

**ANALYSIS OF PRODUCTION AND MARKETING POTENTIAL FOR PAPRIKA
AS AN ALTERNATIVE CROP TO TOBACCO IN URAMBO DISTRICT, TABORA
TANZANIA**

BY

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**A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE
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ABSTRACT

Tobacco has been the most important traditional cash crop in Urambo district since. But 1960s, the production of tobacco in the district has been declining due to world market price. Due to this price decline, farmers have now shifted to paprika production. The economic benefit of tobacco *vis a vis* paprika production in Urambo district has not yet been exploited. This study describes and analyses two crop production systems namely tobacco and paprika growers. Specifically, the objective of the study are (i) to identify and analyze costs and returns between Tobacco growers and paprika growers, (ii) to compare the contributions of Tobacco and Paprika crops to household income, (iii) to examine the profitability of Tobacco and Paprika production. Purposive and multistage area sampling was used in order to include divisions, wards and villages which cultivate tobacco and paprika, giving a total of 100 interviewees. Primary data for this study were collected by administering structured questionnaires. Secondary data were extracted from reports and documents from relevant institutions and organization such as WETCU and Sokoine National Agricultural Library (SNAL). Two tools of analysis i.e. two independent T-test and Gross Margin Analysis were used. Unit production costs for tobacco was 581 288.52 higher compared to paprika and Paprika production is a profitable enterprise with gross margin of T.shs 250 950 /acre when farmers sell their produce to TSL and T.shs 392 070/ acre if they sell to WETCU. Apart from paprika production and marketing problems encountered, the recommendations are as follows; Increase paprika production, construction of irrigation schemes and establishment of paprika marketing within the study area.

DECLARATION

I, ANETH JACKSON MATHANIA do hereby declare to the senate of Sokoine University of Agriculture that the work presented here is my own, and has not been submitted for a higher degree in any other University.

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The above declaration is confirmed

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DEDICATION

To my beloved Mum, Elizabeth Mathania who laid the foundation of my education:

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LIST OF ABBREVIATIONS AND SYMBOLS

AOI	:	Alliance One International Limited
ASDP	:	Agricultural Sector Development Programme
ATTT	:	Association for Tobacco Traders in Tanzania
FAO	:	Food and Agricultural Organization
GDP	:	Gross Domestic Product
GM	:	Gross Margin
ILO	:	International Labour Organization
IMF	:	International Monetary Fund
ITGA	:	International Tobacco Growers Association
MAFs	:	Ministry of Agricultural and Food security
MDB	:	Marketing Development Bureau
MUCCOBS	:	Moshi University College of Cooperatives and Business Studies
NGOs	:	Non-Government Organizations
NPK	:	Nitrogen Phosphorous and Potassium
RPOS	:	Rural Producer Organizations
SNAL	:	Sokoine National Agricultural Library
SPSS	:	Social Packages for Social Sciences
TR	:	Total Revenue
TSL	:	Tanzania Spices Limited
TVC	:	Total Variable Cost
URT	:	United Republic of Tanzania
USA	:	United State of America
USAID	:	United States Agency for International Development
U.S	:	United States

USD	:	United States Dollar
WETCU	:	Western Zone for Tobacco Cooperatives Union
WB	:	World Bank
WHO	:	World Health Organization

CHAPTER ONE

INTRODUCTION

1.1 Background

Tobacco is a cash crop grown worldwide in more than 120 countries in all continents, and most climates except the very coldest (ITGA, 1998). Tobacco is the main source of income to 72,000 small holders and offers employment opportunities in both farms and tobacco processing factories. However, there is no doubt that tobacco production is a highly contentious issue in which critics hold sway, often on health, world price fluctuations and environmental grounds (Rweyemamu, 2001).

In view of fall in world prices of traditional export crops and stiff market competition the Government encourages farmers to diversify their production enterprises mainly by embarking on production of high value non-traditional export crops (Keenja, 2004). Spices like vanilla and paprika are among the high value crop that have been introduced in order to enable farmers improve their incomes (Keenja, 2004).

Due to crop's price fluctuation, fewer farmers are now inclined to continue growing tobacco at any significant scale, as it is seen as a "waste of time and resources that could have been spent more profitably elsewhere." (Masudi *et al.*, 2001). Measures have been taken to improve family incomes in order to alleviate poverty by diversifying crop production instead of depending on tobacco only (Masudi *et al.*, 2001). Thus many farmers in Urambo district have reverted to production of paprika as an alternative cash crop (WETCU, 2004).

1.1.1 The role of crop diversification in agriculture

Diversification is a business expansion as well as a risk management strategy adopted by rural self-help organizations in order to maximize members' benefits through expanded and secure business portfolio and full utilization of emerging/existing business opportunities (Bamanyisa *et al.*, 2005).

Diversification can be influenced by either internal or external or both factors acting simultaneously (Alexander *et al.*, 1998). Internally diversification can arise from the following factors: when existing activities/business is too small to allow sufficient growth rates to enhance members' incomes, to avoid the risk of overspecialization in the event that single business faces some unexpected problems and when members get tired of doing the same things. Externally, diversification can be influenced by some of the following factors: when the market in which the farmers operate is unstable or is declining (Alexander *et al.*, 1998). Despite these factors, crop diversification, is an important instrument for food and nutrition security, income growth, poverty alleviation, employment generation, judicious use of natural resources, sustainable agricultural development, and environmental and ecological management/improvement (Alexander *et al.*, 1998).

Constraints faced by the agriculture sector have also created a compelling condition for crop diversification. These constraints emanate from economic, social and cultural factors. They include: poverty, low production efficiency and unable to integrate the adoption of technological changes to increase production, lack of storage facilities, low level of education, poor information dissemination and lack of rural credit (URT, 2003).

Diversified production reduces the exposure of growers to income variability in the face of variation in tobacco prices (URT, 2003). A diversified pattern of production also provides

the technical possibility for tobacco growers to shift away from tobacco production to other crops immediately because farmers already have the skills, equipment and marketing channels.

Farmers in the U.S have found alternative crops such as Echinacea to be both profitable and a good fit for their farm, tobacco producers are interested in diversification because of questions about the future of that crop (Karl, 1995).

Zimbabwe is the largest producer of tobacco leaf in Africa and the world's fourth largest producer of flue-cured tobacco after China, Brazil and the United States (Maravanyika, 1996). Zimbabwe has successfully diversified its agriculture into many commodity export markets like flowers, cotton, tea, coffee and meat have all increased in recent decades, reducing the level of dependence on tobacco (Maravanyika, 1996). Apart from fall in tobacco world prices, there are other drawbacks to tobacco growing in Zimbabwe for example soil erosion, the loss of indigenous timber used for curing tobacco, the chemicals used by tobacco growers during production (methyl bromide) is seen as the most significant ozone-depleting chemical (Maravanyika, 1996).

In Iringa Region, paprika production as a diversified crop production strategy began in 2001. This is the apparent success of paprika growers as a cash crop in Tanzania. For example the production of paprika in Iringa increased from 91 tones to 315 tones in the period of 2000/01 to 2004/05 (Bamanyisa *et al.*, 2005). These encouraged farmers in other parts of the country including Urambo District to start growing paprika as a cash crop.

In order to stimulate the process of sustained agricultural production in Urambo District, the Tanzania government and non- governmental organization (NGOs) such as Tanzania

Spices Limited (TSL) and Western Zone Tobacco Cooperative Union (WETCU), among other initiatives, started to support paprika production in order to promote it as an alternative cash crop alongside tobacco production in the area (USAID, 2003). This initiative is in line with the Tanzania policy framework for poverty reduction strategies as defined in the Agricultural Sector Development Strategy (USAID, 2003).

1.1.2 Marketing of paprika as alternative to tobacco

Market organizations are entities such as firms, individual agents and cooperatives that perform marketing functions such as collecting, transporting, processing, retailing and exporting of agricultural commodities (Temu, 1999). Market can potentially contribute to the development of crops or any other commodities in two ways, first, it can provide a way to allocate resources ensuring the highest value of production and secondly, it can stimulate growth by promoting technological innovation (Rweyemamu, 2001).

The marketing of produce has a direct relationship to farmer's income (Msuya, 2003). Timely marketing and finding the right buyer who pays at the right time is important in the whole circle of farming (Msuya, 2003). Marketing margin is of great importance because of the impact of intermediary market participant upon prices paid by the consumer and that received by the producer (Nyange, 1993).

