ASSESSMENT OF PIGEON PEA EXPORT ORIENTED MARKET IN BABATI AND KARATU DISTRICTS

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ABSTRACT

The objective of this study was to carry out an assessment of pigeon pea export market. Specifically to: (i) identify profitability or gross margins of investing in pigeon pea production for export (ii) evaluate the pricing structure, costs and margins along the pigeon pea value chain (iii) identify the constraints facing different actors within the value chain and (iv) identify the key actors in the pigeon pea export value chain. The average gross margin for pigeon pea was 210 860 Tshs for Babati and 484 630 Tshs for Karatu. Costs, prices and margins received by actors in pigeon pea value chain increased downstream. Traders were incurring high cost as moving downstream. This cost resulted into high prices received by consumers and increased in marketing margins downstream. Collectors had the marketing margin of 1.94% for Babati and 4.04% for Karatu. Retailers had the marketing margin of 12.14% for Babati and 28.74% for Karatu. Wholesalers had the marketing margin of 11.21% for Babati and 29.04% for Karatu. Exporters had the marketing margin of 16.70% for Babati and 41.36 for Karatu. Some costs were not revealed by exporters like Tax/Tanzania Revenue Authority for fear of disclosing their business information. Collectors faced a lot of marketing constraints like price fluctuation, competition with big companies, low price, and poor quality of pigeon pea, lack of market and lack of marketing information, followed by retailers wholesalers and least marketing constraints to exporters. Key actors identified in pigeon pea export oriented value chain includes, input suppliers, farmers, brokers, collectors, wholesalers, retailers, consumers, exporters and processing industries. Input suppliers for pigeon pea in Babati and Karatu were research institution for experimental purposes, Exporting companies who interred contracts with farmers and stockist. These stockist were also exporting companies like Dodoma transport an exporting company found in Arusha and Babati.

DECLARATION

I, SHADRACK JACOB MBAPILA, do hereby declare to the Senate of Sokoine University of Agriculture that this dissertation is my own work and that it has neither been submitted nor being concurrently submitted for degree award in any other institution.

21/11/2013

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The above declaration is confirmed

21/11/2013

Dr. Evelyne Lazaro — Date

Supervisor

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DEDICATION

This work is dedicated to my beloved parents Dr. Mbapila J.C. and Mrs. Mbapila I. L. who laid the foundation of my education.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ABBREVIATIONS

CRS	Catholic Relief Services
ETC	Export Trading Company
FAOSTAT	Food and Agricultural Organization of the United Nations
GCS	Gendi Cooperative Society
GM	Gross Margin
GMA	Gross Margin Analysis
ICRISAT	International Crop Research Institute for Semiarid Tropics
KM	Kilimo Market
MM	Marketing Margin
NBS	National Bureau of Statistics
NGOs	Non Governmental Organizations
NMB	National Microfinance Bank
RAC	Radio Atomic Certificate
SACCOS	Savings and Credit Cooperatives Society
SARI	Selian Agricultural Research Institute
TFA	Tanzania Farmers Associations
TRA	Tanzania Revenue Authority
URT	United Republic of Tanzania
USAID	United States International Development Agency

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information

Pigeon pea (*Cajanus cajan*) is an important legume in the semi-arid regions of Tanzania. The crop offers multiple benefits – protein rich seed (approximately 21% protein), fuel, fodder, fencing material, improved soil fertility and erosion control and it ranks third among the pulses (after beans and cowpea) in total national production (Bekele *et al.*, 2005).

Pigeon pea is a leguminous crop which improves soil fertility through nitrogen fixation, up to 40 kg/ha, soil organic matter through leaf fall and root decomposition, enhances soil physical conditions, and facilitates accessibility of immobile phosphorous. The crop is mostly grown by poor household without the use of fertilizers (Joshi *et al.*, 2001).

1.1.1 Pigeon pea production

In Asia, pigeon pea is grown in an area of 4.33 million ha with a production of 3.8 million tons. India has the largest area (3.38 million ha) followed by Myanmar (580 000 ha), China (150 000 ha) and Nepal (21 360 ha) (ICRISAT, 2012).

In Eastern and Southern Africa, pigeon pea is grown on 0.82 million ha. It is an important crop in Mozambique, Malawi, Tanzania, Kenya and Uganda. Between 1976 and 2009, pigeon pea area increased 2.5 fold (0.23 to 0.82 million ha) and production by 3 fold (0.13 to 0.53 million tons). The crop is grown for home consumption and export (ICRISAT, 2012)

Pigeon pea in Tanzania is intercropped with cereals such as maize, sorghum, and millet. The crop is grown in several parts of the country and Babati is the leading district in pigeon pea production in the country (Rogath, 2010).

According to national agriculture census report (2007/08) a total of 112 362 ha were grown to pigeon pea (Table 1) by a total of 209 299 households. The crops was mostly grown in Manyara region which had the highest planted area (38 404 ha, 34% of the total area planted with pigeon peas) followed by Ruvuma (16 685 ha, 15%), Lindi (15 862 ha, 14%) and Dodoma (13 156 ha, 11%). Similarly, the highest number of households involved in pigeon pea production were 46 171 in Manyara, followed by 40 405 Lindi and 25 913 Mtwara.

Table 1: Pigeon pea Area planted, Quantity harvested and Yield in Tanzania

Crop	Total area planted (ha)	Area harvested (ha)	Quantity Harvested (tons)	Yield (tons/ha)
Pigeon pea	112 362	78 228	44 942	0.57

Source: Tanzania Agriculture Sample Census report, 2007/2008.

1.1.2 Pigeon pea marketing

The major market of pigeon pea grown in Tanzania is India, Kenya, Europe and other Asian countries. Tanzania is one among the biggest exporters of the crop followed by Malawi; pigeon pea is the diet of approximately 1.1 billion people in the world (Rogath, 2010).

The principal importer and consumer of pigeon pea in Europe is the United Kingdom, owing to its large population of people of Indian and Caribbean descent. Market research

in Europe indicated a significant niche market for high quality grain with pigeon peas grown in northern Tanzania being recognized by European buyers because of its favoured bold cream-coloured grain (Jones, *et al.*, 2002).

Tanzania exports mainly to India are considered the best in Africa by buyers supplying the Indian market, particularly due to their purity of color, by manufacturers working within the Indian market. Tanzania exports significant amounts of pigeon pea to India each year. Estimates for 2011 export levels imply an increase of 80 000 and 85 000 MTs (USAID, 2012).

1.2 Problem Statement and Justification

The functioning of marketing system in pigeon pea is characterized by high transaction cost and lack of coordination along the product value chain (Rogath, 2010). Currently pigeon pea enjoys limited institutional support (credit, extension, organization and agro-dealers) and research because it is not one of the highly ranked crops by the government, for example. The government put more emphasis on major food crops like maize, rice and major cash crops like coffee, tobacco, cotton and sisal. Several studies were done on pigeon pea value chain, Muricho, (2002) has done a study on impact of transaction costs on the marketing channels of dry grain pigeon pea. Rogath, (2010) has done as study on analysis of value chain for pigeon pea in Tanzania. Shiferaw, *et al.* (2008) have done a study on unlocking the potential of high-value legumes in the semi-arid regions: analysis of the pigeon pea value chains in Kenya. None of these studies had clear focus on the export market for pigeon pea particularly in Tanzania. Pigeon pea could help as the cash income to smallholder farmers with little capital and improve their livelihoods in rural areas; therefore this study aims at assessing the export market of pigeon pea for smallholder farmers in Babati and Karatu district. The main focus will be on identifying

institutions and their roles facilitating supply of pigeon peas for export market. Findings of this study will help policy makers and institutions develop strategies for improvement.

1.3 Research Objectives

1.3.1 The main objective

The main objective of the research is to assess pigeon pea export oriented market.

