DETERMINANTS OF TOBACCO PRODUCTION EFFICIENCY AMONG SMALLHOLDERS IN URAMBO DISTRICT IN TANZANIA

NYACHIRO ALFRED

A DISSERTATION SUBMITTED IN FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN ECONOMIC (MSc-Econ)

DEPARTMENT OF ECONOMICS AND COMMUNITY ECONOMIC DEVELOPMENT

OF THE OPEN UNIVERSITY OF TANZANIA

2023

CERTIFICATION

The undersigned certifies that he has read and here by recommends for acceptance by the Open University of Tanzania a dissertation titled; "**Determinants of Tobacco Production Efficiency among Smallholders in Urambo District, Tanzania"** in partial fulfilment of the requirement for the award of degree of Master of Science in Economics (MSc Econ).

……..

Dr. Timothy Lyanga (PhD)

(Supervisor)

……..

Date

COPYRIGHT

DECLARATION

I, **Nyachiro Alfred,** declare that, the work presented in this dissertation is original. It has never been present to any other university or institutions where other people works have been used. References has been provided it's this regard that I declare this work as original mine it's here by present in partial fulfilment of the requirement for the degree of Masters of Science in Economics (MSc Econ).

Signature

20/10/2023

Date

…

DEDICATION

I dedicate this study to my mother *Mrs. Merinda Alfred Masegenya* and my brother *Mr. Mgija Alfred*, mostly to my two adorable children *Alfreda and Aldred*, you are always my why.

ACKNOWLEDGEMENT

I am praising God for this study since writing this dissertation was a wonderful and amusing experience. The dissertation was successfully carried out with the assistance and support from a number of people and institutions. It is a pleasure to acknowledge and thank everyone who contributed to the completion of this dissertation in all means. I heartedly thank all for their assistance and support.

With sincere gratitude I would like to thank my supervisor Dr. Timothy Lyanga (PhD) for his enthusiasm for this study, for his support, encouragement and patience. I am mostly grateful for the Department of Economics and Community Economic Development of The Open University of Tanzania, for input throughout this MSc programme. For their contributions and close cooperation during data collection and completing questionnaire survey I present my appreciation to the following: Tanzania Tobacco Board- Urambo Office, Tabora Regional Office, Urambo District Office, MILAMBO Cooperative Union Office and Primary society(s) leaders and smallholder growers specifically in MILAMBO union.

Due to their profound trust and support I am indebted to my dear parents, friends and my family, thank you. To sum up, I remain solely responsible for any undetected errors in this study

ABSTRUCT

This study assesses the determinant of tobacco production efficiency among smallholders in Urambo district in Tanzania. The study determines tobacco production efficiency, assess farm characteristics statistical insignificance to tobacco production and analyse tobacco production cost in tobacco production. It covers a period of 2 consecutive years where cross sectional research design was used through primary data correction from 269 respondents who are smallholders in Urambo district. Data analysis is done through Regression Analysis, where production cost affect tobacco production efficiency negatively hence high cost reduce the efficiency, and farm characteristics is statistical significance to the tobacco production efficiency i.e. the higher land cultivated with experienced growers the higher production efficiency is achieved. Despite high production cost, tobacco production is profitable. In order to make tobacco production more profitable to smallholders then Government officials and policy makers should consider imparting education to tobacco growers through enough extension services as per grower requirement so that correct input usage is done appropriate and timely to hence increase tobacco yield. Furthermore through formed groups smallholders to be provided with ox driven tools like tractors to reduce production cost specifically labour which will increase tobacco production efficiency.

Keywords: *Smallholders Farmers, Socio-economic Factors, Production Efficiency.*

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS AND ACRONYMS

AUC	African Union Commission
BAT	British American Tobacco
GDP	Gross Domestic Product
JTI	Japan Tobacco International
PMI	Philip Morris International
SPSS	Statistical Package for Social Science
TTB	Tanzania Tobacco Board
UN	United Nations
USD	United States Dollar
WTO	World Trade Organization
TE	Technical Efficiency

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Tobacco production in the world increased as a demand for the tobacco products constantly grown. China is the largest Tobacco producing country with the output of 3.15 million tons of tobacco in 2011. Brazil and India are the next largest producers with production of 951,000 tons and 830,000 tons respectively. There are millions of tobacco users worldwide and the cigarette which is famous in culture is used in every country in the world (WHO, 2019).

World production of tobacco leaf has continued to grow since 2003, up 25% from 6.03 million tons in 2003 to 7.5 million tons in 2012. African countries produced 650,000 tons, or 8.7% of the world production of tobacco leaf in 2012, compared to 440,000 tons or 7.3% in 2003. Total area harvested for tobacco in African countries increased by 66% and output increased by 48%. In this same period, area harvested for tobacco in the United States decreased by 18% while production decreased by 5%. For Europe, the decrease is 40.4% in the area harvested and 43% in production (FAOSTAT, 2015).

Tobacco industries contribute a major significant role in the world micro and macroeconomic growth, such as income generation, employment, generating government revenues and foreign currencies (World Bank, 2017). Tobacco is a cash crop produced and demanded worldwide, most of the countries use as a leisure i.e. cigarette. According Shahbandeh, (2021) China is the most tobacco producer in the world producing about 2.61 million metric tons in 2020 which accounted 39%

followed by India (12.03%), Brazil (11.51%) and other thirteen country producing 100 thousands metric tons including Tanzania, Malawi, Argentina, Zimbabwe and Zambia (FAOSTAT, 2020).

Agriculture in Tanzania is considered the backbone of the economy and the main driver of economic growth, contributing nearly a third of the GDP or USD 13.9 billion and 65% of raw materials for the industry (Economic Outlook, 2016; Suleiman and Rosentrater, 2016). According to the UN's World Food Program (WFP, 2013) and the World Bank (WB, 2015) agriculture in Tanzania provides over 30% of all exports, serves as livelihood to over 65%of the population and accounts for about 75% of the incomes of rural households. Agriculture in Tanzania as in other SSA countries is dominated by smallholder farmers (Smallholder farmers are described as those farmers holding less than three hectares of land and own only a few heads of livestock, Salami, *et al.,* 2010 IFAD 2013, and producing a variety of crops and livestock products, both for subsistence and cash, Parrish et al., 2005). This gives smallholder farmers a vital role in agricultural production and food security. For instance, more than 70% of the agricultural output in Eastern African is produced by smallholder farmers (Schaffnit-Chatterjee, 2014).

Tanzania rank third producer accounted for 116 603 metric tons after Zimbabwe (257 764 metric tons) and Zambia 153 839 metric tons (Rob Cook, 2021). About 85 % of raw tobacco produced in Tanzania is being exported to America, British China and Japan. Most of the Tobacco producing farmers in Tanzania are smallholder farmers characterized by farm size between 1 to 5 hectares. The area under tobacco production is estimated to be 245 hectares.

Tobacco production in Tanzania was initiated in 19th century, approximately 5500 hectors of land was employed during 1960s, and the production was estimated to be 3000 tons per year, with an average of 513kg per Ha (FAO, 2016). The production of tobacco kept on increasing in different area in Tanzania consecutively for three decade (1970s, 1980s and 1990s) varied by 30000 ha. From early 20s the production ranged to 27423 tone in a year produced on 32000 ha with the average yield of 807 kg per ha.

The varieties of tobacco grown in Tanzania are classified as Virginia flue-cured tobacco (VFC), dark fire-cured tobacco (DFC) and burley cured tobacco (BCT). As contended by Ndomba (2018) the varieties of tobacco grown from different area were, 80% of VFC is produced in Tabora, Iringa, Shinyanga, Ruvuma and Mbeya,15% of DFC is mainly produced in Ruvuma, Mara and Kagera while BCT is grown in Ruvuma and various part of the country with very little production contribution in the country.

Despite of taking a record in increasing production in 1930s, in 2016 Tobacco crop became a leading exporting crop in Tanzania contributing about TZS 783.8 billion of exporting revenue crop followed by cashew-nuts756.9 billion (year 2016) as shown in Table 1.1. Most of the government reports shows agricultural sector as the main source of countries gains in raw material and export earnings. The adverse on social economic and environment effect linkage has posed a great challenge to the tobacco production (WHO, 2017). In 2012 Tanzania was the largest producer of tobacco in Africa which has dropped to be the third after Mozambique and Zambia in 2019 FAOSTAT (2021).

Similar to many regions in Tanzania, the main economic activity in Tabora is agriculture covering about 80% of households (National census 2012). The 2012 National Census showed that 64% of Tabora households are engaged in tobacco farming since it is a region's main cash crops, but still farmers engaging in Tobacco production have inadequate income and a few still facing low standard of life. This study aims at weighing out the production activities among smallholders tobacco growers in Urambo district and how their livelihood could be improved.

Table 1.1: Major Exports (Billion TZS), Tanzania, 2010-2016

Commodity	2010	2011	2012	2013	2014	2015	2016
Coffee	162.3	225.7	292.8	259.1	204.3	309.7	224.2
Cotton	133.1	103.9	164.9	137.7	558.4	79.7	100.5
Sisal	11.1	16.9	18.4	25.4	111.3	340.2	32.3
Cashew nuts	173.2	189.6	222.0	301.0	647.9	497.3	756.9
Cloves	11.3	48.4	58.3	68.4	50.9	5.9	22.5
Diamonds	14.2	17.0	41.0	63.6	80.3	65.6	164.3
Gold	1,336.7	3,463.8	3,410.7	2,768.5	2,705.7	2,717.2	3,072.7
Tobacco	178.7	437.9	348.1	159.5	319.3	428.0	783.8
Tea	68.1	73.5	87.4	87.8	72.8	91.0	96.9
Total	**2,088.7**	**4,576.7**	**4,643.6**	**3,871.0**	**4,750.9**	**4,534.6**	**5254.1**

Source: National Bureau of Statistics

Source: NBS, (2018).

1.2 Statement of the Research Problem

Tobacco being agricultural products has number of risks related with its production such as nicotine absorption while handling wet leaves in the farm this is well known as green tobacco sickness. Despite of adverse effect on tobacco production to the human health environment and higher demand of labor as reported by World bank, (2017), Kagaruki *et al*., (2008) as the causatives of diseases and environmental deterioration, tobacco cultivation is still important to individuals economy of the smallholder tobacco farmers and the national economy as whole, Several countries derive revenue in farming and exports. The processing of tobacco leaf into finished

product is increasing which holds economic benefit for employment and revenue. Kagaruki, *et al*., (2008) mentioned that economic benefits do not reach the poor for instance the smallholder farmers. The revenue generated by tobacco production is largely concentrated in the hands of international traders and the government officials tasked with regulating the industry (AUC, 2012).

The increase in area under tobacco production with little average on yield rate poses a challenge to the tobacco cultivation and lead to a decline in production. For instance the challenge of destructive pests that destroy tens of hectares of tobacco farms annually subsequently raise production costs of the cash crop. Production of tobacco declined from 105 million kilograms in 2013/2014 to 93 million kilograms in 2014/2015, moreover, production of the crop decreased from 72 million kilograms in 2015/2016 to 60 kilograms in 2016/2017 and to further 50.5 million kilograms in 2017/2018. (Mnozya, 2019).

Studies and report have been done on tobacco, Ndomba, (2018) explored the importance of tobacco economy on peasant tobacco production in southern Tanzania rural economy. Kagaruki, (2010) on community based advocacy opportunities for tobacco control in Tanzania and came out with hazards related to tobacco production by supporting campaign against tobacco production in improving social economic status of tobacco farmers. Most of the report done by ILO, (2012)., WHO, (2016)., FAOSTAT (2020) explored the impact of tobacco on human health, environment and its impact on promoting child labor but also its huge contribution on countries exporting revenues and trade expansion. However, study on efficiency tobacco production for social economic benefits have been left behind.

This study aims to determine production efficiency and identifying economic consequence to smallholder's tobacco farmers during and after cultivation of the tobacco crop in Urambo district.

1.3 Research Objectives

1.3.1 General Research Objective

The main objective is to assess determinants for the production efficiency of smallholder tobacco growers in Tanzania.

1.3.2 Specific Research Objective

i. To assess farm characteristics of smallholder tobacco farmers in Urambo district
ii. To analyse production costs of smallholder farmers in tobacco production
iii. To determine tobacco production efficiency in Urambo district

1.3.3 Hypothesis of the Research

H_1: The farm characteristics is statistical insignificant to tobacco production efficiency

H_2: The production costs have positive influence in tobacco production efficiency

1.4 Significance of the Study

The study have numerous importance to the communities of Urambo district, government and different scholars, it enables an addition to the existing knowledge on how tobacco production has contributed to reduction of poverty in Tanzania. Also the study would be used as source of information for other scholars to carry out

further studies. Moreover, this study may provide more inputs for improvement of smallholder tobacco productivity in Tanzania.

Also the information generated on this study enable farmers to decide economically what to produce, how to produce, when to produce and how much to produce. The results of the current study are expected to provide an important contribution in the policy formulation process. Policy makers can use information obtained to identify factors that can improve tobacco production and make a strategy to improve farmers' welfare.

This study is of both practical and theoretical importance. At the practical level, measuring efficiency of tobacco farmers, and identifying the factors that affect it, may provide useful information for the formulation of economic policies likely to improve farmers' efficiency. Moreover, from the microeconomic standpoint, identifying factors that may improve farm productivity is one of the major significance since, by using such information derived from such studies, farmers may become more efficient and hence more profitable. At the theoretical level, the study aims to bring some contribution to the understanding of farmer technical performance in developing countries especially in Tanzania. In fact, since the introduction of tobacco production in Tanzania, very few studies have been undertaken at the micro level to evaluate the technical efficiency level of farmers. The results of the study will fill this gap by adding to the few existing literature.

