ECONOMICS OF SMALLHOLDER TOBACCO PRODUCTION AND MARKETING IN MPANDA DISTRICT

JALIWA NTIBIYOBOKA

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ABSTRACT

Tanzanian tobacco has significant contribution to GDP, employment, and industrial raw materials. This study was stimulated by the decrease in tobacco income in Mpanda District from 2010-2012. The decrease in income from tobacco production has made it plausible to conduct a study on tobacco profitability as low profit could increase poverty among smallholder tobacco farmers in the study area. The overall objective of this study is to analyse the economics of smallholder tobacco production and marketing in Mpanda District. Specifically the present study aims at (i) determining the profitability of tobacco production in Mpanda District. (ii) determining the influence of socio-economic factors, particularly farm size on tobacco profitability to farmers in Mpanda District and (iii) determining the contribution of tobacco production to the household cash income. A Gross Margin was used to estimate profitability of tobacco farming. A multiple linear regression model was employed to determine the effect of changing farm size on profitability. Furthermore, descriptive statistics were employed to determine cash contributed by tobacco in relation to other crops. Results show that tobacco has the second largest contribution after paddy. Results show that the GM for tobacco is Tshs 1 111 734/ha while paddy gross margin is Tshs 1 277 060/ha. Furthermore, the results show that maize, beans, and groundnuts Gross Margins were: Tshs 456 527/ha, Tshs 480 957/ha, and Tshs 441 200/ha respectively. Moreover, the results show that tobacco profitability is significantly influenced by farm size, farmers' education level, and extension services. The study concludes that tobacco farmers can increase profit by cultivating moderate farm size and perform farm intensification. The current study recommends increase in farm size, recruitment of more extension officers; adopting modern farming technology that minimizes tobacco labour intensity so as to increase profitability of tobacco farming and hence increase its contribution to household income.

DECLARATION

I, Jaliwa Ntibiyoboka do hereby declare to the Senate of Sokoine University of Agriculture that this dissertation is my original work done within the period of registration and that it has neither been submitted nor being concurrently submitted in any other institution.

…… …….

Jaliwa Ntibiyoboka Date

(MSc. Candidate)

The above declaration is confirmed by

…… …….

Dr. Damas Philip Date

(Supervisor)

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DEDICATION

This dissertation is dedicated to my late beloved parents Ntibiyoboka Kilatungwa and Teresha Ntibiyoboka, who laid the foundation of my education.

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LIST OF ABBREVIATIONS AND ACRONYMS

ANOVA	Analysis of Variance
APTL	Active Premium Tanzania Limited
ASDP	Agriculture Sector Development Plan
ATTT	Association of Tanzania Tobacco Traders
BOT	Bank of Tanzania
CAN	Calcium Ammonium Nitrate
CRDB	CRDB Bank Limited.
DALDO	District Agriculture and Livestock Development Officer
DCO	District Cooperative Officer
DFC	Dark Fire Cured Tobacco
DIO	District Immigration Officer
EARC	East Africa Research Consortium
FAO	Food and Agriculture Organization
FCTC	Framework Convention on Tobacco Control
GAP	Good Agriculture Practice
GDP	Gross Domestic Product
GMA	Gross Margin Analysis
LATCU	Lake Tanganyika Cooperative Union
LRAC	Long Run Average Cost
MAFS	Ministry of Agriculture Food Security and Cooperative Societies
NBS	National Bureau of Statistic
NPK	Nitrogen, Phosphorus and Potassium
NTRM	None Tobacco Related Materials

PCS	Primary Cooperative Society
RFSP	Rural Finance Strategic Plan
ROI	Return on investment
SACCOS	Savings and Credit Cooperative Societies
SADC	South Africa Development Community
SPSS	Statistical Package for Social Sciences
TFC	Tanzania Fertilizer Company
TLTC	Tanzania Leaf Tobacco Company
TR	Total Revenue
TRA	Tanzania Revenue Authority
Tshs	Tanzanian shillings
TTB	Tanzania Tobacco Board
TTC	Tanzania Tobacco Council
TTCIA	Tanzania Chamber of Commerce, Industry and Agriculture
TVC	Total Variable Cost
URT	United Republic of Tanzania
USDA	United States Department of Agriculture
WHO	World Health Organization
WTO	World Trade Organization

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information

Tobacco has been cultivated in Tanzania for a long time by thousands of smallholders and few private enterprises (Kafanabo, 2008). A study by Eskola, (2005) shows that tobacco is a high value product that give high income to farmers as well as generates substantial employment opportunities to the community. Tobacco also provides large exercise tax revenue to the government. The tobacco farmers in the study area not only cultivate tobacco, but also food crops (multi-commodity farmers) such as maize, beans, groundnuts and paddy.

A study conducted by FAO (2003) on projections of tobacco production, consumption and trade to year 2010 indicates an increase in tobacco demand. The world demand for tobacco in the baseline scenario was expected to increase to 7.1 million tonnes in dry weight, reflecting two divergent trends. In developed countries overall demand was expected to decline slightly. The world image of tobacco demand in the future was determined mainly by the developing countries. The main factors that determined the growth in consumption were population and income growth, urbanization and changing tastes. Among them, population growth was perhaps the most important determinant of growth in tobacco consumption (FAO, 2003).

From early times man has developed various types of tobacco for various uses. There are about hundred valid species of tobacco but among these only two species viz; *Nicotiana tabacum* and *Nicotiana rustica* are cultivated extensively. *Nicotiana rustica* requires

cooler climate. According to Ngugi *et al*. (1996), the two *Nicotiana tabacum* and *Nicotiana rustica* are of economic importance. Furthermore, there are three types of tobacco currently grown in Tanzania; Virginia Flue Cured tobacco (VFC): this is a type of tobacco that is cured by flue (water steam) and is grown in Tabora, Shinyanga, Singida, Katavi, Mbeya, Iringa and Kigoma administrative regions. Dark Fire Cured tobacco (DFC): this type of tobacco is cured by smoke, is mainly grown in Ruvuma, the last type of tobacco is Air Cured tobacco (Burley): this is cured by air and is being grown on trial basis in Ruvuma, Kagera and Morogoro regions. Tobacco production is mainly undertaken by smallholder growers. Some tobacco products exist in traditional forms, such as pipes, hand-rolled leaves, and forms of chewing tobacco. Others are more recent inventions, such as manufactured cigarettes, e-cigarettes and dissolvable tobacco (Kaloko, 2013).

Currently tobacco production has various challenges. These challenges alter costs and revenues in the input/output markets and prevent realization of potential profit by tobacco growers (Rweyemamu and Kimaro, 2006). The challenges associated with production identified by farmers in the study area include drought, untimely as well as inadequate supply of inputs. This is attributed by the existence of only one inputs supplier and distributor *i.e* Lake Tanganyika Co-operative Union (LATCU).

Marketing challenges: Like other export crops in Tanzania, the marketing of tobacco experienced several organizational changes before and after independence. These included: native or farmers cooperatives before (1961), village based marketing (1961-1975), crop authorities (1976-1983), government controlled cooperatives (1984-early 1990s) and liberalized market (Early 1990s to today). Market liberalization aimed at providing competition and promoting efficiency in tobacco industry (Sanga, 2008).

However, tobacco marketing has constituted several challenges on farmers. The marketing challenges were like, low producers' price, contradicting grading systems and imperfect competition (Rweyemamu and Kimaro, 2006). Furthermore, tobacco market challenges include frequent changes of regulations example changing taxation and customer rules, demoralization of tobacco products by WHO Framework Conversion for Tobacco Control (FTCT) and enviromental conservation regulations and anti tobacco campains (Daoud, 2006; Hadi *et al*., 2008).

In addition there has been a dialogue during a Tanzania parliament sessions on whether tobacco production should or should not stop (Kakoso (MP) Mpanda, personal communication 2012). Furthermore, the increased communities awareness on the importance of health life, has been threatening the world tobacco economy including production, trade and consumption (Keyser, 2002).

However, in spite of the challenges facing tobacco production and marketing, farmers continue producing tobacco every year. Many respondents said they choose to produce tobacco because it is a cash crop that has a reliable market and can be grown in a wide range of soils and climatic conditions (Kagiso, 2009). In some countries, tobacco is the only crop that thrives on lower fertility lands (Rweyemamu, 2001). Of recent, tobacco in Tanzania has become one of the major agricultural export crops and is the first largest foreign exchange earner after cashew nuts and coffee (BoT, 2012). Tobacco is the main source of income to 92 178 smallholders and offers employment opportunities in tobacco farms, input distribution, extension services and marketing activities, processing factories and in cigarette manufacturing and distribution (Rweyemamu and Kimaro, 2006). Knowing the importance of producing tobacco to the smallholder farmers and Tanzania

economy can enable the government devise measures to improve tobacco production in the country for the benefit of the farmers and the nation at large.

1.2 Problem Statement and Justification

Tobacco is a major source of cash income in tobacco producing areas of Tanzania including Mpanda District. However, recent studies have shown that from 2009 - 2012 the income from tobacco production was declining (TTB, 2012). This declining trend necessitated the study on tobacco profitability as farming with low profits could create poverty among smallholders' tobacco farmers. Profit incentives can lead to higher product quality and cost efficiency. A study by Rweyemamu and Kimaro (2006) stipulates that tobacco producers' cash income are affected by altered prices that lead to low tobacco profitability.

A study by Machunda (2007) in Tabora on impact of loans to cooperative society members shows an existence of low tobacco profitability. A study by Mathania (2007) on paprika and tobacco stipulates that paprika is more profitable than tobacco. From the aforementioned studies no absolute solution has been given on the low tobacco profitability problem. Therefore, more studies on tobacco profitability at farmers' level, such as in Mpanda District are indispensable.

On the other hand a study by Kibwage *et al.* (2009) on assessment of livelihood assets and strategies among tobacco and non tobacco growing households in South Nyanza region, Kenya reports that for decades, the tobacco industry has encouraged countries and families to grow tobacco claiming that it would bring them prosperity though for many households, the reality has been very different. Furthermore, a study by Otanez (2008) on social

disruption caused by tobacco growing in Malawi argues that tobacco farming costs increase poverty and economic under-development of individual farmers as well as families, communities and countries. In view of this background, this study is conducted to fill the identified knowledge gap in tobacco production and marketing. The knowlege gap is filled by considering the fact that better cash income to producers create motivation to produce more through reinvestment and hence reduction in poverty level. The study on tobacco profitability is an important economic problem because farmers are said to be rational (Debertin, 2012). Farmers will continue to produce a commodity when it is profitable.

The knowledge of tobacco production and marketing can 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 labour and land economically. The results of the current study are expected to provide an important contribution in the policy formulation process. Policy makers can use the research results to identify factors that can improve tobacco profitabilityand make a strategy to improve farmers who are the chief source of Tanzania economic development.

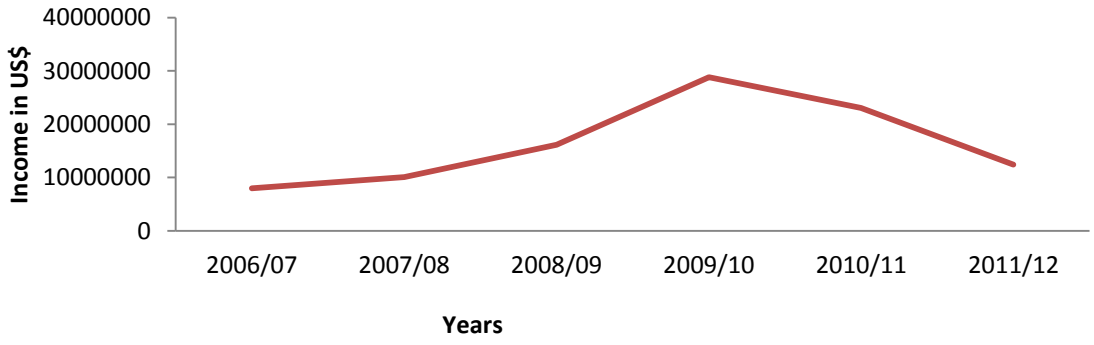

Figure 1: Trend of income from tobacco production of Mpanda District 2007-2012

Source: Tanzania Tobacco Board (2012)

1.3 Study Objectives

1.3.1 Overall objective

The overall objective of this study is to analyze the economics of smallholder tobacco production and marketing in Mpanda District in Tanzania.

1.3.2 Specific objectives

i. To determine the profitability of tobacco production in Mpanda District;
ii. To determine the influence of socio-economic factors, particularly farm size on tobacco profitability in Mpanda District; and
iii. To determine the contribution of tobacco production to the household cash income in Mpanda District.

1.4 Hypothesis

H_O: Socio-ecconomic factors e.g farm size have no significant influence on tobacco profitability.

1.5 Research Questions

(1) Is tobacco production in Tanzania economically profitable?
(2) What was the cash contribution of tobacco, maize, beans, groundnuts and paddy to the household cash income in 2012?

1.6 The Conceptual Framework of the Study

The conceptual or analytical framework on smallholder tobacco growers and the way in which farmers make every effort to maximize profit, is essential as a rule in identifying important variables and for effective and efficient data collection. This section presents a

brief sketch of the conceptual framework used for information generation through primary and secondary data collection (Fig. 2).

The conceptual framework of the present study has the foundation from two economic theories; The duality theory by Hotelling's Lemma and the innovation theory of profits by Young. The duality theory deals with profit optimization basing on two perspectives; the optimal problem or dual problem (Debertin, 2012; Blume (year not stated). The lemma states that the change in the indirect profit function arising from the output expansion path with respect to the *k*th product price is equal to the optimal quantity of the *k*th output that is produced. Factor demand functions emerging from dual approaches can be either output constrained, cost constrained, or ordinary (unconstrained profit max) responses to factor price variations Blume (year not stated). Duality theory requires that production cost, profit, and production functions possess certain characteristics. For example, cost functions must be increasing, linearly homogeneous, and concave in input prices. Also the estimated parameters of the cost function must satisfy required symmetry conditions Blume (year not stated).

According to innovation theory, Mystelka and Smith (2001) holds that, the residual difference between price and costs is increased (hence profit increases) due to the reductions in costs. The reduction in costs is due to innovations such as introduction of new goods, differentiated goods, discovery of new source of raw materials, development of new markets and use of new organizational forms. According to this theory innovations result in a reduction in the prices of the factors of production, thus the costs of production decreases resulting in an increase in the difference between the price and the costs of producion, The point here is, innovation influences product's price. When the price of

produce becomes higher than the production cost then the profit is realized. For the smallholder farmer to do innovation the source of raw materials such fertilizer, chemicals and other implements should be purchased at affordable price. Also there should be well developed markets for selling differentiated agricultural products.

