THE ROLE OF GOVERNMENT INTERVENTION ON AGRICULTURAL GROWTH IN TANZANIA: CASE OF COTTON

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A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN ECONOMICS OF THE OPEN UNIVERSITY OF TANZANIA

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CERTIFICATION

The undersigned certifies that he has read and hereby recommends for acceptance by the Open University of Tanzania a dissertation entitled; "The Role of Government Intervention on Agricultural Growth in Tanzania: Case of Cotton" in partial fulfilment of the requirement for the award of the degree of Master of Science in Economics.

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Prof. Deus D. Ngaruko

(Supervisor)

………………………………

Date

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DECLARATION

I, Prosper Michael Kulaya, do hereby assert that, this study is my own exertion and has not been submitted for any academic award in any Higher Learning Institution or University.

………………………..……

Signature

………………….…………

Date

DEDICATION

This work is dedicated to my beloved family (my wife Elinipa and our beloved children) and my mentor, Mr. Marco Mtunga.

I thank you all for your support and I love you!

ACKNOWLEDGEMENT

First of all, I thank Almighty God for his grace and mercy on my life and who gave me health and strength throughout the study. Secondly, this study has been completed following the support and contribution of a number of people including all my family members, ministry of agriculture and other government officials who provide me with material and moral support relevant to the study.

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Thank you very much.

ABSTRACT

This study intended to examine the role of the Government Intervention on growth of the agricultural sector which is the back-bone of the Tanzanian economy basing on the number of populations who rely on agriculture for their life sustenance. The case study is cotton farming in Tanzania which is the main economic earning for about 40% of Tanzanian population. The study intended to analyze the factors affecting cotton farming in Tanzania and the role of the government to optimize those factors. The result of the study indicates that, cotton output is positively correlated with distributed seeds for planting (0.52), distributed pesticides (0.463), government budget support (0.145) and farm-get price (0.04). Distributed seeds and pesticides are statistically significant (0.001 and 0.005 respectively) while farm-get price (0.909) and budget support (0.442), though positive they are insignificant. Number of extension officers on the other hand shows the inverse relationship with cotton production, calling for critical analysis on the proper way to realize their contribution on agricultural growth. Based on the coefficient of determination (R^2) of 0.754, there is a strong relationship between variables. Thus, the variables under the study are capable to explain 75.4% of variation in dependent variable while 24.6% can be explained by other factor not included in the model, calling for further study to analyze those determinants. Therefore, the study recommends the government to optimize availability and access to these key inputs for cotton farming aimed to complement significantly on attainment of macroeconomic objectives.

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LIST OF ABBREVIATIONS

AMCOS	Agricultural Marketing Cooperative Societies
A/P	Acre-pack
ASDP	Agricultural Sector Development Program
ASDS	Agricultural Sector Development Strategy
BOT	Bank of Tanzania
CDP	Cooperative Development Policy
CECED	Centre for Economics and Community Economic Development
ECGA	Eastern Cotton Growing Areas
GOT	Ginning Out-Turn
IMF	International Monetary Fund
LZARD	Lake Zone Agricultural Research and Development
OUT	Open University of Tanzania
PPP	Public Private Partnership
SPSS	Statistical Package for Social Studies
TARI	Tanzania Agricultural Research Institute
TCA	Tanzania Cotton Authority
TCB	Tanzania Cotton Board
TCMB	Tanzania Cotton Marketing Board
TLSMB	Tanganyika Lint and Seed Marketing Board
TZS	Tanzanian Shilling
UK 91	Ukiriguru 1991
UKM 08	Ukiriguru – Mali 2008
UNCTAD	United Nations Conference on Trade and Development

UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
WB	World Bank
WCGA	Western Cotton Growing Areas

CHAPTER ONE

INTRODUCTION

1.1   Background Information

Cotton is among the major traditional cash crops in Tanzania. It was introduced in the country more than 120 years ago by the German colonialists in the late 19th century. Some other cash crops are cashew nuts, tea, sisal, coffee and tobacco. Cotton contributes significantly in individual welfare and agricultural GDP at large. It is a source of income and general livelihood to about 40% of the Tanzanian population (TCB, 2013). Also, the crop contributes significantly in foreign earning generation; for instance, in 2014/15 it generated about US$ 48.53 million in 2015/16 US$ 36.54 million, in 2016/17 US$ 33.26 million and in 2017/18 US$ 40.57 million which show declining from US$ 115 million in 2008 (TCB, 2018).

Since its introduction in the country, cotton had been passed through various folds due to the number of factors ranging from input availability, farm services and marketing. In the efforts to try to stabilize the sector due to its role in the economy, a number of interventions in terms of policies, programs, strategies and slogan have been developed aimed at strengthening the sector and make it an attractive sector to investors. Some of them include; the Agricultural Sector Development Strategy (ASDS) of 2001, the Agricultural Sector Development Programs (ASDP I & II) of 2005 and 2017 respectively; and the Cooperative Development Policy (CDP) of 2002.

However, despite of the efforts taken by the government to improve agricultural sector in Tanzania, its growth is still below the expected rate to realize social-

economic development in country (TanzaniaInvest, 2016). It is expected that, for the economy to sense the role and contribution of agriculture it should grow at least by 6%. The growth rate for agriculture in 2016 was 3.2% (National Economic Survey, 2016). Taking into consideration the number of populations engaged in agriculture and the growth rate of population, still there should be a purposely effort to boost growth in agricultural sector in order to realize the desires of the government to be the middle-income country by 2025.

This study is envisioned to assess the movement or relationship of two groups of variables namely; government intervention on agricultural sector specifically cotton sub sector and crop performance in terms of production. In this scenario, dependent variable will be annual output growth (production in tons) of seed cotton and on the other side independent variables will be a number of government interventions in terms of improved access to inputs, budget support to regulatory institutions, agricultural policies and strategies, price stabilization, and the like.

The focus of this study will be on traditional export crops production in Tanzania and emphasis will be on cotton farming. This is due to the fact that, cotton is among the strategic crops which expected to fasten the country to attain its industrialization striving, specifically in the garment and textile industries which is famous for its nature of being mass employment creation because of using high labour intensive. The role of the cotton sector to the economy cannot be undermined, specifically in the Western (Lake Zone) where about 600,000 smallholder producers and the livelihood of more than 2.4 million individuals depend directly on cotton. The

number of populations depending their livelihood on cotton increase significantly when putting into consideration the individual who indirectly depend on cotton throughout its value chain. More than 40% of Tanzanian (more than 22.3 million (NBS, 2019) are working in cotton related industries like textile and garments, oil mills, animal feeding and other cotton by-product industries (TCB, 2013).

In its early development in Tanzania, the cotton sector was liberalised to some extent where private companies operated ginneries and the government used to regulate the sector to maintain a fair business ground, investing on key inputs like seed varietal development as well as research and development activities aimed at improving the performance of the sector. Until 1951, production reached 78,000 bales (averaged 181 kg). Furthermore, Tanganyika Lint and Seed Marketing Board (TLSMB) was formed in 1956 to deal with the marketing of seeds and lint and later promotion of cooperatives following deterioration of relationship between small holder cotton farmers and traders. This initiative led to consistent increase in production in the average of 23% annually as well as quality improvement (Paulton, 2009).

In 1973, TLSMB liquidated and replaced by Tanzania Cotton Authority (TCA) and in 1976, all cooperative unions liquidated and all their responsibilities were given to TCA. However, the results in terms of production and quality were not impressive for more than 10 years. In 1986, the government restored the Regional Cooperative Unions by enacting the Tanzania Cotton Marketing Act No. 19 of 1984 which revoked Tanzania Cotton Authority and established Tanzania Cotton Marketing Board (TCMB). The functions of TCMB were regulatory in nature and exporting of cotton lint on behalf of the Regional Cooperative Unions.

From there, performance was slightly pleasing due to improved production as noted by the highest production of 300,000 metric tons seed cotton in 1991 - 1992 (Paulton, 2009). TCA and cooperatives were to a certain degree a public institution; hence they were operating under the government subsidies. Following some external and internal macroeconomic forces, there were significant structural changes in the country in 1990s to the early 2000s which led to substantial decrease in the government and its institutions involvement in business related activities directly (TanzaniaInvest, 2016). In 1993 the government liberalised the entire cotton industry as part of the ongoing economic recovery and structural adjustment programmes, culminating into the formation of Tanzania Cotton Lint and Seed Board by Act of Parliament (Miscellaneous Amendment Act) No. 11 of 1993. The Board became the exclusive overseer of the cotton sector regulation in Tanzania (TCB 2015).

Major aim of the structural adjustment was to allow competition in the economy in order to improve efficiency in production and service delivery in the economy. As a result, in 1994 the monopoly of Tanzania Cotton Association was eliminated leading to cooperative unions and private ginning companies to compete in ginning and marketing of cotton. In 1995 and 1996, the production rose and share of export price to farmers increased from 41% to 51% of the world market (Paulton, 2009).

The sector failed to maintain this performance in terms of quantity produces, quality control for cotton produced and quality inputs (seeds and pesticides) distributed to farmers. As a result, price started to decline (world market result and discount due to low quality) leading to decline in production reaching to its lowest record of 100,000 tons in 1998 – 1999. In summary, from 1973 to 2001, there were

a number of changes of regulatory bodies in the cotton sector where the responsibilities of different institutions were altered time to time. Throughout the period, the government through Tanzania Cotton Authority has tried to revamp the sector through different initiatives. The result was ambiguity due to substantial fluctuation in production over years during the time under review as shown in the figure 1.1
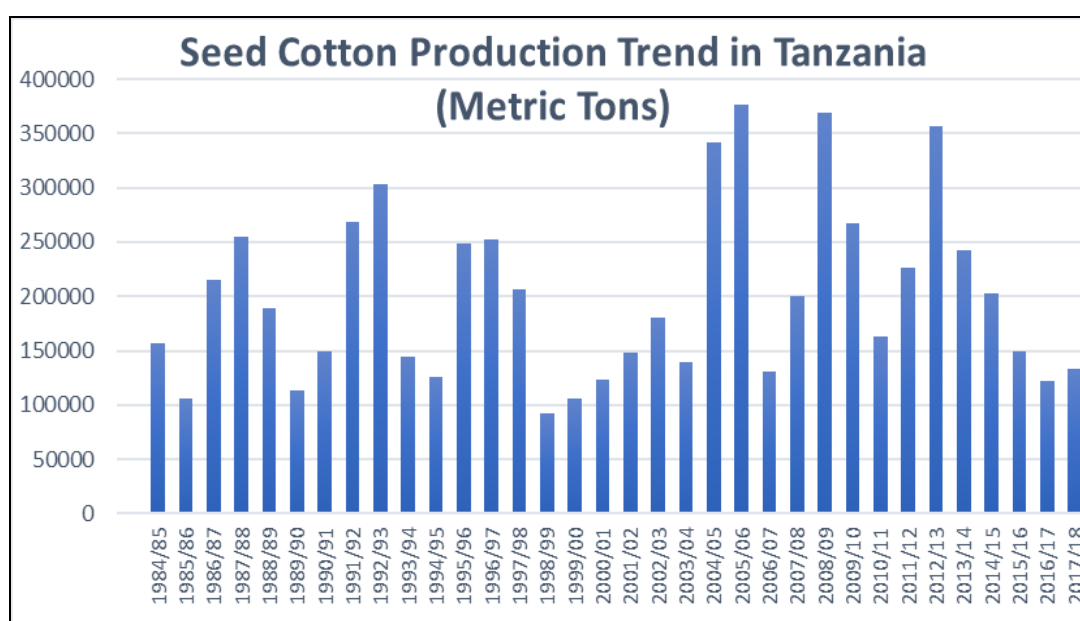
Figure 1.1 Cotton Production in Tanzania 1984/85 to 2017/18
Source: Tanzania Cotton Board

The Cotton Industry Act (2001), provides for the formation of Tanzania Cotton Board to replace the Tanzania Cotton Lint and Seed Board. Main functions of the Board being to put in place a legal and regulatory framework aimed at improving and developing the cotton industry by promoting, facilitating and monitoring the functioning of the entire value chain inclusive of production, marketing, processing and exporting. Many strategies and efforts have been engaged by the Board to address production constraints specifically availability and access to quality inputs. Some of strategies include uses of passbook to acquire inputs, piloting and

operationalisation of contract farming in early of 2010s and including inputs in indicative price calculation for the sake of offering inputs to farmers without direct paying (TCB, 2018). There were some critics for these initiatives from different stakeholders which leading to their failure. The performance of the sector continued to be ambiguous following the stakeholders' failure to identify and solve the challenges of the sector in unified approach (Kabissa 2013).

