GROWTH OF SMALL AGRO-PROCESSING FIRMS AND THEIR INFLUENCE ON EMPLOYMENT CREATION, TANZANIA

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ABSTRACT

The small agro-processing sub-sector accounts for over 80% of all firms in Tanzania. However, the firms have not been effective in absorbing new labour in the market, as reflected by the unemployment rate, which increased from 5% in 2001to 10% in 2011. The low rate of labour absorption has been partly attributed to the slow growth of small agro-processing firms, which grew by only 10%. Labour productivity also is perceived to be low. Hence firms within the sub-sector have not performed to their expected potentials. However, no in depth analysis has been done to confirm these facts, especially in relation to labour productivity and firms' growth. This study examined the growth of small agro-processing firms and their influence on employment focusing on labour productivity in Mbeya and Morogoro Regions of Tanzania. A total of 102 firms represented different types and location in the study area. Time series and cross-sectional data were collected from sampled districts and firms. Employment creation trends, labour productivity performance and factors affecting the firm's growth were examined using descriptive statistics and multiple regression analysis. The analysis show that about 63.6% of firms operated under capacity, hence employing below their potential due to low supply of raw-materials, inadequate capital, and poor marketing systems as well as high cost of energy. Labour productivity growth was influenced by experience, education, training and physical capital. Also the growth of firms was influenced by the value of raw-materials, manager's education and energy cost. Small agro-processing firms in Morogoro Region grew faster (62.7%) compared to firms in Mbeya (37.3%). The difference may be due to Morogoro having better access to factor and product market hence having lower transport cost for inputs and reduced distribution cost of processed products. The study recommends that the government and non-governmental organizations to promote the production of high value of raw-material as contributing factor by 30% to growth of

firms. Such interventions will have a significant effect in employment growth. Furthermore, the government and other non-governmental organization should improve human and physical capital, while emphasising technological innovation and adherence to processing products according to standards set by responsible authorities.

DECLARATION

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

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DEDICATION

This work is dedicated to my parents, my mother Chelina and my late father Tisimia Kipene who laid the foundation for my education.

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LIST OF ABBREVIATIONS AND ACRONYMS

ADBG	African Development Bank Group
AMP	Agricultural Marketing Policy
BET	Board of External Trade
CAMARTEC	Centre for Agricultural Mechanization and Rural Technology
CI	Condition Index
DAEA	Department of Agricultural Economics and Agribusiness
DAFCO	Dairy Farming Company
EAC	East African Community
FAO	Food and Agriculture Organization
FNP	Food and Nutrition Policy for Tanzania
GAPEX	General Agricultural Products Export Company
GDP	Gross Domestic Products
ICC	International Chamber of Commerce
ILFS	Integrated Labour Force Survey
ILO	International Labour Organization
IMF	International Monetary Fund
IPI	Institute of Production Innovation
MIT	Ministry of Industries and Trade
MLEYD	Ministry of Labour, Employment and Youth Development
MPEE	Ministry of Planning Economics and Empowerment
MH	Ministry of Health
MHSW	Ministry of Health and Social Welfare
MRALG	Ministry of Regional Administration and Local Government
NAFCO	National Agricultural and Food Corporation

NBS	National Bureau of Statistics
NDC	National Development Corporation
NEP	National Employment Policy
NGOs	Non – Governmental Organization
NIPP	National Investment Promotion Policy
NMC	National Milling Co-operation
NSIC	National Small Industries Corporation
NSSIC	National small-scale industries corporation
NTP	National Trade Policy
OECD	Organisation for Economic Co-operation and Development
PPP	Public Private Partnership
SIDO	Small Industrial Development Organization
SIDP	Sustainable Industries Development Policy
SMEDP	Small and Medium Enterprises Development Policy
SPSS	Statistical Package for Social Sciences
SUA	Sokoine University of Agriculture
TAFOPA	Tanzania Food Processors Association
TASISO	Tanzania Small Industries Society
TBS	Tanzania Bureau of Standards
TEMDO	Tanzania Engineering and Manufacturing Design Organisation
TFDA	Tanzania Food and Drugs Authority
TFP	Total Factor Productivity
TIRDO	Tanzania Industrial Research Development Organisation
TOL	Tolerance
TRA	Tanzania Revenue Authority
TSH	Tanzania Shillings

UNIDO	United National Industrial Development Organization
URT	United Republic of Tanzania
USD	United States Dollar
VETA	Vocational Education and Training Authority
VIBINDO	*Vikundi vya Biashara Ndogo ndogo*
VIF	Variance Inflation Factor

CHAPTER ONE

INTRODUCTION

1.1 Background Information

The term "Small agro-processing firms" refers to the subset of manufacturing firms that process raw materials and intermediate products derived from the agricultural sector into other commodities for the market and for consumption (Suzann 1999, Holt and Pryor, 1999; MIT, 2002 and Daka, 2008). The level of investments and the number of workers in the processing sector determine the size of a processing firm. The Tanzania small and medium enterprise development policy (SMEDP), defines small agro-processing firms as enterprises with capital for investment that is less than TZS 200 million, and which employ up to 49 workers (MIT, 2002).

Increasing investment and employment are indications of firm's growth as defined by Backstead and Gellatly (2003). These authors argue that, the growth of firms within a sub-sector is reflected through the increase in firm size, number of firms, employment, investment and the value of goods and services produced. In this context, growth is the capacity of small agro processing firms to maintain an increasing trend in employment creation, and value of products produced thus contributing to economic development of a country.

The growth of small agro processing firms in Tanzania has been slow in employment and income generation. The sub-sector has not yet generated adequate employment, income or increased significantly the value of processed products for domestic use and for export. In fact some of the processing firms are collapsing while others are not growing as expected (URT, 2008, FAO, 2008, MPEE, 2007a and 2007_b, Hawassi, 2006). According

to this study, Morogoro Region had more firms that collapsed than Mbeya Region (MPEE, 2007a and 2007_b).

Moreover, studies by Tiisekwa *et al.* (2005_a) and UNIDO (2004_b) show that among the existing small agro-processing firms in Tanzania about 75% operate below their capacity thus generating low income and only limited employment opportunities. It has been further argued by Becker (2004), Materu *et al.* (2010) and Deloitte (2011) that despite the importance of the sub-sector, Tanzania has not translated the dominant agricultural sector into agro-processing firms with multiple benefits to the economy.

1.2 Importance of Agro-processing Firms

Agro-processing is important in developing countries for its role in generating employment and income. Many people are directly employed in firms that process agricultural products and in servicing processing machines (Nambbodii *et al.,* 2003; URT, 2008; Lazaro *et al.,* 2008; Da silva *et al.,* 2009). Moreover, the sub-sector generates backward employment linkages by creating markets for raw materials from agriculture (Hawassi, 2006; Khosla and Sharma, 2012; Eze *et al.,* 2013). At the same time forward employment linkages are generated as people are engaged in supplying processed products to the market.

In addition to generating employment and cash income, agro-processing firms reduce post harvest losses. The shelf-life of processed products is higher, which facilitates storage and transportation, therefore making agriculture more profitable both at the processing and marketing levels (UNIDO, 2004a, IMF, 2006, Lazaro *et al.,* 2008, URT, 2008, ADBG, 2010, Vilane *et al.,* 2012 and Karthick *et al.,* 2013). The ability of agro-processing firms to promote low-cost preservation, processing, marketing, and

transportation of food products compared to imported processed food helps to provide the poor with cheaper food alternatives, thereby preserving their income. For instance maize flour that is processed by local firms is cheaper than imported flour.

It has been demonstrated that, agro-processing firms have the highest contribution towards processing agricultural inputs such as seeds grains and the firms have employment multiplier effects in terms of labour productivity and total factor productivity (Luthfi, 2007). Agro-processing could therefore be a powerful means for generating employment and improving agricultural productivity in Tanzania as it provides a strong link between primary production at the farm level, processors, final consumers and other services linked to agro-processing firms (Hawassi, 2006 and URT, 2008).

Furthermore, several studies FAO (2004) and (2008) have shown that small agro-processing firms serve as a catalyst which stimulates rural development from different dimensions, such as health, education, development of infrastructure such as roads, electricity and water thereby helping to reduce the rural–urban income disparity. Small agro-processing firms also enhance the viability of small-scale farms by providing market outlet for their products, often within the vicinity of rural areas.

In Tanzania the potential of agro-processing firms for employment creation is yet to be realized. For example during the period from 2007 to 2012, new jobs that were created by small agro processing firms amounted to only 5.02% of the total employment from agro-processing firms compared to 92.6% created by medium and large firms (URT, 2012a). Jobs in agro-processing firms are expected to contribute to national effort to reduce unemployment and poverty. Unemployment occurs when a person who is actively searching for a job is unable to find work at a given wage rate. Based on the

Integrated Labour Force Survey (ILFS) for Tanzania, the unemployment rate increased from 5% in 2001 to 11.7% in 2006, decreasing slightly by only 1% in 2011 as indicated in Table 1.

Table 1: Labour force in Tanzania 2001 – 2011

Year	Labour force			Percentage of Labour force		
	Employed	Unemployed	Total	Employed	Unemployed	Total
2001	16 914 806	912 772	17 827 578	95.0	5.0	100
2006	18 821 525	2 194 392	21 015 917	88.3	11.7	100
2011	22 152 320	2 368 672	24 520 992	89.3	10.7	100

Source: NBS 2001, 2006 and 2011

Factors that contributed to the increase and the subsequent slight decrease of the unemployment rate were; inadequate skills for acquisition of human capital and training human capital in particular activities, poorly coordinated industrialization due to inadequate planning and poor policy implementation by the government (Wedgwood, 2005 and Msigwa *et al*., 2013).

Unemployment is undesirable in an economy because it has negative impacts such as increasing the level of income inequality. It also imposes social cost on the community since the unemployed have to depend on relatives and the community at large to sustain their life. A country with a high rate of unemployment spends a large part of their income (savings) to provide services to people who do not contribute to the economy. Such savings could otherwise be used for investment (Demeke *et al.,* 2006). When the unemployment rate is high even those who are employed feel less secured because they could also become unemployed at any time (Demeke *et al.,* 2006 and ILO, 2009). Thus, workers become less willing to leave unsatisfactory jobs, living standards decline while socio-economic divisions within society increase. The prospect of equal opportunity for employment decreases and some local areas can develop a culture of despair. Moreover,

the ILO (2009) shows that, unemployment is associated with higher levels of family breakdown, alcoholism, crime, drug abuse and suicide, which are all detrimental to society.

Thus, the government of Tanzania has been pursuing various options to expand opportunities for growth of small agro-processing firms so that they play a more effective role in addressing unemployment and low earning. These options include; supporting the development of agro–processing firms through investment promotion, tax exemption for agricultural raw-materials, providing credit and training to agro-processors in order to sustain firm's growth (Mwang'ombola, 2005). Nonetheless, such efforts have not been very effective in addressing the problems of unemployment and low earnings. As indicated in Table 1, between 2001 and 2011 unemployment in Tanzania increased from 5% to 10.7% representing only 0.57% annual growth rate.

1.3 Policy Framework for Development of Agro-processing Firms

The government of Tanzania has over time formulated different policies and strategies so that small agro–processing firms may contribute more effectively to employment creation and income generation. In this regard, the Sustainable Industrial Development Policy (SIDP) was developed in 1996 to influence and direct industrialization that would create sustainable employment and economic growth in the country (MIT, 1996). During the same year the National Investment Promotion Policy (NIPP) was designed to address pending challenges after the SIDP. One of the objectives of this policy therefore, was to encourage production of agricultural products and marketing the processed products to create sustainable income and employment (URT, 1996). In 2002 the government introduced the Small and Medium Enterprise Development Policy (SMEDP) to cater exclusively for small and medium firms, which had until then been overshadowed by

large firms under SIDP (MIT, 2002). This move was necessary because the support and operating environment required by small and medium firms was not the same as that for large firms. The National Employment Policy was designed in 2008 to promote employment within different sectors (MLEYD, 2008). All these policies recognized the role of the small agro-processing firms sub-sector to create jobs.

For this reason agro-industries development is presented as one of the ten pillars of "*Kilimo Kwanza*" (Agriculture First), an initiative for agricultural transformation in Tanzania through public-private partnership. In the same vein, the government has supported the Small Scale Industries Development Organization (SIDO) since its establishment in 1973. The organization was conceived to promote and expand small industries by focusing on agro-processing operations as well as establishing firms for high quality packaging materials to cater for increased demand of packaging agro-processed products.

This organization (SIDO) evolved from its predecessors, the National small-scale industries corporation (NSSIC) which was established in1966. The new organization (SIDO) was established to rectify operational inefficiency, poor planning and lack of an extension network (Mwang'ombola, 2005 and URT, 2009). Despite all these efforts the national objectives in terms of poverty reduction, employment generation and economic development through small agro-processing sub-sector have not yet been fully realized, which reflects inadequate and poor implementation of policies and ineffective institutions to achieve the objectives.

1.4 Problem Statement

Full utilization of small agro-processing firms offers the potential for economic and social benefits, including employment creation, income generation and reduction of post-harvest losses. Five years after independence (1961 – 1966) the government established the National small-scale industries corporation (NSSIC). In 1973, this organization was transformed to form SIDO, in order to rectify operational inefficiency and poor planning to improve sub-sector performance. The government has intervened through SIDO to promote technology development, credit provision, training on managerial, technical and marketing aspects of small scale industries. The government also provides extension services and facilitates registration of products through regulatory bodies such as TBS and TFDA (UNIDO, 1999a; Mwang'ombola, 2005 and Bekefi, 2006). Through these efforts many agro-processors across the country have been registered and trained to process agro-products according to TBS and TFDA standards. Under such initiatives, between 2008 and 2001, more than 10 new agro processed products were registered from Mbeya and Morogoro Regions.

Although the government has put these efforts in the sub-sector, small industries have not been very effective in generating employment and overcoming poverty (Tiisekwa *et al.*, 2005b; Isinika and Msuya, 2010). This has been attributed to slow growth of the sub-sector, low capacity utilization of existing firms and low productivity of labour and capital within the firms (Tiisekwa *et al.*, 2005a; Kefale and Chinnan, 2012). In Tanzania, about 74% of agro-processing firms are found in ten regions, including Mbeya, Mwanza, Arusha, Dar es Salaam, Morogoro and Mara (MPEE, 2007a). However about 75% of the firms operate below capacity (Tiisekwa *et al.*, 2005a). Thus the growth of small agro-processing firms has been too low to provide any effective reduction of unemployment rates and poverty (Mwang'ombola, 2005 and World Bank, 2007a).

A study by Mbelle (2005) shows a declining trend of labour productivity from 1.3% to 0.9% between 1986 and 2000, representing 0.4% decline over the period. From 2000-2009 labour productivity growth in Tanzania was generally low estimated at 3.2%-3.4%, annually which is rather small compared to that of other African countries where it was reported to fall within the range of 3.3% to 14.7% (Mwakapugi *et al.*, 2010 and ILO, 2011a).

The purpose of this study was to establish why the growths of small agro-processing firms in Tanzania are not growing as expected to create more employment and income. The study specifically focuses on Mbeya and Morogoro Regions which are among regions in Tanzania with a high concentration of small agro-processing firms. Findings from this study will inform on-going efforts to accelerate the growth of agro-processing firms so that they contribute more towards jobs creation and productivity improvement. This will in turn contribute towards achieving set objective for poverty reduction and overall economic development as stipulated in the National Strategies for Growth and Poverty Reduction (NSGPR), consistent with the global targets for attaining the Millennium Development Goals (MDGs) for income poverty by 2025.

1.5 Justification of the Study

A number of studies and reports UNIDO (1999b), MPEE (2007b) and ADB (2012) indicate that small firms in Tanzania are collapsing and those which survive do not grow as expected. The collapse of most small firms not only increases unemployment, but it also affects household and national income. For instance in Morogoro Region between 1988 and 2006, the number of small firms dropped by 75.5%, from 1000 to 245 (MPEE, 2007b). These firms employed 15 000 people in 1988, but this number dropped to only 3680 by 2006, implying that 75.5% of the workers lost their jobs during this period

(MPEE, 2007b). In Mbeya Region, the number of small agro-processing firms increased only marginally by 0.42% estimated to be 2 390 in 2002 rising to 2 400 in 2006. The number of workers employed increased from 38 400 to 35 850 over the same interval which is only 1.2% higher (MPEE, 2007a).

Undercapitalization has been a key reason for such decline or slow growth (Stergomena, 2000; Skarstein, 2005 and URT, 2012a). In another study, the World Bank (2007a) reported the average labour productivity of agro-processing firms in Tanzania to be 3000 USD per annum being lower than that of other African countries, estimated between 4800 USD and 14 000 USD. This observation reflects poor performance in terms of labour productivity among agro-processing firms in the country, which calls for studies to establish the underlying reasons for such low performance.

In Tanzania, only a few studies Mwakapugi *et al.* (2010) and Niringiye *et al.* (2010) have been conducted to assess the productivity of labour and capital within agro-processing firms. Mwakapugi *et al.* (2010) studied the potential of job creation and productivity through expanded electrification in small agro-processing firms in Tanzania. The study established that if adequate and reliable power was provided, investment in agro-processing firms had a large potential for employment creation. Electrification would reduce cost for many small scale firms, thus stimulating their expansion. The study however did not examine the relationship between employment creation and labour productivity as a factor of firms' growth. Niringiye *et al.* (2010) studied human capital and labour productivity among small manufacturing firms in East African countries. However, they did not link capital and labour productivity as determinant of employment and firm's growth. This study attempts to fill this knowledge-gap. The study attempts to evaluate how the growth of small agro-processing firms is influenced by labour

productivity and other factors; and the influence of such growth on employment creation in Mbeya and Morogoro Regions. It should be expected that firms with higher growth and labour productivity have greater potential for creating more and higher paying jobs, which is good for poverty reduction.

1.6 Objectives

1.6.1 Overall objective

The main objective of the study was to evaluate the growth of small agro-processing firms is influenced by labour productivity and other factors in Mbeya and Morogoro Regions of Tanzania, so that a sub-sector could contribute more to employment and income generation.

1.6.2 Specific objectives

The study pursued four specific objectives which aimed to:

(i) Establish the trends of small agro-processing firms in the study area over the period from 2002 to 2011 in terms of new firms that were established or collapsed per year,

(ii) Compare the performance of selected small agro-processing firms between Mbeya and Morogoro Regions in terms of employment creation over the period 2002 to 2011,

(iii) Analyse the performance of small agro-processing firms in terms of labour productivity during the study period,

(iv) Determine factors which have accounted for variation in the growth of small agro-processing firms in the study area during the study period of 2002 to 2011.

1.7 Research Questions

In order to address these objectives a number of hypotheses and research questions were pursued. In relation to the first specific objective, the study addressed two questions as follows;

(i) What was the trend of new agro-processing firms that were registered in each of the two regions in 2002-2011?

(ii) What were the main activities of the registered agro-processing firms?

1.8 Research Hypotheses

To address the second specific objective, the performance of small agro-processing firms in terms of employment creation was compared between the two regions using the number of new jobs created each year. In this respect, the null hypothesis stated that there was no significant difference in the average number of new job created per firm per year among small agro-processing firms operating in Mbeya and Morogoro Regions. Mathematically the null and alternative hypotheses are presented as:

$H_0;\ \bar{k_1} = \bar{k_2}$ ……..……..…….(1)

$H_1;\ \bar{k_1} > \bar{k_2}$ ……..……...….(2)

Where;

$\bar{k_1}$ = Mean number of new workers employed per firm per annum in Mbeya Region.

$\bar{k_2}$ = Mean number of new workers employed per firm per annum in Morogoro Region

The third objective on labour productivity was analysed by regressing independent variables against labour productivity measured by the ratio of the value of processed product over the number of employees. The coefficient of each independent variable

indicated the degree of association between the variable and labour productivity. The null hypothesis assumed that the coefficients for respective coefficient was equal to zero, implying that variation in the independent variable did not account for variation in the firm's labour productivity. The regression equation representing coefficients that were tested are presented in section 3.3.1 (chapter 3). Mathematically the null and alternative hypotheses are expressed as:

$H_0; \delta_j = 0$ ……..……..……...….. (3)

$H_1; \delta_j > 0$ ……..…….……..……. (4)

Where: δ_j = Coefficient of the j^{th} factor affecting a firm's labour productivity

For j = 1, 2, 3……..n

To address the fourth objective, factors that were considered to contribute in variation of the growth of small agro-processing firms were regressed against output, measured by the value of processed products per year which was used as a proxy for the performance of agro-processing firm. In this respect, two null hypotheses were tested; the first null hypothesis tested if the independent variables accounted for variation in the agro-processing firm's growth. The coefficients of factors affecting growth were assumed to be equal to zero which means the variation of independent variables did not account for variation of the firm's growth. Mathematically the null and alternative hypotheses are given in equation 5 and 6

$H_0; \beta_h = 0$ ……..…….…….. (5)

$H_1; \beta_h > 0$ ……..…….……. (6)

Where: β_h = Coefficient of the h^{th} factor affecting growth of small agro-processing firms measured by the value of processed products for h = 1, 2, 3……..n

The second null hypothesis in relation to the fourth specific objective stated that, the coefficients for corresponding variables for Mbeya and Morogoro Regions were equal,

implying that the two regions were equally affected by the factors influencing growth of agro-processing firms. The regression equations representing coefficients that were tested are derived in section 3.3.2 (chapter 3). Mathematically the null and alternative hypotheses can be presented as;

$H_0; \beta_s mb = \beta_s mg$ ……..……..….…… (7)

$H_1; \beta_s mb \neq \beta_s mg$ ……..……..……...……..…. (8)

Where;

$\beta_s mb$ = The coefficient for the s^{th} variable in Mbeya Region

$\beta_s mg$ = The s^{th} coefficient for the s^{th} variable in Morogoro Region

Based on hypotheses 7 and 8, the study also sought to test whether there was a structural change between the two regions in terms of growth of agro-processing firms. The equation to test for structural change is presented in section 3.3.2 (chapter 3).

1.9 Shortcoming of the Study

In order to analyse the productivity of labour, data for the number of working hours for each of the respondent were required. Such data was however not readily available from most of the processing firms. The employers and owners did not keep records of work hours; they only recorded the quantity of processed products and the number of workers. To overcome this challenge the computation of labour productivity per hour was replaced by the value of processed products per worker per year. In some cases there was inadequate cooperation from firm managers who thought they were being investigated for the purpose of increasing taxes. To overcome this challenge the data was validated by triangulation with similar data from other sources including; workers, SIDO and Local government; such data had been submitted to respective authorities prior to the study, therefore avoiding bias due to the fear of taxes. Nonetheless, such data could still suffer

from the general tendency of firms to under-report revenue but over-report cost of production. Such problems could not be avoided. However, such problems affected data from all firms in the same directions. According to Rajendran (2001) comparing data from sources with similar characteristic provides valid data.

1.10 Organization of the Study

This study is organized in five chapters. Chapter one presented the introduction. In chapter two the literature in relation to agro-processing firms are reviewed covering the performance of agro-processing firms, policy and legal issues as well as various analytical methods that are used for assessing small agro-processing firms. The theoretical and conceptual frameworks are also presented in this chapter. Chapter three describes the methodology, which covers the description of the study area; research design, sampling techniques and data management. The analytical and empirical models are also derived. Chapter four presents the results followed by the discussion of findings. Conclusion and recommendations are made in chapter five.

CHAPTER TWO

LITERATURE REVIEW

2.1 An overview of agro-processing firms

The industrial sector in developing countries is typically dominated by small manufacturing firms. Such firms are generally characterised by poor physical infrastructure, limited human capital endowment and unskilled labour with low levels of education (UNIDO, 2000; Shifer *et al.,* 2012 and Daniel *et al.,* 2012). A large number of these manufacturing firms are agro-related, using agricultural products as their main raw material or those producing agricultural inputs (UNIDO, 2000). The manufacturing sector contributes over 70% of total formal employment in Africa and 60% of manufacturing value-added is from agro-related firms (UNIDO, 2000 and FAO, 2008). These firms are often labour-intensive, especially those for food processing, textiles, clothing, leather and footwear (FAO, 2008).

Within East African countries, agro-processing firms account for more than 80% of manufacturing firms, but these firms are capable of processing only 28% of the agricultural produce (EAC, UNIDO and FAO, 2011). The remaining agricultural products are sold in raw form or lost. Such a low level of processing is due to an unreliable supply of good quality and inadequate quantity of raw materials which are too scattered to reach processing firms (EAC, UNIDO and FAO, 2011). Long distances between producing areas and the location of agro-processing firms, coupled with the poor state of transportation infrastructure also contribute to the small percentage of agricultural produce being processed.

In Tanzania there are only a few large agro-processing firms focusing on regional and international markets meanwhile the sub-sector being dominated by small and medium sized firms. Over 90% of these firms are characterised by low technology, undertaking semi-processing of products that are sold in the local market (Tiisekwa *et al.,* 2005*a* and Hawassi, 2006). This is in contrast to Kenya's agro-industry which accounts for more than 30% of export values, and also constitutes 70% of the value of processed products coming from medium sized and large agro-processing firms (URT, 2012a; FAO, 2008; MOTI, 2007 and Wangwe, 2002).

Factors that contribute to low growth performance include; inadequate and seasonal supply of raw materials, low levels of technology and high cost of raw materials, leading to low volume of processed products such that supply cannot meet demand for local and export markets (FAO, 2008). Other factors include; uneven distribution of small agro-processing firms, high cost of credit, high levels of corruption and high taxes for registered firms. These factors hinder productivity growth of agro-processing firm in Tanzania as well as in other African countries (FAO, 2008 and Hawassi, 2006).