1.3.2 Specific objectives

(i) To identify profitability/gross margins of investing in pigeon pea production for export.

(ii) To evaluate the pricing structure, costs and margins along the pigeon pea value chain.

(iii) To identify the constraints facing different actors within the value chain.

(iv) To identify the key actors in the pigeon pea export oriented market value chain.

1.4 Research Hypothesis

(i) Farmers with high profitability/ gross margins, access to extension services, and large areas are likely to involve/invest in pigeon pea production for export.

(ii) Prices and costs are related to marketing margins different actors receive in the value chain for pigeon pea export oriented market.

(iii) The constraints different actors' faces are related to requirement of export market for pigeon pea.

(iv) The number of actors in the pigeon pea export oriented market is related to the good prices farmers receive in the value chain.

1.5 Organization of the Study

This dissertation is organized into five chapters including the introduction. Chapter two is the literature review. Chapter three describes the theory and methodological framework. Chapter four gives the major findings and discussion of the study. Finally, chapter five evaluates and presents the overview comments of the study and recommendation.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Pigeon Pea Production in the World

Pigeon pea ranks sixth among pulses production in the world and is a major legume crop. Average world production of pigeon pea during the period 2000-05 was 3.00 million tones. The area under cultivation (4.5 million hectares) is stagnant. Pigeon pea accounts for 20 per cent of the total output of all pulses. India accounts for 90 per cent of world output with an area of 3.23 million hectares and production of 2.37 million tons of grains (Sidram, 2008).

2.2 Pigeon pea market in Africa

Pigeon pea is mostly consumed locally, with limited amounts entering international trade, and trade statistics are hardly available. Occasional export demand may boost cultivation. In Malawi and Kenya an estimated 65% of the pigeon pea production in 1996–98 was consumed at, 10% traded on the domestic market, and 25% exported. For Tanzania these amounts were 35%, 10% and 55%, respectively. By far the most important export market is India, followed by the Middle East. In the Indian market African pigeon pea has to compete mainly with pigeon pea from Myanmar Canada and France. Pigeon pea is widely, but often informally, traded within Africa, for instance between Mozambique and Malawi and between Tanzania and Kenya. In northern Tanzania most of the pigeon pea produced is sold in Kenya, where it is very popular among the Indian community (Van der Maesen, 2006). When there is a production shortfall in Kenya, Kenyan traders travel to Babati District in northern Tanzania to purchase whole pigeon peas from rural assemblers, these are processed into dhal by Kenyan millers both for domestic and export markets (Jones, *et al.*, 2002).

2.3 Pigeon pea market in Tanzania

Pigeon pea is a tradable crop both in local and international markets. Smallholder farmers market a substantial portion of the annual produce to meet their cash requirements. Tanzania is one of the major growers and exporters of the crop in the region. Tanzania exports between (30–40) thousand tones/year to India (Asfaw, *et al.*, 2008). Table 2 two shows, production, yield and export data for Tanzania as compiled by Bekele, *et al.* (2007).

Table 2: Area, Production, yield and exports of pigeon pea in Tanzania

Year	Area (1000ha)	Production (1000t)	Yield (t/ha)	Exports (1000t)
1992/93	55	38	0.69	23.39
1993/94	50	34	0.68	22.80
1994/95	60	42	0.70	27.69
1995/96	79	55	0.70	34.61
1996/97	60	41	0.68	25.69
1997/98	65	45	0.69	27.13
1998/99	65	47	0.72	28.58
1999/00	66	47	0.71	29.41
2000/01	66	47	0.71	30.29

Estimates compiled from various sources (this data was not available from FAOSTAT)

Source: Bekele, *et al.*, (2007).

According to (Asfaw, *et al.*, 2008). There is also growing processing and value-adding industry that would allow the country to export de-hulled split pea (*dhal*) to the Far East, Europe, and America.

2.4 Marketing Margins and Gross Margin

2.4.1 Marketing margin

According to (Kähkönen and Leathers, 1999) Marketing margins are the difference in prices at two different points in the marketing chain. A commonly reported marketing margin is the farm-to-retail spread, which measures the difference between the retail

price and the farm gate price for a commodity. Marketing margins are a typical way of measuring marketing efficiencies.

At each intermediary level, it is the difference between the prices received on resale and the purchase price. Marketing margin reflects the costs and profit of the middlemen, and the costs are incurred mainly in adding utilities of time, form, place and possession (Achike and Anzaku, 2010).

Jones, *et al.* (2002) found the gross marketing margin for pigeon pea for Kenya to be highest for urban retail of dhal followed by retail of dried pigeon peas in supermarkets. In both marketing channels farmers receive the lowest share of final consumer prices while urban processors receive the highest.

2.4.2 Gross margin

The gross margin of a farm activity is the difference between gross income earned and the variable costs incurred (Maro, 2008).A study conducted in Tanzania (Amare, *et al.*, 2011) on Welfare impacts of maize–pigeon pea intensification found that the gross margin for pigeon pea local variety was 562.97 Tshs per ha and 710.13 Tshs per ha on the improved varieties.

2.5 The Value Chain Concept

Conceptually, the value chain approach presents a good picture of the process of creating value; a product is brought to the market through a combination of activities, all of which contribute to its final value (Makoka, 2009). Value chain includes activities such as design of products, production, marketing, distribution and support to the final consumer (Rogath, 2010).

Value chain refers to a vertical alliance or strategic network between a numbers of independent business organizations within a supply chain. It is created when organizations have a shared vision and common goals and formed to meet specific market objectives through satisfying the needs of consumers (Hobbs *et al.*, 2000).

Some people use the terms "supply chain" and "value chain" interchangeably, the term *supply chain* refers to the entire vertical chain of activities: from production on the farm, through processing, distribution, and retailing to the consumer (Hobbs et al., 2000). A study conducted in Tanzania (Rogath, 2010) on analysis of value chain for pigeon pea found three major actors in the pigeon pea business, brokers/traders (these includes, retailers, rural wholesaler and urban wholesalers, assemblers (Rural and Urban) found in both urban and towns and exporters (located mostly in towns).

Another study done in Kenya (Shiferaw, *et al.*, 2007) found that in pigeon pea value chain intermediaries in the rural markets include farmers and a network of assemblers, retail shopkeepers, open-air retailers, and wholesalers who are linked to urban markets through transporters. On the other hand, urban markets consist of wholesalers, processors/exporters, supermarkets, retail shopkeepers and open-air retailers. The large numbers of intermediaries translates into high marketing costs that drive up consumer prices. The two studies indicates more less similar results that pigeon pea is the crop which is transacted/traded with little value added on it only pigeon pea which is sold for export market may be processed into dhal for export.

This study defines value chain as movement of pigeon pea from upstream to downstream with additional values which are the results of final prices received by the end consumers.

The added value being sorting, grading, packaging for export, and storage all of which adds value and prices received by the end consumer.

CHAPTER THREE

3.0METHODOLOGY

3.1 Description of the Study Area

The study was conducted in two districts Babati district in Manyara region and Karatu district in Arusha Region. Babati and Karatu district are among the district which are highly involved in production and marketing of pigeon pea.

3.2 Location of the Study Areas

3.2.1 Babati district

Babati is one of the five districts of Manyara region; the other districts are Kiteto, Simanjiro, Mbulu and Hanang. Babati district share borders with Hanang and Mbulu district to the west, Karatu, Monduli and Ngorongoro district to the north, Simanjiro district to the east and Kondoa district to the south (Bee, 2007). Demographically Babati district has a population of 303 013 (men 156 169 and women 146 844). There are 59 970 households with an average of 5.1 people per household (URT, 2002).