1.2 Statement of the Research Problem

Cotton, which is crucial for life sustenance to more than 2.5 million population directly and more than 20 million indirectly through its entire value chain, has passes through different periods with different policies and strategies. As the government trying reform the economy by inviting internal and external investors to invest in textile sector, most of investors are putting several factors inclusive of reliable supply of raw materials (cotton lint), to be in place before deciding to commit their resources.

Wold Bank (2009) pointed out three factors that has a significant impact on cotton yiel namely, price responsiveness, input supply and weather condition. On the other side, Ngaruko (2008) argued that, market reforms in Tanzania produced fewer desirable results in terms of improved provision of agricultural support, agro-services and profitability. Kabissa, (2013) identified the absence of proper multiplication scheme of cotton seed, timely accessibility of pesticides as well as limited value addition domestically for cotton produced are the main hinderance for cotton production and quality. He proposed contract farming where private companies could provide inputs (seeds, pesticides and possibly fertiliser) to farmers

and recover them during the marketing season. The model introduced in 2010 with huge challenges and collapsed officially in 2018. However, the model provides impressive results as effectively applied in 2010 to 2014. Misunderstanding among cotton stakeholders and absence of strong institution controlling the entire system is said to contribute to inconsistence of a number of initiatives as noted by Guterty *et al.* (2011).

From the mentioned studies, there is no one which proposed a solid means to address the challenge identified instead of proposing new institutional arrangement to address the same especially input supply side. This study is critically designed to assess the impact of the government intervention of input supply scheme and capacitating financially and human capital the regulatory institutions. This is due to the fact that, different initiatives had been introduced by the government over years providing different outcomes. Therefore, the study used to assess each initiative with its outcome and propose to the respective authority on proper way to make the sector sustainable in terms of production and quality assurance.

1.3 Research Objectives

The objective of this study is to contribute on improved living standard of the population engaged in agriculture by enhancing cotton farming through improved and sustained production and productivity so as to increase income and profitability to cotton stakeholders specifically farmers. The study will stress on identifying the factors affecting cotton production in Tanzania as well as the role of the government in optimizing the availability and access of those factors. Further, the study indirectly is aimed to support Tanzania industrialization strategy by enhancing

steady supply of raw materials for textile and oil mills industries for the sake of improving purchasing power and general wellbeing of the people.

1.3.1 Overall Objective

The overall objective of this study is to analyse the factors affecting cotton farming in Tanzania and the role of government intervention to sustain them through direct provision, subsidy or farming and marketing policies.

1.3.2 Specific Objectives

Specifically, the study intends to attain the following objectives: -

i.   To identify key factors affecting cotton production growth;

ii. To examine the relationships between the agricultural growth and factors identified in number one above;

iii. To examine different ways that government can intervene the cotton industry by establishing of strong and sustainable means of optimising factors affecting growth of cotton production.

1.4   Research Hypothesis

The above stated objective will be attained through statistical investigation of the cotton sector growth in terms of increased production through expanded acreage/improved productivity and government intervention through different ways over time in terms of spending on input subsidies, direct procurement and processing of seed cotton, input voucher system, levies charged on cotton in different stages in the value chain, budgetary support to regulatory and research institutions and the like.

Total annual production volume of seed cotton, farm get price and world market prices covering the period of 1984/85 to 2016/17 will be assessed in relations to variation of factors affecting cotton production and productivity. The following hypothesis will guide this study;

i. **H$_0$:** Government spending on pesticides procurement for cotton input has no significant impact on cotton production volume;

ii. **H$_0$:** Government subsidy on cotton seeds for planting has no significant impact on cotton production volume;

iii. **H$_0$:** There is no statistically significant relationship between farm-get price and growth in cotton production;

iv. **H$_0$:** There in no statistically significant relationship between budget support to TCB and TARI Ukiriguru on cotton production growth

1.5 Rationale of the Study

Currently, Tanzania is implementing various strategies aimed to attain her industrialization and human development plan by 2025. Availability of raw materials and market for final product is a key factor that promotes industrialization in any country. Cotton, being an important raw material for textile and garment industry as well as a source of income to majority of Tanzanian, special attention should be directed on its sustainable production. This study intends to inform the government and other development stakeholders on the different ways that the government can intervene the agricultural sector in order to ensure steady supply of agricultural related inputs for industrial sector so as to attract internal and external investors in textile and garment industry.

Textile and garment industry are well known as labour intensive industry, hence most of Tanzanian especially youth will get employed in the sector and other sector will be stimulated through multiplier effect and finally lead to higher economic growth and human development in the country. Generally, this study is very important due to its effect on macroeconomic aspects of Tanzania as well as food security and employment creation in the economy. Also, the study is attracting more studies on proper way of addressing challenges confronting the cash crop farming in Tanzania and it will lead to a researcher to be awarded the Masters of Science in Economics degree of the Open University of Tanzania.

1.6 Structure of the Study

The study has been organised into five chapters. After this chapter, which provides the background information, problem statement, objective of the study, hypothesis and rationale of the study followed by chapter two. Chapter two is stressing on examination of various writings from different sources concerning the topic under study leading to development of theoretical framework and hypotheses formulation. Third chapter consists of the description of the research methodology followed by chapter four which include presentation and analysis of findings as well as discussion of the results. Chapter five summarizes the conclusions and discussion of policy implication. Also, the fifth chapter discuss limitations and delimitations as well as providing avenue for further study.

CHAPTER TWO

LITERATURE REVIEW

2.1   Chapter Overview

This chapter presents examination of various literatures related to the subject under study. The chapter is divided into four parts as follows; the first part is the theoretical framework while the second part will analyse the empirical framework. The third part of the chapter is concerning conceptual framework and the fourth part is concentrating on research hypothesis.

2.2   Definition of Key Concepts

The study intends   to examine the relationship between agricultural growth specifically cotton production in terms of increased output in relation to government intervention in key factors affecting agricultural production. The key concepts for the study are government intervention components and agricultural sector growth.

2.2.1   Government Intervention

Andrew and Abel, (2011) defined the government intervention as any action taken by the government that affect the market economy with the direct objective to impact the economy. It occurs when the government try to   get involved in markets to correct some market failures aimed to improve economic efficiency. According to Romer (1996), in the operation of the free market economy, there is no direct or indirect involvement of the government on influncing the the market players' behaviour. Market itslf guide the allocation of scaarse resources. However, it is not always that the free market can allocate the resources efficiently.

The main reason for the government to intervene the economy includes the correction of failures, to attain equitable income distribution and to improve the general performance of the economy. According to Jehle and Reny (2011), market failure can occur in terms of factor mobility, public goods, demerit goods, merit goods, information asymmetry, high relative poverty or monopoly power. In the case of cotton sector and its role toward achieving macroeconomic goals in the economy, the government can intervene the crucial parts as;

2.2.1.1 Government Spending on Input Subsidy

Myer and Kent (2001), defined subsidy as a sum of money granted from public funds to help an industry or business keep the price of a commodity or service low. According to them, though normally extended from the government, subsidy can relate to any kind of support like those from Non-government Organizations. It can come in different forms inclusive of grants tax breaks, low-interest loans, insurance, rent, accelerated depreciation and so forth. The main aim of subsidy can be seen in two different ways: supply side and demand side of the economy. From the supply side of the economy, the subsidies help an industry by letting the producers to produce extra goods and services while on the demand side of the economy, subsidy can benefit consumers by lowering the prices of good or service. In the case of the cotton industry, major aim of the subsidy is to lower the input prices hence improved input use leading to the sectoral growth.

The most common inputs for cotton farming are seeds, pesticides and extension services. Experience from different studies indicate that, in the season with either free or on-credit input supply, the number of farmers and output is higher as

compared with the season with cash procurement of the same. The price for seed is estimated to be TZS. 700/kg and TZS. 4,000/acre-pack for pesticides. Most of cotton farmers are small farmers with the area between 1 to 3 acres and their number is estimated to be 500,000. Current yield is estimated to be 300kg/acre leading to total revenue averaged TZS. 300,000/acre in almost 6 months of field working (TCB, 2014).

The study conducted by TARI Ukiriguru (2017) indicate that, if a farmer decides to comply with recommended input package (except of fertilizer), total production cost is estimated to be about TZS. 322,000 with expected output ranging from 500-800kg/acre ceteris peribus. If some factors affecting cotton production like adverse weather condition hit the crop, the farmer tend to suffer a big loss leading to shift from cotton farming to other crops or businesses. This decision will have a negative impact on government objective to attain industrialization and human development hence necessity the government intervention to lower the cost of production aimed to improve farmers profitability and sustainable production of cotton. Total spending for the two inputs (seeds and pesticides) is estimated to be about TZS. 42 billion where the said inputs will be distributed to the farmers freely. Alternatively, the government may decide to take any portion of the cost leading to farmers to pay the remaining portion.

2.2.1.2 Direct Engagement in Cotton Marketing

In the free market economy, resources are allocated through interrelation of demand and supply where the preferences and expenditure conclusions of consumers as well as supply decisions of traders come together to govern

equilibrium quantity and prices. The government can choose to intervene in the free market basically on the grounds of the intention to alter the allocation of scares resources aimed to a desired goal mainly enhancement of economic and social wellbeing. As Musgrave R., (1959) noted, all governments of every political system intervene the economy to impact the allocation of resources among the competing uses. The main reasons for intervention include; to correct for market failure, to attain equality in income and wealth distribution and to improve the general performance of the economy.

Sometimes the government can decide to supply goods or services that are crucial for the public especially public and merit goods free of charge. Musgrave R. (1959), explained merit goods as commodity which individual or society should consume basing on some concept or intents of need, apart from the capability and willingness to pay. Any goods can be treated as a merit good if its consumption can cause positive externality in the economy and which could not be realized in the Operationalization of free market.

Secondly, in the case that individuals seek to maximize utility in the short run and ignore the long run utility. For the case of the cotton sector, a huge profit to the economy are realized in the late stage of the value chain i.e. ginners, spinners and textile are the one who took more than 80% of the total value leaving cotton farmers with less than 20%. In this scenario, the government being not a profit maximiser can decide to buy, processing and sell cotton produce in order to provide farmers with equity prices for their produce and to ensure quality.

2.2.1.3 Government Budget Support

Mungunasi, et al (2010) defined government budget as a fiscal instrument of the government effectively used to achieve numerous socio-economic purposes. The main objectives that the government try to realize using the budget are; macroeconomic and fiscal sustainability, effective public service distribution and organisation and provision of public investments. Since the government works using different regulatory boards and institution, budget support for these institutions are very crucial for the to implement their mission leading to realization of macroeconomic goals. According to the Cotton Industry Act, (2001) for instance, Tanzania Cotton Board which is the overseer of the cotton subsector is depending 100% on government funding to implement its plans and strategies while prior to 2004 the Board used to finance itself by selling cotton lint domestically and abroad.