About 75% of small agro-processing firms in Tanzania operate below their installed capacity recording only 15% capacity utilization on average, which contributes to high post-harvest losses (Tiisekwa *et al.,* 2005a). It is currently estimated as 30 % of cereals, 70% of fruits and vegetables, and 20% of fish are lost in the post-harvest phase due to lack of processing facilities (URT, 2008 and URT, 2009). For these reason only about 1% of available agricultural raw produce are being processed in Tanzania compared to 40-50% in Thailand, 78% in the Philippines, and 83% in Malaysia (Mukami, 2003). Corresponding figures for other African countries are 34.4% for Kenya, 27% for Uganda and 10% for other Sub-Saharan African countries (ADB, 2008; Diaby and Kamau, 2010).

This difference in the proportion of processed agricultural produce among countries reflects differences in investment levels, which in turn provide opportunities for future investment in countries such as Tanzania where the level of agro-processing and hence investment is very low.

Since independence the government of Tanzania has made various efforts to develop agro-processing firms. Some of these initiatives involved establishing the National Milling Co-operation (NMC) in 1968 to facilitate procurement, milling and storage of grains for internal and external markets. The NMC also provided laboratory facilities and other services for analysis of grains and flour. All these were done to facilitate timely transportation and marketing of processed grain products (World Bank, 1980 and Skarstein, 2005).

The main achievements of the NMC included; procuring crops from farmers at reasonable fixed price and distributing the same to urban consumers at subsidized prices. The NMC however faced problems due to inefficiency in marketing and distribution which led to underperformance in terms of sales and incentives to farmers. Some firms were eventually sold to Mohammed Enterprises, Salim Bahresa enterprises and others were retained for storage of strategic grain reserves (Skarstein, 2005). The market share of the NMC dropped to less than five percent by 1983/1984 (Onsongo, 2002; ADBG, 2001 and PMO, 2001).

In the case of other agricultural commodities, during the 1970s the government initiated vertical integration of various agricultural sub-sectors including; cashew nut, tea, coffee, sisal, grain, oil, beef and dairy by developing agro-processing firms. The establishment of milk processing firms in Mbeya, Tanga and Mara Regions under DAFCO and the

establishment of cooking oil firms under GAPEX, textile and meat packaging firms were achievement of such vertical integration. These firms performed relatively well up to the end of the1970s after which they started to perform poorly (ADBG, 2001 and Skarstein, 2005). A report by the World Bank (1980) indicated that poor performance was due to the policy of self-reliance and protectionism, by which the state provided subsidies to sustain underperforming firms that introduced inefficiency in resource allocation through out the economy.

This led to formulating policies which were rather hostile or at least ambiguous towards the private sector. However, economic liberalization since the mid 1980s led to policy and institutional reforms, which have resulted in growth and better performance of the private sector in various commodities. A good example is milling firms where more than 95% of the milling of grain is done by individual investors and private firms (PMO, 2001). The growth observed after 1980 reversed the negative or stagnant growth rates which characterized the pre-reform period of the late 1970s up to the mid 1980s. Thereafter, from this period, positive growth was experienced and relatively high real Gross Domestic product (GDP) growth rates have been observed. On average 4.4% real GDP growth per annum was recorded compared to only 0.8% real GDP of pre-reform period (Shitundu, 2000 and Skarstein, 2005).

In the same period, unemployment appeared to be increasing in Tanzania since many firms collapsed. Furthermore, during the reforms which began in 1986, different sectorial and sub-sector policies were introduced to facilitate economic development; some among them are linked to small agro-processing firms' development as indicated in the next section.

2.2 Post Structural Adjustment Programme Policies for Agro-processing Development

Following the economic liberalization policies of 1986 up to the 1990s, the country witnessed a series of policy and institutional reforms in all sectors. In the case of industries a number of policies were introduced during the 1990s, designed to unleash the potential of the industrial sector. The main focus of agro-processing was to complement on-going efforts to transform agriculture from substance to market oriented production. This section provides a summary of policies introduced over the period from 1990s to 2000 and beyond, which are relevant for the development of agro-processing firms, with a specific focus on growth of small agro-processing firms and employment generation.

2.2.1 National policies during 1985 - 1990s

The 1990s are known for institutional reforms. Many policies were introduced or revised during this time, including the; Food and Nutrition Policy for Tanzania (FNP) of 1992, The National Investment Promotion Policy (NIPP) of 1996 and the Sustainable Industries Development Policy (SIDP) of 1996. All these policies recognized the importance and need of small agro-processing firms to absorb raw-materials from agriculture create employment and generate income (MH, 1992; URT, 1996_a and 1996_b).

The policies encouraged production growth of agricultural products as well as processing and marketing of these products. This was done by facilitating training and providing finance in order to reduce postharvest losses, promote value addition and reduce unemployment. Furthermore, human resource development was emphasised to cope with expected changes in technology and the demand for a wide range of skilled workers. The policies emphasized that processing firm should be constructed near or within producing areas where the raw materials are abundant in order to avoid destruction and

loss of nutritional quality, which occurs during transportation (MH, 1992 and URT, 1996_a).

The outcome of these policies has been witnessed in terms of increased private sectors investment in processing agricultural produce and growth of manufacturing exports by a factor of 4.0 from 1997 to 2010 (URT, 2012*a*; Sutton and Olomi, 2012). The Tanzania Food and Drugs Authority (TFDA) was established to facilitate adherence to set standards of processed products (MHSW, 2003).

2.2.2 National Policies After the year 2000

Policy reforms continued beyond the year 2000. Among the policies introduced included; the Small and Medium Enterprises Development Policy (SMEDP) of 2002, National Trade Policy (NTP) of 2003, National Employment Policy (NEP) of 2008 and Agricultural Marketing Policy (AMP) of 2008, which were all consistent with promoting sustainable development of agro-processing firms and employment generation.

The SMEDP was introduced in 2002 to provide guidelines and directives for developing small and medium enterprises. Among other things, the policy emphasized the development of firms for jobs creation, by supporting the establishment of new SMEs in rural areas, improving marketing, producing good quality products, improving packaging and enhancing linkages between large and small enterprises (MIT, 2002).

Furthermore, the National Trade Policy of 2003 aimed at promoting manufacturing firms within selected zones; the emphasis being on using available local materials in manufacturing textiles, garments, leather goods and other agro-products. The policy set to facilitate diffusion of technology to local entrepreneurs and firms in order to increase

productivity hence creating more jobs. The government also encouraged investments in commercial farming and agro-processing firms growth within the sector through out-growers, contract farming schemes and other market linkage relationships (MIT, 2003).

The National Employment Policy (NEP) of 2008 was also established within this period to emphasize the application of simple and appropriate technologies to increase labour productivity in small agro-processing firms (MLEYD, 2008). The policy encouraged production of agricultural products to provide raw-materials for small firms as well as creating forward and backward employment linkages. The policy recognized agro-processing firms as an opportunity to promote employment and income generation (MLEYD, 2008).

The Agricultural Marketing Policy (AMP) of 2008 recognizes the fact that if agricultural products are marketed in their raw form farmers and the nation lose opportunities for higher earnings and for generating more jobs (MITM, 2008). Agro-processing has the potential for increasing income through value addition and increasing the shelf life of products. This also, makes processed food products accessible in rural and urban areas. Strategies to achieve this include (i) introducing special programmes and incentives for investors who have invested in agro-processing firms, (ii) encouraging consumption of locally processed agricultural products in the domestic market and (iii) investing in research and development for agro-processing activities (MITM, 2008).

The policies established since 2000 were implemented in various ways including the establishment of Vocational Education Training colleges (VETAs) and the outcome was observe in terms of increased valued added per capita of manufactured agricultural products by 5% from 2000 to 2010, being higher than other East African countries.

A 31% annual growth rate of manufacturing export was also recorded within the same period, being higher than that of previous records (URT, 2012a).

2.3 Post Structural Adjustment Programme and Institutional Changes

Policies are normally translated into strategies and programmes for implementation. Some policies may require changes in laws, which when operationalized would support and clear legal and institutional impediments. It is therefore imperative to have effective policy implementation, which conforms to national and local laws and by-laws. Discussion about institutional changes often encompasses the legal framework in relation to the rules of the game as well as other organizational aspects. In this section we present changes which have occurred since 1986 in relation to laws establishment as institutional aspects that promoted or constrain the development of agro-industries. The positive and negative implications of some of these institutional aspects are discussed below.

2.3.1 Tanzania food, drug and cosmetic act

The Tanzania Food, Drug and Cosmetic Act number 1, of 2003 led to the establishment of the Tanzania Food and Drugs Authority (TFDA) under the Ministry of health and Social Welfare, The TFDA's mandate is to provide efficient and comprehensive regulation and control of food, drugs, medical devices, cosmetics, herbal drugs and poisons (MHSW, 2003). In this regards, the TFDA directs actors in agro-based value chains to increase the production of high value of agro-processed products for domestic and international markets, hence creating employment and other benefits. Processors are required to register the firms and processed products in accordance to this Act; and sell or manufacture products according to the licence granted. Any processor contravening this law commits an offence and upon conviction is liable to pay fine or face imprisonment.

The TFDA has tested different agro-processed products such as maize flour, cooking oil, bakeries to gauge whether were processed in accordance to required standards. The TFDA has also been working nationally to combat products that are not tested and approved (imported and local), which are sub-standards and hazardous by destroying them and punishing unscrupulous processors. The institute has promoted packaging and fortification of food products according to set standards, hence rendering the products exportable (FAO and WHO, 2005). All these efforts provide additional employment arising from higher demand of marketing and packaging materials, which must be manufactured.

However, the TFDA has not set processing standards for some of the agro-processed products such as dried fruits and vegetables (MMAL, 2008). The TFDA also, does not have enough inspection facilities to cover the whole country, which increases the prevalence of sub-standard and hazardous agro-products (MMAL, 2008). These factors are hindering efforts to ensure that firms are competitive in domestic and international markets. However, the TFDA cannot implement the Act effectively since there are so many enterprises, which are unable to comply to set standards. ATE (2005) argued that if the TFDA successfully enforced all the standards many enterprises would be closed, leading to serious employment and food crises. The TFDA works in collaboration with the Tanzania Bureau of Standards (TBS) to regulate the quality of processed products. The mandate of TBS is stipulated in the next section.

2.3.2 Tanzania Standards Act

Standards are very important for positioning processed products within a market. The Tanzania Standards Act number 3 of 1975 established the Tanzania Bureau of Standards (TBS) under the Ministry of Industry, Trade and Marketing to strengthen the

supporting institutional infrastructure for the industry and commercial sectors of the economy. The Bureau has mandate to undertake measures for quality control of a wide range of products and promote standardization in industry and commerce. This includes assisting firms to set up and enforce quality assurance systems, provide facilities for examination and testing standards of manufactured produce as well as processed and treated products from firms (MIT, 1975). The Act is also very important in supporting the development of a vibrant and competitive organization within the agro-processing sub-sector.

2.3.3 National Industries Licensing and Registration Act

The National Industries Licensing and Registration Act number 27 of 1967 also under the Ministry of Industry, Trade and Marketing intended to provide registration and regulation of firms in Tanzania. The Act divides firms into three categories for the purpose of regulation and development. These include small-scale, medium and large-scale firms. All categories of firms are required to obtain a Certificate of Registration in order to be established and produce products in accordance to set standards (URT, 1967). However, there are other institutions responsible for registration of small agro-processing firms, which includes Local Government Authorities provided by the Local Government Act as specified in the next section.

2.3.4 Local Governments Acts

The Local Governments Acts, No. 7 and 8, of 1982 gives general authority to Local Governments to control health, to relieve poverty and to control and improve trade, commerce and industry. Further, the Act facilitates Local Governments to register and govern small agro-processing firms within their areas. The Local Governments are responsible for controlling the firms to manufacture products according to set standards

(MRALG, 1982). The Small Industries Organization (SIDO) also plays a role to control firms so that they manufacture products according to standards. The role of SIDO is described below.

2.3.5 Small Industries Development Organization Act

The Small Industries Organization (SIDO) was established under the Act of Parliament number 28 of 1973. The organization (SIDO) evolved from the National Small Industries Corporation (NSIC), which was established since 1966, under the National Development Corporation (NDC). The NSIC set up small industrial clusters, which essentially served as training and production workshops. The purpose of established SIDO was to improve planning, coordinating, promoting and offering every form of service to small scale industries. In addition, SIDO and other stakeholders continue to collaborate in supporting and establishing SME as a strategy for empowering the private sector. Some of those associations include; Tanzania Food Processors Association (TAFOPA), Tanzania Small Industries Organisation (TASISO) and '*Vikundi vya Biashara Ndogo'* (VIBINDO). Some of the functions of these associations include facilitating access of market information, raw-materials, packaging materials and micro credit services (MITM, 2011). These associations have been useful for involving members in matters related to advocacy.

2.3.6 Tanzania Industrial Research Development Organisation

Apart from SIDO, Tanzania Industrial Research Development Organisation (TIRDO) was established to support enterprise development. The Tanzania Industrial Research Development Organisation was established by the Act of Parliament number 5 of 1997. The mandate of TIRDO is to assist the industrial sector of Tanzania by providing technical expertise and support services to upgrade their technology base by carrying out

applied research for developing suitable technologies, which will be used for indigenous agro-product through processing (MIT, 1979).

2.4 Employment Status in Agro-processing Sub-sector

In developed countries, the agro-processing sub-sector employs about 34% more workers per unit of value-added output than developing countries, which employ only 26% workers per unit of value-added output (UNIDO, 2000). This indicates a difference of 8% of employment created per unit of value - added output. In India agro-processing firms are labour intensive, thus offering significant employment opportunities compared to many African countries (Nambbodii *et al.*, 2003). The industrial sector in India employs 18% to 20% of the country's labour force with significant effect towards reducing unemployment problems (Nawab, 2003).

In Tanzania, manufacturing firms account for less than 5% of the total labour force, with the largest 40 manufacturing firms employing only 36% of all manufacturing labour. This is equivalent to the employment generated by 24 000 micro enterprises (URT, 2012a). Perhaps a worrying fact is that only 11% of employment is generated by firms which began operations in 2005 or later (URT, 2012a). This reflects that the new investments in manufacturing firms have not yet resulted in significant jobs being created despite government efforts to support development of firms for that purpose. Moreover, the 2008 and 2009 annual survey of industrial production and performance reports indicated a remarkably low contribution of new jobs created by the formal small agro-processing sub-sector; being 5% in 2008 and 5.5% in 2009 of all jobs created by the industrial sector (URT, 2010 and URT, 2012b).

A study by Komba (2008) identified challenges of creating employment opportunities in Tanzania to absorb 700 000 new entrants into the job market annually. One of the challenges includes establishing more agro-processing firms and making them sustainable in a situation where most of the proceeding firms are collapsing. Meanwhile, various authors including UNIDO (2008) and MLEYD (2008) have emphasized the need for developing agro-related firms for milling, and for processing fruits and vegetables to bring positive impacts on employment creation in the sub-sector; but results in this direction are still only marginal.

2.5 Labour Productivity Performance

Productivity measures the rate at which goods and services (output) are produced per unit input, which includes labour and capital embodied in raw-materials and other inputs (Isinika, 1995). Partial productivity is computed based on a single input such as yield which is a ratio of output per unit area such as Tons/ha (Isinika, 1995). Meanwhile, total factor productivity is computed by the value or amount of output per unit value of inputs comprising of labour and capital (OECD, 2001). This measure of productivity is used to determine the efficiency of a firm (Kohli, 2004). The total factor productivity of a production process is affected by innovation, investment, research and development, trade, firm size, government policy and inflation (Khan, 2006).

Meanwhile, the productivity of a firm depends on the relationship between labour, capital and technology. Labour as an input is affected by education, experience, skills, training, age and gender of firms' employees relative to the amount of goods and services produced (Afrooz and Rahim, 2010). Labour therefore, is a key variable in a firm's productivity. Improvement in the productivity of labour will have occurred if the same number or value of workers can produce a larger quantity of goods or, the same quantity

of goods can be produced by a smaller number or values of workers. This is alternatively stated by Laurentiu (2009) as; “a certain amount of output is produced by less labour (in monetary terms)”. Labour productivity performance worldwide is so divergent. A country such as Malawi had the lowest average labour productivity of US$ 1 354 in 1990-2005. During the same interval labour productivity of the United States of America (USA) was US$ 70 235, being more than 50 times larger than that of Malawi. The corresponding value for Tanzania was US$ 1646 being only slightly higher than that of Malawi (World Bank, 2007a).

Labour productivity growth in Tanzania as established by the World Bank (2007) indicated 3.1% annual growth rate among small agro-processing firms, which is very small compared to other African countries estimated at 5.3% per year. In monetary value the World Bank (2007a) reported the average of US$ 3000 of labour productivity per annum between 1990 and 2005 in Tanzania, which is also smaller than that of other African countries estimated at US$4 800 to US$14 000. Such low labour productivity was attributed to limited physical capital investment in the sub-sector (World Bank, 2007a). In comparison, China recorded the fastest overall labour productivity growth rated at 8.9% per annum.

The trend of labour productivity within manufacturing in Tanzania has been variable over time. The most impressive growth was experienced from the mid 1960s when it was higher than that of Asian countries (Mbelle, 2005). After 1973 up to mid 1980s there was a decline in labour productivity estimated at -11% per annum due to poor incentives for productivity, bad macroeconomic policies and poor investment decisions by parastatals. The economic reforms which commenced in 1986 to contributed towards marginal growth, recorded at 1.8% per annum in 2003. This improvement has been attributed to

increased capital per worker (ILO, 2008b). Mbelle (2005) compared the labour productivity of low-income economies in Asia and Tanzania starting from the 1960s. The Asian countries started at a lower level of economic growth than Tanzania recording little change over time, but they caught up during the 1980s when labour productivity growth for Tanzania had dropped down to -11% per annum. There-after the Asian economies gained momentum, their labour productivity growth accelerating to 25% per annum from the 1980s up to 2000 (ILO, 2008b). The outcome in terms of economic performance and food self sufficient has been demonstrated in almost all Asian economies (Mbelle, 2005). This was attributed to a large number and proportion of skilled labour and change of technology.

In another study, Mwakapugi *et al.* (2010) identified the shortage of skilled personnel as a hindrance for labour productivity growth in the electricity sub-sector which indirectly affects the productivity of other sub-sectors that depend on it. Niringiye *et al.* (2010) showed that in Tanzania, manufacturing firms with a high proportion of skilled workers exhibit significantly higher levels of labour productivity than firms that have a low proportion of skilled workers. Their findings indicated that the elasticity of production for skilled workers was 0.227 significant at 0.05 levels.

All these studies reflect that the performance of labour productivity within any firm, including small agro-processing firms is determined by different factors which include the type and level of physical and human capital investments made by the firms. Physical capital includes basic infrastructure such as machinery and building to support production. Human capital includes the stock of competencies, knowledge, social and personality attributes embodies in workers which contribute towards improving productivity.

2.6 Effect of Labour Productivity Growth on Employment Creation

Labour productivity in small agro-processing firms has a strong relationship with employment since labour productivity is computed as a ratio of the quantity or value of output to the number of workers. According to Landmann (2004) and ILO (2008*a*), labour productivity growth increases employment by reducing production cost. Labour productivity also increases returns on investments thereby providing greater income to business owners, who in turn reinvests their profit in other economic activities, expanding further into new firms that employ more workers. Productivity growth also allows product prices to decline by increasing the product market size and the number of actors. Such increase leads to more workers being hired (Helper *et al.*, 2012). Consequently, the overall impact of labour productivity growth is to expand employment rather than reduce it.

In some cases however, labour productivity growth caused by improvement of technology may be associated with lowering direct employment growth, since the increase of labour productivity means fewer workers are required to produce a given quantity of output (Boulhol and Turner, 2009). Such change of technology therefore reduces direct employment creation (Backstead and Gellatly, 2003 and OECD, 2001). Fortunately however, labour productivity growth resulting from technology improvement increases indirect employment by more than two times, hence offsetting the negative effects.

This phenomenon is indicated in a theory proposed by Rosenstein- Rodan which states that “spill-overs in production may cause the return to an activity to increase with the number of workers who undertakes other activities” (Hoff, 2001). This means spill-overs increase the number of workers undertaking different activities related to activities of a given firm. Similarly, various researchers (Shitundu, 2000; Kapunda, 2005; Kaliba, 2008;

Jajri1 and Ismail, 2010) have discussed the link between increased labour productivity caused by technological improvement that leads to multiple increases of indirect employment as well as GDP in small agro-processing firms, thereby reducing the problem of unemployment. From these arguments it is evident that while labour productivity growth due to technology may have negative impacts in relation to direct employment in firms, but, there is a greater positive impact through indirect employment in affiliated sub-sectors.

2.7 Growth and Sustainability of Small Agro-processing Firms in Tanzania

As narrated in (section 1.3), the first post-independence small industrial development strategy was developed in 1965. To facilitate implementation of the strategy the National Small-Scale Industries Corporation (NSIC) was created in 1966 under the National Development Corporation - NDC (Mwang'ombola, 2005). Emphasis on establishment and operation of industries was added after the Arusha Declaration in 1967 to promote structural change and increase self- reliance (Shitundu, 2000). After 1967 agricultural parastatals such as Dairy Farming Company - DAFCO (dairy), National Agricultural and Food Corporation - NAFCO (grain), NMC (milling), General Agricultural Products Export Company - GAPEX (oil seeds), and various crop authorities (Sisal, Cashew, tea, tobacco and cotton) were established and strengthened for vertical integration of respective sub-sector (Shitundu, 2000). This was done to overcome inefficiency, poor planning and lack of extension services for farmers and other actors. However, the NSIC, which was established in 1966, provided little constructive support for industrial growth and performance and was subsequently replaced by the Small-Scale Industries Development Organisation (SIDO) established in 1973 (Mwang'ombola, 2005) as described earlier. This organization was designed to bring positive impacts both at the

micro and macro levels of the economy by generating employment and income (Wangwe and Rweyemamu, 2002).

However, between 1980s and 1990s firms faced significant challenges of collapsing and poor production due to unwarranted overcapitalization and poor management during the 1970s. Consequently, unemployment rates rose up to 30% (Shitundu, 2000). Collapsing and stagnation of firms dragged the Tanzanian economy down to the last position among the three East African countries (Kabelwa, 2002). The National Milling Corporation (NMC), also collapsed during this period due to a number of factors including; poor co-ordination, under-funding of the corporation, inefficient marketing and distribution of products (Isinika *et al*., 2005; Onsongo, 2002 and ADBG, 2001).

The poor performance of firms was closely associated with policy-related problems, which failed to maintain the growth of firms (Shitundu, 2000). Ashimogo (2008) similarly pointed out that failure of agro-processing firms to grow is associated with trade policies which were not favourable to the sub-sector. Another reason that dragged down the small agro-processing firms of the 1970s and 1980s includes, low value addition growth which was associated with low levels of infrastructure and physical investment. This increased the export of unprocessed agro-products while also increasing imported processed products in order to meet domestic demand (Mukami, 2003; ADBG, 2010 and URT, 2008). With regard to this (unsustainable growth of agro-processing firms) analysis of factors affected their growth has been conducted in different areas in Worldwide as summarized in the next section.

2.8 Analytical issues

This part reviews the literature on theories and analytical issues relevant for small agro-processing firm's growth and employment creation. The review covers the process of industrialization and employment. Discussion of analytical issues includes evaluation methods to assess employment creation, labour productivity performance and measurement of growth of small agro-processing firms.

2.8.1 Industrialization for economic growth and employment creation

Industrialization refers to a process of social and economic change that transforms a human group from a pre-industrial society to an industrial society (Mtatifikolo, 1998; Kapunda, 2005 and Singh, 2006). Homer and Alfred (1982) defined industrialization as the sustained increase in the rate of growth of total and per capita output of industries compared with what was achieved before. Gulhati and Sekhar (2002) defined industrialization as a process by which an increase in the proportion of a country's economic activity emanates from industries as an essential component for economic development, and is largely responsible for the growth of cities (urbanization) and modernization. Generally, industrialization is the overall change in capital investment, technological innovation, economic development and resources mobilization for manufacturing products and associated services.

According to Shitundu (2000), the World Bank (2004) and Kaliba *et al.* (2008) industrialization creates high demand for labour, leading to rapid expansion of employment, increasing income levels and reducing poverty. As the income level of industrial workers' rise, markets for consumer goods and services tends to expand, providing a further stimulus for economic growth and industrial investment. This assertion has been supported by Singh (2006) and Habib (2012) who argues that the

development experience of advanced countries and the newly industrializing economies have shown that industrialization is the only way through which the general level of living standards can be continuously improved. The industrialization process is guided by a number of theories as discussed below.

The theory of Rosenstein-Rodan on industrialization points out the importance of industrialization in relation to employment creation and income generation. The theory assumes returns that spill-overs from industrial activities lead to increased returns from other linked sub-sectors (Hoff, 2001; Fan, 2002; Hossain and Papadopoulou, 2010). This phenomenon is also referred to as the multiplier effect. Based on this theory, at various development investment stages, one sector may increase the profitability of other sectors due to multiplier effects of services and goods from those industries, hence increasing the number of people involved in corresponding activities and thus creating new jobs (Hoff, 2001 and Fan, 2002).

The theory elaborates that, demand effects depend on two factors: economies of scale with respect to labour and some non-tradable input (raw-materials). For example, if intermediate goods for processing firms are non-tradable (they are not imported) they will be obtained and used within the country hence reducing importation cost. Use of such inputs increases returns from production processes (Hoff, 2001). If the industry is expanded, it would increase the demand for non-tradable inputs thus stimulating more production of these in-puts, hence increasing production of final goods which creates more income and employment through spill-over effects.