3.2.2 Karatu district

Karatu district is one of the five district of Arusha region. The other districts are Arumeru, Arusha, Ngorongoro and Monduli. It is bordered by the Ngorongoro district to the north, Shinyanga region to the west, Monduli district to the east, and Manyara region to the south and south east. Demographically Karatu district has a population of 178 434 (men 92 895 and women 85 539), there are 33 299 households with an average of 5.4 people per household (URT, 2002).

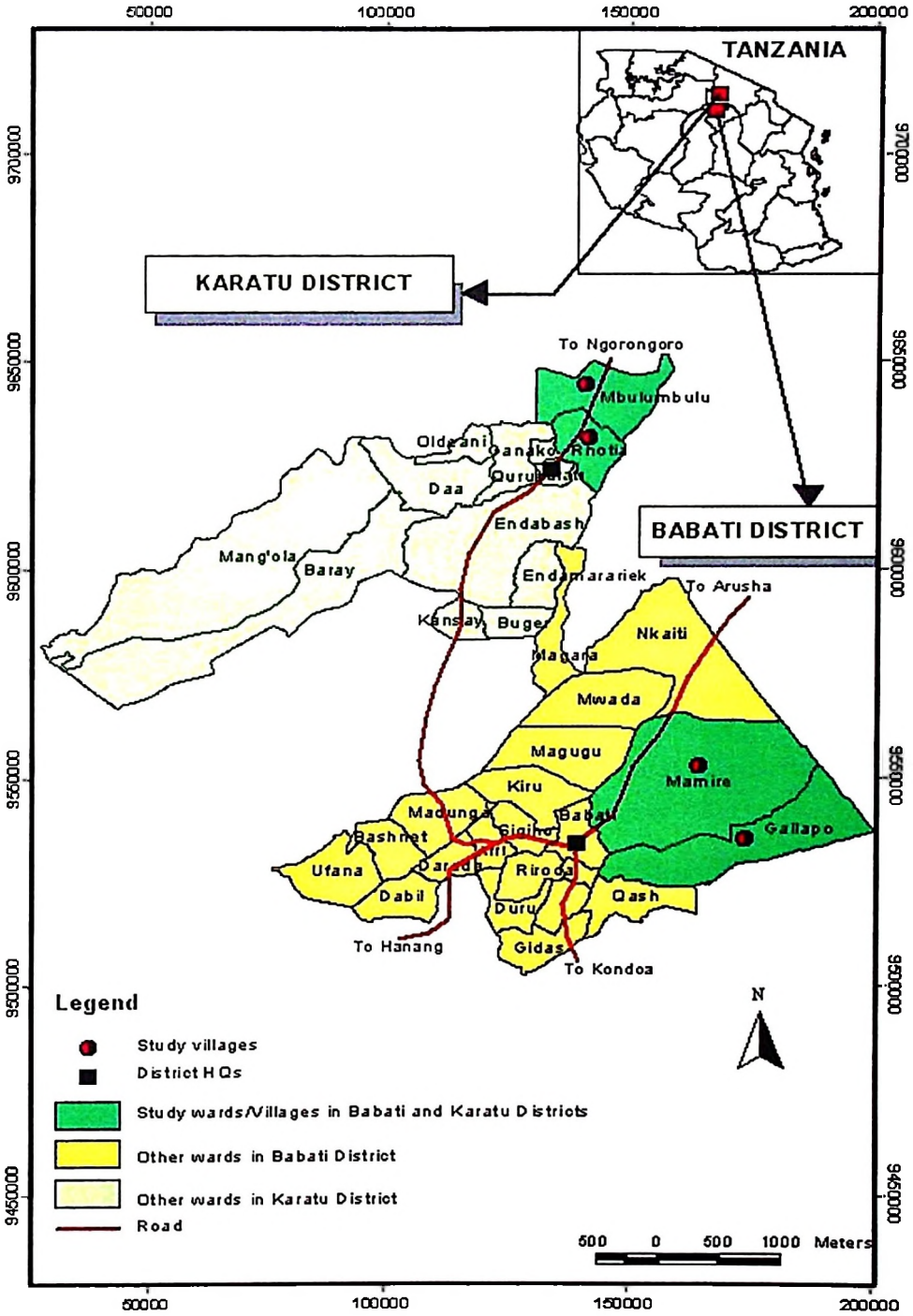

Figure 1: The map of Karatu and Babati district showing study wards and villages.

Source: Ministry of Land, 2002

3.3 The Study Design

This study employed cross-sectional study design as data were collected once from the respondents. However secondary data were also collected from Food and Agricultural Organization (FAO), Agricultural census and Ministry of Agriculture and Food Security (MAFS) on production, yield and area under production.

3.4 Data and Sources

Both primary and secondary data were collected in this study. Primary data were collected using questionnaire by direct interviewing the respondents. Secondary data were collected from records and publication on pigeon pea exports market and production.

3.5 Sampling

Multistage sampling was used to select sample of farmers. Whereas stratified sampling was used to select actors in the district. Stratified sampling was used because trader's population was divided into strata of different actors. Multistage was used to enable get sample from district to villages' level.

Multistage sampling procedures i.e. from each district two wards were selected, from each ward one village was selected and from each village the number of respondents was selected randomly. Sample of 62 pigeon pea farmers in Babati district and 60 pigeon pea farmers in Karatu district (in total 122 farmers) was obtained (Table 3).

Stratified sampling procedure i.e. four strata were obtained that of exporters, wholesalers, retailers and collectors; from each strata un-proportionately number of actors was

selected randomly. Sample of 50 actors in the export oriented market for pigeon pea including collectors, retailers, wholesalers, exporters' was obtained.

Babati district had 12 wards which grows pigeon pea. Out of twelve two wards were selected randomly. For each ward one village was selected randomly, resulting into two villages selected for the district. Two villages were selected since the interview involved pigeon pea farming household head.

Karatu district had 9 wards which grows pigeon pea. Out of nine two wards were selected randomly. For each ward one village was selected randomly, resulting into two villages selected for the district. Two villages were selected since the interview involved pigeon pea farming household head.

Within the same districts and villages, strata of four traders were selected. Wholesalers and exporters who were mostly found in districts towns. Collectors who were mostly found in villages and retailers strata that were found in villages and towns. Four strata were obtained where randomly sample of traders was selected different for each stratum (Table 4).

3.5.1 Sampling frame

The sampling frame was all pigeon pea farming household head in Karatu and Babati districts, Number of all actors in pigeon pea market, wholesalers, retailers and institutions involved, was also obtained from district and village government offices. It was managed to get the number of pigeon pea farming household heads and traders for Karatu district only. Such figures for Babati district were not available.

3.5.2 Sample size

The sample size was determined by using the formula for calculating the infinite population sample since the exact population of farmers and actors was not known specifically for Babati district.

$$n_o = \frac{Z^2 pq}{e^2}$$

Which is valid where n_0 is the sample size, Z^2 is the abscissa of the normal curve that cuts off an area a at the tails (1 - a equals the desired confidence level, e.g., 95%) [1], e is the desired level of precision, p is the estimated proportion of an attribute that is present in the population, and q is 1-p. The value for Z is found in statistical tables which contain the area under the normal curve.

The population of pigeon pea farmers in Babati and Karatu districts was assumed to be not less than 50 000 farmers, since the exact number of pigeon pea farmers and traders was not obtained/known in Babati., according to Israel, (1992) at 10% level of precision desired; the proper sample for the population like this is not less than 100 respondents.

3.5.3 Sampling design

A sample of 62 farmers in Babati and 60 farmers in Karatu was obtained (Table 3), with 31 farmers for each village in Babati and 30 for each village in Karatu. Sample was obtained using multistage sampling.

Table 3: Sample villages and number of respondents

		Sample villages and number of respondents				
		Gallapo	Mamire	Rhotia Kati	Gyekrumlambo	Total
Sample	Babati	31	31	-	-	62
	Karatu	-	-	30	30	60
Total		31	31	30	30	122

3.5.4 Traders interviewed

A sample of traders from different strata was obtained for each district (Table 4). A sample of 20 collectors, 14 retailers, 14 wholesalers and 2 exporters was obtained. This sample considered the large in number for the type of trader, as there are many collectors due to large number in the villages.

