per acre (1000kg @ TSH.600 per Kg). While LZADRI(2010) cost benefit analysis reports for last five seasons indicated cotton revenue of TSH.280,000 ([700kgs@TSH.400](#) per KG), TSH.301,000 (700kgs @ TSH.430 per Kg),TSH.374,000([840kgs@TSH.440](#) per Kg.),TSH.680,000 ([850kgs@TSH.800](#) per Kg), and TSH.184,800/=(280Kgs @ TSH.660 per Kg.) for cotton seasons 2007/2008, 2008/2009, 2009/2010, 2010/2011 and 2011/2012 respectively. This shows that there is high uncertainty in the revenues of farmers not only due to prevailing price variation but also due to yield variation per acre in various seasons.

2.7. Economic viability

The concept of viability can be defined at different levels and in various contexts. In a general context, it includes the ability of the scheme to generate sufficient income to satisfy the household income expectations of the growers, and to cover basic operational and maintenance costs of the cotton growers, while not mining the natural resources soil and water.(Kamara , Van koppen and Magingxa 2001)

Murray, (2012) highlights the viability of a business is measured by its long-term survival, and its ability to have sustainable profits over a period of time. If a business is viable, it is able to survive for many years, because it continues to make a profit year after year. The longer a company can stay profitable, the better its viability. According to Oxford brookes university express the project viability in terms of a set of benefits which contribute towards strategic goal(s).

Mustafa (2007) advised that for cotton crop to be economically viable, farmers income should be increased through using high yielding seed varieties, applying fertilizers, employing mechanization in watering and producing better fibers quality.

Cotton economic viability depends on minimizing cotton production costs while revenue on cotton should be higher relative to production costs. Cotton viability also depends on government assistance on the cotton sector. Richardson (2005) pointed out that there are negative impacts on the economic viability of U.S. crop producers, of alternative methods of reducing federal expenditures on income supports.

2.8. Cotton growing challenges

Hornby (2010.) defines Challenge as “a new or difficult task that tests somebody’s ability and skill” (p.231). Challenges test some body’s ability and skill in facing issues involved in any activity depending upon nature of activity and prevailing environment. The intensity and specificity of challenges varies with the circumstances which is also applicable to cotton growing. The different components of cotton growing challenges as per some studies are shown here under

According to Reddy, (2011) “cotton growing challenges aggregates rising production costs, fluctuation market prices for cotton, decreasing or stagnant yield, inability to manage water resource effectively, and Deterioration in genetic purity of the multitude of cotton varieties and hybrid seeds”(P.3).

According to Sigalla, et al (2011) The first constraint, which directly affected the cotton producers, was cheating by buying agents who were using tampered weighing scales and low cotton quality was the second major constrain

Tanzania cotton board on second corporate strategic plan 2010/11- 2012/13 disclosed that Tanzania cotton sector is facing deep rooted challenges and which can be categorized into two types- domestic and external challenges. Poor farm and crop management practices, poor infrastructure, as well as high taxes and utility tariffs which escalate production costs are some of domestic challenges while competition from man-made fibers, imposition of production and marketing subsidies in developed cotton producing countries exemplifies external cotton challenges.

2.8.1. Internal cotton growing challenges

According to Tanzania cotton board on its second cotton sector development strategy (2010) The domestic challenges include poor farm and crop management practices; poor infrastructure, as well as high taxes and utility tariffs which escalate production costs, rampant contamination with deleterious effects on farm gate prices and fiber competitiveness; limited extension services and research services; budgetary constraints; and droughts.

Existence of domestic challenge individually or aggregated escalates the production costs subsequently low yield experienced and eventually manifestation is persistent poverty to smallholder cotton growers.

2.8.1.1 High taxes and utility tariff

Tanzania cotton board in its report ‘the second cotton sector development strategy (CSDS II): 2009- 2015’ stated that “High taxes on seed cotton, lint and textiles, also resulting from high energy tariffs, lead to an increase in the costs of production throughout the value chain; encourage tax avoidance, under- declaration and underreporting on vital crop statistics” (P.32). Tanzania cotton value of chain exposed to complicated and mixed taxes, levies and fees. According to Baffes John (2002), “Now cotton, like all other export crops, is subject to a host of taxes, levies, and fees administered at both district and central government levels” (P.15). Cotton growers in Magu district not directly pay tax, but ginners and cotton exporters exposed to multiple and complicated taxes, cotton buyers pay 5% of price per kilogram at Magu district council this is the compulsory levy to every cotton buyer in the district area. However there are authorized other contributions paid to the council by the ginners TZS.200, 000 for Uhuru torch, education fund contribution on yearly basis. Apart from district level tax, ginners also pay union levy 2% of local price while 3% paid as primary society union levy. Taking account of indirect taxes paid on ginners’ consumption like fuels, spare parts practices that escalate production costs which in the end reduce farm gate price.

2.8.1.2. Cheating by buying agents

Some cotton corporations buy cotton from farmers deploying cotton buying agents who a practice to use tempered weighing scales to cheat farmers. Sigalla, et al (2011) highlights “The first constraint, which directly affected the cotton producers, was cheating by buying agents who were using tampered weighing scales” and “the loss of earning can represent up to 40% of what could have been paid”. (p.18)

2.8.1.3. Credits needs

Cotton growers’ credit needs require an existence of regulations that easily enable farmer’s access loans from financial institutions to finance cotton growing. Unfortunately such provisions yet to develop and bring them to practice for the cotton growers in Magu district. Bank loan inaccessibility has been a great challenge to grower especially people who own vast fertile land with no corresponding capital to utilize the land. According to Mahendra (2012) “absence of access to credit markets or imperfect credit markets leading to sub-optimal investment decisions or input applications for small and medium cotton farmers”(p.8). In cotton production chain buyers, ginner, and cotton exporters met banks’ lending requirements and therefore access loans while primary producer’s ability fails to meet the bank requirements due to tight terms and conditions put forward by banks like securities. However buyer, ginner and exporters borrow at higher lending rate that eventually escalate entity running costs which in turn reduce farm gate price.

2.8.1.4. Low quality cotton production

The quality of cotton is affected by different factors. According to Sigalla, et al (2011) “the quality of cotton is affected by several factors such as late harvesting, harvest with foreign matters, dirty harvesting tools and poor storage amongst others” (Pp.18). Most of the factors affecting cotton quality are under the control of cotton growers themselves, the main problem of cotton quality is actually the contamination of cotton by farmers themselves. Tanzania cotton board 2010 annual report highlights “cotton highly contamination being the challenge to the board”.(P.39).

According to Sigalla, et al (2011) “Knowing that the buying agents generally cheat them (i.e. cotton growers), farmers add foreign objects to their products such as white sand, water and salt to artificially increase the weight” (p.18). As results of these growers’ practices lower cotton quality in turn affects primary cotton producers’ cotton income and the value of chain as whole in the country.

Tanzania cotton board second corporate strategic plan: 2010/11- 2012/13 p.9 reports that cotton contamination practices reduce cotton quality in the world cotton market “rampant contamination with deleterious effects on farm gate prices and fiber competitiveness” (p.9).

2.8.1.5. Inadequate infrastructure

According to Tanzania cotton board annual report (2010) “Poor infrastructure in particular feeder roads and cotton storage facilities at village level is among of the major challenge in the cotton sub-sector in Tanzania” (p.3). Cotton buying corporations lacks appropriate cotton warehouse facilities at buying centers and hence hires residing houses temporarily before bought cotton taken to ginneries. Hired houses are small in size and insufficient to store all the produce and consequently being kept outside exposing to nature which may lead to poor cotton quality. It is also leading to higher cotton transport cost as everyone wants to avoid keeping cotton exposing to nature fearing cotton contamination as longer left outside the house.