The theory of unfettered economic growth as noted by Homer and Alfred (1982) indicates that in the industrialization process, the supply side and business profits are invested in

new firms with more efficient and more specialized techniques of production. This results in productivity improvement of actual output for a given level of capacity utilization. On the demand side expansion of capacity generates additional employment. Increased employment will push up the average standard of living, given access to more goods and services. A higher standard of living leads to greater demand for goods and services, hence more purchases. Both Rosenstein-Rodan's spill-overs and Homer and Alfed's growth theories consider labour and the supply of raw-materials in firms as key factors for productivity improvement.

2.8.2 Theories on employment

Traditional Keynesian employment theory views labour market to be determined by demand and wages (Keynes, 1936). Thus, hiring labour is not desired for its own sake but rather because it aids in producing output, which contributes to an income and to producer's profit. The demand for an additional unit of labour depends on the Marginal Revenue Product (MRP) and the Marginal Cost (MC) of a worker. Accordingly, unemployment is caused by a decrease of the marginal revenue products and increase of marginal cost (Keynes, 1936). This theory is contrary to the search-matching theory, which explains unemployment by frictions in the labour market. The theory purports that unemployment arises because it takes time for workers and firms to find each other, which is regarded as friction (Carlssona *et al.*, 2006). Under this theory it is argued that, without friction there would be no unemployment. If labour supply increased, firms would open new vacancies, and the new jobs would be filled. This would happen even if wages did not adjust. According to this argument, demand plays no role in the standard search-matching theory to create employment. However supply creates its own demand for employment (Carlssona *et al.*, 2006).

The two theories yield fundamentally different predictions about what determines job creation. Demand-oriented models by Keynes (1936), point to wages and aggregate demand as key factors which determine employment while the search-matching theory by Carlssona *et al*. (2006), asserted labour supply (unemployment) to have a direct effect on job creation. Other schools of thought propose different approaches to address the problem of unemployment. For example, Monetarists pioneered by Friedman believe that, in the short run, an increase in money supply (inflation) causes employment and output to increase (Stockhammer, 2006). They assert further that, in the long run controlling inflation, which facilitates growth and investment, is more important, and will lead to more employment than controlling inflation the period with high unemployment (Skousen, 1992 and Stockhammer, 2006). Promotion or increasing investment in different sectors of the economy is another method of solving the problem of unemployment in the long run. It is on this basis that investment in small agro-processing firms is justified in order to address unemployment.

2.8.3 Evaluation of agro-processing firms

Since agro-processing firms are particularly important for developing agricultural economies through income generation and employment creation, it should be expected that researchers and government should pay much more attention to foster their development. Different studies have analysed various aspects that relate to agro-processing firms and employment creation. For instance Mutabazi *et al.* (2007); Rijkers (2009) and Benavente *et al*. (2008) evaluated employment creation trends. Other authors including Niringiye *et al.* (2010); Bervidova (2002); Kapunda (2005) and Mwakapugi *et al.* (2010) analysed labour productivity performance in areas with electricity, while the growth of firms was analysed by Marthur and Gill (2011); Kinda and Loening (2010); Mohnen and Nasev (2006). These evaluations are discussed in the subsequent sections.

2.8.3.1 Evaluating firms for employment creation

Evaluation for employment creation among small agro-processing firms has been done by different scholars including Mutabazi *et al.* (2007) who evaluated employment creation in southern highland zone through correlation analysis and use of descriptive statistics such as percentage to capture the relationship between the numbers of new jobs generated in relation to the volume of products processed in small agro-processing sub-sector. The findings indicated that the number of paid labour in a firm in southern highland zone had a positive and significant effect on the volume of marketed milk.

Rijkers (2009) evaluated the employment growth rate of manufacturing enterprises in Ethiopia using ordinary least square regression analysis. The model contained the annual employment growth rate as a dependent variable which was regressed against the age of a firm, activities performed by the firm, management effectiveness and the geographical location of a firm (urban or rural). The results indicated that rural firms grow less quickly than urban firms and rural firms are less labour productive than urban firms. Benavente *et al.* (2008) evaluated employment growth by ordinary least square regression method to assess how the growth of products sold was influenced by investments and products innovations. The findings indicated that product innovation had a significant positive effect on employment, concluding that emphasis on innovation is important for effective jobs creation.

2.8.3.2 Evaluation of labour productivity

Labour productivity is one of the efficiency measures of a firm's production. The variable labour productivity is widely used by economists to measure labour efficiency (Isinika, 1995 and Bervidova, 2002). The production efficiency of an industry depends on labour as an important factor in the production processes, since labour controls other production

factors namely capital and technology. Labour productivity provides a measure of competitiveness, economic growth, and living standards within an economy (Freeman, 2008; Laurentiu, 2009; Allan, 2001 and Dorward, 2013). The productivity of an industry largely depends on the relationship between labour as an input that is affected by the education level, experience, skills, training, age and gender being proxies for human capital (Afrooz and Rahim, 2010; Khan, 2006 and Mahadevan, 2003).

Partial Labour productivity is measured by the real output per unit of labour input (Webber and Horsewell, 2009). According to the Organization for Economic Cooperation and Development - OECD (1998) and Freeman (2008), labour productivity can be measured in different ways such as; as gross output per worker or as gross value added per worker. Measuring the value of output can be based on the price of goods in the local market multiplied by the volume of goods sold. The value of output produced at a given time is then divided by the number of hours spent to obtain labour productivity per hour. This method is particularly useful for firms that have good records of all permanent, temporary and part time workers. The method also works well for firms with good records for worked hour. Alternatively, especially when data for hours worked are not available or are of low quality, the labour input is measured as the number of workers who were employed and worked in a particular firm at a particular time (Isinika, 1995; Hunt, 2000; Schreyer, 2005; Khan, 2006 and Freeman, 2008).

Different authors have used the labour input measured by the number of workers at a particular time to estimate labour productivity. Niringiye *et al.* (2010) who used productivity models to estimate factors affecting labour productivity in manufacturing firms. Kapunda (2005) used a descriptive method to identify the effects of productivity on the creation of direct and indirect employment while Mwakapugi *et al.* (2010) used

descriptive analysis to identify the levels of skills required to boost the electricity sub-sector, hence improving productivity in the industry sector. They attempted to analyse factors contributing to differences in labour productivity across firms. Their findings identified capital stocks, differences in education and the experience of workers to account for labour productivity variation among firms.

Apart from descriptive analysis, the Trans-log and Cobb-Douglas functional forms have been used to analyse labour productivity. The Trans-log functional form provides a second order approximation to an arbitrary twice-differentiable linearly homogenous function (Coelli, 1995; Debertin, 1993 and Greene, 2003). The Trans-log specification is attractive because of its flexibility, in the sense that, it nests or approximates a number of popular models including labour productivity models (Greene, 2003). However, the Trans-log functional form is susceptible to multicollinearity and has potential problem of insufficient degrees of freedom due to the presence of interaction terms (Coelli, 1995).

Consequently, the Cobb–Douglas function form is used more often to evaluate the performance of agro-processing firms than the trans-log form (Corvers, 1997; Goedhuys *et al.,* 2008 and Niringiye *et al.,* 2010). The Cobb–Douglas functional form affords maximum flexibility in dealing with data imperfections such as missing or incomplete observations. It is also less restrictive when all the coefficients are allowed to vary. Moreover the Cobb-Douglas functional form has been acknowledged by researcher to fit the manufacturing data reasonably well (Debertin, 1993; Greene, 2002; Khan, 2006; Afrooz and Rahim, 2010).

The Labour productivity model often used in analysis is indicated in equation 9;

$$LP = \frac{Y}{H} \quad \text{or} \quad LP = \frac{Y}{L}$$

……..(9)

Where LP = Labour productivity,

Y = Volume or value of output produced at a given time,

H = Hours spent in the production of outputs and

L= Number of workers involved in production of output.

The performance of human capital in terms of labour productivity is examined through three stages including computation of labour and capital productivity per worker, generating labour productivity trends for each of the studied firm and analysing how human capital and other factors affects labour productivity performance. All this information regarding labour productivity was used in developing analytical models for the current study.

2.8.3.3 Evaluating the growth of small agro-processing firms

The analysis, which was used to evaluate the growth of small agro-processing firms, is entails by evaluating the value of processed products in relation to the investment made within a firm (World Bank, 2003 and Rijkers, 2009). However, different scholars including Kinda and Loening (2010) as well as; Schimke and Brenner (2011); Sangosanya (2011) have used other methods to evaluate a firm's growth, which included measuring the value of products in terms of growth of sales, profits, inputs used, value of assets and the number of working days. For instance, Marthur and Gill (2011) evaluated the growth of firms by using the value of output computed from sales. Kinda and Loening (2010) used the number of working days as an indicator of firm's growth. This is often used for firms with good records for labour working days (Kinda and Loening, 2010;

Marthur and Gill, 2011). Meanwhile, Mohnen and Nasev (2006) used the quality of human capital measured in terms of education levels, experience and skills to indicate a firm's growth. In this study, the value of processed products measured by the selling price, value of raw-materials measured by commodity price, labour productivity, energy cost, value of capital invested and other factors were used because human capital factors are embodied in labour productivity.

2.9 Conceptual Framework

The analytical models for this study were derived from a conceptual relationship between growth of agro-processing firms expressed in terms of (i) investments measured in (United States Dollars)-USD to facilitate comparison with other countries, (ii) number of workers, (iii) quantity of processed products measured in tonnes (iv) value of processed products measured in USD (v) and quality of processed products measured by whether or not they follow TBS and TFDA standards.

A framework considers a combination of different economic and institutional factors as drivers of growth for small agro-processing firms. The framework for this study (Figure 1) has been modified from Krugman (2008); Erol *et al.* (2008); Hawkes (2007); Adam and Ghaly (2007), taking into account most of the factors listed above. Small agro-processing firms are said to grow if there is continued increase in the numbers of firms, quantity and quality of products (value of products), value of investment, number of employees and the wage bill or the average wage. Moreover, growth within a sub-sector should be reflected through the performance and welfare of the firms and households that are employed in the firms. As firms' investment and profit margin increase, the benefits accrue to household members (labour) through wages and other benefits. If there is a general improvement of wages across many firms within a country, households employed

in those firms will in turn increase their purchasing power and savings. It is assumed that the rise in wage would be accelerated by similar factors in different sectors, thereby reflecting economic growth.

A general wage increase motivates workers within firms to increase productivity; concurrently workers from other sectors are expected to increase their purchasing power for agro-processed products, as their wages increase. Rising wages are also expected to be associated with higher savings by household through formal financial institutions, which in turn provide more funds to firms for investment. All these are characteristics of the circular flow model for a closed economy (Robert, 2006), which is now adapted for assessing the performance of agro-processing firms. The growth of agro-processing firms and hence the sub-sector is assumed to be dependent on internal and external factors as presented in Fig. 1. These include human capital factors (education, skills and experience), technology, financing, availability of raw-materials, market for products, competitors, cost of energy (fuel and electricity), as well as the policy and the legal framework as reflected in Fig. 1.

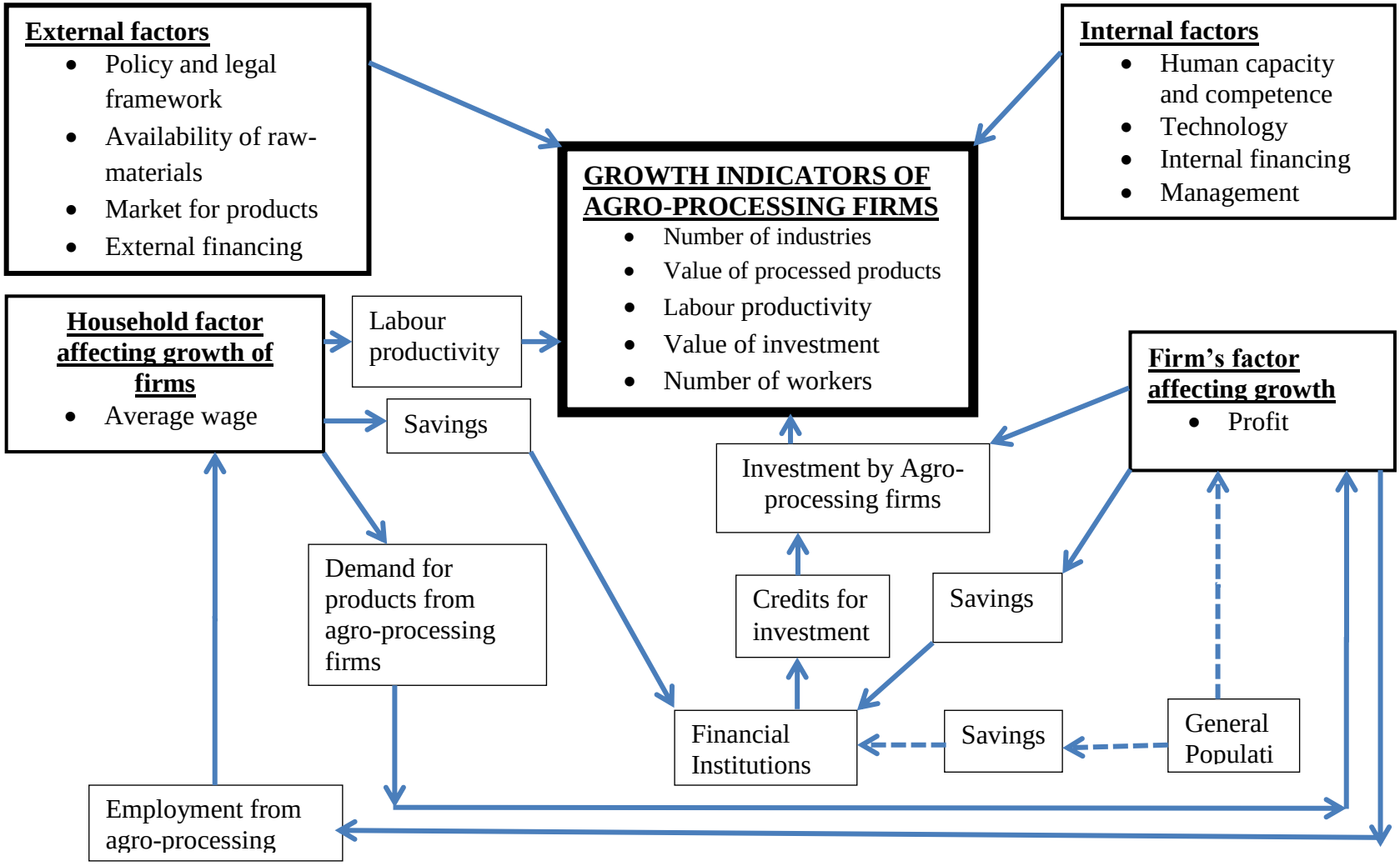

Figure 1: Conceptual framework of Growth of Small Agro-processing firms for Employment Creation

Source: Modified from Krugman (2008), Erol, *et al* (2008), Hawkes (2007), Adam and Ghaly (2007)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Description of the Study Area

The study was conducted in Mbeya in the southern highlands and Morogoro in the Eastern zone. Both play an important role in agro-processing activities in Tanzania. These regions were purposively selected to represent other regions in the country where agro-processing plays an important role in their economies. From each region two districts were selected as presented in Figure 2. From Mbeya region, Mbeya urban and Mbeya rural District were purposively selected for collecting detailed data on individual agro-processing firms because these districts have a substantial presence of agro-processing activities. The same reason applies for Morogoro municipality and Kilombero District, in Morogoro Region. Mbeya urban and Morogoro municipality are both regional headquarters, hence an ideal investors' choice for locating firms because of good service in terms of water, electricity and proximity to consumers. Mbeya rural and Kilombero Districts were selected for their extensive agricultural production activities that supply raw material to agro-industries.

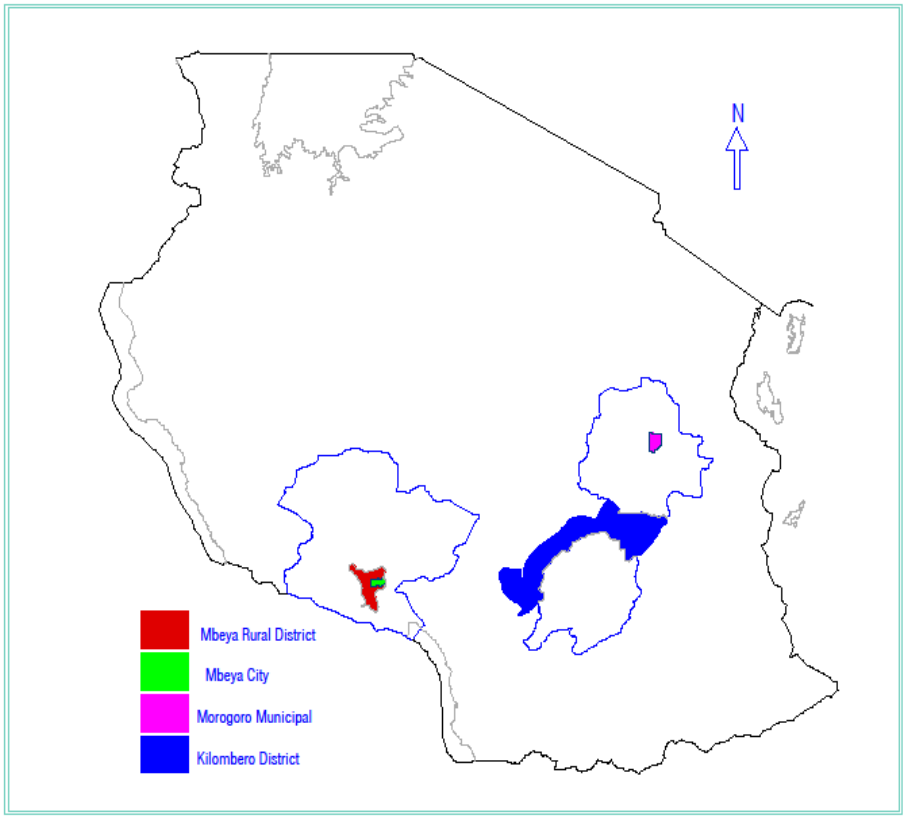

Figure 2: Map of Tanzania showing study regions and districts

3.2 Research Design

The study adopted a combination of cross section and time series research design. A cross section research design involves collecting data at one point in time, for generating in-depth data about managers and workers views regarding growth of small agro-processing firms (Bryman and Bell, 2007). Time series data were collected from different records on; the number of workers and their qualities, the amount and value sales for each processed products from 2002 to 2011, and the number of registered small agro-processing firms. Cross sectional data were collected from workers and managers of different types of firms while time series data were collected from different secondary sources including SIDO, TRA, District trade officers and other published sources in order to capture performance trends of small agro-processing firms over time.

3.3 Analytical Framework

Descriptive analysis involving percentages, tables, graphics and correlation analysis was used to evaluate labour productivity performance and employment creation trends. Econometric models were used to assess factors that affected labour productivity and growth of the agro-processing firms, using the value of agro-processed products as a dependent variable. Different methods, which have been used for analysing labour productivity and sub-sector growth as discussed in section 2.8, were employed for this analysis.

3.3.1 Labour productivity model

Labour productivity (LP) is indicated as;

$$LP = \frac{Y}{H} \text{ or } LP = \frac{Y}{L} \quad \ldots\ldots (10)$$

Where LP= Labour productivity,

Y = Volume or value of output produced at a given time of a particular firm,

H = Hours spent in the production of outputs over the same period and

L= Number of workers involved in the production of output over the same period.

Labour productivity (LP) is a measure of labour efficiency which could be represented by the letter "*r*". Based on Cörvers (1997) and Niringiye *et al.* (2010), the term (*r*) is presumed to be influenced by a number of factors which include the managers' education, experience, type of training attended. Additional factors are; the number of workers with different levels of education, experience of workers, the value of capital invested in processing firms as well as the location of a firm. The efficiency function for labour is therefore presented in equation (11).

$$r_i = f(l_i l_{i,j}^{\theta})\text{..}(11)$$

Where r_i = Overall labour efficiency of the i^{th} firm,

l_i = Number of workers for the i^{th} firms, for i = 1, 2, 3, ………………..……, s.

$l_{i,\,j}$ = The jth factor that influence the performance of labour (human capital) of the i^{th} firm for i = 1, 2, 3,……………..,s *and* j = 1, 2, 3,……., n

θ = Parameters that reflect the contribution of factors to the efficiency of labour, Such parameters include; (i) education measured by the number of years of the managers and number of workers with a particular level of education; (ii) experience measured by the number of years and (iii) training measured by dummy variables.

Meanwhile, the efficiency of labor is one of the factors that influence the value of products (y) as presented in equation (12) using a Cob-Douglas model

$$y_i = ak_i^{\alpha} r_i^{\beta} e^{\varepsilon i}\text{……………………………………..…………………………..}(12)$$

Where; y =Value of output,

a =Technology used in production for each particular agro-processing firm,

k = Efficiency of capital,

r = Efficiency of Labour,

e = Natural logarithm,

α are the capital parameters,

β are the labour parameters,

ε = Error term

By substituting r_i from equation (11) into equation (12) we get equation (13).

$$y_i = ak_i^{\alpha}(l_i l_{j,i}^{\theta})^{\beta} e^{\varepsilon i} \quad \text{(13)}$$

Where e = Natural logarithm

ε_i = Random error for the i^{th} firm

All other variables are as previously defined in equations (11) and (12)

Equation (13) can be expanded as presented in equation (14)

$$y_i = ak_i^{\alpha}(l_i l_{1i}^{\theta 1} l_{2i}^{\theta 2} l_{3i}^{\theta 3})^{\beta} e^{\varepsilon i} \quad \text{(14)}$$

Dividing both sides by (l_i) we get equation (15)

$$\frac{y_i}{l_i} = \frac{ak^{\alpha}(l_i l_{1i}^{\theta 1} l_{2i}^{\theta 2} l_{2i}^{\theta 3})^{\beta} e^{\varepsilon i}}{l_i} \quad \text{(15)}$$

Equation (15) can be re-written as equation (16) after multiplying $\frac{l_i^{\alpha}}{l_i^{\alpha}}$ on both sides.

$$\frac{y_i}{l_i} = \frac{ak^{\alpha}}{l_i^{\alpha}} \frac{l_i^{\alpha}}{l_i} (l_i l_i^{\theta 1} l_i^{\theta 2} l_i^{\theta 3})^{\beta} \ell^{\varepsilon i} \quad \text{(16)}$$

Simplification of equation (16) leads to equation (17), which is further simplified to form equation (18)

$$\frac{y_i}{l_i} = a(\frac{k_i}{l_i})^{\alpha} l^{\alpha - 1} (l_i l_i^{\theta 1} l_i^{\theta 2} l_i^{\theta 3})^{\beta} \ell^{\varepsilon i} \quad \text{(17)}$$

$$\frac{y_i}{l_i} = a(\frac{k_i}{l_i})^{\alpha} l_i^{\alpha + \beta - 1} l_{1i}^{\beta \theta_1} l_{2i}^{\beta \theta_2} l_{3i}^{\beta \theta_3} \ell^{\varepsilon i} \quad \text{(18)}$$

Log-linear transformation of equation (18) forms equation (19)

$$\frac{Y_i}{L_i} = A + \alpha\left(\frac{K_i}{L_i}\right) + (\alpha + \beta - 1)L_i + \beta\theta_{1,}L_{1,i} + ... + \beta\theta_{n,}L_{n,i} + \varepsilon_i \text{...} \quad (19)$$

Where $\frac{Y_i}{L_i}$ = Ln $\frac{y_i}{l_i}$,

A = Ln a,

$\frac{K_i}{L_i}$ = Ln $\frac{k_i}{l_i}$,

L_{1i} = Ln l_{1i}

L_{ni} = Ln l_{ni}

The ratio $\frac{Y_i}{L_i}$ is substituted by the variable *Xi* for convenience, and for consistency, the remaining variables in equation 19 are changed to X_{ji} as presented in equation 20.

$$\text{X}_0 = A + \alpha X_1 + (\alpha + \beta - 1)X_2 + \beta\theta_1 X_3 + ... + \beta\theta_n X_n + \varepsilon_i \text{.......................} (20)$$

Where $X_0 = \frac{Y_i}{L_i}$ = Labour productivity

$X_1 = Li$ = number of workers in i^{th} firm

$X_2 = L_{1i}$ = the first component of labour affecting the productivity of labour in i^{th} firm

$X_3 = L_{2i}$ = the second component of labour affecting productivity of labour in i^{th} firm

$X_3 = L_{ni}$ = the nth component of labour affecting productivity of labour in i^{th} firm

According to Debertin (1993) and Niringiye (2010) it has been assumed that: Technology is a variable with many aspects which cannot be captured quantitatively. Thus, the parameter A is represented by the error term "ε". Equation 20 is modified further such that;

α is represented by δ_2; $(\alpha+\beta-1)$ is represented by δ_2;

$\beta\theta_1$ is represented by δ_3, and $\beta\theta_n$ is represented by δ_n

These changes are reflected in equation (21), which represents various factors affecting labour productivity.

$$\frac{Y}{L}=\delta_0+\delta_1X_{1i}+\delta_{2,}X_{2i}+\delta_{3,}X_{3i}+\delta_{4,}X_{4i}+\delta_{5,}X_{5i}+\delta_{6,}X_{6i}+\delta_{7,}X_{7i}+\delta_{8,}X_{8i}$$
$$+\delta_{9,}X_{9i}+\delta_{10,}X_{10i}+\delta_{11,}X_{11i}+\varepsilon_i \quad \text{.....(21)}$$

Where $\frac{Y}{L}$ = Average labour productivity in given year for small agro-processing firm, this was the dependent variable to assess firm's performance in terms of labour productivity.