Table 4: Type and number of traders interviewed

		Type and number of traders interviewed				
		Collector	Retailer	Wholesaler	Exporter	Total
Market	Babati	-	7	7	1	15
	Karatu	-	7	7	1	15
	Gallapo	5	-	-	-	5
	Mamire	5	-	-	-	5
	Rhotia	5	-	-	-	5
	G/lambo	5	-	-	-	5
Total		20	14	14	2	50

NB: The exporter in Babati had his export office in Arusha, Dar es Salaam and a wholesale office in Babati district. G/lambo means Gyekrumlambo. (Babati was a wholesale office not exports office or exporter).

3.6 Data Collection Methods

Prior to main data collection a preliminary survey was conducted using check lists for producers and traders, here the information on pigeon pea farming and business was to be explored. The objective was detailed understanding of the pigeon pea export market. The information from farmers and traders (collectors, wholesalers, retailers and exporters)

was detailed because there were open ended questions. The respondents were free to give their knowledge on pigeon pea and its export market.

Before the main survey questionnaire was pre-tested to look for the clarity of questions, unnecessary repetition, and time for administering the questionnaire. Then During the main survey data were collected using questionnaire from farmers, marketing agents like collectors, retailers, wholesalers, main exporters and institutions which were involved in the export market for the pigeon pea

3.7 Data Analysis Methods

3.7.1 Gross Margin Analysis (GMA)

For objective one the Gross Margin Analysis (GMA) was used to analyze the profitability of investing in pigeon pea. For financial analysis gross margin analysis was performed. Gross margin (GM) was taken as the gross income of an enterprise less variable costs (Ocaido *et. el,* 2009). It can be represented by the equation as:

$GM = \Sigma (yi*py_i) - \Sigma (x_i*px_i)$ .....(1)

Where:

$\Sigma (yi*py_i)$ = gross income in Tshs

y_i = quantities of pigeon pea in tonnes

pyi = respective prices of pigeon pea in Tshs

$\Sigma (x_i*px_i)$ = total variable costs in Tshs

x_i = quantity of inputs in tonnes

px_i= respective prices of inputs in Tshs

3.7.2 Marketing margins, costs and pricing structure

For objective two the marketing margins were computed. Market margins are differences between prices at different market levels. The term market margin is commonly used to refer the difference between producer and consumer prices of an equivalent quantity and quality of the commodity (Kabungo, 2008). However it may also be used to describe price differences between other points in marketing chain, for example between producer and wholesaler or wholesale and retail prices (Kabungo, 2008).

$MM = f(Pi, \mu)$ .....(2)

Where; MM = Marketing margin

Pi = Buying price at specific market

μ = Error term

Marketing Margin = Selling Price – Buying Price .....(3)

The cost and pricing structure was examined using the descriptive statistics, means, max, and min from the information gathered using a structured questionnaire on price structure and costs.

3.7.3 The logistic regression

For the first hypothesis the logistic regression was used. Logistic regression measure the probability at which farmers are involved in export market (selling direct to exporters) for pigeon pea and the probability (rate) which are not involved in the export market for pigeon pea. The involvement (participation) in export market was the dependent variable., Other factors such as average price for pigeon pea bag in Tshs, quantity produced of pigeon pea per hectare (yield tones/ha), area under cultivation (ha), profitability (gross margin) in Tshs, and dummy variables age, education and extension services, Sex, and main occupation as independent variables.

A logistic model calculates the probability that an event occurs. An example is the probability of the adoption of a new pigeon pea variety versus the probability of non-adoption of this variety. The model has the following form: (Nkuba and Mafuru, 2010).

$$\frac{\Pr ob(event)}{\Pr ob(noevent)} = \frac{1/(1+e^{-z})}{1-prob(event)} \quad \text{.....(4)}$$

Z is a linear combination of independent variables:

$$Z = b_o + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + ... b_nX_n + e \text{ .....(5)}$$

Where by Z = involvement in export market (dummy) b_o = constant, (b_1 to $b_{8)}$ = coefficients X_1 = age of respondent (years), X_2 = education level of respondent (years) X_3 = Access to extension Services (dummy) X_4 = Area under pigeon pea cultivation (in hectares), X_5 = Profitability accrued from pigeon pea (gross margin in Tshs), X_6 = Sex (dummy), X_7 = main occupation (dummy), e = other factors not known.

3.7.4 Description of variables included in the model

Age has effect on participation in economic activities the distribution of age reflects the dependency and active people in production. Sex has effect on ownership of resources like land as factor of production to conduct economic activities which may limit production for Tanzania. Education creates awareness and entrepreneurial skills to search for market, produce efficiently and increase yield and hence volume required for export. Main occupation increase specialization and it was expected people would concentrate and produce more if it is their main occupation. Price was thought to attract production as we expect to increase supply (production) if the price is very high. Area; if the area under cultivation is large, production will be increased to meet export demand. Gross margin was expected high gross margin for the crop could have influenced participation and increased production of the same, high gross margin means higher returns from the crop

which attracts production. Access to extension services would help farmers produce more as they are trained on good way of producing and the use of high yielding and export preferred varieties it could increase production to meet export demand.

3.7.5 Constraints faced by different actors in the value chain

For objective three and four the information on different actors and constraints were collected from actors in the export of pigeon pea: farmers, wholesalers, retailers, exporters and institutions involved. The descriptive analysis i.e. cross tabulation, frequencies, descriptive, means and multiple responses was done using the information collected from the structured questionnaire. The ranking of the marketing problems experienced by farmers and traders was done by selecting the problem with high frequency as the highest in rank and the most important to farmers and traders. The ranking was done by absolute ranking.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Demographic Characteristics of Actors in Pigeon pea Value Chain

4.1.1 Farmer's characteristics

Analysis indicates on average the age of pigeon pea farmers was 48 years in Babati district with the maximum of 79 and minimum of 23 (Table 5). Karatu on average the age of farmers was 44 years with maximum of 71 and minimum of 22 (Table 5). This implies pigeon pea is a crop which is produced by all people, those young and old. Income from the crop may have attracted participation of both ages in production.

Table 5: Age of the household head

District	n	Minimum	Maximum	Mean
	Age of the household head in years			
Babati	62	23.00	79.00	48.66
Karatu	60	22.00	71.00	44.73
Total	122	22.00	79.00	46.73

Age group analysis of respondents shows that 19.4% of pigeon pea farmers in Babati are people of age from 18 to 40 years, 67.7% are people of age from 41 to 60 and only 12.9% were above 61 years (Table 6). Where as in Karatu district 41.7% are people of age from 18 to 40 years, 50% from 41 to 60 and 8.3% were above 61 years (Table 6). Similarly age group also indicates participation of both ages in pigeon pea production.

Table 6: Age group of the household head

		The age group of the household head							
		18-40		41-60		≥ 61		Total	
		n	%	n	%	n	%	n	%
Districts	Babati	12	19.4	42	67.7	8	12.9	62	100.0
	Karatu	25	41.7	30	50.0	5	8.3	60	100.0
Total		37	30.3	72	59.0	13	10.7	122	100.0

An analysis of education of pigeon pea farmers interviewed presented in (Table 7) shows that only 9.7% in Babati and 10% in Karatu of the respondents had no formal education. Farmers with primary education were 75.8% in Babati and 75% in Karatu. Secondary education 12.9% and 15% for Babati and Karatu respectively, only 1.6% of the producers in Babati had higher education. This implied that the Labour force in pigeon pea production in Karatu and Babati district is comprised of people with some level of education. Hence knowledge intake may be relatively easy to this population to increase production.