Surveyed roads in the villages where cotton bought from farmers are not available in most of the areas. The three infrastructure shortcomings severely impede the development of the cotton sector include transport by rail, the road network in the Mwanza region and seed multiplication. According to Baffes (2002) pp.9, roads run from ginneries to cotton village centers are rough roads maintained once per year “roads in Mwanza region where most cotton is produced need considerable upgrading” Baffes (2002) p.10, further observed that heavy rainfall falls leaves roads in bad condition with more pits on the roads. Cotton Transport costs from buying centers to ginneries inflate following rough roads and Lorries take so long along the

way consumes much fuels. In view of the above John (2002) suggests for improvements in rail and road transport efficiency so as to reduce costs to growers, thereby leading to higher producer prices”. (p. 10)

2.8.2. External cotton growing challenges

Tanzania’s agricultural export sector liberated since 1994.(Maro and Poulton (2009), p.5. Consequently whatever happening in the world cotton market affects local cotton markets in enormous forms depending on the triggering event in the world cotton markets. External challenges emanates outside the country and non-controllable at national level. Tanzanian cotton sector in combating external cotton challenges has been using a lot of money reducing effects of such changes in the world cotton market to cotton growers. For instance in cotton season 2007/2008 the government paid TSH.80/= per kilo extra to supplement low cotton price as results of world crisis effects. Western countries cotton subsidies, exchange rates and competition to synthetic fibers are some of external cotton challenges discussed in the subsequent paragraph.

2.8.2.1. Western countries cotton Subsidies

Subsidy is a sum of money granted from public funds to help an industry or business keeping the price of commodity or service low. According to Tanzania cotton board report named “second corporate strategic plan: 2010/11- 2012/13” “imposition of production and marketing subsidies in developed cotton producing countries lead to artificial over – production and a decline in market prices for cotton” (p.9) . Price to producers reduced as results of major cotton producing countries’ subsidies, cotton become less economic viable as revenue to growers kept down. Because of low world cotton price caused by subsidizing cotton, fairness on the market will be attained if subsidies removed. According to Baffes (2011) “While the elimination of cotton subsidies is indeed important from trade fairness and development perspectives, this is just the tip of the iceberg as far as African cotton growers are concerned” (p.8).

2.8.2.2. Exchange rate fluctuation

Cotton traded in US dollar, the relative exchange rate movement between US dollar and Tanzania shilling affects cotton revenue to growers. According to Labaste, at el (2009) “Because cotton is traded in U.S. dollars (as are most commodities), cotton prices are affected by the movement of the U.S. dollar in addition to all other factors affecting cotton prices”pp.16. Tanzania shilling has been over time depreciating relative to US dollar. This unfavorable exchange rate movement leads to loss to the Tanzania cotton exporters. According to Delgado and Minot (2000) “An important factor affecting the growth and profitability of the agricultural sector, and especially tradable commodities such as cotton, is the real exchange rate” pp.34 .Figure 1 shows trends in the real exchange rate in the years since cotton sector liberalization. This shows that there was a significant appreciation in the real exchange rate in the mid-to-late 1990s, which limited companies’ ability to pay attractive prices to producers. The situation has improved since, although the real exchange rate is not back to the level prevailing at liberalization.

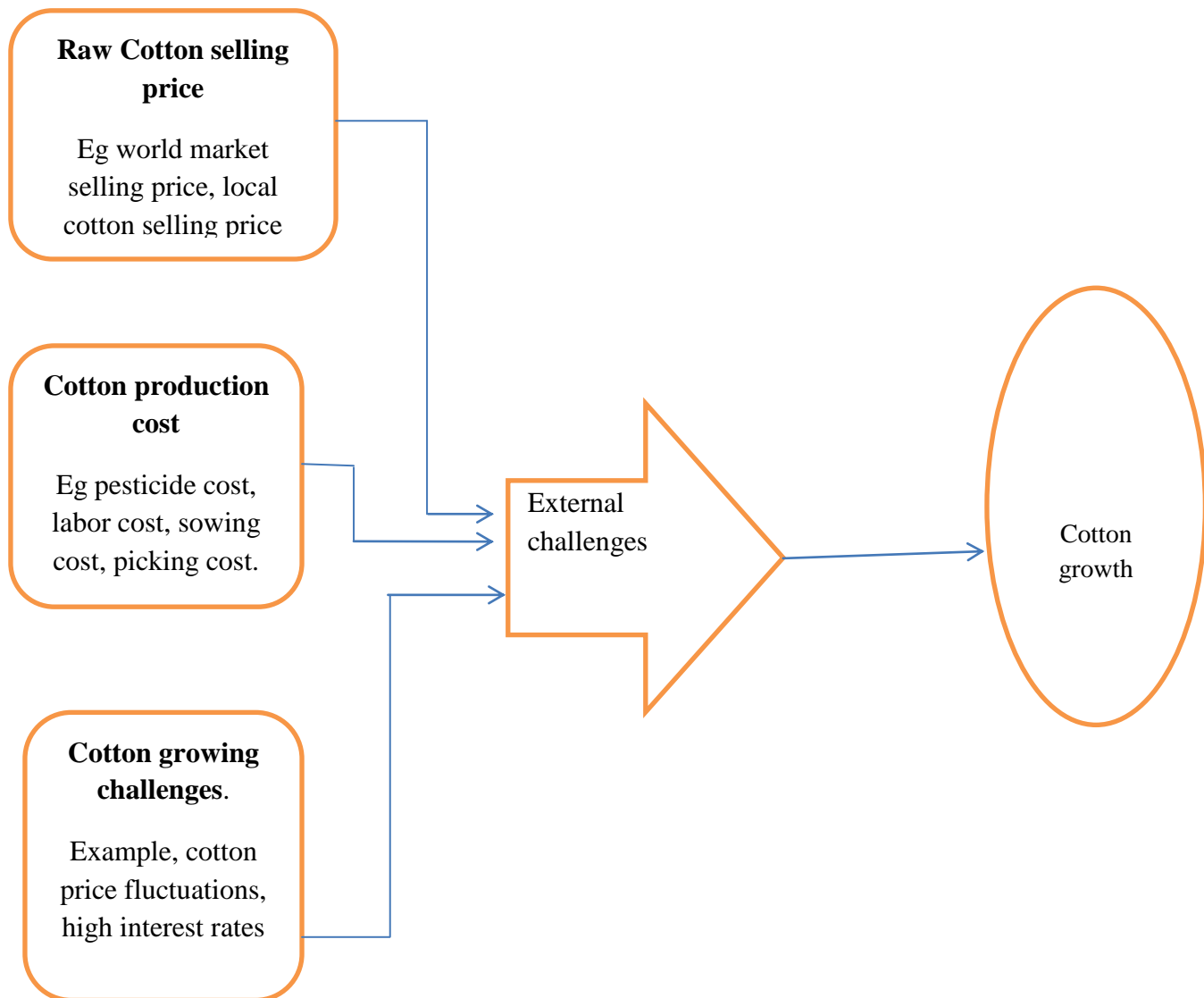
2.8.2.3. Competing synthetic fibers

Production of competing synthetic fibers like polyester, acrylics, nylon, rayon, wool, mohair, and silk negatively affect demand on cotton putting downward pressure on world cotton prices. Chemical fibers remain competitive to cotton because of its relative low selling price. According to Baffes (2004), “cotton encounters intense competition from chemical fibers, especially following technological improvements of the early 1970s that brought the prices of synthetics down to cotton’s levels” (p.15). Cotton faces main competition from chemical synthetic fibers. World Bank report 2008, points that “The main challenge for cotton is to be able to compete with artificial fibers, mainly polyester, on both price and quality” (p.19). Consumption of cotton has declined while synthetic fibers demand keeps increasing. According to Labaste, Tschirley, Poulton, (2009) “consumption of chemical fibers, which compete with cotton, has increased over the past 50 years by 2.2 percent per year, causing cotton’s share in total fiber consumption to decline from 60 percent in 1960 to less than 40 percent in 2005”.Because cotton is a natural and seasonal product, its fiber properties, its cleanliness and contamination, and the homogeneity of its

characteristics can vary greatly as a result of genetic, environmental, harvesting, and ginning factors. Such variability impacts processing performance, costs, and quality throughout the cotton textile chain, such variations also cause a demand shift to synthetic fibers which have no such contaminations and cost effective relative to cotton fibers. The reduced cotton demand results into low world price consequently primary cotton producers' price is reduced too.

2.9. Conceptual frame work

Figure. 2.1. Conceptual frame work



Source Researcher's construct.