As stated in section 1.3, the general objective of the current study is to analyze the economics of smallholder tobacco production and marketing in Mpanda District in Tanzania. The specific objectives are: to determine the profitability of tobacco production in Mpanda District; to determine the influence of socio-economic factors particularly farm size on tobacco profitability to smallholder farmers in Mpanda District and to determine the contribution of tobacco production to the household cash income in relation to other crops. The ultimate aim is to show precisely potential opportunities to economic growth and make recommendations on the best ways to improve the performance of tobacco smallholder farmers in Mpanda District and elsewhere in Tanzania.

To meet the information needs of the general and specific objectives and identify the variables for data collection, a conceptual framework for choosing variables and respondents in tobacco was developed. In the conceptual framework, factors that influence tobacco profitability are situated at the top. As tobacco is an international cash crop, factors that influence its profitability are both domestic and international factors (Rweyemamu, 2001). According to the present study domestic factors could be; farm size, farmer's education level, total land cultivated, non farm income, extension services and household labour cost. These factors in special combination can influence the production of a great quantity of tobacco. On the other hand, external/international factor is mainly

based on tax policy. This affects manufacturer's price thus producer price. As tobacco revenue is a product of quantity and price of tobacco produced other things remaining constant, if the manufacturer is affected negatively a producer price is also affected in the same way. Price has the greater role to farmer's revenue since it affects both input and output. The influence of price has been observed in other studies. As the total revenue is the product of quantity of commodity and price, low tobacco yield and price can imply low total revenue to the tobacco smallholder farmers.

In the conceptual framework of the current study, the Production costs are situated immediately after total revenue. Costs are closely related with revenue in the sense that, costs should be incurred in order to realize revenue. Also to determine whether the business is profitable or not, revenue is compared with costs. When revenue is more than cost the business is profitable, the opposites true. The present study identifies costs of production such as; fertilizer and chemicals costs, labour costs and other implements costs. Furthermore, the gross profit is at the bottom of the conceptual framework as it is obtained in the last stage during profit computation. The gross profit is obtained by subtracting total variable costs from total revenue. Tobacco smallholder farmers can realize profit when total revenue is more than total variable cost.

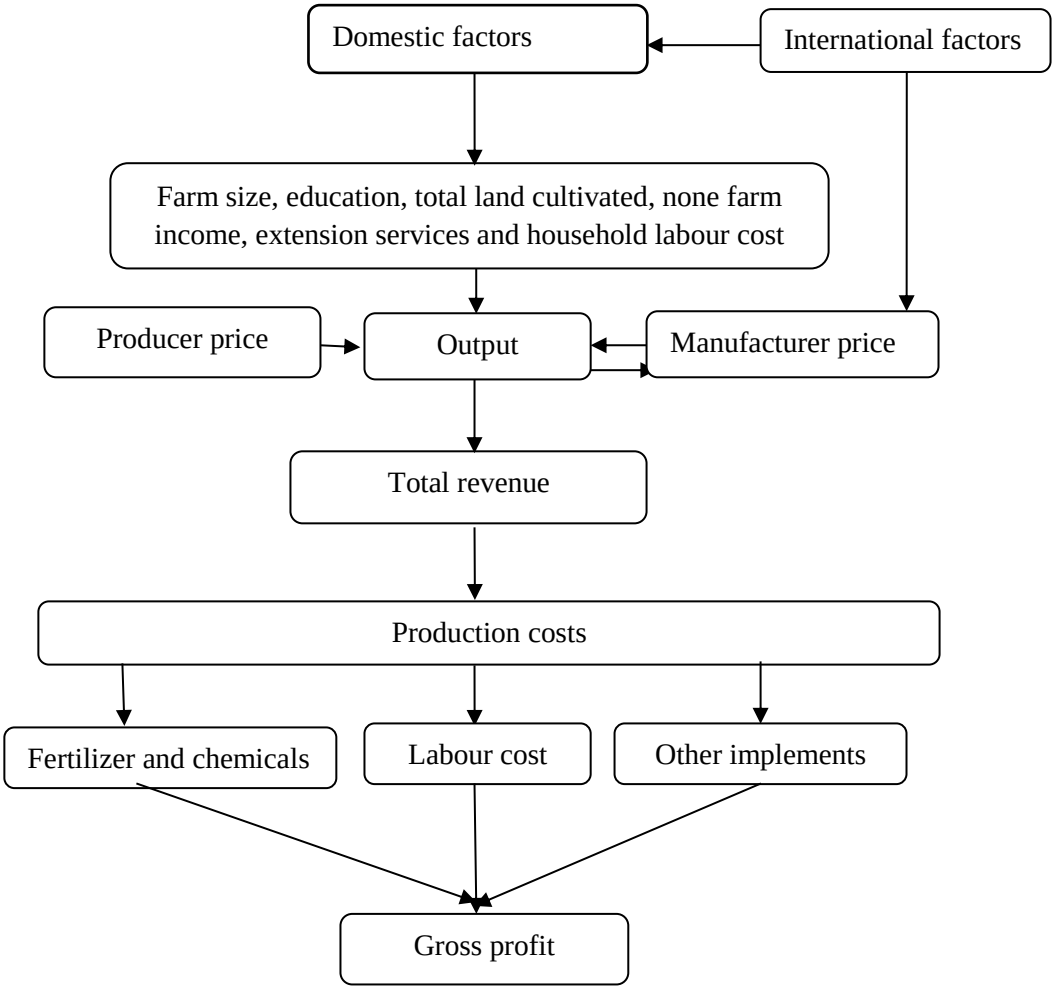

Figure 2: Conceptual framework of factors influencing tobacco profitability
Source: Modified from Reddy, (2006)

1.7 Factors Influencing Tobacco Profitability

For the cash crops like tobacco, profits are squeezed by commodity price which is global while production cost is local. Falling prices received for outputs and rising costs of inputs reduces tobacco smallholders' profit. The two opposite direction arrows in the conceptual framework implies two circumstances *i.e* when price is favourable and when is unfavourable. For the multi-commodity farm, farm profits still vary widely by farm type, size, location, and commodity produced. The multi- commodity farm is recommended as it

reduces risk. Risk can be mitigated through planting different plant varieties with different resistance capabilities to environmental changes.

Furthermore, agricultural profits are affected by several factors that are beyond farmers' control. Some of these factors include; markets, production, political economy and envronmental factors. These factors includes; trade barriers (complicated standards), natural calamities (hailstones, floods and drought), some organizations campains against tobacco production and use (WHO, WB, IMF) and enviromentalists. As some tobacco companies accepts contract farming in order to mitigate or avoid loss.

1.8 Organization of the Study

The dissertation is organized into five chapters including this introduction. Chapter Two presents a review of literature and an overview of tobacco industry in Tanzania in general, and in the study area in particular. Chapter Three presents and discusses the methodology employed in the study. Empirical results are presented and discussed in Chapter Four. The conclusion and recommendations are presented in Chapter Five.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 The Importance of Tobacco Production in Tanzania

Tobacco production in the country serves as source of cash income and employment. Selling agricultural products is the main source of cash income for most rural smallholders 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).

Table 1: Tanzania export earnings of major cash crops to its economy

Commodity	Unit	2006	2007	2008	2009[r]	2010[r]	2011[r]	2012[p]
Coffee	Mill.US $	23.2	41.0	35.5	34.9	24.6	62.5	61.1
Cotton	Mill.US $	20.7	5.4	14.2	18.2	18.9	4.4	16.2
Tea	Mill.US $	8.4	9.2	12.5	13.6	16.1	12.7	15.6
Tobacco	Mill.US $	10.3	22.5	74.1	38.6	77.0	127.8	99.0
C'nut	Mill.US $	18.7	8.3	43.3	47.5	25.8	60.4	34.7
Cloves	Mill.US $	2.4	3.8	3.4	4.3	0.6	0.4	24.5

Notes: p=provisional, r=reviewed

Source: BoT, (2012)

The 2011/12 data show that the earnings from tradition export were US$268mil. while non-traditional export were US$ 858mil. Tobacco alone contributed US$ 127.8mil. which accounted for 11.34% of total export earning for the country (BoT, 2012). Tobacco was the main source of income to some 72 000 smallholder farmers who were striving to get out of poverty Rweyemamu and Kimaro, (2006). Currently, it offers employment opportunities in both tobacco farms and in two tobacco processing factories in Morogoro. As of 2008, in Tanzania the tobacco industry employment record stood at about 92 178

growers, 550 in input distribution, extension services and marketing activities, 7 291 people in tobacco processing and 2 000 in cigarette manufacturing and distribution (TTC, 2006).

2.2 Economies of Size in Agriculture

The term economies of size is used to describe a situation in which as the farm expands output, the cost per unit decreases (Debertin, 2012). Some of the factors for economies of size includes: the farm ability to spread its fixed costs over a larger amount of output as the size of the operation increases, an expansion in output that can reduce some variable costs, and the advantage of pecuniary economies.

While the economies of size is debated by academicians and professionals, the study by 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. The higher the input usage by the large farms tends to increase the quantity produced and with the lower price of input, generates larger profit per hectare. The higher input prices faced by small farmers tends to reduce amount of inputs used thus giving lower profit (Padilla-Fernandez *et al*., 2012).

When looking into the farm size issue, one of the first items to be addressed is how to categorize farms into different size classes. The United States Department of Agriculture (USDA), the leading source for aggregate farm statistics has several methods of

categorizing farm size. USDA typically breaks down farms into three size classes: Farms with $1000 - $9 999 in gross sales,US$10 000 – US$99 999 in gross sales and farms over US$10 000 gross sales(Dumler,2001). The government has the role to play in categorizing farm sizes.

A critical issue in the discussion and debate concerning industrialization of agriculture concerns the economies of size in agricultural production and the shape of the long run average cost curve. The conventional economic model infers U-shaped long –run cost curve that initially declines as size or scale increases, reaches a minimum and then rises with further increase in size or scale (Philip, 2001). In fact, even if costs were invariant by size *i.e* constant cost industry with a flat cost curve, farm size would likely increase over time if the industry is profitable (Philip, op.cit). Thus rising costs are not likely to constrain growth in farm size, and the rate at which farms will grow in size over time will be primarily determined by the profitability of the business and the amount of the net earnings that are retained and combined with debt capital to expand the business (Philip, op.cit).

2.3 Tobacco Development in Tanzania

Tobacco production in Tanzania started about 1933 in Biharamulo (Kafanabo, 2008). The production of tobacco as a commodity began in 1963(Kafanabo, op.cit). The first institutions to be involved in the promotion of small-scale tobacco production in the mid-fifties were the Tanganyika Agricultural Cooperation (TAC) and Tobacco Authority of Tanzania (TAT). Currently tobacco production is promoted by the government and other tobacco stakeholders. This has resulted into increased coverage of tobacco production since 1991. Initially tobacco was grown in Urambo (Tabora), Kahama (Shinyanga),

Manyoni (Singida), Namtumbo (Songea), Mpanda (Katavi) and Chunya (Mbeya). Recently new tobacco growing districts include Kasulu and Kibondo (Kigoma), Sikonge (Tabora) and Tarime (Mara), (Kuboja *et al.*, 2011).

In Mpanda District tobacco is cultivated similar to other agricultural products, where land must be cleared and thickets removal for cultivation followed by manual tilling of the land. The crop production season begins from mid–August. Table 3 describes activities undertaken from mid-August through December and January through June.

Table 2: Months during which tobacco activities are more intensive

Activity	**Months**											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Firewood collection												
Land preparation												
Cultivation												
Nursery work												
Transplanting												
Weeding and fertilization												
Topping and desuckering												
Harvesting and curing												
Grading												
Marketing												

DALDO, Mpanda (2012)

From the agricultural calendar it is observed that most of tobacco operations are intensive during the months of January through April and August through December. During these months labour requirements are relatively higher than other months (Ramadhani, personal communication, 2012).

2.4 Tobacco Varieties Grown in Tanzania

Currently a number of tobacco research activities are taking place in Tanzania. The research include preliminary flue and air cured tobacco which are major varieties grown in the country. Evaluation on yield and quality, evaluation of NPK fertilizer in different ratios on tobacco production in different soil status, evaluation of theeffectiveness of farm yard manure in tobacco production versus inorganic fertilizers and evaluationof different chemical rates in controlling tobacco pestsand diseases are among researches in progress to improve tobacco production (Kuboja *et al*., 2012). In his study Mangora, (2012) identified three types of tobacco namely, flue-cured, fire-cured and air-cured burley tobacco. The most widely grown tobacco worldwide, is flue-cured , whereby the leaves are heated in barns to temperatures up to and over 70°C which results in the distinctive yellow/orange colour of the leaves. This process takes 5 to 8 days. After curing, the tobacco is further distinguished into sub-groups by various characteristics related to perceived quality of the tobacco, such as maturity, conformity and colour. This process is known as grading. One tobacco plant is capable of producing several different grades of leaf. The leaves higher up the plant are more exposed to the sunlight and typically attain a higher grade (Mangora, 2012).

2.5 Tobacco Agronomic Practices

2.5.1 Tobacco seedbed preparation and maintanance

Tobacco production normally starts by preparing the seedbed. The study by Peek, (2008), highlighted some agronomic practices applicable in tobacco production. He argues that the first step for a successful crop is to have a uniform and healthy plant. The study comments on private production of transplants so as to reduce the likelihood of importing diseases and pests. Other agronomic practices recommended upon are: locating a seedbed on a

deep, fertile soil with good surface and internal drainage; locating seedbeds near an adequate water supply and protected by wind breaks. The soil should be well pulverized, smooth, and free of clods and avoiding flat and saucer-shaped seed beds. Applying the recommended amount of NPK and CAN fertilizers on seedbed and use extra nitrogen from calcium nitrate if necessary. Control diseases and insects using only approved chemicals. In practice the recommended size of seedbed for planting an acre is 15 by 20 metres and will require a thirty gram packet which contains 12 000 tiny seeds. Sedlings are transplanted by hand after 60 days, and a height of 15-20 Centimetres (TGANC, 2010).