X_1 = Natural log of ratio of the capital added per worker in small agro-processing firms

X_2 = Dummy variable of firm location $D_{1,}$ = 1 if a firm is located in urban area and zero otherwise

X_3 = Dummy variable for manager's education $D_{2,}$ = 1 if Manager has form 4 education; and above and zero otherwise

X_4 = Dummy variable for manager's attendance in formal training for agro-processing products, such that $D_{3,}$ =1 if the manager has attended form training in agro-processing products and zero otherwise.

X_5 = Natural log of the number of workers with education below form four working in a particular small agro-processing firm during a given year.

X_6 = Natural log of the number of workers with form four education and above working in a particular small agro-processing firm during a given year.

X_7 = Natural log of the average number of workers with experience below one year in an agro-processing firm

X_8 = Natural log of the average number of workers with experience equal to and above one year in an agro-processing firm.

X_9 = Natural log of the average wage per worker within a given agro-processing firm

X_{10} = Dummy variables for managers who have working experience (measured in number of years) in agro-processing firms.

$D_{4,}$ = 1 if a manager has experience above one year and zero otherwise,

X_{11} = Dummy variable for manager's sex, $D_{5,}$ =1 if a manager is male and zero otherwise.

Equation (21) was used for empirical estimation of labour productivity. A detailed description of variables is presented in Appendix 6.

Having derived the model for assessing the effect of various factors on the productivity of labour among small agro-processing firms, in the next section we derive the model for assessing factors that affect the growth of individual agro-processing firms and the agro-processing sub-sector in general.

3.3.2 Firms' growth model

Within some literature including (Bervidova, 2002; Freeman, 2008; Webber and Horse well, 2009) it has been argued that the net value of output or the added value of processed products is preferred for evaluating the performance of processing firms because it takes into account differences and changes in data quality. Kinda and Loening (2010) also recommended the net output or value added method as the best output measure for the growth of firms if data is available. For this study such time series data were available from TRA and SIDO. The value of processed agro-products (y) is influenced by many

factors. The relation between the dependent variable (y) and independent variables (z_i) is represented in a general form - equation 21.

y = f ($z_1, z_2, \ldots\ldots\ldots\ldots z_n$)..... (22)

Using the Cobb Douglas functional form, equation (22) can be written as:

$y_i = b_0 \prod_{j=1}^{k} z_{ij}^{b_i} e^{\varepsilon_i}$.....(23)

Where; b_o = Constant

b_i = a coefficient of the i^{th} firm for the j^{th} variable (z_{ij})

e = Natural log

ε_i = an error term for the i^{th} firm

Log-linear transformation leads to equation (24)

$Y_i = b_0 + B\sum_{j=1}^{k} Z_{ij} + \varepsilon_i$ ..... (24)

y_i = Ln Y_i

Z_{ij} = Ln Z_{ij}

b_i = Ln B_i

b_{ij} = for i =1, 2, 3.....n being respondents

j=1, 2, 3.....k being variables

ε_i = Error terms

Expanding the components of equation (24), we get equation (25). For convenient we drop the notation "*i*" representing the i^{th} firm.

$Y = b_o + B_1Z_1 + B_2Z_2 + B_3Z_3 + B_4Z_4 + B_5Z_5 + B_6Z_6 + B_7Z_7 + \varepsilon$ ..... (25)

Where Y = Value of agro-processed products per year.

Z_1 = Labour productivity (measured as value of product per number of workers computed per firm)

Z_2 = Value of raw-materials per annum

Z_3 = Number of years in operation (considering the time since a firm started to operate up to 2011)

Z_5 = Value of capital invested per firm per annum

Z_4 = Cost of energy per year per firm.

Z_6 = Dummy variable; 1if operated infrequently 0 otherwise (a firm was assumed to be operating infrequently if at least did not operate for an average of 90 days per year).

Z_7 = Dummy variable; 1 if a firm was not managed by owner, 0 otherwise. (Firms considered were those which did not transfer the ownership)

A detailed description of the variable is presented in Appendix 7.

Based on the Chow test, this model was run for Morogoro, Mbeya and for the whole sample, in order to test for structural change between Morogoro and Mbeya in terms of growth of agro-processing firms based on equation 25, the sets of three regression equations are presented as follows;

Whole sample $Y_1 = b_{o1} + B_1Z_1 + B_2Z_2 + \ldots + B_7Z_7$ ..... (26)

Mbeya (region1) $Y_2 = b_{o2} + B_{21}Z_{21} + B_{22}Z_{22} + \ldots + B_{27}Z_{27}$ .....(27)

Morogoro (region 2) $Y_3 = b_{o3} + B_{31}Z_{31} + B_{32}Z_{32} + \ldots + B_{37}Z_{37}$ ……..……..(28)

The Chow test was used to test for structural change based on statistical difference between corresponding parameters estimates for Morogoro, Mbeya and the whole sample as whole. This is one alternative to test for structural change. Another option is to use

dummy variables but both options provide similar results with regard to structural change. The F test for structural change is given in equation (29).

$$F(k, n_1 + n_2 - 2k) = \frac{(SSE_R - SSE_1 - SSE_2)/k}{(SSE_1 + SSE_2)/(n_1 + n_2 - 2k)} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots(29)$$

Where:

SSE_R = the sum of squared error for the entire sample.

SSE_1 = the sum of squared error for Mbeya region

SSE_2 = the sum of squared error for Morogoro region

n_1 = the number of observation for Mbeya region (n_1 = 56)

n_2 = the number of observation for Morogoro region (n_2 = 50)

K = the number of regressors, including the intercept (K = 8)

The testable hypothesis was:

$$H_0: \beta_{21} = \beta_{31}; \ldots\ldots, \beta_{27} = \beta_{37} \ldots\ldots\ldots\ldots\ldots\ldots (30)$$

The calculated F- value was compared with the critical value from the corresponding F-Table. The null hypothesis being tested in this case is that; if regression coefficients for Mbeya and Morogoro Regions are similar, they will also be similar to those of the whole sample, which will reflect structural similarities in the growth of small agro-processing firms between the two regions (or no structural difference between the two regions). If the null hypothesis is rejected; it means the growth rate of small agro-processing firms represented by the elasticises of production of the dependent variables is different between Mbeya and Morogoro Regions.

3.4 Sampling and Sample Size

The sampling frame was defined as; all small agro-processing firms within each of the selected districts (Kothari, 2004; Bryman and Bell, 2007; Chakraborty, 2012). This section describes the sampling procedure for this study. Information on performance indicators was collected from each of the sampled firm to elicit data on workers, managers, and other inputs into the production process.

3.5 Sampling Methods

Sampling was done at different levels stating with regions, going down to districts, firms and respondents from each selected firm (managers and workers). Purposive sampling was used to select regions, considering their standing in relation to the present and past performance of small agro-processing firms. Based on these reasons Mbeya in the southern highlands zone and Morogoro in the eastern zone were selected because they have a wide range of agro-processing activities. Purposive sampling was also used to select two districts from each region to be surveyed. Two districts were selected to represent rural settings and another two representing urban areas. Existence of extensive agricultural production that supplies raw-materials to agro-processing firms was another consideration. Mbeya city and Mbeya rural were selected from Mbeya Region while Morogoro municipality and Kilombero District were selected from Morogoro Region.

Stratified random sampling was used to select firms and respondents. The proportion of different types of firms within selected districts was considered. The firms in each district were divided into homogenous subgroups (strata) according to the type of processed products. Firms were selected according to their proportion in the population. Respondents from each sampled firm were also selected proportionally for each category, namely; managers, skilled workers, unskilled workers and firm's proprietors.

The respondents from each stratum were conveniently selected to make sure that each category was represented.

3.6 Sample Size

There were 860 registered small agro-processing firms within the selected districts from which the sample for this study was drawn. The sampling unit was an individual small agro-processing firm. The sample size was determined using the formula by Bartlet *et al.* (2001) and Malangalila (2009) who stated that for social sciences a sample size of about 10% is adequately representative, that is computed according to equation 31.

$$n = N \times \frac{c}{100} \quad \text{..... (31)}$$

Where; c = percent of firms to be surveyed

N= Number of registered firms in the regions

n = Number of selected firms to be surveyed.

Based on equation (31) 12% of all the 860 agro-processing firms in the study area were selected for the study.

$$\text{Using equation (31) } n = 860 \times \frac{12}{100} = 102 \text{..... (32)}$$

Since the total number of workers in these firms was not known a *prior*, the sample of individual respondents was determined by a formula adopted from Cooper and Schindler (2006) as well as Bartlet *et al.* (2001), given in equation 33.

$$r = 1.96^2 \frac{pq}{m^2} \quad \text{..... (33)}$$

Where;

r = Total number of respondents to be interviewed.

p = Percentage of respondents representing management and firm owners which was assumed not exceeding 30%.

q = Percentage of respondents representing workers which was assumed to be 70%.

m = Margin of tolerance error of the proportion assumed to be 5%.

By computation: $r = \frac{(1.96)^2(0.3)(0.7)}{0.05^2} = 321$ ..... (34)

Since there are 102 firms in the sample, then about three respondents would be interviewed per firm ($\frac{321}{102} = 3.2 \approx 3$). In some firms however, there were fewer employees than expected, hence only 297 out of 321 of respondents were interviewed which is about 93% of the expected number, being slightly lower than the 5% tolerance level of variance. Table 2 indicates the proportional distribution of firms and respondents included in the sample.

Table 2: Sample Size

Study Area	Existing number of agro-processing firms	Number of firms selected for the Study (12%)	Recommended number of respondents for interview	Number of respondents interviewed (93%)
Mbeya Urban	359	45	138	126
Mbeya Rural	198	23	75	69
Morogoro Municipality	134	20	48	47
Kilombero	169	19	60	55
Total	860	107	321	297

3.7 Data Collection

Prior to the main fieldwork a pilot survey was conducted between 14th May and 30th June 20011 to test the adequacy and effectiveness of research instruments. Pretesting is normally done as preparation for the main study (Lazaro, 1996). Pretesting also served to establish whether the sampling frame and techniques were effective in obtaining the

required information. This exercise provided an opportunity to train field assistants for data collection and assess the adequacy of resources allocated for this purpose.

This was followed by a formal survey which was conducted between August 2011 and March 2012. The survey used a questionnaire to interview and hold discussion with managers and workers who had been selected as described above. In addition, key informants from different organization like SIDO, TRA, District Trade Officers, TBS and TFDA officers were also interviewed using guided questions. Focused group discussion was conducted involving groups of workers to probe further for information on the working environment and benefits they received while working in this sub-sector.

Qualitative and quantitative data were collected from managers, workers and from different institutions such as, SIDO, TRA and District trade officers using a semi-structured questionnaire. Data included; the number of established firms between 2002 and 2011, number of workers in different types of firms, wages per labour, value of raw-materials, value of processed products, workers' and managers experience measured by the number of years in processing the products, education level of managers and other workers in terms of the number of years to attain formal education, annual investment and running cost.

Additional qualitative data were collected from key informants using guided questions and focus group discussion supported by direct observation. The data were collected at the regional and district level, TRA, SIDO, District trade officer, Tanzania Bureau of Standards (TBS) and the Tanzania Food and Drug Authority (TFDA). The types of data collected from these key informants are summarised in Table 3.

The study required secondary data on a number of aspects which were obtained from written sources including journals, case studies, reports and other published and unpublished documents. Focus group discussions were organized involving staff at TRA and SIDO offices in Mbeya and Morogoro Regions. The discussion covered the contribution towards developing small agro-processing firms and the sub-sector as well as their contribution towards employment creation and income generation. Direct observation played a vital role in assessing the type of technology used in agro-processing products, the quality of processed products and the working environment which includes the presence of safety gears, cleanness and machine operation guidelines.

Table 3: Types of data collected from key informants

Key informants	Types of data collected	
	Qualitative data	Quantitative data
SIDO	Background of small agro-processing firms	Number of jobs created
	Types of technology used in processing products	
	Perceived degree of processed products in international and local market by SIDO officers	Number of firms established and collapsed
	Quality and standards of processed products	
TFDA and TBS	Perception regarding the legal and policy framework toward growth of small agro-processing firms	Number of firms processing according to standards
	Quality and standards of processed products	Number of firms processing according to standards
TRA	Perception regarding the legal and policy framework toward growth of small agro-processing firms.	Number of firms established and collapsed
Local government officials,	Perception regarding the legal and policy framework toward growth of small agro-processing firms.	Number of jobs created Number of firms established and collapsed

3.8 Data Processing

The first step of these analyses was to establish the trends of small agro-processing firms, which had been established in Mbeya and Morogoro Regions together with jobs that were created and jobs that were lost. Some of the firms have persisted throughout the study period hence retaining jobs but others collapsed during the study interval, leading to job

loss. In this respect, descriptive analysis was used to compute the average number of small agro-processing firms established and those which had collapsed per year during the interval of 2002 and 2011. The average numbers of small agro-processing firms created and firms which collapsed were obtained from different sources including; TRA, SIDO and District Trade Offices.

The second objective sought to analyse the performance of small agro-processing firms in terms of employment creation, descriptive analysis was used here to compare the number of new jobs created and jobs that were lost over the study period. Comparison of new and lost jobs between Mbeya and Morogoro Regions was done by the percentages as well as means using t test. The values were also presented in graphs and tables.

The third objective of this study, related to the performance of small agro-processing firms in terms of labour productivity, was analysed according to the regression model specified in equation 21 (section 3.3.1). The value of processed products was deflated to account for inflation to get real value for each firm for each year. The values of products were deflated by Consumer Price Index – CPI to account for inflation. The real values of processed products for each firm per year for the duration of this study were used for the analysis (Fodio and Salaudeen 2012). The Price index was constructed with 2002 as the base year to get the real values of products during the study period. These were used for regression analysis. Coefficients for equation 21 were estimated using STATA and the coefficient were tested for (i) significance of their different from zero (ii) the significance of the difference between coefficients for Mbeya and Morogoro Regions as well as the whole sample. A detailed explanation of each category of explanatory variables is presented in Appendix 6.

The fourth objective of this study addressed factors that were hypothesized to account for variation in the growth of small agro-processing firms, which was analysed using equation 25. The model was run using STATA to estimate the coefficients. Testing for the significance of the coefficients' difference from zero was done using the t test and their difference between the two regions was done using the Chow test (equations 26 – 29). The full list of explanatory variables is presented in Appendix 7.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Chapter overview

This study set out to achieve four objectives as presented in section (1.6.2). In this chapter the findings are presented such that each of the study objectives is addressed with their corresponding hypothesis tested. Prior to discussing the specific objectives the types of firms, ownerships of firms, technology used in processing products and standards of processed products are presented and discussed as basis for subsequent discussion.

4.2 Types of Firms According to Products Processed

Out of 107 firms that were selected 45 (42%) are located in Mbeya urban, 23 (21%) in Mbeya rural, 20 (19%) in Morogoro municipality and 19 (18%) are in Kilombero District. These firms were engaged in different types of agro-processing activities including milk processing, oil extraction, production of animal feed, milling cereals and bakeries. Table 4 presents the distribution of these firms by districts. Mbeya urban dominates in milk processing, accounting for 56% of the firms under this category. Mbeya city also dominates firms that were involved in oil extraction (49.2%), animal feeds (52.6%) and maize flour mills (50.7%). Morogoro municipality ranks highest for bakeries while Kilombero District ranks highest in accommodating rice milling firms. This district did not have any firm for processing milk, oil seed extraction and animal feeds.

The proportional distribution of firms in the districts reflected the availability of raw-materials as it was reported by respondents. Another reason for variation in the distribution firms is consumer's preference toward the products. More consumers in Morogoro preferred to use bread and other bakery products for breakfast compared to

Mbeya urban and other rural districts where they use local food such as boiled potatoes and rice.

Table 4: Composition of firms according to products processed by percentage

District	Milk (n=9)	Oil extraction (n=65)	Animal feeds (n=19)	Firm Maize flour (n=507)	Rice (n=247)	Bakeries (n=13)	Total (n=860)
Mbeya (c)	56	49.2	52.6	50.7	20.2	38.5	41.7
Mbeya (r)	0	33.8	31.6	22.5	22.7	0	23.0
Morogoro (m)	44	16.9	15.8	13.8	16.2	46.2	15.6
Kilombero	0	0	0	13.0	40.9	15.4	19.6
Total percent	100	100	100	100	100	100	100

C= City, r = Rural and M = Municipal
[1]The figure in brackets (n) represents number of firms.

4.3 Ownerships of Small Agro-processing Firms

Ownership of a business firm may be defined as the total rights to use and enjoy the firm's property, bequeath it, or to convey it by sale. Ownership implies the legal right to possess a firm, regardless of whether or not the owner personally makes constructive use of it (Hansmann, 2006). Ownership of a firm may be private, public or joint venture between public and private; or private and private institutions. In the study area there were no agro-processing firms, which were operated by public institutions. They were all classified as private companies firms or private non-company firms. The former are enterprises that have been registered as companies under the Companies' Act, 2002, while the latter are firms that are not formally registered as companies but they operate as businesses that are registered under the Business Activities Registration Act, 2007 and the Local Governments Acts, No. 7 and 8, of 1982.

Table 5: Ownership of small agro-processing firms

Types of firms	District									
	Mbeya city		Mbeya rural		Morogoro municipality		Kilombero		Total	
	N	%	N	%	N	%	N	%	N	%
Registered private Company	5	11.1	0	0	8	25.8	2	10.5	15	14.0
Registered private non Company	40	88.9	11	91.7	23	74.2	16	84.2	90	84.0
Un registered firms	0	0	1	2.2	0	0	1	5.3	2	1.8
Total	45	100	12	100	31	100	19	100	107	100

Results in Table 5 show that, there is a dominance of private non-company firms, which constitute 84% of the sample; only 14% of the firm were registered companies (88.9% in Mbeya city, 91.7% in Mbeya rural, 74.2% in Morogoro municipal and 84.2% in Kilombero District). Two firms, one in Mbeya rural and another in Kilombero Districts did not indicate whether they were registered or not. Morogoro municipality had 25.8% of firms registered as companies, while the rest 74.2% were private non company firms. In Mbeya city and Kilombero District only 11.1% and10.5% of the firms respectively registered as companies firms. Mbeya rural District consisted sorely of private non-company firms (91.7%).The reason for such low registration of companies include (i) bureaucracy during the registration process, which is very demanding, (ii) registration cost being very high (iii) Lack of knowledge about registration procedures and benefits (iv) respondents not perceiving any advantage of registering their enterprises as a companies.

There are advantages and disadvantages of operating as registered a company. Among the advantages, a registered company operates as a legal entity with limited liability that identifies properties, which are not related to the company, thereby protecting firms from liquidation in case of filing for bankruptcy. A registered firm also acquires recognition, which has multiple benefits such as ability to borrow from financial institutions.

Registered firms can raise funds from the public by selling shares. They may also benefits from tax deductible items that are purchased by the firm. Moreover, registered firms enjoy relationships with other organizations, easy ownership transferability to other owner.

However, a registered firm enjoys less privacy since most of their business information is publically available for inspection (Nickels *et al.,* 2002). Moreover, general operation and administrative cost are high. Details of the firm's financial annual accounts must be completed every financial year; fines are incurred for late preparation and submission of such reports.

4.4 Technologies Used by Small Agro-processing Firms

The quality of processed products is highly influenced by the technology that is used for production. For example in the case of grains, processors struggle to get machinery which will preserve enriched nutritional attributes. In the case of rice, processing should reduce grain loss and preserve grain size by minimizing the level of grain polishing. In the case of maize the processor would like to preserve attributes that relate to texture, colour and nutritional contents. For this reason agro-processing machinery are classified based on their ability to produce products that preserve the nutritional quality and structure. Another factor of machinery quality relates to the efficacy in processing products and smoothness of operations. These aspects are most pertinent in processing edible oil but also grains such as maize and rice.

In the study area, machinery that was used by firms were classified as (i) locally made, (ii) improved or (iii) modern machines. Locally made machines are mostly operated manually to process the products and they often perform a single activity like rice hulling,

grinding maize or pressing oil seeds. The rest of the activities like cleaning, sieving and packing are performed manually. Improved machines have combined components that perform different activities like hulling, shelling and polishing for rice processing. In the case of maize, processing involves cleaning, milling and sieving. Meanwhile, processing oil seeds involves cleaning, pressing and sieving. Improved machines are operated by electricity.

Modern machines are more complex performing more activities than improved machines. Such machines have sensors to detect defects during operations. They process products according to set standards, which could be in the form of size, texture or moisture content.

Table 6: Machinery used for processing agricultural products

	Machines currently used for processing		Machines required for processing	
	Number	Percentage	Number	Percentage
Locally made machines	8	9	1	1
Improved machines	68	72	28	34
Modern machines	18	19	54	65
Total	94	100	83	100

According to firm managers who were interviewed for this study, most of the firms (72%) use improved machines (Table 6). A lower proportion (19%) use modern machines and only 9% used locally made machines. This finding is consistent with that obtained by Mbelle (2005) who observed that, Tanzania lags behind in using modern technology to improve productivity and facilitate growth of firms. When asked to indicate their preference of machinery for their enterprises, 65% of the managers prefer modern machines because of efficiency and production of high quality products. This means, a high proportion of firms using locally made and improved machines processed low quality products. However about 34% of managers preferred improved machines because

of availability and servicing since many local artisans and technician can repair most damages. Only 1% of the managers preferred locally made machines due to affordability and durability. There are many firm managers, who would like to convert to better performing machines but they are limited due to financial (credit and equity) or technical (spare parts and expertise for repair and maintenance) reasons.

4.5 Standards of Processed Products in Small Agro-processing Firms

The law in Tanzania requires that processed products that are sold through the formal market should meet TBS and TFDA standards, in order to protect the health of consumers. Act number 1, of 2003 for TFDA and Act number 3 of 1975 for TBS regulates the quality and safety of processed products, registers and grants the licence for processing products. Table 7 indicates the status of processed products that meet TBS and TFDA standards.

Table 7: Firms' Status in relation to TFDA and TBS approval (%)

Types of Approval	District				
	Mbeya city (n = 45)	Mbeya rural (n= 23)	Morogoro municipality (n = 30)	Kilombero (n = 9)	Total (n =107)
TFDA and TBS approval	15.8	2.8	10.3	1.9	40.2
No TFDA and TBS approval	26.2	18.7	17.8	6.5	59.8
Total	42	21.5	28.1	8.4	100

[2]The figure in brackets (n) represents number of firms

Results in Table 7 indicates 59.8% of firm's processed products without TBS and TFDA approval, a leading district with many firms without approval was Mbeya city which accounted 26.2% of all studied firms. This was fallowed by Mbeya rural (18.7%) of all firms. This reflects that, most of the processed products sold without any approval from TBS or TFDA were from Mbeya. Considering the stiff competition posed by imported products, there is a danger that locally processed products could loose their market share

or not get a market share at all in emerging local markets. This also means more than half of the processed products cannot even penetrate into export markets. Having such high a proportion of agro-processing firms that operates and sell food products without compliance to TBS and TFDA implies that there are many processed products in the market which could be violating the law, especially in relation to food safety for consumers. Table 8 reflects the amount of processed products not exported probably due to low standards.

Table 8: Proportion of firms sold processed products to local and export markets

Region	Proportion (%)		
	Local market (n=104)	Exported (n=3)	Total (n=107)
Mbeya	53.3	0.9	54.2
Morogoro	43.9	1.9	45.8
Total percent	97.2	2.8	100

[3]The figure in brackets (n) represents number of firms

From Table 8, about 97.2% of the firms in the sample sold their products to local buyers and only 2.8% of the firms exported their products. About 59.8% of the firms as indicated in Table 7 packed their products without TFDA and TBS approval; often the materials used for packing were of low quality. This means there is an opportunity for establishing firms to manufacture high quality of packaging materials to be used by domestic processors and for export as well. As portrayed by Porter's model of trade which says firms tend to use the domestic market to perfect their products before venturing into export markets since buyers determine better market surroundings for local goods and services (Bakan and Doğan, 2012). Recently (2013), local firms of A- one Products and Bottlers Ltd established a line for processing bottles seal for milk bottles. This has been appreciated by milk processors as a move in the right direction to improve the availability packing materials. However, there are several other factors hindering compliance to TFDA and TBS standards as indicated in Table 9.

From Table 9, factors that hinder firms from meeting TFDA and TBS standard include; the perception that the process is costly, limited knowledge regarding necessary steps to meet the standards and negative perceptions to ward compliance to the standards.

Table 9: Factors hindering compliance to TFDA and TBS standards

Reason	Mbeya city (n= 45)	Mbeya rural (n= 20)	District Morogoro municipality (n = 19)	Kilombero (n = 23)	Total (n=107)
Knows importance but costly to implement	22.4	14	9.4	7.5	53.3
Knows importance but does not know how to get the service	12.1	4.7	3.7	7.5	28.0
Sub-total %	34.5	18.7	13	15	81.3
Does not know the importance of standards	7.5	2.8	5.6	2.8	18.7
Total %	42	21.5	18.7	17.8	100

[4]The figure in brackets (n) represents number of firms

Results indicates 81.3% of respondents knows the benefits of compliance to TBS and TFDA standards but out of these 53.3% felt that compliance was too costly while 28% said they did not know how to get the services so that they would comply with laws. Meanwhile 18.7% of the respondents did not know the importance of standards hence they did not rush to comply except to avoid a penalty. This observation implies that the cost of compliance to standards should be addressed first as it account large percent than other reasons to accelerate the pace of processing many products in accordance to approved standards. This will also accelerate the establishment of firms that meet TFDA and TBS standards. This reflects the need for raising awareness, capacity building and providing other types of support to processors as they strive to process the products according to set standards. The government should facilitate compliance to TBS and TFDA laws through training, technical support as well as by reducing the cost of compliance so it remains affordable and available to different categories of firm's owners.