From Fig 2.1 above, raw cotton selling price, cost of production and cotton growing challenges represent independent variables, external cotton challenges being an intermediate independent variable, while cotton growth being dependent variable.

Disproportional cotton selling price and production cost fluctuation have both favorable and unfavorable effects on cotton growth in the lake zone. Decline in cotton selling price with relative stagnant or slight increase in production costs swap out cotton revenue to farmers. However, mild price increase results in cotton revenue down turn especially when supported by highly production cost increase. As show in FIG.2.1 selling price have direct impact on cotton growth, farmers motivated to grow cotton as selling price absorbs all production cost and leaves out substantial disposable income to cotton growers and the opposite is the case.

Cotton production costs determine cotton growth, if cotton production cost gets out safety zone hates revenue expected from cotton, therefore farmers will cultivate cotton as production cost minimum as possible to get satisfactory revenue. Cotton farming involves numerous production costs purchasing cotton seed, land rent cost for farmers own no land, land preparation and digging cost, seed planting and weeding costs, pesticide costs, loan expenses, harvesting costs and selling expenses. Other indirect expenses to cotton growers are opportunity cost for unpaid labor, interest rates, exchange rate unfavorable movements and opportunity cost of growing cotton where in the end farmers need to purchase food deploying revenue from cotton. Aggregating cotton production costs determine cotton farming, low production cost as compared to revenue favors cotton farming mean while high production cost discourage cotton farming unless accompanied with high selling price.

Cotton farming challenges categorized as internal and external. Internal challenges are the challenges originate internally like high labor, rent costs, while external cotton challenges are the one that emerge from outside the country for instance fluctuation in exchange rates, and world cotton markets price, large country cotton producer subsidizes that leads to low world cotton price. Both cotton challenges have

impacts on cotton growth, the extend of impact on cotton growth depends on the magnitude of the challenge itself.

Tanzania cotton markets are liberated since 1994; such liberation has brought some notable changes on cotton sector in the country including shot up production costs, price fluctuation in the world cotton market, high interest rates. Most of cotton challenges, high cotton production costs originate from external business environment. This is why the external challenges is put as intermediate independent variable other independent variables are greatly influenced by external challenges. Appendix 5 shows the summary of the literature review

2.10. Research model

This research on economic variability of cotton cultivation in Magu district used the following equation for identifying the factors affect cotton economic viability.

$S = R - (F + V)$ where by

S – Surplus

R –Revenue

F – Fixed cost

V – Variable cost

Breakeven point (BP) = $F/P - V$ whereby P= price per cotton kilo

CHAPTER THREE

RESEARCH METHODOLOGY

This chapter deals with the design of the research, the population and sampling procedures, sample size, methods of data collection, and data analysis techniques.

3.1. Research Design

The study on economic viability of cotton cultivation in Magu used an embedded single case study design. It is the researcher's expectation that case study design eliminated and reduced chances of biasness since they cross-check the answers given in the study questions. Moreover case study enabled to obtain the required with less effort, time and finance. Case study also matched the time constraint of the researcher, provided comprehensive description and analysis within a district involvement of empirical investigation of this phenomenon and thus, gained a rich understanding of the economic viability of cotton cultivation in Magu district. The research deployed both qualitative and quantitative research design.

3.2. Population and units of inquiry

3.2.1. Population

Population consisted of cotton farmers, Magu district agricultural employees, Tanzania cotton board staffs and regional cooperative union staffs as cotton buyers. The population selected possesses all the relevant characteristics required to answer the research questions. Cotton farmers provided production costs and selling price statistics, growing challenges and other more insight information on cotton crop, district agricultural staffs assisted in understanding whether good cotton management and farming methods are followed as their full responsibilities in the local area, Tanzania cotton board provided information on production trends and external cotton challenges on the sector, on the other hand regional cooperative unions which are the cotton buyers gave information on how they develop cotton buying price, because buying price has direct impact on farmers cotton revenue.

3.2.2. Units of inquiry

The objects of inquiry were cotton farmers, district agricultural staffs, Tanzania cotton board staffs and regional cooperative union staffs representing cotton buyers. The subject of inquiry were the cotton production costs such as variable costs labor costs, cotton inputs costs and fixed costs, selling price per cotton kilogram, cotton yield in kilograms per hectare and cotton cultivation challenges.

3.3. Sample size and sampling techniques

Magu district made of six divisions which have in total 32 wards, both divisions and wards in the district grow cotton. From each division two wards were randomly selected to form a sampling frame, 10 cotton growers were randomly selected from each ward. Therefore, 12 wards were taken for study which comprised a sample size of 120 cotton growers. Apart from cotton growers another sample constituent were 4 district agricultural officers from the district, 2 Tanzania cotton board employees from Magu district and 4 regional cooperative union employees from both SHIREKU and NCU. Thus, study comprises of 130 total samples.

Purposive and simple random sampling techniques were employed in this study. Purposive sampling was used because it is recommended when sample elements and locations are chosen to fulfill certain criteria or characteristics or have attributes under study (Makombe, Temba and Kihombo, 1999 citing Mbilinyi, 1992). This technique was used to select the two population units (i.e. Magu district agricultural employees and Regional cooperative union employees) who possessed skills, knowledge, and experience in cotton cultivation matters. Criteria for selection were as follows:

- i) Magu district agricultural employees were selected due the fact that are responsible for overall district cotton production data such as area put under cotton per season, Magu district cotton production in kilograms per hectare and general controlling and supervision of cotton matters in the district of the study.
- ii) The Tanzania cotton board employees at Magu district were selected because have the authority of establishing cotton price to primary

producers and have general cotton supervision responsibility in the country.

- iii) Regional cooperative union employees were selected based on the fact that experienced cotton buyer so they are responsible for cotton revenue and cotton cultivation challenges.

However sample random sampling techniques were used on sampling cotton farmers in the area of the study. The method was adopted because gives equal chance of cotton growers for inclusion in the sample so avoided biasness of research on selecting growers for sample inclusion.

Table 3.1. Sampling

Sampling units	population	Samples	Percent of sample to population
Cotton farmers	800	120	15%
Magu district agricultural employees	12	4	25%
District cotton board employees	2	2	100%
Cooperative unions employees	15	4	25%
Total	832	130	15.6%

Source; Researcher's construction.

3.4. Types of data and data collection techniques

The research adopted both primary and secondary types of data.

The primary data collection made through interviews, questionnaire, focused on group discussion and documentary review of which the raw data without interpretation or pronouncement that present an official opinion.

The secondary data, mainly interpretations of the primary data which used for the study includes books, journals, internet and some government publications.

a) Interview

The researcher interviewed some of the respondents using semi structured interview so as to allow flexibility, control on the scope of the study, sufficient data extraction, entirety of the interview and the inclusion of non- verbal remarks.

b) Questionnaire

The questionnaire comprised a list of questions; either closed-ended or open-ended questions prepared prior as per appendix 3 and 4. The questions were written in definite order distributed to the sample. The questionnaire showed the real picture with regard to the study topic.

c) Documentary review

This method was very useful since a great part of the research retrieved its statistical data from documentary sources. Information studied from official documents such as second corporate strategic plan 2010/11-2012/13 of Tanzania cotton board, the cotton industry implementation plan CIIP: 2010-2015, Annual cotton production reports from Lake zone Agricultural Research and development institute. Further literature was obtained from Library of Mzumbe University and within the council of Magu. They provided useful background knowledge and thereby helped to focus on the research problem at the hand more sharply.

3.5. Data analysis techniques

The data gathered were inferentially analyzed and processed using computer packages especially Microsoft office excel template computer application. Data analysis techniques used were Ratios, trends and break even analysis was applied to analyze the statistical data.

CHAPTER FOUR
PRESENTATION OF THE RESEARCH FINDINGS, DATA ANALYSIS AND
DISCUSSION

4.1. Introduction:

This chapter deals with analysis of the data and presenting the findings objective wise along with discussion.

4.2. Trends in Cotton production

The study wanted to examine the overall cotton production trend in the district of Magu. The trends are worked out in terms of cotton growth in hectares, production per hectare ,yield in KGs per hectare and also in terms of price per kg for the period from 1999/2000 – 2011/12.