2.2.1.4 Agricultural Growth

World Bank, (2005) defined agriculture growth as the rate of increase in agricultural output over time. The growth rate can be increasing trend, declining trend or constant trend. In all economies, agriculture has been identified as a vital factor for the livelihood of majority specifically rural communities and small holder farmers (Mundlak, 2007). Growth in agriculture throughout the history has been identified as the main engine for economic growth and development, as associations among farm and non-farm economies produced extensively employment and income to majority. From this perspective, agricultural growth shall be treated as major means to eradicate of poverty and hunger in those economies that have not fully achieved the macroeconomic growth. This is principally so in Tanzania particularly in cotton sub sector, where the statistics of rural poor with land less than 5 acres and individuals

farming in a very small portions with very low inputs use are large. For instance, Analyses of cotton output growth from 2007 to 2017 provide cause for worry as the figure below depicts.
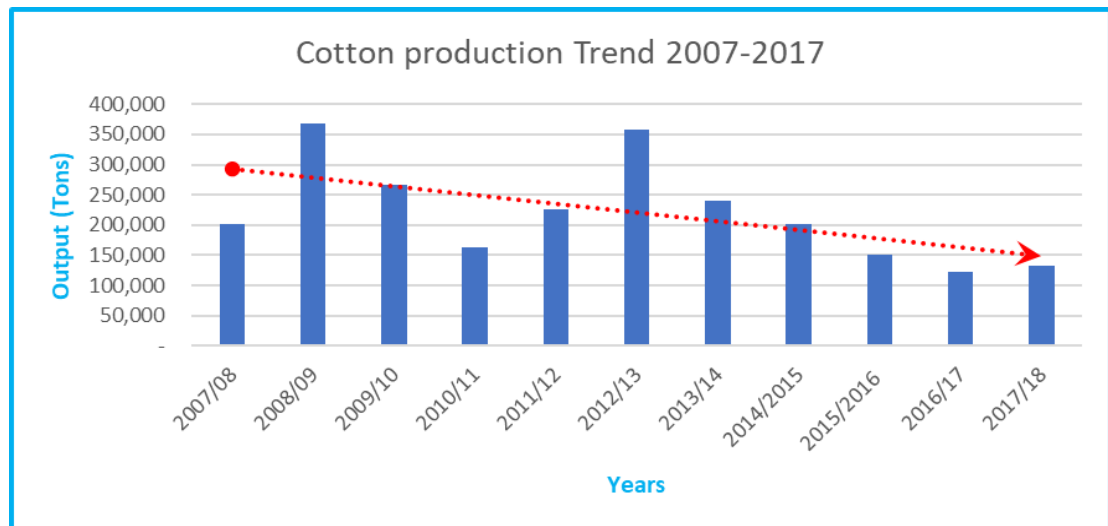
Figure 2.1: Cotton Production Trend for 10 Years
Source: TCB 2018

2.3 Theoretical Review

Economic growth has been a major concern of many economists. Different schools of thoughts have tried to explain the source and sustenance of how economic growth in both short run and long run in terms of employment, gross domestic product and the rate of interest. The following are analyses of some theories concerning the subject matter.

2.3.1 Classical Model

The analysis of economic growth process was the key feature in the classical economists. This was the first contemporary macroeconomic views which linked with famous economists like Adam Smith (1723 – 1790), Thomas Malthus and David Ricardo (1772 – 1823). The concept behind the classical economics point of view is that, free economy and very small government involvement are essential in

determining successful operation of the economy (Andrew, 2011). According to this theory, all markets in the economy like labour market, financial market as well as the markets for goods and services should work smoothly without any impediments such as minimum wage, interest rates ceiling and the like.

The argument is that, all prices and wages can naturally adjust quickly enough to maintain a general equilibrium in case of any shock. In any market, when quantity demanded surpasses quantity supplied, prices rise to bring the market into equilibrium while in the market where more of a goods are available than individuals want to purchase, price will fall to take the market its original equilibrium where demand and supply curve intersect each other. In this sense, there may be some temporal periods of fluctuation where employment and output fall below or raise above its natural rate but price responsiveness in the short run and in the long run can bring back all macroeconomic variables in smooth functioning of the free market. In general, the resources allocation will be decided by market system and not the government intervention. Figure 2.1 depicts the classical economic view;
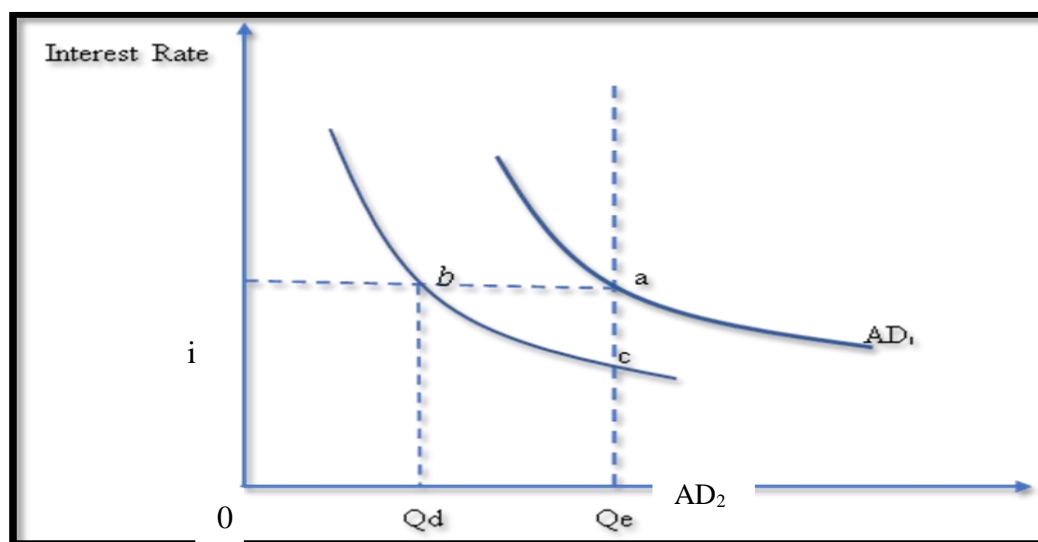
Figure 2.1: Demand and Supply in Classical Economics

In any market, when quantity demanded surpasses quantity supplied, prices rise to bring the market into equilibrium while in the market where more of a goods are available than individuals want to purchase, price will fall to take the market its original equilibrium where demand and supply curve intersect each other. In this sense, there may be some temporal periods of fluctuation where employment and output fall below or raise above its natural rate but price responsiveness in the short run and in the long run can bring back all macroeconomic variables in smooth functioning of the free market. In general, the resources allocation will be decided by market system and not the government intervention. The below diagram depicts the classical economic view;

From the diagram above, initially, the economy is at equilibrium at point *a* where aggregate supply and aggregate demand curves intersect each other. Following some shocks in aggregate demand components, private investment expenditure or consumption may fall leading to fall (shifting in aggregate demand expenditure from point *a* to disequilibrium point *b* where output is low. As a result, business firms will suffer due to inability of people to consume their produce and they will respond by cutting investment expenditure.

People will lose their jobs; their purchasing power will fall and the economy will undergo natural adjustment to new equilibrium point **c** ($AS = AD_2$) with low level of aggregate demand expenditure. Later on, prices will fall, sales will increase, more people get employed and in long run the economy can go back to its natural rate of equilibrium ($AS = AD_1$). In all these processes, there is no any role played by the government. All mechanisms take place as a function of price operations.

However, in the Great depression (1929 – 1932), the model fails to prove its applicability where most of macroeconomic variable gone astray for almost a decade. Real GDP dropped by about 30%, per-capita income fell by 40% and more than twelve million people thrown out of their jobs. Also, businesses failed, inflation was very high and persisted for almost a decade (Jha, 2003). As a result, there is a doughty about the efficiency of pure classical view on optimal economic operationalization.

2.3.2   Keynesian Model

2.3.2.1 National Income Theory

According to Keynes, there are different sources of national income, such as government, foreign trade, individuals, businesses and trusts. A perusal of the basic ideas of Keynes can be clearly understood from the brief summary in the flow chart. Total income depends on total employment which depends on effective demand which in turn depends on consumption expenditure and investment expenditure. Consumption depends on income and propensity to consume. Investment depends upon the marginal efficiency of capital and the rate of interest.

The total expenditure of an economy can be divided in to four categories of spending. They are consumption expenditure (C), investment expenditure (I), government expenditure (G) and net expenditure on trade or net exports that is, exports minus imports, (X-M). The aggregate demand is the sum total of all such spending. Hence the aggregate demand function is represented as: -

AD = C+ I + G + (X-M)

Keynes gives all attention to the aggregate demand function. The main basis of Keynesian theory is that employment depends on aggregate demand which itself depends on two factors namely, propensity to consume (Consumption function) and inducement to invest (Investment function).

2.3.2.2 General Equilibrium

From Keynesian point of view, wages and prices adjust slowly not rapidly as assumed by classical view. In the book, The General Theory of Employment, Interest, and Money (1936), Keynes argued that, slow wage and price change meant that market could be in disequilibrium where quantity demanded is not equal to quantity supplied for long periods of time. From the viewpoint of Keynesians, the classical theory appeared to be seriously inconsistent due to prolonged higher rates of unemployment during the great depression in late 1920s and 1930s.

In the Keynesian model, unemployment can continue because wages and prices do not adjust rapid enough to match the number of individuals that businesses want to employ against the number of individuals who want to work. Keynes suggest solution to high unemployment was the government to increase its purchases of goods and services, hence raising the demand for output. According to Keynes this strategy would lessen unemployment because, for the firms to meet the higher demands for their products, they would have to employ more labours. In addition, Keynesian proposed, the newly employed workers would have extra income to spend, generating another source of demand for produce that would increase employment further. Generally, in contrast to classical view, Keynesians tend to be doubtful about the invisible hand and consequently are keener to advocate a role for

government in improving macroeconomic performance. Consider the following diagram;
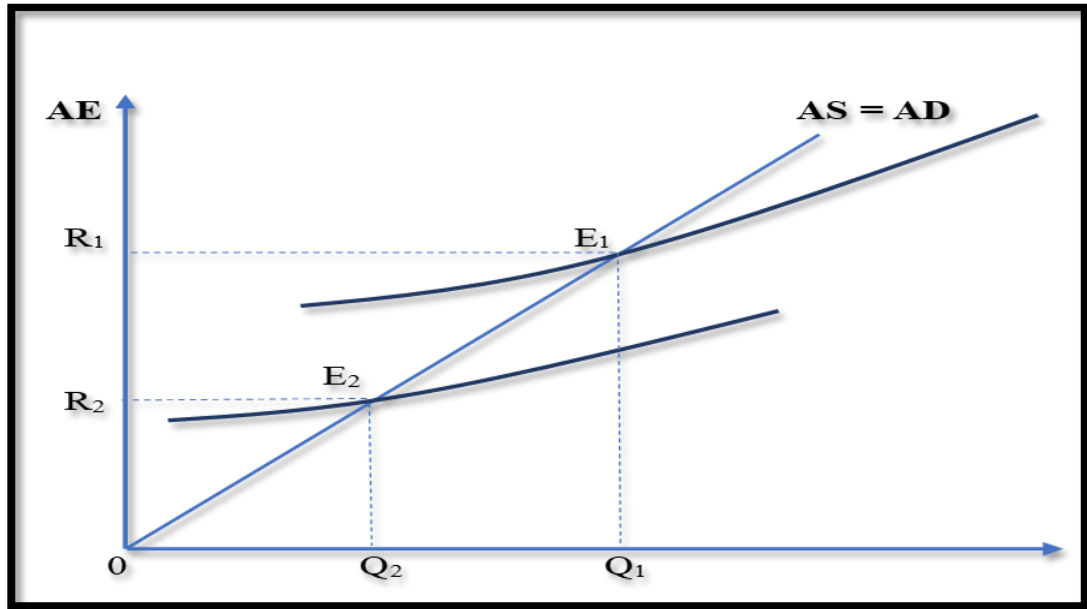
Figure 2.2: Aggregate Demand and Supply Curves

From the diagram above, initial equilibrium was at E_1 with output Q_1 and interest rate R_1. However, following some macroeconomic shocks, consumption, investment or export may be adversely affected leading to decline in output from Q_1 to Q_2 and equilibrium point shift from E_1 to E_2. According to Keynesian proposition, the government intervention through monetary or fiscal policy can be used to draw back output and equilibrium to its natural rate.

The two important concepts of Keynesian views are the two equilibriums namely investment and saving equilibrium or goods market equilibrium (IS) and money demand and supply or money market equilibrium (LM) models of John Hicks and the Phillips curve. It was John Hicks model that Keynesian economics formed a clear model which policy makers can use to try to know and govern economic

activities in the country. IS-LM model is nearly as convincing as Keynes' original study in shaping actual policy and economics. It is associated with aggregate demand and employment to three exogenous variables namely the amount of money circulating in the economy, the government budget, and the business expectations.

The model was very common with economists after the second World War because it could be understood as a general equilibrium theory. Another key part of a Keynesian policymaker's hypothetical device was the Phillips curve. This curve, was more of a practical observation than a theory, designated that raised employment, and reduced unemployment, implied increased inflation. Keynes predicted that dropping unemployment would lead to increased price, not increased inflation rate. Therefore, the policy makers could use the IS-LM model to foresee, for example, that by increasing money supply, output and employment can increase.