In Urambo district the marketing channel of paprika consists of producers, cooperatives (WETCU) and Tanzania Spices Limited (TSL), who in turn export paprika to Spain and Hungary. For tobacco, marketing channel is producers, buyers (private tobacco leaf dealers TTTMP and AOI), processors and external markets,

1.2 Problem statement and justification

In Tabora Region (including Urambo District), the total arable land amounts to about 2,129,900 ha, of which an average of 29.6% (86,087 ha) is cultivated annually. Tobacco is the only major traditional crop grown. Other crops grown in the area are maize, rice, groundnuts, cassava and sweet potatoes. Maize is the predominant food crop in Urambo District.

Tobacco has been the most important traditional cash crop in Urambo district since 1960s. However between 1995/1996 to 1999/2000, the production of Tobacco in the district declined from 13, 027,000 tones to 4,675,405 tones (Masudi *et al.*, 2001). Kalamata (2006) pointed out that, at the beginning of 1996/97 total production started to decline, reaching its lowest point in 1999/2000. The world market price of tobacco has been fluctuating, for example in 1999/2000 and 2003/04 the price varied between US \$ 2.09 to US \$1.04 per kilogram (MAFS, 2005).

Also, the increase in tobacco output after the appeal of the restrictive special crops act in 1989 was induced by the inherent comparative advantage of tobacco relative to other crops and not by an increase in real value of the crop (WHO, 1999). Although concerns for poverty reduction are appreciated and entry of smallholder's production is welcome, there is mounting fear that over-production may ultimately result in loss of quality and decline in the world price of tobacco (WHO, 1999).

These fears are not altogether unwarranted, considering that Urambo district is a major producer of flue tobacco in the country. The World Bank (2003) estimates that the full effect of liberalization would be a decline in world prices by about 28 percent in the short run and 9 percent in the long run. The negative income effects of such a decline in the

world price would be more severe in Urambo district, since flued tobacco contributes substantially to farmers' household income and the country's foreign exchange earnings (WHO, 1999).

In addition, the negative effects of tobacco production resulting from deforestation and environmental degradation, especially reduction in biodiversity and sanitation of rivers and lakes, need to be weighed against the benefits in the long run (WHO, 1999). Dependence on one crop has also been a main problem addressed in the structural adjustment programme supported by the World Bank and IMF (WHO, 1999). Considering an increase in anti-smoking campaigns in western countries and the associated reduction in demand for tobacco, as well as the recently launched work of an International Negotiating Body on drafting a WHO framework Convention on tobacco control, the need to diversify out of this crop, as a major source of economic livelihood and foreign exchange, is evident (WHO, 1999).

The search for alternative agricultural crop has been a persistent challenge facing smallholder farmers in Urambo District (WETCU, 2004). This problem has forced farmers to start paprika cultivation due to the fall in tobacco revenue which has been a traditional cash crop for many years (WETCU, 2004). Paprika has been introduced recently and farmers are now showing great interest due to the high price incentives (WETCU, 2004). According to Bamamyisa *et al.* (2005) the crop is sold at Tshs 1070 per kilogram for grade A, Tshs 560 per kilogram for grade B and Tshs 250 per kilogram for grade C.

The first attempts to introduce paprika production in Urambo District were made by WETCU and TSL in 2004 under the contractual agreement (WETCU, 2004). Tanzania Spices Limited has committed itself to the providing standard inputs for the crop and

buying the product. Currently a total of more than 260 farmers have received seeds from WETCU and they expect to harvest 300,000 kilos of paprika (WETCU, 2004).

The emerging importance of paprika as an alternative cash crop is not limited to Tanzania alone. Two innovative, flue-cured, tobacco producers are exploring bell pepper production as an alternative or additional crop on their farms in Southeast Virginia (USA), their initial results are very promising (Alexander et al., 1998). Maravanyika (1996) recommended that with market price for tobacco on the decline, Zimbabwe's farmers need to look for paprika as an alternative to supplement production of this traditional crop.

Urambo District appears to have a high potential for production of paprika owing to favorable climatic conditions. However its potential remains to be exploited. Little economic research has been conducted on paprika production in Tanzania. This study concentrates on the analysis of production and marketing potential for paprika as an alternative to tobacco in Urambo District. This analysis will help policy maker to know the economic benefit of tobacco *vis- a- vis* paprika production and take measures on how to improve the profitable crop.

1.3 Objectives of the study

1.3.1 Overall objective

To examine the economic benefit of Tobacco Vis paprika production in Urambo District.

1.3.2 Specific objective

- (i) To identify and analyze costs and returns between Tobacco growers and paprika growers

- (ii) To assess the contribution of Tobacco and paprika to household income in study area.
- (iii) To examine the profitability of Tobacco and paprika production.

1.4 Hypotheses

Based on the problem and the objectives of this study, the following hypothesis were formulated and tested.

- (i) Unit production costs are not significantly higher in tobacco compared to paprika growers. The hypothesis 1 was tested by computing the mean difference between the two means using two sample independent T- test.
- (ii) Contributions of paprika as alternative crop to household income are not significantly higher than tobacco crop.
- (iii) No significant difference in profitability between tobacco and paprika production.

Hypotheses (ii) and (iii) were tested by computing production costs and returns per acre (gross margins) of each enterprise.

1.5 Organization of the study

This thesis is organized into five chapters including introduction. Chapter two is a review of relevant literature. Chapter three describes the theory and methodological framework. Chapter four shows the findings and discussion of the study. Chapter five presents findings of the study and summarizes concluding remark and policy recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Overview

The Tanzanian economy is agriculture dominated, with other sectors growing. In 2004, the agricultural sector contributed 46% of GDP and provided about 51% of foreign exchange and 75% of the total employment (URT, 2004). Agriculture in Tanzania is based on small scale farmers who use hand hoe and is rain fed. Its growth rate has decreased from 6.5% 2001 to 6.1% in 2002 due to various factors including lack of adequate rainfall, fall in world market prices, decline in production, loss in soil fertility etc (URT, 2003). The earnings from traditional export crops are decreasing due to fall in price at the world market and heavy taxes on export crops (URT, 2003). Low export earnings may also be attributed to decline in quality, poor quality offers lower prices (Bamanyisa *et al.*, 2003). Thus forcing farmers to diversify into alternative high yielding crops and income generating activities.

Economic contributions of tobacco and paprika production as income generating crops have been conducted in a number of countries in which the crops play an important economic role (Rweyemamu, 2001).

2.2 Economics of tobacco as income generating crop

There are seven types of tobacco produced in the world these include, light air-cured, fire cured, flue cured, burley, dark- air/sun –cured, dark –air cured cigar and dark fire cured tobacco (Rweyemamu, 2001). In China, tobacco is an important source of income for the government, as its taxes contribute to government revenue (WB, 2003). In Brazil, for example, some 135 000 households produce tobacco as their main economic activity. In

the 2000/2001 crop year average gross income per family farmer reached R\$ 9 165 (US\$5 000) (WB, 2003). In India, tobacco makes a significant contribution to the economy in terms of employment, income and government revenue generating nearly Rs. 20 billion (US\$0.45 billion) income per annum (WB, 2003).

In Turkey, approximately 250,000 labourers and 282,000 tenants are employed in the tobacco industry, which also supports 1.1 million people (WB, 2003). Also there are approximately 600 000 small tobacco growers in Turkey employing some 1.5 million persons apart from those employed in other tobacco-related activities, such as transportation, storage, trade and cigarette manufacturing (WB, 2003). Under such a situation, a fall in tobacco production necessarily causes a fall in total employment.

In Malawi, tobacco production has a major role in the employment and income of rural households (Charles *et al.*, 2001). Malawi accounts for about 20 per cent of the total world production of burley tobacco (Charles *et al.*, 2001). In Zimbabwe where 98% of tobacco production, is exported, tobacco makes an important contribution to GDP and to export revenue, and plays a major role in the national economy (WB, 2003). According to Maravanyika (1996) tobacco industry in Zimbabwe accounts for one tenth of the national work force. This includes labour involved in primary production on the farm right through to manufacturing in the various factories. In the agricultural sector alone, tobacco farming accounts for 33% of total agricultural employment. This high employment capacity is no doubt aided by the labour-intensive nature of tobacco production. For example about 98000 people are employed in all activities from seedbed preparation, transplanting, weeding, harvesting and the to the drying of the leaf on the farm.

In Tanzania three types of tobacco are grown namely, fired cured, flue cured and burley, and tobacco production is an important source of employment and income (FAO, 1990). However, fall in tobacco production in the country is contributed by several factors; these include: inadequate capital, general decline in tobacco real producer price, competition in resource use between tobacco and alternative crops, general unfavorable weather conditions and changing roles of institutions involved in production and marketing (MDB, 1992).