1.5 Scope of the Study

To determine tobacco production efficiency of Urambo smallholder's farmers, This

study collected primary data within Urambo district and focus on micro level determinants of tobacco production efficiency in Urambo including Farm size, Price of tobacco and Production cost, processing cost, experience, presence of extension services and subsidy.

1.6 Justification of Study

Knowledge of tobacco production enable farmers to decide economically what to produce, how to produce, when to produce and how much to produce. Also, the knowledge can enable farmers to use farm labor to minimise coast and increase profit. The results generated by this study expected to provide important information for sound policy making. Policy makers' uses information gathered to identify factors that can improve tobacco productivity.

1.7 Limitation of the Study

Due to scarcity of financial resources and limited time, investigation based only on one district which has same agro climatic condition instead of collect data from different partial agro climatic condition, this reason make difficult to generalize the finding in relation to other tobacco production area.

1.8 Organization of the Proposal

This research proposal is organized into three chapters. Chapter one presents the background of the study, objectives and problem statement, states the relevance of the study. Chapter two brings up literature review, whereby arguments of different scholars from different angles of the world are cited and general overview of tobacco industry in Tanzania particularly in Urambo District. It also gives empirical evidence

of the study. Chapter 3 discusses the research methodology that which has been employed for data collection, data mining and data analysis for obtaining results/information for discussion.

CHAPTER TWO

LITERATURE REVIEW

2.1 Overview

This chapter cites literatures in line with the research topic, argument and critics of different scholars. Also, the chapter includes definition of the main concepts, theoretical, empirical and conceptual framework used in the study. There are number of factors affecting tobacco production in Tanzania. The chapter described the theoretical and empirical background where relevant theories related to the tobacco production efficiency to the global, national and Tanzania individual economy have been cited and discussed.

Furthermore, matters relating to the general and specific research objectives are discussed alongside relevant supporting studies. This was including the understanding of the concept and some aspects that may result into acquisition of the tourism experiences in the revenue contribution. The chapter further was discussing some theories and models used by the study to inform and reveal some existing features and relationships in respect of the study main objective. Some empirical review was further present in the effort to address the study's hypothesis and the conceptual framework will finally develop in this section. This chapter include the following heading:

2.2 Definitions of Key Terms

2.2.1 Smallholders Farmers

Those farmers who own small portion of land on plots to grow sustenance crops and one or two cash crops and mostly depend on family labor. Smallholder farmers are

defined as livelihoods creators in poor rural areas. Smallholder farmers have access to land as means of livelihoods and depend on family labor for production (DoAFF, 2012).

2.2.2 Socio-economic Factors

This is a composite measure of an individual's economic and sociological standing. It is a complex assessment measured in a variety of ways that account for a person's work experience and economic and social position in relation to others, based on income, education, and occupation (Erreygers, 2013).

2.2.3 Production Efficiency

Agricultural productivity is usually considered to depict the efficiency of the production process. However, as Grosskopf (2002); Nishimizu & Page (1982); Fare, *et al*., (1989); and others argued, this is true only under the assumption that the farm (or firm) is technically efficient, arguably a strong assumption. Agricultural productivity depends on two components: the type and quality of inputs used in the production process and how well these inputs are combined. The first component represents the production technology while the second refers to the technical efficiency of the production process.

2.2.4 Technical Efficiency

Technical Efficiency (TE) is the achievement of maximum potential output from a given quantity of input under a given technology. Thus, it is the attainment of production goals without wastage as stated by (Jandrow, *et al*., 1982; and Amaza & Olayemi, 1999). Technical efficiency is defined as the ability to achieve a higher level of output given similar level of production inputs. Russel and Young (1983)

stated that technical efficiency arises when less than maximum output is obtained from a given combination of factors.

2.3 Theoretical Literature Review

2.3.1 Importance of Tobacco Production in Tanzania

Tobacco production in the country serves as source of foreigner currency, cash income and employment. Selling agricultural products is the main source of cash income for most rural small holder farmers in Tanzania (Eskola, 2005). Tanzania exports coffee, cotton, sisal, tobacco, cashew nuts and cloves as its traditional exports. Tobacco is the leading export cash crops in Tanzania ranking first as a foreign exchange earner before cashew nuts and coffee (BoT, 2012). 2011/12 data showed that, the earnings from tradition export were US$ 268 mil, while non-traditional exports were US$ 858 mil. Tobacco alone contributed US$ 127.8mil which is 11.34% of total export earnings for the country (BoT, 2012). Tobacco was the main source of income for 72000 smallholder farmers who were striving to get out of poverty Rweyemamu and Kimaro, (2006).

Currently, it offers employment opportunities in both tobacco farms and two tobacco processing factories in Morogoro. As of 2008, Tanzania the tobacco industry employment record stood at about 92178 growers, 550 in input distribution, extension services and marketing activities, 7291people in tobacco processing and 2000 in cigarette manufacturing and distribution (TCC, 2006).

2.3.2 Farming Level of Tobacco in Urambo

Literacy rate is the foundation of what type of methodologies should be used to train a given group of people. According to the United Republic of Tanzania (2002), the

percentage of literacy rate in Tabora was 53.5 and that of Kigoma was 65.2. The statistics for rural areas was poor comparing to the urban areas. In tobacco farming and operations, the age which is involved is that of 20-64 years. According to the United Republic of Tanzania (2002), this age had a literacy rate of 55.36% for the whole country. This is also expected to be below that, in rural areas of Tanzania.

According to Tanzania Tobacco Council (2006), a farmer training is a shared function between tobacco stakeholders; this is part of the Tanzania sub-sector Development Program 2006 to 2015/16. The tobacco stakeholders are government, farmers, and tobacco dealer (merchants). According to Tobacco Council of Tanzania (2006), most of the tobacco farmers are organised in primary societies and unions. There are also farmers' associations dealing with tobacco production. All these organisations are responsible for farmers training. However, according to Tobacco industry Act Regulations (2005) the actual job of tobacco baling in a required standard remains to the primary societies through its councils.

According to the Ministry of Agriculture Food Security and Cooperatives (2010), the Ministry will collaborate with all stakeholders to ensure that the Agricultural Sector Development Programme achieve its goals. Specifically, the Ministry will enhance demand driven research and development and revamp extension and training services (Ministry of Agriculture Food Security and Cooperatives, 2010).

2.3.3 Theories and Models Adopted for Study

This study is based on theory that is production theory; this theory is relevant to this study as believes on the farm household production, theory is based on the concepts,

the profit-maximizing, utility maximization and the risk-averse attribute of smallholder farmers of the economic agents (individual/households).

2.3.3.1 Neo-classical Theory of Economic Growth

Neo-classical growth theory is an economic theory that outlines how a steady economic growth rate can be accomplished with the proper amounts of the three factor of production: labor, capital and technology. The theory states that by varying the amounts of labor and capital in the production function, an equilibrium state being accomplished, Moreover, technological change has a major influence on economy, (The Neoclassical Growth model of Solow, 1956). The subsequent neoclassical model was introduced by Solow (1956), Swan (1956) Cass (1965) and Koopmans (1965). It focused on exogenous technological or population factors that determine production efficiency. In this model the balanced path growth is achieved when the production is determined by physical capital growth and labor force growth. (The Neoclassical Growth model of Solow, 1956) The theoretical framework of this study focused on the theories due to their relevance.

Furthermore, the economic theory was extended to come up with the Farm Household Production. Theories as analysed by Mendola (2007). The theoretical framework of this study focused mainly on these Farm Household Production Theories due to their relevance. Mendola (2007) insists that smallholder farmers with access to a piece of land in their respective area do exploit family labor in farm production since they do not have income for hiring labor. Smallholder farmers are partially engaged in markets, (Mendola, 2009; Hunt, 1991) defines smallholder farmers as being units for both production and consumption, implying that the

proportion between the produce and consumption is more or less 50/50. On the other hand, they are dominated by economic and political systems which influence their production behaviour.

Cobb-Douglas production function, that adopts constant returns to scale and perfect competition in factor and product markets, is insufficient to clarify reasons for smallholder farmers' production behaviour (Taylor and Adelman, 2003). Another prominent neo-economist is William Stanley Jevons (1835 -1882) who argued that consumers will buy the goods that provide them with the greatest satisfaction. He advanced the marginal utility theory and modern theory of consumer behaviour, linking the total and marginal utility (Jevons, 1871). Jevons argued differently to classical on the theory of values, classical economists argued that values are determined by cost of production and scarcity but Jevons argued that the relative prices depend upon subjective assessment by people of the satisfaction to be gained from purchasing different sources (Pressman, 2016).

In summary, the neo-classical economics theory has two central methodological features, which are methodological individualism that emphasises on interest and motive of individual choices, and instrumentally rationality choice which an individual chooses the best alternative optional utility (Cassel, 1903; Miyamura, 2020). The theory is an economic theory that outlines how a steady economic growth rate can be accomplished with the proper amounts of the three driving forces, which are labor, capital and technology. This theory models the human behaviour in assumption that self-interested individual's choice maximise his/her utility.

Most criticism points out that neoclassical economics makes many unfounded and unrealistic assumptions that do not represent real situations. For example, the assumption that all parties will behave rationally overlooks the fact that human nature is vulnerable to other forces, which can cause people to make irrational choices. Therefore, many critics believe that this approach cannot be used to describe actual economies. Neoclassical economics is also sometimes blamed for inequalities in global debt and trade relations because the theory holds that such matters as labor rights will improve naturally, as a result of economic conditions.

Moreover, the theory criticised that ignores the cognitive limitation in calculating benefits and cost of alternative choices (Miyamura, 2020; Simon, 1979). Behavioural economics assert that decision making may not be optimal due to a restriction in the ability to process information, because people tend to act intuitively (Simon, 1979). Therefore, the best optional is the bounded rationality approach that account for the smallholder grower obtain revenue and after removing the cost previously incurred on capital, land and labor, he/she remains with profit which ultimately level of production as this study was contributed to fill the left theoretical gap.

2.3.3.2 Solow- Swan (1956) Model of Economic Growth

The Solow –Swan growth model was used for guiding or underpinning this study which described the total factors productivity or portion of the output that cannot explained by amount of input used in the production process and efficiency. The Solow –Swan growth model is a neo-classical economic growth model which was independently developed by Solow (1956) and Swan (1956). Solow (1956) accepted all the Harrod-Domar Model's assumptions except that of fixed proportion.

Moreover, neo-classical and Keynesian assumptions of relations and rigidities are relaxed in Solow (1956) model.

A Solow (1956) long-run growth model is assumes that the rate of production of a single community Y at time t, Y(t) and the instant's output $y_i(t)$ is consumed and the restis saved and invested (Solow, 1956).The function of output saved is a constant *s*, so that the rate of saving is sY(t). The community stock of capital K (t) takes the form of accumulation of composite community. Therefore, net investment is just the rate of increases of capital stock dK/dt. That is, at every instant of time the net investment is dK/dt = sY. The output is produced with the help of two factors of production, which are capital and labor, whose rate of input is L (t). The technological possibility is represented by a production function.

Y = F (K, L). ……..1

In this function, Y is assumed to be net output and homogenous of first degree and there is no scarcity of land. Hence, the production shows the constant return to scale. In Swan (1956) model, the commonness of the Smith, Mill and Lewis is addressed in perspective of connexion between capital accumulation and the growth of the productive labor force. In the first instance, capital and labor are only factors of production, and annual output Y depends on the stock of capital K, and labor force N. According to the constant elasticity production function,$Y = K^{\alpha}N^{\beta}$, with a constant returns to scale $\alpha + \beta = 1;$ the annual addition to capital stock is the amount saved sY, where s is a given ratio of saving to output (or income).

Therefore, the annual relative rate of growth of capital is sY/K, the symbol *y* and *n* stand for the annual relative rates of growth of output and labor respectively. Therefore, the production function implies the basic formula for the rate of growth of output is

$$y = \alpha S\frac{Y}{K} + \beta n \quad \text{.....(1)}$$

In general, Solow (1956) and Swan (1956) created a Solow-Swan (1956) growth model that assumed that the key factors of production are capital and labor, and to technical progress. Moreover, the model assumed saving ratio is constant, and saving equals investment, capital depreciated at constant rate d, and population grows at a constant rate (n). The general production function in Solow-Swan model is Y = F (K, L), under the assumption that the technological progress is unchanged.

The condition of constant returns to scale implies that the labor is a fixed input, that is, the production Y = F (K, L) is divided by L. The function becomes,

$$\frac{Y}{L} = \mathrm{F}\left(\frac{K}{L}, 1\right) = L.f(k) \quad \text{.....(2)}$$

Where y = $\frac{Y}{L}$ is the output or income per worker, *k* = $\frac{K}{L}$ is the capital –labor ratio and the function f (k) = f (k, 1). Thus the production function is expressed as y = f (k).In the Solow-Swan model, saving is a constant fraction, s of income. So saving per worker is sy of *s*f(k), since income equals to output, sy =sf(k).

The investment required to maintain capital per worker (k) depends on population growth rate (n), and depreciation rate (d). Therefore, if the population grow at a

constant rate (n), the capital stock grows at the rate of n.k to provide to the growing population. Since, d is a depreciation rate, then the total capital – worn out or total depreciated capital is d.k (the investment needed to replace the capital worn-out, or in other words, this value is the depreciation investment per worker to maintain the capital-labor ration for growing population, this amount is added to the total capital stock/community capital which is *n.k*. That is, (nk +dk) = k (n+d), the investment required to maintain capital –labor ratio (capital per worker). The net change in capital per worker (k) over time is equal to the difference between saving per worker and the required investment to maintain the capital per worker (to depreciated capital)K = sf(k) – (n+d)k, when K = 0, then Sf(k) = (n+d)k, the economy reaches a steady state at point E (Figure 2.1).