4.2.1 Trends in cotton growth area, productions and yield

The area under cotton cultivation, cotton production in tons and yield per hectare for the period from 1999/2000 to 2011/12 are shown table 4.1. The averages, minimum and maximum limits, standard deviations of all the variables are worked out and shown in table 4.1a. In addition the correlations between the variables also calculated and shown in Table 4.1b.

Table 4.1 Cotton growth trend

Cotton season	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Cotton yield in kg per hectare	458	403	430	642	530	535	538	408	640	479	458	431	601
Cotton growth in hectares	28,370	36,139	24,857	53,855	46,901	18,120.30	35,840.10	42,026.80	30,658.90	29,249.40	34,000	36,742	36,848
production in tonnes	12,993	14,745	10,689	34,575	24,856	9,694	19,282	17,147	19,622	14,010	15572	15836	22,146

Source: Magu district council and Tanzania cotton board

Table 4.1 a: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
price per kg	13	175.00	1100.00	407.3077	262.31831
hectares under use	13	218120.00	53885.00	34895.1538	9312.42660
production in tons	13	9694.00	34575.00	17782.0769	6632.70262
yield per hectare	13	403.00	642.00	504.0769	84.07384
Valid N (listwise)	13				

Source: Compiles from the records of Magu district council and Tanzania cotton board.

Where “N” is equal to total number of cotton seasons

Table 4.1 b. Correlations

		price per kg	hectares under use	production in tons	yield per hectare
price per kg	Pearson Correlation	1	.141	.058	-.024
	Sig. (2-tailed)		.646	.850	.939
	N	13	13	13	13
hectares under use	Pearson Correlation	.141	1	.884**	.249
	Sig. (2-tailed)	.646		.000	.412
	N	13	13	13	13
production in tons	Pearson Correlation	.058	.884**	1	.661*
	Sig. (2-tailed)	.850	.000		.014
	N	13	13	13	13
yield per hectare	Pearson Correlation	-.024	.249	.661*	1
	Sig. (2-tailed)	.939	.412	.014	
	N	13	13	13	13

Source: Compiles from the records of Magu district council and Tanzania cotton board.

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

The following inferences can be drawn from table 4.1, 4.1a and 4.1b:

- There has been, on the whole, increase in cotton growth in hectares. The hectares under cultivation in 1999 was 28,370 and went up to 36,848 hectares

in 2011/12 recording 130 % over a period of 12 seasons indicating on an average about 2% increase. A close look at changes indicates that the fluctuations are ranging between 218,120 hectares and 53,855 hectares. The average cotton growth in hectares over a period of 13 seasons was 34895.1538 hectares. Except in four years, in all other years the growth area was more than the average. Further except in last three years the changes were once in 2 years showing increase in 2nd year and immediately decreases in subsequent year. However in last three years there was continuous increase in area under growth. The standard deviation was 9312.42660 showing high variability.

- There has been, on the whole, increase in cotton production growth in tones over the given areas under production during the period under study. The cotton production in tons in 1999 was 12,993 tones and went up to 22,146 tons in 2011/12 recording 170 % over a period of 12 seasons indicating on an average about 5.83% increase. A close look at changes indicates that the fluctuations are ranging between 9,694 tons and 34,575 tons. The average cotton production in tons over a period of 13 seasons was 11,782.07 tons. Except in four years, in all other years the production in tons was more than the average. Further except in last four years the changes were in fluctuations showing more uncertainty in production. In last four years there was continuous increase. Highest production can be observed in 2002/3 and lowest production can be seen 2004/5. The standard deviation of the production in yield during the period under study was 6632.70 showing high uncertainty. The volatility production in tones is higher compared to hectares under cultivation when compared their standard deviations with the averages. The standard deviation of hectares under use constitutes $(9312.4/34,895.2)$ 26.7% of its average where the standard deviation of production in tones constitutes $(6632.7/11782.1)$ 56.3% of its average. These phenomena hint that some factors are causing this variability.
- There has been, on the whole, increase in cotton yield in kilograms per hectare during the period under study. The cotton yield in kilograms per

hectare in 1999 was 458 kgs and went up to 601 kgs in 2011/12 recording 131.2 % over a period of 12 seasons indicating on an average about 2.5 % increase. A close look at changes indicates, the fluctuations were ranging between 403 kgs and 642kgs. The average cotton yield in kilograms per hectare over a period of 13 seasons was (6553/13) about 504. Except in six years, in all other years the cotton yield in kilograms per hectare was more than the average. The standard deviation of yield per hectare was 84.07. It constitute(84.07/504.07) 16.7% of cotton yield average which is lower compared to the composition of standard deviations of hectares under use and production in tones in their averages.

- It concludes that the average increase in cotton growth area in hectares was 2% whereas the yearly average rate of increase in production in tons was 5.83% and yield in kgs was 2.5%. Thus there is no parity between production and yield of cotton during the study period.
- The correlations between hectares under use yield per hectare and price per kg, are shown in table4.1b. The table reveals that the correlation between hectares under use and yield per hectare was 0.412 whereas the correlation between hectares under use and production in tones was 0.884. It shows that production in tones is highly correlated with hectares in use when compared to yield per hectare.

4.2.2 Cotton prices and cotton growth area:

To establish the relation between changes in cotton prices and its impact on cotton growth area the information relating to the price and hectares of land cultivated for the period from 1999/2000 to 2011/12 are shown in table 4.2. Further the descriptive statistics and correlations related to these variables are given in Tables 4.2a and 4.2b.

Table 4.2 Raw cotton selling price and cotton production in hectares.

Cotton season	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Raw cotton selling price in TZS	180	175	180	280	250	220	360	450	480	360	600	1100	660
Cotton growth in hectares	28,370	36,139	24,857	53,855	46,901	18,120.30	35,840.10	42,026.80	30,658.90	29,249.40	34,000	36,742	36,848

Source: Records of Magu district council

4.2a. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
price per kg	13	175.00	1100.00	407.3077	262.31831
hectares under use	13	18120.00	53885.00	34895.1538	9312.42660
Valid N (listwise)	13				

Source: Compiles from the records of Magu district council.

Table 4.2b. Correlation between hectares under use and price per KG

		price per kg	hectares under use
price per kg	Pearson Correlation	1	.141
	Sig. (2-tailed)		.646
	N	13	13
hectares under use	Pearson Correlation	.141	1
	Sig. (2-tailed)	.646	
	N	13	13

Source: Compiles from the records of Magu district council.

The following observations can be made from table 4.2.

- There has been, on the whole, increase in cotton selling prices. The price was TZS.180 in 1999 and went up to TZS.660 in 2011/12 recording 367 % over a period of 12 seasons indicating on an average per season about 30% increase. A close look at changes indicates that the fluctuations are ranging between TZS. 175 and TZS.1100. The average cotton price over a period of 13 seasons was TZS.403.3. Except in 5 years, in all other years the prices were lower than the average price. The rate of increase was substantial from 2005.

The standard deviation of cotton price per kg was 262.31 which constitute (262.31/403.3) 65.04% of its average signifying very high volatility.

- As against this there has been, on the whole, increase in cotton growth in hectares. The hectares under cultivation in 1999 was 28,370 and went up to 36,848 hectares in 2011/12 recording 130 % over a period of 12 seasons indicating on an average about 2% increase. A close look at changes indicates that the fluctuations are ranging between 218,120 hectares and 53,855 hectares. The average cotton growth in hectares over a period of 13 seasons was 34895.1538 hectares. Except in four years, in all other years the growth area was more than the average. Further except in last three years the changes were once in 2 years showing increase in 2nd year and immediately decreases in subsequent year. However in last three years there was continuous increase in area under growth. The standard deviation was 9312.42660 which constitute (9312.12/34895.15) 26.7% of its average.
- The correlation coefficient between both the variable show positive relationships showing 0.646 under two tailed test. It can be construed that whenever prices are going up the hectares under cultivation also going up and vice versa. Thus the area under cultivation is sensitivity to the price fluctuations.

4.2.3 Local and world cotton price

World cotton price has direct impact on local cotton price, decrease in world cotton price reduce price paid to farmers and vice versa. Figure 4.2c shows both local and world cotton prices trends, represents a real picture of cotton revenue varies depending the market forces and other factors in the world market.