4.6 Number and Trends of Small Agro-processing Firms Established

The first objective of this study was to establish the trends of small agro-processing firms in the study area over the period of 2002 to 2011 in terms of new firms established and existing firms that collapsed per year. The number of firms which were established during the interval of 2002 to 2011 indicates the level of the sub-sector's growth. The trend firms' establishment as presented in Fig. 3 indicates a general increasing trend up to 2006 (for Kilombero and Morogoro Municipality), followed by a declining trend.

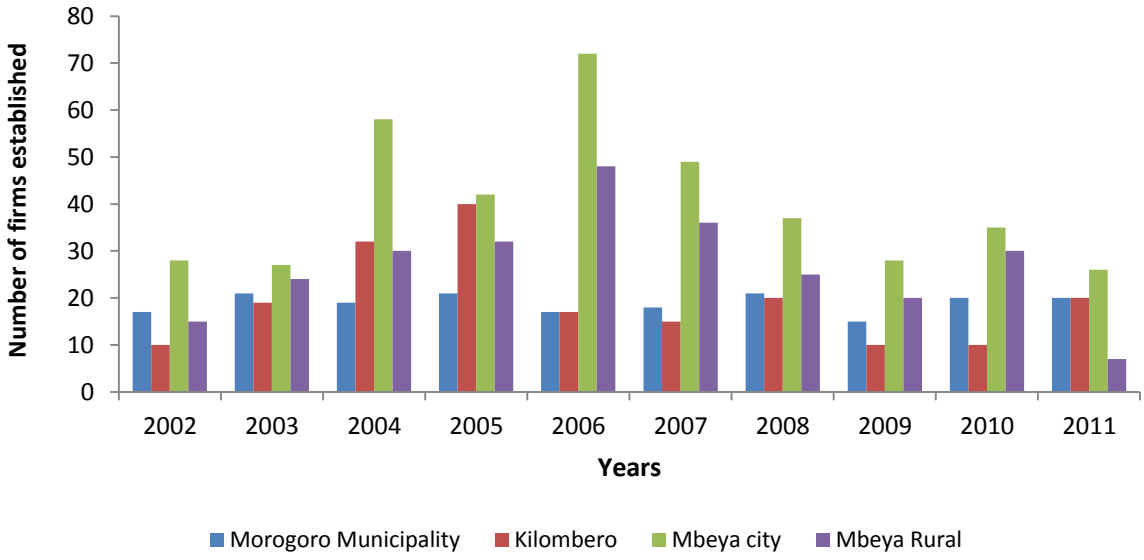

Figure 3: Number of new established small agro-processing firms per year

Mbeya city and Mbeya rural had a higher number of firms established than Morogoro municipality and Kilombero District except for the period 2004 and 2005 when Kilombero surpassed Mbeya rural. According to results presented in Table 10, about 40 firms were established per annum in Mbeya city compared to 27 for Mbeya rural while of the number for Morogoro municipality and Kilombero District were 19 each.

These findings are consistent with similar figures contained in two reports - MPEE (2007a and 2007b), which show that, the number of new firms established is growing faster in Mbeya than in Morogoro Region. However, another set of reports URT (2010) and URT (2012b) indicated lower differences in the growth rate of small agro-processing firms established in the two regions; the annual average being 10 for Mbeya and 9 for Morogoro Region over the interval of 2005-2009. Over the same interval, the same study indicated that 78 firms were established in Mbeya and 39 in Morogoro Region. The annual average increase in the number of agro-processing firms is lower in the government reports (URT, 2010 and 2012b) compared to corresponding figures from this study because the government report did not take into account micro-enterprises.

Table 10: Persistence of small agro-processing firms 2002-2011

District	Total New firms established (2002/11)	Percentage of new firms established (n=1050)	Average No. firms established per annum	Number of firms survived by 2011	Percent of surviving firms per district	Overall (%) of survived firms by 2011 (n=860)
Morogoro (m)	189	18.0	19	134	70.9	15.6
Kilombero	193	18.4	19	169	87.6	19.7
Mbeya (c)	401	38.2	40	359	89.5	41.7
Mbeya (r)	267	25.4	27	198	74.2	23.0
Overall number	1050	100	105	860	81.9	100

C= City, r = Rural and M = Municipal
[5]The figure in brackets (n) represents number of firms

Results in Table 10 also indicate that Mbeya city had a higher proportion of surviving firms (90%) followed by Kilombero (88%), Mbeya rural (74%) and was lowest in Morogoro (70%). For the sample as a whole, 81.9% of the agro-processing firms established during the study interval survived (Table 10). Mbeya city accounted for 38.2% of established firms and 41.7% of firms that survived during the period 2002-2011.This probably due to presence of infrastructures and being marketing centre of other regions and districts. This was followed by Mbeya rural which accounted for 25.4% of

firms that were established and 23% of firms that survived. Kilombero District followed, accounting for 18.4% of firms that were established and 19.7% of firms that survived, while Morogoro municipality ranked lowest with only 18% of firms that were formed 15.6% of firms that survived during the study interval.

Table 11: Operation status of small agro- processing firms/year (%)

Operation status	Mbeya city (n=45)	Mbeya rural (n=23)	District Morogoro municipal (n=30)	Kilombero (n= 9)	Total (n=107)
Frequently	31.1	34.8	46.7	33.3	36.4
Infrequently	68.9	65.2	53.3	66.7	63.6
Total % within district	100	100	100	100	100

[6]The figure in brackets (n) represents number of firms

In the case of surviving firms managers and owners reported that only 36.4% of firms operated frequently in the study interval (Table 11). The remaining 68 (63.6%) operated three to five times per week due to low availability of raw-materials and electricity leading to capacity under-utilization. The proportion of under capacity utilization within districts was higher in Mbeya city 31 (68.9%) and lowest was in Morogoro municipal 16 (53.3%). Firms that operated throughout the period from 2002 to 2011 had alternative source of electricity. They also had the capability to buy and store raw-materials for processing during scarcity. Unreliable availability of raw-materials accelerated the collapse of agro-processing firms as presented in the next sections.

The number of firms which collapse reflects increasing unemployment and negative growth of firms in the sub-sector. The composition of collapsed small agro-processing firms within each district as presented in Table 12 varies but the highest average was seven firms per annum for Mbeya rural which was followed by Morogoro municipality with 6 firms collapsed per annum on average. The other numbers are four and two for

Mbeya city and Kilombero District respectively. Mbeya rural had the highest proportion, accounting for 36.3% of the collapsed firms followed by Morogoro Municipality (28.9%), Mbeya city (22.1%) and Kilombero (12.6%). However within district, Morogoro Municipality had the highest proportion of collapsed firms (29.1%) followed by Mbeya rural (25.8%), Kilombero (12.4%) and lowest for Mbeya city (10.5%).

Table 12: Number of collapsed small agro-processing firms 2002-2011

District	Total number new firms	Percent new firms (n=1050)	Number new firms per annum	Total No. collapsed firms	Overall % firms collapsed (n=190)	No. firms collapsed per annum
Morogoro Municipality	189	18.0	19	55	28.9	6
Kilombero	193	18.4	19	24	12.6	2
Mbeya city	401	38.2	40	42	22.1	4
Mbeya Rural	267	25.4	27	69	36.3	7
Overall Sample	1050	100	105	190	100	19

[7]The figure in brackets (n) represents number of firms

The collapse of small agro-processing firms is associated with different factors which are presented in Table 12. According to the managers and workers of existing firms as well as SIDO officers, the main reasons for agro-processing firms to collapse includes; limited availability of raw-materials mentioned by 46% of respondents. This was followed by limited access to capital (24%), limited markets or (11%), high energy cost (10%), poor technology (5%) and low quality of labour (4%).

These firms were affected by constraints differently. Firms for processing cereals, animal feeds, milk and oil were more affected by low availability of raw-materials (46%) compared to bakeries, which use raw-materials that came from other firms, producing in excess for export. Poor access to capital for investment ranked second (24%) as a reason for the collapse of agro-processing firms due to rigid condition imposed by financial institutions.

Table 13: Reasons for collapse of small agro-processing firms

Types of firms	Number of Respondents per type of Firms	Percent of Respondents per types Firms	Percentage of Reasons for Collapse of Firms Within Category					
			Poor Market of Products	Poor Access to capital	Human capital	Poor technology	Poor availability of raw-materials	High Energy cost
Cooking oil	60	21.3	6.7 (4)	30 (18)	3.3 (2)	0 (0)	51.7 (31)	8.3 (5)
Rice mills	114	40.4	14 (16)	19.3 (22)	1.8 (2)	4.4 (5)	49.1 (56)	11.4 (13)
Maize flour mills	72	25.5	11.1 (8)	33.3 (24)	0 (0)	1.4 (1)	44.4 (32)	9.7 (7)
Bakeries	18	6.4	5.6 (1)	11.1 (2)	33.3 (6)	16.7 (3)	27.8 (5)	5.6 (1)
Animal feeds	6	2.1	16.7 (1)	16.7 (1)	0 (0)	0 (0)	33.3 (2)	33.3 (2)
Milk processing	12	4.3	8.3 (1)	8.3 (1)	0 (0)	33.3 (4)	41.7 (5)	8.3 (1)
Sample Total (No.)	282	100	11 (31)	24 (68)	4 (10)	5 (13)	46 (131)	10 (29)

[8]The figure in brackets represents number of firms

The firms most affected include; milling firms (33%), cooking oil (30%) and animal feeds (17%). Most locally processed products often depend only on the domestic market which competes with imported products. Locally processed products uses packing materials that are below recommended standards hence imposing stiff competition in the local market (Hawassi, 2006). Limited markets for processed product also lead to low product prices hence small returns to firms. For example 500 millilitres of imported processed milk is sold in the local market at Tshs 2500 which is 50% higher than the price of locally processed milk, selling at Tshs 1200 per litre during the study period. Electricity was given as the fourth factor, mentioned by 10% of respondents as a serious challenge. The argument was, electricity is not regular especially in rural areas where access is limited and the use of diesel to run processing machines makes processing more costly than using electricity from TANESCO. This is supported by Jesse (2010) and URT (2011) who argued that only 2% of the rural areas access electricity although there is a government programme (Rural Electrification Agency–REA) addressing this challenge.

Poor technology ranked fifth as a reason for collapse of small agro-processing firms, being mentioned by 5% of the respondents; But it was reported as a leading reason by 33% of the respondents in milk processing firms, where firm managers argued that, milk processing demands modern machines and high quality of packaging materials to satisfy the standards required by TFDA and TBS and to compete in local and international markets.

Low quality of human capital had the lowest proportion of respondents (4%) as a reason for firms to collapse, but it ranked as the first reason attributed for the collapse of bakeries as reported by 33% of the respondents. This is probably due to regulations which direct that, it is compulsory for bakeries to meet TFDA and TBS standards, which demands skilled workers who have attended special training on processing the products. Other agro-processing firms might use experienced workers who have not attended any special training course for agro-processing activities.

4.7 Performance of Small Agro-processing Firms

Under this section the objective of the study intended to analyse the performance of small agro-processing firms in terms of employment creation. The performance of agro-processing firms is discussed in terms of employment creation trends per type of firm, capital investment and the relationships between jobs created and labour productivity.

4.7.1 Employment creation trends

The trend of jobs creation is discussed based on the type of firm, region, type of job and value of capital invested per firm. Table 14 indicates the average number of new jobs created per type of firm per year. On average seventeen jobs were created per bakery, the highest average number of new jobs was twenty three in 2003 and the least was ten in

2008. This was followed by rice processing firms, where eleven jobs were created per firm per year on average, with the highest average of sixteen jobs occurring in 2010 and the lowest average of five jobs in 2002.

Milk processing firms employed about nine workers per annum on average followed by sunflower firms which employed about six new workers per year. Maize flour mills had the lowest average of three new jobs per firm per year. The highest average number for maize flour mills was five in 2008 and the lowest average was one in 2009.

Table 14: Average number of new jobs created per firm/year

	Firms						
Year	Animal feed	Bakeries	Maize	Milk	Rice	Sunflower	Total
2002	3	21	4	6	5	4	43
2003	5	23	2	6	9	4	49
2004	2	22	4	7	10	5	50
2005	4	17	3	9	10	4	47
2006	4	15	2	9	8	5	43
2007	2	16	3	10	12	6	49
2008	5	10	5	11	11	8	50
2009	4	15	1	8	12	5	45
2010	6	16	2	11	16	6	57
2011	4	17	2	12	15	9	59
Total No. of jobs	39	172	28	89	108	56	492
Annual average	4	17	3	9	11	6	49

Results in Table 14 have also been reported in Figure 4, showing that the average number of new jobs created from different types of small agro-processing firms during the interval from 2002 to 2008 was increasing slowly, but there was a slight decline in 2009 which is probably attributed to low rainfall that was experienced in some parts of the country, including. This led to low production of most agricultural products hence, low supply of raw materials for processing firms. From 2009 up to 2011 gradual growth of jobs creation was experienced. On average, about 49 new jobs were created per year during the study period 2002-2011. The trend of employment created per firm during the

study interval reflects periods of marginal increase and decrease growth as indicated in Fig. 4.

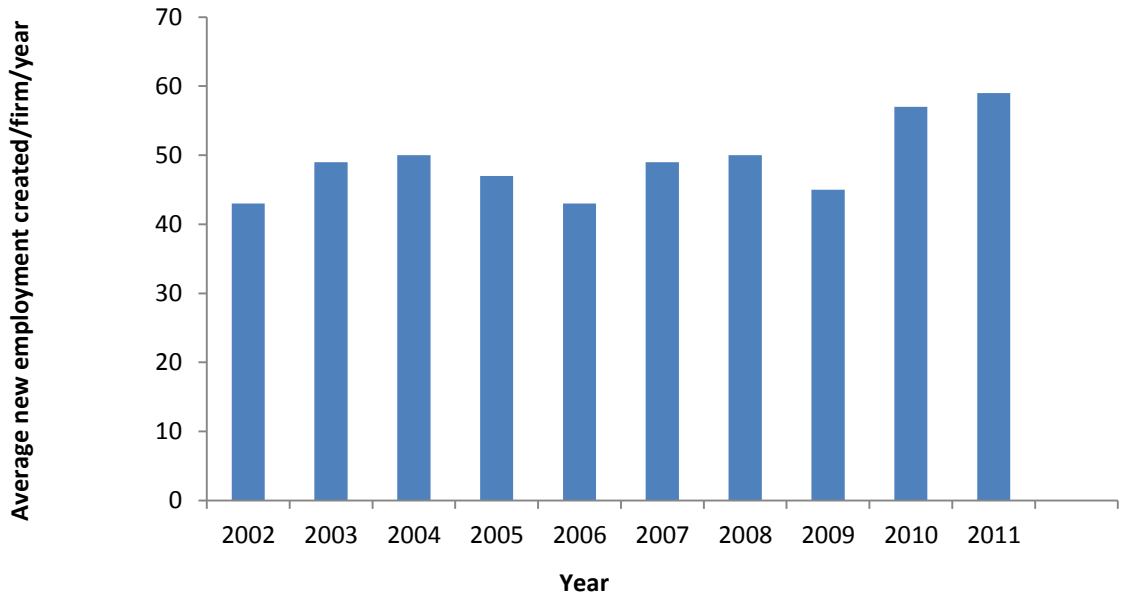

Figure 4: New employees hired per firm: 2002 - 2011

From this study it was also revealed that, most of the firm's recruited workers with standard seven educations or below, who represented more than 73% of all workers in the firms within the sample. According to response of managers and owners of firms, employing standard seven and below is cheaper also are easily available. Morogoro Region had a higher proportion of employees with standard seven education (59%) meanwhile Mbeya had higher percent of worker with education below standard seven (63.6%). Also Mbeya had had higher proportion of workers with form four education and above (Table 15).

Table 15: Percentage of new workers according to level of education

Education level	Below standard 7 (n=11)	Standard 7 (n=362)	Form 4 (n=98)	Workers with Form 6 and above (n=21)	Total (n=492)
Region					
Mbeya	63.6	41.0	64.0	71.0	47.6
Morogoro	36.4	59.0	36.0	29.0	52.4
Total	100	100	100	100	100

[9]The figure in brackets (n) represents number of workers

The labour force was predominantly female being 67.4% of the workers in the sampled firms (Table 16), outnumbering male workers by 34.8%. Similar results have been established in other parts of Africa where it has been reported that women constituent a larger share of employees in agro-processing industry (Kinda and Loening, 2010). The number of new workers fluctuated during the study interval as indicated in Fig, 4 and Table 16. The numbers of male and permanent workers were small and have not changed significantly over the 10 years interval. It is the firm managers' strategy to maintain low levels of permanently employed workers to reduce losses, which could occur when firms are not producing, but permanent employees would have to be paid. Temporary workers also outnumbered permanent workers by 27.6%. This implies that most of the temporary workers are female. Such jobs are prone to low wages and high risk of job loss.

Table 16: Number of jobs created by sex and type of jobs per year

Year	Number of New jobs			
	Male workers	Female workers	Permanent workers	Temporary workers
2002	66	114	61	119
2003	12	27	13	26
2004	13	59	29	43
2005	24	41	27	38
2006	23	27	18	32
2007	24	28	18	34
2008	18	42	21	39
2009	23	63	37	49
2010	11	42	23	30
2011	15	30	7	38
Total No. new workers	229	473	254	448
Average No. of new workers per annum	23	47	25	44
New workers per annum %	32.6	67.4	36.2	63.8

The avarage number of permanent workers was smaller than that of temporarily workers in both regions, indicating temporary jobs dominate among new jobs created by small agro-processing firms. Further, analysis of new jobs indicates that unskilled workers for processing agro-products represented 80% of all the workers in the sampled firms (Table 17). Due to many workers working in small agro-processing firms lacking processing skills probably have caused many products to be processed below standards.

Table 17: Processing skills of workers

Variable	Number of workers	Percentage
Skilled workers	54	20.0
Unskilled workers	225	80.0
Total	279	100

However, 70% of the skilled workers have acquired skills through on job training as indicated in Table 18. This implies that owners and managers do not send their workers to be trained in institutions and colleges for agro-processing activities.

Table 18: Forms of training attended by workers

Variable	Number of workers	Percentage
On the job training	38	70
Off the job training	16	30
Total	54	100

The managers and workers also shown that, there are very few technical training institutions for people who work in agro-processing firms, and institutions which offer such training are very expensive. The list includes some of the colleges under the Vocational Educational and Training Authority (VETA). Comparing the mean number of new jobs created during the study period, there was not significant difference between the two regions ($t = 0.65$) as indicated in Table 19.

Table 19: Comparison of jobs created in Mbeya and Morogoro regions per year

	Mbeya		Morogoro		Comparing mean for Mbeya and
Variable	Mean	Std dev.	Mean	Std dev.	Morogoro (t)
Male Workers	3.46	3.51	5.45	4.51	2.56**
Female workers	3.19	4.68	0.90	2.21	3.15***
Permanent workers	3.12	5.65	2.78	3.69	0.37
Temporary workers	4.06	4.38	3.37	4.31	0.43
Entire Sample	3.33	4.09	3.18	3.36	0.65

** Difference between means is significant at the 0.05;
*** Difference between means is significant at the 0.01 levels

The average number of new jobs created per year was also not significantly different between the two regions for permanent workers (t = 0.37) as well as for temporary employees (t = 0.43). However Morogoro hired significantly more male workers than Mbeya Region (t= 2.56) but the reverse is true for female workers in Mbeya Region (t = 3.14).

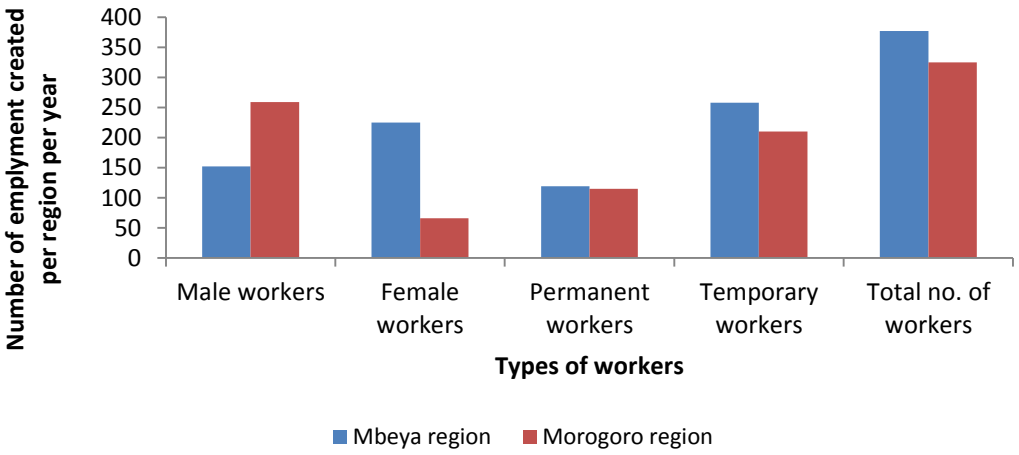

Figure 5: Number of new employees per region per year

Figure 5 depicts the findings in Table 19 showing that, the number of male workers employed in small agro-processing firms in Morogoro Region is higher than in Mbeya region. Meanwhile the number of female workers is higher in Mbeya Region than that in Morogoro Region. Other finding including the number of temporary and permanent workers were not significantly different from each other.

4.7.2 Creation of seasonal employment

The average number of jobs created per firm has been fluctuating depending on the season. The results in Table 20 indicate that the average number of new jobs created during the dry season was 83% for rice, 78% for cooking oil and 71% for flour mills out of the total number of employees per firm per year. During the dry season most agricultural crops are harvested hence, plenty of raw-materials are available for processing among other uses. The average number of seasonal jobs created from December to June for milk processing firms accounted for 78% of the total employment per year. This is the season when there is plenty of animal feeds hence high production of milk.

Table 20: Percentage of new temporary workers per month per firm

	Percent of Jobs/ firm type/ annum					
	Rice	**Bakeries**	**Milk**	**Animal feeds**	**Flour**	**Cooking oil**
January	5.0	7.4	12.5	10.5	4.2	2.7
February	1.7	11.1	15.6	10.5	4.2	5.4
March	6.7	3.7	12.5	10.5	4.2	5.4
April	6.7	11.1	12.5	5.3	4.2	5.4
May	8.3	11.1	9.4	5.3	8.3	8.1
June	13.3	3.7	9.4	10.5	12.5	10.8
July	15	11.1	6.3	5.3	16.7	13.5
August	11.7	7.4	3.1	5.3	12.5	10.8
September	10.0	3.7	6.3	10.5	12.5	13.5
October	8.3	7.4	3.1	10.5	8.3	13.5
November	10.0	11.1	3.1	5.3	8.3	8.1
December	3.3	11.1	6.3	10.5	4.2	2.7
Column Total	100	100	100	100	100	100
Total % of jobs in dry seasons for other firms and wet season for milk firms	83.3	66.7	78.1	47.4	70.8	78.4

Seasonal jobs for temporary workers therefore depend very much on the time for harvesting agricultural products and the availability of raw-materials. This has been reflected in Figure 6 where the production of rice, flour and cooking oil to had a higher number of new jobs between May and November, which is the dry season, when most

agricultural produce is harvested; but a higher number of jobs is reflected between December and April for milk processing firms, also reflecting the seasonality of animal feeds availability.

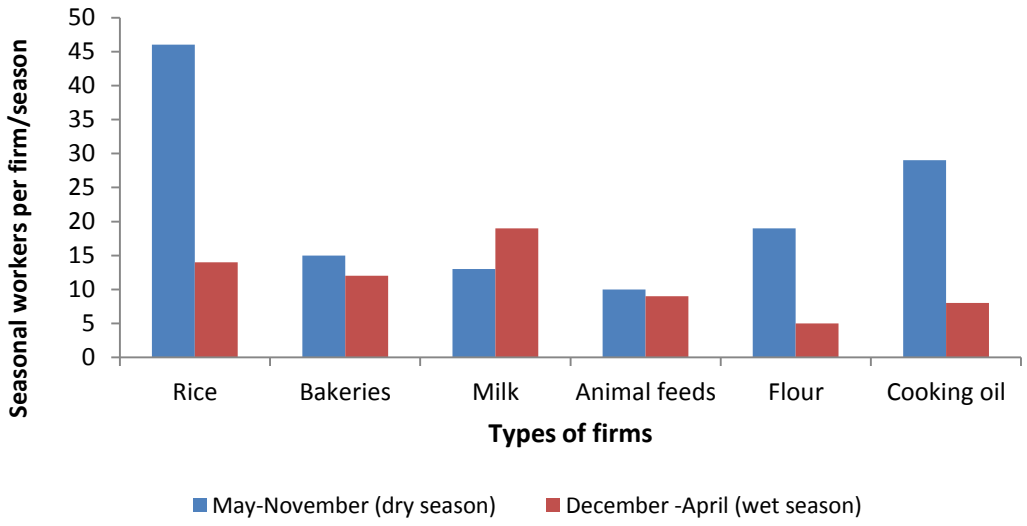

Figure 6: Number of temporary worker/seasonal/firm

4.7.3 Capital investment in relation to jobs creation

Bakeries, milk and rice firms have larger investment, with more new workers per firm per year than other firms for processing cooking oil, animal feeds, and flour mills. The capacity of creating new jobs is higher among these firms as reported by 60% of the firm owners, due to higher levels of investments, ability to buy and store raw-materials for use at times of scarcity. These results support the demand oriented theory which states that, when investments and production increase more jobs are created. Mutabazi *et al.* (2007); Kinda and Loening (2008) as well as Kipene *et al.* (2013), have similarly argued that, increased investment for small firms has substantial impacts on productivity and employment growth.