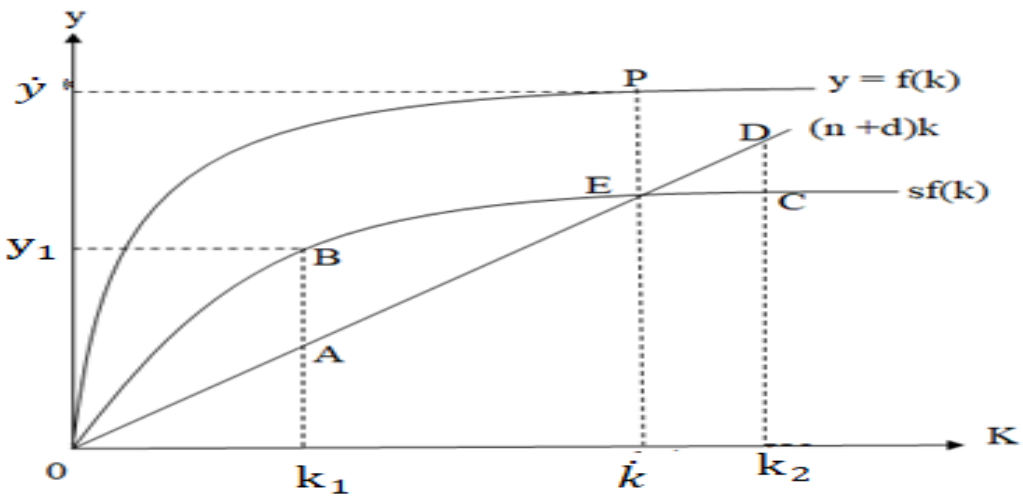


Figure 2.1: The Steady State Economic Growth under Solow-Swan (1956) Model
Source: Adopted from Solow (1956) and Swan (1956).

The Figure 2.1 the vertical axis represents the output per worker (y) and capital per worker (k) represented by a horizontal axis. The y =f(k) curve is a production function which shows that output per worker increases at a diminishing rate as k

increases due to the law of diminishing return. The sf(k) curve represents saving per worker. The (n+d)k is the investment requirement line from the origin with a positive slope equal to (n+d).The steady state level of capital is determined where the sf(k) curve intersects the (n+d)k line at point E. The steady state income is y with output per worker, KP as measured by point P on the production function y =f (k).

The mechanism of the steady state situation of the Solow-Swan model is explained by using a figure 4. At K_1 the saving per worker K_1B is greater than the investment required to keep the capital-labor ratio constant, K_1A ($K_1B > K_1A$). Thus, k and y increases until K is reached when economy is in the steady state at point E. Furthermore, at K_2, the saving per worker, K_2C will be less than the investment required to keep the capital-labor ratio constant, K_2D ($K_2C < K_2D$). Thus, y will fall as k fall to K and the economy reaches the steady state at E. Therefore, Solow-Swan model shows that the growth process is stable, no matter where the economy starts, forces exist that will push the economy over time to a steady state.

The implications of this model are the growth rate of output (exogenous) of the factors of production and independent of the saving rate and technical progress. If the saving rate increases, it is increase the output per worker by increasing the capital per worker, therefore the growth rate of output will be change.

2.4 Empirical Analysis of Relevant Studies

2.4.1 Studies in World

Padilla-Fernandez, *et al*., (2012) examines the production efficiency of sugarcane production across farm size in the Philippines. The study indicates that the small

farm group appears to be not as economically efficient as larger ones. Medium and large farm groups appear to be equally economically efficient. Inefficiency differences among farm size groups appear to be related with the physical input used and cost. Efficiency determined by frontier line either by increase production or by decrease cost of production, larger farmers benefit the economies of scale the higher and efficient input usage by the large farms tends to increase the quantity and quality of produced and with the lower price of input. The higher input prices faced by small farmers tends to reduce crop management, amount of inputs used low production efficiency (Padilla-Fernandez, et al., 2012).

Chavas and Aliber (1993) constructed a non-parametric frontier and examined technical, allocative and scale efficiency in the United States. The frontier in Chavas's analysis included 545 farms that included crops and livestock. Variables used in crop included hired labor, family labor, repairs, seeds, fertilisers, and pesticides .Results from the study showed that the majority of farms had at least one form of inefficiency. However, the study found that technical inefficiencies were minor. Surprisingly, small-scale farmers experienced more economies of scale than large-scale farm operations.

2.4.2 Studies in Regions

Bukenya, et al., (2013) studied the efficiency of resource use among fish farmers and applied a stochastic production frontier approach. The estimated index of resource-use efficiency showed that fish farmers were inefficient in resource allocation. Results showed that variables, such as access to extension services and credit, were associated with technical efficiency. Also, Sibiko, Ayuya, Gido,

Mwangi, and Egerton (2013) measured economic efficiency in the production of beans in the eastern region of Uganda. They applied a stochastic frontier cost function to a sample of 580 farm households. Their findings showed that economic efficiency in bean production was at 60%, and was positively associated with the value of assets, off-farm income, and credit.

Abass, et al., (2017) under took a comparative study between farmers who had adopted a mechanised farm practice in cassava processing and those who did not use it. Specified Trans log production function and reported a mean technical efficiency of 0.69 and 0.52 for mechanised and non-mechanised farms respectively. Socio-economic factors in this study were important in determining efficiency. The results showed that level of education, membership in farmers' associations, and access to markets were negatively associated with technical inefficiency.

Kansiime, et al., (2018) applied a stochastic production frontier to a group of farm types to assessed farm resource use efficiency. Results showed that farm-specialised farms exhibited inefficiencies, particularly in labor and fertiliser, compared to diversify and off-farm specialised farms. Technical efficiency was also positively associated with extension services and market access. The study therefore recommended that interventions should focus on extension services and market access to improve farm efficiency.

2.4.3 Studies in Tanzania

Rugimbana (2008) asserts that efficient use of modern agro-technology and other inputs in Tanzania require a certain level of education to enable farmers to decode

and comprehend their complex nature, to make efficient selection and appropriate allocation of resources to benefit from the opportunities provided by new superior inputs. Her study found that farmer's education level has a significant influence on tobacco productivity. Basing on the regression analysis of the factors influencing productivity, the coefficient of the level of education for the farmer was significant with a value of 2.443 at $p<0.05$. She argued that it may be due to the notion that farmers who are educated are more likely to understand and follow the advice and directives from the extension agents on the importance of using improved technologies and the use of inputs on recommended rates.

Sergent (2004) assessed the profitability of tobacco production at Mpanda district in Tanzania declares that, fluctuating of demand, supply and price of a crop with minimization of cost of cultivation affects the level of profit of tobacco. Maximization of tobacco profit turns out to be a multi-objective decision-making problem. Moreover, as price of tobacco depends on grades and weight, any misclassification will impact directly on the price of tobacco leaves and in many occasions lead to reduced tobacco profitability (Ntibiyoboka, 2014).

Ntibiyoboka, (2014) showed that, tobacco contributed 29% to Mpanda household cash income, also revealed the positive relation between education level and the quality of tobacco. Educated farmers adopt easily new agricultural technology to improve quality of seeds, application of fertilizer and chemicals on time, good plant/ridge spacing, modern barns for processing tobacco as well as good storage facilities (Ntibiyoboka, 2014). Kuboja, et al., (2012) study on factors influencing tobacco production among contracted farmers in Songea, revealed that tobacco isone

of the major agricultural export crops ranked among the top three foreign exchange earner and offers employment to many Tanzanians in both tobacco farms and in the tobacco processing factories, also declared that tobacco production in Tabora region provides social profitability dates back several decades since colonial era.

Table 2.1: Previous Studies on the Production Efficiency of Smallholder Tobacco Growers

Author and Year	Study Objectives	Study Location	Sampling Method	Analytical Method	Sample size	Findings
Chandio et al., (2018)	The effect of agricultural credit on wheat productivity of small farms in Pakistan	Pakistan	Random sampling	Two stage least square	180	Positive and Significant
Mustapha (2017)	Analysis of access to credit and agricultural performance in Sub-Saharan Africa.	Nigeria	Panel data(200-2014 SSA countries)	Panel co-integration approach	21 SSA countries	positive and significant influence
Selejio et al (2018)	Compare production efficiency between adopter and non adopters of land management and conservation technologies in Tanzania	Tanzania	National Panel data	Stochastic frontier approach		Positive and significance
Srinvasulu R. et al., (2015)	Measure the technical efficiency of farm household that produce traditional vegetables in Tanzania	Tanzania	Random sampling	Stochastic Production frontier approach	181 household	Positive and significance
Msuya, et al., (2005)	Determinant of efficiency to increase smallholders maize production and productivity	Tanzania	Random sampling	Stochastic Production frontier approach	223 farmers	Positive and significance

Source: Compiled by the researcher from empirical literature reviews (2021).

2.5 Research Gap

Production efficiency is a crucial component to enhance productivities of any crops particularly tobacco. The assessment of determinants for the production efficiency of smallholder tobacco growers has a paramount important to understand factor which increase or decrease production efficiency. However scholars in the tobacco

production conduct studies in a different context, for instance, tobacco profitability and marketing, Ntibiyoboka (2014) was based only on tobacco marketing. This study is focusing on efficiency production in order to increase tobacco productivity while reducing cost of production.

Mwita (2016) worked on the Shifting Cultivation, Wood Use and Deforestation Attributes of Tobacco Farming in Urambo District, Tanzania, but his study did not deal with tobacco production on management of forest resources in Kigoma region particularly in Kasulu District. On the other side, the reviewed literature also revealed that what lead most tobacco producers to concentrate in producing tobacco is different from one place to another. Chivuraise (2011) dealt with the economics of smallholder tobacco production and implications of tobacco growing on deforestation in Hurungwe District of Zimbabwe. This study is dealing with tobacco production on the assessment of determinants for the production efficiency of smallholder tobacco growers in Urambo district in Tanzania. This circumstance prompted the researcher to conduct a study to assess determinants for the production efficiency of smallholder tobacco growers in Urambo district in Tanzania.

2.6 Conceptual Framework

A conceptual framework in study is prepared to give flow of an idea that the study wants to find out or guiding as a road map to what the study aims to achieve. The conceptual framework in this study used the information generated through primary and secondary data collection. Basing on the production theories which are narrowed and modified in Farm Household Production theories (Mendola, 2007). The Farm

Household Production Theories are based on three concepts, the profit-maximizing, utility maximization and the risk-averse attribute of smallholder farmers.

Smallholder growers tend to be risk-averse because any loss will pull them to the worse situation and in order to ensure maximum profit, smallholders growers tend to grow crops with market assurance like tobacco, utilize the household labor and plot they have as well as use the simple technology basing on the level of education and income (Mendola, 2007; Ntibiyoboka, 2014).

The conceptual framework in this study assumes a linear relationship from one step to another. The smallholder grower cultivates tobacco farm using factors of production including seedling, fertilizers, and agro chemical to produce. Efficiency utilization of factors of production basing on the farm size, level of education, size and type of labor, experience weather condition and household income. Institutional factors such as agriculture extension staff and agro dealers are the important components to facilitate knowledge dissemination to farmers, while price of output is an important factor for profit maximization where output is then taken to the market to be sold at the agreed price between the producer and manufacturer or buyer.

This study shows seven independent variables (farm size, experience, extension services, other income, and cost of inputs) that affect one dependent variable (tobacco production efficiency), (Figure 2.1).

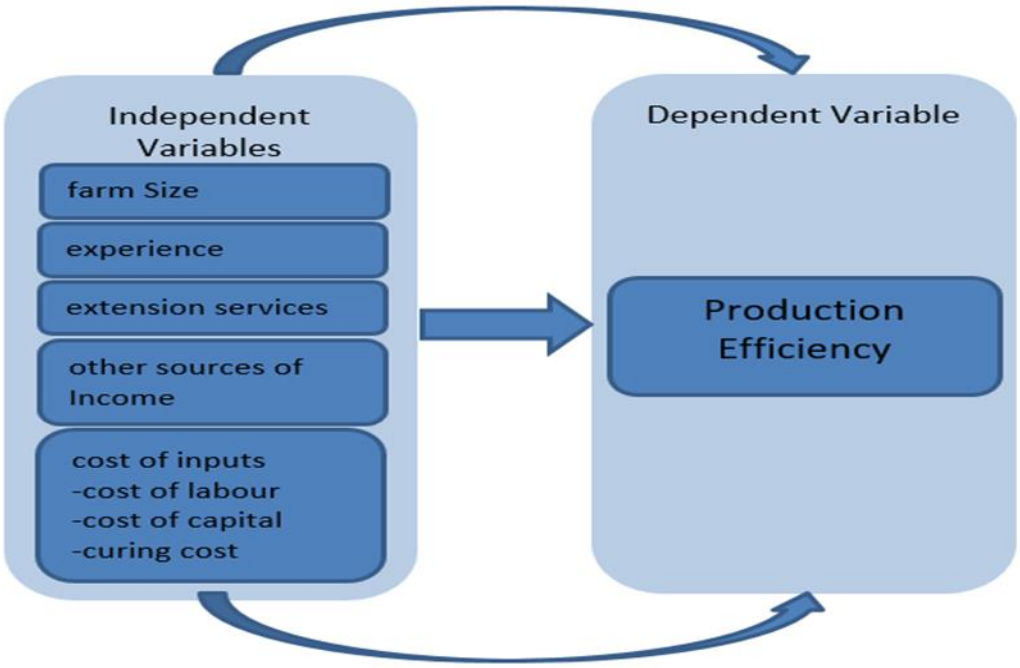


Figure 2.1: Conceptual Framework of Factors Influencing Tobacco Production Efficiency
Source: Compiled by the researcher from The Conceptual framework (2021).