2.3.3 Neoclassical Economic Growth Model (Solow Model)

Solow model of economic growth shows in what way growth in the capital stock, labour force and advancement in technology interrelate and how they together affect the economy's total output (Romer, 1996). Production function in Solow Model is given in equation 1.

$$Y_{(t)} = F(K_{(t)}, A_{(t)}L_{(t)}) \quad\text{...}\quad (1)$$

where subscript t represent time, Y is output, K represent stock of capital, A is technology and L represent the stock of labour in the economy. Important two features in Solow production function is that, time enter the production through labour, capital and technology and secondly, technology and labour enter the

production function multiplicatively. Production function in Solow model is assumed to have constant returns to scale:

$$cY = (cK, cL) \text{ where c} > 0 \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{ (2)}$$

Production function being constant returns to scale, more analysis of quantities in the economy relation of the size of the labour force can be done. By setting $c = {}^{1}\!/_{L}$, in above equation, to get ${}^{Y}\!/_{L} = F({}^{K}\!/_{L}, 1). \dots\dots\dots\dots\dots \text{ (3)}$

This equation specifies that, the output amount of each worker is a function of capital per worker. The intensive form production function $(y = f(k))$ is assumed to satisfy $f(0) = 0$, $f'(k) > 0$ and $f''(k) < 0$ proving that, $f'(k)$ is the marginal product of capital (Romer, 1996).

2.3.4 Dynamics of Solow Model

As noted above, production function in Solow model has three main inputs namely capital, labour and technology. Hence it is important to study the behaviour of the economy in response of change in one of these variables.

2.3.4.1 Change in Labour and Technology

The model assumes that, labour and technology are growing at a constant rate $(n \text{ and } g)$ respectively. That is, ${\partial L_t}\!/_{\partial_t} = nL_t \dots\dots\dots\dots\dots\dots\dots\dots \text{ (4)}$

$${\partial A_t}\!/_{\partial_t} = gA_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{ (5)}$$

where **n** and **g** are exogenously determined. The model assumes that, L and **A** are exponentially growing.

2.3.4.2 Change in Capital Stock per Labour

Since $k = {K}/{AL}$, chain rule method can be used to differentiate the equation aimed to find change in k over time.

$$\partial k(t) = \frac{\partial K(t)}{\partial A(t)L(t)} - \frac{K(t)}{[A(t)L(t)]^2}[A(t)\partial L(t) + L(t)\partial A(t)]\dots\dots\dots\dots\dots\dots\dots (6)$$

$$= \frac{\partial K(t)}{\partial A(t)L(t)} - \frac{K(t)}{A(t)L(t)}\frac{\partial L}{L(t)} - \frac{K(t)}{A(t)L(t)}\frac{\partial A(t)}{A(t)}\dots\dots\dots\dots\dots\dots\dots (7)$$

From the model, labour and technology are growing at a constant rate i.e.

$$\partial L(t) = nL(t) \ and \ \partial A = gA(t)\dots\dots\dots\dots\dots\dots\dots\dots\dots (8)$$

Therefore,

$$\partial k(t) = \frac{sY(t) - \delta K(t)}{A(t)L(t)} - k(t)n - k(t)g\dots\dots\dots\dots\dots\dots\dots (9)$$

$$= S\frac{Y(t)}{A(t)L(t)} - \delta k(t) - nk(t) - gk(t)\dots\dots\dots\dots\dots\dots\dots (10)$$

$$\partial k(t) = sf(k(t)) - (n + g + \delta)k(t)\dots\dots\dots\dots\dots\dots\dots\dots (11)$$
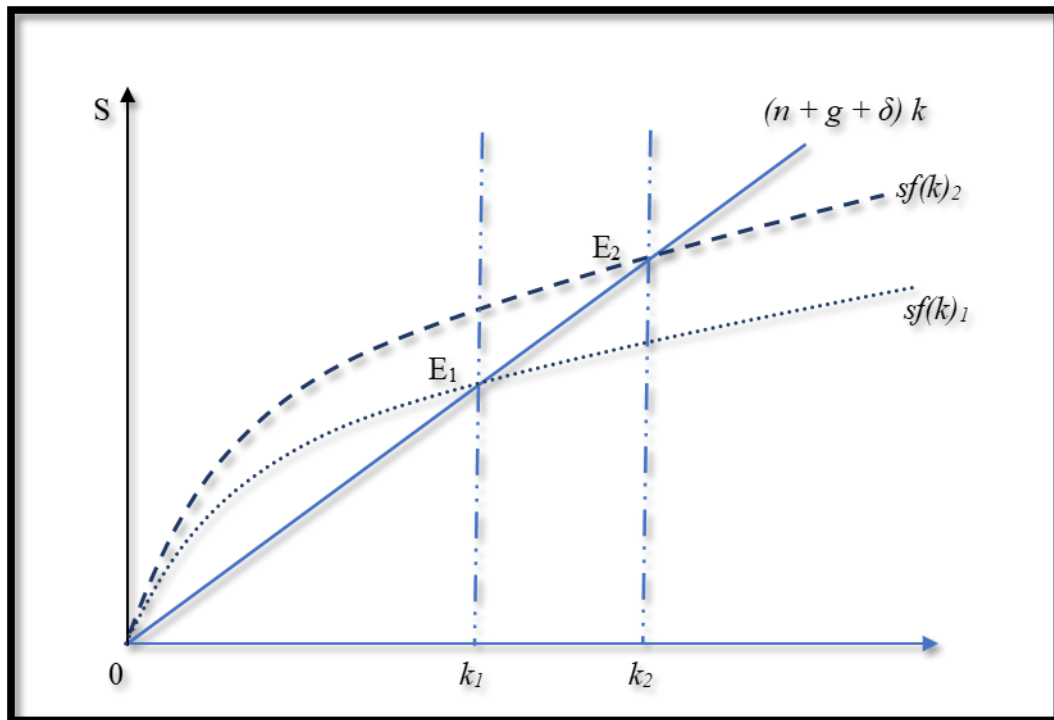
Figure 2.3: The Effect of Increase in Saving (Investment) on Economic Growth

Generally, equation 11 from the Solow model state that, the rate of change in the capital stock per labour is the different between actual investment (sf(k) and break-even investment $((n + g + \delta)k(t))$………………………………….……... (12)

Finally, using the fact that Y / AL is given by f (k), we have

$$k(t) = sf(k(t)) - (n + g + \delta)k(t) \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots (13)$$

From the figure above, output can increase by increasing saving rate which will affect investment component and output. However, because capital is subjected to the law of marginal diminishing return, this growth will be of short run i.e. from k_1 to k_2 According to Solow model, only growth in technology can take the economy in keeping growing over time.

2.4 Conceptual Framework
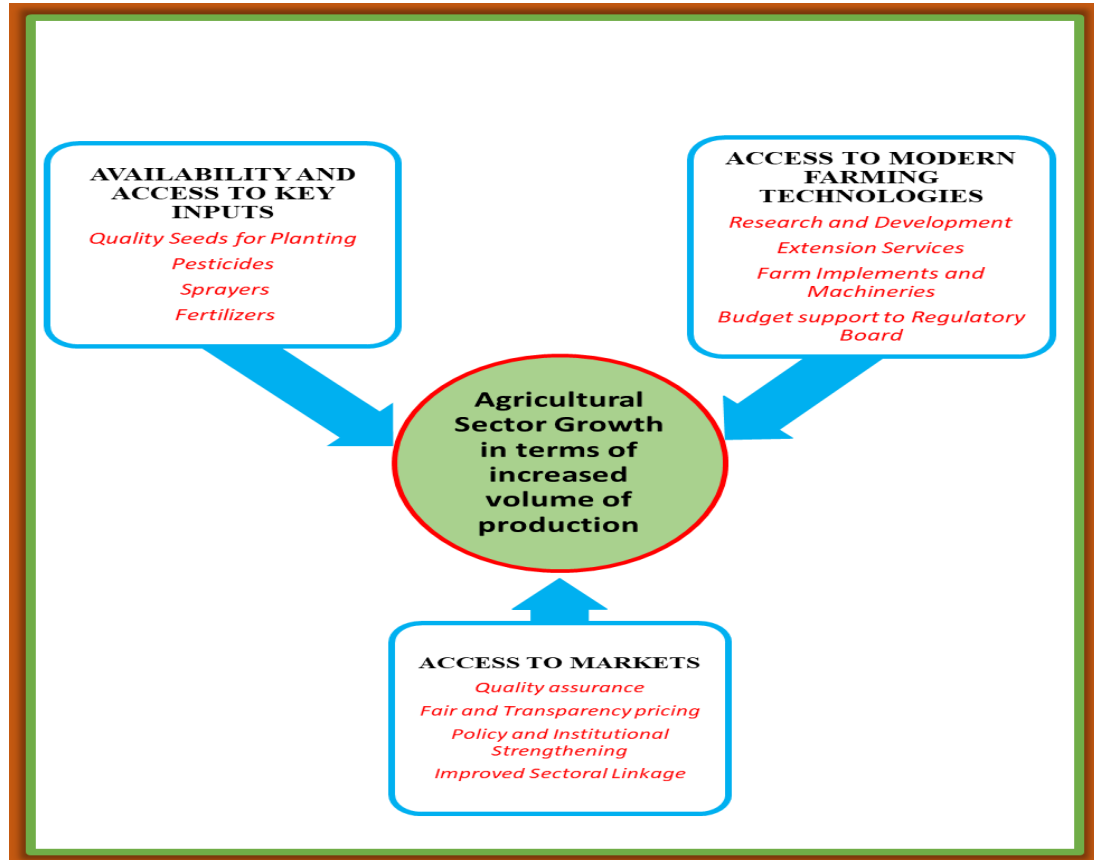
Figure 2.4: Model Summary Showing Relationship between Variables

2.5   Cotton Production Function

Cobb-Douglas production function can be used to analyse the relationship between inputs and output of cotton and to reach judgment concerning the efficiency of predominant factors affecting cotton farming and to suggest the improvements in these proportions aimed to increase the efficiency in cotton farming. Crucial cotton inputs are discussed hereunder;

2.5.1 Government Policies

Government support to agricultural sector through different policies is crucial towards its growth. This support can be done through input subsidies, direct production, border protection, insurance or floor price mechanism. For instance, low market price for seed cotton in 2009/10 led to the government to extend TZS. 80/kg subsidy to producers (TCB, 2010). Furthermore, the government year after year through CDTF is providing subsidy to cotton seeds for planting (transport & distribution cost), pesticides (about 50% of the market price) and sprayers (more than 50%) aimed to reduce the production cost. Bargawi (2008), highlighted various institutional policies since introduction of cotton in Tanzania around 1904. These include government to finance research activities and other activities remained to private companies (1904 –1950s), introduction of cooperatives and formation of Cotton

Board to replace private companies (1960s – 1970s), introduction of reform in 1994 and allowing competition in the sub sector, introduction of cotton industry Act of 2001 to allow fully market operation and Tanzania Cotton Board to remain as a regulator, formation of the Cotton Development Trust Fund in 2008,

introduction of contract farming in 2009, reintroduction of AMCOS and burning of contract farming in 2018 and the like. All these policies had the impact on cotton output and quality because they affected directly input availability, quality control and price of seed cotton.

2.5.2 Technology Transfer (Extension Services)

Cotton farming technologies and other good cotton farming practices have been always produced and recommended by cotton research centres (Ukiriguru in Mwanza and Ilonga in Morogoro) regularly (Mwangulumba & Kalidushi 2012). Extension of recommended practices are an important feature in improving cotton production and productivity for farmers for both WCGAs and ECGAs in Tanzania. Traditionally, the government had been assumed the task throughout the years by employing extension officer in ward-wise. The Second phase Agricultural Sector Development Strategy (2017), strongly indicate the wish of the government to recruit more extension officers leading to every village to have at least one extension officer. TCB (2014) indicated the rescuing strategies adopted by cotton stakeholders including piloting and extension of contract farming model aimed to involve cotton companies in financing inputs and extension services.

However, due to challenges associated with the model and the wish of government to encourage competition in the sector, contract farming model demised in 2017/2018 farming season and the government committed itself to supervise input and extension service availability. Another effort was to use knowledgeable and experienced farmers to train their fellows (TCB 2014). This model had been proposed to supplement extension services aimed to provide solution for the long-

lasting challenge in the cotton sub-sector which is low productivity due to limited availability of extension services. The lead farmer model of technology transfer where lead farmers are trained and then pass on the technologies to their peers seems to be a real solution.

The plan was to integrate the existing lead farmer who were selected based on their technical expertise, their success in cotton farming, their role in the community and their level of literacy. The main responsibility of a lead farmer was to motivate other farmers to use new productive technologies, leading by practising on their own fields and to represent other farmers in agricultural development and train them to use the best agronomy practices and new technologies. However, there is no clear sign of maturing of the system due to low cooperation from respective authorities (TCB, 2018). Empirically, there is expected direct relationship between the number of extension officers and agricultural output.