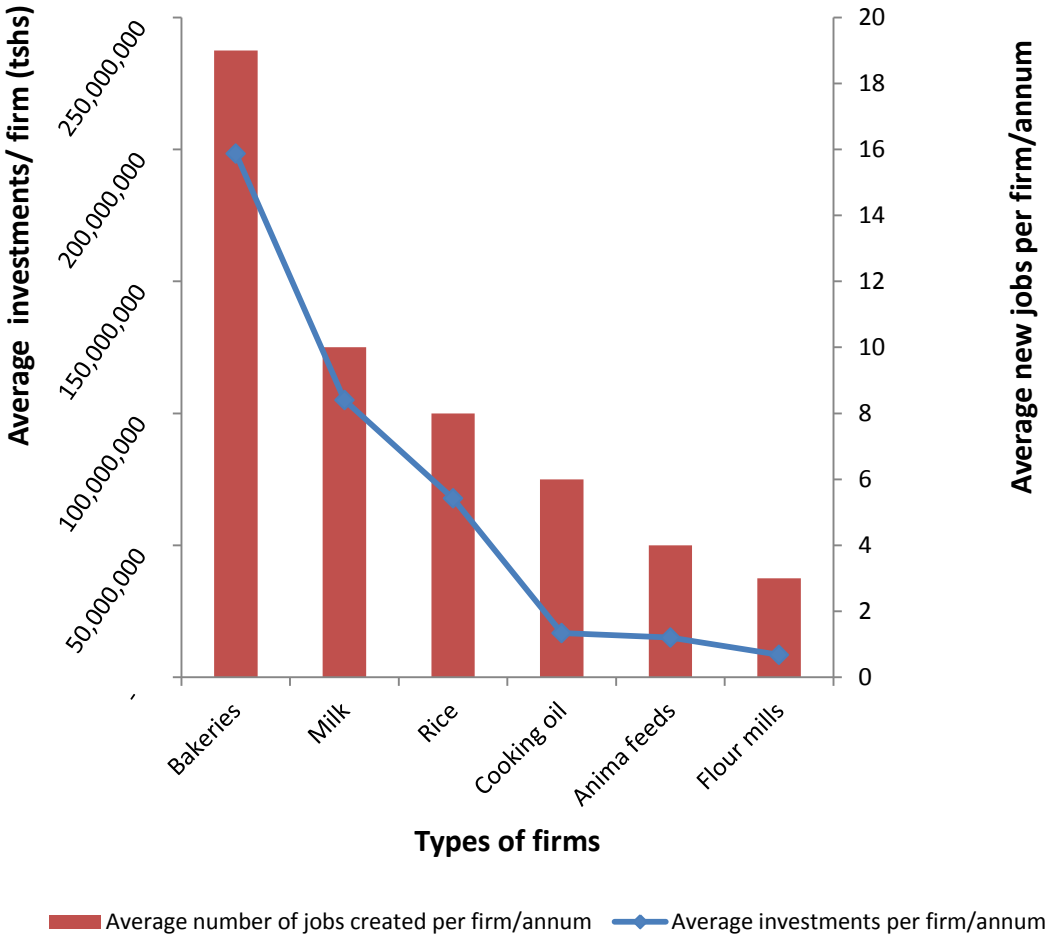

Figure 7: Employment creation in relation to capital investment

As it can be seen from Fig. 7, the number of generated jobs was positively associated with the investment levels. Firm with large investment also had a higher number of new jobs. Findings from the present study conform to observation made by Kongolo (2010) and Kaliba *et al.* (2008) who argued that direct and indirect employment multiplication is accelerated by higher investments and reduction in running cost.

4.8 Labour Productivity

The third objective of this study intended to assess the performance of small agro-processing firms in terms of labour productivity, which was used as an indicator to gauge the performance of small agro-processing firms, which was also considered to be indicative of the sub-sector performance in general. Labour productivity reflects a firm's efficiency and level of investment. The results presented below indicate the trends of labour productivity during the study interval (2002 – 2011). The analysis also presents an analysis of factors that affect the productivity of labour.

4.8.1 Labour productivity trends

The ILO (2007) has indicated that labour productivity growth rates in Tanzania is around 3.1% annually which is remarkably small compared to that of other African countries, estimated at 5.32% per annum. Results in this section does not provide enough factors with their degrees of effects in labour productivity, the regression analysis therefore was conducted to address this gap. Such an analysis was expected to provide policy guidance in future to raise labour productivity.

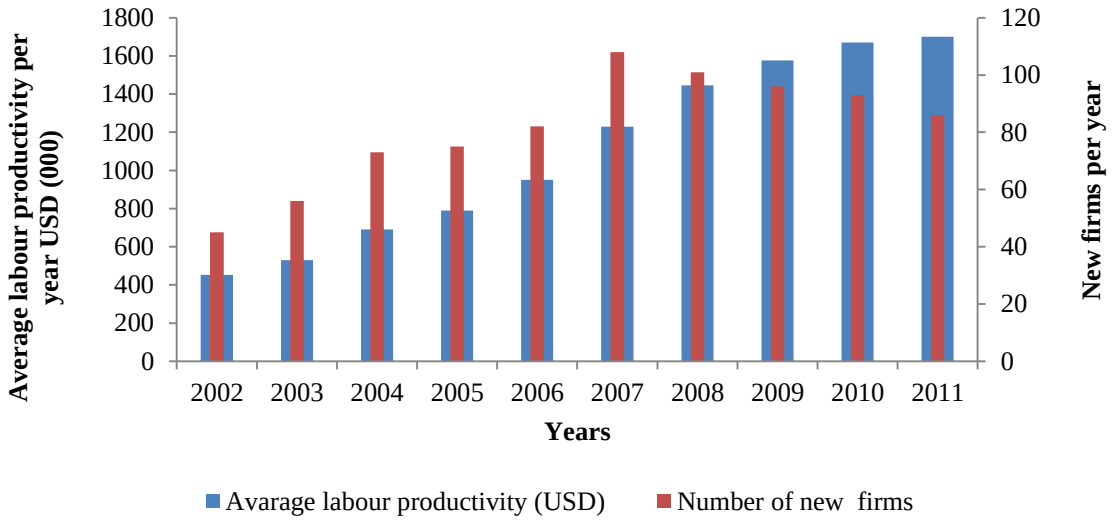

Figure 8: Trends of labour productivity and number of new firms established

Results in Fig. 9 show that firms for animal feed and grain had higher labour productivity between 2006 and 2011, but milk processing and cooking oil firms indicated lower labour productivity. From 2002 to 2006 labour productivity of animal feed, bakeries and milk processing firms were lower than those of milling firms, which have shown progressive increase in labour productivity since 2002 up to 2010 when it started to decrease.

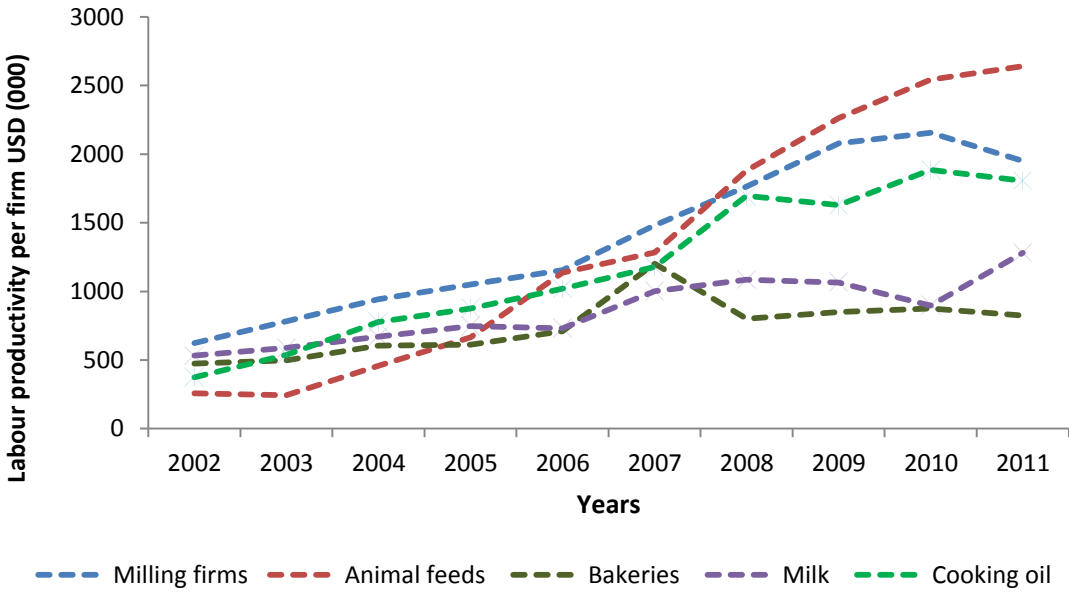

Figure 9: Labour productivity trend in relation to types of firms

Results in Fig. 9 indicated that before 2005 differences in labour productivity between types of firms existed but were this statistically significant. After 2005 labour productivity for animal feed firms improved steadily faster than all the other firms' types. Gradual improvement for grain mills and cooking oil but declined after 2009/2010. For a case of bakeries and mills they were stagnating and deteriorating. Based on such differences of performance, regression analysis was done to determine the factors influenced the variation in labour productivity in order to focus on factors which will have significant impact on labour productivity.

4.8.2 Factors affecting labour productivity in the study area.

In order to assess the effect of various factors on labour productivity variation between firms, regression analysis was conducted using equation 21. Labour productivity was regressed against a number of independent variables, including; education, location of firm, experience, being trained in processing products, wages, ratio of capital per labour and sex of managers. When the model was tested for stability there was evidence of multicollinearity between some variables including the number of workers trained on the job with number of workers with experience above one year; and the number of workers not trained with number of workers with education below form four. Number of workers trained on the job and number of workers not trained (Condition Index of 52.8 and 104.6 respectively) were dropped to correct for multicollinearity (Greene, 2003 and Gujarat, 2004). After correction the VIF values for all variables were within tolerance levels between 1.4 and 3.7, being lower than the acceptable upper limit of 10 (Gujarati, 2004 and Studenmund, 2001)

The model was also tested for autocorrelation and heteroskedasticity by running the regression analysis using Generalized Least Squares (GLS) based on Prais-Winsten transformation. Results presented in Table 21 indicate a Durbin-Watson statistics of 2.121, which is beyond the critical tabulated value (dL = 1.462 and dU = 1.898) indicating absence of serial autocorrelation (Studenmund, 2001; Gujarat, 2004 and Hoechle, 2007). The revised model also exhibited no heteskedasticity ($Ch^2 = 2.93$), it was therefore considered good for making statistical inference. The model's adjusted R^2 value was 0.383 and with an F value of 5.96, which is significant at $\alpha = 0.01$. This means, about 38.3% of the variation in labour productivity between agro-processing firms within the sample is accounted for by the independent variables. The intercept is positive (7.338)

and significantly different from zero ($\alpha < 0.05$), representing change of labour productivity when there is no variation in all the independent variables. Most of the variables had the expected signs except the number of workers with experience below one year and manager's experience below one year, whose sign was expected to be negative, but they turned out to be positive. Four variables had a significant effect on labour productivity.

Table 21: The effect of human capital factors in labour productivity (2002-2011)

Variable	Expected Sign	Coefficient.	t	P>|t|	VIF
Constant	(+)	7.338**	2.237	0.028	
Location of a firm (1 if urban)	(+)	0.089	1.087	0.280	1.152
Manager's educ. above F4	(+)	0.076	0.927	0.356	1.185
Managers trained on agro-processing	(+)	0.173**	2.014	0.047	1.271
Number workers with experience< 1yr	(-)	0.012	0.120	0.905	1.829
Number workers with experience > 1 yr	(+)	0.457***	4.758	0.000	1.570
Average wage per worker	(+)	0.042	0.505	0.615	1.194
Number workers educ <. F4	(-)	-0.282***	-2.795	0.006	1.737
Number workers educ > F4.	(+)	0.243***	2.828	0.006	1.277
Ratio of capital added per worker	(+)	0.275***	3.089	0.003	1.378
Manager's experience above 1 yr	(+)	0.119	1.469	0.145	1.129
Dummy (1 if firm manager male)	(+)	0.032	0.394	0.694	1.140
Number of observation	= 105				
R2 = Adjusted R^2	= 0.383				
F-value	= 5.96				
Prob > F	= 0.000				
Model VIF	= 1.4				
Condition Index	= 3.71				
Durbin-Watson statistic	= 2.121				

* Significant at α= 0.1; ** significance at α= 0.05 and *** significant at α=0.01

Results in Table 21 show that firm a manager's training in agro-processing s had a positive coefficient (0.173), which was significantly different from zero ($\alpha < 0.05$) Other variables with positive significant variables (at $\alpha < 0.01$) included; the number of workers with experience above one year (0.457), education of workers above form four (0.243) and ratio of capital added per firm per worker (0.275). These coefficients represent elasticity of production such that a prone percent increase in the variable would increase productivity by the value of the corresponding coefficient.

Meanwhile number of workers with education below form four had negative sign (-0.282), which was significant different from zero ($\alpha < 0.01$), meaning a one percent increase in the number of workers with education below form four would reduce labour productivity by 0.28.3%. This finding underlines the importance of education for workers in processing firms where adherence to technical instructions. An educated employee is more likely to follow such instructions is required. The coefficient for a worker's experience above one year was 0.46, significant being highly significantly different from zero. This means if the number of workers with experience in the firm increased by one percent, labour productivity would increase by 0.46%, indicating the importance of experience in specialized jobs such as working in agro-processing firms. As the workers stay longer in a firm, they become more exposed to firm procedures, learning by doing hence accumulated experience which makes them more effective in using introduced technologies compared to new workers (Schonewille, 1999; Bessen, 1998; Mahadevan, 2003 and Chiang, 2004). Meanwhile, the number of workers with experience below one year (-0.012) had a negative coefficients, but it was not significant. A one percent increasing in this variable would reduce the productivity of labour by only 0.012%.

The results also show that a one percent increase in the ratio of capital added per firm per worker would increase labour productivity by 0.28%. In a study by Jajri and Ismail (2010) on the impact of labour quality on labour productivity, they established that, a 1% increase in the capital to labour ratio increased the labour productivity by 0.19%., which shows that physical capital investment improves labour productivity.

Other results of this study show that, a one percent increase in the number of workers with education above form four was likely to increase labour productivity by 0.24%, consistent with a fundamental human capital theory, which states that increasing an

employee education should also increase their labour productivity (Olaniyan and Okemakinde, 2008; Supachet 2010; Afrooz and Rahim, 2010). Educated workers are better inclined to use inputs more effectively and follow instructions as discussed earlier in relation to accumulated experience.

Since the variable for whether the manager was trained on agro-processing or not was used as a dummy, the coefficient (0.173) is interpreted to mean, if a firm manager was trained the firm was likely to have higher labour productivity by about 17.3% compared to a firm with an untrained manager. Similar findings were established by Niringiye *et al.* (2010) who found that, training managers in Kenya's processing firms had a positive effect, improving labour productivity by 42.9%. This justifies the recommendations made by SIDP and SMEDP that human resources within firms should be developed through training in order to facilitate growth of productivity and coping with technological changes (MIT, 1996 and 2002).

Other variables such as; the manager's education and sex, workers' average wage, firm's location and manager's experience had positive coefficients but they did not have a significant influence on labour productivity variation between firms. One variable; the number of workers with experience below one year (-0.012) had negative coefficients, but it was not significant. A one percent increasing in this variable would reduce the productivity of labour by 0.012%.There fore there is a need to balance the proportion of workers of different categories within a firm.

4.9 Growth of Small Agro-processing Firms

At the aggregate level, the development of small agro-processing firms is vital for economic growth as well as for employment generation. Firms in the study area, as well as firms in Tanzania in general have been facing different challenges, which have limited the sub-sector's growth rate. Some of these challenges are discussed in the next section (4.8), To analyse the growth of the agro-processing firms expressed in terms of the annual average value of processed products from 2002 to 2011, is discussed in the next section. To account for inflation, the value of processed products at any point in time was deflated before they were used for analysis.

4.9.1 Trends of small agro-processing firms growth

The trend of growth for small agro-processing firms measured by the real value of processed products per year has been increasing but at a decreasing rate as indicated in Figure 10. The value of processed products in Morogoro Region shows an increasing growth trend being higher than those of Mbeya Region and the average of both regions. This trend is contrary to similar trends reported by MPEE (2007a) and MPEE (2007_b) which indicated a declining trend of agro-processing firms for Morogoro while the trend for Mbeya was increasing. This difference in findings is probably due to the method used to evaluate growth of firms. The MPEE (2007a) and MPEE (2007b) reports evaluated growth of firms in terms of number of firms established while this study evaluated growth in terms of value of sales of processed products. Evaluating growth based on the real value of products is recommended because it reflects the income and profit obtained by firms, a better indicator of growth than the number of firms established. A high number of firms could be established but they may be operating below capacity or they may be producing low value products.

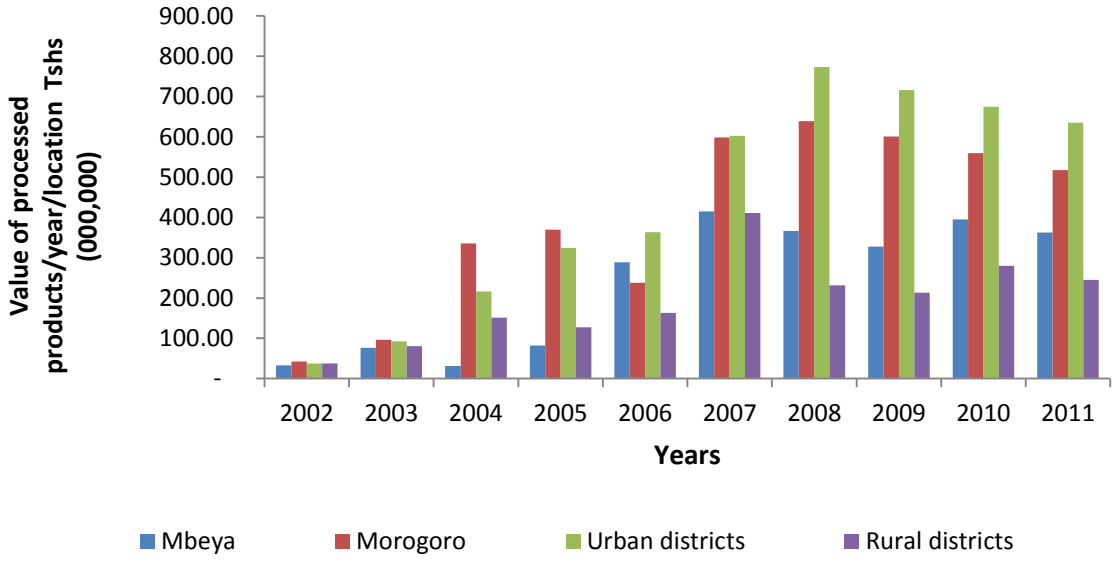

Figure 10: Average value of processed product per year per location

For Morogoro Region, the value of processed products increased from 2002 to 2005 followed by a decrease in 2006 and a subsequent increase in 2007 continuing up to 2009 after which it declined. In the case of Mbeya Region, the value of processed products increased from 2002 up to 2003 followed by slight decrease in 2004, then increased from 2005 up to 2007. There was a slight decline in 2008, which recovered during 2009, thereafter remaining almost stagnant until 2011. The increase in the value of processed products in 2003 was associated with the introduction of prudent monetary policy and restrained fiscal policy during 2002 that lead to the decline of food inflation to 4.4% which contributed to improvements in supply of basic foodstuffs following increased food production and improved distribution (ICC, 2005 and IMF, 2006). This probably contributed to the growth of value for processed products in both Mbeya and Morogoro regions from 2003 to 2005. As can be seen in Fig. 10, the value of processed products per annum was higher in Morogoro than that of Mbeya Region as reflected in Fig. 10 probably because Morogoro being near Dar es Salaam, a major market for agricultural produce has more price effects than Mbeya since transport and other cost are lower in

Morogoro than in Mbeya Region. Decline in the value of processed agro-products, which was experienced in both region during 2006 may be attributed to poor harvest which occurred throughout the country during 2005 due to drought (Minot, 2010); Consequently, agricultural output fell by 33% compared to the previous year hence reducing the average value of agro-processed products (Minot, 2010).

As noted earlier, the growth of value of processed products for Mbeya Regions was almost stagnant from 2007 to 2011 growing at 4.8% (about 1.2% annually) compared to Morogoro Region, which experience 10% during the same interval, representing 2.5% annual growth rate. The difference in growth could be attributed to relaxed export restriction within the East African market. The East African Community customs union protocol which went into effect in 2007, which allowed more relaxed movement of agro-processed products hence expanding the market, meanwhile Southern African development Community - SADC harmonized customs union for Tanzania was expected to start in 2010 after the East African Community customs union protocol (Khorana *et al.*, 2009). The harmonization of custom union has not yet started for SADC countries, hence presenting a temporal disadvantage to Mbeya Region which is near to boarders of SADC countries. In contrast to Morogoro Region which is near to the market accessed easily by East African countries, which probably brought the temporal advantage to fetch more value of processed products than Mbeya Region.

The growth of value of processed products in rural areas also indicates progressive growth between 2002 and 2004, followed by a slight decline in 2005. Between 2006 and 2007 the value increased, followed by declining growth up to 2010. In comparison, the value of products produced in urban areas of both regions was higher by 56% than that of

rural, which should be expected since most processing firms are located in urban areas where there is water and electricity.

4.9.2 Factors affecting growth of small agro-processing firms

The fourth objective of this study, regarding factors affecting the growth of small agro-processing firms was analysed using equation 25 which was derived earlier in chapter three. The model was tested and established presence of multicollinearity based on the VIF values above the upper limit of 10 for several variables and CI being above10 for more than one variable After correction VIF value for all variables were within the tolerance level of 1.13 while the Condition Index was a low 2.3 (Appendix 9).

The model was also tested for autocorrelation and heteroskedasticity using the Newey-West standard errors method (Hoechle, 2007) and the Durbin-Watson test. The model was found to be free of heteroskedasticity ($Ch^2 = 0.08$). Meanwhile the DW statistic was 2.589 which falls above the critical upper and lower limits established between 1.697 and 1.841 indicating absence of autocorrelation (Studenmund, 2001; Gujarat, 2004 and Hoechle, 2007).

The model had an adjusted R^2 value of 0.68, implying that about 68% of the variation in the growth of value of products from small agro-processing firms in the sample was accounted by the variation in the independent variables. The intercept was 5.915 and significantly different from zero ($\alpha < 0.01$). All seven variables had the expected signs and four variables had a significant effect on variation of growth of value of products.

Table 22: Factors affecting growth of small agro-processing firms (2002-2011)

Explanatory variables	Expected Sign	Coefficient	t	P>|t|
Constant	(+/-)	5.915***	5.307	0.000
Labour productivity	(+)	0.522***	8.811	0.000
Value of raw-materials	(+)	0.308***	5.221	0.000
Number of years firm in operation	(+)	0.313***	5.264	0.000
Capital invested per firm	(+)	0.011	0.190	0.850
Cost of energy	(-)	-0.167***	-2.751	0.007
If a firm operated infrequently	(-)	-0.006	-0.100	0.921
If a firm was not managed by owner	(+)	0.0062	1.098	0.275
Number of observation = 106				
Adjusted R^2 = 0.68				
F-value = 33.79				
Prob > F = 0.000				
VIF = 1.13				
Condition Index = 2.3				
Durbin-Watson statistic = 2.589 ;				

* Significant at the 0.1, ** at the 0.05 and *** at the 0.01 levels

The coefficient for labour productivity (0.522), value of raw materials (0.308) and number of years a firm had been in operation (0.303) had positive coefficients that were significantly different from zero at $\alpha < 0.01$. Meanwhile the coefficient for the cost of energy (-0.167) was negative and significantly different from zero at $\alpha < 0.01$. The coefficients for capital invested per firm (0.011), and that for a firms operated infrequently (- 0.006) and if a firm manager was not the owner (0.0062) had positive coefficients but they did not have a significant affect on the growth of firms' values.

Results in Table 22 shows the increase of labour productivity by one percent would increase the value of processed products by about 0.52%, since labour productivity determines a firm's efficiency, therefore accelerating growth of firms (Kohli, 2004). Meanwhile, a 1% increase in value of raw-materials would increase the value of processed products by about 0.3%. Likewise a firm that has been in operation for a longer period was more likely to increase value of processed products by about 31%. Such a firm would have more investments, accumulated knowledge and experience, secured more business contacts such as buying inputs at a discount and maintaining

lucrative markets; all these provide competitive advantage to the firm, leading to higher value of processed products hence increasing employment according to vacancies created. For this case value increase of processed products caused by labour productivity could increase employment.

However, one percent increase of cost of energy per year would reduce the value of products by 0.167%. In addition to tariff rates, such cost could be higher due to inconsistent supply of energy, as established by findings by Mbelle (2005) as well as Kinda and Loening (2010) who argued that an inconsistent power supply increases the cost of processing products. These findings were further analysed to find if the effects varied according to region by testing for structural change.