2.5.2 Tobacco agronomic practices in the field

The best soils for tobacco production are deep, well-drained, nearly level, loamy soils with little or no risk of flooding. Soils with siltyor loamy surfaces and subsoils and a rooting depth of at least 30 inches are best. Production has also been quite successful on soils with well-structured red clay subsoils if slopes are not too steep and the soil has a loamy surface. Soils with tight, heavy clay subsoils, very sandy soils and soils with rooting depths of less than 30 inches should be avoided. Soils with clayey surfaces that tend to be cloddy when tilled may cause problems with transplant survival (Peek *et al.*, 2008).

2.5.3 Technology used in tobacco production process

Technology used in tobacco production process refers to the application of scientific knowledge for practical purpose. Crop management forms the framework of tobacco production and requires the implementation of acceptable agronomic and environmentally sound practices from planning to post harvest. The study by TGANC (2010) identified several guiding practices in tobacco production. Those guiding practices include, seed

variety selection, selection of appropriate agrochemicals, topping and suckers control, tobacco curing process, barn management and on farm tobacco storage.

2.5.3.1 Tobacco seed variety selection

Concerning seedlings the TGANC (2010) commented on using varieties produced from an approved source(s).In the study area the common tobacco seeds varieties are K326, LTF10 and RG 17. Those varieties are supplied by tobacco buying companies. Fertilizer are crucial nutrient in tobacco production. Two types of fertilizer are applicable in tobacco production these are; NPK 10: 18: 24, and CAN 26% .

2.5.3.2 Selecting appropriate agrochemicals

With reference to selection of agrochemicals, TGANC(2010), argues that the approved product selected should be the least toxic, least persistent and safe to humans, wildlife and the environment while providing effective management of the pest, disease or weed problem. It further argues that selected agrochemicals should not be harmful to natural predators of the pests and trap crops. Also it should be specific in mode of action and not broad spectrum. In the study area some agrochemicals identified were; Yamaotea, Actara, Confidor and Decis (Ramadhan, personal communication, 2012).

2.5.3.3 Topping and Suckers control

The floral parts of tobacco plants are removed (commonly called "topping") to produce optimum yield and quality. The study indicates that early topping decreases yields (Yazdani, 2013). Topping is normally done by hand. Most plants are topped at 14-16 which decreases yield. The recommended level of topping in the study area is 18-20

leaves (Swai, personal communication, 2012). Yamaotea is the best agrochemical used in succers control (Yazdani, 2013).

2.5.3.4 Tobaccocuring process and barn management

As to tobacco curing and barn management, proper curing and barn management is critical for maximizing both yield and quality hence crop value. The TGANC, (2010) argues that, curing barn design should incorporate the most efficient furnaces available. Furnaces that provide indirect heat and prevent combustion gases from entering the curing chamber. Using hygrometers to either automatically or manually control relative humidity in flue curing. Also it argues that curing barns should be inspected on a regular basis for cracked or leaking heat exchangers and repaired if necessary. During curing process tobacco leaves hanged on rakes are heated at temperature of 70^0C and above. The process takes 5-8 days.

2.5.3.5 On farm tobacco storage

In relation to on-farm tobacco storage it is often necessary to hold tobacco from the time it has completed curing, through grading and baling, until it is ready to be marketed. Correct tobacco leaf conditions are required to avoid deterioration in quality and loss of yield. The TGANC (2010) suggests tobacco to be stored at the correct moisture and density, be free of any Non-Tobacco Related Materials (NTRM), contamination or infestation and not have any agrochemical product applied post harvest.

2.5.4 Agricultural extension services

Agricultural services generally aim at disseminating specific knowledge to producers, such as the transfer of technology, the improvement of management practices or the transfer of knowledge and capacities. A study by Zivkovic *et al*. (2009) stipulates that agricultural

extension service has the objective to assist family holdings or farmers in improvement of methods and techniques of agricultural production, farm management and increase of income and of productivity and production quality.

2.6 Tobacco Pests and Diseases

Diseases are important production constraints in tobacco growing environments of the country. Specifically pests and diseases can be found in two environments, in seed bedsand in fields. Management of these pests and diseases help in both quantitative and qualitative enhancement of tobacco yields Jahagirdar and Hundekar (2009). While playing a key role in Tanzanian economy despite its socialdisapproval due to its alleged association with human health, tobacco has thrived well. Its development is contributed by the presence and application of various information concerning identification, management and control of pests and diseases.

2.6.1 Diseases of flue cured tobacco in nursery

Damping-off, leaf blight and black shank werethe major fungal diseases. Damping-off was one of the most severe diseases in nurseries. Leaf blight and black shank were caused by different inoculum propagules of soil borne fungal pathogen. Management strategies in nursery involved use of slurry followed by soil drenching (Jahagirdar and Hundekar, (2009). Also a study by Dimock *et al*. (2011) reports that insects can cause serious problems on transplants produced in greenhouses and plant beds. Cutworms, aphids, vegetable weevils and flea beetles were the most common insect problems in tobaccoplant beds.

2.6.2 Diseases of flue curedtocacco in the field

2.6.2.1 Tobacco budworm (Heliothis virescens)

This pest causes loss and requires treatment on some acreage virtually every year. It is the first or second most-damaging insect pest of tobacco, requiring treatment on 40 to 50 percent of tobacco acreage (CORESTA, 2005). Larvae feed in the growing terminal bud sometimes destroying it and damaging anddistorting leaves. Usually remaining deep in the bud, it is often protected from chemical applications. Almost all treatment in the field occurs at least two weeks before first harvest.

2.6.2.2 Tobacco aphid (Myzus nicotianae)and green peach aphid (M. Persicae)

The tobacco aphid is the most consistently damaging pest of tobacco affecting both crop yield and quality. Aphid damage tobacco by removing plant juices and contaminating leaves with cast skins and honeyde. Uncontrolled, it might reduce crop values by 10 to 25 percent (TGANC, 2010). However, aphid control is not effective in reducing the spread of these diseases. Chemical control measures are the most reliable means currently available to control the tobacco aphids.

2.6.2.3 Tobacco flea beetle (Epitrix hirtipennis)

Both the larvae and adults of this pest species attack tobacco. Adults chew many small 'shot-holes' in the leaves and stalks of tobacco plants. Damage can occur in plant beds and in the field. Larvae feed on the roots and tunnel in underground stems, potentially stunting the plant and causing an irregular crop that is more difficult to manage. Several generations occur, but the most significant damage is caused by thefirst and third generation.

2.6.2.4 Tobacco hornworm (Manduca sexta)

Hornworms are potentially the most damaging insect pests of tobacco. A heavy infestation may completely destroy a crop. However, such heavy infestations are uncommon, and beneficial insects typically reduce populations significantly. These pests cause loss and require treatment of some acreage virtually every year. Larvae of these species feed on leaves all over the plant (CORESTA, 2005).

2.7 Optimization

Optimization of the planning objective is defined as achieving the farm household's goals as efficiently as possible in the face of whatever constraints of a physical, environmental, legal or socio-cultural nature. This implies obtaining maximum possible net benefit over time from the operation of the farm system. Net benefit is measured, as appropriate in terms of output or profit or, more broadly as satisfaction or utility. Maximization of net benefit implies efficient use of available resources and opportunities. For the achievement of a given level of net benefit, it implies the minimization of costs (Dlamini, 2013).

In tobacco production, profit or loss also depend on fluctuating demand, supply and pricing of a crop with minimization of cost of cultivation needed for that crop. Thus the maximization of profit turns out to be a multi-objective decision making problem (Sergent, 2004).

As a matter of fact tobacco cropping need capital investment in insecticides, pesticides, fertilizers, more labours and high grading cost. Another factor responsible for its fluctuating prices is sudden availability in international market and difficulty in its long tern storage. Thus keeping in view of variable and uncertain prices of tobacco, a proper land planning is needed for optimal return. The reason is, markets are made up of multinational companies which are influenced by demand and supply. In view of

developing a supply chain of network, these organizations are financing the growers for smooth functioning of their supply chain, thus a proper land utilization and proper cropping pattern is needed at their farmers level. In order to optimize profit a farmer must grow tobacco in a way that it should be harvested and be marketed in quality required by a buyer. In view of the current study, tobacco farmers can enter into contract farming as a guaranteed for profit.

2.8 Tobacco Marketing

2.8.1 Tobacco marketing in Tanzania

In Tanzania, all the tobacco produced at farm level is sold to the contracted tobacco buying companies. However, seeds, pesticides and some inputs are provided on loan by Cooperative union thereafter deducting all costs from earnings (LATCU, 2012). The market of tobacco growers are TLTC and PATL Companies. These companies provide some principles to guide marketing process as indicated below:

i. Sorting, grading and baling should be done at the centre registered by TTB
ii. The activities in part (i) above should be monitored by the PCSs leaders
iii. The bales' weight should be 25kg minimum and a maximum of 75 kg
iv. Each bale should have tobacco of one grade
v. Hessian clothes used for bales should not have holes and
vi. Tobacco bales should not be mixed with 100% NTRM

The premises for selling tobacco can be either to the primary society or to the centre chosen by the cooperative society. The transport cost of tobacco bales is borne by the farmers. The marketing efficiency of tobacco depends on the institutional and

organizational arrangements that promote the crop. The institutional organization forms policy, rules and regulations to guide the market procedures (Kafanabo, 2008).

2.8.2 Quality evaluation and grading of flue cured tobacco

Most of classification, quality evaluation or grading of the flue-cured tobacco leaves are manually operated, which relies on the judgmental experience of experts, and inevitably limited by personal, physical and environmental factors. The classification and the quality evaluation are therefore subjective and experientially based (Rweyemamu and Kimaro, 2006). In practice, tobacco classifiers at every market make random checkup of bales before the market starts. The final decision to award grade to a particular bale is done by Tanzania Tobacco Board (TTB) leaf classifier, Tanzania Tobacco Council (TTC) leaf classifier and tobacco leaf company classifiers.

Quality is the most complicated component of the tobacco grading based on several subcategories. These categories includes, maturity, leaf structure, weight, oil content, color intensity, width, length, uniformity, injury, and waste tolerances. These quality criteria are also dependent on the group and colour of the leaf. Leaves of different groups or colours may have different scales on some of the quality criteria. The study by Huabo (2011), identified 13 groups of flue-cured tobacco leaves according to their growth position, colour and maturity. Tobacco Leaf Tanzania Company (2012) on the other hand established 68 grades of tobacco in the study area. As price of tobacco depends on their grades and weight, any misclassification will impact directly on the price of tobacco leaves and in many occasions lead to reduced tobacco profitability. The performance of the classification depends on experience and skill of the human experts. Consistency of the grading among the specialists is another important issue that will affect creditability of the

grading result. An automatic machineis therefore sought-after to promote fairness in the tobacco classification (Huabo, 2011).

CHAPTER THREE

3.0 METHODOLOGY

3.1 Description of the Study Area

3.1.1 Location

Mpanda District is one of the three districts of Katavi Region. Others are Mlele and Nsimbo. The District lies between longitude $30^{o}00$'to $33^{o}31$' East and from latitude $5^{o}15$' to $7^{o}03$' South. The District is located in the western rift valley. Mpanda District stretches alongside the shores of Lake Tanganyika and Lake Rukwa and reaches inland up to the Ugalla river system (Kagiso, 2009). It is bordered to the North-West by Kigoma Region, to the North East by Tabora Region, to the East by Mbeya Region, to the South by Nkasi District and to the West (small portion) by Lake Tanganyika. Characteristics for the district are mountain ranges and highlands separated by depressions, valleys and plains.

3.1.2 Agro- ecological zones

Mpanda District is divided into four main agro-ecological zones. Major vegetation and agro-economic zones including information on location, altitude, rainfall, soils and land use are shown in Table 3.

Table 3: Mpanda District Agro- ecological zones

Zone	Altitude	Rainfall	Physiography	Economic activities
Rukwa rift valley	770 to 1 300 m	1 000 to 1 200 mm	Flat plains covered with good drainage	Agriculture: Maize, paddy Livestock: Cattle, goats, sheep, poultry.
Msaginya plains	800 to 1 800 m	800 to 1000 mm	Undulating plains and plateaus with moderate to good drainage	Agriculture: Maize, tobacco, beans, paddy and groundnuts. Livestock: Cattle, sheep, goats and poultry
Woodlands mainly Inyonga	1 100 to 1 300 m	600 to 1000 mm	Gently undulating plains mostly well drained, sandy to sandy loam with good drainage	Agriculture: Maize, tobacco, Groundnuts and beans, Livestock: Cattle, goats and poultry. Others: Beekeeping
Highlands Mwese division	1 100 to 2 500 m	900 to 1 100 mm	Flat to gently undulating plains with good drainage	Agriculture: Maize, cassava, beans, banana, coffee Livestock: Cattle, goats, sheep, poultry

3.1.3 Climate

The District is generally warm with temperature peaks in September and October just before the start of the rain season. The district experiences mean minimum and mean maximum temperature of 19˚C and 28.5˚C in January and 15˚C and 29˚C in July, respectively (Kagiso, 2009). It experiences dry season of about three to five months between June and October. The rainfall pattern is slightly bimodal with peaks in November/December and in March.

3.1.4 Human population

Mpanda District covers a total area of 47 527 km^2. About 564 604 people live in this area (URT, 2012). This means a ratio of 12 inhabitants per km^2. With this, the population in the district has increased compared to the last national census when the ratio per km^2 was 9.28 (Kagiso, 2009). Majority of the population is actually not Tanzanians but people from Burundi and Rwanda. About 90 000 people live in the two refugee settlements of Katumba and Mishamo, after about 60 000 returned to their home country (DI0, Mpanda). The concentrations are in the centre around Mpanda town, to the East around Inyonga, to the South spreading over Mpimbwe Division, to the West around Karema and Mwese and to the North-West around Mishamo (Kagiso, 2009).

Table 4: Mpanda District: Human population by sex, average household size and Sex ratio

District/Council	Total	Male	Female	Average Household Size	Sex ratio
Total	564 604	279 682	284 922	5.5	98
Mpanda Town Council	102 900	50 437	52 468	4.8	96
Mpanda District Council	179 136	89 265	89 871	5.7	99
Mlele District Council	282 568	139 980	142 588	5.8	98

Source: URT (2013)

3.1.5 Mpanda District agricultural activities

Majority of Mpanda inhabitants' activity is agriculture (farming and animal keeping). Major crops that are grown in the study area are: tobacco, maize, beans, groundnuts and paddy. Also sunflower, cassava and coffee are produced but at the small scale. Other activities include beekeeping, lumbering, making bricks, charcoal production and fishing along Lake Tanganyika and Lake Rukwa. Looking at the crops cultivated, tobacco is the

only leading cash crop produced so far. Coffee is produced at a small scale in Mwese Division (DALDO Mpanda, personal communication, 2012).