Table 7: Education group of household head

		The education group of household head									
		No education		Primary education		Secondary education		University or College		Total	
		n	%	n	%	n	%	n	%	n	%
Districts	Babati	6	9.7	47	75.8	8	12.9	1	1.6	62	100.0
	Karatu	6	10.0	45	75.0	9	15.0	0	0.0	60	100.0
Total		12	9.8	92	75.4	17	13.9	1	0.8	122	100.0

Analysis indicates on average the years spent in school were 6.63 in Babati and 6.65 in Karatu district (Table 8). Similarly years spend in school indicates this population of farmers has some level of education.

Table 8: Education level of household head

District	n	Minimum	Maximum	Mean
	The level of education of the household head in years			
Babati	62	0.00	18.00	6.63
Karatu	60	0.00	11.00	6.65
Total	122	0.00	18.00	6.64

The size of the household of the interviewed farmers ranges from 1 to 20 in Babati and 2 to 22 in Karatu of people per household, with an average of 7.8 and 7.2 people per household in Babati and Karatu respectively (Table 9). This data is slightly higher than the 2002 census average of 5.1 and 5.4 people per household for Babati and Karatu districts respectively. National census was done about 10 years past; population per household could have increased. Secondly national census includes the entire population. The single family household size in Babati district of one person was from the divorced male and unmarried pigeon pea farmer.

Table 9: Household size of household head

District	n	Minimum	Maximum	Mean
	The size of the household in numbers			
Babati	62	1.00	20.00	7.83
Karatu	60	2.00	22.00	7.26
Total	122	1.00	22.00	7.55

Analysis indicates 17.7% in Babati and 15% in Karatu of farmers were between 1 to 4 household size groups, 29% in Babati and 45% in Karatu were between 5 to 8 and 53.2% in Babati and 40% in Karatu were above 8 (Table 10). This implies that the dependence in Babati and Karatu district is very high; the income which is produced from pigeon pea harvested may not be allocated to other economic activities but used to feed large family.

Table 10: Household size group

		The household size group							
		1-4		5-8		> 8		Total	
		n	%	n	%	n	%	n	%
Districts	Babati	11	17.7	18	29.0	33	53.2	62	100.0
	Karatu	9	15.0	27	45.0	24	40.0	60	100.0
Total		20	16.4	45	36.9	57	46.7	122	100.0

The analysis shows that 88.7% in Babati and 80% in Karatu of the interviewed households were male headed household and 11.3% in Babati and 20% in Karatu district of interviewed household were female headed household (Table 11). According to National sample census of agriculture, (2007/08). About 20% of the households in Tanzania are female headed households. This result shows Babati was below and Karatu was similar to national average according to this data. This may be due to the culture that most of the household are headed by male few with female.

Table 11: Sex of the household head

		Sex					
		Male		Female		Total	
		n	%	n	%	n	%
Districts	Babati	55	88.7	7	11.3	62	100.0
	Karatu	48	80.0	12	20.0	60	100.0
Total		103	84.4	19	15.6	122	100.0

The analysis of the marital status shows that 91.9% in Babati and 95% in Karatu of respondents were married. Whereby 8.1% in Babati and 5% in Karatu of respondent were single, divorced or widowed (Table 12). Since pigeon pea production in Babati and Karatu district is highly depending on family labour, married family has large household size and enjoys cheap labour in pigeon pea production but, has an implicit cost.

Table 12: Marital status of the household head

		The marital status of the household head									
		Married		Single		Divorced		Widowed		Total	
		n	%	n	%	n	%	n	%	n	%
Districts	Babati	57	91.9	3	4.8	1	1.6	1	1.6	62	100.0
	Karatu	57	95.0	2	3.3	1	1.7	0	0.0	60	100.0
Total		114	93.4	5	4.1	2	1.6	1	0.8	122	100.0

The analysis shows that there were four major occupations for pigeon pea farmers, farming which was 91.9% in Babati and 91.7% in Karatu of the interviewed pigeon pea producers, teaching 3.2% in Babati and 5% in Karatu of producers. Livestock keeping which was 3.3% in Karatu and farming and business which was 4.8% in Babati (Table 13). This analysis implies that the population of pigeon pea farmers in Babati and Karatu districts is not only involved in pigeon pea production there are diverse number of activities which they are involved

Table 13: Main occupation of the household head

		Main occupation of the household head									
		Farming		Teaching		Livestock keeping		Farming & Business		Total	
		n	%	n	%	n	%	n	%	n	%
Districts	Babati	57	91.9	2	3.2	0	0.0	3	4.8	62	100.0
	Karatu	55	91.7	3	5.0	2	3.3	0	0.0	60	100.0
Total		112	91.8	5	4.1	2	1.6	3	2.5	122	100.0

4.1.2 Trader's characteristics

The average age of traders was 42.7 years and 42.1 years for Babati and Karatu district respectively (Table 14). Similarly traders also are composed of all age groups involved in pigeon pea business. The availability of export market has attracted both age groups into pigeon pea business.

Table 14: Age of trader's household head

District	n	Minimum	Maximum	Mean
	The age of the household head in years			
Babati	25	28.00	60.00	42.76
Karatu	25	24.00	60.00	42.12
Total	50	24.00	60.00	42.44

The analysis indicated that 44% in Babati and 40% in Karatu of traders were between 18-40 years and 56% in Babati and 60% in Karatu of traders were between 41-60 years (Table 15). This analysis also shows that large percent of pigeon pea traders were aged between 41 years to 60 years, who are still very active to engage in the business

Table 15: Age group of trader's household head

		Age group of the respondents					
		18-40		41-60		**Total**	
		n	%	n	%	n	%
Districts	Babati	11	44.0	14	56.0	25	100.0
	Karatu	10	40.0	15	60.0	25	100.0
Total		21	42.0	29	58.0	50	100.0

The average years spent in school were 8.9 and 7.9 for Babati and Karatu district respectively (Table 16). This implies traders group consists of people with higher level of education than farmers; probably is what enables these traders to search for the market (outsource) and manage to conduct pigeon pea business. Farmers had attained low levels of education as compared to traders, may be that was the reason also why many farmers did not manage to sell their crops direct to exporters.

Table 16: Education level of trader's household head

District	n	Minimum	Maximum	Mean
	The level of education of the household head in years			
Babati	25	2.00	18.00	8.96
Karatu	25	7.00	14.00	7.92
Total	50	2.00	18.00	8.44

The analysis indicates 60% in Babati and 80% in Karatu of interviewed pigeon pea traders had primary school education, 20% in Babati and 16% in Karatu had ordinary level education. On other hand 8% in Babati and 4% in Karatu had higher education. Only 12% had high school education in Babati (Table 17). Similarly traders have somehow attained higher level of education than their counterpart farmers.

Table 17: Education group of the respondents

		Education group of the respondents									
		Primary education		Secondary school		High school		University or College		**Total**	
		n	%	n	%	n	%	n	%	n	%
Districts	Babati	15	60.0	5	20.0	3	12.0	2	8.0	25	100.0
	Karatu	20	80.0	4	16.0	0	0.0	1	4.0	25	100.0
Total		35	70.0	9	18.0	3	6.0	3	6.0	50	100.0

The analysis indicates on average the household size of pigeon pea traders was 6.1 and 7.7 people per household for Babati and Karatu respectively (Table 18) higher than the national average of 5.1 and 5.4 for Babati and Karatu districts respectively (URT, 2002). As national census was done so many years past this population could have increased. Secondly national census includes the entire population.

Table 18: Household size

District	n	Minimum	Maximum	Mean
	The size of the household in numbers			
Babati	25	1.00	10.00	6.12
Karatu	25	2.00	16.00	7.72
Total	50	1.00	16.00	6.92

Analysis also indicates 28% in Babati and 24% in Karatu were in the household size group of 1 to 4 people per household. Whereas 60% in Babati and 36% in Karatu were in 5 to 8 and 12% in Babati and 40% in Karatu were in the household group of 8 and above (Table 19). This is also a very large household size which means the income generated will be used to feed the large household. The one person household size in Babati was from the divorced man.