4.9.3 Structural change for growth of small agro-processing firm

This study examined if the factors affecting growth of small agro-processing firms had the same effect in Mbeya and Morogoro by comparing the parameters pairwise using a t test and for the entire models based on the Chow test for structural change. Three models were run for this test according to the equation (29) derived in section 3.3.2. The model was tested for stability indicating absence of multicollinearity for the whole sample (VIF 1.13 and CI 2.3, for Mbeya region (VIF 1.14 and CI 2.65), and for Morogoro Region (VIF 1.33 and CI 4.15). The model was also tested for autocorrelation and heteroskedasticity using the Newey-West standard errors method (Hoechle, 2007). A Durbin-Watson statistic of 2.59 (dL = 1.51 and dU = 1.72) for the whole sample, 2.34 (dL = 1.33 and dU = 1.69) for Mbeya region and 2.23 (dL = 1.26 and dU = 1.69) for Morogoro Region all was above the critical tabulated values, which indicates absence of serial autocorrelation (Studenmund, 2001; Gujarat, 2004 and Hoechle, 2007).

The adjusted R^2 value of 0.68 for the whole sample was 0.68 comparable to 0.67 for Mbeya region and 0.71 for Morogoro Region. This implies about 68% of the variation in the growth of value of products from small agro-processing firms in the whole sample was accounted by the variation in the independent variables as well as 67% for Mbeya region and 71% for Morogoro Region. The intercept was 5.915 for the whole sample, 5.598 for Mbeya Region and 6.101 for Morogoro Regions significantly different from zero ($\alpha < 0.01$). All seven variables had the expected signs and four variables had a significant effect on variation of growth of value of products as indicated in Table 23.

The working hypothesis was that the parameter estimates for Mbeya Region were similar to those of Morogoro Region, as well as those of the entire sample. The alternative hypothesis was that the parameter estimates for Mbeya and Morogoro Regions were statistically different from each other and also different from those of the entire sample. The computed F value for the Chow test was 5.94 being greater than the critical value of 2.25 for 6 degree of freedom at $\alpha = 0.05$ significance level. Based on these findings the null hypothesis was rejected, indicating that parameters estimates for Mbeya and Morogoro Regions are significantly different from each other, which reflects the existence of structural difference between the two regions in the rate of growth for small agro-processing firm. This is clearly reflected in Figure 10 as discussed earlier (section 4.8.1) where growth for the value of processed products value was different between Mbeya and Morogoro as well as between each region and the whole sample.

The results on Table 23 show that, if labour productivity increased by one percent, the value of processed products was likely to increase by 0.55 in Mbeya, by 0.52 in Morogoro compared to 0.55 for the whole sample. The difference between Mbeya and

Morogoro regions is 0.03. The value of raw-materials was also seen to cause changes in the value of products by difference of 0.003% between the regions. Likewise firms that operated for a long time were more likely to increase the value of products by a difference of 0.06% between Mbeya and Morogoro. Contrary to these findings, one percent increase for the cost of energy was likely to decrease the value of products by 0.01% between the regions.

Other variable such as; capital invested per firm and if a manager was not the owner had positive coefficients but they did not have a significant influence on value growth of processed products variation.

Table 23: Structural change for growth of small agro-processing firms (2011-2012)

Explanatory variables	Expected Sign	Whole s ample Coefficient	Mbeya Coefficient	Morogoro Coefficient	Whole s ample T test	Morogoro T test	Mbeya T test
Constant	(+/-)	-5.915***	-5.598***	-6.619***	5.307	-3.614	-3.379
Labour productivity	(+)	0.522***	0.556***	0.521***	8.811	6.332	5.617
Value of raw-materials	(+)	0.308***	0.303***	0.300***	5.221	3.414	3.625
Number of years in operation	(+)	0.313***	0.308***	0.368***	5.264	3.468	4.023
Capital invested per firm	(+)	0.011	0.045	0.062	0.190	0.539	6.780
Cost of energy per firm	(-)	-0.167***	-0.181***	-0.191***	-2.751	-2.082	-2.000)
If a firm operated infrequently (weekly)	(-)	-0.006	-0.0733	-0.100	-0..100	-0.130	-1.192
If a firm was not managed by owner	(+)	0.062	0.020	0.136	1.098	0.237	0.154
N		106	56	50			
R^2 Adjusted		0.68	0.67	0.71			
Compute F-values		33.794***	14.49***	18.49***			
Durbin-Watson		2.589	2.341	2.229			
VIF		1.13	1.142	1.325			
Condition Index		2.3	2.651	4.147			
Chow Test	= 5.940						
Dependent variable	= Value of processed product						

* Significant at the 0.1, ** at the 0.05 and *** at the 0.01 levels

A one percent increase in the amount of capital invested per firm could change the value of products by a difference of 0.07% between the regions, compared to if a manager was not an owner; could cause changes of value of products by a difference of 11.6%. The status of firms operations per week had a negative coefficient but was not significant implying that, if a firm operated infrequently could decrease value of products by difference of 2.7% between Mbeya and Morogoro Regions.

4.10 Relationship of Jobs Created with Different Factors in Small Agro-processing Firms

The relationship between the types of jobs created within agro-processing firms is based on the marginal productivity theory which stated that; a firm will maximize profit when the marginal cost of employing an extra worker equals the marginal revenue from that additional worker. If the marginal revenue is greater than the marginal cost, the firm's profit will increase by adding more workers. The firm's profit maximization motivates and subsequent investment enables the firm manager to determine the number of workers required, whether full time or temporary (Mtabazi *et al.*, 2007 and Kipene *et al.*, 2013). The correlation between the type of firm and various aspects of employment are shown in Table 24; indicating both Spearman's rho and Pearson indices. Spearman's rho (non-parametric method) has been used for unranked qualitative variable like type of firm versus types of jobs created, meanwhile Pearson's rho has been used to correlate jobs created per year with value of products, investment and labour productivity because these variables are quantitative (Gupta, 1999).

Table 24: Correlation matrix results for jobs created in small agro-processing firms

Correlated qualitative variables	N	Spearman's rho	P>|t|
Type of firm Vs Total New jobs/year	107	0.207**	0.033
Type of firm Vs New permanent jobs/year	107	0.131	0.178
Type of firm Vs New temporary jobs/year	107	0.421***	0.000
Correlated quantitative variables	N	Pearson	P>|t|
Value of products Vs Jobs created per year	107	0.625***	0.000
Investment Vs Jobs created per year	77	0.379***	0.001
Labour productivity Vs Jobs created per year	87	0.494***	0.000

*** Correlation is significant at the 0.01 and ** 0.05 levels (2-tailed).

Results of the Spearman's rho in Table 24 shows that, the correlation between the type of firm and the number of new permanent workers per year was 0.131 but it was not significantly different from zero. However the correlation coefficient between the type of firm and new temporary employees per year as well as the coefficient between types of firm and the total number of all new workers were 0.421 and 0.207 respectively, both being significantly different from zero at $\alpha = 0.05$. Likewise the correlation coefficient of Pearson between the number of new jobs created per year and the annual average value of products was 0.625, the average investment per firm versus jobs created per annum was 0.379 and labour productivity vs new jobs created was 0.494, all being significantly different from zero at $\alpha = 0.01$. The findings are supported by the views of Pissarides and Vallanti (2003) and Landmann (2004) who argued that increase in labour productivity may not necessarily lead to reduction in the number of new jobs within a particular firm because productivity improvement could increase the number of new jobs due to higher profit levels, which leads to more investment within and outside the firm thereby creating more new jobs.

4.11 Challenges facing small agro-processing firms

The agro-processing sub-sector faces different challenges which limit the potential for growth, generating more jobs and increasing labour productivity. Results in Table 25 indicate the challenges facing small agro-processing firms in general as responded by respondents in the interview.

Table 25: Challenges facing small agro-processing firms for employment creation

Pressing challenge	Frequency	Percent
Poor implementation of policies to boost firms development	18	7.3
Poor marketing system	31	12.7
Limited access to capital	68	27.8
Lacking managerial skills	12	4.9
Low level of technology	25	10.2
Poor quality of raw materials	70	28.6
Limited access to energy	21	8.6
Total number of respondents	245	100.0

Poor quality of raw-materials was a leading challenge, mentioned and ranked highest by 28.6% of respondents. This was followed by inadequate working capital mentioned by 27.8% of the respondents. Marketing problems and low level of technology were mentioned by 12.7% and10.2% of respondents respectively. These findings are ranked similarly as in Table 13 as factors causing collapse of different types of firms in the sub-sector. Other challenges include inadequate and poor implementation of policies to boost agro-processing firms, limited access to energy but electricity in particular and high cost of energy (electricity and fuel) were seen as challenges, especially in rural areas. Firms located in rural districts incurred up to 30% higher costs for operations compared to similar firms operating in urban areas because they were not connected to reliable sources of power. They had to use expensive fuel instead, which also had to be transported at very high cost due to poor rural roads (Mwakapugi *et al.,* 2010). All these challenges forced about 90% of the processing firms to operate below their capacity, and for only part of the year.

Table 26: Processing capacity of small agro-processing firms

Types of firms	Average installed processing capacity (Tonnes)/year	Actual capacity utilization (Tonnes)/year	% capacity utilization (Tonnes)/ year
Animal feeds	3220	131	4.1
Milk	1680	241	14.7
Bakeries	196.4	88.9	45.0
Flour	1850	533	29.0
Rice	2881	1005	35.0
Cooking oil	1055	308	29.0
Average for all firms	10882.4	2306.9	21.2

Results in Table 26 shows average processing capacities of firms in the interval of 2006-2011. Bakeries had the highest average capacity utilization rate, but it was only 45% of their installed processing capacity per year. This was followed by rice mills which utilized only 35% of their installed capacity. Cooking oil and flour firms also utilized 29% of their installed capacity. Other results including milk and animal feed processing firms were operated under capacity by 14.7% and 4.1% respectively. Respondents mentioned lack of raw-materials and limited markets for processed products to be the leading causes of capacity underutilization. As a consequence, only a small number of workers were hired by these firms per year as reported earlier (Table 14). Low capacity utilization by agro-processing firms has forced more workers to be laid off as reported earlier in section 1.1 and 1.4.

Firms were also assessed for the extent to which they complied with TFDA and TBS standards. It was reported earlier that only 40.1% of the firms operated with approval from TFDA and TBS (Table 7). Majority of the firm owners did not comply due to the cost of compliance being too high (53.3%), not knowing the procedure (28%) and not knowing the importance of complying (18.7%). Results show further that more than 59% of processed products were packed without TFDA and TBS approval as reported earlier in Table 7. Some of the violation included using poor packing materials, selling

unlabelled processed products, not indicating expiry dates and processing products under poor hygienic condition as reflected in Fig. 11. Packaging without meeting TFDA and TBS standards reduces opportunities of products entering into the export markets, hence reduced employment generation option (URT, 2008 and 2011). However, about 90% of the bakery and milk products were reasonably well packed according to TFDA and TBS standards, which is consistent with higher levels of investment and value addition by these firms as reported earlier (Fig. 7).

Unlabelled sunflower oil

Unpacked breads

Poorly packed animal feed

Packed maize flour without expiry date

Unhygienic cooking oil extraction

Poorly packed rice

Figure 11: Products processed below TBS and TFDA standards

Another challenge relates to lack of skilled workers for operation, maintenance and processing products. Findings in Table 27 reveal that more than 76% of respondents did not attend training, which specifically focused on agro-processing. These results are similar with those in Table 17 which reported that unskilled workers represented 80% of all workers working in small agro-processing firms in the study area.

Table 27: Workers attended training on agro-processing

Training status	Number of worker	Percentage
Workers attended training	66	23.4
Workers not attended training	216	76.6
Total	286	100

Consequently firm managers complained about the workers' limited capacity to operate and maintain agro-processing plants and equipment. These challenges have also contributed to the slow growth of firms, labour productivity and jobs creation in the sub-sector. Unless efforts are made to address these challenges, the sub-sector will continue to have only limited contribution towards employment generation and sub-sector growth.

4.12 Summary of Findings

In addressing the first objective, this study established that, the trend of new firms established in Mbeya and Morogoro regions during the study period (2002 – 211) fluctuated, being influence by prevailing trade and other policies as well as weather conditions. The average number of firms established per annum was highest for Mbeya city (40) followed by Mbeya rural district (27). Morogoro municipality and Kilombero district reported nineteen new firms per annum each. About 90% of the established firms survived in Mbeya city, followed by Kilombero district (88%), Mbeya rural district (74%) and Morogoro municipality (70 %). The percentage of collapsed firms was 18% for the whole sample, being highest in Morogoro municipal (29%) followed by Mbeya rural

district (26%) and lowest in Mbeya city and Kilombero districts which had 10% each. The main reason for agro-processing firms to collapse included; low and untimely availability of raw-materials mentioned by 46% of the respondents, followed by limited access to capital (24%), poor access to markets (11%), high cost and limited supply of energy (10%), low access to technology (5%) and low quality of human capital (4%). Based on these findings alone, it would seem that Mbeya city performed better than the other study areas.

The second objective of this study sought to analyse the performance of small agro-processing firms based on employment creation. The overall results indicate that, the average number of new jobs created by different types of small agro-processing firms increased progressively from 2002 to 2008 followed by a decline in 2009, and then gradual improvement occurred from 2009 up to 2011. On average, 17 jobs were created per bakery per year followed by rice firms (11 new jobs) and milk processing firms (3 new jobs). About 70% of the workers employed in small agro-processing firms were standard seven graduates, most being female (67.4%).

The proportion of permanent workers was small (27.6%) compared to temporary workers (72.4%). The study established that the dominance of temporary workers was not an accident; rather it was a calculated strategy by firm managers to minimize severance payment to workers when production declined or stopped due to various reasons, such as low supply of raw-materials or power outage. Unskilled workers represented 80% of all employees in the study area. However 70% of such workers obtained skills through on the job training. Private firms at the micro and small enterprise level have seldom sponsored their workers to attend training because of externalities that cannot exclusively be captured by the sponsoring firm (World Bank, 2007b).

The average number of jobs created per firm, fluctuated seasonally. Most of the firms hired more workers during the dry season as indicated by 75% of the flour mills, 74% of the rice mills and 67% of the cooking oil firms. This should be expected since; most of the agricultural produces are being harvested during the dry season, when raw-materials are readily available. In contrast, milk processing firms hired more works during the wet season when there was increased milk supply due to ample availability of pastures. More than 60 % of the firm's owners and managers reported that a firm's potential for job creation was directly related to the level of investment, and the firm's ability to buy and store raw-materials and use them when such resources are scarce.

The performance of small agro-processing firms measured by the average labour productivity indicated progressive increase during the study interval but it was increasing at a decreasing rate for almost all types agro-processing firms. From 2002 to 2006 labour productivity of animal feed, bakeries and milk processing firms were lower than that of cereal milling firms. Milk and bakery processing firms indicated lower labour productivity but with higher rate of employment creation by more than 25% per firm per year compared to other processing firms. Animal feed and grain milling firms showed higher labour productivity between 2006 up to 20011; Meanwhile, milk processing and cooking oil firms showed lower labour productivity throughout the study period. These performance differences are associated with the market value of processed products which are affected by imported products including milk, animal feeds and bakeries.

Regression analysis to assess labour productivity performance revealed that, the adjusted R^2 value was 0.383implying that about 38.3% of the variation in labour productivity between agro-processing firms is accounted for by the independent variables. The number

of workers with experience above one year had highly significant effect in raise of labour productivity while the ratio of capital added per worker had a significant effect in labour productivity. In the case of training a firm manager who had training on agro-processing, was more likely to have higher labour productivity. The level of education of workers was also identified as an important factor in increasing of labour productivity. Further that, the number of workers who had education above form four was likely to increase labour productivity.

Regression analysis to assess factors that influence the growth of small agro-processing firms, with comparison between Mbeya and Morogoro revealed the presence of structural difference between the two regions. The value of raw-materials was found to have significant effect on growth of small agro-processing firms. The number of years a firm had been in operation also contributed to the variation of growth among firms. In contrast, an increase in the cost of energy per year in processing would decrease the value of products of the entire sample.

It was generally observed that, during the study period (2001– 2011) more new firms were established in Mbeya and less firms collapsed than Morogoro but growth in the value of processed agro-products was higher in Morogoro region than that of Mbeya region, probably due to price transmission effects from Dar es Salaam. The value of products in urban areas was seen to grow higher faster by 56% than those in rural areas due to poor roads, high energy cost and poor communication. Based on the Chow test it was established that structural differences in the growth of agro-processing firms exists (value of processed products). The computed F value of 5.94, was higher than 2.453 from F Tables which signifies that, there are structural difference in the rate of growth among small agro-processing firms in different regions.

About 97.2% of the processed products were consumed within local market which according to Porter's model of trade is good for testing products before they are sold in export markets. However, more than half of the firms (59.8%) produced products did not meet TFDA and TBS standards in terms of quality of products and packing. The leading challenges constraining the growth of small agro-processing firms were identified as; (i) limited and untimely availability of raw-materials, (ii) low access to capital, (iii) poor marketing system for the processed products which does not favour locally processed products and (iv) low level of technology used in processing the products which led to process products below standards. Unless these challenges are addressed, the value of processed products will continue to grow at a low rate, providing only marginal impacts to productivity improvement and employment creation.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

This study evaluated the growth of small agro-processing firms in relation to labour productivity and employment creation in Mbeya and Morogoro regions of Tanzania. The study pursued four objectives; (i) to establish the trend of establishing and collapsing small agro-processing firms in the study area, (ii) to analyse the performance of small agro-processing firms in relation to employment creation, (iii) to analyse the performance of small agro-processing firms in terms of labour productivity (iv) to determine factors which have accounted for variation in the growth of small agro-processing firms.

The trends of established and collapsed small agro-processing firms in Mbeya and Morogoro was analysed descriptively but were also presented in graphics and tabular form. Mbeya city and Mbeya rural district had a higher number of newly established firms per year compared to Morogoro municipality and Kilombero district. New firms were dominated by cereal mills for maize flour and rice products. Mbeya rural and Morogoro municipality had a higher number of firms that collapsed than Mbeya city and Kilombero district. Reasons for firms to collapse were given as; inadequate and untimely raw-materials, low access to capital, limited use of modern technologies by firms, poor access to markets for processed products, high cost of production and low access to energy (fuel and electricity), poor road infrastructure for transportation and limited access to water.

The performance of small agro-processing firms in terms of employment creation was also presented in graphics and tables. The majority of firms recruited workers who had standard seven education or below. These represented 70% of all workers in the sample,

and about 67.4% of the workers were female. It was also observed that small agro-processing firm employed more temporarily workers, who represented 63.8% of the employees in the sample, to mitigate against losses which could occur when raw-materials become scarce or during prolonged power outage.

Labour productivity as an indicator of firm's performance was analysed descriptively and presented in graphics. Factors affecting labour productivity were assessed using a Cobb-Douglas regression model. The trend of labour productivity fluctuated throughout the study interval (2002 to 2011) due to a combination of human capital and physical capital factors. The study established that, human capital factors, which include managers' training, workers education and the number of workers with experience, contribute significantly to labour productivity improvement. Milling firms showed progressive increase in labour productivity from 2002 up to 2010. Milk processing and bakery firms indicated lower labour productivity than all the other types of firms.

The growth of small agro-processing firms was expressed as the value of processed products per year. Based on this criterion, the growth of small agro-processing firms has continued to increase at a decreasing rate throughout the study period. This has been attributed to limited availability and high cost of raw-materials, followed by inadequate working capital, unreliable market for processed products, and a low level of technology. The pricing cost of energy had also a negative impact on firms' growth. All these factors, contributed to low growth of firms, with subsequent low potential for creating new jobs as reflected in correlation analysis that growth of firms is positively correlated with new jobs created.

5.2 Recommendations

Based on these findings as presented in the main text and summarized under conclusions, a number of recommendations are made as follows;

i. Many firms in the study area collapsed due to insufficient capital, low level of technology and poor infrastructure such as electricity and water. To improve the availability of capital and technology to agro-processing firms, it is recommended that the government should work with other stakeholders to improve provision of adequate and affordable financing for the sub-sector. To address the problem of electricity undersupply, it is further recommended that, more funds should be allocated to expedite the on-going programme under Rural Electrification Agency (REA) to reach the areas that are not yet connected with electricity. Water infrastructures should also be expanded to satisfy the demand of agro-processing firms as well as other users, hence reducing the number of firms collapsing after they are established.

ii. A part from insufficient capital and low technology as stated above, the study also revealed that, majority of workers in these agro-processing firms are standard seven graduates or they have no formal education at all. Such workers often lack necessary skills for agro-processing which lead to low labour productivity. This calls for wider involvement of stakeholders in the sub-sector to address a number of issues. First, at the policy level it is crucial to put more emphasis on expanding investment in infrastructure for vocational and technical education. Well developed infrastructures and equipped vocational training colleges (VETA) as well as other technical colleges will contribute towards increasing the stock of knowledgeable and skilled workers for agro-processing firms. Such investments can

be done by the government if they accelerate implementation of the current programme to establish at least one VETA institute per district, especially in remote districts such as Kilombero. The private sector can also be encouraged through tax rebates and other incentives to invest in technical training for agro-processing and other industry related jobs. Third, through private-public partnership, the government and the private sector can collaborate for the same purpose.

iii. Findings from this study also show that, firms whose workers had a higher level of education were able to attain higher levels of labour productivity, which has contributed to higher firm growth in terms of value of products and investment. It is therefore recommended that, employers should aim at raising labour productivity within their firms by either hiring trained and skilled workers for agro-processing activities from the labour market or by providing on the job training to their employees in order to improve their knowledge and agro-processing skills for activities they are responsible, thereby ensuring good quality products.

iv. Furthermore, several factors were found to limit the growth of agro-processing firms. These include; (i) low quality of raw-materials (ii) low supply of raw-materials and (iii) high cost of energy. To improve the situation requires coordinated efforts from various stakeholders. First, quality regulatory bodies should ensure that they monitor quality of inputs for agricultural production and outputs and take measures when standards for inputs are violated. Second, service providers such as government extension services, NGOs and private sector should improve service delivery so that farmers increase the quantity of agricultural products to meet the requirements of processors and consumers in the market. Farmers should also be trained to produce high quality products. This will help them not only meet the

quality standards but also to fetch high market price for their products. Third, the government should allocate more resources for improving rural infrastructures such as rural roads in order to reduce the cost of processing in rural areas. This will increase employment opportunities in rural areas.

v. The study established that compliance to quality standards was low among agro-processing firms. Firms that were aware found the cost of compliance too high. In some cases they did not know how to comply or where to get information regarding compliance procedures. A small proportion of respondents were not aware at all that they had to comply with quality standards. To address the problem of low compliance to quality standards, it is recommended that the government through relevant organization, including, TFDA, TBS, MITM and others should develop innovative ways to raise awareness among processors as well as consumers. In additional TFDA and TBS should conduct regular training in order to raise compliance, hence the quality of processed products from Tanzania. This will place Tanzania products in a better position to compete in the local market as well as other export markets. In addition TFDA and TBS should organize regular visits to agro-processing firms not only for inspection but also for education and guidance.

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APPENDICES

Appendix 1: Sampling frame of Small agro-processing firms in Mbeya and Morogoro

Year / Firms	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
Mbeya											
Milling firms	24	30	32	23	35	43	42	45	41	39	354
Cooking oil	4	5	7	6	9	11	13	9	8	7	79
Bakeries	1	1	0	0	1	1	0	0	1	0	5
Animal feeds	1	0	1	1	0	1	0	1	1	0	6
Milk firms	1	1	0	1	0	1	1	0	2	1	8
Sub. Total	31	37	40	31	45	57	56	55	53	47	452
Morogoro											
Milling Firms	22	26	37	36	37	44	50	40	43	39	374
Cooking oil	1	2	1	2	3	2	3	4	3	3	24
Bakeries	1	0	0	1	1	0	0	2	1	0	6
Animal feeds	0	0	0	0	1	0	0	1	0	0	2
Milk firms	0	0	0	0	0	1	0	1	0	0	2
Sub. Total	24	28	38	39	42	47	53	48	47	42	408
Total	**55**	**65**	**78**	**70**	**87**	**104**	**109**	**103**	**100**	**89**	**860**

Source: TRA, and Districts Council

Appendix 2: Number of workers employed in agro-processing firms from 1990-2005

Employment size / Types of firms	<49	50-99	100-499	>=500	Total
Processing and preserving fish and Similar products	89	228	1 594	1 967	3 878
Processing vegetable oils and fats	435	447	225	0	1 107
Milling grains products	825	321	280	779	2 205
Other food products	831	1 046	3 336	31 128	36 341
Beverages and tobacco	501	326	2 238	9 528	12 593
Textiles and leather products	377	440	2 490	10 123	13 430
Woods and other products	264	0	901	1 476	2 641
Total	**33 22**	**2 808**	**11 064**	**55 001**	**72 195**

Source: Annual survey of Industrial (National Bureau of statistics) 2008

Appendix 3: Labour Productivity per Worker per year in Agro-processing Firms of Developing Countries

Country	Labour Productivity in USD
South Africa	14 000
Senegal	6 000
China	5 800
Kenya	5 000
India	4 800
Lesotho	3 000
Tanzania	3 000
Mozambique	500

Source: World Bank 2007.