4.3. Analysis of cotton production costs

The study researched for variety of cotton production costs incurred in cotton growth where respondents were required to identify different cotton costs and amount of money expensed on each cost categories. 100% of respondents managed to nominate costs involved in cotton production and they were more specifically mentioning even

the amount of cost. The average of every component cost is worked out by dividing total cost of every component by number of respondents. The survey revealed that the farmers are incurring fixed costs such as purchase of bulls, ox plough costs, hand hoes, insecticide pump cost, iron chain cost. However fixed cost such as insurance and borrowing costs not incurred because farmers do not meet financial institutions lending requirements. Table 4.3 lists out various costs involved in cotton production and sum of money paid on each cost class for the last five cotton seasons. They further indicated only variable costs involved in cotton production categorized into two main classes input cost and labor cost.

Table 4.3. Amount of costs involved in cotton production per hectare

	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012
variable costs	TZS	TZS	TZS	TZS	TZS
Input costs:					
seed cost	6,000	6,000	6,000	6,000	9,000
pesticide	7,000	7,000	7,000	7,000	7,000
Transport	4,000	4,000	5,000	5,000	8,000
Picking and selling sacks/bed sheet	10,000	14,000	16,000	16,000	20,000
Total input costs	27,000	31,000	34,000	34,000	44,000
Labour costs:					
Land preparations	15,000	21,000	37,500	37,500	40,000
Sowing	3,000	4,500	12,500	12,500	12,500
First weeding & gap filling	15,000	21,000	37,500	37,500	40,000
Second weeding	8,000	12,000	20,000	20,000	24,000
Pesticides application	1,000	1,500	2,500	2,500	5,000
Picking	14,000	21,000	35,000	35,000	40,000
Transporting & selling	5,000	7,500	10,000	12,500	15,000
Uprooting & burning stalks	5,000	7,500	12,500	12,500	20,000
Total labour costs	66,000	96,000	167,500	170,000	196,500
Total variable costs	93,000	127,000	201,500	204,000	240,500
Fixed costs	272,000	272,000	272,000	272,000	272,000
Total costs	365,000	399,000	473,500	476,000	512,500

Source: Compiled from data collected from field survey

Table 4.3 a. Composition of costs per hectare of cotton growth

Costs	2007/08	2008/09	2009/10	2010/11	2011/12
Input costs	27,000 (7.39%)	31,000 (7.77%)	33,000 (7.18%)	34,000 (7.14%)	29,000 (8.59%)
Labor costs	66,000 (18.08%)	96,000 (24.06%)	167,500 (35.37%)	170,000 (35.71%)	140,200 (38.34%)
Fixed cost	272,000 (74.52%)	272,000 (68.17%)	272,000 (57.44%)	272,000 (57.14%)	272,000 (53.07%)

Source: Compiled from data collected from field survey

The following observations can be made from the above table:

1. As per the respondents the total costs are grouped into two categories fixed and variable costs. Variable cost divided further into two subunits namely input and labor costs. The input costs include cotton seed, pesticides, transportation, selling and picking sacks/ bed sheets. Seed cost per hectare is determined by multiplying standard quantity 30 kgs cotton seed by per kilo current market price, pesticide cost is calculated by taking the amount of 1 liter pesticide required per hectare multiplied by current market price, while picking selling sacs and transport costs fetched from market price. The labor costs for cotton production include land preparation cost, sowing cost, weeding costs, pesticides application, picking cost, transport and selling, and uprooting and burning stalks. Land preparation costs, sowing, weeding, burning and uprooting stalks, pesticides application were measured by size of land worked more often cost per hectare were readily known. Whereas picking costs established by filling cotton in the basket of 20 litres volume, price per basket was the current market price, to get for example picking cost per cotton season was simply obtained by taking total cotton baskets per hectare multiplied by price per basket.

2. The total input costs per hectare varied between TZS.27,000 and TZS.34,000 during the period under study. The average input cost per hectare over the study period was TZS.30,800. There was continuous increase from first year to till 2011 and in subsequent year it came down. Out of five years in three years the actual costs were more than average and in first and last year the cost were lesser than average. The composition of input costs in total costs varied between 14.46% and 29.13%. Highest share was in 2007/08 and lowest was in 2009/10. During the first three years there was continuous decrease in the share and in subsequent 2 years it went up gradually. However, its share in 2011/12 is lesser than first 2 years. Except in transport and picking and selling sacks costs in all other costs there was decrease in 2011/12. There was increase in transport cost in the last year where as continuous increase can be observed in picking and selling sacks cost.
3. The total labour costs per hectare varied between TZS.66,000 and TZS.170,000 during the period under study. The average labour cost per hectare over the study period was TZS.127,940. There was continuous increase from first year to till 2011 and in subsequent year it came down. Out of five years in three years the actual costs were more than average and in first 2 year the cost were lesser than average. The composition of input costs in total costs varied between 70.97% and 85.54%. Highest share was in 2009/10 and lowest was in 2007/08. During the first four years there was continuous increase in the share and in subsequent one year it went down substantially. However, its share in 2011/12 is more than first 2 years and lesser than next 2 years. Except in transport and picking and selling sacks costs in all other costs there was decrease in 2011/12. There was increase in transport cost in the last year where as continuous increase can be observed in picking and selling sacks cost. There was continuous increase in pesticides, transportation and uprooting costs. With regard to other labour costs there was continuous increase till 2010/11 and in subsequent year it came down.

This concludes that cotton production costs include both variable costs and fixed costs. Fixed cost constitute highest share followed by labour costs

whereas input costs constitute lowest share in total costs. The rate increase in labour costs was comparatively higher than input costs.

4.4. Economic viability of cotton growth

The study wanted to examine the economic viability of cotton growth of respondents in the Magu district. The economic variability of cotton growth for five cotton seasons from 2007/2008 to 2011/2012 worked out in terms of cotton yield per hectare, cotton kilogram (kg) selling price, input costs, labor costs, and fixed costs and shown in table 4.4. Cotton yield per hectare measured in terms of number of kilograms produced per hectare, price per one kilogram (kg) of cotton is ascertained from the specific season market price, total revenue per cotton season was established by multiplying total cotton kg per hectare by its cotton kg market price. Variable costs include input costs and labor costs. The costs of input and labor components are ascertained from the 120 respondents and their averages are calculated. Contribution margin to fixed costs and profit was ascertained subtracting variable cost from total revenue of a particular period. Total costs consist of variable and fixed costs, while gross benefit/ (loss) are the difference between total revenue and total cost per hectare.

4.4.1 Fixed cost and break even points

Fixed costs are the costs that do not vary with output level in certain relevant output range. As per the respondents in cotton cultivation they use fixed assets like ox plough, hand hoe, pesticide pump, wooden jockey and its iron chain. In addition they also take the services of Bulls for various operations of the cultivation including marketing. Hence the fixed cost of every item is equivalent to the cost of every such items divided by its economic life. The total fixed costs are equivalent to the total such costs incurred on every item. It was ascertained that every farmer use minimum of 4 oxen and on average every ox costs Tshs. 350,000. Further it was reported that the life of ox on an average is 5 years. Thus fixed cost of using animals in cultivation is equivalent to $[4 \times 350,000 / 5] = \text{Tshs.}240,000$. Though the useful life of the bulls varies with workload, for the purpose 5 years were taken as economic useful life of bulls on average manner based on the opinions expressed by the respondents. The

average costs of ox plough, two iron chains, pump and four hand hoes are as follows Tshs. 120,000, Tshs. 40,000, Tshs. 40,000, and Tshs. 12,000 respectively. Their economic useful lives are reported as 10 years, 5 years, 5years and 3 years respectively. Therefore total depreciation of Tshs. 272,000/= indicated in the table 4.4 comprises of Tshs. 240,000/= bull depreciation, ox plough Tshs. 12,000/= (i.e. $120,000 \div 10$ years), chains and pump Tshs. 16,000 (i.e. $80,000 \div 5$ years), and hand hoes Tshs. 4,000/= (i.e. $12,000 \div 3$ years). For the purpose of simplicity straight line method is applied. For the purpose of economic viability the breakeven point of cotton cultivation per hectare in terms output (Kgs). and in terms of total value of sales calculated by using the following equation.