3.2 The Research Design

The present study used a cross sectional study design and employed a survey method where data were collected at a single point in time. The reason for choosing this design is because of its suitability for description purposes as well as the determination of the relationship between the variables (Bailey, 1994). Further, the study design was preferably chosen because it was less expensive in terms of finance and it serves time.

3.3 Questionnaire Formulation

A questionnaire was formulated with the intention of collecting data from the study area. A questionnaire for tobacco growers comprised a household general information specifically identification variables. It also included production information, *i.e* information about farm activities, labour use and other inputs, investment and equipment costs, enterprise output and consumption. Furthermore, the questionnaire included farm financial information e.g credits and marketing information. A pilot study was conducted so as to test questionnaires. Questionnaires were restructured accordingly.

3.4 Sampling Process

3.4.1 Sample size determination

In the current study, a simple random sampling technique was employed to select a sample size of 120 tobacco household farmers. The selection based on proportionate sampling from a sampling frame of 2 385 tobacco growing households. The population was obtained from 6 surveyed villages 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 the 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 fulfill 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.

3.4.2 Respondents sampling

A sampling frame for tobacco farmers was obtained from the Primary Cooperative Society officers in the study area. The list comprised farmers who are registered by Tanzania Tobacco Board (TTB). There after farmers to be interviewed were selected at random. A proportional allocation of the sizes of the samples from different villages was determined from each village making a total of 120 respondents (Table 5).

Table 5: Mpanda District: Respondents interviewed by tobacco zone, ward and village

Village name	Zone	Number of households	Frequency	Percentage
Songambele	Central	350	18	15
Urwira	Central	335	17	14
Bagamoyo	Eastern	320	15	13
Mapili	Eastern	450	25	19
Kalungu	Northern	430	19	18
Kanoge	Northern	480	26	21
Total		**2385**	**120**	**100.0**

3.5 Data Collection Procedures

3.5.1 Primary data

The primary data for this study were collected by administering structured questionnaire to the head of the households through formal surveys to get an in-depth understanding of issues related to the economics of tobacco producing households. The current study employed both closed and open ended questions. The data collected included household identification variables, farm activities, labour use and other purchased inputs. Furthermore, data included, output and marketing of tobacco and crops other than tobaccos, revenues from respective crops, farm size, fertilizer usage, own cash employed in farm activities and revenue from livestock.

3.5.2 Secondary data

Secondary data were collected from DALDO Mpanda, Tanzania Leaf Tobacco Company, Lake Tanganyika Cooperative Union (LATCU), and from various publications. Important variables for which secondary data were collected included foreign exchange earnings from cash crop export, tobacco prices with their respective grades, register of tobacco growers, input credit price trends and formal and informal credit status, tobacco contribution to economics of various African countries and other relevant records.

3.6 Methods of Data Analysis

The collected data were coded, edited and then analysed using appropriate computer software that included Statistical Package for Social Sciences (SPSS). The quantitative data were analysed using descriptive statistics to capture mean, frequency, and percentages thus the cash in relation to each enterprise. A multiple linear regression model was adopted in determining the influence of farm size on tobacco profitability to smallholder farmer in

Mpanda District. Tobacco profitability was analysed using a Gross Margin. Gross Margin was also used in determining the profitability of the selected crops (maize, beans, groundnuts and paddy).

3.6.1 Gross margin analysis

The analysis of gross margin (GM) per hectare aimed at estimating the relative economic profitability, return to labour and capital invested for the 2011/12 season. The analysis of gross margin per hectare was important because the five crops compete for production resources such as labour, land and other inputs especially during land preparation, cultivation, weeding and harvesting. The patterns of resource utilization change with shifts in prices of both products and inputs. Producers normally tend to allocate more resources to enterprises providing higher returns per unit resource. Thus higher returns will justify future production of a more competitive crop, as transferable resources are switched from the low paying to it. Also the gross margin of the five enterprises would help to compare the contributions of each crop to the household cash income.

Ngairo (1993) used gross margin of the main crops maize, potatoes and pyrethrum in order to establish the relative economic profitability of various smallholders' production. Rweyemamu (2001) employed a gross margin analysis for the two competing crop enterprises in the area, tobacco and maize so as to establish the relative economic profitability of the crops. It was also used to make comparison of returns to resources for different economic activities and suggested relative efficiency in different markets (Kakiko, 2010). The present study analysed a gross margin for each enterprise basing on the formula:-

$GM = TRi - TVC_i (i = 1, 2, ..., n)$.....(1)

Where

$GM_=$ Gross margin (Tshs/hectare)

TR_i = Total revenue (Tshs/hectare)

TVC_i =Total variable costs (Tshs/ectare)

3.6.1.1A consideration of the components of the formula

TR_i = Total revenue (Tshs/hectare)

These were calculated by multiplying the total yield by price per kilogram for the case of tobacco farms. The price and yields for the tobacco farmers in the study area were obtained from the records of the Primary Cooperative Societies and the Tobacco buying companies. In the case of maize, beans, groundnuts and paddy farmers, the calculation involved multiplying yields by the average market price.

TVC_i = total variable costs (Tshs/ hectare)

The cost of fertilizers and chemicals were obtained directly from Primary co-operative societies, while the farming costs were obtained directly from farmers. Farming costs identified in the current study includes land preparation charges: Slashing-and-burning thickets, ridging/manual tilling of land, harrowing for paddy, seed cost, seed bed management costs, planting/transplanting costs, weeding, crop protection, harvesting and transporting costs. It is important to note here that some activities for tobacco, such as barn maintenance are performed every year and thus the costs for these items have been distributed to cover costs per hectare.

3.6.1.2 Strength and limitation of the gross margin technique

Kafanabo (2008) highlighted a number of strong points associated with Gross Margin analysis. First, it is easy, simple and flexible to use. It does not require complicated

mathematical computation apart from multiplication, addition and subtraction which are within the understanding of most farmers. Second,it is simple to use when making comparison of returns to resources for different economic activities and it suggests relative efficiency in different markets. Third, the study concluded that the Gross Margin cannot be treated as a profit figure because fixed costs have to be covered by Gross Margin in order to derive the net profit figure.

On the other hand gross margin have some limitations;

- Difficult in allocation of labour: Labour can be difficult to allocate as most businesses have permanent labour and casual labour. In a gross margin analysis we tend to focus on the casual labour associated with that particular activity such as harvesting or packing labour.
- Presense of risk in decision making: There is inherent risk in agricultural production, such as pricing in markets, crop failure and variable input costs. If a gross margin analysis showed that there was a single crop that was far more valuable than others, this does not mean that it is the best decision to plant only that particular crop rather an assessment needs to be made so that the risks can be managed.
- Gross margins do not take into account overhead costs: A gross margin analysis may show a good result for one particular crop; however after all the overhead costs are included such as in a ‘cash flow budget’ or a ‘profit and loss budget’ the business may still make a loss (http://ausveg Businesscatalyst.com).

3.6.2 Regression analysis

To test the second objective which requires information on the influence of socio-economic factors on tobacco profitability and farm size in particular, a multiple linear regression

model was used. It used to examine the functional relationship between factors that were assumed priori to have significant effect on tobacco gross margin. The socio-economic variables included in the model were those thought in advance to be capable of affecting level of profitability. Tobacco gross margin in this study was specified as dependent variable while the independent variables included: tobacco farm size, farmers' educational level, extension services and non-farm income.In the current study the regression model used for objective two is in the form:-

$Y = \alpha+\beta_1X_1+\beta_2X2+\beta_3X_3+\beta_4X4+\varepsilon$…… (2a)

Whereby:

Y	=	Tobacco gross margin in Tshs per hectare
α	=	Intercept when all independent variables are equal to zero.
X_1	=	Tobacco farm size in hectares
X_2	=	Farmers' educational level in number of years spent at school.
X_3	=	Non-farm income in Tshs
X_4	=	Extension services in number of visits to smallholder farmer
$\beta_1 - \beta_4$	=	Coefficients of independent variables
ε	=	Stochastic disturbance (Error term)

Furthermore, a profitability function graph to show the turning points for the profit curve was employed. It explained the fact that nonlinearity or inverse relationship between increase in farm size and profitability can happen. This can emanate from lack of precise measure of soil fertility which is very likely that larger farms have lower soil quality on average. Also, the number of management decisions which must be made regarding marketing, inputs and timing of field operations which usually expands with each

additional hectare or farm added to the operation (Bellemare, 2012). Furthermore, decisions regarding the financing of expansion–through land leases or purchase can also have both short and long-term impacts on tobacco profitability. These factors can conflict with the assumption that increase in farm size is direct related with increase in profitability. The profitability function to capture non-linearity relationship between farm size and profitability is represented in the form:

$Y = -1.002 \text{ X } 10^{7} - 1.982 \text{ X } 10^{6} X_1^{3}$……..(2b)

Where Y= Tobacco profitability and

X_1 =farm size

Explanation of variables and a priori expectations

Profitability (Y)

This is the dependent variable and is measured by profit in Tshs per hectare. It is assumed to be determined by all the explanatory variables included in the model.

FSZ: Farm size and profitability

As agricultural production gets concentrated to fewer regions and to fewer farms, two trends dominate: Intensification and specialization in regions with competitive advantages and extensification of production in remote areas with unfavorable economic, social or environmental conditions (Brouwer, 2006). The two terms mostly means addition of other quantity of resources that combine with a given amount of land. These other resources can be labour (family members or draught animals), implements, manure, buildings, etc.

In this definition, a small area farm size (i.e. a farm with a small area of arable land) combined with large quantities of other production resources, is referred to as intensive cultivation. Extensive cultivation refers to a large area farm size (i.e. a farm with a large

area of arable land) that is combined with small quantities of other resources (mostly labour). Intensification of agricultural production refers to an increase in the productive output, whether per unit of land, or per unit of labour or technology. Extensification refers to lower returns per area, or per unit of labour or technology, Place and Hazell (2003).

The pull and a push on farmers to intensify agriculture by using more labor and or capital (broadly defined as chemical inputs, organic matter, equipment, and land conservation infrastructure) per hectare of land improve production. In the longer term, as industrialization proceeds (and/or trade increase allows for import of inputs), manufactured input prices decline, farm wages are driven up by the demand for labor in the nonfarm sector, farm capital prices are driven down, and access to output markets increases (Reardon *et al*., 2008). When farm capital price and access to output market increases, large farm sizes are likely to be more profitable than small farms.

The question of whether bigger is always better continues to be hotly debated. Generally the arguments for increasing size stem from the advantage of economies of size. Of those who didn't think farm size influenced profitability stem from farm management than the size of the operation (Rames *et al*., 2011). In the study by Debertin (2012), the maximum profit is where the first derivative of the production function equals to zero and the second derivative of the same function equals less than zero. This means that the influence of farm size on tobacco profitability can have both positive and negative signs.

EDN: Influence of farmer's education on crop profitability

In the current study farmers education is based on the number of years spent at school. The level of education facilitates open-mindedness of adopting and implementing new farming

technologies. This implies that the more the number of years spent at school the more the open minded one becomes other things held constant. The open mind helps in acquiring new technology which when applied effectively can improve productivity hence profitability. Similar observation was obtained in a study by Liberio (2012) that the farmer's education is an important factor in determining the readness to accept and apply new technologies. On the other hand, a study by Ugwumba *et al*. (2010), contented education being important particularly in intergrated farming systems where different crops are grown together and are treated with different attention. The study expected educated farmers to easily capture and apply correctly instructions from extension officers that could result into good quality of produce that fetch higher prices hence profitability.

NFI: None Farm Income

Non-farm activities in the study area includes bricks making and beekeeping. However, few farmers are participating in these activities. In other studies non-farm activities have become an important component of livelihood strategies among rural households (Ibekwe, 2010). A study by Babatunde (2012), on'on-farm and off-farm works: complements or Substitutes? shows that land productivity increases steeply with non farm income, the study further shows that profits from non- farm activities enable households to hire labour to undertake timely cultivation practices and also help to find the purchase of farm inputs. As tobacco quality depends on timely cultivation and fertilizer application, the current study expects non-farm income to have positive influence on tobacco profitability.

EXTS: Extension Services on tobacco profitability

Extension services generally aim at transfering explicit knowledge to crop producers, such as the transfer of technology, the improvement of management practices or the transfer of

skills and capacities. Agricultural extension services have the objective to assist family holdings or farmers to increase income, production quality, increase in standard of living and elevating of social and educational standards in villages (Zivkovic *et al*., 2009). The current study expects extension services to have positive influence on profitability due to the level of education attached to most farmers in the study area. As most of the respondents had primary level, this could help farmers to easily adopt modern farming technology enabling improving product quantity and quality hence profitability.

3.6.3 Descriptive analysis

To ascertain the contribution of tobacco production to the household cash income in relation to other crops, the descriptive statistics wasemployed. The gross margin from tobacco, maize, beans, groundnuts and paddy were used to determine the percentage contribution of each crop.The pie chart was drawn to clearly show the magnitude contributed by each crop enterprise to the household cash income.

3.7 Limitation of the study

Data collection process had several problems. The accuracy of the data collected from tobacco and food crops (maize, beans, groundnuts and paddy) depended on respondents' memory to recall and their willingness to cooperate. Regarding the memory issue, respondents were given questionnaire to read by themselves and be able to note important points required of them then the next day was for filling questionnaires. This gave respondents enough time to recall and cooperate. There was also amarkable difficulty on the part of the respondents to give a correct report of household production and marketing data such as actual area cultivated, quantity of input used and yields. Agricultural extension agents and Primary Co-operative Societies' agents had to be consulted in areas

where records of farmers were available, and a lot of traverse checks was employed so as to assess and confirm the given information.

Non-standard units for maize, beans, groundnuts and paddy were also a problem since some farmers used local units e.g. bags of different sizes, "*debe" "sado"* and "*bakuli*". Also some farmers were selling unpeeled groundnuts and paddy instead of peeled groundnuts and rice which are common commodities in the markets. Measurements were taken after converting local units into standard units such as kilograms.