2.5.3 Budget Support to Regulatory Board

Restructurings for the Agricultural Sector in Tanzania started in 1990s by reducing commercial activities done by the Crop Marketing Boards (the Crop Boards (Miscellaneous Amendment) Act, No. 11, of 1993). Afterward, followed enacting crop industry law of main crops like cotton, coffee, tobacco and sugar in 2001. These reforms burned all commercial activities of crop boards and the government committed itself to finance all regulatory activities by 100% and development activities to be financed by stakeholders (farmers and private companies) in the supervision of respective crop board through Crop Development Funds.

However, according to TCB (2013), the trend of government to disburse funds for regulatory activities is declining year after year and contribution of stakeholders declined due to fall in production volume over years. It should be known that, the amount contributed by stakeholders are deducted from price determination. If production is low, crop development fund will be low and vice versa. Failure of government to assume funds, led to boards fail monitor key issues in respective crop leading quality deterioration as well as declining output (Mwangulumba and Kalidushi (2012).

2.5.4 Research and Development in Cotton Farming

There are two centres (Ukiriguru for WCGA and Ilonga for ECGA) specialized in cotton research aimed to provide technological support by inventing more productive and diseases resistant varieties operating under the Ministry of Agriculture. Since the cotton research started at Ukiriguru, about twenty different varieties have been developed. In 1991, the variety UK 91 was released and grown for the whole of the WCGAs. In 2008, two varieties UKM 08 and UK 08 were released as new varieties for the WCGAs. These varieties had high potential for the yield in terms of seed cotton and lint, ginning out-turn percentage, resistance and other characters than the preceding varieties.

From that time up to currently, the multiplication of the same reached 60% of total distributed seed to farmers in 2017/2018 season (TCB, 2018). This is due to financial constraints and absence of strong institution to supervise and finance the multiplication process. Also, the firmness of private companies to engage in seed

multiplication as well as financial and technical incapability of regulatory institutions made input availability and distribution specifically high yielding variety to be difficult. Externality and public good nature of cotton inputs led most of stakeholders to relax with the existing situation because there is no direct benefit to them and they can switch their businesses in case of sectoral failure.

2.5.5 Cotton Pricing Mechanism

Cotton farmers are very sensitive on farm get price change of seed cotton. According to TCB (2014), increase in farm gate price derive many cotton farmers to expand their area under cultivation while the season with lower price farmers reduce area under cultivation for the coming season. Thus, there is an expected direct relationship between price (lag factor) and cotton output resulted from expanded acreage. Some efforts have been taken by the government by subsidizing price (2009/2010), removing some levies and other associated deductions. However, major factors determining the farmgate price are said to be world market price, exchange rate and ginning costs (Kabissa 2013). Therefore, instead of the government trying to deal with prices, it should address other areas like input availability aimed to improve productivity and quality, capacitating regulatory boards in terms of finance and technical know-how as well as setting standards for ginning plants aimed to improve GOT which has direct impact on farmgate prices.

Various studies recommend improvement in productivity instead of price because what do matter in not a price per unit but the total income obtained. Therefore, if a farmer produces 300 kilograms per acre with price of TZS. 1,500/kg, then s/he can get TZS 450,000 as total income. On the other hand, if s/he produce 1,000kg/acre

and price being TZS. 700, s/he can get 700,000 which is much higher. Thus, Kabissa (2013) suggest more efforts by government and other stakeholders on productivity improvement. Furthermore, investing in technology aimed to promote domestic processing of raw cotton could improve the farmgate price. Currently more than 60% of cotton produced in Tanzania are exported in raw form due to low capacity and obsolete technology for domestic textile industries (Baffes and Maro 2009).

The diagram above describes summaries of theories concerning the source of agricultural growth, putting into consideration the role of the government in ensuring availability of conducive environment for production to take place. Also, the model shows the role of private sector or individuals in production process to attain agricultural growth. Jha (2003) pointed out that, for the nation to undergo industrialized there are a number of factors that should be in place. These factors include; policy related factors like stable political environment, resource ownership relation and the like. Furthermore, resources like quality labour and capital must be available at a reasonable cost. This argument is supported by both classical, neoclassical and Keynesian theories of economic growth (Romer, 1996).

2.6 Empirical Literature Review

This part of literature review deals with original investigation like research studies, surveys, and scientific experiments. They base on observation and experience, slightly apart from systematic logic. Main focus of this part is to observed application of the government intervention in agriculture, cotton in particular from different scenario in different countries rather than on theory.

2.6.1 Input – Output Relation

Principally, output is a function of input meaning that, if the input is poor, also the output is likely to be poor. The study conducted by ESRF (2015) on integrating the Tanzania cotton, textile and apparel sector in global value chains exposed that, the producers in general practice low input - low output approaches to production; its output fluctuates due to heavy dependence on rainfall and market price. Several initiatives have been taken to revamp the sector including formation and implementation of the Cotton Sector Development Strategy I (CSDS 2001-2006) which was the first strategy that was put in place, complemented by the Mwanza Resolution. It was followed by CSDS II of 2010-2015; the main objectives of these measures were to improve operational systems in the cotton industry so as to provide a competitive position in the international markets ESRF (2015).

For several years, Tanzania Cotton Board has been advocating for contract farming which was introduced by the Gatsby Charitable Foundation, and establishes direct contracts between farmers and ginneries, removing the agent from the process; Gatsby Africa (2016). However recent developments are that contract farming is facing strong resistance from people who are wrongly exercising their financial and political power. The farmers and firms who once had high regards for the system and reintroduced it in Mwanza, Shinyanga and Geita Regions for their own survival seem to have accepted they are powerless before the resistance.

Reports from the WCGA have it that production can drop considerably in 2016 due to a number of reasons but mostly due to the collapse of the contract farming arrangement. Recommendation from ESRF state that, there should be a new focus on

genetically modified (GM) cotton seed known as bt cotton in the developing countries. Recently, certified organic cotton production sits at just under 1% of global cotton cultivation. The five biggest producers of organic cotton are: India (>70%), China, Turkey, USA, and Tanzania. Organic cotton seed is difficult to access and the efficiency and profitability in organic cotton value chain needs is low.

2.6.2 Intervention Policies

Cotton production of has a number of challenges ranging from higher input prices, producer price fluctuation, limited internal credit and unpredictable weather conditions which effects the supply of Tanzanian cotton. Principally, cotton is grown for exchange purposes and in the presence of uncertainties lead to farmers to shift from cotton to other crops or other economic activities with the reliable incomes.
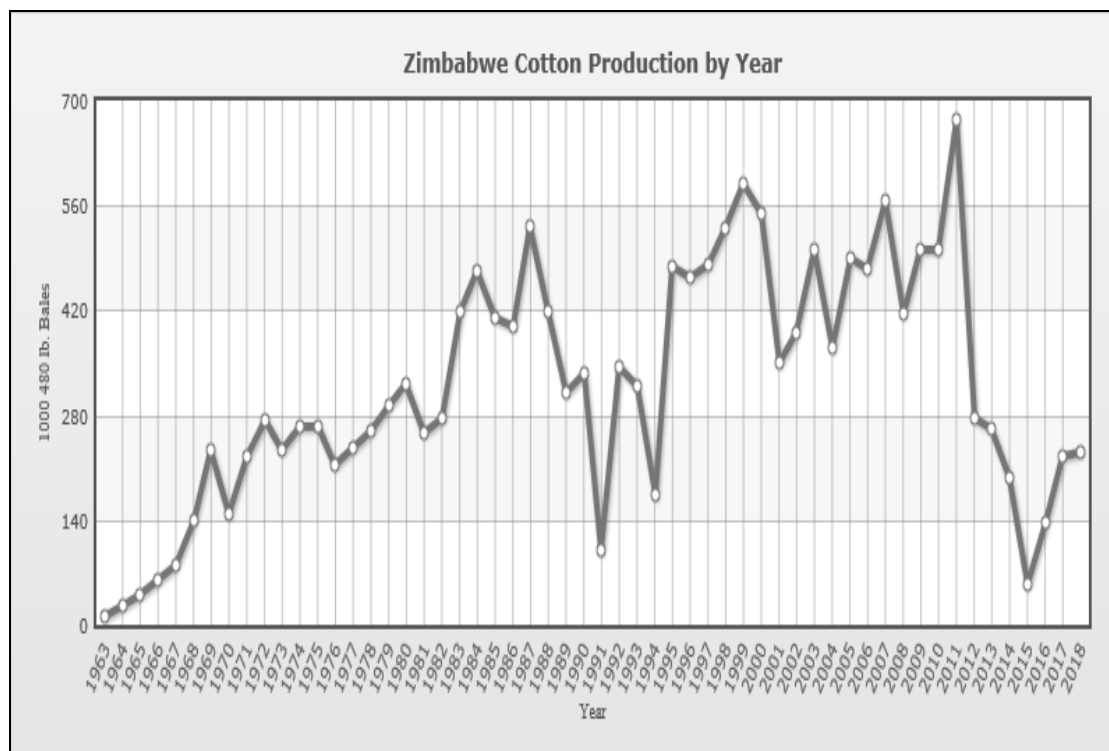
Figure 2.5: Cotton Production Trend in Zimbabwe
Source: United States Department of Agriculture

Experience from Zimbabwe show that, when the individuals used to finance their cotton inputs either through cash basis or contract, production tend to be very low as compared with when the government assume the input costs (Esterhuizen, 2016). This can be seen clearly in the figure 2.5.

As figure 2.6 portrays, from 1992, cotton farming was conducted under the intensive government support through input credit scheme, insurance and extension services. Yet, liberalization of the sector to new companies was the death knell for the sector. From being among the top-quality cotton producers in the world, the sector collapsed with production levels dropping to less than 50% of average volumes in 2015. In appreciating the strategic role of the cotton in Zimbabwe and the huge number of smallholder farmers relying on cotton farming as a major source of their livelihood, Zimbabwean government decided to intervene the sector to address the problem of declining in seed cotton production and reviving the cotton farming. Through the National Budget presented to the Parliament on November 2015, the government announced the subsidy amounted to US$ 25.8 million in support of cotton input scheme, directing 250,000 hectares cotton production. This initiative led to steady revamping of the sector as figure 2.6 depicts.

In the case of China, the government policies supported cotton production through exercising protectionism basing on sliding scale duties, quotas, and direct cotton purchases by the government for the reserves. As a result of these interventions domestic cotton prices in China became above international prices hence, incentivise farmers (ICAC, 2012). As a result, production trend in China is stable

and farmers as well as processors are comfortable from external shocks. In the USA, the government issued various subsidies to cotton farmers ranging from insurance, direct payments, counter cyclical, loan deficiency and the like. For instance, the subsidy received by cotton producers in 2010/11 and 2011/12, was under the crop insurance scheme.

Absence of other forms of subsidies was due to historical higher market prices (ibid). Approximately, every cause of fall in cotton yields is covered by multi-peril crop insurance like adverse weather conditions, pests, and fire in exception of producer negligence. According to ICAC report (2012), most of cotton producing countries has some intervention to ensure steady cotton production. In India for instance, there is a minimum price support program while in Turkey the government pays a premium per kilogram of seed cotton to producers. Gillson *et al.* (2009) argued that, cotton farming and trade are highly distorted by government policies. Support to cotton farmers has been highest in the US, trailed by China and the EU.

For instance, in 2001/02, total support of US to the cotton sector was US$2.3 billion while China provided US$ 1.2 billion and the EU equalled US$700 million. Generally, subsidies boost surplus production, which sold on the world market at subsidised prices. This scenario depressed world prices and damaging production in developing countries which rely on exports of cotton for a substantial component of foreign exchange earnings. Basing on the theory of struggling for existence and role of cotton in realizing macroeconomic objectives, the governments in developing countries like Tanzania have to introduce a strong intervention to the

cotton sector in order to ensure steady supply of cotton for potential emerging textile and garment industry.

2.6.3 Enabling Environment

The enabling environment is intended to enhance agricultural growth and competitiveness as driven by efficient markets operating in a stability framework and supportive public sector behaviour of forward-looking (Diaz-Bonilla et al, 2014). This environment can comprise of multidimensional settings for the agricultural sector and the general economy of stable policies, adequate delivery of public goods, good governance, addressing market failures as well as effective public institutions over which government actions and activities are operationalised.

Hyun (2006) recommended that, the role of the government in agricultural sector growth process should be on coordination, mobilization and allocation of scarce resources, designing and implementing policies to stabilize the economy and to promote technological development and transfer. This roles in combination can provide stability in the economy, ensuring availability of development funds, direct investment in key industries that have higher trickle-down effect, to motivate private investors and social security.