Break even points (BEP) in terms of output (KGs) =

$$\text{BEP}_{(\text{in Kg})} = \text{Fixed costs} \div \text{Contribution margin per Kg}$$

Contribution per Kg = selling price per kg – (total variable Costs /total output in kgs.)

Fixed costs imply total fixed costs per hectare while contribution margin established by subtracting variable cost per Kg from cotton Kg selling price.

Table 4.4 Cotton revenue and costs and break even quantity

Item	Units	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012
		TZS	TZS	TZS	TZS	TZS
Yield (kg/ha)	Kg/ha	640	713	789	632	700
Price (sh/kg)	sh/kg	480	360	600	1100	660
TOTAL REVENUE	sh/ha	307,200	256,680	473,400	695,200	462,000
Variable costs						
Input costs		27,000	31,000	34,000	34,000	44,000
Labour costs	Pdays/ha	66,000	96,000	167,500	170,000	196,500
Total variable costs		93,000	127,000	201,500	204,000	240,500
Contribution margin per Ha		214,200	129,680	271,900	491,200	221,500
Fixed costs	sh/ha	272,000	272,000	272,000	272,000	272,000
TOTAL COSTS	sh/ha	365,000	399,000	473,500	476,000	512,500
GROSS BENEFIT/(LOSS)	sh/ha	(57,800)	(142,320)	(100)	219,200	(50,500)
Price per kg	Tshs	480	360	600	1100	660
Percentage	%	100	75	125	229.17	137.5
Variable cost per kg	Tshs	145.313	178.121	255.387	322.785	343.571
Percentage	%	100	122.57	175.74	222.13	236.435
Contribution margin per kg	Tshs	334.687	181.879	344.613	777.215	316.429
Breakeven in kgs	Kgs.	812.698	1495.4998	789.2912	349.9675	859.5925

Source: Compiled from data collected from field survey

The following observation were made from table 4.4 above

- i. The total revenue per hectare for the period from 2007/2008 to 2011/2012 indicates high volatility, though on the whole it signifies increase. The highest revenue per hectare of Tshs. 695,200/= was in the 2010/11, while the lowest revenue was in the 2008/2009 amounted to Tshs.256,680. The average revenue during the period of study was Tshs.438,896. Except in two seasons, in all other seasons the actual revenue was higher than the average revenue. The average price per kg has gone up from Tshs 480 to 660 over the study period. The increase was 37.55 over a period of 4years indicating an average increase of 9.17%.

- ii. Despite the fact that the total cotton revenue per hectare over the period from 2007/2008 to 2011/2012 specifies down-up trend, the relative total cotton production costs per hectare has tremendously increased over the period of the study. Though the fixed costs assumed to be constant over the study period as per the opinions of the respondents, the variable costs have gone up significantly showing 136.43% over 4 years signifying an average increase of 34.11%. Thus it can be concluded that the cost have gone up at higher rate of increase when compared to price of the product. The average variable cost per Kg was Tshs.249.05. except in first 2 years in all other years the cost was more than average.
- iii. With regard to Profit or loss on cotton production, out of five cotton seasons in only one season (2011/2012) respondents earned a profit of Tshs.219,200/=because there was highest cotton Kg selling price. In the rest of the seasons respondents incurred losses the highest loss was Tshs. 142,320/= in the year 2008/2009 in which there was also lowest cotton selling price.
- iv. The break-even output in kgs has also gone up during the study period. However there were wide fluctuations. It varied between 348.97 and 1495.49 kg. In two years it was extreme and in remaining three years more or less remained same. The fluctuations are primarily on account of price changes followed by increase in variable costs per kg. Thus taking the present output and break even quantity as basis in four years out five years the Magu district farmers incurred losses. This is also identified in profitability taking total costs and total revenue as the basis.

Thus it can be concluded that the economic viability of farmers is mostly sensitive to cotton prices followed by increase in variable costs as at present it appears non-viable. Hence, there is need to increase their yield per hectare so as to face this challenge.

4.5 Cotton growing challenges:

The study wanted to assess the cotton production challenges faced by primary cotton farmers right from cotton sowing until cotton is sold. Respondents were asked to disclose all perceived challenges which coming in the way of economic viability of cotton growth in the area under the study. The perceived challenges include cotton price variability,

4.5.1. Cotton price variability

Respondents revealed that the foremost cotton challenge is selling price variability and unpredictability. They expressed that decrease in cotton price over previous year is the most common experience than increase. This also can be evinced from the data taken for the study. They expected that the price should increase as the costs of inputs are increasing. As the result was against to this expectation there has been mismatch of cotton revenue and cotton production costs in some cotton seasons where there a great fall in selling price despite the fact that cotton production costs remain stagnant or moved up. 98% of the respondents expressed that selling price is most important cotton growth challenge. Table 4.5 shows cotton selling price, percentage change over previous year along with increase or decrease for the period from 1995 to 2012.

Table 4.5 selling price and percentages of variability

Years	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Local cotton price in TZS	207	170	180	185	123	180	175	180	280	250	220	360	450	480	360	600	1100	660
selling price percentage (%) change		18%	6%	3%	34%	46%	3%	3%	56%	11%	12%	64%	25%	7%	25%	67%	83%	40%
increase or decrease in price		↓	↑	↑	↓	↑	↓	↑	↑	↓	↓	↑	↑	↑	↓	↑	↑	↓

Source: Compiled from Tanzania cotton board records

Note: ↓ - indicates cotton price decline from the previous year price; ↑- indicates cotton price increase from the previous year price

From the table 4.5 the following observations can be made:

- Out of 15 seasons study in 7 seasons there was decrease in prices over previous years. The decrease varies between 3% and 40%.
- Out of 15 seasons there was increase in prices in 8 seasons. The increase ranges between 3% and 83% showing high volatility.
- A close observation reveals that the fluctuation is once in 2-3 years showing uncertainty about price prediction by the farmers

Thus it can be concluded that the price is one of the most important factor for non-viability of farmers which is confirmed on the basis of the opinions of the respondents and also on the basis of above data.

4.5.2 Non use of modern agricultural implements due to lack of centralized facilities.

Use of modern agriculture implements facilitates high yield and reduced uncertainties. Agricultural implements include tractors, planters, water pump, Tories etc. Every operation of the cotton cultivation is being done manually. For water totally depend on rainfall. If some centralized such facilities are available either by some private agency, government agency or cooperative agency it may help them to make use of such equipment as they cannot afford of buying of the same. In view of the above Majority of the respondents expressed that they are unable to cope up with the matching cultivation operations with that of season resulting into untimely performance of activities. The area under cultivation is limited because of lack opportunity to use modernized equipment in cotton cultivation.

4.5.3 Lack of collateral for loan from financial institution

Adequate financial resources are pivotal for the cotton cultivation for which most of the Respondents depend on borrowings. Borrowings are tied up with fulfilling formalities as per the requirements of the financial institution or the lender. Majority of the respondents reported that lack of adequate collateral is the foremost hurdle

coming in the way of availing financial facility from the institutions. Table 4.6 shows the information about loan applied and received the loan.

Table .4.6 bank loans with cotton farming

Bank loan	Respondents	Percentage	Reasons
Not requested for bank loan	116	97%	not aware if banks gives loan
Applied for bank loan	4	3%	to finance cotton farming
Given loan	0		meet bank requirements
Not given loan	4	3%	did not meet bank requirements
Total	120	100%	

Source: Compiled from data collected from field survey

From the table it can be understood that except 3% all did not get any finance from banks for their cotton cultivation. Most of them were not provided loans because they were not having collateral.

4.5.4 Cheating by buying agents

The Tanzania cotton board has specific responsibility of ensuring the genuine weighing scales of every buying company or agent to meet the predetermined standards. Cotton buying license or permit is issued based on many criteria one being that all weighing scales should be assessed to check standard compliance as stated by cotton board employee at Magu district. However, after getting license there were instances of using unstandardized weighting practices due to insufficient supervision resulting into under weighing of the produce of the farmers. This resulted into decrease in revenues of the farmers.