The variables that are used in the production functions (inputs), output and determinants of production efficiency are defined as follows.

2.6.1 Dependent Variable

Production Efficiency: describes a maximum capacity level in which an entity can no longer produce more of a one without lowering the quality of another good. In this study it is the dependent variable in the estimation of production functions, and being measured by number of kilograms (Kg) produced per season.

2.6.2 Independent Variables

Inputs: This refers to explanatory variables which influence output and is used in the estimation of production functions. In this study these are referred to be determinants of Production efficiency, also considered as factors of production which influence

dependent variable:

2.6.2.1 Farm Size

Farm size: This refers to the area of plot of land allotted for crop production. The unit of measurement for area is also different in different parts of the country; hence the data was changed to hectare for smoothness the analysis.

2.6.2.2 Experience

Observed through number of years which farmers engage direct into tobacco production, this parameter has some relationship with age but not always.

2.6.2.3 Extension services

Agricultural extension services are agencies provide advice, information, and other support services to farmers to enable them to improve the productivity of their crop.

2.6.2.4 Income

Income- is the money that a person or farmer earns or receives from sells of tobacco, as opposed to the money those they has to spend or pay out.

2.6.2.5 Input Cost

Input Cost includes a set of cost incurred during production which influences output, such costs are Labor cost, Capital Cost and curing cost:

Labor Costs: Also known as Total labor cost is the total expenditure borne by employers for employing staff during the course of tobacco production. Total labor cost includes wages payments.

Capital Costs: Incurred on the purchase of land, buildings, construction and equipment to be used in the production of (tobacco) goods or the rendering of

services.

Curing Costs: Refers to the cost incurred during processing of harvested tobacco leaf to make ready for the market. It is a well-standardized process especially in FCV tobacco to achieve the desirable qualities in the cured leaf along with the removal of moisture.

2.7 Summary

This chapter summarises the literature review from theoretical through empirical to conceptual framework. It has also provided the definition of key terms as well as the research gap. The following chapter presents the research methodology which will be employed in this study.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Overview

The chapter describes how the research were carried out, by showing a plan of different aspects on which data were collected and converted into meaning full words. Research methodology guides a researcher on how to gather information, performing field activities, describing research techniques for data collection relating to the problem, using statistics to analysing and interpreting data to answer research problem. The aspects include study population, sample size, data collection procedures, data analysis methods and presentation. Research methodology is the study of methods which described procedure used to obtain data from field and it analysis (Bell, 1993), As per Kothari (2004).

3.2 Research Design

The study used a cross sectional research design whereby data were collected at a single point in time to sampled area. The selection of the design was based on its power to collect quick and sound data as well as the design being less expensive compared to time series and panel design. The design used a structure questionnaire which administered to sampled tobacco farmer in Urambo district. The benefit of a cross sectional study design was that it allowed researcher to compare many different variables at the same time with little or no additional cost.

3.3 Research Strategies

3.3.1 Survey Population

Population is the total of individuals from which a statistical sample is drawn for

investigation (kamzora, 2008). The targeted population in this case were smallholder tobacco farmers in Urambo district. The population of interest for this study was 187,436 rural smallholder tobacco farmers in Urambo district in Tabora region of Tanzania. Urambo was chosen because is the highest tobacco grower in the districts at Tabora - Tanzania, consisting of Tabora Municipal Council, Igunga, Kaliua, Nzega, Sikonge and Uyui. The main economic activities of Urambo district are agricultural production and livestock keeping. About 90% of the population is engaged in agriculture and livestock keeping apart from other activities like beekeeping, fishing and lumbering.

The region is estimated to have 2.4 million hectare of potentially cultivable land but only less than 20 per cent is under cultivation. Subsistence farming is the main form of farming. Food crop production of which maize is the leading staple food crop is mostly aimed at meeting the family's food requirements. Tobacco and cotton are the major cash crops about 30% of the total tobacco produced in Tanzania, NBS, (2015). In addition to that, according to NBS, (2012), Urambo district lead in tobacco productivity with 67,736 hectares. Production of tobacco has steadily been increasing from 6,136 tons in 1987/88 to 25,671 tons in 2020/2021.

3.3.2 Sample Size

Simple random sampling technique was employed to obtain the representative of the population, and sample sizes of 290 tobacco farmers/respondent were obtained. The sample was obtained from seven surveyed villages (Kasisi, Tumaini, Itundu, Uyogo, Ifuta, Nsenda and Ugalla) from Urambo ward in three tobacco growing zones (North, Central and Western zone). This sample size was reasonably considered

sufficient for statistical analysis in conformity with Bailey (1998) who reported that for statistical efficiency, validity and reliability of minimum sample size should be 30 cases.

Also, Mwanyika (2000) contented that a sample to be representative of the population should not be less than 5% of the population under study. The choice of this sample size can fulfil the requirements of the study for statistical analysis. Kothari (2004) stated that, if the items of the universe/population are homogeneous regardless of the population size a sample of 100 cases is sufficient. Tobacco growers in the study area were assumed to be homogeneous because they all operate under the same geographic characteristics, same market conditions and same farming practices.

However the population of tobacco farmers was unknown due to inconsistency of season production. According to Kothari (2007) sample is a collection of some parts of the population to be a true representative of the population (i.e. number of items to be selected from the population). The sample size of this study consisted 290 individuals. These 290 individual samples were observed in two years to sample observations. In finding sample size, this study considered sampling suggestion argued by Tabachnick and Fidell, (2007) who suggested the use of $N > 104 + m$ for testing individual predictors, hence used $N > 104 + m$.

Where N stands for the individual sample size and

m stands for the number of independent variables.

This study had a total of seven independent variables which are farm size, experience, extension services, other income, labor cost, capital cost and curing cost.

Using, $N > 104 + m$.....*equation*..1,

Where m = 7;

Thus, $N > 104 + 7$.....*equation*..2

N = 111 was the minimum sample.

Therefore the sample size determined to this study was 290 (n = 290).

3.3.3 Area of the Research

Urambo is agriculture leading district of the Tabora Region located in Western Tanzania. Urambo district is among the seven districts in Tabora region with a population of 2,576,053, by 2016 with 50% of the population depend on tobacco production as the major source of income. Urambo district was selected because is the leading potential in Virginia flue cured tobacco producer. It should be noted that, 45% of the total tobacco produced in the country comes from Urambo (Mayuya, 2013). The region benefits from agriculture, livestock and a wealth of natural resources. Tobacco and cotton are the primary cash crops for farmers in the region. Climate and safety make Tabora attractive to investment, in particular in agriculture and agro-processing. Investment in and around Tabora can help drive the socio-economic transformation (Millennial cities 2011, NBS Web- census 2012).

3.3.4 Sampling Design and Procedure

This study involved smallholder tobacco producers in Tabora region, purposive sampling technique was used to select Urambo district since it is the popular as a leading tobacco producer district in Tabora as well as in Tanzania. A sampling frame based on the population of interest, where tobacco farmers were obtained from the PS (Primary Society) leaders in the study area. The list comprised farmers who are

registered by TTB (Tanzania Tobacco Board). Farmers interviewed were selected by using simple random technique. A proportional allocation of the sizes of the samples from different villages was determined from each village and made a total of 290 respondents.

3.4 Variables and Measurement Procedures

In this study production efficiency was measured by using House Hold output, where, Multiple liner regression model were employed using multiple variables; Production efficiency as dependent variable visas multiple of independents variable farm size (acre), experience (years), subsidy, other sources of income, price of tobacco (Tzs) and production/ input cost (i.e. capital cost, labor cost and curing cost).

3.5 Methods of Data Collection

This study employed Primary and secondary data, Primary data were gathered directly from individual small scale tobacco farmers by administering structured questionnaire to the household. Focus group discussions and individual interview were implemented. The data collected included household characteristics such as age, education, experience in tobacco cultivation, cost incurred, area grown tobacco per individual farmer, cost used in the production. Data collection was done to the head of household or family member with experience on tobacco farming i.e. spouse. The obtained secondary data were collected from TTB, journals, articles, and books related with tobacco farming and contribution of tobacco in various economic activities.

3.6 Regression Analysis

The data collected were analysed using appropriate computer software that included

Statistical Package for Social Sciences (SPSS). The quantitative data were analysed by descriptive statistics to capture the frequencies, mean and percentages. Regression analysis was used in determining the dependent of the variable used.

3.6.1 Descriptive Statistics

Descriptive statistics summarizes or describes the characteristics of a data set, consists of two basic categories of measures: measures of central tendency (mean, median and percentage) and measures of variability/spread. Measures of variability or spread describe the dispersion of data within the set. Objective one used descriptive statistics to obtain quantitative information in a manageable form by using tobacco yield, farm size, experience of farmers, and other sources of income.

3.6.2 Validity and Reliability

Reliability is the repeatability of the measurement while obtained the same answers. The goal of reliability of the thesis was to minimize the errors and biases in this study. The construct validity aimed at defining the correct operational approach for the concepts being studied; the internal validity seeks for the establishment of the causal relationship in events; the external validity is defining the authenticity of the conclusions can be generated from the findings (Yin, 2009). Since larger sample size can improve the reliability. This study adopted this method of using large sample size to minimize variance and increase validity and reliability.

3.7 Data Processing and Analysis

In order to obtain causal relationship of the variable regression analysis was adopted to analyse data in this study. A multiple linear regression model is a model that

dependent variable is expressed as linear function of independent (explanatory) variable (Gujarati, 2004). the collected data were cleaned and audited before subjected in the analysis, regression analysis method by using SPSS was employed to determine how independent variable influence the dependent variable by looking into magnitude and direction of the coefficient sign.

3.8 Expected Results of the Study

The study was expected to find tobacco production efficiency in Urambo smallholders farmers through farm size against the after sales profit. There is an inverse relationship between the farm size and productivity for example; in Madagascar it was observed inverse relationship between farm size and productivity when farm size is decreased below one hectare and when increased beyond 4 hectares (Bellemare, 2012). This study is expected to find the inverse relation between yield and social economic variables such as Farm size, Price of tobacco and Production/ input cost. Also, this study expects a positive relationship between smallholder incomes with social economic variables.

3.9 Model Specification

To test the objective three which requires information on the influence of socio-economic factors on tobacco production efficiency, a multiple linear regression model was used to examine the functional relationship between factors that were assumed prior to have significant effect on tobacco production. Tobacco production efficiency in this study was specified as dependent variable while the independent variables included: farm size, experience, extension officer, subsidy, other sources of income, household size, price of tobacco and production/ input cost(capital, labor

and curing cost). In this study the regression model specified as:

$$\gamma_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \varepsilon \qquad \text{................ (1)}$$

Where,

Yi= Production Efficiency

X1= farm size

X2= experience

X3= extension services

X4= subsidy

X5= other sources of income

X6= cost of capital

X7= cost of labor

X8= cost of curing

3.10 Estimation Diagnostic Tests

These were some of the estimation diagnostic tests which have been performed;

3.10.1 Normality Test

To be clearly measured the normality; the study measured the asymmetry of the distribution through skewness which is the third central movement of the distribution.

$$\alpha_3 = \sum\left(\frac{x-\mu}{\sigma}\right)^3 \qquad \text{..........(2)}$$

The sample skewness is evaluated as follows:

$$\hat{\alpha}_3 = \frac{1}{n}\sum_{i=1}^{n}\left(\frac{x_i-\bar{x}}{\hat{\sigma}}\right)^3 \qquad \text{..........(3)}$$

Where:

$$\hat{\sigma} = \frac{1}{n}\sum_{i=1}^{n}(x_i-\bar{x})^2 \qquad \text{..........(4)}$$

The skewness α_3 is 0 for a symmetric population. Therefore, if the sample skewness is significantly different from zero; we can infer that the population distribution is unlikely to be symmetric, hence not normal. Another number that can be used to check the normality of the distribution is the fourth central movement of the distribution, called the Kurtosis α_4, which is given as:

$$\alpha_4 = \sum\left(\frac{x-\mu}{\sigma}\right)^4 \quad \ldots\ldots(5)$$

The sample Kurtosis is computed as:

$$\hat{\alpha}_4 = \frac{1}{n}\sum_{i=1}^{n}\left(\frac{x_i-\bar{x}}{\hat{\sigma}}\right)^4 \quad \ldots\ldots(6)$$

The Kurtosis measures the amount of the total probabilities of the distribution and equals 3 for a normal population distribution. Since the sample Kurtosis is $\hat{\alpha}_4$ there is significantly different from 3, then we can infer that the population distribution is unlikely to be normal.

3.10.2 Heteroscedasticity

This assumption of linear regression is that the residuals have constant variance at every level of x. This is known as homoscedasticity. When this is not the case, the residuals are said to suffer from heteroscedasticity. When heteroscedasticity is present in a regression analysis, the results of the analysis become hard to trust as it increases the variance of the regression coefficient estimates; this makes it much more likely for a regression model to declare that a term in the model is statistically significant, when in fact it is not. The simplest way to detect heteroscedasticity is by creating a fitted value vs. residual plot. Once you fit a regression line to a set of data, you can then create a scatter plot that shows the fitted values of the model vs. the

residuals of those fitted values.