Some of the data from secondary sources (particular those associated with cost of fertilizer carried forward) were not available. Therefore, for some items, estimations had to be made which might have reduced the accuracy of the outcome. Despite such challenges, the researcher is certain that data collected were reliable and adequate given the ways in which were addressed/overcame.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Socio-economic Characteristics of Respondents

The present study considered the economics of smallholders with special reference to tobacco production in Mpanda District,South West Tanzania. The socio-economic characteristics dealt with in the present study included: gender, marital status, age, education level, household size, tobacco farm size, agricultural extension services, farming experience and none farm income. For the purpose of this study, a household was defined as one person living alone or a group of people, who may or may not be related, living (or staying temporarily) at the same address, with common housekeeping, who either share at least one meal a day or share common living accommodation (*i.e.* a living room or sitting room) (Jenkinson, 1998).

Gender of the household head: The findings presented in Table 6 show that the majority of the household heads are males. The research reveals that 95% of the respondents were males while 5% were females. Small percentage of females in the sample might be attributed by the cultural issues that most of the household properties including land are owned by men. In a study by Kuboja *et al.* (2011) on adoption and impact of tobacco production in Tabora Region also found the percentage of male who owns tobacco farms being more thanthat of women. Furthermore, the study reports that the initial capital for tobacco production is not easily accessed by many females (Kuboja *et al.,* 2011).

Table 6: Household identification variables (n=120)

Demographic variables	Category	Frequency	Percentage
Gender			
	Male	114	95.0
	Female	6	5.0
	Total	**120**	**100**
Marital status			
	Married	111	92.5
	Single	6	5.0
	Divorced	1	0.8
	Widowed	2	1.7
	Total	**120**	**100**
Age (years)			
	21 - 35	1	0.8
	36 - 45	83	69.2
	46 - 60	36	30.0
	Total	**120**	**100**
Education			
	Adult education	1	0.8
	Primary education	117	97.5
	Secondary education	2	1.7
	Total	**120**	**100**
Household size (in number)			
	1 – 4	47	39.2
	5 – 8	66	55.0
	>8	7	5.8
	Total	**120**	**100**

Considering the age of the household heads, it was found that 69.2% of the respondents were aged between 36-45 years. The second group that accounted for 30% of the respondents was aged between 46-60 years old. The last group *i.e.* 0.8% of the respondents was aged between 21-35years old (Table 6). These findings show that most of the respondents are in the category of economically active age which is regarded to be more energetic to undertake tobacco production activities which need strong people. The last group with age between 21 – 35 years is of youths and unmarried. This group is less interested in agricultural activities hence involving themselves more in none farming activities such as vendor, brick making, motorcycle shuttling (*bodaboda*), shoe shinning, "*mamalishe*" and "*babalishe"* and loaders.

The findings show that the household heads who are married accounted for 92.5% of all respondents. It was also found that, 5%of the household heads are not married, 1.7% widowed and 0.8% divorced (Table 6). Marriage provides additional farm labour for the farmers. Generally the higher percentage of married couples is a reflection of stability of family and the society at large which could make them engage in agriculture. Similar, a study by Kuboja *et al.* (2011) observed that majority of the farmers in Tabora are married.

The findings also show that 97.5% of the tobacco producers' household heads were primary education leavers, while 1.7% of the household heads are secondary education leavers. The rest 0.8% attended adult education (Table 6). The findings imply that most of tobacco growers are primary education leavers. That level of education enables farmers to adopt technologies provided by extension officers hence improving tobacco quantity and quality. A study by Ghafoor *et al.* (2010), argues that qualification of the respondents directly improve their efficiency that cause an increase in income hence saving also improves.

Furthermore, the findings show that most of the tobacco growing households have 5-8 members (Table6). Since tobacco production is labour intensive, this implies households with large number of people produce more tobacco as compared to household with fewer members if all members would be participating in crop production. In addition to labour input, tobacco production requires: fertilizer, chemicals, land and credits so as to harvest a good quantity and quality of tobacco. The study by Takane (2008), reports labour as a key asset for smallholder households in rural Malawi where farm mechanization is virtually non existent andall farm work is done manually, having access to necessary labour for agriculturalproduction directly affects the levels of household farm income.

4.2 Production Information

4.2.1 Farming experience

For most rural areas, most people participate in agriculture from their youth. The findings show that 8% of the respondents have 1-10 years of farming experience, 34% have 11-20 years, 28% have 21-30 years,24% have 31-40 and 6% have 41-50 years of farming experience (Fig. 3). The findings implies that majorityof the tobacco smallholder farmers have long farming experience lying between 11-20 years. Ibekwe (2010) argues that in almost all occupations, earnings rise for a time as the individual gains experience and knowledge but then turns down at latter age. Farmers who are educated, have more years of experience and who can combine many viable enterprises tend to be more efficient in production and consequently realize more profit. A study by Syverson (2004) states that experience allows producers to identify opportunities for process improvements.

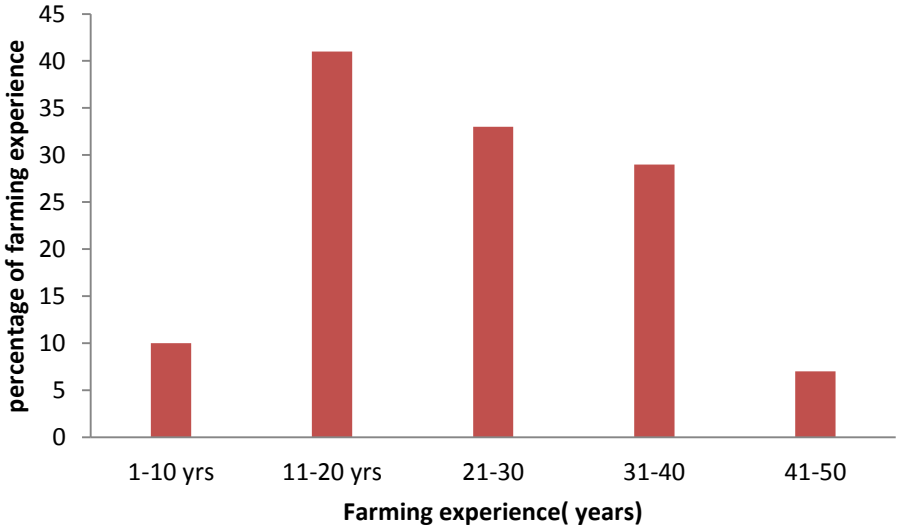

Figure 3: Distribution of respondents by tobacco farming experience

4.2.2 Sources of labour in tobacco production

The current study shows that 60% of the tobacco households use a combination of family and hired labour; while 40% uses only family labour. The findings implies that, tobacco requires a substantial number of casual labour to complement family labour. It is important to note here that most tobacco farmers employ temporary workers than permanent workers. However, it is noted that, the number of hired labour depends on household size and available capital other things being equal. A study by Masudi *et al*. (2001), reports that whether grown on small subsistence farms or on large plantations, the crop involves numerous stages and processes of work, which are for the most part labour-intensive and thus require more human labour inputs than machinery and automation.

4.2.3 Family members who work on farm

The findings show that 57% of the household family has 1-2 members while 38% of the households have members between 3-4 people. Furthermore, 5% of the family size has members exceeding 4 people (Table 7). As the mode for family members working in farm

lies between 1-2, this findings reflect that married couple are the major workers in the farm. This also implies existence of limited manpower among many tobacco households. Similaly, as most of our farmers use hand hoe for cultivation, then the cultivated area tends to be small hence low yield leading to low profitability.

Table 7: Distribution of family members who were working in farm

Family size	Frequency	Percentage
1- 2 members	68	57
3- 4 members	46	38
>4 members	6	5

4.2.4 Size of the land cultivated for tobacco, maize, beans,`groundnuts and paddy

Closely comparing tobacco farm size with other crops, the minimum areas for the five enterprises are: tobacco 0.4ha, maize 0.4ha, groundnuts 0.2ha, beans 0.1ha, and paddy 0.4 hectares. On the other hand the maximum hectares for the five enterprises are: paddy 0.8ha, beans 1.6ha, groundnuts 2.8ha maize 3.6ha, and tobacco 4 hectares. Tobacco farm size is the largest followed by maize (Table 8). A study by Mashayekhi,(2013) on economics survey of barley crop, implications on optimized farm size and land consolidation using the Long Run Average Cost (LRAC) reveals that the average total cost decreases with increase in farm size. So tobacco farmers can optimize tobacco revenue through increasing farm size other things remaining constant.

Table 8: Size of land cultivated (hectares)

Type of crop	n	Minimum	Mean	Maximum
Tobacco	120	O.4	0.8	4.0
Maize	119	0.4	1.18	3.6
Groundnuts	70	0.2	0.8	2
Beans	42	0.1	0.67	1.6
Rice	7	0.4	0.6	0.4

4.2.5 Labour demand by different crops for various operations

The selected crops in the current study have variations in size/hectares hence magnitude of operations. The findings of the current study show tobacco to be the most labour demanding crop among five selected crops: tobacco, maize, beans, groundnut and paddy. The individual crop labour demand in man days are as given: tobacco 219 man-days, paddy 131man days, groundnuts 48man days, beans38man days and maize 40man days. Tobacco labour intensity implies more cost charges as wages as well as socio-wellbeing expenses. This implies that tobacco might have low profit as compared to the rest of the crops. This is due to the fact that most household have fewer members who work in farms, therefore the more time spent on tobacco production the little time is spent on other crops.

However, tobacco yield and average price can contravene crop profitability rankings. The reason for tobacco labour intensity is caused by poor technology employed in tobacco production and processing. The study by Masudi *et al*. (2001) associates the highest demand for labour with many activities which are performed in tobacco production. These includes: clearing bush and thickets for cultivation; manual tilling of the land/ridging, construction of tobacco drying sheds, preparing tobacco nursery beds, watering of tobacco seedlings, transplanting of tobacco seedlings, weeding and trimming the planted plots several times. Harvesting activities includes: plucking tobacco leaves and drying (curing) them in barns, bundling and grading of tobacco leaves (into more than 70 grades), trucking of bundles to drying bays/storehouses, and burning of tobacco stalks.

Table 9: Distribution of labour input in farming per hectare

Operations	**Man days**				
	Tobacco	**Maize**	**Beans**	**G'nuts**	**Paddy**
Firewood collection	12	-	-	-	-
Slashing-and-burning thickets	5	5	5	5	7
Manual tilling of the land/ridging	10	8	8	8	16
Harrowing	-	-	-	-	8
Sowing/planting	3	3	3	5	2
Nursery work (sowing& watering)	46	-	-	-	28
Transplanting	5	-	-	-	8
Barn construction and maintenance	15	-	-	-	-
Weeding phase 1	10	7	6	6	10
Weeding phase 2	7	5	4	4	7
Thinning	-	-	-	-	3
Birds scaring	-	-	-	-	30
Fertilizer & pesticide application	4	-	-	-	-
Topping & desuckering	2	-	-	-	-
Harvesting and transportation	21	10	8	16	12
Pesticide application (output)	-	2	-	-	-
Curing	48	-	-	-	-
Sorting, grading, bailing	28	-	4	4	-
Haulage and marketing	3	-	-	-	-
Total	**219**	**40**	**38**	**48**	**131**

4.2.6 Inputs and implements prices

The findings show tobacco fertilizer and chemicals price trends (Figure 4) .The overall price trend shows price fluctuations. As tobacco input and output price depends on international market, the repeated changes in demand and supply of tobacco inputs and outputs cause changes in respective prices leading into price fluctuations.

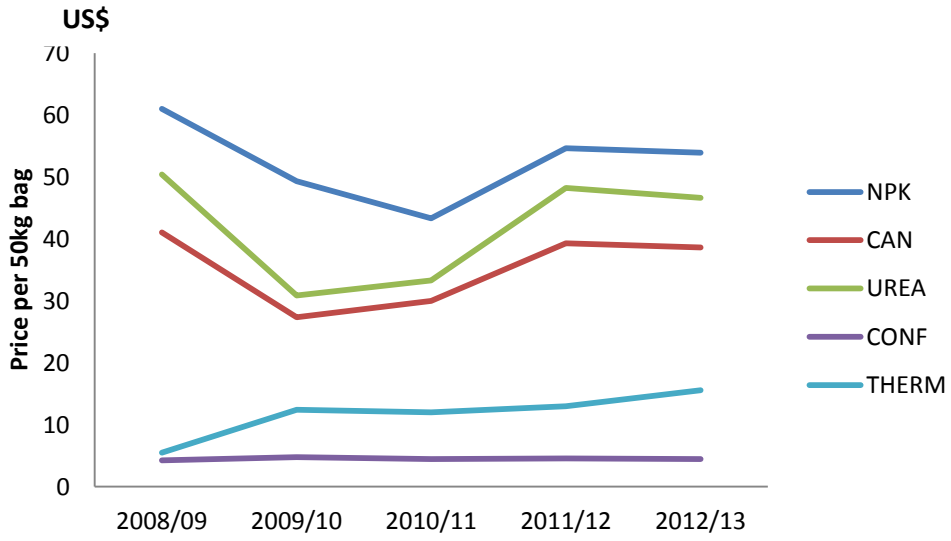

Figure 4: The input credit price- list trend

4.3 Problems Experienced in Tobacco Production

Also the findings show that tobacco has more input requirements than the remaining crops in the current study (Table 10). The imperfect information on input and output prices leads tobacco production into risks and uncertainty. A study by Baltzer and Hansen (2011) on input prices shows that agricultural input raise productivity, however most of the Sub Sahara African countries fails to adopt this opportunity because of high input price and low output price. Furthermore, a study by Uliwa and Ringo (2007) identifies several constraints that impede input price information such as; lack of awareness of sources, inability to access sources input and output price information gap and weak links in chain.

Table 10: Gross margins of tobacco, maize, beans, groundnuts and paddy

Parameters	Tobacco	Maize	Beans	G'nuts	Paddy
Inputs requirements/ha	4bgs NPK 10:18:24, 2.5 bags CAN 27%, 4pkts 40gm-acteric, 6 pkts 30gm-confidor, 219 man days	12.5kg seeds, 5 bgs M'jingu 2 bgs of Urea 1 tin Acteric 40 mandays	50kg seeds 1 tin acteric 38mandays	45kg seeds, 48 mandays	30kg seeds 131 mandays
TR (Tshs)	4 515 875	997 500	1 110 375	1 062 360	2 231 250
TVC (Tshs)	3 404 141	540 973	629 418	621 154	954 190
GM (Tshs)	**1 111 734**	**456 527**	**480 957**	**441 200**	**1 277 060**

The present study identifies two categories of constraints facing tobacco production that is production and marketing constraints. Production constraints involves: untimely and inadequate supply of inputs, inadequate formal financial support services, insufficient land and barns, high cost of labour, firewood, hailstone, pests and diseases (DALDO Mpanda, personal communication, 2012). On the other hand, market constraints involves: poor grading system, pricing system, infrastructures, untimely cash payments after sale, frequent changes of regulations, limited number of buyers, WHO and environmentalists campaign against tobacco production and uses (Keyser, 2002). The result implies that, economic benefits from tobacco may fall due to the mentioned constraints unless government and public private authorities who are involved directly in tobacco business decide to intervene. The government intervention is important as some problems are resulted from improper enforcement of rules and regulation. For example tobacco buying companies could be denied to form an association in so as to increase the number of tobacco buyers. Similarly, a study by Rweyemamu (2001) reported several problems that faced tobacco smallholder farmers. Rweyemamu reports on pests and diseases,lack of adquate capital an unavailability of inputs.