61% of respondents agreed to an existence of cheating practices by buying individuals and the issue is more serious with cotton agents. Cotton agents are individuals with small capital they buy cotton from farmers and sell it to ginners or

large buying companies at a profit. Most of the low income farmers sell their cotton to agents because of they are accessible nearby their dwelling homes.

4.5.5 Lack of education among farmers

Farmers education enables them to apply improved methods of cultivation use of technology so as to get higher yield per acre. Respondents clarified that they cultivate cotton adopting instructions received from their ancestors such instruction has been inherited from one generation to another Table 4.7 shows education status of the respondents.

Table 4.7 Educational status of the respondents

Education status	Respondents	Percentage
Uneducated	48	40%
Below standard seven	12	10%
Standard seven	53	44%
Secondary education	5	4%
College/University	2	2%
Total	120	100%

Source: Compiled from data collected from field survey

According to the above table 40% are uneducated and 60% have some literacy background ranging from school education to college education. However 87% of respondents agreed that lack of appropriate education on cotton cultivation is the major causative of chronic illness on unsatisfactory cotton revenue. They added that even those government employees on cotton matters rarely visit the farmers in the field in order to provide appropriate education on how should manage cotton farms. In the period after independence till 1990,s the authorities used to exhibit films on cotton cultivation practices in all the villages of the district at least once per season. Now this practice is discontinued. Lack of relevant skills on cotton growth was also supported by all 12 respondents (district agricultural officers) poor cotton yield is

outcomes of suspending improved cotton management practices. 13% of respondents differed; they said informal education on cotton growth acquired from their forefathers enough to cultivate cotton.

4.5.6 Lack of reliable source of cotton seeds

Respondents disclosed that before agricultural sector liberation in 1994 cotton seeds were supplied by primary cooperative unions, after liberation cotton matters left under forces of the market and thus cotton seeds are bought from the free market. Such practices have brought problems to farmers as 72% of respondents agreed that lack of reliable seed source is the challenge whereas 28% of respondents disagreed. They further clarified that the government through its agricultural research institutions announces the relevant cotton seed to be planted in particular cotton growing areas like “Ukiringulu 92 cotton seed” is specific for Tanzania lake zone. However it has been unsuccessful in preventing cotton seed from unreliable cotton seed producers to enter the cotton seed market in the district. Consequently some respondents revealed that they planted unviable seed cotton purchased from the free market that did not germinate. Others unfolds that they planted inferior quality seeds consequently resulting into low crop. Some expressed that they lack skills to recognize the appropriate seeds and nobody was available to help us in this respect except believing the seller.

CHAPTRE FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction:

This chapter deals with summary, objective wise conclusion with some suggestions.

5.2 Summary

The study on the economic variability of cotton cultivation in Magu district intended to study and analyze the trends in cotton production, cotton production costs and economic viability of cotton farming in Magu District. In addition it also paid attention on finding the Challenges facing cotton growers in Magu district. The required data relating to different variables of the study were gathered by distributing questionnaires to 120 cotton farmers' respondents. In addition to farmers, data was also collected from 4 district agricultural employees, 2 district cotton board employees and 4 employees from primary union cooperatives. The data collected were processed and analyzed by use of percentages, trends, apart from applying the breakeven analysis for the economic viability to cotton farmers. The conclusions emerged out of the study were presented here under.

5.2 conclusions

The conclusion emerged out of this study are presented objective wise. The objectives of the of the study include a) to analyze the cotton production trend, b) to study and analyze cotton production costs, c) to examine the economic variability of cotton cultivation, d) and finding out challenges facing cotton growers.

5.2.1 Cotton production trend.

There has been increase in cotton production area, cotton production in tons and cotton yield per hectare during the period 12 years. However the increase was not continuous and steep fluctuations are identified in variables. It concludes that the average annual increase in cotton growth area in hectares was 2% whereas the yearly average rate of increase in production in tons was 5.83% and yield in kgs was 2.5%.

Thus there is no parity between production and yield of cotton during the study period.

The correlation between hectares under use and yield per hectare was 0.412 whereas the correlation between hectares under use and production in tones was 0.884. It shows that production in tones is highly correlated with hectares in use when compared to yield per hectare.

The correlation coefficient between price per kg and hectares under cultivation show positive relationships showing 0.646. It can be construed that whenever prices are going up the hectares under cultivation also going up and vice versa. Thus the area under cultivation is sensitivity to the price fluctuations

5.2.2 Cotton production costs in Magu district

This concludes that cotton production costs include both variable costs and fixed costs. Fixed cost constitute highest share followed by labour costs whereas input costs constitute lowest share in total costs. The rate of increase in labour costs was comparatively higher than input costs.

5.2.3. Economic viability of cotton cultivation in Magu District

Since the break even quantity of output per hectare was higher than the actual output in 4 years out of 5 years, it can be concluded that the cotton growing was economically nonviable in Magu District. The main cause for this state of affair is that the economic viability of farmers is mostly sensitive to cotton prices followed by increase in variable costs. Since price and variable costs are not in control of the farmers, the only way left for facing this challenge is to increase their yield per hectare.

5.2.4 Challenges facing cotton growers in Magu district

Cotton farmers in Magu district face numerous cotton cultivation challenges which include Cotton price variability, lack of education among farmers, cheating by buying agents, Nonuse of modern agricultural implements due to lack of centralized

facilities, lack of reliable source of cotton seeds and Lack of collateral for loan from financial institutions.

5.3 Recommendations

Based on the research findings on the study objectives, the following recommendations were made

- The uncertainty in cotton prices is one of the prime causes for non-viability of cotton growing in Magu district. It is not in the control of farmers. Hence, it is suggested that the Government of Tanzania has to intervene in this matter by declaring support price for cotton marketing for every season based on economic viability and keeping reasonable margins to the farmers of the cotton growing. Further this stipulation should also form part of contract farming agreements so as enable assured return to the farmers. If this measure taken, since farmers are assured of reasonable returns, the area under cotton cultivation may increase.
- To reduce large share of fixed costs in total cotton production costs, the government in addition to zero rate tax on agricultural implements, should take responsibility of providing appropriate facility to acquire bulls and at reasonable price. Furthermore the government should think of subsidizing inputs for cotton production. Because subsidizing will not only reduce production costs but also will enable farmers to acquire and use modern agricultural implements at low costs.
- To improve the economic viability of cotton farmers. Cotton yield should be improved by following approved farming management methods, application of fertilizers and manure, use of modern agricultural implements, research and developments should be continuously carried out to release adaptable cotton seeds to cope with weather dynamism.
- In order to overcome the challenge of high cost of modern agricultural implements, farmers are advised to develop comporment of using tools or cotton inputs already available in the local environment instead of relying

tools and inputs from outside which are very expensive and sometimes irrelevant and appropriate to the environment. For instance adopting manure which is found anywhere at low costs but high yield may assist avoiding unnecessarily fertilizer expenses.

- To combat the challenge of hindrance of obtaining loan from financial institutions, the government, in addition to the already developed agricultural bank, should develop policies and regulations that will enable Farmers to access bank loans for financing cotton production. Farmers must develop a philosophy of seating together discuss their cotton matters through discussion for which they may think of establishing depositing and borrowing Sacco's which can overcome the constraints of loan from financial institutions.
- To overcome the challenge of Lack of education among cotton farmers, the government should organize film shows, training programs, educating programs quite often at various places of Magu District. They can think of revoking the pre-agricultural liberalization farmer's education program of displaying films on best practices of agriculture. Further, the government should train and use effectively already available agricultural officers in advising on technical matters and also overseeing the cultivation of the farmers.
- In order to avoid Cheating by buying agent challenge with unstandardized weighing, it is advised that the Tanzania cotton board with the responsibility of issuing license on buying agents should continuously carry out unpredicted regular inspection on the weighing scales of the buying agents. Painful punishment for cheaters should be charged to discourage such practices in the cotton sector.

5.4 Scope for Future Research

The study has placed focus on the perceived economic viability of cotton cultivation using Magu district as a case. The study is of both qualitative and quantitative

character and of limited scope. Hence the following may be taken under scope for further research:

- Extending the same study i.e the economic viability of cotton farming to every region and the country as whole
- The impact of contract farming on economic viability of cotton farming in every region and the country.
- Since the present study is confined to marginal farmers, it can be extended to medium and large farmers.