According to Masudi *et al.* (2001) farmers in Urambo district have been producing tobacco since 1960, and yet most farmers are still very poor. It has been observed that 84% of the parents' children working on the tobacco farms come from very poor socio-economic backgrounds and they force their children to work on tobacco farms so as to assist their family to buy food, pay school fees and other needs (Masudi *et al.*, 2001). On average farmers at Urambo district earn between TSh. 81,000.00 and TSh. 86,400.00 per year (Masudi *et al.*, 2001). In order to increase their income levels, farmers in Iringa and Tabora (including Urambo district) have been encouraged to produce alternative crop rather than depending only on Tobacco production (Masudi *et al.*, 2001).

Crop production in Tanzania is based entirely on peasant farming with household as a unit of production. Family is the major source of labour for crop production (Mwakyambiki, 1998). Rweyemamu (2001) noted that tobacco is a labour intensive crop and demands a large amount of investments in terms of fixed and variable cost. According to Ishuza (1985), cited by Rweyemamu (2001) found that one hectare of tobacco requires 738 mandays while a Ha of maize needs 160 mandays.

2.3 Economics of tobacco as foreign exchange earner

Developing countries with a positive tobacco leaf trade balance (net exporters) are: Argentina, Brazil, Chile, Colombia, Guatemala, India, Kenya, Macedonia, Malawi, Mexico, Mozambique, Tanzania, Thailand, Turkey and Zimbabwe (WB, 2003). These countries potentially have more to lose from a fall in global demand, although much will depend on how competitive their tobacco leaf exports are (WB, 2003). Falling global tobacco prices could squeeze higher cost producers out, and increase the market share of lower-cost producers, although profit margins might be lower. It should also be noted that even in the major growing countries, tobacco leaf exports make a modest contribution to total export revenues, except in Malawi (60%) and Zimbabwe (20-30%): the figures are 5-6% in Bulgaria, Dominican Republic, Kyrgyzstan and Tanzania, 1-2% in Brazil and Turkey, and well below 1% in all the other top tobacco-growing countries (WB, 2003).

2.4 Economic contribution of Paprika

Gourmet paprika is New Zealand's largest grower of capsicums and is cultivated in environmental controlled glasshouses (Ray, 2003). The project is very significant with respect to creating income and employment. To date, the glasshouse facility has employed 38 people. Socially, the result is significant, with a real change being seen in the Mokai and Mangakino communities. The reason for this is because people have more discretionary money to spend as a result of increased employment. The plant is operating well and the stakeholders have an expectation that an expansion will take place in the near future (Ray, 2003).

In Mozambique, paprika creates employment of 5 people per hectare and 30 people per thousand tons in the paprika factory (Kellogg, 2003).

Peru is the world's largest producer with revenues from paprika foreign sales reaching US\$54 million (Miski, 1999).

In 1995, growers in Israel exported \$13 million worth of paprika (Globes, 1996). Israel is the only successful exporter of a dry spice. Its export of paprika reached USD 15 million. Israel's total production in 2001-2002 was estimated to be 8,000 tonnes 7,200 tonnes (90%) of this was exported, and 800 tonnes (10%) was sold on the domestic market (David, 2004).

In Zimbabwe, small-scale producers account for over 90 percent of the total paprika output in the country (Somogyi *et al.*, 2004). Zimbabwe exports 97 percent of paprika to Spain, India, United States and Germany and currently has an annual production of about 14 800 tonnes grown on about 15 000 hectares of land (Zhean, 2003). In 2000, Zimbabwe was the largest producer of paprika in Southern Africa (15,000 tonnes/year). Farmers receive about USD \$5000 per hectare, hence have a profit of USD \$3000 per hectare (Zhean, 2003). The annual production of paprika could rise to about 21 2000 tonnes and earn the country \$7.1 billion annually due to an anticipated decline in international demand for tobacco (Zhean, 2003). Zimbabwe earned more than US\$8 million from export of paprika (*Capsicum annum*) (Somogyi *et al.*, 2004).

In Zambia, Bimzi family agribusiness i has organised 3000 small-scale farmers to grow paprika for export (Tata, 2003). Bimzi exports 400 tons a year, most of the paprika grown in its raw form, to South African manufacturers (Tata, 2003)).

In Tanzania, according to Bamanyisa et al. (2005) before diversification, farmers at Ihemi and Kilolo (Iringa region) were producing maize, beans, vegetables and *kifuku-ulanzi* that

had relatively lower returns. Now farmers are at least assured of a constant income from selling paprika.

2.5 Paprika: History, production and uses

2.5.1 History of paprika

Spice and vegetable paprika, which cover a diverse variety of members of the *Capsicum* genus, belong, as for tomato, potato and tobacco to the Solanaceae family (Mark, 2003). There are five cultivated *Capsicum* forms; *annuum*, *frutescens*, *chinense*, *baccatum* and *pubescens* which all originate from South America (Mark, 2003). *Capsicum annum* was also found in Central America. Paprika and bell peppers belong to the species of *Capsicum annum* and mainly to the *Grossum* Group. They have been developed particularly in Spain, and Hungary and much later in the United States (Mark, 2003). The varieties developed in Spain and Hungary are genuinely non-pungent varieties whereas the varieties in the United States are non- or mildly pungent Anaheim chilies (Mark, 2003). The plants of Spice paprika produce a red (in its ripe stage) and non-pungent fruit that is de-hydrated for the production of the red powder (Chemonic International Inc., 2003).

Due to the high cost of hand harvesting, there has been a major shift from traditional producing countries such as Spain and Hungary (Mark, 2003). Spain and Hungary remain significant producers. Currently the most important production areas in the world are United States (mainly in New Mexico), Brazil, Peru, Chile, Zimbabwe and South Africa (Chemonic International Inc., 2003).

In Tanzania the crop is now grown in Iringa, Ruvuma and Tabora regions (including Urambo). The global production of dry paprika products is estimated at some 90 - 100 million kg of which some 40-60 % is traded internationally (Bamanyisa et al., 2005).

Paprika fruit has 4 main parts; the stem or calyx, the skin or pericarp, the seed list or placenta and the seed (ratio in American varieties is approximately 5, 70, 2, 23 % respectively) (Chemonic International Inc., 2003). The most valuable part of the fruit is the pericarp that holds the colour and flavour. The seed and placenta contain no valuable colour or taste and the placenta is that part of the fruit containing the largest portion of the pungent elements (Chemonic International Inc., 2003).

2.5.2 Uses

According to Derera and Faiast (2000) paprika is favoured for its spice and its food colouring properties (produces a bright red powder to flavour and colour foodstuffs). Especially the Hungarian product is famous for its 'spicy' aroma. The high value plant is cultivated for use as cosmetics, a paprika powder is used as spice and as natural colour for food products and also paprika contains vitamin A and vitamin C.

CHAPTER THREE

METHODOLOGY

3.1 Description of the study area

3.1.1 Location

Urambo district is one of the six districts of Tabora region situated in the mid-western part of mainland Tanzania on the central plateau between latitude 4° and 7° south of the Equator and longitude 31° to 34° east of Greenwich. The district covers a total area of 21 2999 square kilometers. It is bordered in the east by Uyui district, Shinyanga region to the North, Kigoma region to the West and Tabora region to the south (URT, 2005).

3.1.2 Climate and topography

The district has two seasons. The first starts from October or November to December followed by a slight dry spell in January or February. The main season occurs between February or March to April. The amount of rain it receives annually ranges from 1000 mm to 1100 mm. Its average temperature is 23° C and has sandy- loamy soils. These soils are generally moderately fertile and responsive to fertilizer. The area is of great agricultural potential (URT, 2005).

3.1.3 Human population

Urambo district has a population of 370 796 people with 62 633 households with average size of 5.9 people per households. Majority of the population lives in rural areas (URT, 2005).

3.1.4 Farming system

In Urambo district the main food crops are maize and cassava, but sweet potatoes, paddy and pulse are also produced. Tobacco is the main cash crop. However due to price drop in

the world market farmers are looking for alternative cash crops. Paprika has been introduced recently and farmers are now showing interest due to high profit. Livestock keeping is also practiced even though tsetse fly infestation is very high (URT, 2005).

3.1.5 Infrastructure

Urambo district has poor road communication which limits development especially in rural areas, though there is a moderately developed infrastructure of roads (earth roads) linking Urambo district to Kaliua division, Ulyankulu division, Usoke division and Tabora region (URT, 2005).

3.2 Design of the study

3.2.1 Selection and justification of study sites.

Urambo district was chosen for the study due to having relatively longer experience in flue tobacco growing and is the second district after Tabora district in Tabora region which adopted paprika production.

3.2.2 Questionnaire formulation

Two questionnaires were formulated for the purpose of collecting data from survey area, one for tobacco growers and the other for paprika growers. Pilot survey was undertaken so as to test questionnaires. Modifications were made accordingly.