Several authors like Hamalainen (2003), Lewis (1955), Todaro and Smith (2003) and Porter (1990) argued that, government intervention in the economy through institutional strengthening, reducing transaction costs, direct investment and political stabilization is crucial in agricultural growth and the general economy as a

whole. In case of China, Huang (2012) argue, economic take-off in China started in 1970s and decrease in its poverty in next couple of periods was completely determined by its rural developments and its internal reforms. Park (2011) for the case of South Korea, his analysis on the source of rapid growth of Korean economy from 1960s to 1990s, argued that, Korean government played a key role in coordinating the economic interventions which successfully overcome the failures in coordination by the market mechanism.

2.6.4 Research and Development

The role of government on research and development towards agricultural growth cannot be undermined. Pingali (2006), revealed that, attaching the scientific knowledge and technological innovations is crucial as the economy attempts to prepare the agricultural sector to face the challenges of an increasing commercialised and globalization. The governments have to continue to ensure food security to the populations as well as improved research and infrastructural investments for sake of coping globalization. Furthermore, the research is aimed to provide farmers with flexibility to make crop choice decisions and to move relatively freely between crops and other agricultural enterprises (Pingali and Rosegrant, 1995).

The study conducted by Rosegrant and Perez (2015), pointed that, as compared with the baseline situation of business as usual, Research and Development investment strategies can increase total factor productivity by 2% and lead to lowering world prices of cereals and meat by about 17 and 15 percent respectively. Also, it can increase area under production by 2.4% and crop yields by 8.5% by

2030. Therefore, the nature of this investment and its role to the economy, force the government to set aside enough fund for research and development for agricultural growth.

2.6.5 Sectoral Linkage

In developing countries like Tanzania, there are problems of sectoral disintegration leading to export of raw products and importing final products. For instance, Tanzania is exporting about 60% of raw cotton and import huge of textile products. From the experience of Tiger Economies, there is a strong need of the government to intervene and promote the textile and garment industry aimed to adding value to Tanzanian cotton for the benefit of growers, processors and the economy at large. Guterty (2011), provide the areas that need strong focus from the government as; investment in information technology, human resource development, financing, legal frameworks and energy. Other areas include; development of textile oriented technology, state-of-the-art marketing strategies, product differentiation and quality awareness.

From Feder (1982) model of sectoral externalities to a time- series context, we get ground for examination of how far agricultural output can be affected by inter sectoral spill overs. The study conducted by Gemmel *et al.* (2008), suggest that expansion of manufacturing sector, even if in the short may reduce the agricultural output, is associated with agricultural expansion over the long- run. Indication on sectoral performance and productivity is consistent with neoclassical advices suggesting the paybacks of higher productivity in manufacturing sector tend to spill over to agricultural sector, hence encouraging productivity convergence.
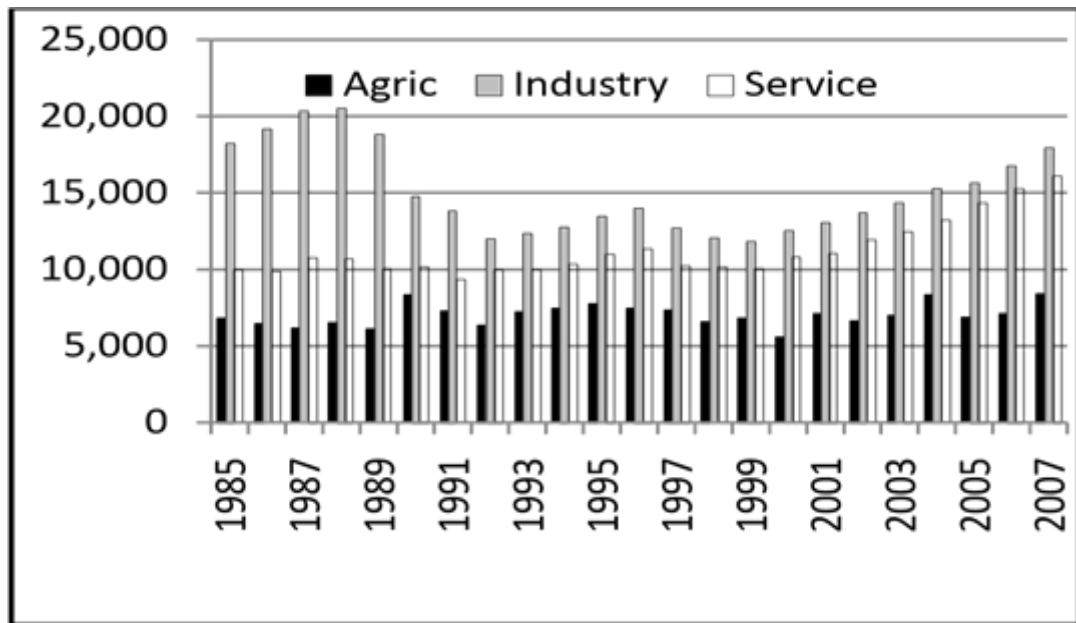
Figure 2.6: Sectoral Correlation Analysis in Poland

The evidence provided by Subramaniam and Reed (2009) shows that, there were three cointegrating routes for Poland and one for Romania confirming the different sectors in the two countries moved together over the period under review. For this reason, the rate of growth for those sectors are interdependent. The long-run association of service, manufacturing and trade sectors to agricultural sector were positively correlated.

In support of above argument, the Tanzanian government ambition to promote manufacturing sector will lead to growth in agricultural sector due to interdependent nature of the two. That is, industrial sector depends on agricultural sector for raw materials and market while agricultural sector depends on manufacturing sector for market and employment. This argument is supported by the study conducted by Balla (2014), analysing the sectoral interdependencies in Romania, Hungary and Slovakia where the result was significantly positive.

2.7   The Summary of Literature Review

A number of theories have been developed trying to explain various sources of economic growth and industrialization process as championed by the government interventions in different ways. Government intervention in the economy has a number of effects which at the end can brought about economic prosperity and improved standard of living for the entire society. Government through various policies can coordinate and discipline various players in the economy, it can stimulate investment by investing in higher capital projects especially for the key sector for the economy in which it is difficult for the private sector to put their fund due to some uncertainties or free rider problems. Also, government can improve labour quality and controlling macroeconomic aspects like interest rates, exchange rates, political stability and empowering the institutions associated with regulations and technology production and dissemination.

Jelic et al (2014) desribed the critical reasons for government intervention in the key sectors of the economy especially agriculture as (a) to increase efficiency in agricultiral production and productivity, (b) to protect farmers in order to fetch reasonable incomes from agricultural produce, (c) to ensure food security in the economy and (d) to accomodate external effects in production and the challenge of public goods in agriculture. They argued that, in all over the world, the government controls economic processes, like agriculture. Intervention of the Government in agriculture takes different forms in different countries depending on a number of factors. Among the reasons that make government to impose policies on agricultural sector is to accelerate the income growth rate among farmers, providing for public

goods like research and development of new farming technologies and physical infrastructures like roads, schools, health facilities and the like.

Correction of market failure, income redistribution, price stabilization as well as technology production and dissemination to the public rationalise the involvement of the government in economic growth process. Thus, Jelic, *et al.* (2014) argue that, government intervention in key sectors is vital for increased economic activities in the country. Other authors argued for these investments to be done by the private sector. Sweeney (2008), Hameed and Mixon (2013), and Haider (2014) claimed that, in the absence of any government interference in the economy, private sector can employ scarce resources efficiently and fastening economic growth by ensuring maximum employment creation and poverty reduction.

However, the conclusion of Pieterse (2000), call for involvement of both government and private sector in realizing sustainable growth. He argued that, for the rapid success, the government should participate in development and maintenance of infrastructure and services delivery, promotion and expansion of existing businesses, addressing inefficiencies in the economy, promotion of human capital, to support special groups like women, disabled people to participate in the labour market and other economic activities, to encourage public development by encouraging businesses and cooperatives, to strengthen local exchange systems and availability of credit and so on. Therefore, different approaches such as Classical, Keynesian, Neoclassical and New Growth theories can be used in justification of role of government in growth process especially at the taking off stage as well as the role private sector to sustain the growth.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1   Chapter Overview

This chapter represent the methodology employed in this study. The chapter is divided into four main sections which are (i) nature and sources of data for the study, (ii) validity test for the data which include stationarity test, Cointegration test, autoregression test and causality test, (iii) variables measurements, (iv) establishment of econometric model and estimation techniques.

3.2   Research Design

This section provides a framework for a study before data collection or analysis can commence. It is a work plan like which provide details on what has to be done for the successful of the study. The function of a research design is to ensure that the evidence obtained enables to answer the research hypothesis (Yin, 2000). Based on the nature of data to be collected and analysis to be done, the quantitative approach will be applied for the study.

3.3   Research Area

The area of this study was national-wide cotton growing areas namely Western Cotton Growing areas (WCGAs) and Eastern Cotton Growing Areas (ECGAs). As noted in the first chapter, WCGAs include Simiyu, Shinyanga, Tabora, Singida, Geita, Mwanza, Mara, Kigoma, Dodoma, Katavi and Kagera while those of ECGAs include Morogoro, Kilimanjaro, Manyara, Pwani, Iringa and Tanga. Since all data concerning input distribution and production are compiled at a national level, the researcher need not visit all these regions. Instead, the researcher collected all

appropriate data from secondary source like Tanzania Cotton Board Offices in Shinyanga and Mwanza, Ministry of Agriculture in Dodoma, National Bureau of Statistics (Website) and other crucial sources like UNCTAD, UNESCO, UNDP, IMF, UNESCO, World Bank, and publications as mentioned in chapter two above.

3.4 Research Population

This denotes to the elements of the study. The study involved all cotton growing regions in Tanzania. The key element in the study was output of cotton in relation to exogeneous factors. Main respondents of the study were the cotton regulatory board (Tanzania Cotton Board), Ministry of Agriculture and National Bureau of Statistics.

3.5 Scope of the Study

The study covered cotton growing regions in Tanzania mainland for the period under the study. Specifically, production and input data from Simiyu, Shinyanga, Tabora, Singida, Geita, Mwanza, Mara, Kigoma, Dodoma, Katavi Kagera, Morogoro, Kilimanjaro, Manyara, Pwani, Iringa and Tanga have been collected and analysed according to the specified methodology.

3.6 Nature and the Source of Data

This study involved solely secondary data regarding cotton output over time in Tanzania in terms of change in cotton production volume annually, fiscal budget support to Regulatory Board and Research Institutions, number of extension officers in cotton growing regions, amount of annual input consumption (seeds for planting and pesticides) and different institutional arrangements. These data collected from 1984/1985 marketing season to 2017/2018 and independent variables have been

analysed in lag 1 due to their nature. That is, input of year 1 will produce output for year 2. All data with supporting figures included periodic journals, publications, newsletters, internet sources and others sources especially International Organizations

3.7   Testing for Validity

Wherever appropriate, collected data tested to ensure validity in relation to the study. Some important test undertaken were; stationarity (Dickey Fuller Test) to assess the presence of unit root among variables under consideration. Also, Johansen Trace Test of cointegration undertaken as well Granger Causality Test to assess the relationship among the variables under consideration.

3.8   Variables and Measurement

The variables under the study were described and measured. Agricultural growth as dependent variable, has been measured in physical and percentage change in cotton production volume (metric tons) from 1984/85 to 2017/18 marketing seasons. The amount of input subsidies, agricultural fiscal budget specifically for regulatory board and research institutions, total inputs used (seeds and pesticides) and other relevant flow independent variables measured in actual change for the mentioned time frame. Variables like number of extension officers, farm-get prices, policy changes and institutional arrangements have been measured in intervals accordingly. The summary of variables and their measurements are provided hereunder;

3.8.1   Cotton Production Volume

In this study, cotton output treated as the dependent variable responding to different

actions of the independent variables. It measured over time from 1984/85 to 2017/18 marketing seasons by considering production volume measured in metric tons. Ministry of agriculture, Tanzania Cotton Board, National Bureau of Statistics, Bank of Tanzania and International Organizations were the relevant source of data for the study.

3.8.2   Cotton Key Inputs

There are a number of inputs in cotton production. In this study, four inputs namely cotton seed for planting, pesticides, extension services and budget support have been taken into consideration. Seeds for planting measured in terms of the number of kilograms distributed and financing methodology applied over the period under review. Pesticides has been measured in terms of bottles (acre-packs) distributed to farmers and financing modes adopted over the period under review. The data for specified inputs requested from Tanzania Cotton Board and District Councils (for cotton farming districts).