3.10.3 Multicollinearity

Multicollinearity refers to the situation in which independent variables are highly correlated; resulting in a paradoxical effect, whereby the regression model fits the data well, but none of the independent variables has a significant impact in predicting the dependent variable (Gujarati, 2004). Here correlation between variables must be taken into consideration. Correlation is one of the statistical measures that identify the two or more variables that change together. Correlation measures the direction and magnitude or strength of the relationship between each pair of the variables. In other words, correlation is a measure of correlation or association that tests whether a relationship exists between two variables. A positive correlation shows that these variables are moving in the same direction, increasing or decreasing together, while a negative correlation means that these variables are moving in an opposite direction, one is increasing and another is decreasing.

3.10.4 Karl Pearson's Coefficient of Correlation

It is known as Pearson's correlation coefficient and denoted by R. Pearson's R is the statistical measure for the association among the quantitative data. The values of the Pearson's correlation coefficient are always between −1 and +1. A value of R = +1 indicates that two variables are perfectly related in a positive linear sense. R = −1 means that the two variables are perfectly related in a negative linear sense, and a correlation coefficient of 0 indicates that there is no linear relationship between the two variables. The direction of the relationship is indicated by the sign of R

$$R = \frac{Cov(X,Y)}{\sqrt{[Var(X)Var(Y)]}} \frac{= \sum(X-\bar{X})(Y-\bar{Y})}{\sqrt{\sum(X-\bar{X})^2}\sqrt{\sum(Y-\bar{Y})^2}} \quad \text{.....(7)}$$

3.10.5 Coefficient of Determination

Coefficient of determination (R^2) is the most suitable and clear way of understanding the value of correlation coefficient using the square of linear correlation coefficient.

3.11 Analytical Framework

The approach here was semi-parametric. In stage 1, a non-parametric DEA model generates efficiency scores which are used to run a second stage parametric model. Tobitis needed in stage two to deal with the non-normal distribution of efficiency scores. The type of analytical tools to be used in research studies depend to a greater extent on the purpose for which the model is being estimated, nature of the study, available data, types of data (cross-section, time series and panel), convenience of the analysis, other economic under pins and indeed advantages derived from the tools. Hence, stochastic frontier production and cost of productions were used to analyse the technical, allocative and economic efficiencies respectively of the farmers while the farmers' economic efficiencies were estimated as the product of TE and AE. Thus, the model used in this work is based on the one proposed by Battese and Coelli (1995) and Battese, *et al.*, (1996) in which the stochastic frontier specification incorporates models for the technical inefficiencies effects and simultaneously estimates all the parameter involved in the production and cost function model.

Model specification – the stochastic frontier production function model of Cobb-Douglas functional form is employed to estimate the firm level technical and allocative efficiencies of the farmers' in the study areas. The Cobb-Douglas functional form was used because, the functional form has been widely used in

farm efficiency for the developing and developed countries, the functional form meets the requirement for being self-dual, allowing an examination of economic efficiency, and lastly, Kopp and Smith (1980) suggested that functional form has a limited effects on efficiency measurement.

The Cobb-Douglas production functional form which specifies the production technology of the farmers is expressed as follows:

$Y_i = f(x_i : \beta)$

$Y_i = f(x_i;\beta)\exp V_i - U_i$……..(8)

Where:

Yi– represents the total output of tobacco production which is measured in (Kg);

Vi–represents the quantity or costs of input used in the production. The Vi's are assumed to be independent and identically distributed random error, having normal $N(O,\delta^2)$ distribution and independent of the U_i's which are technical inefficiency effects, which are assumed to be non-negative truncation of the half-normal distribution $N(\mu,\delta^2)$.

The technical efficiency of individual farmers is defined in terms of the ratio of observed output to the corresponding frontiers output, conditional on the level of input used by the farmers. Hence, the technical efficiency of the farmers is expressed as:

TE, $=Y_i/Y^* = f(xii\beta)\exp(Vi-Ui)/f(xi;\beta)\exp Vi = \exp(-U_i)$……(9)

Where:

Yi is the observed output andYi* is thefrontier's output. The TE ranges between 0 and 1 that is Od"Ted"1.

The corresponding cost of frontier of Cobb-Douglas functional form which is the basis of estimating the allocative efficiencies of the farmers is specified as follows:

$Ci=g(Pj;\alpha)exp(V_i+U_i)=1,2,\ldots,n$……………………………………(10)

Where:

C_i represent the total input cost of the i-th farmers, g is a suitable function such as the Cobb-Douglas function, Pi represents input prices employed by the i-th farm in ground nut production measured in naira; αis the parameter to be estimated, V_i's and U_i's are random error and assumed to be independent and identically distributed truncations (atzero) of $N(\mu_i,\delta^2)$ distribution. U_i provides information on the level of allocative efficiency of individual farmers defined in terms of the ratio of the predicted minimum cost(C_i*) to observed cost(C_i).

That is, $AE=C_i^*/C_i exp(U_i)$…………………………………(11)

Hence, allocative efficiency ranges between zero and one (0&1)

This section provides a description of all variables used for the analysis. The output variables were the quantities of all crops produced per household and was measured in kilograms. Inputs included area harvested (in acres), labor, representing total man-days worked (hired and family labor), and purchased inputs such as fertiliser and seeds, seedlings, and planting stock. Tobacco producing households have additional inputs, such as jute twine, fuelwood, and fuel pipes.

The subset of production variables used in the frontier analysis, the analysis computed separate farm efficiency measures for each type of crop farm and later

included an analysis at the household level. The decision to include the unit of analysis at a farm plot level was motivated by the existence of important differences in farm input usage across the different types of crops. The results of the frontier analysis are reported as mean percentages, the coefficient of variation, and the number of efficient farms and households. The coefficient of variation adjusts the standard deviation by dividing by the average, which gives a measure of relative rather than absolute dispersion.

The variables were considered for the second stage procedure (Tobit models) together with the single variance of analysis tests. The three Tobit models explain efficiency scores, with farm and farmer characteristics. Farmer characteristics include experience and educational level. Age is in years for the head of household, who is assumed to be the farm decision maker. The expected sign on age is not predetermined; older farmers are more experienced, which could benefit productivity, but they also tend to be more poorly educated and set in their ways than younger farmers, which will be detrimental to productivity. Given that there is data on experience and education, the most likely outcome is that the coefficient on age will be insignificant.

CHAPTER FOUR

RESULTS AND FINDING DISCUSSION

4.1 Introduction

This chapter presents the findings that obtained during analysis by providing the descriptive statistics, graphs and Table presentation, analysis of the data, and correlation analysis in testing the data validity and reliability for the time series data as well as the regression analysis in responding to the subject under the study. This chapter provides the answer of three objectives which are to assess farm characteristics of smallholder tobacco farmers, to analyse production costs of smallholder farmers in tobacco production and to determine tobacco production efficiency in Urambo district as stated in introduction chapter.

4.2 Demographic Characteristics of the Respondents

Demographic and socio-economic characteristics of the respondents including age, sex, marital statuses, education and occupation presented in tables. These characteristics provided the demographic and socio-economic descriptions of the study Stone (2002). In this subsection, respondents were asked to mention their demographic information based on the following variables; Sex/gender, Age, Level of Education and working experience of respondents. The research had 325 respondents who were given questionnaires to fill at Benbella Girls Secondary School and Ministry of Education.

Out of 325 respondents, only 227 respondents equal to 69.8 %, filled and returned questionnaires. According to Saldivar (2012) on acceptable or desirable response rate 50% is adequate for data analysis, also rate of 60% good for data analysis and

rate of 70% very good for data analysis. Therefore, basing on acceptable rate theory, the respondents' rate was 69.8% which is very good enabled the researcher to analyze the data.

4.2.1 Gender of the Respondents

Gender involvement in research study it has paramount important for ensuring the sustainability of the project output in the community. Participation in decision making technologies adoption among stakeholders in tobacco production gender consideration helps in identifying the influencing strategic in how tobacco production has been implemented in the area. Based on this study male were the most participating group with an average of 92.4 per cent than female 7.6 per cent, this indicates persistence lower interest or gender bias of female in tobacco production. Thus give a room to male earning more than female since tobacco is the major contributing income in Tabora region than other crops. The results are in line with Nicholous, *et al.*, (2011) reported male to be the main adopting group for tobacco production.

4.2.2 Age of the Respondents

Age is among of the important factor in any production for it depicts the labor and influence the output force. According to the Table 4.4 of the study shows large group 35.17 percent of tobacco farmers laying in the age between 46-55 followed by 36-45 which comprise 27.93 per cent, followed by age group above 55 years which occupied 17.94 per cent and the age group 25-35 occupied 10 per cent and the lowest is age group less than 25 years. The data showed that majority of tobacco farmers are more aged which depict enough experience, capable and energetic to undertake

tobacco farming. Less percent 7.25 tobacco farmers are under the age less than 25 years, this figure revealed that tobacco production does not depend in the child labor. Ndomba (2018) declared the importance of age as the factor which accelerates efficiency production.

4.2.3 Level of Education of Respondents

Findings in Table 4.4 of the study shown that large number by 57.32 of farmers engaging in tobacco farming attained primary education, followed by illiteracy farmers which occupy 20 percent and 10.34 percent of tobacco farmers attained secondary education. Though each level of education participate in tobacco farming, but the remaining has very negligible per cent which occupied 6.20, 4.14, 1, and 1 per cent for certificates level, diploma, degree and masters level respectively.

4.2.4 Farming Experience of Respondents

Findings in Table 4.4 of the study shown that85.20 per cent of tobacco farmers have an experience of about 3-4 years, this provide an insight that there is large group of Tabora region dwellers particularly Urambo district joining the tobacco farming. Followed by farmers with more than 5 years which is 13.10 per cent and farmers with experience less than 3 years observed to be 1.70 per cent.

4.2.5 Marital Status

Findings in Table 4.4 of the study shown that, majority by 40 per cent of farmers engaging in tobacco farming are married, followed by single (33.10%). 14.14 per cent of tobacco farmers divorced and 12.76 per cent are widow or widower. These finding revealed that tobacco farming is a main activities of all group/gender in the

societies of Urambo and Tabora in general.

Table 4.1: Demographic Characteristics of the Respondents

Variable	Category	Frequency	Percentage
Gender	Male	268	92.40
	Female	22	7.60
Age (yrs)	< 25	26	8.96
	25-35	29	10.00
	36-45	81	27.93
	46 -55	102	35.17
	>55	52	17.94
Education	Illiteracy	58	20
	Primary	168	57.32
	Secondary	30	10.34
	Certificate	20	6.20
	Diploma	12	4.14
	Degree	1	1.00
	Masters	1	1.00
Marital status	Single	96	33.10
	Married	116	40.0
	Divorce	41	14.14
	Widow/widower	37	12.76
Farming Experience	< 3 Years	5	1.70
	3-4 Years	247	85.20
	5 >Years	38	13.10

Source: Researcher findings from Field (2022)

4.3 Testing for Validity and Reliability Analysis

4.3.1 Testing Results for Validity

According to Omar (2011) concept of validity refers to the extent in which the findings are in the same line with the research objectives. As measure of accuracy validity intend to determine whether instruments employed in the study provide the correct measurements. Study employed different tools to ensure validity of information generated, in order to streamline the accuracy of data collection, the study use SPSS to obtain R, R square and adjusted R square. Moreover, test to detect sources of variation i.e. autocorrelation, multicollianearity, heteroscedasticity and other test was considered. Researcher incorporated all comments and suggestion

from the supervisor from the beginning of proposal generation up to the results discussion.

4.3.2 Testing Results for Reliability Assessment

Reliability is the degree to which the data are correctly presented, which reflects the reality of the current situation (Kombo, 2000). To ensure respondents provide the correct data, researchers conduct the questionnaire pre-test techniques to the study area. After obtaining the ground true information from the respondents researcher prepared structured with assistance from supervisor and supplement information was obtained from reputable journal and different university library. The interview was conducted to the household head or the knowledgeable person of the family.

4.3.3 Data Accuracy Testing

Data accuracy have been tested by using R,R^2 square and adjusted R^2, the results revealed that coefficient of multiple determination to be 75 while the value of R square is 70.30 and adjusted R square 70.40. These results indicate data used for estimation different model in this study is accuracy and fit well.

4.3.4 Testing for Normality for the Production Model

In statistics, normality tests are used to determine data set if is well-modelled by a normal distribution and to compute how likely it is for a random variable underlying the data set to be normally distributed. The Kolmogorov–Smirnov test and the Shapiro–Wilk test are most widely used methods to test the normality of the data. Both methods show the data is highly significant at 0.00, which means the data collected underlying normal distribution principle or criteria. Table 4.1 shows the

normal distribution carves compliment the results found by kolmogorov–smirnov and Shapiro – wilk.

Table 4.2: Results of Normality Testing

Tests of Normality						
	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Yields	0.232	290	0.000	0.731	290	0.000
area cultivated	0.308	290	0.000	0.706	290	0.000
Experience	0.490	290	0.000	0.482	290	0.000

Source: Research Finding (2022).

4.3.5 Testing for Multicollinearity for the Production Model

Multicollinearity occurs when there is linear dependence among the regression variables. This correlation is a problem because it violates the principle of independent variables. If the degree of correlation between variables is high enough implies poor prediction equation. The variance Inflation Factors (VIF) is a tool used to detect the presence of multicollinearity when the VIF value is larger than 10 imply serious problems with multicollinearity, 2-5 moderately correlate and 1 no correlation (Montgomery *et al*, 2017). The study observes the VIFs value of 1.002 which implies no correlation among variable as well as the model used is sound enough to predict the results.