3.2.3 Drawing a sample

The sampling frame was obtained from the tobacco and paprika farmers' registers kept by WETCU. Since all paprika growers and few tobacco growers sell their produce to WETCU, the sampling frame was easily obtained from the sale register. Any paprika growers who harvested and sold his produce to WETCU in 2004/05 season qualified for

the inclusion in the sampling frame. Each and every tobacco and paprika growers who harvested and sold his produce to WETCU in 2004/05 season had an equal opportunity of being selected for the interview. The sampling frame consisted of 1000 for tobacco and 560 for paprika.

3.2.4 Sample selection

Boyd *et al.* (1981), cited by Senkondo (1988) and Wien (1990), cited by Nyange (1993) indicated that a sample (n) is to be chosen such that the sampling fraction (n/N) is at least equal or greater than 5 percent.

Sample of 50 farmers from tobacco was equal to the requirement (5%) and 50 farmers from paprika were above requirement (9%). The samples were drawn by two stage sampling i.e. area sampling and respondent sampling.

Area sampling

Purposive, multistage and systematic sampling was carried out. In the first stage, purposive and multistage area sampling was used in order to include divisions and wards which cultivate tobacco and paprika. All four divisions in Urambo district were sampled namely; Urambo division, Ulyankulu division, Kaliua division and Usoke division. The reason for selection is that all divisions in Urambo district produce tobacco and paprika. Urambo division produced more followed by Ulyankulu division, Kaliua division and Usoke division.

From each sampled divisions different villages were sampled comprising tobacco and paprika growers. The villages and their division in paranthesis are as follows; For tobacco Kalemela 'A' (Urambo), Kalemela 'B' (Urambo), Uyogo (Urambo), Urambo mjini (Urambo), Songambebe (Urambo), Uyowa (Ulyankulu), Barabara ya 13 (Ulyankulu),

Igagara No. 5 (Kaliua), Usimba (kaliua), Nsogolo (Usoke) and Kalembela (Usoke). For paprika, Ukondamoyo (Urambo), Uyogo (Urambo), Kalemela 'A' (Urambo), Urambo mjini (Urambo), Songambebe (Urambo), Uyowa (Ulyankulu), Kaswa (Ulyankulu), Barabara ya 13 (Ulyankulu), Usimba (Kaliua) and Nsogolo (Usoke).

From sampling frame, sampling proportional to size using systematic sampling was selected. Farmer were delineated into three groups according to their production (that is village with more than 20 farmers, 10-15 farmers and with 5 farmers), this was only done to have different categories of representation in the sample. 10 and 11 villages from tobacco and paprika divisions were obtained.

Respondent sampling

From each of the selected villages, a sampling frame from WETCU comprising tobacco and paprika farmers was used. According to WETCU none of the tobacco and paprika farmers could be regarded as large or commercial farmers. This is because land area under tobacco and paprika fluctuates from year to year depending on labour availability. In the second stage systematic sampling was used. However, with the above sampling procedure about 3-10 tobacco and paprika respondents were chosen randomly from each village using a list sampling frame, giving a total of 100 interviewees from tobacco and paprika.

3.2.5 Data collection

The study involved a cross sectional single visit survey. This design allowed the collection of data at one point in time i.e. during November and December 2005/06

Primary data for this study were collected by administering the structured questionnaires. The questions for tobacco and paprika growers were administered to the head of the

households. A visit was made to the respective farm so as to see the physical condition of the farm. The information collected included household identification variables, farm activities, labour use and other purchased inputs, farmer's problems, labour's problems, output and marketing of paprika and tobacco. The researcher and three- trained enumerators conducted the interviews at their homesteads.

Secondary data were extracted from reports and documents from relevant institutions and organizations such as WETCU and Sokoine National Agricultural Library (SNAL)

3.2.6 Data analysis

Part of the analysis is based on descriptive statistics to describe the responses, characteristics and trends of some of the data and information. Response from the interview were coded, summarized and entered in a computer. The data was analyzed using Statistical Package for Social Science (SPSS). Two sample independent T- test was used to test the unit production costs of two different means of tobacco and paprika. Senkondo (1988) pointed out that, a unit production costs can be examined by testing the difference between two means of the two different groups of growers, using two sample independent T- test. The following formular.

$$T = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{S_1^2/n_1 + S_2^2/n_2}} \approx t(n_1 - 1, n_2 - 1)$$

Where:

\bar{x}_1 and \bar{x}_2 = Two means being compared,

s_1^2 and s_2^2 = The sample variances of the two populations and n_1 and n_2 are sample size.

Production costs and returns were analyzed using Gross margin analysis in order to examine the relative profitability between paprika and tobacco growers.

3.2.6.1 Gross Margin analysis

Most often new technologies in smallholder agriculture aimed at increasing the farm production by the fact that increased income is one of the immediate objectives of the overall enterprise of the farmers (Johnsen, 2003). Johnsen (2003) stated that the costs involved in introducing new technology might hinder the adoption of improved production technologies. Mutayoba (2005) used gross margin of vanilla to compare with the competing crops i.e. coffee, tea, banana and maize. 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. Mwikila (1992) used gross margin per ha for the two crops i.e. tobacco and maize to obtain the most profitable enterprise. Senkondo (1988) used gross margin per ha for the sugarcane and paddy to obtain the most profitable enterprise. It is useful to compare the gross margin of tobacco to other competing crops particularly paprika in the area in order to identify which crop is more profitable.

To define the concept of gross margin, first we have to distinguish between variable and fixed costs. Variable costs are those costs that increase or decrease as output changes, while fixed costs do not change as output is changed. Common examples of variable costs in crop production include seeds, fertilizer and pesticides. The important fixed costs in agricultural production are owned land, farm building and farm machinery and implements (Ashimogo, 2000).

The gross margin of a farm activity is the difference between the gross income earned and the variable costs incurred. Gross margin analysis is used as an indicator of enterprise

profitability/viability. It is easy, simple and flexible to use, also it does not require advanced mathematical computation than addition, subtraction and multiplication which are within capacity of an intelligent farmer. It is used to make comparison of returns to resources for different economic activities and suggest relative efficiency in performance of different markets (Msangi, 2001)

$$GM_i = TR_i - TVC_i$$

Where:

GM_i = Average gross margin (Tshs/ha)

TR_i = Average total revenue (Tshs/ha)

TVC_i = Average variable total costs (Tshs/ha)

Advantages and limitations of Gross margin analysis

According to Ferris *et al.* (2000), cited by Mutayoba (2005) gross margin analysis has the following limitations:

- Gross margin is not a profit figure. Fixed costs have to be covered by the gross margin before arriving at a profit figure.
- Gross margins ignore the contribution of fixed capital and depreciation to profitability of competing enterprises and thus overestimate the degree of competitiveness.
- Gross margin analysis, even after accounting for cost of fixed capital and depreciation, fails to capture competitiveness to resource use between one enterprise and another, although it measures opportunity cost between them, *ceteris paribus*.
- Gross margin can vary widely from one year to the next. This is due to differences in market prices, weather condition and efficiency. Gross margin can also differ considerably from farm to farm. This can result from difference in performance level or difference in the overall system of production or method of recording.

- Comparison to average gross margin can be useful but it should be done over a number of years. However, it gives the starting point in the assessment of the enterprise.

Advantages

- It is a crude measure of profitability depicting the difference between gross revenue and cost of variable factors. These are simple to estimate and interpret and therefore effective in extension education among smallholder farmers, most of whom are illiterate
- It is easy, simple and flexible to use, also it does not require advanced mathematical computation than addition, subtraction and multiplication which are within capacity of an intelligent farmer.
- It is used to make comparison of returns to resources in different economic activities and suggest relative efficiency in performance of different markets

3.2.7 Limitation of the data

The data collection process had several problems. The data collected from tobacco and paprika growers, depend mainly on their memory recall and willingness to cooperate. Some paprika farmers were angry because of the way WETCU had cheated on paprika price as the price offered to them was quite different from what they had expected. This reduced some cooperation. However efforts were made to convince them to give the information.

CHAPTER FOUR

EMPIRICAL RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents empirical results and discussion for the data obtained from the formal survey. The results are divided into two sections; the first section presents descriptive statistics showing family and general characteristics of sampled tobacco and paprika growers. Followed by production process, profitability analysis from the empirical results and discussion from hypotheses (i), (ii) and (iii). Finally the problems facing tobacco and paprika farmers.

4.2 Family and general characteristic of tobacco and paprika growers

A representative sample of 50 people each from tobacco and paprika growers were selected for this study during 2004/05 season. The sample indicates an average family size of 6 and 8 persons for tobacco and paprika farmers respectively, of which only an average of 2 and 4 persons work in the farm.