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APPENDICES

Appendix one

Comparative Costs of Producing One Hectare of Rain fed Cotton: 2007/08: (US\$)

	Benin	India (Central)	South Africa NW (Stella)	USA (MS Portal)	Tanzania	
					ECGA	WCGA
Pre-sowing						
• Land rent		93.75		193.70	30.00	30.00
Land revenue/ tax		2.20				
Ploughing	38.78	12.00			40.00	12.00
Other	6.0	0			8.00	
Sub total	44.78	107.95		193.70	78.00	42.00
Sowing						
Land preparation	10.77	21.88				
Seed		61.37	32.43	210.83	2.4	2.4
Fertiliser	13.20	56.25			0	7.6
Herbicides	1.60	0			0	
Other	11.30	19.38			12.00	12.0
Insecticides	59.07	15.63	13.43	268.67	24.00	16.20
Other		0	0	310.070	0	
Sub total	255.50	80.00	48.14	739.64	92.00	16.20
Harvesting						
Hand picking	52.80	50.00	0		78.80	32.00
Machine picking	0	0	68.57		0	
Stick cutting/ slashing	10.77	0	0			20.00
Other	23.50	0	0			
Sub total	87.07	50.00	68.57		78.80	52.00
Grand Total	424.24	396.82	149.14	1,144.17	261.20	174.20

Source: Tanzania cotton board

APPENDEX Two (2)

BEI YA PAMBA KWA MKULIMA KUENZIA 1989/90 - 2009/10

MSIMU	BEI YA MKULIMA	BEI SOKO LA DUNIA	% ANAYOLIPWA MKULIMA
1989/90	28	96	29
1990/91	41	114	35
1991/92	70	121	57
1992/93	60	142	42
1993/94	80	190	41
1994/95	120	308	39
1995/96	207	350	59
1996/97	170	329	51
1997/98	180	373	48
1998/99	185	301	61
1999/00	123	264	46
2000/01	180	323	55
2001/02	175	271	63
2002/03	180	296	61
2003/04	280	440	64
2004/05	250	363	69
2005/06	220	337	65
2006/07	360	442	81
2007/08	450	584	77
2008/09	480	650	62

SOURCE: Tanzania Cotton board.

Appendix 3

QUESTIONNAIRE FOR COTTON FARMERS

Date code

Personal information

Name_____ Age_____

Education_____ source of income _____

How many family members in your family _____

How many family members earn income _____

Village name _____

District name _____

Experience in cotton growing (tick the appropriate)

- a) None
- b) Less than two year
- c) Less than five years ()
- d) More than five years

Numbers of cotton hectares you have been cultivating for last five years.

- a) Less than one hectare
- b) More than one hectare but less than two hectares. ()
- c) More than two hectares but less than 5 hectares
- d) Above 5 hectares.

Question one

How much have you been paying for farm preparation for last 5 years?

	2008	2009	2010	2011	2012
Land clearing					
Land digging					
Fertilizer cost					

QUESTION TWO

How much have you been paying for sowing cost for the last 5 years?

2008	2009	2010	2011	2012
TZS.				

QUESTION THREE

How much have you been paying for growing cost per hectares for the last 5 years?

	2008	2009	2010	2011	2012
Spacing cost					
Weeding					
Pesticides					
TOTAL					

QUESTION FOUR

How much have you been paying for cotton picking cost per hectares for the last 5 years?

	2008	2009	2010	2011	2012
Picking cost					
Bedsheet cost					
Transport cost					
Selling cost					

QUESTION FIVE

What was the selling price per 1 kg for the last five years?

Year	2008	2009	2010	2011	2012
Price/kg					

QUESTION SIX

How many kilos per hectares have you been producing for the last five years?

Year	2008	2009	2010	2011	2012
kgs/hectare					

QUESTION SEVEN

Do you expect grow cotton in future YES () or NO () tick one

Why?

QUESTION EIGHT

Do you benefit from cultivation cotton?

QUESTION NINE

What are the cotton growing challenges?

QUESTION TEN

What should be done to make cotton cultivation viable?

QUESTION ELEVEN

What should be done to fight against cotton challenges?

QUESTION TWELVE

How do you finance cotton activities?

- a) Bank loan ()
- b) Others

Why financing cotton with your finance source

QUESTION THETEEN

Have you applied for bank loan to finance cotton? a) YES _____ b)
NO_____ Why? _____

Did you receive bank loan for financing cotton? a) YES _____ b) NO_____

Why? _____

Appendix 4

QUESTIONNAIRE FOR TCB STAFFS/ DISTRICT AGRICULTURAL OFFICERS/ COOPERATIVE UNION OFFICERS.

Date Code

Personal information

Name _____ Age _____

Designation _____

District name/institution name _____

QUESTION ONE

Do cotton farmers follow improved cotton farming management? a) YES ____ b) No

Why

QUESTION TWO

What are the external and internal cotton growing challenges?

QUESTION THREE

Do you think cotton production viable?

a) YES ()

b) NO

Why?

QUESTION FOUR

What cotton production in tons or kg, area put under cotton for the?

Cotton season	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Cotton yield in kg per hectare													
Cotton growth in hectares													
production in tonnes													

QUESTION FIVE

a) What product is main cash crop in the district? _____

b) How much money contribute to the district revenue per year

QUESTION SIX

What should be done in handling down cotton growing challenges?

QUESTION SEVEN

What are the cotton selling price per kg for last 13 cotton season

Cotton season	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
cotton selling price per kg													

QUESTION EIGHT

How cotton selling price paid to primary cotton farmers developed

THANKS

Appendix 5

Summary of literature review

The literature reviews on the cotton growing costs, revenue, challenges and their relationships on economic viability are summarized hereunder.

Author(s)	Date of the study	Farm preparation cost	Seed and sowing cost	Weeding cost	Manure costs	Plant protection cost	Harvesting cost	Uprooting and burning stalks costs	Labour cost	Selling price
Vargas R.N.	USA 2003	-ve			-ve	-ve			-ve	
LZARDI	Tanzania 2009	-ve			-ve			-ve		
John R. Shao	Tanzania 2002		-ve							
Khan B.M et al	USA 2011		-ve							
Meister H.S	2004			-ve						
TCB	Tanzania 2012			-ve						+ve
Mayberry K. S.	2002				-ve					
Bell A.A	USA 1999					-ve				
Simon F. at el	2005					-ve				
Meister H.S	2004					-ve				
Nelson et al	2000						-ve			
Haque T.	India 2010							-ve		
Frank, Ramakrishnan and Paul	India 2007								-ve	
MahendraDev S.	India 2012								-ve	
National council of America	USA 2012									+ve
Mtunga M.	Tanzania 2012									+ve

Author(s)	Date of the study	Selling price	World cotton price	Real cotton price	Cotton growing	High taxes and utility	External cotton	Exchange rate fluctuation
The International Food Policy	2002	+ve						

Research Institute(IFPRI)								
Minot N. and Daniels L	USA 2002	+ve						
Gibbon P.	Denmark 2001		+ve					
kabissa J. at el	Tanzania 2011			+ve				
Tulip, A. and Ton P.	United Kingdom 2002			+ve				
Watkins K.	2002			+ve				
Hornby S.A	United Kingdom 2010				-ve			
Reddy N.D, Dr.	2011					-ve		
Sigalla .A et al	Tanzania 2011					-ve		
Tanzania cotton board on second corporate strategicplan	Tanzania 2010/11-2012/13					-ve		
Baffes John	2002							
Maro .w. and Poulton .C.	2009						-ve	
Labaste P, Tschirley D, Poulton C	2009							-ve

Author(s)	Date of the study	Fixed costs	Variable cost	Rent cost
ACCA	2006	-ve	-ve	
Blocher .J.E at el.,	2005	-ve		
Ferreira W. N.	2010	-ve	-ve	-ve
Ramakrishna M. at el	2007		-ve	

Note

-ve – decrease economic viability of cotton cultivation.

+ve - increase economic viability of cotton cultivation.