Table 4.3: Multicollinearity Test

Model	Unstandardized Coefficients		Standardized Coefficients	T value	Sig value	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
Constant	1367.321	345.267		3.960	0.00		
area cultivated	42.505	46.792	0.054	0.908	0.364	0.998	1.002
Experience	7.640	82.808	0.005	0.092	0.927	0.998	1.002

Source: Research Finding (2022).

4.3.6 Testing for Autocorrelation Assumption

The Durbin Watson statistic is a test statistic used in statistics to detect autocorrelation in the residuals from a regression analysis. The Durbin Watson statistic will always assume a value between 0 and 4. A value of DW = 2 indicates that there is no autocorrelation. Autocorrelation measures the relationship between a variable's current value and its past values. An autocorrelation of +1 represents a perfect positive correlation, while an autocorrelation of negative 1 represents a perfect negative correlation. The results shows the value of 1.72 which is less than 2means there is positive autocorrelation in the data, positive autocorrelation means that the increase observed in a time interval leads to a proportionate increase in the tobacco yields.

Table 4. 4: Autocorrelation Test

R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
0.754	0.703	0.704	518.23	1.72

Source: Research Finding (2022).

4.3.7 Testing for Heteroscedasticity

Breusch Pagan Testis used to test for heteroscedasticity in a linear regression model and assumes that the error terms are normally distributed. Heteroscedasticity is a problem because ordinary least squares (OLS) regression assumes that all residuals are drawn from a population that has a constant variance (homoscedasticity). The data collected observed to have less variance (homoscedasticity), therefore data collected does not violate the principal of homoscedasticity.

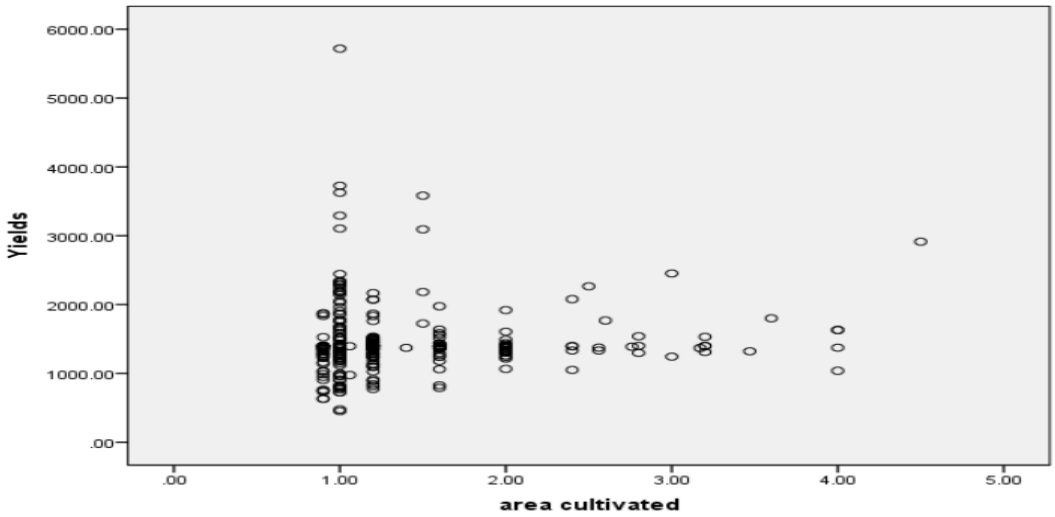


Figure 4. 1: Scatterplot for Testing Heteroscedasticity
Source: Research Finding, (2023).

4.4 Descriptive Statistics

Table 4.1 provides the descriptive statistics of three parameters i.e. tobacco yields, area used for tobacco cultivation and experience of tobacco farmers collected in 2021 tobacco production season. The results summary of the descriptive statistics for the parameters shows the characteristics of smallholder farmer's engagement in tobacco production. Characteristics of smallholder farmers provide the insight about the capabilities and strength of farmers toward achieving potential tobacco production. Ainembabazi and Mugisha (2014) observe the relationship between agricultural technologies adoption and experience in banana, coffee and maize production in Uganda.

Table 4. 5: Descriptive statistics

Parameters	Area (ha)	Experience	Yields
Mean	1.39	4.11	1457.83
Std. Deviation	0.65	0.36	517.19
Skewness	2.22	1.33	23.19
Std. Error of Skewness	0.14	0.14	0.14
Kurtosis	5.25	2.94	18.94
Std. Error of Kurtosis	0.28	0.28	0.28
Minimum	0.90	3.00	451.58
Maximum	4.50	5.00	5718.87

Source: Research Finding (2022).

The descriptive summary statistics findings shows, majorities of smallholder tobacco farmers in the study area has the mean area of 1.39 ha which are used for tobacco production, while majority of tobacco farmers has the mean experience about 4.11 years and mean production yields of 1487.83 Kg for the 2020 season.

A range of standard deviation observed to be between 0. 65 to 0.36 and the data are skewed at2.22 in which normality of the data is observed with kurtosis of five. According to Mardia, (1974) if the data are close to zero the data are perfectly normal distributed and for kurtosis in measuring either the data are light tailed ranges on K<3 or heavy tailed it ranges between k>3 relative to normal distribution. Ranges between 2.5 are normal skewed or normal distributed since variable lies below 3. Furthermore, the study showed that, farmers with small area (0.90 hectare) obtained minimum production (452) while farmers with large area (4.50 hectare) revealed to produce maximum production (5719 kg).The study observe the close relationship between experience, area and yields, it revealed that higher yields obtained when farmer has higher experience and larger production area.

Table 4. 6: Area Cultivated 2020 Season

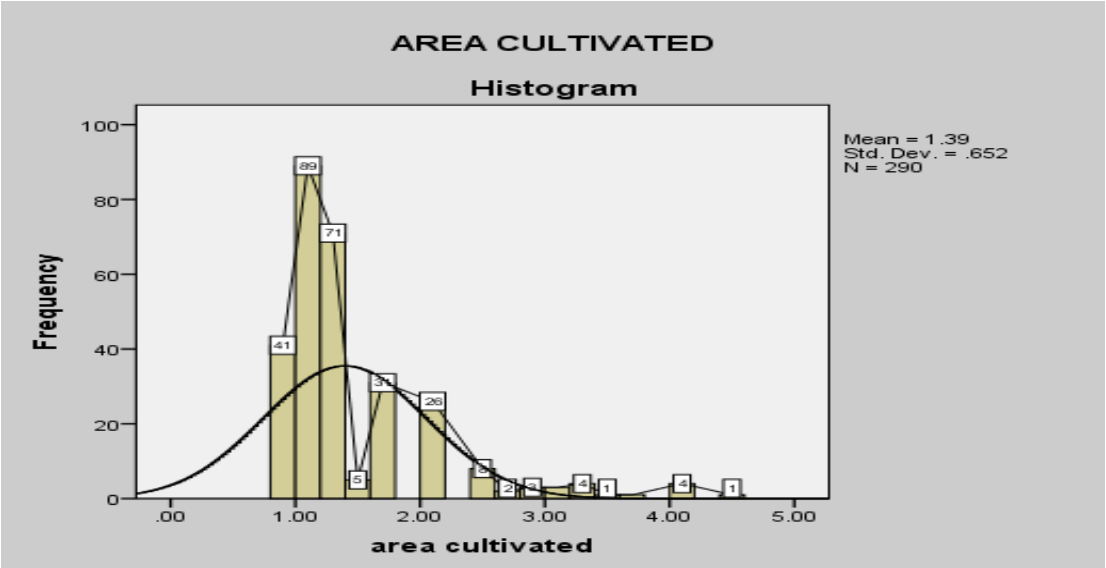
Range	Area cultivated Frequency	Percent
<1	128	44.1
1.01≤3	150	51.7
3>	12	4.1
Total	290	100.0

Source: Research Finding 2022 1=<1 hectare, 2=1.01-3=hectare, 3= 3.> hectare

Table 4.9 shows that, majority by 51.70 per cent of tobacco farmers cultivated area which range above one hectare to 3 hectare in Urambo. While large farmers comprises4.10 per cent of total tobacco farmers observed to cultivate tobacco above

three hectare (3>). Farmers cultivated area below one hectare, that is <1 which occupy total share of 44.10 per cent of cultivated tobacco. This information provides a clear picture that majority by 45.90 per cent of tobacco farmers in Urambo district are subsistence farmers with less than three hectare.

Figure 4. 2: Area Cultivated



Source: Research Finding, (2023).

Graph 4.1 shows the histogram with the normal distributed graph of distributed tobacco cultivated area among farmers. The graph shows the normality of the analysed data for the line graph, implying the data collected are normally distributed and the kurtosis shows the peak of the distributed data.

Table 4.7: Experiences Engaged in Tobacco Production

Years	Frequency	Percent
3.00	5	1.7
4.00	247	85.2
5.00	38	13.1
Total	290	100.0

Source: Research Finding (2022).

From the analyzed descriptive statistics in Urambo district shows higher percentage of smallholder farmer have higher experience in tobacco farming about 85.20 per cent of four years, followed by tobacco farmers with 5 years' experience which is 13.10 per cent and lowest experience are farmers with 3 years' experience which comprises 1.7 per cent. The experience rate from the study results in Table 4.3. Shows most of surveyed smallholder farmer have enough experience in tobacco production of at least 3 years.

4.4.1 Production Costs for Smallholder Tobacco Farmers

The aim of any crop cultivation is to acquire profit. The cost analysis is important since it help in making decision and proper resources planning on tobacco production. In analysing the cost production among the smallholder farmer, computed cost in tobacco production is among the key issues mainly considered by the farmers. The finding in Table 4.4: shows the cost used acquiring gain in the future prosperity of tobacco production, the result findings indicates higher input cost about 1,067,096.06TZs, in year 2020 followed by labor cost about 807,093.09 TZs and processing cost about 382,318. 03TZs.

Table 4.8: Economic Analysis of Tobacco Production in Urambo – Tabora 2020.

Parameters	**Unit**	**Quantity**
Yields	(Kg/ hectare)	1,462.88
Price	Tzs	3,520.00
Total income	Tzs	5,149,337.60
Labor cost	Tzs	807,093.12
Input cost	Tzs	1,067,096.06
Processing cost	Tzs	382,318.03
Total cost	Tzs	2,256,507.22
Profit	(Revenue-cost(Input +labor + processing)	2,892,830.38

Source: Research Findings, (2023).

The higher input cost for tobacco production shows how flexible farmers could be in running away from engagement tobacco production. This assertion is supported by Ian, (2016) on the tobacco reports that the higher the input cost the high possibilities of tobacco farmers opt for alternative production. Also, high production cost increase production efficiency Breakeven Point for attaining output to cover all cost involved in production.

Furthermore, tobacco is among the cash crop suspected for higher labor demand; from the study result of labor rank the second highest cost (807,093.12 Tzs)after inputs cost, while processing cost (382,318.03 Tzs) rank third and last. Due to anticipated gains farmers have been devoted their time even involving child labor in the production as the strategies to minimize labor cost as contended by (Ndomba, 2018). All these show tobacco farmers are committed in the crop production. However tobacco farmers have been experiencing high cost of production unfortunately result shows revenue ought to way cost which is the benefit to farmers. However, revenue is higher than production cost but it reduce the inputs purchasing power hence efficiency of farmers to attain the production efficiency is decline.

4.4.2 Tobacco Production Efficiency in Urambo District

For determination of tobacco production efficiency in Urambo district, Frontier analysis was used to analyse nine variables by adopt Cobb Douglas production function, during analysis 5 variables were omitted by the program due to several reasons but the main reason was to avoid/deals with multicollinearity and autocorrelation issues .The model observed to be significant at 0.06 which means the general model used is significant at 1 per cent level of confidence.

Out of five variables used, it was observed that three variable NPK, processing cost, and confiders land has the negative sign which means it reduce the production of tobacco and two variables Deltamethrin 25 seed bed are positive meaning it increase tobacco production. Deltamethrin 25 seed bed observed to increase tobacco production at highest by 26.32 per cent and followed by Confidor seed bed which increases tobacco production by 18.52, unfortunately, both variables are insignificant. The positive influence of these variables might be due to effective use of inputs which increase efficacy and reduce lower cost and easy accessibility of these inputs by farmers.

Table 4.9: Estimates of Production Efficiency of Tobacco Farmers in Urambo District

Variable /frontier	Coefficient	Std error	Z	P>/z/
Constant	43.46	52.13	0.83	0.404
Npk 101824	-17.89	46.03	-0.39	0.697
Deltamethrin 25 seedbed	26.32	61.98	0.42	0.671
Confidor seed bed	18.52	63.01	0.29	0.769
Mulching grass	(omitted)			
npk101824 land	(omitted)			
Can land	(omitted)			
Deltamethrin 25 land	Omitted			
Confidor land	-27.01	47.75	-0.57	0.572
Yamaotea land	(omitted)			
Processing cost	-0.05	0.15	-0.32	0.746

Source: Research Findings (2022).

Inputs confidor land observed to reduce tobacco production at the highest level by 27.01 per cent compared to other inputs, the negative influence might be attributed by high cost of inputs as well as technical knowledge on the usage. High cost of inputs may make farmers to use inputs not in optimal level as recommended by experts. Followed by NPK 101824 which showed to reduce tobacco production by 17.89 per cent, fertilizer application it has positive and negative outcome depend on

technical knowledge of the user. Mostly negative influence might be caused by application of input during harsh condition like drought which makes the inputs not to be absorbed by plant and turn to be a toxic in plant.