4.2.1 Sample profile

The study, covered 11 villages of tobacco growers and 10 villages which grow paprika (Tables 1 and 2). The 11 tobacco villages growers included; Kalemela 'A' (6%), Kalemela 'B' (3%), Uyogo (8%), Urambo mjini (6%), Songambebe (2%), Uyowa (7%), Barabara ya 13 (6%), Igagara No. 5 (4%), Usimba (3%), Nsogolo (3%) and Kalembela (4%).(Table 1).

Table 1: Urambo District: Respondents interview by tobacco village

Village	Frequency	Percent
Barabara ya 13	6	12.0
Igagara 5	4	8.0
Kalemela	2	4.0
Kalemela A	6	12.0
Kalemela B	3	6.0
Nsongolo	3	6.0
Songambebe	2	4.0
Urambo mjini	6	12.0
Usimba	3	6.0
Uyogo	8	16.0
Uyowa	7	14.0
Total	50	100.0

The 10 paprika village growers included; Ukondamoyo (5%), Uyogo (7%), Kalemela 'A' (10%), Urambo mjini (6%), Songambebe (3%), Uyowa (7%), Kaswa (2%), Barabara ya 13 (3%), Usimba (4%) and Nsongolo (3%). (Table 2)

Table 2: Urambo District: Respondents interview by paprika village

Village	Frequency	Percent
arabara ya 13	3	6.0
Kalemela A	10	20.0
Kaswa	2	4.0
Nsongolo	3	6.0
Songambebe	3	6.0
Ukondamoyo	5	10.0
Urambo mji	6	12.0
Usimba	4	8.0
Uyogo	7	14.0
Uyowa	7	14.0
Total	50	100.0

4.2.2 Household variables

4.2.2.1 Age

About 82 percent of the tobacco respondents were between 36 and 54 years, 18 percent were above the age of 55 years (Table 3). The range of paprika respondent was from 24 years to a maximum of 75 years. About 54 percent of the paprika respondents were between 36 and 54 years, 36 percent were above the age of 55 years and 8 percent were

between 24 and 35 years (Table 4). The large percentage of the paprika respondent between 36 and 54 years was due to the fact that young people are the ones who adopt technologies early compared to older ones. Paprika is less labour intensive compared to tobacco; this is due to the fact that 38 percent of paprika respondent of age above 55 year can work on farm than 18 percent of tobacco growers.

Table 3: Urambo District: Age of tobacco respondents

Age range	Frequency	Percent
btn 36-54	41	82.0
btn 55 and above	9	18.0
Total	50	100.0

Table 4: Urambo District: Age of paprika respondents

Age range	Frequency	Percent
24-35	4	8.0
36-54	27	54.0
Above 55	19	38.0
Total	50	100.0

4.2.2.2 Sex

Of the 100 respondents, 44 percent were male and 8 percent were female, 42 percent were male and 6 percent were female from paprika and tobacco respectively (Table 5 and 6). The smaller the percentage of female respondents for both paprika and tobacco growers can be explained by the fact that in Urambo district in particular and in Tanzania in general men still control most resources of the family.

Table 5: Urambo District: Sex of tobacco respondents

Sex	Frequency	Percent
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Male	44	88.0
Female	6	12.0
Total	50	100.0

Table 6: Urambo District: Sex of paprika respondents

Sex	Frequency	Percent
Male	42	84.0
Female	8	16.0
Total	50	100.0

4.2.2.3 Marital status

About 94 and 78 percent of paprika and tobacco respondents respectively were married. This shows that the society is stable, while divorce rate is low at 2 percent and 8 percent for paprika and tobacco respondents respectively. A stable family can concentrate on production than unstable one thus may influence agricultural production. (Tables 7 and 8).

Table 7: Urambo District: Marital status of paprika respondents

Status	Frequency	Percent
Married	47	94.0
Single	1	2.0
Divorced	2	4.0
Total	50	100.0

Table 8: Urambo District: Marital status of tobacco respondents

Status	Frequency	Percent
Married	39	78.0
Single	4	8.0
Divorced	4	8.0
widowed	3	6.0
Total	50	100.0

4.2.2.4 Education level

Mwikila (1992) reported that education is a factor of growth and productivity. In this survey results indicate that 56 percent of paprika growers completed primary school, followed by 18 percent who finished secondary school, 14 percent did not attend school, 10 percent have attended adult education and only 2 percent attended other education such as colleges and universities

For tobacco growers, 56 percent completed primary school, followed by 26 percent did not attend schools, 8 percent finished secondary school, 6 percent attended adult education and only 4 percent attended other education such as colleges and universities. This implies that paprika growers are more literate than tobacco growers that is why they find it necessary to make use of the extension agents,. (Tables 9 and 10).

Table 9: Urambo District: Level of education of tobacco respondents

	Frequency	Percent
None	13	26.0
Adult education	3	6.0
Primary education	28	56.0
Secondary education	4	8.0
College/university	2	4.0
Total	50	100.0

Table 10: Urambo District: Level of education of paprika respondents

	Frequency	Percent
None	7	14.0
Adult education	5	10.0
Primary education	28	56.0
secondary education	9	18.0
College/university	1	2.0
Total	50	100.0

4.2.2.5 Mode of Land acquisition for tobacco and paprika production

The average total land area own by tobacco household for the 2004/05 season was 3.94 acres. Table 11 presents the various mode of land acquisition for the surveyed 50 tobacco farmers in Urambo district. The survey revealed that 66 percent of the respondent acquired land through inheritance, 30 percent by village government and only 2 percent accessed it as free and through hire. However, analysis of the 50 paprika farmers show that 50 percent of the respondent got land through the village government, 26 percent acquired land through inheritance, 18 percent got it free, 2 percent acquired land through purchasing and only 1 percent through hire (Tables 11 and 12).

Table 11: Urambo District: Mode of land acquisition of tobacco respondents

	Frequency	Percent
Inherited	33	66.0
Hired	1	2.0
Given by the village government	15	30.0
Access as free land	1	2.0
Total	50	100.0

Table 12: Urambo District: Mode of land acquisition of paprika respondents

	Frequency	Percent
Inherited	13	26.0
Bought	1	2.0
Hired	2	4.0
Given by the village government	25	50.0
Access as free land	9	18.0
Total	50	100.0

4.2.2.6 Seasonal labour requirements by farm operations and by crop (mandays/ acre)

Table 13 shows labour requirement per acre by operations per crop. From the table it can be seen that tobacco has the highest labour demand per year with harvesting and curing operation having more than 50 percent of total labour requirement than for paprika.

Table 13: Urambo District: Season Labour requirements by farm operation and by crop (Mandays /acre)

Operation	Tobacco	Paprika
Preparing nursery and beds	2	6
Management of nurseries	25	15
Construction of bans and store	11	-
Marking of ridge	5	10
Transplanting of seedlings	5	4
Fertilizer application	8	6
Weeding	11	5
Pesticide application	10	10
Harvesting/weaving	60	12
Curing/drying/burning	60	30
Grading	10	9
Balling/transport to the market	2	1
Total	209	108

4.3 Tobacco and paprika production process

4.3.1 Tobacco production

As far as tobacco is concerned, the crop production season begins from mid- September. The first activity marking the beginning of the season is firewood collection to be used for tobacco curing. Nurseries are prepared sometimes between October and November. Bush clearing and ploughing are undertaken between November and December before planting, which is usually done in January. Other pre- harvest activities like weeding and fertilizer application are carried out between January and March and harvesting is usually done between March and April. Post harvest activities of curing, sorting and grading are undertaken between April and July after which the crop is marketed (WETCU, 2004).

4.3.2 Paprika production

Paprika grows on a wide range of soils (WETCU, 2004). Poorly drained or surface drained soils, which may cause water logging, should be avoided. The optimum pH of the soil is 6-

6.5. Nursery preparations should start at the beginning of November. A clean piece of land close to a good supply of clean water should be selected. The soil of the seedbed should be well cultivated (30 cm deep) before the beds are made. The nursery soil should be fertile, well-draining, disease free and high in organic matter (like cattle manure). The height of the seedbed is 15 cm. ideally the nursery is protected with a grass fence. The nurseries should be prepared on an individual basis. Six beds of 10 * 1.2 meter cater for 0.25 ha of crop, and will require a half a kilo contains 60,000 seeds and can be spread to four seedbeds (1mX 10m) per acre. Watering of seedbeds is done everyday if it is in dry period. Sanitation and prevention measures should be adhered to (WETCU, 2004).

Seed germination takes 7 days and seedling of about 6 weeks there after be transplanted in the cultivated ridge plots. The evening before transplanting the beds should be heavily watered. (WETCU, 2004). Transplanting must be done on an overcast or rainy day and one has to ensure that seedlings never dry out. This may necessitate watering in the seedlings after transplanting. Transplanting is done manually following the ridge and the seedlings are spaced 12.5 cm plant to plant and 1m ridge to ridge and one seedling per hole (WETCU, 2004).