Table 19: Household size group of traders

		The household size group							
		1-4		5-8		8-above		Total	
		n	%	n	%	n	%	n	%
Districts	Babati	7	28.0	15	60.0	3	12.0	25	100.0
	Karatu	6	24.0	9	36.0	10	40.0	25	100.0
Total		13	26.0	24	48.0	13	26.0	50	100.0

The analysis indicated most of interviewed traders involved in pigeon pea business were male 100% in Babati and 96% in Karatu, 4% female in Karatu (Table 20). Besides the sampling procedure used since there were very few traders, to get them traders were asked for the next well known traders. This is why you might find very small numbers of females in the business. As in most cases the well known traders identified were males.

Table 20: Sex of head of household

		The gender of the household head					
		Male		Female		Total	
		n	%	n	%	n	%
Districts	Babati	25	100.0	0	0.0	25	100.0
	Karatu	24	96.0	1	4.0	25	100.0
Total		49	98.0	1	2.0	50	100.0

The analysis indicated most of interviewed trader's families, 96% in Babati and 84% in Karatu were in their marriage life, and only 4% in Babati and 16% in Karatu of traders were single or divorced (Table 21). Married people have large household which other members of the household may assist in conducting other household activities and help to improve the family income, since most of these traders household are also farmers, i.e. the collectors in the village who are also doing the farming activities.

Table 21: Marital status of interviewed traders

		The marital status of the household head							
		Married		Single		Divorced		**Total**	
		n	%	n	%	n	%	n	%
Districts	Babati	24	96.0	0	0.0	1	4.0	25	100.0
	Karatu	21	84.0	4	16.0	0	0.0	25	100.0
Total		45	90.0	4	8.0	1	2.0	50	100.0

4.2 Pigeon Pea Value Chain

4.2.1 Farmers selling of pigeon pea harvest 2010/11 season

Most of farmers sell their pigeon pea at home as analysis indicated 95.2% in Babati and 96.2% in Karatu of interviewed farmers sell their pigeon pea at home to farm collectors and only 4.8% in Babati and 3.8% in Karatu of interviewed farmers transported their

pigeon pea to the market (Table 22). This is the reasons why the transport cost to the market for the pigeon pea farmers was also very small.

Table 22: Farmers selling of pigeon pea harvest 2010/11 season

		Farmers selling of pigeon pea harvest 2010/11 season					
		Sale at home to farm collectors		Transport & sale pigeon pea to the market		Total	
		n	%	n	%	n	%
Districts	Babati	59	95.2	3	4.8	62	100.0
	Karatu	50	96.2	2	3.8	52	100.0
Total		109	95.6	5	4.4	114	100.0

4.2.2 The type of traders who bought pigeon pea at home stead

Almost all type of traders bought pigeon pea direct from farmers, but farmers in the districts largely depend on collectors analysis indicated 66.1% in Babati and 87% in Karatu of the produces (Table 23) were purchased by collectors. And only farmers in Karatu district were able to sell their pigeon pea direct to the exporters by 10.9% (Table 23). This is because in Karatu district the exporters direct purchase pigeon pea from farmers likewise in Babati district wholesalers purchase pigeon pea and sell to exporters in Arusha

Table 23: The type of traders who bought pigeon pea at home stead

	The type of traders who buys pigeon pea at home													
	Retailers		Collectors & Retailers		Collectors		Wholesaler, Collectors & Retailers		Exporter		Farmers		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Districts Babati	6	10.2	13	22.0	39	66.1	1	1.7	0	0.0	0	0.0	59	100.0
Karatu	0	0.0	0	0.0	40	87.0	0	0.0	5	10.9	1	2.2	46	100.0
Total	6	5.7	13	12.4	79	75.2	1	1.0	5	4.8	1	1.0	105	100.0

4.2.3 The domestic value chain

The key actors identified in the pigeon pea domestic value chain, includes input suppliers, farmers, brokers, collectors, wholesalers, retailers, hotels, restaurants and consumers. Each actor purchased pigeon pea direct from farmer as shown in (Fid 2). The common chain of transaction usually involves farmers, brokers, collectors, wholesalers, retailers and consumers. When actors purchase pigeon pea direct from farmer they shorten the chain and this has resulted into so many chains (see the arrows). For local chain pigeon pea sold by traders was unprocessed. Collectors are business men/women who specialize in purchasing pigeon pea from farmers in the village some of them are also farmers collecting pigeon pea in villages. For consumers there were local consumers, hotels, restaurants and some farmers who purchased pigeon pea from their fellow farmers as seeds. The inputs suppliers for pigeon pea were research institution who supplied seeds for experimental purposes, exporting companies interred contracts with farmers to provide seeds in order to sellback pigeon pea to them. There were also very few stockist like Dodoma transport who is also an exporter for the crop.

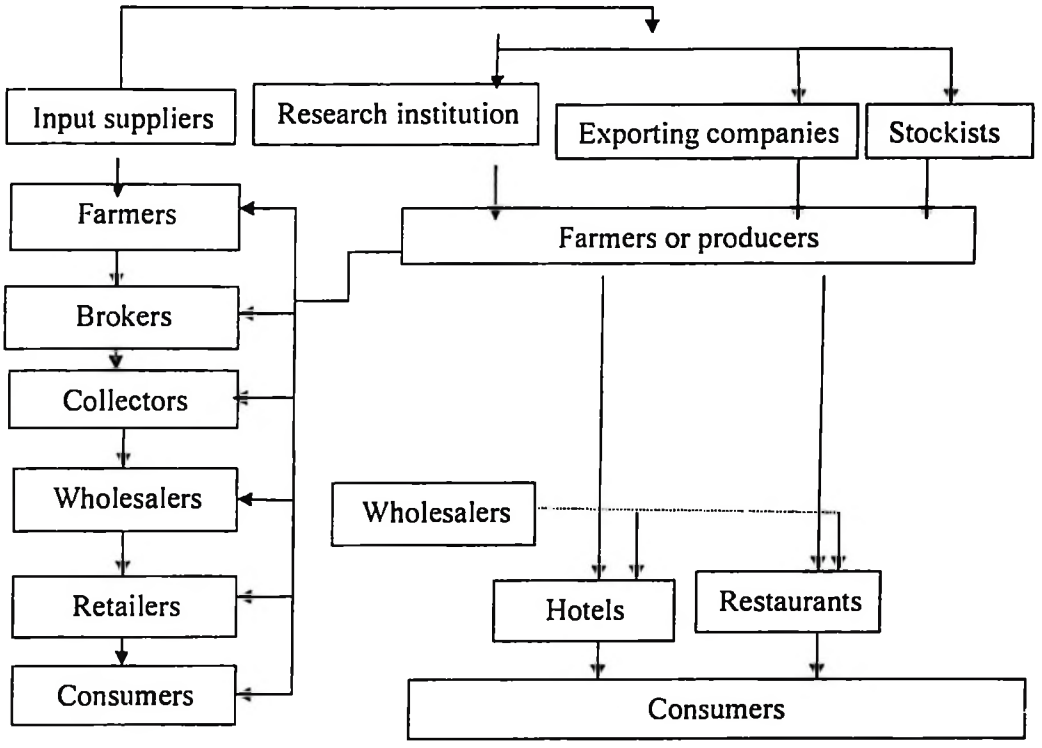

Figure 2: Key actors in pigeon pea domestic value chain in Babati and Karatu districts.