4.4 Marketing Information

Farmers need informarion in order to make better economic decisions on their farming activities. The findings shows that, 96.7% of tobacco respondents got information on tobacco input and output prices through middle men, 2.8% through cellphones and 0.8 through hearing from friends (Fig. 5). Market information particularly input and output price acts as an indicator of short run demand and supply conditions in various markets, by indicating what amount of product are demanded and where. This facilitates estimating volume of production to meet the consuming markets and thereby contributes to production efficiency (Vorhies *et al.*, 1999).

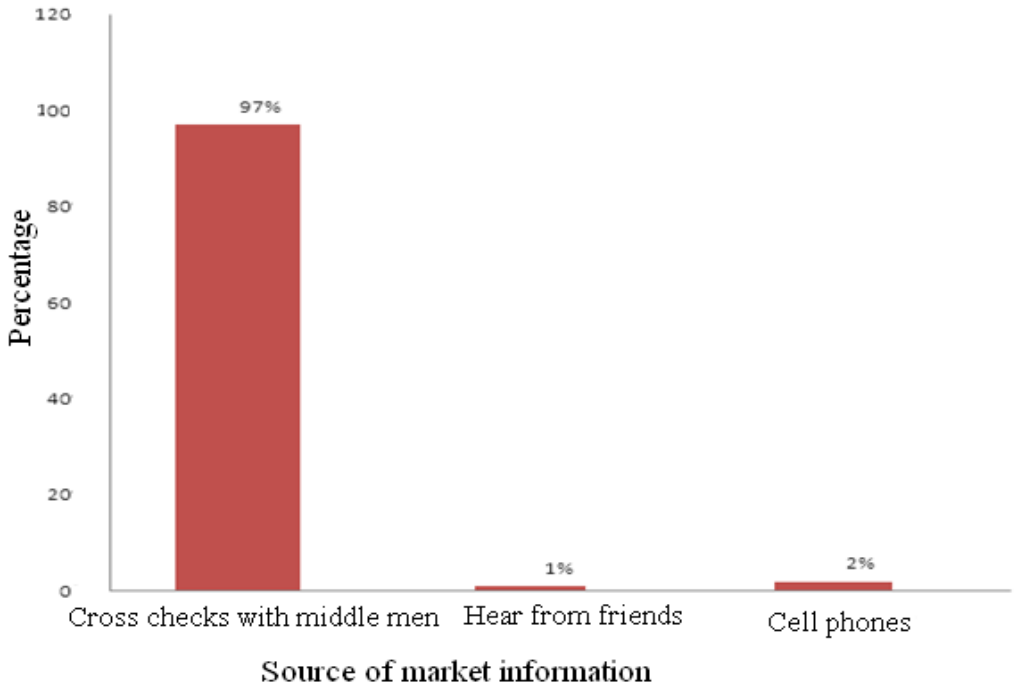

Figure 5: Sources of market information

4.5 Sources of Household Cash Income

4.5.1 Cash income from sale of crops

The current study limited itself to crops production as it is the major activity for most households in the study area. Income from sale of burnt bricks and honey is considered

when determining the influence of none farm income to tobacco profitability. The results show tobacco as the major source of cash income as it is grown by all sample households. Paddy production ranks first followed by tobacco in cash income. Others are, maize, beans and groundnuts.Paddys' highest income is associated with its low cost of production, high price of rice as it can be easily stored and the fact that fewer people are growing it due to agro-ecological constraints. A study by Kagiso (2009) reports tobacco as the only "real" cash crop produced so far in the study area (Kagiso, 2009).The market for tobacco is certain while for the food crops is not. A reliable market makes many people engage in the business.

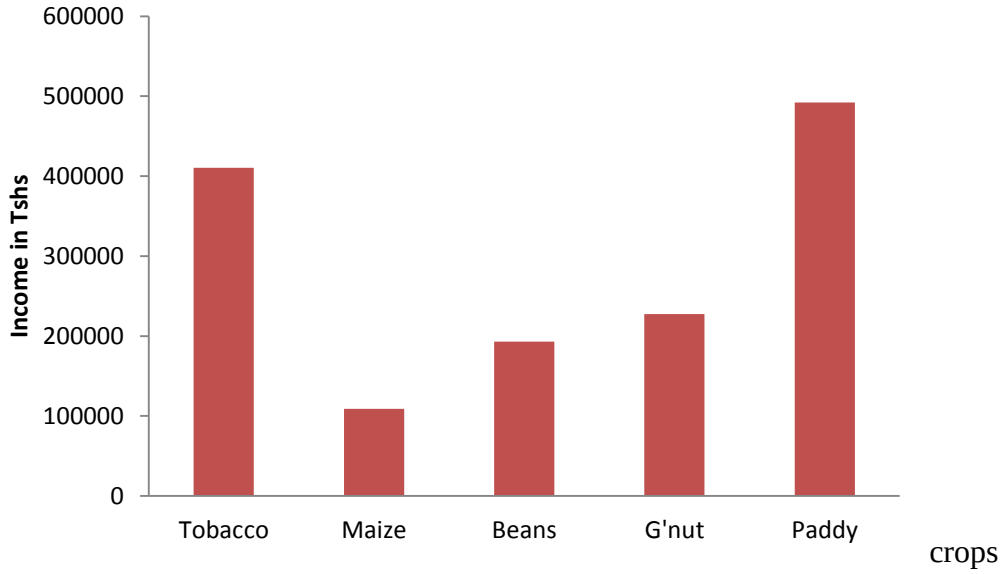

Figure 6: Tobacco farmers' cash income from sale of crops

4.5.2 Cash income from sale of none farm items (bricks and honey)

Besides crop production, respondents in the study area keep bees and make bricks for sale. The current study reveals income from sale of burnt bricks of Tshs 640 000 or 5% of total off farm income and 12 035 000 or 95% of total none farm income (Figure7). The findings

imply that farmers have opportunity to increase income through beekeeping. Big results from beekeeping can be achieved through adopting modern beekeeping technology.

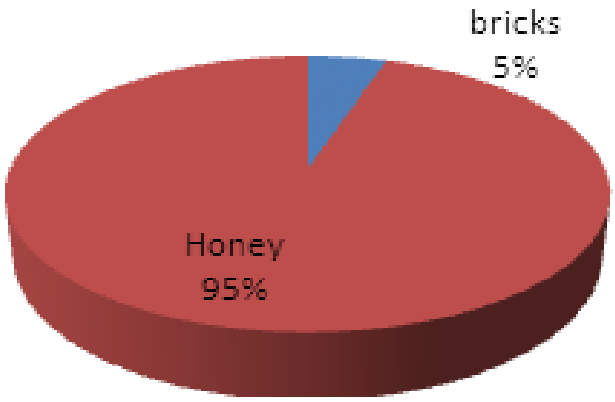

Figure 7: Tobacco farmers' cash income from sale of non-farm products

4.6 The Profitability of Tobacco, Maize, Beans, Groundnuts and Paddy Production

A gross margin analysis to determine the gross returns from tobacco vis-àvis other competing crops (maize, beans, groundnuts and paddy) has been carried out. The gross margin equals the difference between the sales'earnings and the per hectare variable cost of production. Variable costs include the cost of seeds, fertilizers, chemicals, labour and implements. It may be noted here that since fixed costs have not been incorporated, the gross margin analysis may not be an exact indicator of economic benefits. However, it does allow for comparisons to be made between alternative uses of inputs.

4.6.1 Tobacco production profitability

The findings reveals that the gross margin from tobacco production is Tshs 1111 734 per hectare. This indicates that tobacco production realises about Tshs 1 111 734 after incurring all the direct costs associated with tobacco production (Table 11). This implies that the business is profitable. Furthermore, in order to assess if the business is viable or

not, the return to ‘investment model’ is employed. The return to investment model is the ratio of a gross margin to cost of production. Results indicate that tobacco earns Tshs 0.33 of what he/she has invested. This means for every one shilling invested 67 cents are not recovered. The results show that tobacco production earnings do not cover cost of production. It is important to note here that improved producer price and yield per hectare can improve farmers’ return on investment hence economic viability. This can be through tobacco quality improvement and introduction of tobacco leaf auction market.

Table 11: Gross revenue, variable costs, and gross margin for tobacco production

Cost/gross profit item	Amount	Amount in Tshs
A: Gross revenue		
Average quantity of tobacco in Kgs	1625	
Average price of tobacco per kg in Tshs	2 779	
Total revenue		**4 515 875**
B: Variable costs		
Firewood	2.5 trips	371 075
Slashing –and- burning thickets	1 ha	48 160
Nursery management	1 Nursery bed	45 700
Ridging	1 ha	122 450
Planting	1 ha	26 697
Weeding phase 1	1 ha	81 625
Weeding phase 2	1 ha	61 295
Fertilizer N.P.K 10:18:24	4 bags @ 50 kg per hectare	873 760
Fertilizer CAN 27% N	2.5 bag @ 50 kg per hectare	157 080
Fertilizer application	1 ha	37 972
Pesticide- Actara	40gm 4Pkts x Tshs 7 028	70 240
Pesticide- Confidor 70 WG	30gm 6Pkts x Tshs 9 196	137935
Applying agrochemicals	4 man-days	48 160
Manual desuckering	2man-days	12 040
Harvesting and transportation to the village	5 people @21man-days	505 680
Curing	48 man-days	250 432
Sorting and grading	4 people @28 man-days	539 392
Haulage and marketing	3man-days	14 448
Total variable cost		3404 141
Total man days	**219**	-
C: Gross margin per hectare		**1 111 734**

4.6.2 Maize production profitability

The findings show that the gross margin of maize sold by the producer is Tshs 456 527 (table 12). This shows that maize production is profitable. To assess level of payment (wage) from maize production the return to 'labour model' is employed. The return to

labour is the ratio of a gross margin to total man days. The results indicates maize labour earns Tshs 11 413 per day. This also supports the earlier result that maize production is profitable. Furthermore, the assessment is conducted in order to assess business workability, the return to investment ‘model is employed. The results indicate that maize earns Tshs 0.84 of what he/she invested. This implies that the maize earnings per hectare do not cover the costs of production.

Table 12: Gross revenue, variable costs, and gross margin of maize production

Cost/gross profit item	Amount	Amount in Tshs
A: Gross revenue		
Average quantity of maize per acre in Kgs	**2 850**	
Average price of maize per kg in Tshs	**350**	
Total revenue		**997 500**
B: Variable costs		
Slashing- an- burning thickets	1 ha	46 800
Manual tilling of the land/Ridging	1 ha	119 625
Cost of seeds	12.5kg-1ha	40 625
Planting/sowing	3 man-days	28 896
Fertilizer (Minjingu)	5 bags per hectare	23 750
Urea	2 bags	76000
Weeding phase 1	1 ha	67802
Weeding phase 2	1 ha	55875
Harvesting and transportation to homestead	1 ha	63 000
Cost of pesticides (Acteric)	150cc-27 bags	18600
Total variable cost		540 973
Total man days	40	
Gross margin per hectare		**456 527**

4.6.3 Beans production profitability

The findings indicates the gross margin of beans sold by the producer. The gross margin results show a gross margin of Tshs 480 957/ha. This indicates that beans production is

profitable as it realises Tshs 480 957 after deducting all direct costs associated with production. Also the return on labour input is Tshs 12 657 this also supports the earlier findings that beans production is profitable (Table 13). Furthermore, in order to assess if the business is viable or not, the test for poverty was done by dividing the gross margin by total number of days in the year (365 days). The result was Tshs 1 318 per day which is below the poverty line of one US$ per day.

Table 13: Gross revenue, variable costs, and gross margin for beans production

Cost/gross profit item	Amount	Amount in Tshs
A: Gross revenue		
Average quantity of beans per acre in Kgs	822.5	
Average price of beans per kg in Tshs	1 350	
Total revenue		**1 110 375**
B:Variable costs		
Slashing-and-burning thickets	1 ha	42 370
Manual tilling/ridging	1 ha	122 875
Cost of seeds	50kg	142 000
Planting/ sowing	1 ha	49 152
Weeding phase 1	1 ha	67202
Weeding phase 2	1 ha	58 500
Cost of pesticides	1 tin acteric	12 471
Harvesting and transportation to village	10 man days	96 320
Sorting and grading	4 mandays	38 528
Total variable cost		629 418
Total man days	38	-
Gross margin per hectare		**480 957**

4.6.4 Groundnuts production profitability

Findings show that the gross margin of groundnuts sold from the producer. Results presented in (Table 14) show that the gross margin of groundnut production in the study

area is about Tshs 441 200. This indicates that groundnut production realises about Tshs 441 200 after deducting all the direct costs associated with groundnut production (Table 13). This shows that the farmers who are involved in groundnut production get profit. The study took more interest to assess the cost coverage in groundnuts production. The return to 'investment model' is employed. Result indicates that the return to investment is 0.71which implies that costs are not covered by the generated income. Furthermore, the results are used to assess the implication of the profit attained on poverty. Results indicates that groundnut earns Tshs 1 209 per day which is below the poverty line of one US$ per day. To alleviate poverty from groundnuts producers, producer price and yields should be improved. Groundnuts' price can be improved by adding value on it (processing and well packing). Well processed and packed groundnuts can have both domestic and international markets at a better price and can stay unspoiled for a long time.