Processing cost observed to reduce the production of tobacco in Urambo district by 0.05 per cent, the effect of processing cost is indirect because processing does not affect direct in the fields but after harvest. The highest cost of tobacco processing reduce the capacity of farmer to invest in production for the next farming season, this will reduce inputs usage, labor hiring and other utilization of improved inputs and technologies. The study done by Fulginiti and Richard (1993) support this study that high processing cost has an indirect negative impact in agriculture production for the coming production season.

Table 4.10: Estimates of Technical Inefficiency of Tobacco Farmers in Urambo District

MU	Coefficient	Std error	Z	P>/z/
Constant	-2.721984	1.863205	-1.46	0.144
Farm size (hectare)	-4.501887	8.107882	-0.56	0.579
Experience (yrs)	-3.722435	5.734491	-0.65	0.516
Other source of income	-0.01995	0.039305	-0.51	0.612

Source: Research Findings (2022).

According to technical efficiency theories explained by Tim Coell and Kumbakhar, negative sign of the source of technical inefficiency (MU) mean to reduce technical inefficiency, or in other way round negative sign it increase technical efficiency because dependent variable of the model is inefficiency (MU). Moreover, positive sign on technical inefficiency model indicate to increase technical inefficiency or reduce technical efficiency because the dependent variable on the TE model is

negative (MU).

All three sources of inefficiency/ efficiency (farm size, experience and other source of income) observed to influence tobacco production positively. Farm sizes observe to increase technical efficiency by 4.05 per cent or reduce technical inefficiency by -4.50. This is possible because on average tobacco farmer in Urambo own 3.47 hectare, reference on Table 4.6.Medium land size make easy for farmers to manage in term of labor and inputs. Experience of tobacco farmers observed to reduce technical inefficiency by 3.7 per cent, this imply that farmers with high experience has the wide chance to tackle problem accounted during production process. The study observed that tobacco farmers in Urambo district have an average experience of 4 years Table 4.6 is concern. Other sources of income in any project are an alternative strategy for mitigation or survival of other business because it acts as the backup strategy. In this study farmer with other source of income observed to reduce technical inefficiency by 0.02 per cent. Other sources of income make tobacco farmers to manage farm by purchase or obtain inputs and technology on time to tackle the problem.

Table 4.11: Descriptive Analysis for T.E

Variable	Mean	Std dev	Min	Max
TE	0.94	0.936	0.668	0.988

Source: Research Findings (2022).

The descriptive analysis of technical efficiency results shows that, all 290 tobacco farmers observed to be above average technical efficiency. The minimum technical efficiency observed to be 0.67 or 67 per cent, this implied that the lowest technical efficiency farmers has the chance to improved tobacco production by 33 per cent by

utilizing same amount of inputs. The highest technical efficiency observed to 0.99 per cent or 99 per cent, this results indicate that farmer with highest technical efficiency has the room to increase tobacco production using same quantity of technologies and inputs by 1 per only. On average tobacco farmers from Urambo district have TE of 0.94 per cent, generally farmers in Urambo district has only 6 per cent room to increase production by using same resource available. Therefore, tobacco farmers in the study area are well technical efficiency by using the resource available in their area. This indicates that, if farmers in Urambo district want to improve tobacco production beyond six per cent they must use different improved inputs and technology.

4.5 Discussion of Findings

Data results shows that most of smallholder tobacco farmer have experience in tobacco production on average of 4years. The experience enables smallholder farmer to solve problems related to tobacco production easily. The experience motivate farmer to adopt new technological and select proper inputs for the improvement of production efficiency.

Land used for tobacco cultivation in Urambo district ranges from 0.1 to 5 acres. This reveals the presence of other competitors crops grown in the area, but also the possibility of optimize tobacco production in the district. The average land size used by Urambo tobacco farmers encourages the environmental protection which has been a challenge to tobacco farmers. This is supported by Mashayeck, (2013) who argued on the land size optimization in acquiring benefit for tobacco production. Although the result reveals the presence of gains, the production of tobacco is

expensive. Initial stages that involve land preparation, buying inputs up to processing stage. This might raise a caution on the profit generation. Ntibioka (2018) analysing the market situation on tobacco came up with the concept of economies of scale, assert that, the more area used in production the more it reduces the cost. Result of this study showed the area which is under tobacco averaging 1 to 3 hectare for majority of farmers, this might be among the reasons of the higher cost of input usage.

The issue of processing cost emerge when analysing cost production in tobacco (table 4.4)but when analysing technical efficient in(Table 4.6) Processing cost observed to reduce cost of production by 0.05per cent, this can be surprised but it's factual that for more engagement of family in tobacco cultivation the processing cost is indirect reduced. The indirect of processing cost for the farmers is 'due' in avoiding the sense of any burden for the next season, which encourages tobacco farmer to participate more on tobacco production.

Thus from the result the issue of higher cost is attributed by the size of land employed for tobacco production. However the descriptive result indicates the mean technical efficiency of farmer in producing tobacco in Urambo tobacco is 94 per cent leaving 6 per cent for improvement, while maximum efficient farmers is 99 per cent.

.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter presents wrapping up and recommendation based on study results as well as suggestion for the areas of further studies.

5.2 Conclusion

The study focused on assessing the determinants of production efficiency of smallholder tobacco growers in Urambo district as the case study. It analysed production costs of smallholder farmers in tobacco production as well as tobacco production efficiency in Urambo district. The study employed cross-section design as the tool for data survey for 290 respondents/tobacco farmers from Urambo district to answer the study objectives, and SPSS was used to analysing the data. The result depicts the presence of normality within the study meaning the data selected are well distributed. The study employed large sample which decrease variance and increase validity and reliability of the study. In analysing data five variables were omitted to avoid multicollinearity.

Researcher observed that farm size and experiences of farmers has higher influence to higher yield. The higher the experience the better farmer acquires knowledge concerning tobacco production. Result findings shows 82.50 per cent of farmers in Urambo had experience on tobacco cultivation. The results showed that tobacco farmers obtain the profit of 2,892,830 TZs per hectare regardless of higher production cost. The higher cost in purchasing inputs poses challenges in decision on either to stick on tobacco production or to opt for other competitors crops.

However the results obtained from regression analysis reveals that experience of farmers on tobacco production, farm size have positive influence in technically efficiency of tobacco production. The descriptive analysis shows the dependent variable are expressed by 99 per cent for maximum efficient and 67 per cent for minimum efficient while provide 1 per cent to 33 per cent chance for minimum technically and maximum technical farmers for improvement. The general observation shows that, lowest technically and highest technically farmers efficient a good standard for the area to be proud in tobacco production.

5.3 Recommendation

Grounding on the general findings of the study, the recommendations ultimately presented focusing on the three objectives of the study. Objectives include assessing farm characteristics of smallholder tobacco, analysing production costs and determining tobacco production efficiency in Urambo district.

5.3.1 Assessment of Smallholder Farm Characteristic

Farm characteristic was found to have influential influence in improving tobacco yield in Urambo district. Other characteristics involve area employed in tobacco cultivation, experience of the farmer in the production, and overall understanding of the production. Moreover, 82.50 per cent of farmers have an experience in tobacco cultivation. Most of land involved in tobacco production about 51.50 per cent is below 3 hectare is smallholder farmer should not be overlooked. The farm characteristic is important for extensional services officers to consider when planning for technologies dissemination.

However the study pointed out a minimum of 2.5 hectare of land and maximum of 11.5hectare of land used for tobacco cultivation in the district. Although the ranges were identified, most of the farmers are statistically using the mean average of 3 hectare. Thus, there is a great need to make a follow up on the farmers' effort for intensify tobacco production and use area in relation to their capacity while taking into account environmental conservation.

5.3.2 Production Costs of Smallholder Tobacco Farmers

Whenever there is production the issue of cost is unavoidable, more than half of the demand for production incurs cost. According to the nature of agricultural business, most of the production costs are covered during production process, for instance preparation cost, that involve land clearing, farm preparation, labor cost and uses of inputs such as seed, fertilizer and pesticides. The findings for this study grouped cost in three categories that is labor cost (hired and family labor), input cost (seed, fertilizer and agro chemical) and processing cost.

The leading group was input cost implying many farmers incurred higher cost in buying inputs than labor and processing cost followed by labor cost then processing cost. This situation bring attention that, there is a need to manage utilization of inputs before and during application. Knowledge for efficiency utilization of fertilizer should be disseminated to farmers as one of the strategies to attain production potential. Fertilizer inputs have showed negative value meaning a unit increase in fertilizer for tobacco production lead to a decrease production by 17 percent. This implies that there is a need to impart knowledge for farmers how to use improved technologies particularly fertilizer application.

Generally, the cost injected during production process if not managed leads to production loss instead of profit for the farmer. A strong positive altitude should be established for tobacco farmers toward output or input oriented, this will help farmer to reduce unnecessary cost while improve productivity.

5.3.3 Determinants of Tobacco Production Efficiency

Though the findings revealed the abortion of five variables in efficiency model, yet the modal was sound viable for the study by realising that minimum efficiency farmers has the chance to improve production by 33% for the selected variable while for maximum likelihood only 1% percent was left for farmers improvement which counted for 99%. Generally on average tobacco farmers from Urambo district have TE of 0.94, which implied 94% remaining with only 6% chance to increase production by using same resource available. This shows how well/efficiency resources are utilized by tobacco farmers. Indicating if farmers want to improve tobacco production beyond 6% they have to use different improved input and technology. Furthermore, the results reported the omitted parameters were to avoiding multi collinearity, this provides the insight that proper utilization of the model has the significant importance for obtaining the sound information.

5.3.4 Recommendation to Policy Makers

i. The findings of the current study show that farms are dominated by small scale farmers operating between 0.9 and 4.5 hectares. These small farms are characterized by low productivity, inefficiency and low growth. Farmers are not enjoying economies of size hence the cost of tobacco production is high.

The higher cost of production reduces tobacco profitability. So plans should be made to train farmers to adopt the use of ox-driven farm implement and tractors in order to improve land tillage, increase farm size and reduce cost of labor thus increasing tobacco profitability. Furthermore, the cost of tractors can be an obstacle to most smallholder farmers. The initiative is needed either grouping farmers for one tractor or whatever the strategy may be suitable.

ii. Farming technology can occasionally change as a result of agricultural research results, environmental changes or market demand changes. To cope with occasional changes a continuing education is recommended. Farmers should be equipped with a body of knowledge (education) through farm field schools and seminars on better farming technologies. The use of modern farming technologies can enable farmers to produce tobacco of high quality. The high tobacco quality has high selling price that can make tobacco production profitable.

iii. In tobacco production farmers should form several groups to serve various purposes like training, loan assistance and credit input self-sponsoring. As tobacco farmer groups are many, tobacco stakeholders should recruit more extension officers to cater for farmers' extension officers' demand. Extension officers are required at different stages of tobacco production for tobacco quality assurance. Having many extension officers can facilitate improved tobacco quality leading to better tobacco profitability.

5.4 Area for Further Studies

While this study dealt with the assessment of determinants for the production efficiency of smallholder tobacco growers in Urambo district in Tanzania;

i. The study should expand on the impacts of tobacco marketing on household income to expand it at the family levels to be more successful.
ii. Future research should consider examining other angles environmental impact of tobacco production, because tobacco production is a significant issue that bears further environmental assessment or investigations.
iii. Additional research should be conducted to examine whether the researcher's results are supported in a larger sample and indifferent localities.

This study' findings presented some emerging gaps, which can establish a foundation for further researches in tobacco production in Urambo district. For the cost analysis, the result revealed the revenue obtained from total yield of tobacco production is greater than the cost which prevailing from tobacco cultivation. Thus the study suggest for more investigation on the enterprises budget and partial budget in order to realize the potential cost that vary by using different technologies in Urambo district. Farm enterprise will bring out the perception of farmers on the importance of tobacco and the importance of intensify tobacco production.

REFERENCES

African Union, (2012). The Impact of Tobacco Use on Health and Socio-Economic Development in Africa. A Status Report. African Union, Union Africare & Uniao Africana.

Ainembabazi, H. & Mugisha, J. (2014). The role of farming experience on the adoption of Agricultural Technologies: Evidence from smallholder Farmers in Uganda. *Journal of development study,* 50, 666-679.

Chapanda. J. P. (2016). Assessing the Impact of Tobacco Farming in Poverty Alleviation: The Case of Small Holder Centenary Farmers, Report work, AFRIBARY.

Fulginiti, L. E. & Richard K. P. (1993). Prices and Productivity in Agriculture. *The Review of Economics and Statistics,* 75(3), 471–82.

ILO & GoT, (2016). Rapid Assessment on Child Labor in Tobacco Growing Communities in Tabora Region, Tanzania. Fundamental Principles and Rights at Work (Fundamentals). International Labour Organization (ILO).

Kothari, C. R. (2004). *Research Methodology: Methods and Techniques,* 2nd Rev. Ed., 7-10, 31-40, 152-155. New Delhi: New Age International (P) Ltd.

Kuboja, N. M., Kazyoba, S., Lwezaura, D. & Namwata, B. M. L. (2012). Adoption and impact of tobacco recommended varieties among smallholder farmers in Tabora Region. *Journal of Agricultural Science and Technology,* 2, 553-562.

Mayuya, S. (2013). Impact of tobacco production on poverty reduction at household level: a case of Urambo district in Tabora, Tanzania. *SEGi Review,* 6, 42-59.