Appendix 4: Overall Tanzania production of agro-products in tonnes 2002-2011

Year	Maize	Rice	Sunflower	Milk
2002	4 408 420	984 615	180 000	900 500
2003	2 613 970	1 096 920	194 000	1 386 400
2004	4 651 370	1 058 460	200 000	1 386 400
2005	3 131 610	1 167 690	220 000	1 386 400
2006	3 423 020	1 206 150	250 000	1 412 790
2007	3 659 000	1 341 850	239 000	1 422 210
2008	5 440 710	1 420 570	305 000	1 500 000
2009	3 326 200	1 334 800	304 730	1 604 130
2010	4 733 070	2 650 120	313 110	1 650 000
2011	4 340 820	2 248 320	786 902	1 650 000

Source: FAO Statistics Division 2012

Appendix 5: Average number of employment created per firm 2002-2011

Year	Animal feed	Bakeries	Maize Flour	Milk	Rice	Sunflower
2002	3	21	4	6	5	4
2003	5	23	2	6	9	4
2004	2	22	4	7	10	5
2005	4	17	3	9	10	4
2006	4	15	2	9	8	5
2007	2	16	3	10	12	6
2008	5	10	5	11	11	8
2009	4	15	1	8	12	5
2010	6	16	2	11	16	6
2011	4	17	3	12	18	9

Source: TRA, SIDO and Districts Council

Appendix 6: Variables specified in human capital factors affecting labour productivity in agro-processing firms' model

Variable	Definition
Location (Urban =1 or otherwise)	If a firm is located in urban area was expected to have a positive coefficient due to accessibility of raw-materials, energy and other social economic services.
Ratio capita (ratio of capital per worker)	The amount of capital added for investment per worker per year was expected to improve labour productivity
Managers education level (number of years) dummy variables	It was expected that better educated manager would improve results in labour productivity. This variable was represented by two dummies including: (i) managers with form four education and above (ii) with education below form four.
Manager's attendance of training. (attended =1 or otherwise	If the manager attended training in agro-processing activities was expected to improve labour productivity thus a positive sign than the one who was not attended training.
(Number of workers below form four educations).	The number of workers with less education was expected to bring negative results in labour productivity because are not efficient in work because they are difficult to train them.
Number of workers with above form four education	The number of workers above form four education was expected to bring positive results because they are efficient in work and they are trainable.
Number of workers with experience below one year	By having a large number of workers with low experience (below one year) were expected to bring negative results. It is assumed that workers with low experience lead to low efficiency.
Number of workers with experience above of one year	Having a large number of workers with more experience was expected to bring positive results. It is assumed that having workers with high experience leads to high efficiency.
Average wage per worker	Increasing wage per worker was expected to have a positive impact on labour productivity.
Managers with working experience (number of years working in processing activities) dummy variables	It is assumed that as experience increases the firms productivity would increase. Thus positive sign. This variable was represented by dummy variables; experience below one year, experience above one year to three years and experience above three years.
Sex(female managers=1or otherwise)	The sex of manager was also important factor for determining labour productivity. Positive coefficient was expected since the performance of women is often affected by more other social activities than men.

Appendix 7: Variables specified in factors affecting value growth of agro-processed products model

Variable	Definition
Average labour productivity	Increase of efficiency was expected to bring positive impact in value of processed products
Value of raw-materials in Tshs	The increase of value of raw-materials was expected to bring positive results to value of processed products
Number of years in operation	The increase of years in operation was expected to bring positive result due to experience and investment
Value of capital invested	The amount of capital invested was expected to bring positive and adding value to processed products
Cost of energy	Increase of energy cost was expected to bring negative impact of value of processed products
Status of operation	A firm that operates frequently was expected to process products with more value than the one operated infrequently
Manager's Ownership of a firm Owned by a manager = 1 or otherwise	A firm managed by owner was expected to bring more value than managed by others

Appendix 8: Multicollinearity diagnostic result for factor affecting labour productivity

Before dropping Two variables

Variables	CI	VIF
Location of a firm if is in urban area	2.377	1.152
Manager's educ. above form 4	2.635	1.185
Trained managers in processing pro.	2.772	1.271
Workers with experience below 1 yr	2.986	1.829
Workers with experience above 1 yr	3.065	1.570
Average wage per worker	3.488	1.194
Workers with educ. below form four	3.848	1.737
Workers with educ. above form four	4.272	1.277
Ratio of capital added per worker	5.401	1.378
Manager's experience above 1 yr	6.066	1.129
I a firm's manager is a male	3.875	1.140
number of workers trained on the job	52.846	1.099
the number of workers not trained	104.623	1.133
Model mean	**15.250**	**1.554**

After dropping Two variables causing Multicollinearity

Variable	CI	VIF
Location of a firm if is in urban area	2.377	1.152
Manager's educ. above form 4	2.635	1.185
Trained managers in processing pro.	2.772	1.271
Workers with experience below 1 yr	2.986	1.829
Workers with experience above 1 yr	3.065	1.570
Average wage per worker	3.488	1.194
Workers with educ. below form four	3.848	1.737
Workers with educ. above form four	4.272	1.277
Ratio of capital added per worker	5.401	1.378
Manager's experience above 1 yr	6.066	1.129
I a firm's manager is a male	3.875	1.140
Model mean	**3.708**	**1.351**

Appendix 9: Multicollinearity diagnostic result for factor affecting growth of firms

Before dropping Two variables

Explanatory variables	VIF	CI
Constant		1
Labour productivity	2.4880258	1.440969
Value of raw-materials	3.988727	12.733416
Number of years firm in operation	2.2678445	2.077261
Capital invested per firm	3.4536143	12.294033
Cost of energy	2.1880345	2.732079
If a firm operated infrequently	2.3781792	3.712984
If a firm was not managed by owner	1.9472486	4.398256
Modern machines	5.4140946	51.83395
Using hired transport	7.360246	103.3326
Model mean	**3.4984461**	**19.28394**

After dropping Two variables causing Multicollinearity

Explanatory variables	**VIF**	**CI**
Constant		1
Labour productivity	1.1769275	3.106294
Value of raw-materials	1.1643622	2.160878
Number of years firm in operation	1.1846709	1.333768
Capital invested per firm	1.0305319	1.560443
Cost of energy	1.2297554	1.671845
If a firm operated infrequently	1.0821414	4.30804
If a firm was not managed by owner	1.0603088	1.861591
Model mean	**1.1326712**	**2.286123**

Appendix 10: Questionnaires for Management of Agro-Processing Industries

Name of firm.....

Dear respondents, I'm conducting a study leading to the award of a higher degree (PhD) at Department of agricultural Economics and Agribusiness of Sokoine University of Agriculture. I'm requesting to respond to the questions in this document. The information you provide will avail our national as well as different institutions with important to be used to influence national policies to promote small agro-processing industries as well as reducing unemployment problem. I strongly urge you therefore; please assist the research team in compiling the necessary data. I assure you that your answer will only be used for a framework of this study. YOUR INFORMATION WILL BE TREATED STRICTLY CONFIDENTIALLY. Please attach any relevant documents available. Circle the number against the appropriate answers in cases where these choices 1,2,3,4 and 5 are provided and put ($\vee$) to the provided spaces in different tables. In cases where space is provided, write your answer in that space.

A. Background Information

(i). Interviewing date.....Region.....
(ii).Division.....Ward.....
(iii). Village or Street.....
(iv). Location of a firm .1= urban 2 = Per urban 3 = Rural (circle the appropriate)
(v). Gender 1= male 2=Female (circle the appropriate)
(vi). Type of firm (Tick the appropriate Part)

S/N	Type of firm	Response
1	Proprietorship	
2	Company	
3	Individual owned	

(vii). Level of education attained by respondent (Tick the appropriate Part)

S/N	Level of education of respondent	Response
1	None	
2	Primary school	
3	Secondary School	
4	Diploma	
5	Degree	
6	Others specify	

(viii). Year of firm establishment……

(ix). How long have you been working in this processing industry

S/N	Time	Number of (wks/months/years)
1	Week(s)	
2	Month(s)	
3	Year (s)	

(x). Occupation(Tick the appropriate Part)

S/N	Time	Response
1	Owner of a firm	
2	Top management	
3	Middle level of management	
4	Lower level of management	

(xi). Have you attended any kind of training concerning operations, maintenance of machines and processing the products?1= Yes 2= No (circle the appropriate)

(xii).If yes indicate the community or organization provided training……

(xiii). If yes indicate the number of (weeks/months/years) of attendance

S/N	Time	Time of Training
1	Week(s)	
2	Month(s)	
3	Year (s)	

(xiv). What types of skills do you think your employees need training at most (Tick the appropriate Part)

S/N	Skills needed	Response
1	Processing skills	
2	Management skills	
3	Financial management skills	
4	Entrepreneurship skills	

(xv). What are barriers your workers face in accessing training

S/N	Barriers for training	Rank
1	High training cost	
2	Lack of transportation	
3	Training not offered at a convenient time	
4	Training not available locally	
5	Shortage of training manpower	
6	Others (specify)	

(xvi). How much are you being paid?

S/N	Time	Tshs
1	Day(s)	
2	Week(s)	
3	Month(s)	
	Year (s)	

(xvii). What is the status of firm operation 1=through out a year 2 = infrequent

(xviii). If the answer is 2 (infrequent) then mention the causes of infrequently

……

……

……

B: Small agro-processing industries and employment creation

(i) Indicate the number of workers according to level of education

S/N	**Level of Education**	**Number of employees**
1	None	
2	STD seven	
3	Form Four	
4	Form six	
5	Diploma	
6	Degree	
7	Above all	

(ii) Indicate the number of workers according to agro-processing skills

S/N	**Status of Skills**	**Number of employees**
1	Trained in specific training collage	
2	Trained in short course	
3	On job training	
4	Not trained	

(iii) Indicate the number of workers according to the working time in this field (experience)

S/N	**Number of years worked in agro-processing**	**Number of employees**
1	Below 1 year	
2	Above 1- 4 years	
3	Above 4years	

(iv) Please indicate the number of all worker in a firm with type of employment

S/N	**Status of Employment**	**Male**	**Female**	**Total number**
1	Temporary			
2	Full time			
3	Part time			
4	Daily paid			
5	Seasonal			

C: Performance of labour productivity of small agro-processing firms

(i) Indicate the main processed products in your firm

1.....

2.....

3.....

4.....

5……

(ii) Indicate the production capacity of your firm for the products indicated in (i)

Type of product	**Processed products during Harvesting season (Kg, Litre & Tones)**			**Processed products during off season (Kg, Litre & Tones)**			**Annual average total capacity**
	Daily	**Weekly**	**Monthly**	**Daily**	**Weekly**	**Monthly**	

(iii)Is a firm operating below its capacity 1= Yes 2= No

(iv)If no give reasons (by putting tick to the appropriate reason)

S/N	**Reason**	**Response**
1	Lack of working capital	
2	Shortage of labours	
3	Lack of raw-materials	
4	Shortage of power	
5	Expensiveness of power	
6	lack of market	
7	Shortage of spear parts	
8	others (specify)	

(v) Please indicate the average/actual quantity of products processed and prices obtained for the last five years.

S/N	**Year**	**Type of product**	**Quantity of processed products (Kg, Litre & Tones)**			**Price of processed products (Kg, Litre & Tones)**		
			Harvest season	**Off season**	**Total**	**Harvest season**	**Off season**	**Total price**
1	2011							
2	2010							
3	2009							
4	2008							
5	2007							
6	2006							

(vi)Please indicate the value of raw- materials processed

Type of Raw material	**Quantity of raw-material processed (Kg, Litre & Tones)**			**Price of raw-material processed (Tshs)**		
	Harvest season	**Off season**	**Total**	**Harvest season**	**Off season**	**Total price**

C: Factors that have caused variation in the production growth of small agro-based firms

Part I: Financing a firm.

(i). How much capital did you use to start this firm ……

(ii).How did you get the start up capital (Tick the appropriate Part)

S/N	**Source of capital**	**Response**
1	Family contribution	
2	Friends	
3	Personal savings	
4	Bank loan	
5	Money lenders	

(iii). What is the current value of you firm? ……..

(iv). Do you plan to expand the production of your products in future 1=yes 2= No(circle the appropriate)

(v).If yes indicate how you are going to finance the firm (Tick the appropriate Part).

S/N	**Source of finance**	**Response**
1	Family contribution	
2	Friends	
3	Personal savings	
4	Bank loan	
5	Money lenders	
6	Profit	

(vi). If yes indicate the reasons for expansion (Tick the appropriate Part)

S/N	**Reason for expansion**	**Response**
1	Increased demand of products	
2	Support from stakeholders (specify)	
3	Availability of raw materials	
4	availability of packaging material	
5	Due to increase of profit (specify)	
6	others (specify	

(vii).If No in (vi) give reason (Tick the appropriate Part)

S/N	Reasons for not expanding	Response
1	Lack of market	
2	High cost of production	
3	Lack of credit facilities	
4	Strong competition due to imported products	
5	Very high tax rate	
6	The by-laws hampers the expansions	
7	Lack of support from government and other stakeholders	
8	Others specify	

(viii). Indicate the cost of running firms

S/N	Item	Tshs
1	Cost of production	
2	Tax rate	

Part II: Power Processing Costs

(i). Is the processing power affordable 1=yes 2= No (circle the appropriate)

(ii).How much do you pay for processing power?

Type of energy	Price for power used in processing (Tshs)			
	Daily	Weekly	Monthly	Yearly
Diesel				
Electricity				

Part III: Raw-materials

(i)What is a source of raw materials for processing the products (Tick the appropriate Part)

S/N	Source of raw-Materials	Response
1	Being brought by suppliers	
2	Buying directly from the farmers	
3	Imported	
4	Others (specify).	

(ii) Why do you prefer that source? (Tick the appropriate Part)

S/N	Source of raw-Materials	Response
1	Easily available at right time	
2	Easily available at right place	
3	Good quality	
4	Affordable	

(iii) Please indicate the average/actual quantity raw materials processed and prices for each year.

S/N	Year	Type of raw materials	Quantity of processed products (Kg, Litre & Tones)			Price of raw-material processed (Tshs)		
			Harvest season	Off season	Total	Harvest season	Off season	Total price
1	2011							
2	2010							
3	2009							
4	2008							
5	2007							
6	2006							

Part IV: Marketing of agro-processed products

(i). Who are your major customers of the processed products(Tick the appropriate Part)

S/N	Customers	Response
1	Local buyer	
2	Whole sellers	
3	Company	

(ii). Do you have an contracts with your product customers 1=yes 2= No (circle the appropriate)

(iii). If yes how long have you operated by contracting with your product customers .....years.

(iv). Has the number of customers increased, decreased or remained the same during the past 6 years

S/N	Change of customers	Number of customers Increases/decreases
1	Increased	
2	Remained the same	
3	Decreased	
4	Fluctuating	
5	Others	

(v). Give reasons for answer in item.....

(vi). Are the processed products competes with other products 1= yes 2 = No

(vii).If yes (iv) which products competes with your products

1……..

2…….

3……

(viii).If No in (v) indicate the reasons 1= poor quality of the processed product 2 = poor marketing strategy 3= Poor packaging 4 = Customers thinks the imported products are better than yours

(ix). Ways of overcoming the competition challenges(Tick the appropriate Part)

S/N	**Ways of overcoming challenges**	**Response**
1	Reducing price of products	
2	Producing high quality of processed products	
3	Producing cheapest products	
4	Promoting and advertising	
5	Others (specify)	

(x). How do you get information regarding market price of your products(Tick the appropriate Part)

S/N	**Means of Getting price Information**	**Response**
1	Direct visit to the market	
2	Cross check with many middlemen	
3	Hear from neighbours and friends	
4	Hear from mass media	

(xi). What major factors did you consider when setting your products' price (Tick the appropriate Part)

S/N	**Factors to decide selling products**	**Response**
1	Price determined by a market	
2	Cost of producing the products	
3	Others (specify)	

(xii).Are the sales increasing, decreasing or remaining the same for each of the following markets

Type of market	**Type of Product**	**Seasons**	
		Harvest season	Off season

Option 1= Increasing 2= decreasing 3= remain the same 4= Fluctuating 5= others (specify).....

(xiii).How do you deliver your products (Tick the appropriate Part)

S/N	**Means of Delivering Products**	**Response**
1	Own transport	
2	Hired transport	
3	None of the above	
4	others (specify)	

(xiv). State the effectiveness and/or efficient of the delivery mode mentioned in (Tick the appropriate Part)

S/N	Effectiveness and Efficiency of delivering means	Response
1	Very effective/efficient	
2	Moderate	
3	Not effective/efficient	
4	others (specify)	

(xv). If not effective/efficient, propose the alternative solutions to be put in place in order to overcome the prevailing situation.....

(xvi). How much do you pay the following items when marketing your product?

Item	Average amount in Tshs per season		
	Harvest season	Off season	Annual average
Transport facilities			
Loading and unloading			
Storage			
Packaging			
Government levy and others taxes			
Miscellaneous costs			

(xvii). Do you advertise /or promote your products? 1=yes 2= No (circle the appropriate)

(xviii). What is frequency of advertisement /or sales promotion per season

Seasons	Response	Reasons
Harvest season		
Off season		
Total		

1= one time 2= two times 3= Three times 4= More than three times 5= Not advertising

(xix). Which specific role have you played within value added commodity chain in marketing systems? (Tick the appropriate Part)

S/N	The specific role in value added commodity chain	Response
1	Buying raw material from farmer and processing	
2	Processing and selling to trader	
3	processing and distributing the products to various customers	
4	all of the above	
5	others (specify)	

(xx). Are there any potential markets for your products which a firm has not yet exploited? 1=yes 2= No (circle the appropriate)

(xxi). If yes specify the potential……..

Part V: Quality of products

(i) Are the processed products meets standards of TFDA and tbs 1= Yes 2 = No (circle the appropriate)

(ii) If No in (vi) why you do not follow these standards (Tick the appropriate Part)

S/N	TFDA and tbs Standards	Response
1	Expensive to meet them	
2	I don't know the standards to be met	
3	I don't have knowledge of fixing these standards	

(iii) What quality attributes do you observe during processing the products? (Tick the appropriate Part)

Quality attributes (product feature)	Response
Taste	
Freshness	
Shelf life	
Texture	
Economy	
Nutritional factor	
Colour	
Flavour	

(iv) Are the processed products stored before sold 1= Yes 2 = No (circle the appropriate)

(v) If yes indicate the storage facilities

Type of product	Method used	Storage facility
1.		
2.		
3.		
4.		
5.		

Part VI: Processing Technology

(i) What types of machine do you use in processing products?

S/N	Model of machines needed	Response
1	Locally made	
2	Improved machines	
3	Modern machines	

(ii) Are the machines used in processing the products satisfying the demand? 1= Yes 2 = No (circle the appropriate)

(iii) If No What kind of machines do you think are needed for processing the products(Tick the appropriate Part)

S/N	Types of processing machine	Response
1	Locally made	
2	Improved machines	
3	Modern machines	

(iv) Do you pack your products? 1= Yes 2 = No (circle the appropriate)

(v) If no in (iv) give reasons……

(vi) If yes what kind of materials do you use to pack the products (Tick the appropriate Part)

S/N	Types of Packing Materials	Response
1	Local materials	
2	Material from local firms	
3	Imported materials	

(vii) Do you receive technical advice? 1= Yes 2 = No (circle the appropriate)

(viii)If yes who provide this advice.....

(ix)Comments on usefulness of technical advice obtained. (Tick the appropriate Part)

S/N	Types of Packing Materials	Response
1	Very useful	
2	Not useful	
3	I don't know	

Part VII: Problems in agro-processing products

(i) Which are the most serious problems you face in carrying processing activities

S/N	Problem	Rank from higher as 1 to the last
1	Government policy	
2	Marketing system	
3	Source of capital	
4	Personal problems	
5	Poor technology	
6	Availability of raw materials	
7	Power costs	

(ii) Problems related to government policy

S/N	Problem	Rank from higher as 1 to the last
1	Unnecessary by laws formulated by local government	
2	Very high tax rate	
3	Lack of government efforts to improve good quality of products	
4	Failure to protect locally processed products	
5	Difficult to obtain license	

(iii) Problems relating to marketing system

S/N	Problem	Rank from higher as 1 to the last
1	Poorly processed products	
2	Poor infrastructure facilities such as transport	
3	Poor quality of locally processed products	
4	locally processed products are expensive	
5	lack of sales promotion and advertisement	

(iv) Problem associated with source of capital

S/N	Problem	Rank from higher as 1 to the last
1	Lack of credit facilities	
2	High interest rates of loans	
3	Bureaucracy in obtaining credit facilities	
4	Conditionality's tied with loan are not easily met	

(v) Problems related to personal issues

S/N	Problem	Rank from higher as 1 to the last
1	Lack of working capital	
2	Lack of processing skills	
3	Lack of processing experience	
4	Limited labour forces	
5	Others (specify)	

(vi) Problems associated with Poor technology.

S/N	Problem	Rank from higher as 1 to the last
1	Lack of improved appropriate processing technology	
2	Lack of appropriate packaging materials	
3	Expensiveness of processing machines	
4	Loss of products due to poor processing technology	

(vii) Please indicate the status of availability of raw materials

S/N	Problem	Rank from higher as 1 to the last
1	Raw- materials are expensive	
2	Raw materials are not enough to satisfy demand	
3	Raw materials are in poor quality	
4	None	

(vii) Please indicate the status of power costs

S/N	Problem	Rank from higher as 1 to the last
1	Are expensive	
2	Moderate	
3	Cheaper	
4	None	

(viii)Please indicate the route cause and possible solution for the most critical problem listed (i).

Problem	Route causes	Possible solution
Government policy		
Marketing system		
Source of capital		
Personal problems		
Poor technology		
Availability of raw materials		
Power costs		

(viii) How important of opportunities listed below to your firm as current opportunities and/or challenges. Please, rank them in order of importance (1, 2, 3 ....,)

S/N	Reasons	Rank
1	New products/services	
2	Expansion of markets/customers	
3	Training and upgrading skills/abilities for employees	
4	Added value business opportunities	
5	Improved service delivery	
6	Improved quality of products	
7	Gaining market intelligence	
8	Investment in new technologies	

Appendix 11: Questionnaires for Workers of Agro-Processing firms

Name of firm.....

Dear respondents, I'm conducting a study leading to the award of a higher degree (PhD) at Department of agricultural Economics and Agribusiness of Sokoine University of Agriculture. I'm requesting to respond to the questions in this document. The information you provide will avail our national as well as different institutions with important to be used to influence national policies to promote small agro-processing firms as well as reducing unemployment problem. I strongly urge you therefore; please assist the research team in compiling the necessary data. I assure you that your answer will only be used for a framework of this study. YOUR INFORMATION WILL BE TREATED STRICTLY CONFIDENTIALLY. Please attach any relevant documents available. Circle the number against the appropriate answers in cases where these choices 1,2,3,4 and 5 are provided and put ($\vee$) to the provided spaces in different tables. In cases where space is provided, write your answer in that space.

Part: I Background Information

(xix). Date.....Region.....
(xx). Division.....Ward.....
(xxi). Village or Street.....
(xxii). Gender 1= male 2=Female (circle the appropriate)

(xxiii). Level of education attained by respondent (Tick the appropriate Part)

S/N	Level of education of respondent	Response
1	None	
2	Primary school	
3	Secondary School	
4	Diploma	
5	Degree	
6	Others specify	

(xxiv). Age of respondents .....(years)

(xxv). Marital status (Tick the appropriate Part)

S/N	Marital status	Response
1	Married	
2	Single	
3	Separated	
4	Widow	

Part II: Experience and Production activities

(i). Job status (Tick the appropriate Part)

S/N	Job status	Response
1	Full time	
2	Part time	
3	Daily pay	
4	None	

(ii).How long have you been working in this processing firms

S/N	Time	Number
1	Week(s)	
2	Month(s)	
3	Year (s)	

(iii). How much are you being paid

S/N	Time	Tshs
1	Day(s)	
2	Week(s)	
3	Month(s)	
4	Year (s)	

(iv). Do you have technical knowledge relating to the agro-processing of products 1 = yes 2= No (circle the appropriate)

(v). If yes in (vii) How did you get this knowledge (Tick the appropriate Part)

S/N	Time	Response
1	Formal training	
2	Informal training	
3	Trial and error	
4	None	

(vi). Have you attended any kind of training in processing the products?1= Yes 2= No (circle)

(vii). If yes indicate the number of (weeks/months/years) of attendance

S/N	Time	Time of Training
1	Week(s)	
2	Month(s)	
3	Year (s)	

(viii). Indicate whether your firm's working atmosphere is characterized by the following conditions (Tick the appropriate Part)

S/N	Working condition	Response
1	Long hours (specify)	
2	Harassment from management	
3	Not providing safety gears	
4	Not following government legal and regulations	

(ix). Do you want to change your job? 1 = yes 2= No (circle the appropriate)

(x). If yes in (xvii) what is the reason that makes you wanting to look for another or additional job?

S/N	Reasons	Rank from higher as 1 to the last
1	Insufficient earnings or meager incentives	
2	Does not suit the educational qualification	
3	Short hours	
4	Long hours	
5	Work conditions is not good	
6	Place of work is far from residence	
7	Transportation difficulties	
8	Does not like the present job	
9	Other (specify) ----------	

(xi). Please indicate the number of hours do you work per day

S/N	Working time	Number of hours
1	Per day	

(xii). Comments on usefulness of the processing technology. (Tick the appropriate Part)

S/N	Types of Packing Materials	Response
1	Very useful	
2	Not useful	
3	I don't know	

Part III: Problems in agro-processing products

(ix) Which are the most serious problems you face in carrying processing activities

S/N	Problem	Rank from higher as 1 to the last
1	Firms policy	
2	Safety condition	
3	Small amount of salary	
4	Personal problems	
5	Poor technology	
6	Availability of raw materials	

(x) Problems associated with Poor technology.

S/N	Problem	Rank from higher as 1 to the last
1	Reduces the quality of products	
2	Reduces the quantity of products processed	
3	Harms our health	
4	Loss of products	