3.8.3   Government Budget

In Tanzania, cotton farming is undertaken under the supervision and support of Tanzania Cotton Board, Research Institutions, Local Government Authorities and other institutions. Effectiveness of these institutions depend mainly on availability of funds to finance their operations. This study stressed on examination of the budget support from the government to key institutions specifically Tanzania Cotton Board and Research Institutions LZARD in particular. This data was collected from the Ministry of Agriculture and respective institution.

3.8.4   Cotton Indicative Price

Most of literature indicates that, cotton farming is highly elastic in respect to the price change. Experience shows that, the production volume for the year after higher price tend to be higher and vice versa. Data for seed cotton price over the period under review has been collected from Tanzania Cotton Board and summarized to assess their impact on cotton production volume using 1 lag analysis.

3.8.5   Error Term

Principally, cotton production can be affected by number of factors inclusive of weather condition, soil fertility, personal management, presence of alternative crops and other economic activities variables. Practically, most of them is difficult to measure or the possibility to assess their impact on dependent variable may is very complex. The contribution of these factors has been captures by error term in the specified model.

3.9   Formulation of Econometric Model

In order to assess the impact of independent variables (Pesticides (P), distributed seeds (S), Government Budget Support (B), number of extension Officers (E) and Farm Gate Price (FGP) to the dependent variable (Cotton Production Volume in metric tons), econometrics model techniques applied where multiple regression analysis was conducted to estimate the effect of each independent variable on dependent variable as well as the direction of the effect (positive or negative). Comparison of output over time established basing on periods with strong

involvement of government in ensuring availability of independent variables and the time where government left the total operations to the private sector. Also, the variables with significant effect on the cotton output has been identified and recommendations have been provided on proper way to handle those factors. The applied model for this study has been specified as follows:

$$Lag1LogY_t = LogP_t + logS_t + logB_t + logE_t - logFGP + \varepsilon_t \ldots \ldots \ldots \ldots .14$$

Where;

$Lag1Y_t$ Denotes cotton output at one lagged year

P_t Denotes the number of procured pesticides at time t

S_t Denotes cotton seeds for planting distributed at time t

B_t Budget support the crop at time t

E_t Number of extension officers at time t

FGP_t Cotton Farm $-$ Get Prices at time t

ε_t Other factors affecting cotton output not included in the model

Since the study in question is a kind of a supply model and has a similar feature as those stipulated Keynes Model in equation 14 above, logarithm has been introduced to each factor and furthermore, the dependent variable has been one lagged because of the production nature. This model was more suitable in analysing the effects of different independent variables on dependent variable (cotton output growth overtime). In order to assess the impact of independent variables (several government interventions) to the dependent variable (cotton production volume), econometrics model techniques applied where multiple regression analysis was conducted to estimate the effect of each independent variable on dependent variable as well as the direction of the effect (positive or

negative). Comparison of output over time established basing on periods with strong involvement of government in ensuring availability of independent variables and the time where government left the total operations to the private sector. Also, the variables with significant effect on the cotton output has been identified and recommendations have been provided on proper way to handle those factors.

3.10 Model and Estimation

Multivariate Linear Regression analysis has been conducted using Statistical Package for Social Sciences (SPSS) to measure the effect and direction of that effect of each independent variable to the dependent variable. The result summarized, presented on tables and graphs and interpreted accordingly. Thereafter, recommendation and conclusion drawn and shared to the relevant bodies for appropriate decisions.

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSION

4.1 Chapter Overview

This chapter presents the analysis of collected data as well as its interpretation according to the research methodology. The analysis is both qualitative and quantitative though it mostly base on quantitative due to the nature of collected data. Since the study use a secondary data, the chapter has been structured by presenting findings, discussion and followed by implications of the study. The results are presented to reflect the role of the government intervention on agricultural growth; a case being cotton farming in Tanzania. The data for the study was collected basing only on secondary sources as a research methodology. Statistical Package for Social Sciences (SPSS) has been used to calculate basic statistics for the study including frequencies, means and standard deviation for all variables under the study. Also, the software used to undertake correlation, ANOVA test and regression analysis to   assess the impact of independent variables to the dependent variable as referred to the research question and objective.

4.2 Data Presentation

The data collected was time series for 34 years covering 1984/85 to 2017/18 marketing seasons covering cotton production (metric tons) as dependent variable, input use (seeds, pesticides, budget support and extension officers) and farm-get price of the same period. Data came from different sources mainly Tanzania Cotton Board (TCB), National Bureau of Statistics (NBS) Ministry of Agriculture (MoA), World Bank and other related publications.

4.3 Descriptive Statistics

The mean cotton production in Tanzania for the period under review reached the maximum of 376,869 metric tons of seed cotton in 2005/06 and the minimum of 92,700 tons in 1997/98. The mean for distributed pesticides, seeds for planting, budget support and extension officers were 1,875,004 acre-packs, 16,727 metric tons, TZS. 5.02 billion and 2,757 extension officers respectively as provided on the Table 4.1.

Table 4.1: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Cotton Production (Metric Tons)	34	92,700	376,869	209,506	77,212
Cotton pesticides (a/p) distributed	34	438,346	5,906,000	1,875,004	999,923
Cotton Seeds (tons) distributed	34	12,193	27,835	16,727	3,524
Budget Support (000)	34	623,662	17,128,450	5,019,524	4,857,433
Extension officers	34	1,760	3,962	2,757	749
Different charges	34	1	268	74	76
Farm get price	34	6	1,200	349	350

Source: Research Data

4.4 Data Examination

Data was plotted in Sequence Chart to examine their nature and trend direction before being analysed. Figure 1 below depict the nature and direction of collected data. Figure 4.1 shows the sequence plot of variables graphically indicating the trend of each variable over years. After linearization, the result demonstrates direct relationships for almost all variables with substantial fluctuation over time. The scientific relationship among them will be analyzed in regression analysis.
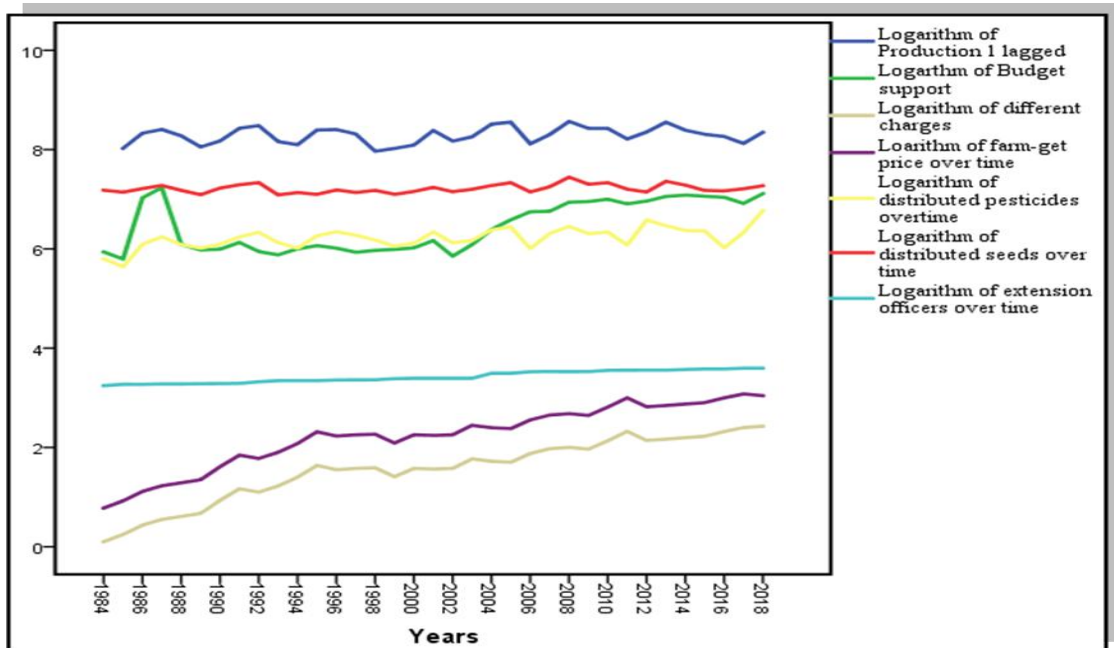
Figure 4.1: Trend of Variables

Source: Research Data, 2019

4.5 Factors Affecting Growth in Cotton Production

Regression analysis were conducted to estimate the association between dependent variable (Seed Cotton Production in Metric Tons) and independent variables (distributed pesticides, distributed seeds for planting, government budget support, number of extension officers, different charges and farm-get prices. Table 4.2 displays the output of the model fitness. The coefficient of R (0.868) exhibited that the independent variables of the model which is distributed pesticides, distributed seeds for planting, budget support, number of extension officers and farm-get price have a correlation of 86.8% with the dependent variable (cotton production). The coefficient of determination (R^2) of 0.754 presented that, the model can explain 75.4% of the variations in the dependent variable, implying that, 24.6% of the variations in dependent variable can be explained by other factors not included in the model.

Table 4.2: Regression Model Summary

		Model Summary		
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.868[a]	0.754	0.700	0.09118

a. Predictors: (Constant), Log Pesticides, Log Farm-get Price, Log Seeds, Log Budget, Log Extension, Log Charges

Source: Research Data, 2019

Furthermore, the model indicates that the independent variables (distributed pesticides, distributed seeds, budget support, number of extension services and farm-get price) are significant in determining cotton production in Tanzania as shown in Analysis of Variables in Table 4.3 below.

Table 4.3: Analysis of Variables (ANOVA)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.646	5	.129	13.559	.000[b]
	Residual	.267	28	.010		
	Total	.913	33			

a. Dependent Variable: Logarithm of Production 1 lagged
b. Predictors: (Constant), Logarithm of extension officers over time, Logarithm of distributed seeds over time, Logarithm of distributed pesticides overtime, Logarithm of Budget support, Logarithm of farm-get price over time

Source: Research Data, 2019

Table 4.3 presents the correlation coefficients between variables of the study which confirms the high degree correlation among them. Cotton production has a positive correlation of 67% with distributed pesticides, 80.5% with distributed seeds, 40.9% with budget support, 27.9% with the number of extension officers, and 23.1% with farm-get price. Basing on this result, the relationship between dependent variable and independent variables seems to be significant.

Table 4.4: Pearson Correlation Coefficients

	Log Production1lag	Log Pesticide	Log Seed	Log Budget	Log FGP	Log Extension
Log Output 1lag	1	.670[**]	.805[**]	.409[*]	.231	.279
Log Pesticides	.670[**]	1	.543[**]	.511[**]	.635[**]	.586[**]
Log Seeds	.805[**]	.543[**]	1	.503[**]	.256	.351[*]
Log Budget support	.409[*]	.511[**]	.503[**]	1	.545[**]	.728[**]
Log Farm-get price	.231	.635[**]	.256	.545[**]	1	.924[**]
Log Extension	.279	.586[**]	.351[*]	.728[**]	.924[**]	1

Source: Research Data, 2019

However, independent variables themselves are highly correlated since increasing one variable necessitate increase of another variable. For instance, when amount of seeds distributed is higher, the need for pesticides also is likely to be higher. Also, as farm-get price increase, charges and deductions tend to increase in the same proportional as well. Table 4.5 displays the regression output. This study used standardized coefficients to draw statistical inference of the model. The model can now be presented as in equation 14 as follows;

$$Y_t = 0.463P_{t-1} + 0.52S_t - 0.145G_{t-1} + 0.04FGP_{t-1} - 0.287E_{t-1}\dots\dots\dots\dots\dots\dots\dots15$$

Where:

Y_t = Cotton Production volume at time t

P_{t-1} = Distributed pesticides for the last farming season

S_{t-1} = Distributed cotton seeds for the last farming season

G_{t-1} = Government Budget support for the responsible institutions a year before

FGP_{t-1} = Farm-get price for the last marketing season

Table 4.5: Regression Analysis Results

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-0.156	2.118		-0.073	0.942
	Log pesticides	0.376	0.123	0.463	3.061	0.005
	Log Seeds	0.994	0.256	0.520	3.882	0.001
	Log Budget	0.048	0.062	0.145	0.781	0.442
	Log Farm-get price	0.011	0.097	0.040	0.116	0.909
	Log Extension	-0.412	0.570	-0.287	-0.722	0.476
a. Dependent Variable: Logarithm of Production 1 lag						

Source: Research Data, 2019

From the presented results, a unit change in the distributed pesticides for cotton led to increase in cotton production by 46.3% and by increasing a unit of distributed seeds for planting will lead to increase in cotton production by 52%. Furthermore, a unit increase in the government budget support lead to increase in cotton production by 14.5%. A unit increase in farm-get price lead to increase in cotton production by 4%. while number extension officers have inverse relationship with cotton production by 28.7%. These result hold only when all factors are used together. If analysis id being done basing on a single variable, the result is different. This indicates a substantial degree of association among independent variables as shown in table 4.3.