Table 14: Gross revenue, variable costs and gross margin of groundnuts production

Cost/grss profit item	Amount	Amount in Tshs
A: Gross revenue		
Average quantity of groundnuts per acre in Kgs	1362.5	
Average price of groundnuts per kg in Tshs	780	
Total revenue		**1 062 360**
B: Variable costs		
Slashing-and- burning thickets	1 ha	43 650
Ridging	1 ha	121 895
Cost of seeds	45kg	83 250
Planting	1 ha	60 135
Weeding-phase 1	1 ha	64 700
Weeding-phase 2	1 ha	54 890
Harvesting and transportation to homestead	16 man-days	154 112
Sorting and grading	4 man-days	38 528
Total variable cost		621 154
Total man days	48	-
C: Gross margin per hectare		**441 200**

4.6.5 Paddy production profitability

The findings shows that the gross margin of rice sold by farmers is about Tshs 1 277 060. This indicates that paddy production is profitable (Table 15). Paddy production is assessed for its viability. Basing on the return to investment model, results indicate that a paddy grower earns 1.34 of what he/she invested. This implies that the earnings from paddy production cover all costs of production. Also supports the earlier findings that paddy production is profitable. Furthermore, an assessment is made to test paddy profitability implication on poverty level. The results show that the earning per day is Tshs 3 499 which is above the poverty line of one US$ per day. A point to note here is; many farmers in the study area are not utilizing the available opportunity from paddy production due to agro-ecological reasons. Most of Mpanda district have undulating plains and plateaus with moderate to good drainage. Few areas are low plains that fit for paddy production.

Table 15: Gross revenue, variable costs, and gross margin for paddy production

Cost/gross profit item	Amount	Amount in Tshs
A: Gross revenue		
Average quantity of rice per acre in Kgs	2 625kg	
Average price of rice per kg in Tshs	850	
Total revenue		**2 231 250**
B: Variable costs		
Land preparation for cultivation	1 ha	45 320
Manual tilling of the land	1 ha	124 800
Harrowing	1 ha	136 625
Cost of Seeds -30 kg @Tshs 2500	1 ha	75000
Seedbed management	1 seedbed	48640
Transplanting	1ha	61 250
Weeding phase1	1 ha	60 800
Weeding phase 2	1 ha	54 625
Thinning	1 ha	51 250
Bird scaring	30 man-days	144 480
Harvesting and transportation to the village	1 ha	151 400
Total variable cost		954 190
Total man-days	131 days	
C: Gross margin per hectare		**1 277 060**

4.6.6 A summary of selected crops gross margins

The finding presents the summary of the gross margin of tobacco, maize, beans, groundnuts and paddy production both sold and consumed by the producer. Results presented in Table 15explains that the gross margin of tobacco, maize, beans, groundnuts and paddy are; Ths 1 111 734, Tshs 456 527, Tshs 480 957, Tshs 441 200, and Tshs 1 277 060 respectively. These amounts have been obtained after deducting all the direct costs associated with the production of the selected crops. This indicates that production of

tobacco, maize, beans, groundnuts and paddy is profitable. On the other hand assessment was made on return to labour. This is established by determining the ratio of a gross margin to total man days for each enterprise. The results were Tshs 5 076 (tobacco), Tshs 11 414 (maize), Tshs 10 931 (beans), Ths 9 192 (groundnuts) and Tshs 9 748 (paddy). This shows that all enterprises are profitable. Of all the selected crops, tobacco has the lowest return on labour. The findings relate this situation with tobacco being very labour intensive compared to the rest enterprises.

On the other hand, key informants response as to why they continue to cultivate tobacco inspite of the lowest return on labour they said "tobacco is the only crop that has a reliable market and established board" in the study area. The study by Naher and Chowdhury (2002) points out several reasons that cause tobacco farmers preferring tobacco production despite of having the lowest return on labour;

- Tobacco has the reputation of being very profitable crop with few "equally lucrative" substitutes.
- Tobacco has been an ancestral occupation: Tobacco has become so much a part and parcel of their lives that they are reluctant to give up, sometimes even citing that their soil is unsuitable for cultivating any other crop.
- Tobacco provides a guaranteed market and lady cash unlike other competing food crops.
- Demonstrative effect also plays an important role to the extent that a farmer is 'persuaded' to tobacco farming simply by watching his /her neighbor "graduate out of poverty" after cultivating this crop.
- Patronization by the tobacco companies seems to have been an important engine for the proliferation of this crop where tobacco farmers produce it under contract farming.

These factors have made tobacco farmers continuing producing tobacco although it hasthe lowest return on labour. Furthermore, an assessment is done on whether production of the selected crops is viable or not. The results of return on investment are; tobacco (0.33), maize (0.84), beans (0.76), groundnuts (0.71) and paddy (1.34) times of what he/she has invested. The study on paddy production by Kadigi (2003) shows thatpaddy production may involve the use of a number of inputs including seeds, tools/equipment, labour, fertilizers/manure and water. However, very few inputs are used apart from labour and irrigation water. New seedsneed to be purchased at the beginning of each season, although most farmers keep a small proportion of each year's harvestas next years' seed. The use of fertilizers, pesticides, herbicides or manure is rare. Being cheaper in operation costs enables it to fetch a very high pricewhen sold hence higher profit.

Table 16: A summary of gross margins, return per manday and return on investment for tobacco, maize, beans, groundnuts and paddy production

Enterprise	**Tobacco**	**Maize**	**Beans**	**G'nuts**	**Rice**
Average Yield (kg/ha)	1 625	2 850	822.5	1 362	2 625
Average Price (Tshs/kg)	2 779	350	1 350	780	850
Gross returns (Tshs/ha	**4 515 875**	**997 500**	**1 110 375**	**1 062 360**	**2 231 250**
TVC (Tshs/ha)	3 404 141	540 973	629 418	621 154	954 190
G/ Margin (Tshs/ha	**1 111 734**	**456 527**	**480 957**	**441 200**	**1 277 060**
Labour input	219	40	44	48	131
Returns per man-day	5076	11 413	10 931	9 192	9 748
Return on investment	0.33	0.84	0.76	0.71	1.34

4.7 Regression Analysis Results

4.7.1 Overall evaluation of the model

In this subsection the target is to determine the influence of socio-economic factors on tobacco profitability particularly the farm size. The current study assumed tobacco

production to have more than one factor contributing to its profitability. To make the study viable more variables were included and tested for their influence on tobacco profitability. The role of education, non- farm income, extension services and farm size were attached to the multiple linear regression model to test their influence on tobacco profitability.

The results show that the model provides a best fit as suggested by F=8.279, R square (0.648) Adjusted R^2 (0.570) and p = $0.001^{a.}$for linear profit function. From these results it shows that the independent variables explain about 57% of the dependent variable *i.e* tobacco gross margin and that this result is statistically significant (Sig. 0.001). However, it is also implied that there were some variables which significantly influenced tobacco profitability but were missed during the model estimation. Such missing variables give room to be investigated in future studies.

4.7.2 Testing for multicollinearity

The regression model is tested for the multicollinearity problem; the problem that describes the presence of linear or near linear relationship among explanatory variables in the econometric model (Gujarat, 2004). The results show that the model is fine as the ANOVA table was significant at p<0.001. Also the variation inflation factor (VIF) value range between 1.010 - 1.192while the tolerance level range between0.839 - 0.990. The results implies that the model can be explained by other variables from 1% - 16.1%.This low percent that can be explained by other variables shows that the model provide a better fit representing the results. A study by Belsley *et al*. (1980) reported that they got concerned when the VIF was over 2.5 and the tolerance was under 0.40. Therefore, VIF ≥ 2.5 is an arbitrary but common cut – off criterion for deciding when a given independent variable displays “too much” multicollinearity. From Table 16 the result shows that

tolerance values do not approach zero and VIF values are below two point five (2.5) for independent variables hence reliable results.

4.7.3 Model parameter estimates

To test the effect of various factors, which are hypothesized to influence tobacco profitability to smallholder farmers' regression equation and a profit function graph are employed. The equations aimed at examining the influence of farm size, education level, extension services, and none farm income on tobacco profitability under linear and none linear profit functions. Results for the estimation of the regression equation are presented in Table 16 results assume linearity between tobacco profitability and socio-economic factors influencing tobacco profitability.

The results on Table 16 show that all coefficients are positively related to tobacco profitability. The positive coefficients includes: farm size, education level, extension services and none farm income. Although four parameters were assumed to influence tobacco profitability, only those attached to farm size, education level, and extension services are statistically significant at ($p<0.01$) and ($p<0.001$). This implies that when farm size is increased also tobacco profitability increases.

Table 17: Linear regression analysis results for tobacco profitability

Independent variables	Dependent variable: profitability (Tshs/hectare)					
	Unstd Coeffs.		Std Coeffs			
	B	Std. Error	Beta	t	Sig.	VIF
(Constant)	$-1.038x10^7$	$3.179x10^6$		-3.266	0.004	
Tobacco farm size	$3.128x10^6$	656921.151	0.712	4.762	0.000***	1.141
Education level	$2.270x10^6$	974392.173	0.328	2.329	0.032**	1.016
Extension services	$2.702x10^6$	$1.051x10^6$	0.391	2.571	0.019**	1.182
None farm income	.336	.332	0.148	1.010	0.326	1.103
R square 0.648, Adjusted Rsquare 0.570, F = 8.279 , p = 0.001[a]						

Source: Field Data (2014)

a. Dependent Variable: Tobacco gross margin
b. Note: ** Significant at 5% level, *** = Significant at 1% level.

4.7.4 The farm size–profitability relationship

The findings show that from the middle of the x-axis to the right, as farm size increases profitability decreases (Figure 8). The inverse relationship is shown by negative sign to the left of zero. The graph shows that decreasing farm size to a certain levelincreases profitability, however further decrease in farm size leads into reduced profits. The turning points on the graph liesaround two hectares (five acres). Therefore operating beyond two hectares for most smallholders in the study area means profit per hectare will likely start declining.This implies that tobacco profitability for most smallholder farmer in the study area lies arround two hectares or five acres. The study by Bellemare (2012) on the inverse farm size–productivity relationship for rice farms in Madagascar observes that farm size productivity will decrease when farm size is decreased below one hectare and when increased beyond 4 hectares.

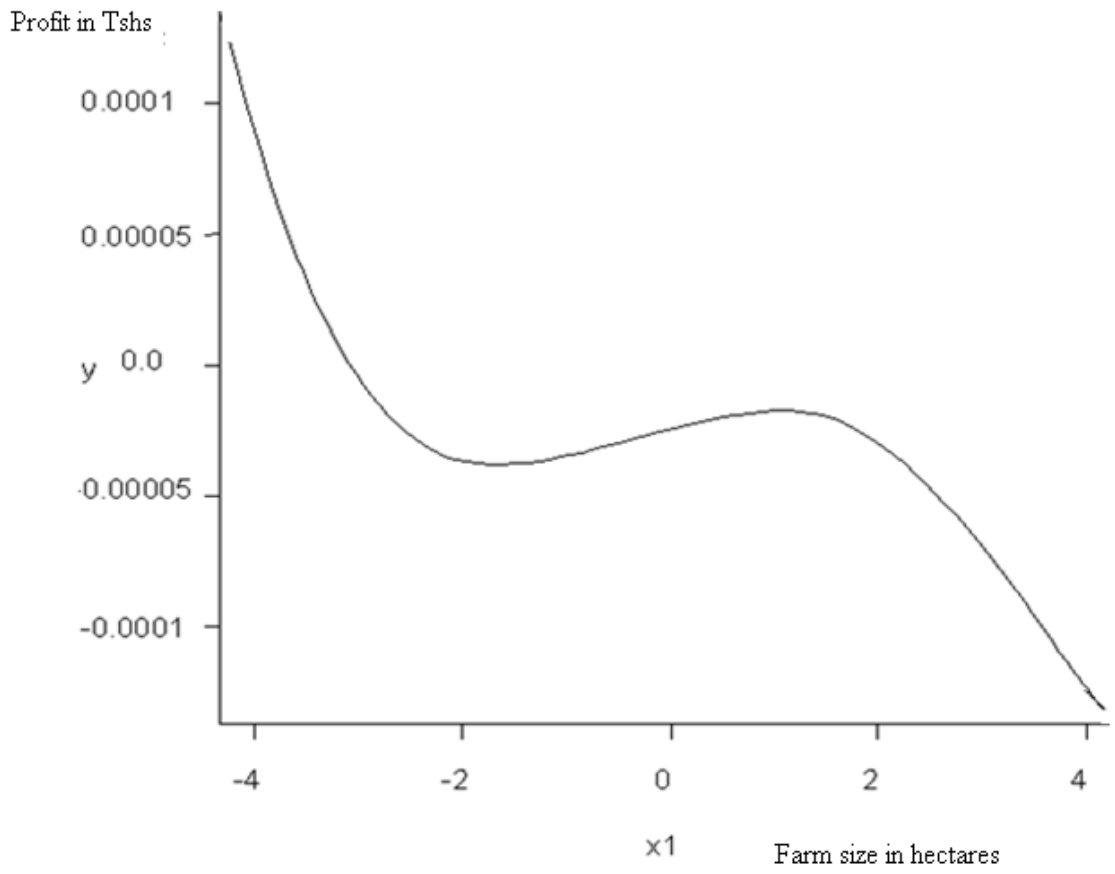

Figure 8: The inverse farm size–profitability relationship

Significance of parameters

The significance of the parameter attached to tobacco farm size can be attributed to the fact that the volume of tobacco leaves harvested depends on the size of the farm other things held constant. This implies that the bigger the farm size the larger the volume of tobacco leaves harvested. As tobacco market is concerned, every kilogram of tobacco produced is priced accordingly, the outcome of quantity of tobacco produced and price per kilogram is higher for those with larger farm size as compared to those with smaller farm size other things held constant. However, this result assumes linearity which is not always true. When the farm size is cubed, the tobacco profitability becomes none linear meaning that the increase in farm size leads to reduced profitability (Bellemare, 2012). This can be

due to poor management, low soil fertility and inability to sale whole commodity when the price is high.

The significance of education level to tobacco profitability can be attributed to the fact that educated farmers are likely to have tobacco with high quality that is normally attached to high prices hence profitability. The high quality of tobacco from educated farmers is due to the fact that educated farmers can easily adopt new agricultural technology important for improving their crops like planting quality seeds, applying appropriate fertilizer and chemicals on time. Good spacing between ridge to ridge and plant to plant, using modern barns for processing tobacco and better storage facilities.Besides formal education the tobacco profitability is influenced by experience hence the study expects farmer with a combination of education and experience to be profitable in tobacco production. Similar, observation on the influence of education on profitability was made in a study by Zulu (2011) on Profitability of Smallholder Cowpea Production in Zambia. The study reported majority of the farmers who grew cowpeas only had primary level education.The study analysis results show majority of the farmers whohad primary and secondary level education had positive gross margins. For those who hadtertiary level education all had positive gross margin and the majority of farmers who had noformal education had negative gross margins. Thus attainment of formal education may have abearing on gross margin and thus on profitability. Currently most of the tobacco farmers are educated so given enough land, better crop price and modern technology smallholder farmers can improve crop profitability.