Key: ⟶ Pigeon pea value chain

4.2.4 The export value chain

The export oriented value chain is similar to the domestic value chain except retailers were not involved in the export oriented value chain. Actors in the export chain were inputs suppliers farmers, brokers, collectors, wholesalers and exporters or processing industries for export (Fig 3). Each actor purchased pigeon pea direct from farmers. This helped to increase price received by farmers as many actors raised competition and reduced transport cost to farmers as market was near to the villages. Common chain for export oriented market involved farmers, brokers, collectors, wholesalers and exporters or processing industries for export. Pigeon pea sold for export was either processed or unprocessed. Similarly once any actor buys direct to farmer creates other shortened chains. Processed pigeon pea is the one which is de-hulled split pea called (dhal).

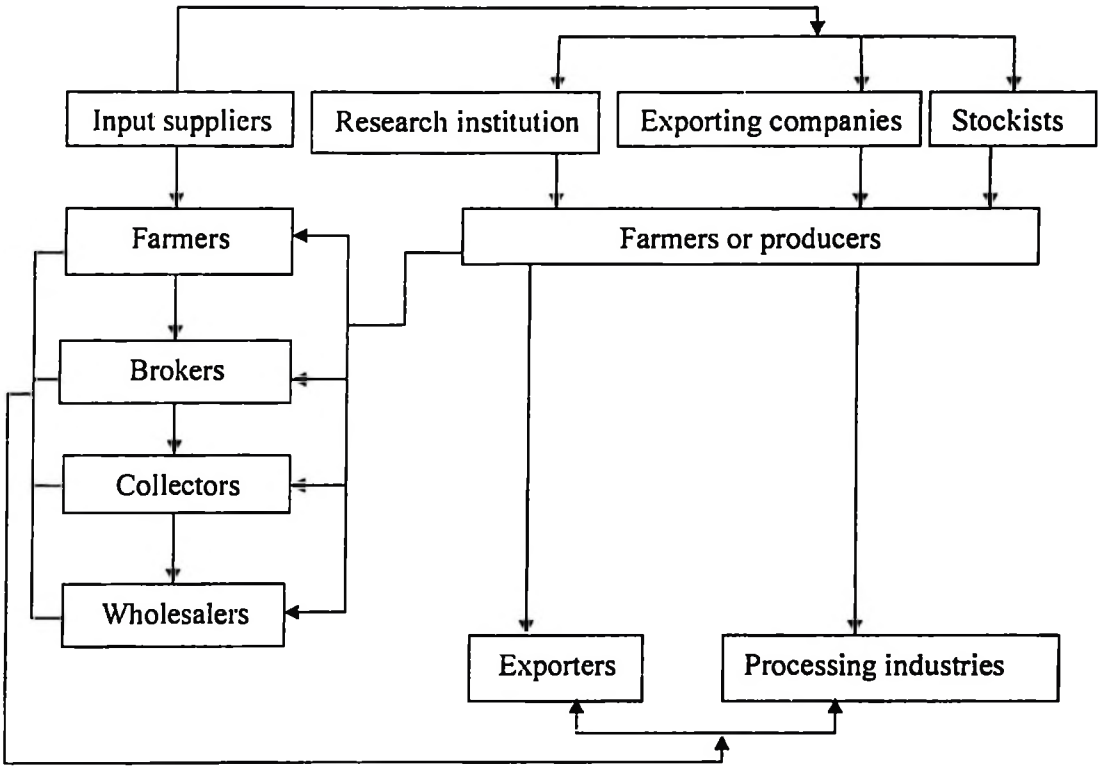

Figure 3: Key actors in pigeon pea export value chain in Babati and Karatu districts.

Key: ⟶ Pigeon pea value chain

4.3 Pigeon Pea Production

4.3.1 The main reason for growing pigeon pea

The pigeon pea production in Babati and Karatu districts is mainly for cash income; analysis indicates 51.7% of grown pigeon pea was for export in Karatu (Table 24). Where as 41.9% in Babati and 48.3% in Karatu of pigeon pea was grown for the purpose of selling (Table 24). Only a very small percent of pigeon pea was for family/home consumption alone 1.6% in Babati (Table 24).

It is found that even those farmers who were producing targeting both family consumption and export market were only 3.2% in Babati (Table 24). Likewise some

farmers were producing targeting family consumption and domestic market by 43.5% in Babati (Table 24), but when compared to 41.9% for domestic consumption would mean the same 1.6% was intended for family consumption.

Table 24: The main reason for growing pigeon pea

	The main reason for growing pigeon pea													
	Export market		Family/home consumption		Available domestic market		As cash crop		Family consumption & Available domestic market		Export market & Family consumption		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Districts Babati	5	8.1	1	1.6	26	41.9	1	1.6	27	43.5	2	3.2	62	100.0
Karatu	31	51.7	0	0.0	29	48.3	0	0.0	0	0.0	0	0.0	60	100.0
Total	36	29.5	1	0.8	55	45.1	1	0.8	27	22.1	2	1.6	122	100.0

4.3.2 Pigeon pea area cultivated, amount harvested, and yield in 2010/11

An analysis of the area cultivated by farmers indicates on average the area cultivated were 2.6 and 1.3 hectares in Babati and Karatu respectively (Table 25). The study done by Asfaw and shiferaw, (2009) for Eastern and Southern Africa shows the average area under pigeon pea cultivation for Tanzania was 1.54 hectares. Babati is slightly higher to the national average and Karatu is slightly below the national average as Babati export market is well established which has influenced production into large area.

An analysis of the quantity harvested indicates on average pigeon pea quantities harvested were 1.45 and 0.74 tones per household per year in Babati and Karatu respectively (Table 25). The harvest was good in Babati as compared to Karatu, as some of farmers in Karatu harvested 0.00 tones last season in Gyekrumlambo; these farmers complained the rainfall was not good to them last season and some of the crops were invaded by pests identified as (*Fusarium wilt*).

Table 25: Pigeon pea area cultivated, amount harvested, and yield in 2010/11

Districts	Area under pigeon pea in hectares				Quantity produced in tones				Yield			
	n	Min	Max	Mean	n	Min	Max	Mean	n	Min	Max	Mean
Babati	62	0.40	24.00	2.61	62	0.12	10.80	1.45	62	0.11	1.53	0.58
Karatu	60	0.20	5.60	1.32	60	0.00	2.60	0.74	60	0.00	2.10	0.74
Total	122	0.20	24.00	1.98	122	0.00	10.80	1.10	122	0.00	2.10	0.66

4.3.3 Pigeon pea varieties cultivated by farmers

Pigeon pea farmers interviewed in Babati and Karatu district identified four varieties namely; Mali (ICEAP 00040), Babati white (Bangili), Red, and White that are commonly produced in their respective areas. Farmers did also mention other three varieties which are not yet released which were denoted by their germplasm (lines), like the ICEAP 00053, ICEAP 00036, and ICAEP 00032. Pigeon pea seeds are of two colors red and white as notable is the identification of local variety, the Red and White varieties mention by farmers could be among the six varieties some farmers mention Red and White as they were not remembering the exact name of the variety (Table 26).

Some pigeon pea varieties which were adopted by farmers from experiments have attracted farmers and were cultivated by many farmers like ICEAP 00053 which 67.7% of farmers in Babati have been cultivating the variety (Table 26). The experimental varieties ICEAP 00032 and ICEAP 00036 were also cultivated in Karatu by 8.3% for ICEAP 0032 and 1.7% for ICEAP 00036 (Table 26). These varieties promoted by SARI were not very much adopted as compared to ICEAP 00053 in Babati. In my views the variety ICEAP 00053 need to be released as farmers have shown high level of use and preference.

Pigeon pea produced in Babati (Babati White) is one of the world best preferred pigeon pea, because of its favoured bold cream-coloured grain (Jones, *et al.*, 2002). This has attracted export market for pigeon pea in the region which in turn influenced production; this is why even the area cultivated in Babati is large.