Mendola, M. (2007). Farm household production theories: A review of "institutional" and "behavioural" responses. *Asian Development Review,*

24(1), 49-68.

MoFP, (2017). Economic Survey Report for 2017.

Montgomery, C. D., Peck, A. E. & Vining, G. G. (2017). *Introduction to liner Regression Analysis, 3rd* Ed., Hoboken: John Wiley & Sons.

Ndomba. H. H. (2018). A history of peasant tobacco production in Ruvuma region, southern Tanzania. An empirical scunuity. PhD Dissertation, Stellenbosch; University Stellnibosch, Stellenbosch, South Africa.

Ntibiyoboka, J. (2014). Economics of Smallholder Tobacco Production and Marketing in Mpanda District, unpublished master dissertation, Sokoine University, Morogoro, Tanzania.

Omari I. M. (2011). *Concepts and methods in educational Research: Practical guide based on Experience.* Oxford: Oxford University Press.

Omari I. M. (2011).Motivational Theories in Education.Journal of issues and practice in education. Unpublished master dissertation, The Open University of Tanzania, Dar es Salaam, Tanzania.

Pettinger, T. (2017). Definition of Absolute and Relative Poverty. Retrieved on 13th June, 2022 from; https://www.economicshelp.org/blog/glossary/definition-of-absolute-and-relative-poverty/.

Singh, A., Vasishtb, A. K., Kumara, R. & Dasc, D. K. (2008). Adoption of integrated pest management practices in paddy and cotton: A case study in Haryana and Punjab. *Agricultural Economics Research Review,* 21, 221-226.

The Earth Institute at Columbia University Tabora, (2011). The Millennium Cities Initiative (MCI), Tanzania Potential Opportunities for Investors.

URT, (2012). Basic Demographic and Socio-Economic Profile, Population and

Housing Census, National Bureau of Statistics, URT.

Wabbi J. B. (2002). Assessing factors affecting adoption of agricultural technologies: The case of integrated pest management (IPM) in Kumi District, Eastern Uganda. Unpublished Master Thesis, Polytechnic Institute and State University Blacksburg, Virginia.

Watts, H. (1968). *An Economic Definition of Poverty. In: Moynihan, D.P., Ed., On Understanding Poverty*, 316-329, New York: Basic Books.

Xinhua, M. (2019). Tanzania Sees Declining Tobacco Production. *www.news.cn.*

APPENDICES

APPENDIX 1: QUESTIONNAIRE

I am Nyachiro Alfred, pursuing Master of Science in Economic of the Open University of Tanzania. As part of fulfilment of academic requirement, I conduct a study on "Determinants of Tobacco Production Efficiency among Smallholders in Urambo District, Tanzania". Please answer the below questions in order to facilitate the success of the study. The information will be kept confidential and will be used for the purpose of this study only.

Questionnaire No .....

GENERAL INFORMATION

1. Respondent's name..... Respondent's Sex……
2. Date of interview…….
3. Division……..Village……

HOUSEHOLD IDENTIFICATION VARIABLES

4. Household head name……..
5. Marital status of the head of household ……..
   1= Married, 2= Single, 3=Divorced, 4 =Widowed.
6. Age of household head? ……
7. Sex of the household head …….
8. Total members of your household? …….
9. How many members are under 18 yrs ……
10. How many member are above 60 yrs
11. What is your highest level of education attained? (√)
    0) Illiterate
    1) Primary education
    2) Secondary education
    3) Tertiary collage
    4) University
    5) Adult education
    6) Others (specify)…….
12. What are the economic activities carried out by the household head
    1…….

2…….

3……

13. What is the main occupation of the household head……..

CULTIVATION INFORMATION

14. Is extension officer accessible? 1. Yes 2) No ( )
15. Did you get any subsidy for tobacco production 1. Yes 2. No ( )
16. How many total acres of land do you own? ……
17. How many hectares of land used for tobacco production in 2019 and 2020 season? .....
18. For how long have you been growing tobacco? ……
19. What are your main sources of labor in tobacco production?
    1) Family labor
    2) Hired labor ( )
    3) Both (family and hired labor)

20. Did you apply any inputs in growing Tobacco in 2019 and 2020 season?
    1) Yes 2.No ( )

21. If yes what was the price of Input (fertilizer and chemicals) in 2019 and 2020 season?

Input	2019		2020	
	Quantity	Price	Quantity	Price
NPK				
CAN				
Yamaotea				
Confidor				
Pesticide				
Land				

22. Cost of labor used for tobacco production 2019 and 2020?

Activity	**Cost-2019**	**Cost-2020**
Land preparation		
Planting		
Weeding		
Pesticide		
Fertilization		
Harvesting		
Marketing		
Processing		

23. Is there any cost of the different items/equipment incurred in tobacco operations 2019 and 2020

Item Name	Land	Barn	PPE	Barn Thermometer	Bailing Box	Water can	Hoe
Cost-2019							
Cost-2020							

24. How much tobacco yield/ harvest did you obtained (kg)……

25. How much quantities of tobacco (Kg) did you sold last season…….

26. What was the price of tobacco per one Kg ……..

27. How much TZs did you obtained last season…….

28. Is there any other source of income apart from tobacco? 1. Yes ……2, No…… ( )

29. If yes, specify the source (s) and amount earned in 2019 and 2020 season

Name of other source of income	Amount Year 2019	Amount year 2020

Appendix 2: Research Clearance Letters

THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

THE OPEN UNIVERSITY OF TANZANIA

Ref. No OUT/ PG2017996862 **7th November, 2022**

Regional Administrative Secretary,
Tabora Region,
P.O Box 25,
TABORA.

Dear Regional Administrative Secretary,

RE: RESEARCH CLEARANCE FOR MR NYACHIRO ALFRED, REG NO: PG2017996862

2. The Open University of Tanzania was established by an Act of Parliament No. 17 of 1992, which became operational on the 1st March 1993 by public notice No.55 in the official Gazette. The Act was however replaced by the Open University of Tanzania Charter of 2005, which became operational on 1st January 2007.In line with the Charter, the Open University of Tanzania mission is to generate and apply knowledge through research.

3. To facilitate and to simplify research process therefore, the act empowers the Vice Chancellor of the Open University of Tanzania to issue research clearance, on behalf of the Government of Tanzania and Tanzania Commission for Science and Technology, to both its staff and students who are doing research in Tanzania. With this brief background, the purpose of this letter is to introduce to you **Mr. Nyachiro Alfred, Reg. No: PG2017996862)** pursuing **Master of Science in Economics (MSC ECONOMICS)**. We here by grant this clearance to conduct a research titled **"Determinants of Tobacco Production Efficiency among Smallholders in Urambo District in Tanzania"**. He will collect his data at Milambo Cooperative Union in Tabora Region from 8th November to 8th December 2022.

4. In case you need any further information, kindly do not hesitate to contact the Deputy Vice Chancellor (Academic) of the Open University of Tanzania, P.O.Box 23409, Dar es Salaam. Tel: 022-2-2668820.We lastly thank you in advance for your assumed cooperation and facilitation of this research academic activity.

Yours sincerely,
THE OPEN UNIVERSITY OF TANZANIA
Prof. Magreth S.Bushesha
For: VICE CHANCELLOR

The Open University of Tanzania,
Tabora Regional Centre,
The Old CWT Building,
Bachu Street,
P.O.BOX 1204,
Tel. No. 026-260-5519
Mob: 0689 056776
TABORA, TANZANIA.

Chuo Kikuu Huria cha Tanzania,
Kituo cha Mkoa Tabora,
Jengo la zamani la CWT,
Mtaa wa Bachu,
S.L.P 1204,
SIM No. 026-260-5519
Mob: 0689 056776
TABORA, TANZANIA

16TH NOVEMBER, 2022

Regional Administrative Secretary

Tabora region,

P.o.box 25,

Tabora

Dear sir/Madam,

INTRODUCING NYACHIRO ALFRED-REG NO PG201799862

Refer to the heading above

I am writing to introduce Miss **Nyachiro Alfred-Reg no PG201799862** who is our student pursuing Master of Science in Economics at the Open University of Tanzania-Tabora Regional Centre.

I confirm that the letter dated 07 November, 2022 from Research clearance unit named "MR NYACHIRO ALFRED" had a typing error.

Please accord her all the necessary assistance.

Yours Sincerely

OPEN UNIVERSITY OF TANZANIA P.O BOX 1204, TABORA TANZANIA DATE 16/11/2022 REGIONAL CENTRE - TABORA

Caroline N. Mugolozi

For DRC –Tabora Regional Centre

MILAMBO CO - OPERATIVE UNION LIMITED

MILAMBO CU(2018) LTD - REG. NO. 5604

Telegraph: 'MILAMBO'
Tel:
Mob: 0625669093
Fax:

E-Mail: *milambocultd@gmail.com*

Bomani Road,
P.O. Box 186,

URAMBO.

Unapojibu tafadhali taja:
Kumb. Na. DB.274/327/01/34

30 NOVEMBA, 2022

BI:NYACHILO ALFRED

YAH: UTAMBULISHO KWA VYAMA VYA TUMBAKU JUU YA UTAFITI WA ZAO LA TUMBAKU

Rejea kichwa cha barua hapo juu,

Ofisi ya Milambo Union inapenda kukutambulisha vyamani juu ya ombi la kufanya utafiti ya zao la tumbaku kupitia barua yako yenye kumb Na. DA.116/247/01/255 Kutoka kwa Katibu Tawala Mkoa wa Tabora Kuhusu mada hapo juu,

Hivyo kwa barua hii nakutambulisha Ndg. NYACHIRO ALFRED mwana Chuo wa Chuo Kikuu Huria kufanya utafiti juu ya Uzalishaji wa zao la Tumbaku wilayani Urambo Na Kaliua, kibali hiki kimetolewa kufanya utafiti huo kuanzia tarehe 08/11/2022 hadi tarehe 08/12/2022.

Tafadhali viongozi na watendaji wa amcos zote tunaomba mumpatie ushirikiano wakutosha.

"Pamoja na Salamu za Ushirika"

Leakey Maganga Madale
MENEJA MKUU

MILAMBO CO - OPERATIVE UNION LIMITED
MILAMBO CU LTD
REG. NO. 5604
P. O. BOX 186
URAMBO.

JAMHURI YA MUUNGANO WA TANZANIA
Ofisi ya Rais
Tawala za Mikoa na Serikali za Mitaa

Telegrams: MKUU WA WILAYA

Telephone: 0732-988332

Fax; 0732-988484
Email: dc.urambo@tabora.go.tz

Ofisi ya Mkuu wa Wilaya,
S. L. P. 83,
URAMBO.

KUMB. NA. AB.173/211/01'A'/11

Tarehe: 29/11/2022

Kwa yeyote anayehusika
URAMBO.

YAH: KUFANYA UTAFITI

Tafadhali husika na mada tajwa hapo juu,

02. Ofisi ya Mkuu wa Wilaya ya Urambo imepokea barua yenye ***Kumb Na. DA.116/247/01/255*** ya tarehe 17/11/2022 kutoka kwa Katibu Tawala wa Mkoa wa Tabora kuhusu mada hapo juu.

03. Kwa barua hii namtambulisha ***Ndg. Nyachiro Alfred*** Mwanachuo wa Chuo Kikuu Huria kufanya utafiti juu ya uzalishaji wa zao la Tumbaku Wilayani Urambo. Kibali kimetolewa kufanya utafiti huo kuanzia tarehe 08/11/2022 hadi 08/12/2022 Wilayani Urambo.

Tafadhali apewe ushirikiano.

Byemelwa Paschal Bernard.
Katibu Tawala Wilaya
URAMBO.

KATIBU TAWALA WA WILAYA
URAMBO.

Nakala: Ndg. Nyachiro Alfred
Urambo.

JAMHURI YA MUUNGANO WA TANZANIA

OFISI YA RAIS
TAWALA ZA MIKOA NA SERIKALI ZA MITAA

Telegrams: MKUUMKOA
Telephone: (026)
2604058/2604116
Fax: (026) 260 4274
email:ras.tabora@tamisemi.go.tz
TafadhaliUnapojibutaja:

Ofisi ya Mkuu wa Mkoa,
2Barabara ya Kiwanja cha Ndege,
S.L.P. 25,
45180 TABORA.

Kumb. Na. DA. 116/247/01/255 **17 Novemba, 2022**

Katibu Tawala Wilaya,
S. L. P 83,
URAMBO.

Yah: KIBALI CHA KUFANYA UTAFITI

Ofisi ya Mkuu wa Mkoa imepokea barua yenye Kumb. Na.OUT/PG2017996862 ya tarehe 7/11/2022 kutoka Chuo Kikuu Huria cha Tanzania.

2. Chuo Kikuu Huria cha Tanzania kinamuombea kibali **Ndugu Nyachiro Alfred** mwenye namba za usajili PG.2017996862 kwa ajili ya kufanya utafiti kuhusu **Determinants of Tobacco Production Efficiency among smallholders in Urambo District in Tanzania** kuanzia tarehe 08/11/2022 hadi tarehe 8/12/2022.

3. Kwa barua hii, kibali kimetolewa kwa mwanafunzi tajwa kwa ajili ya kufanya utafiti katika Wilaya yako, hivyo mpokee na kumpa ushirikiano.

4. Ahsante kwa ushirikiano.

Mwi. Kaponda J. J.
Kny: KATIBU TAWALA MKOA
TABORA

KATIBU TAWALA MKOA
TABORA

Nakala: Ndugu Nyachiro Alfred,
DAR ES SALAAM.