To consider the level of significance for each independent variable, t-statistic was applied to create a coefficient of significance. The result indicates that, distributed pesticides (0.005) and distributed cotton seeds (0.001) have a p-value of less than 0.05. Other independent variables have the p-value of greater than 0.05 demonstrating that, distributed pesticides and distributed seeds for planting are statistically significant in explaining variation in cotton production over time while

government budget support (0.442) though it has direct relationship with cotton production, it is not significant in explaining variation in cotton production over years. Also, farm-get price (0.909), number of extension officers (0.476) and are not significant in explaining variation in cotton production in Tanzania as shown in the Table 4.4.

4.6   Discussion of Results

The main objective of the study was to identify key factors affecting cotton production in Tanzania as well as the role of the government in optimizing the availability and access of those factors. Anwar M. (2009) indicated the factors affecting cotton production as a cultivated area with coefficient of 0.113 and seed (0.103).

4.6.1   Availability of Key Cotton Inputs

This study agrees with some authors like Baffes (2002) and Kabissa (2013) on the role of availability and access to seeds on improved cotton production. Most of the study stress on improved income of farmers to enable them to purchase seeds according to their need and discouraging engagement of the government on provision of this key input. However, the problem of leaving the sector under the free market operation is provided by (Alston, *et al.* 2007; Bassett, 2010; Delpeuch & Vandeplas, 2013) which is   extreme government subsidies received by the cotton farmers in the developed economies like United States of America and the European Union which led to reduction in the world cotton prices hence reducing the income of cotton growers in developing countries.

Taking consideration of the role of cotton in Tanzania and the number of populations relying on it for their life sustenance, cotton farming inputs can be treated as "public good" which necessitate government intervention in terms of subsidy of free provision of them. This can be evidenced from the research data where the season in which inputs were provided on credit through contract farming, passbook or government subsidy, the production responded very positively while the season with cash basis, input use was very low and production also declined significantly.

As the result of this study illustrating cotton seeds for planting and pesticides (0.52 and 0.463 respectively of coefficient which are significant in 5%), are crucial factors in determining cotton production in Tanzania. Therefore, basing on the research result and Keynes (1936) postulation, the first and second null hypothesis of this study are rejected.

4.6.2 Farm-get Price

Many studies have indicated the direct relationship between the farm-get price and the cotton production amount for the next season. This mean that, price incentivize the farmers to expand their production or new cotton farmers enter the sector. Carlos et al. (2002) concluded that the increased in cotton production depend upon the price of cotton, the price of competing crops, other input prices, amount of rainfall, harvested area and time trend. Chibwanda (2018), recommended the government to subsidize cotton inputs and improve cotton price to motivate farmers to grow cotton. Presence of alternative crops in many developing countries have led to decline in cotton production due to unpredictable and unreasonable prices.

As the result of this study stipulate, price has direct relationship (0.04 coefficient) with cotton production (though insignificant). That is, even though farm-get price contributes positively to the cotton production, it is not a crucial factor in determining variation in cotton production in Tanzania. This is due to the fact that, most of cotton farming community in Tanzania do farming cotton due to the geographical location (harsh climatic condition) rather than economic benefit of the crop over other crops. In most growing areas like Simiyu, Tabora and Shinyanga, it is difficult to grow other crop due to insufficient rainfall. Therefore, third null hypothesis of the study has been accepted. However, for the sustenance of the crop, the main strategy to develop the sector for the sake of attaining economic growth and industrialization through textile should not only stress on input availability but also the price received by farmers as compared to alternative crops.

4.6.3 Government Budget Support

Cotton farming in Tanzania is coordinated and regulated by the Tanzania Cotton Board (Regulatory Board) and Ukiriguru Research Institute (seed varieties development and other related researches). Before 2004, the TCB was a business-oriented institution financed by the sector through buying and selling cotton. Introduced reformation in 2004 made the Board to remain only with regulatory activities and being financed by the government for 100% in their administrative and operations activities.

Cotton development activities on the other hand, are financed by stakeholders through Cotton Development Fund (TCB, 2014). Gillson I. et all (2004) mentioned types of government support to the cotton based on price support, supply of key

inputs like fertilizer, export subsidy and import tariff. In Tanzania, the scenario is a bit different. The government is supporting the sector by financing administrative cost of TCB and Research institutions. Other area of support to low extent is subsidy to research institutions in seed development and multiplication as well as scientific equipment.

The result of this study indicates that, the government budget has a coefficient of 0.145 which is insignificant at 5% significant level. The reason behind this result is that, the government funds are not directly directed to the sector instead it is used for mostly administrative manner. Since the TCB staff are not directly involved in cotton production, it is likely their wellbeing to be directly related to the cotton output. Alternatively, if government support were directly related to cotton production function, the result could be better.

Number of extension officer in this study is negatively (-0.287) related to cotton production and it is insignificant at 5% because for their productivity to be seen, there should be sufficient facilities in terms of working tools and motivation. This is supported by Wambura R. M and Mwasyete K. K. (2015)., who stressed on Staff motivation for effective performance in extension service provision. Therefore, what do matter is not only the number of extension officers, but also supportive working environment.

CHAPTER FIVE

CONLUSION AND RECOMMENDATIONS

5.1 Chapter Overview

This chapter is intended to provide the general overview of the study. The chapter is divided into three sections namely, the summary of the study, conclusions and recommendations. The summary section is bringing attention on the overall objective of the study, its methodology, findings and data analysis. The second section provide the conclusion by comparing the result of the study with the expected result and the last section is general recommendations.

5.2 Summary

The study aimed to establish the role of the government intervention on agricultural growth: A case of cotton farming in Tanzania. It employed descriptive research design which enabled to establish the contribution of different factors affecting cotton farming in Tanzania which are mostly procured and provided or subsidized by the government. Secondary data sources covering 34 years i.e. from 1984 to 2017 was collected for this study from different sources mainly TCB, NBS, UN Agents and some other publication.

Analysis of collected data was conducted using IBM SPSS Statistics 22 Software to assess the correlation of each independent variable with dependent variable. Although there were some complications in assessing general impact of all independent variable altogether, the results of the study to a great extent agreed with some past studies undertaken by different scholars but contradicting with some scholars in few areas.

5.3 Conclusions

Grounding on the study's findings the overall conclusions can be drawn. As indicated in the table 4.4, seeds for planting have a direct relationship with cotton production for 52% (0.52 coefficients) which is significant at 5%. This is due to the fact that, in absence of seeds for planting, other factors or variables are useless. Therefore, assurance of availability and access to seeds for planting is crucial in improving and sustaining cotton farming in Tanzania.

Distributed pesticides revealed to significant in determining variation in cotton farming in Tanzania since increased one unit of distributed pesticides leads to increase in cotton production for 46.3% (0.46.3) and it is significant at 5%. As different literatures depict, influx of cotton pests and diseases as a result of global warming necessities increased use of agro chemicals. Practically, the cotton farming community is faced with financial constraints at the time of higher demand for pesticides, which call for the public and private sector to find-out the means of supply on credit or huge subsidy.

Government budget support (0.145), which is insignificant at 5% also has a direct relationship with cotton production. That is, one unit of government support can increase cotton production for about 14.5%. Its insignificancy can be traced form the direct beneficiary. Most of the funds extended by the government to the responsible institutions are directed to administrative and logistic activities instead of serving the crop directly. Thus, the government and stakeholders have to rearrange the proper way to finance the sector.

Many literatures have indicated strong intervention of governments on actual price received by cotton farmers. In China, Brazil, India, USA, Egypt and Ivory Coast, cotton farmers receive the price above the world market price due to the strong price support by those governments. In Tanzania, farmers receive the price less than the world market due to transaction costs, profit margin of ginners, government taxes and discount due to deteriorated quality. The result from this study indicates positive relationship between farm-get prices and cotton production. On the other hand, the result (0.04) is insignificant at 5% because most of cotton farmers do cotton farming because of the nature of their geographical locations. That is, cotton is only crop that can be grown in their locality like Simiyu, Shinyanga and Tabora. Also, the price and markets for the available alternative crops are worse than cotton (Kabissa 2013).

The number of extension officers (-0.722) seem to contradict with the existing literatures because it has an inverse relationship with cotton production and it is insignificant in portraying variation in cotton production in Tanzania. Some literature like Wambura R. M. and Mwasyete K. K. (2015)., argued that, the number of extension officers by itself cannot add anything in production. Instead, they stress on conducive working environment, working facilities and motivation. In Tanzania, these three components have to be improved to realize the role of extension officer in improving agricultural output.

5.4 Recommendations

Cotton is a crucial source of income and life sustenance of more than 18 million people in Tanzania throughout its value chain. Performance of the crop has a big

impact to individuals' life and economy as a large through backward and forward linkages of the crop. Also, cotton is highly needed in industrial stimulation of the country, fastening the attainment of the national goal of being a middle-income country by 2025.

Therefore, the government should put in place relevant polices to ensure steady and sustainable supply of key inputs for cotton farming, specifically pesticides, seeds for planting, reliable extension services and price stability. Since direct intervention by the government to procure inputs directly is not recommended, some Public – Private Partnership (PPP) strategies like contract farming, pass-book, creation of input basket or introducing seed money to circulate year after year through extending input to farmers on credit has to be adopted. This strategy can boost cotton production to a great extent leading to impact many aspects of the economy and individuals who are dealing with cotton directly. Furthermore, investment in research and development activities to ensure availability of improved seed varieties as well production and distribution of good agronomic practices which are is crucial for the agricultural growth cotton inclusive.

5.5 Policy Implication of the Study

Results from the variables of the study indicate that, about 43.2% of the variation in cotton production in Tanzania has been accommodated in the specified model. That is, cotton output is highly determined by reliable supply and accessibility of pesticides, seeds for planting and extension services. From trend analysis of cotton production, the period where government was closely involved, the input supply was high and production was high. Therefore, basin on the result of this study, the

government should put in place strong strategies that ensure optimal availability and access to seeds for planting, pesticides, price support and motivation and improved working environment to extension officers for the betterment of farmers and the national economy at large.

Furthermore, there should be a strong and sustainable institutions to monitor and promote agricultural growth strategies in Tanzania. This will ensure proper and effective implementation of short term and long-term plans towards agricultural prosperity in the country. The result of the study agrees with Keynesian argument that, perfect free market economy cannot attain maximum economic growth specifically in vulnerable sectors like agriculture. This call for some involvement of the government to correct some market failures specifically input availability and reasonable cotton prices to motivate farmers for the sake of attaining economic growth with human development for the key sectors of the economy like agriculture which employ more than 65% of the population.

5.6 Limitations of the Study

Several challenges were encountered during the process of undertaking this study. Some challenges were with the capacity of the author and some of them were out of the control to the author. For instance, data availability from some government institutions was a serious problem for what called either confidential or excessive bureaucracy which led to either to find out an alternative to get those data or to modify some parts of the study. Also, availability of data for 34 years for some government institution were a truly challenge. Some institutions could provide data for 5 to 15 years and few for more than 25 years. This necessitate the author to

find data from different sources specifically UN agents.

Budget constraints was also a challenge to the study. Following headquarters of many government be shifted to different locations, it necessitates the author to travel frequently to Dar es Salaam, Dodoma and Mwanza for some consultation and clarifications from respective government officers. This is due to the most of online information from government institutions to be outdated or need more clarification and details.

5.7 Suggested Areas for Further Study

As noted on the result of this study, the variables included can explain about 43.2% of variation in cotton production in Tanzania. This call for further study on other factors affecting cotton farming in Tanzania. From oral discussion with some TCB and Ministry of Agriculture officials, weather condition and emergency of competitive crops especially horticulture crops affect cotton farming in the country. However, there are nothing in place to explain the effect of those factors empirically. Moreover, the impact of key factors improving productivity like soil fertility, improved seed varieties and general understanding (level of education) of the farmers should be studied. Strengthening agricultural regulatory boards and related research institutions are also need more studies to assess their role in agricultural growth in Tanzania.

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