Before transplanting, seedling roots are deepening into Dursban or tarmaron (insecticide) solution for 5 minutes in order to avoid nematodes infection. If it is in dry period watering of the plant should be done 3 weeks after transplanting and NPK fertilizer is applied at the rate of 20kgs/ace. Weeding is done manually (WETCU, 2004).

The fertilizers applied are Urea, Farm yard manure and NPK 6:20:18 or 10:24:18 60kgs per acre applied into 3 splits each 20kgs for 3-4 weeks interval (WETCU, 2004).

Insect and pests are common in the farm due to continuous cultivation of the same variety for a long time. The most important diseases in paprika are damping off diseases, Anthracnose, Cercospera leaf spot, Bacterial sport, phytophthers and powdery mildew. Viral diseases can also affect paprika. Aiphids, thrip or whiteflies spread these. The pests have been successfully controlled by spray of insecticides both in nursery and main plot like Dursban, Tarmaron, Thiodan, Decis 2.5 EC and Karate. (WETCU, 2004).

Harvesting of pods is done manually. The pods harvested are dried in the open – air on drying racks. This is the easiest and least expensive way of drying the crop. The drying racks are constructed in the same way as coffee drying racks. It takes some 2-4 days before the fruits start cracking. The pods are covered at night, as they might otherwise get wet due to morning dews or late season rain showers. Paprika must never become wet again after washing and drying (WETCU, 2004). A normal crop produces high and a low quality grades. The high quality should fall in a visual grade A category and should represent at least 80% of the yield, unless the crop was subjected to serious damage. Other important factors that determine quality and the demand for raw materials include the moisture, how clean it is from soil and foreign plant materials and how pungent the taste is (WETCU, 2004).

Paprika quality is predominantly determined by its colour content, taste and texture (WETCU, 2004). The following are three types of paprika:

Grade A. Extremely good visual appearance with a uniformly deep red (almost maroon).

Grade B. The pods will mostly have the normal red colour with limited appearance of yellow and brown markings, normally because of damage in some way though water, and hail either insects or diseases.

Grade C (reject). The pods are usually not suitable for the above mentioned grades and do not have that good looking appearance, sometimes pods are of reddish, yellow or even brown colour. Both for harvest and for international export paprika is packed in polypropylene materials. For export purposes, these must be new. Clear labeling is essential..Hessian bags should not be used (Chemonic International Inc., (2003).

4.4 Production analysis

In testing hypothesis 1, which states that, unit production costs for tobacco farmers are not significantly higher compared to paprika farmers, two sample independent T- test and value of 5 percent level of significant was used. For tobacco and paprika growers production costs per acre involve labour, capital and land. In both cases the formulations of the hypothesis were as follows:

$$H_0: \bar{X}_t = \bar{X}_p$$

$$H_a: \bar{X}_t > \bar{X}_p \text{ using one tailed test}$$

Where:

Ho = Null hypothesis

Ha = Alternative null hypothesis

Xt = Means of tobacco growers

Xp = Means of paprika growers

Table 14, shows that, according to the test and the pre-specified level of significance, there is evidence to reject the null hypothesis in favour of the alternative hypothesis in both cases. There is a significant difference between per unit production cost of tobacco and

paprika with the P- value < 0.001 . This means that, unit production costs for tobacco was 581 288.52 higher compared to paprika.

Table 14: Urambo District: Comparison of per unit production costs between tobacco and paprika enterprises

Crop	N	Mean	Std. Deviation	t-test for Equality of Means				Mean Difference	Std. Error Difference	95% Confidence Interval	
				Std. Error Mean	T	df	Sig. (1-tailed)			Lower	Upper
Tobacco	50	760534.00	95409.713	13492.971							
Paprika	50	206685.00	86903.590	12290.024	32.95	98	<0.001	581288.52	18251.163	565069.681	637507.359

* 0.05 significant level

4.5 Profitability analysis

Production costs and revenue for tobacco and paprika were calculated in order to find out whether there is any significant difference between the two crops. Gross margin analysis was used to get the relative profitability of the two enterprises (Table 18).

4.5.1 Production costs

4.5.1.1 Cost of production for tobacco

Tobacco growers:

Labour in tobacco is hired on seasonal basis. At the end of season a seasonal labour is paid Tshs. 104 220. One acre needs two persons for the whole season, therefore a total of Tshs 204 440 is required to pay for this labour.

4.5.1.2 Costs of food for the labour in tobacco

The other costs of tobacco production is the costs of food (Table 15) required to sustain the hired labour for nine months until when the labour has been paid their due and left free. As follows;

Table 15: Urambo District: Costs of food for the labour in tobacco

12 debes (20lt tin container) of maize per 2 persons	48 000
2000 x 12 x 2 1kg dagaa Mwanza fish per month	18 000
1000 x 9 x 2 kg of salt per month	2 700
2 x 150 x 9 x 2 Total food costs	68 7000

4.5.1.3 The cost of tobacco inputs (in Tshs/acre) in 2004/05

The other costs of tobacco production are the costs of inputs (Table 16) used in Tshs per acre as follows;

Table 16: Urambo district: Cost of tobacco inputs (in Tshs/acre) in 2004/05

Production costs*	Price per unit	Total cost per acre
Fertilizer	25 010	92 190.00
• NPK Fertilizer 3(50kg)	17 160	
• CAN fertilizer1(50 kg)		
Pesticides		12 854.17
• Asafat 1(litre)	6 606.00	
• Dithane 1(litre)	4 180.00	
• Blue c:opper 1pct	2 068.17	
Packing materials		16 816.00
• Jeki	7 294.00	
• Gunia(jute) 14 kg/acrex 600 Tshs	8 282.00	
• Kamba 2 kg /acre x 620	1 240.00	
Transport cost per season 1 trip	46745.56	46 745.56
Total inputs cost		153 405.73

Note: * Are average of all growers sampled

Therefore cost of tobacco production per acre is categorized as follows

Labour cost = Tshs 208 440.00

Costs of tobacco inputs = Tshs 153 405.73

Running cost(food for hired labour) = Tshs 68 700.00

Total cost 430 545.73

4.5.1.4 Cost of production for paprika

Paprika growers:

Labour in Paprika is family, based on the opportunity cost, if hired labour farmer would pay 100 000 per season per acre i.e 100 man days x average of Tshs 1 000 wage which

would be equal to Tshs 100 000 per season. One acre needs one person therefore a total of Tshs 1 00 000 is required to pay for this labour (opportunity costs).

4.5.1.5 Cost of Paprika inputs

The other costs of paprika production are the costs of inputs (Table 17) used in Tshs per acre as follows;

Table 17: Urambo district: Cost of Paprika inputs (in Tshs/acre) in 2004/05

Production costs	Price per unit	Total cost per acre
Fertilizer	24010.00	48 020.00
• NPK fertilizer 2 (50kg/ acre)		
• CAN fertilizer 1 (50 kg/acre)	17160.00	17160.00
Pesticides		
• Asafat 2 litre	6 606.00	13212.00
• Dithane 1 litre	4 180.00	4180.00
• Blue copper 1 litre	2 068.17	2068.00
Parking materials		
• Gunia (jute) 10 pcs/ acre	500.00	5000.00
• Kamba 2kg/ acre	620.00	1240.00
Transport costs 200Tshs/kg	46 384.00	46 384.00
Seeds cost 1kg/acre	16 250.00	16 250.00
Total input cost		107 130.00

Note: * Are average of all growers sampled

Therefore cost in paprika production per area is categorized as follows

Labour cost = Tshs 100 000.00

Costs of paprika inputs = Tshs 107 130.00

Total cost 207 130.00

Table 18: Urambo District: Summary of Gross Margin per acre and Return per mandays for specified enterprise on 2004/05 yield and price

Item	Tobacco	Paprika Grade A (TSL)	Paprika Grade A (WETCU)
Revenue			
Yield (kg/acre)	635	560	560
Price (Tshs)	756.40	818	1070
Total revenue (Tshs/acre)	480 315.00	458 080.00	599 200.00
Total cost (Tshs/acre) (from above calculations including Tables 16 and 17)	430 545.73	207 130.00	207 130.00
Gross margin (Tshs/acre)	33 629 .27	250 950.00	392 070.00
Labour input(man days per acre)	209	108	108
Return per manday	160.90	2 323.61	3 630.27
Return per Tshs invested	0.08	1.21	1.89

Table 18, shows that paprika growers had relatively lower variable costs but higher gross farm income. When all variable costs were considered paprika growers showed a net profit of T.shs 250 950 /acre when they sell their produce to TSL and T.shs 392 070/ acre if they sell to WETCU with return per manday of Tshs 2 323 .61 and 3 630. 27 respectively. Tobacco grower showed a net returns per acre of T.shs 33 629.27 with return per manday of Tshs 160.90 for 2004/05 season. Also return per Tshs invested for paprika enterprise is 1.21 and 1.89 respectively, this shows the ability of the farm to generate funds for reinvestment while tobacco enterprise has 0.08 return per Tshs invested which shows that the enterprise has little ability to generate funds for reinvestment (appendix 3) That is for every shilling invested in tobacco a farmer gets back only 8 shilling more.