The significance of extension services to tobacco profitability can be attributed to the fact that extension officers' role is to disseminate agricultural kowledge to farmers. This

implies that farmers who receive extension services are likely to produce tobacco of better quality than those who does not.In tobacco production extension officers guide farmer on principles of tobacco production. Also enforces rules and regulation of tobacco buying companies as tobacco is operated under contract farming. Tobacco buying companies have set their rules and regulations that are required to meet their tobacco domestic and international market standards requirements. It is through meeting good standards that enable tobacco farmers obtain better price hence profitability. Also extension services are the main source of technical information to smallholder farmers. It is through extension officer new technologies reach smallholder farmers who are limited to information on input and output prices. For that matterin the study area the tobacco buying companies have employed extension officers in each ward to provide extension services to tobacco farmers. The more the number of visits the farmer get the more production efficiency is expected. A study by Keyser (2002) on costs and profitability of tobacco in Zimbabwe reported tobacco to be extreme robust and smallfarmers can be placed to competein the world market. However, it depent on extension services and input supply system. The study supports the influence of extenssion services on tobacco profitability.

4.8 The Contribution of Tobacco to Household Cash Income

The descriptive statistics analysis was employed to get the contribution of tobacco cash income to household livelihoods in relation to other crops. The study dealt specifically with income from crops as many smallholders farmers depend on cash from sale of agricultural products for their livelyhoods (Eskola, 2005). The descriptive statistics based on percentage showed that tobacco contributed 29% to the household cash income while paddy contributed 34% (Fig. 9). The two crops contributed more than half of the households' cash income. Paddy contribution was the highest because during the study the

price of it was high. It should be noted that paddy can be stored for a long time hence be sold when the price is high. The cost of paddy production was low as smallholder farmers did not apply industrial fertilizers which were said to be higher.

The source of water for irrigation was reliable as it came from both rain and river water (Msaginya and Urwira rivers) (DALDO, Mpanda, personal communication, 2012).Furthermore, tobacco cash contribution was higher because tobacco had a reliable market. It was produced under contract market system as stated ealier, the support by the system enabled many smallholder to manage well their farms. A well managed farm produced good quality tobacco which after sale earned a substantial amount of money to the farmer. On the other hand, the cash contribution by maize and groundnuts was 12% respectively while beans contributed 13% (Fig. 9). maize was least because maize production operations mainlydepend on smallholders own cashto buy fertiliser, quality seeds and pesticides. The cash contribution of beans and groundnuts were relatively small. Beans and groundnuts were grown either for sale or for relish. Some farmers, grew them in small quantities, normally grew them together with maize (intercropping system).

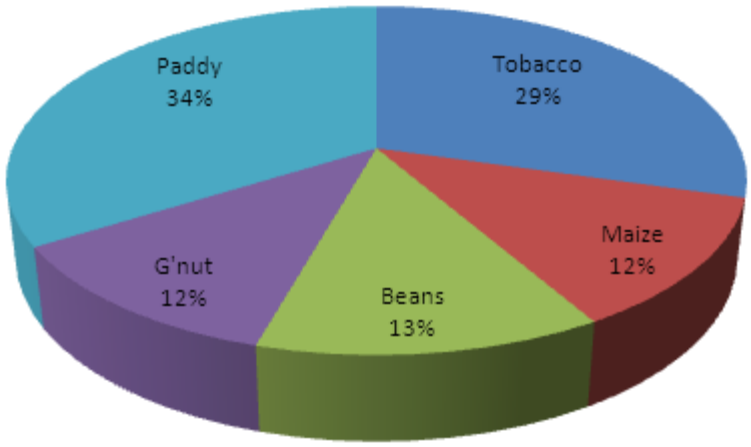

Figure 9: The gross cash income contribution from crops

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The overall objective of the study was to analyse the economics of smallholder tobacco production and marketing in Tanzania using tobacco smallholder farmers in Mpanda District as a case study. In examination of this broader objective, it was hypothesized that tobacco farm size has no influence on tobacco profitability. Also the study aimed at determining the profitability of tobacco and the contribution of tobacco to household cash income in relation to other crops. To make the study thorough, maize, beans, groundnuts and paddy were included in the study because they compete for various resources with tobacco production.

The profitability analysis of tobacco, maize, beans, groundnuts and paddy revealed paddy as the most profitable crop followed by tobacco. The analysis of gross margin indicates that the highest Gross Margin of (Tshs 1 277 060 /ha) is obtained from paddy production while GM (Tshs 1 111 734Tshs/ha) is for tobacco production, GM (Tshs 480 957/ha) for beans, GM (Tshs 441 200/ha) for groundnuts and GM (Tshs 456 527/ha) for maize. These results indicate that all five crops are profitable to the smallholder farmer. However, when the return on labour is assessed tobacco production becomes the last profit making enterprise. The point to note here is that tobacco production is labour intensive than the rest selected crops. Paddy production stipulates the highest gross margin because the cost of production is low. The lower gross margin for tobacco is observed to be attached with high cost of production. It is obvious that the high cost of production reduce profits, it is also true that low price reduces total revenue. Therefore, reduction in cost of production

and improvement in tobacco price will improve tobacco gross margin. The study recommendation to tobacco farmers is, to grow both food and cash crops in a reasonable farm size proportion and adopt modern farming technologies.

Moreover, close examination of the results obtained from regression equation reveals that farm size, education level, non-farm income and extension services to have positive influence on tobacco profitability although none farm income variable was not significant. Farm size was significant but both positively and negatively related to tobacco profitability. When production is assumed to be linear farm size influences tobacco profitability positively, meaning that the more farm size is increased the more profit is made. When the farm size is increased by its square, the profit increases to the maximum point where no more profit can be made. Beyond that stage profit increases at the decreasing rate (Figure 8). However, when the farm size is cubed the profits will decline to the minimum point then it will take off if innovations are made.

The trend of falling and rising of tobacco profitability in relation to farm size is due to economies and diseconomies of size. As the size of the operation increases, the farmer pay less per unit of variable input because inputs can be bought in larger quantities. On the other hand diseconomies can be caused by poor management or inability to sale all output at a good time. Among four parameters that influence positively tobacco profitability, only tobacco farm size, education level, and extension services are significant. The regression analysis results enabled the study attached to the tobacco farm size to reject the null hypothesis which stated that tobacco farm size has no influence on tobacco profitability ($p<0.001$). On the other hand education level, and extension services are significant ($p<0.05$).

The descriptive statistics are employed to determine the contribution of tobacco production to household cash income from crops. The descriptive statistics show the percentage contribution of Rice 34%, Tobacco 29%, Beans 13%, Groundnuts 12% and Maize 12%. The results reveal that tobacco contributes significantly to the household cash income in relation to other crops. Furthermore, farmers have opportunity to improve their cash income from food crops especially in paddy production as the crop is the most profitable. Farmers can use effectively the irrigation schemes of Urwira, Ugalla, Karema, Iloba and Mwamapuli and other suitable low land plainslike Mwamapuli, Mwamkuru, Kasekese, Kakese and iloba, which are available in the study area.

The study concludes that tobacco production is profitable. It has contribution to households' cash income and it has spillover effect. However, the low cash income facing tobacco households could be attached to moderate tobacco profits due to high labour intensity. Tobacco profitability becomes very little when labour is considered. The return on labour and on investment becomes low due to the great number of man days spent in tobacco production as compared to other enterprises.

5.2 Recommendations

In Tanzania where the main source of foreign exchange is from sale of cash crops, tobacco being the leading cash crop in foreign exchange earnings (BoT, 2012), effort is required to improve tobacco production by smallholder farmers. Based on findings of this study the following are some of the recommendations to policy makers who plan for agricultural development in the country.

5.2.1 Recommendation to tobacco farmers

i) Concerning non-farm income on tobacco profitability: Tobacco smallholder farmers should be advised to engage themselves in non-farm activitie such as: making bricks for sale, beekeeping, carpentry and masonry. These other activities can help farmers to buy more inputs and hence increase farm size. The use of more inputs can improve produce quality hence tobacco profitability.

ii) As an alternative to tobacco production, farmers in the study area can opt for paddy production as it is the most profitable enterprise. Farmers in the study area can effectively use the irrigation schemes and broad low lands which are under utilized. Low lands are found in Mwamapuli Mpimbwe division, Iloba in Karema division and Kasekese, Kakese and Mwamkulu in Kabungu Division. Alternatively, tobacco farmers in the study area can use irrigation schemes in Urwira, Kakese, Ugalla and Karema. Other crops that can be opt for and are profitable are maize, beans and grundnuts. The added advantage on them is enviromenal friendly.

5.2.2 Recommendation to policy makers

i) The findings of the current study show that farms are dominated by small scale farmers operating between 0.4 and 0.8 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 labour 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 occational 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 inputself-sponsoring. As tobacco farmer groups are many, tobacco stake holders 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.

iv) The current research findings show that the return on labour and on investment are low. The return can be improved through increasing productivity and improve tobacco buying price. The government should intervene the tobacco

input market to enable smallholder farmers accesss inputs at low cost basing on the cost of production.

5.2.3 Recommendation for further research

i) Tobacco processing requires heat energy from firewood. Tobacco processing is done every year. A research is required on alternative source of energy in tobacco processing for environment conservation.

ii) During analysing the Economics of Smallholder tobacco Production and Marketing in Mpanda District, some variables were not included in testing factors influencing tobacco profitability due to shortage of time and finance. Further studies can involve variables like cost of production, age, gender, household size and composition so as to have broad understanding of the subject matter.

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APPENDICES

Appendix 1: A questionnaire of tobacco farmers

Title: Economics of Smallholder Tobacco Production in Mpanda District, Tanzania

GENERAL INFORMATION

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

1. HOUSEHOLD IDENTIFICATION VARIABLES

4. Household head name……..
5. Marital status of household head……..

1= Married, 2= Single, 3=Divorced, 4 =Widowed.

6. How old are you?(AGE)……(years)
7. How many people do you have in your household?
8. What is your highest level of education attained?

1) Primary education…….....

2) Secondary education…….....

3) Adult education…….....

4) Others (specify)…….

II. PRODUCTION INFORMATION

9. For how long have you been growing tobacco? (tick)

Years	1-5 yrs	6-10 yrs	11-15years	Others

10. How many hectares/acres of tobacco did you cultivate in 2011/2012 season? .....

11. What are your main sources of labour in tobacco production?

Family members 1=Yes 0 = No

Work groups1=Yes 0 = No

Hired labour1=Yes 0 = No

Combination of the above 1=Yes 0 = No

12. From your family how many do work in tobacco farm?

1-2	3-4	>4

13. How big were your cultivated land, and the yield obtained in each enterprise?

Crop enterprise	Area cultivated (acres)	Yield (Kg)
Tobacco		
Maize		
Beans		
Groundnuts		
Paddy		

14. What was the price of fertilizer and chemicals in 2011/2012 season?

S/n	Item	Quantity (Kg/Litres)	Price
1	N.P.K 18: 10: 20		
2	CAN		
3	Yamaotea		
4	Confidor		
5	Actara		
6	Decis		

15. What was your schedule of activities from land preparation to harvesting in 2011/2012

Enterprise	**Activity**	**Months**											
		1	2	3	4	5	6	7	8	9	10	11	12
Tobacco													
	Land preparation												
	Planting												
	Weeding and fertilization												
	Harvesting												
	Marketing												
Maize	Land preparation												
	Planting												
	Weeding and fertilization												
	Harvesting												
	Marketing												
Beans													
	Land preparation												
	Planting												
	Weeding and fertilization												
	Harvesting												
	Marketing												
G'nuts	Land preparation												
	Planting												
	Weeding and fertilization												
	Harvesting												
	Marketing												
paddy													
	Land preparation												
	Planting												
	Weeding and fertilization												
	Harvesting												
	Marketing												

16. How did you allocate your labour input among five crop enterprises and the associated costs for 2011/2012 agricultural season?

Operations	**Source of labour**		**Associated costs (Tshs)**					**Total**
			T'co	**Maize**	**G' nuts**	**B'ns**	**Paddy**	
	Family	**Hired**						
Firewood collection								
Land preparation								
Cultivation								
Ploughing								
Harrowing								
Purchase of seeds								
Sowing/planting								
Nursery work								
Transplanting								
Barn costs								
Weeding phase 1								
Weeding phase 2								
Thinning								
Fertilizer & pesticide appl.								
Topping &desuckering								
Harvesting								
Pesticide application (phv)								
Curing								
Sorting, and grading								
Transport								
Haulage and mkting								
Total								

17. What were the major problems you experienced in tobacco production in 2011/2012 ?

18. How many extension officers do you have in your Ward……

19. How many time did the extension officer visited your group? (tick)

1	2	3	4	5

FINANCIAL INFORMATION

19. Where did you get your financial assistance in 2011/12 season for tobacco production?

1. CRDB Bank 2.NMB Bank 3.SACCOS 4.Street landers or some combination of the above.

20. What was the interest rate of your loan? (i)..... (ii)……..

MARKET INFORMATION

21. How do you collect information on market input and output prices?

1. Direct visit to the market ……...

2. Cross checks with middle men…….

3. Hear from friends……..

22. Give the amount (kg) produced, consumed at home, sold and prices of the different crop enterprises in the 2011/2012 season.

Enterprise	**Amount produced**	**Amount consumed**	**Amount sold**	**Unit price**		**Gross income**
				Private	**Social**	
Tobacco						
Maize						
Beans						
Groundnuts						
Rice						

23. When did you get paid after selling your tobacco?(tick)

1) Immediately after selling crops……

2) 1-2 months after selling……

3) 3-4months after selling…….....

VI: MISCELLANEOUS INFORMATION

24**.** Indicate cost of the different items/equipment incurred in tobacco operations 2011/2012**.**

Item	**Land**	**Barn**	**Hoe(s)**	**Watering can(s)**	**PPE**	**Barn thermometer**	**Bailing box**
Cost							

25. Besides income received from crop production, do you have any other source of income? 1 =Yes 0 = No

26. If yes, specify the source (s) and amount earned in 2011/2012 season

Source	**Chicken**	**duck**	**Goat**	**Sheep**	**Cows**	**Gardening**	**Making bricks**	**Honey**
Amount								
Value								

THANK YOU FOR YOUR COOPERATION