If Gross margin was the only criteria for income contribution to the households then paprika is the first most important crop. However, it is evident that paprika growers in Urambo district have not captured the full potential benefits of paprika production. Production and marketing of paprika is promoted mainly by WETCU and TSL however, their production and marketing arrangements do not provide adequate incentive to paprika growers in terms of input.

Thus, it is a clear indication that paprika enterprise is more profitable as it yielded higher gross margin and is a desirable venture to undertake as an alternative cash crop to tobacco. Return per Tshs invested is higher in paprika enterprise than tobacco enterprise. Based on its profitability, paprika contributes more to household's income than tobacco enterprise.

4.6 Production problems faced by tobacco and paprika growers

4.6.1 Tobacco

4.6.1.1 Low rainfall

Farmers indicated that they experience low rainfall condition during 2004/05. This was about 24 percent of farmers who complained on low rainfall leads to low tobacco yield in the season.

4.6.1.2 Poor service from private companies

Tobacco growers rely very much on services that are provided by private companies (AOI and ATTT) at cost. These services include extension services, fertilizer, pesticides and packing materials. But these services are provided at high price. About 28 percent of farmers complained of high cost of production due to high price of inputs. Only 4 percent complained that services provided from those companies were poor. Timeliness of fertilizer was also cited as a major problem for example 4 percent and 12 percent of tobacco growers complained on timeliness in fertilizer and pesticides respectively which leads pests to affect seedlings. About 2 percent farmers complained on the lack of capital which caused 18 percent of the farmers failing to employ worker in their farms (Table 19).

4.6.2 Paprika

4.6.2.1 Poor service from TSL

Though TSL agreed to provide paprika inputs to growers which includes; fertilizer, pesticides, seeds and extension services. About 40 percent of paprika respondent complained on lack of pesticides while 34 percent stated lack of packing materials.

4.6.2.2 Low rainfall

Paprika farmers indicated that they experience low rainfall condition during 2004/05. This was about 24 percent of farmers who complained on low rainfall leads to low paprika yields. Only 2 percent experience labour shortage (Table 20).

4.6.3 Constraints to paprika production

Paprika like other spice is a labour intensive crop (WETCU, 2004). Paprika has to be harvested over a long period. This make them ideally suited to small producers. However, overstretched extension services are not able to help with crop management, this affects many growers. Despite of these problems, production of paprika has some advantages. Paprika can be grown very successfully if intercropped with other food crops like maize. In Urambo district it has been intercropped with maize (WETCU, 2004).

Table 19: Urambo District: Proportion of respondents stating most critical problem in tobacco production

Problems	Percent
Timeliness of fertilizer	4.0
High cost of production	28.0
Lack of extension officers	4.0
Lack of fertility in soil	8.0
Lack of capital	2.0
Pests disease	12.0
Low rainfall	24.0
Lack of workers	18.0
Total	100.0

Table 20: Urambo District: Proportion of respondents stating most critical problem in paprika production

Problems	Percent
Low rainfall	24.0
Lack of pesticides	40.0
Lack of labour	2.0
Lack of drying materials	34.0
Total	100.0

4.7 Marketing problems faced by tobacco and paprika growers

4.7.1 Tobacco growers

Tobacco producer price is reviewed annually and announced by the ministry of agriculture. The price per kg of tobacco paid to growers depends on grades. The majority of the farmers about 68 percent complained about low price and 14 percent complained on returns of bales that is why few farmers that is 2 percent complained on low revenue. Other 8 percent and 4 percent stated lack of transport and late payments respectively (Table 21).

Table 21: Urambo District: Proportion of respondents stating most critical problem in tobacco marketing

Problem	Percent
Returns of bales	2.0
Buyers are bias	14.0
Late payments	4.0
No problem	2.0
Low price	68.0
Poor transport	8.0
Low revenue	2.0
Total	100.0

4.7.2 Paprika growers

The study shows that the major problem encountered by 100 percent of paprika respondent is far marketing centre at Iringa region, this led to high transportation costs. Paprika marketing in Urambo district is tightly controlled and monopolized by TSL the sole buyer. The implication of this is lack of bargaining power and therefore farmers are offered low

price, the interesting thing was the fact that TSL buys paprika only from members who bought seeds from them. Farmers are now reducing production or not producing paprika in the area.

4.8 Paprika marketing

However, paprika growers have many disadvantages in crop marketing. In Urambo district WETCU is the one organization that collects produce from farmers, store the produce (this led to change of the grades if it takes long time) and sell to TSL where they have an informal selling contract (WETCU, 2004). Due to these paprika farmers at urambo district who are members of WETCU have to incur a cost of Tshs 200 per kg for transporting raw paprika to TSL which is located at Iringa region. Farmers are not aware of any other paprika marketing channel. As a result, they are not being offered a better price for their crop (WETCU, 2004).

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1 Conclusion

The main objective of this study was to examine the economic benefit of tobacco vis a vis paprika production. The specific objectives were to identify and analyze costs and returns between tobacco and paprika growers, to compare the contribution of paprika and tobacco crops to household income and finally the study examines the relative profitability of tobacco and paprika production.

The data obtained were analyzed using two samples independent T-test for testing the unit production cost for tobacco and paprika and gross margin analysis with the aim of assessing the relative profitability of the two crops.

5.2 Findings of the study

5.2.1 Objective i

The results of the study show that, there is a significant difference between per unit production cost of tobacco and paprika with the P- value < 0.001 . This means that, unit production costs for tobacco was Tshs 581 288.52 higher compared to paprika.

5.2.2 Objective ii & iii

The study shows that the paprika production is a profitable enterprise with gross margin of T.shs 250 950 /acre when farmers sell their produce to TSL and T.shs 392 070/ acre if they sell to WETCU with return per manday of Tshs 2 323 .61 and 3 630. 27 respectively than for tobacco which has net return of T.shs 33 629.27 with return per manday of Tshs 160.90 for 2004/05. Some problems have been noted from the study, which indicate some

inefficiency in the entire production- marketing system. These problems increase cost and reduce revenues and prevent the realization of potential income gains to paprika and tobacco growers.

5.3 Recommendations

This study was conducted with reference to the 2004/05 cropping season from Urambo district. Based on the study findings, the following recommendations aimed at improving the paprika enterprise are made.

5.3.1 Increase paprika production

In addition to the world tobacco price fluctuation, health and environmental problems, tobacco has higher unit production cost than paprika in the study area. Return per Tshs invested is low for tobacco enterprise than for paprika. In order for the farmer in Urambo district to increase their income, they should increase paprika production or produce high quality of tobacco using the improved seeds and not re cycled seed, this will compensate for the cost incurred during production.

5.3.2 Construction of irrigation scheme within the study area

Paprika crop can be harvested three times per year if farmers in urambo district practice irrigation system (WETCU, 2004). This would increase their income through out the year. It is recommended that, government (ASDP) should collaborate with Urambo district to construct dams that will help farmer to irrigate paprika crops so that they can get more yields per year and hence more profit. This will reduce poverty in the district.

5.3.3 Establish paprika market within the study area

Though paprika enterprise is more profitable than tobacco in Urambo district, marketing centre situated in Iringa region is the major cause of increased cost of storage that affects grade, transport as well as delay in paprika marketing. To fill the gap of the farmers' market problem, government in collaborations with TSL has to rely on profound market within the production area or building the small factory. When farmers are not technically supported, they tend to lose interest in cultivation of a newly introduced crop as might be the case for paprika. This situation has been observed in the study area where farmers have been discouraged to produce paprika because of long distance from market which led to high transportation costs.

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13. If yes, where.....distance from your farm..... miles

Course type.....

Duration of course.....years/months/days

Farm activities

14. Do you own this farm 1= Yes 2=No

If no, who owns it.....

15. How do you acquire this land?

1=Inherited

2=Bought

3=Hired

4=given by the village government

5=Accessed as a free land

6=Others (specify).....

16. What is the size of your farm.....hectares

17. Area under paprika.....hectares

18. What area under other crops.....hectares

19. Crops grown in 2006/07

Crop	area produced (Ha)	output (tones)	amount sold	price
Paprika
Tobacco

20. Why did you choose to grow paprika?

1. Is more profitable

2. Persuaded by WETCU

3. Government's law

4. Government's advice

5. Persuaded by neighbours

6. Others (specify)

21. When did you start paprika cultivation?

.....

22. Do you keep livestock 1= Yes 2= No

If yes, mention type and number

Type	Number
.....
.....
.....

Do you sell any of these during the year 1= Yes 2= No

Type of livestock sold	Number	Value
.....
.....

Do you use some of the livestock for providing animal power 1=Yes 2=No

Number	Approximate value of the animal
.....
.....

Do you rent some of these animals outside 1=Yes 2=No

If yes, what is the hire rate.....Tshs/ha

23. Do you have your own machinery/equipment for

- i) Land preparation Yes/No
- ii) Planting Yes/No
- iii) Weeding Yes/No
- iv) Spraying Yes/No
- v) Transport Yes/No
- vi) Others (specify).....

If yes, mention the machineries and tools you own including hand equipment

Tool/Implement/Machinery	Number
.....
.....
.....
.....

Useful life (years)	Initial price (Tshs)
.....
.....
.....
.....

Do you hire equipment for carrying your operations in last season Yes/No
 If Yes,

Equipment	Source	Payment rate (per ha/hour)Tshs
.....
.....
.....

24. What benefits do you get from WETCU.....

25. What are your future plans on paprika production?

- 1=expand production
- 2=Reduce production
- 3=continue producing the same
- 4=others (specify).....

Labour use and other purchased inputs

26. What are the main sources of your labour force in 2006/06 season?

- Family labour 1= Yes 2=No
- Hired labour 1= Yes 2=No
- Combination of the above 1=Yes 2=No

27. Labour use for paprika/tobacco in 2006/07 season

Man-days

Operations	Paprika		Tobacco	
	Family	hired	Family	hired
Clearing bush and thickets for cultivation				
Cultivation: manual tilling of the land				
Construction of paprika/tobacco drying sheds				
Preparing paprika/tobacco nurseries and constructing nursery beds				
Sowing of paprika/tobacco seeds				
Watering of paprika/ tobacco seedlings				
Making ridges and transplanting of paprika/ tobacco seedlings				
Weeding				
Fertilizer application				
Pesticide application				
Harvesting				

Burning				
Sorting, bundling ,grading				
Transport to the market				
Total				

28. How much do you pay your labour force on paprika/tobacco manual tasks.....Tshs per day/week/month?

29. Fertilizer use for paprika/tobacco crops (2006/07 season)

Fertilizer type	Quantity used	Value Tshs
.....
.....
.....

30. Use of other purchased inputs

Input type	where purchased	Quantity	Price/unit	Total
.....
.....
.....

Farmer’s problems

31. (a) What is the most critical problem in

- (i) Paprika production.....
- (ii) Paprika marketing.....

31(b) How do you think these problem can be solved?

- (i) Paprika production.....
- (ii) Paprika marketing.....

32. Do you have access to extension officer?

- 1=Yes
- 2=No

33. If yes, how many times?

- 1=Once per season
- 2=2-3 times per season
- 3=4-5 times per season
- 4=more than 5 times per season

34. Where do you receive extension services?

- 1=Extension officer
- 2=Training centre
- 3= On my farm plot
- 4= On demonstration plots
- 5= During meeting
- 6= Through farmer's group
- 7= Other (specify).....

35. What type of advice do you get from a village extension officer?

- 1=Crop protection
- 2=Crop management
- 3=Marketing issue
- 4= Others (specify).....

36. Do you get credit for paprika production during the last season?

- 1=Yes 2= No
- If no, why?
- 1=lack of credit facilities 2= High interest rate 3=Not aware of credit availability
- 4=High risk 5=Low income obtained from crop
- If yes, what was the source of credit that you received?
- 1=Bank 2= Traders 3= other farmers 4= cooperative union 5=Other (specify).....

37. Indicate the amount of credit you received.....

38. Did you receive the amount of credit that you requested for?

- 1=Yes 2= No
- If no, what were the reasons for provision of the above
-

39. Have you returned the credit?

- 1=Yes 2=No

If no, why?

.....

If yes, what was the repayment procedure?

1= in cash 2=in kind 3=others (specify)

If in cash, what was the amount per year?.....Tshs

40. What was the repayment period?.....

41. In your own opinion do you think that credit is helpful?

1=Yes 2=No

If yes, why?.....

If no, why?.....

42.Do you keep farm records?

1=Yes 2=No

Labour's problems

43. Do you experience labour shortage? Yes/No

If yes, when

Land preparation

Planting

Weeding

Harvesting

Others (specify)

44. How do you solve the problem of labour shortage?

- 1. Hire more labour
- 2. Reduce various farm operations
- 3. Postponing some of the farm operations
- 4. Resorting to family labour
- 5. Others (specify)

45. How far is the selling point from the home stead?

Paprika.....km

Tobacco.....km

Output, consumption and Marketing

46. (a) (i) Has output(yield) of paprika increased since 2004?

- 1=Yes 2=No

(ii)If yes, what was the most reason for the increase?

.....

(b) has output (yield) of paprika decreased since 2004?

- 1=Yes 2=No

(ii)If yes, what was the most reason for the decrease?

.....

47. How do you correct market information for paprika?

- 1=Direct visit to the market
- 2=Cross checks with fellow farmers
- 3=Hear from friends
- 4= From extension officers
- 5=From WETCU
- 6=Others (specify).....

48. What has been the price for paprika produce for the last season?

- 1= Increasing
- 2= decreasing

50. If it is increasing/decreasing, why?

- 1=low supply/high production
- 2= High/low demand
- 3=others

51. Give market information as indicated for 2004/05

Amount produced	Amount consumed(if Applicable)	Amount sold	Unit price(Tshs/kg)		Revenue	Transport cost
			WETCU	TSL		

THANK YOU FOR YOUR COOPERATION

Appendix 2: Buyers' questionnaire for marketing of paprika

Organization Name..... Date of interview.....

A. General Information

1. For how many years have you been in the marketing business?

.....

2. Where is your major (a) buying are..... (b) Selling country.....

3. How many kgs of paprika do you buy and sell for last three seasons?

year	Amount bought in kg	Price kg	Amount sold in kg	Price /kg	Money obtained
2004					
2005					
2006					

4. What is the average selling price?.....Tshs

5. What is the average distance to buying places.....km

6. What is the average buying and selling quantity do you handle per transaction?.....kg

7. Do you provide extension services to paprika growers on production and marketing?

1= Yes 2.No

8. Do you provide inputs to paprika growers?

1=Yes 2.No

9. If yes, in 7 above, please specify the inputs.....

10. Do you provide credit to paprika growers?

1= Yes 2. No

B. Pre storage and storage practices

C. 11. What is the average transport cost for a kg of paprika in 2004/05 season.....Tshs/kg/km

12. How much money do you pay for handling costs in selling a kg of paprika?.....Tshs/kg

C. Paprika Market condition

13. During the 2004/05 marketing year do you have any contractual arrangement with;

(a) Your sellers (producers) 1= Yes 2= No

(b) Your buyers (TSL)1= Yes 2=No

14. Do you store the traded paprika in 2004/05 1=Yes 2=No

15. If yes, for how long do you store..... Months/days (specify)

16. Why do you store paprika?

1. To assemble larger quantities
2. Lack of transport
3. To overcome periods of low prices

17. What are the conditions for sale?

1. Cash
2. Credit
3. Others (specify)

I THANK YOU FOR YOUR COOPERATION

Appendix 3: Urambo district: Marketing of paprika (2004/05)

Organization	Buying price in Tshs			Selling price in Tshs		
	Grade	Grade	Grade	Grade	Grade	Grade
	A	B	C	A	B	C
TSL	818	284	137	818	284	137
WETCU	1070	560	250	1070	560	250

Source: WETCU Development Report 2004/2005.

Appendix 4: Urambo District: Seasonal labour requirement by operations and by crop (Mandays /acre)

Operation*	Total*		Average	
	Tobacco	Paprika	Tobacco	Paprika
Preparing nursery and beds	122	280	2.44	5.6
Management of nurseries	1256	734	25.12	14.68
Construction of bans and stores	580	0	11.6	0
Making of ridges	251	518	5.02	10.36
Transplanting of seedlings	249	211	4.98	4.22
Weeding	414	256	8.28	6.34
Fertilizer application	555	317	11.1	5.12
Pesticide application	509	507	10.18	10.14
Harvesting	3011	1502	60.22	30.04
Curing/drying/burning	2978	601	59.56	12.02
Grading	489	470	9.78	9.4
Balling and transporting	85	50	1.7	1

Note: * are 50 sampled labour demands for farm operations for tobacco and paprika respectively.