Table 26: Pigeon pea varieties cultivated in 2010/11

		Districts							
		Babati[a]			Karatu[a]			Total[a]	
		n	%	% of Total	n	%	% of Total	n	% of Total
Varieties cultivated in 2010/11	00053	42	67.7	34.4	1	1.7	0.8	43	35.2
	Babati white	1	1.6	0.8	4	6.7	3.3	5	4.1
	Local	6	9.7	4.9	13	21.7	10.7	19	15.6
	Mali	27	43.5	22.1	21	35.0	17.2	48	39.3
	00032	0	0.0	0.0	5	8.3	4.1	5	4.1
	00036	0	0.0	0.0	1	1.7	0.8	1	0.8
	Red	0	0.0	0.0	17	28.3	13.9	17	13.9
	White	0	0.0	0.0	29	48.3	23.8	29	23.8
Total		62		50.8	60		49.2	122	100.0

Percentages and totals are based on respondents.

a. Group

4.3.5 Access to extension services to farmer

The analysis indicates that 83.9% in Babati and 75% in Karatu of farmers accessed extension services and 16.1% in Babati and 25% in Karatu of farmers did not access extension services (Table 27). Farmers are well supported by the extension services and it may increase the production of pigeon pea in these areas. Most of farmers had contact with extension staffs.

Farmers were asked whether they contact extension officers for extension services and most of them have indicated to have contact with extension agents. This is an indication that at least these farmers can access extension services and they know where they can access the services in case of any problem.

Table 27: Access to extension services to farmer

Districts		Access to extension services		
		Yes	No	Total
Babati	n	52	10	62
	%	83.9	16.1	100.0
Karatu	n	45	15	60
	%	75.0	25.0	100.0
Total	n	97	25	122
	%	79.5	20.5	100.0

4.3.6 Pigeon pea Utilization

Pigeon pea is a crop which is cultivated for selling purpose Fig 4 below indicates about 86% of pigeon pea that is cultivated is sold, only 6% percent is consumed and 8% percent is stored by farmers for seed in the next season.

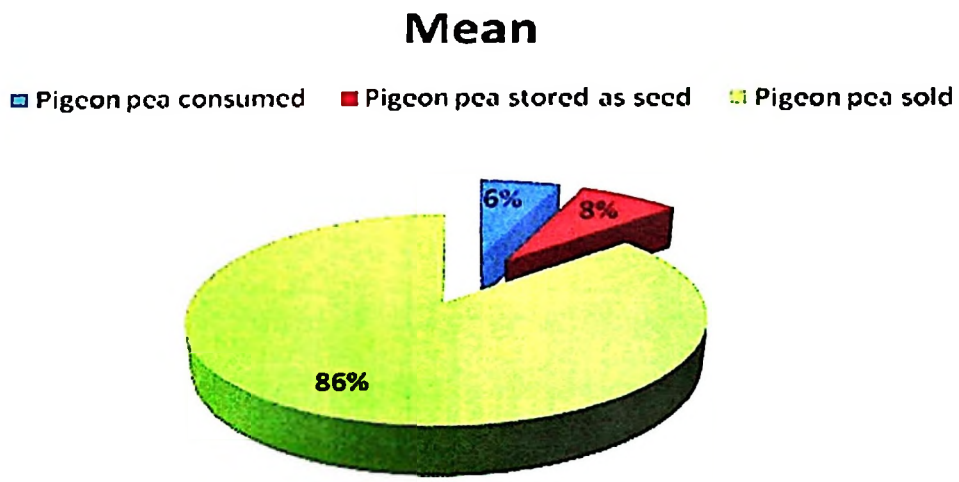

Figure 4: Pigeon pea consumed, stored as seed and sold

4.3.6.1 Pigeon pea consumption

Pigeon pea is not a very preferred diet for majority of farmers in Babati and Karatu districts. The analysis indicates on average the pigeon pea consumption by farmers was

0.09 and 0.06 tones per household per year for Babati and Karatu district respectively (Table 28). This justify pigeon pea is produced mainly for cash income gain.

Table 28: Pigeon pea consumption

District	The total amount of pigeon pea consumed by farmers in tones			
	n	Minimum	Maximum	Mean
Babati	58	0.01	0.24	0.09
Karatu	48	0.02	0.24	0.06
Total	106	0.01	0.24	0.07

4.3.6.2 Pigeon pea stored as seeds

There is evidence that farmers do not have good quality seeds for pigeon pea in the area the analysis indicates on average about 0.12 and 0.04 tones per household per year of seeds comes from what farmers stored in Babati and Karatu district respectively (Table 29). These seeds may be mixed with others which are not well preferred for export market. Farmers need to be educated on the use of quality seeds which will also increase the yield for pigeon pea. Intervention is also needed to reduce the price for the seeds so that farmers can afford to purchase high quality seeds which are also highly preferred for export.

Table 29: Pigeon pea stored as seeds

District	The amount of pigeon pea stored as seeds by farmers in tones			
	n	Minimum	Maximum	Mean
Babati	49	0.02	1.88	0.12
Karatu	27	0.01	0.10	0.04
Total	76	0.01	1.88	0.09

4.3.6.3 Pigeon pea sold

An analysis indicted there is large quantity of pigeon pea which was sold by farmers on average 1.28 and 0.74 tones per household per year in Babati and Karatu district respectively (Table 30). Pigeon pea as mention by farmers is mainly grown for selling; it could be one of the food crops that are grown as cash crop

Table 30: Pigeon pea sold

District	The total amount of pigeon pea sold by farmers in tones			
	n	Minimum	Maximum	Mean
Babati	62	0.12	8.88	1.28
Karatu	52	0.04	2.40	0.74
Total	114	0.04	8.88	1.03

4.3.6.4 The main market for the pigeon pea sold by farmers

Farmers in Karatu and Babati districts most sell their pigeon pea in their farm areas this is shown by the main markets where they sold their pigeon pea, none of the farmers were able to export their pigeon pea direct (Table 31). But some farmers are aware of the Indian and Kenya market as they mention India and Kenya as one of the market. Export market needs capital, quality and meeting standards which farmers do not have in the districts.

Large percent of pigeon pea was sold in Babati 39.5%, Gallapo 25.5% and Arusha 58.8% as these were the centers and most of traders were found in towns (Table 31). An example of these traders located in town was Kilimo Market in Karatu town; Mamire is also a town centre. As farmers were asked to identify the main market some mention the market places where they meet by names while one farmer mention the name of trader as

for the case of collectors. Similarly for Kilimo Market one would expect the maim market to be in Karatu but as Kilimo market own offices and warehouse in Karatu where farmers sold pigeon pea was mention as the main market or market place.

Table 31: Main markets for the pigeon pea sold by farmers

			Districts		
			Babati	Karatu	Total
Main markets for pigeon pea[a]	Arusha	n	25	42	67
		% within	37.3	62.7	
		% of Total	21.9	36.8	58.8
	Babati	n	45	0	45
		% within	100.0	0.0	
		% of Total	39.5	0.0	39.5
	Mamire	n	12	0	12
		% within	100.0	0.0	
		% of Total	10.5	0.0	10.5
	Collectors	n	1	0	1
		% within	100.0	0.0	
		% of Total	0.9	0.0	0.9
	Gallapo	N	29	0	29
		% within	100.0	0.0	
		% of Total	25.4	0.0	25.4
	India	n	1	1	2
		% within	50.0	50.0	
		% of Total	0.9	0.9	1.8
	Kenya	n	1	0	1
		% within	100.0	0.0	
		% of Total	0.9	0.0	0.9
	Karatu	n	0	16	16
		% within	0.0	100.0	
		% of Total	0.0	14.0	14.0
	Kilimo market	n	0	2	2
		% within	0.0	100.0%	
		% of Total	0.0	1.8	1.8
Total		n	62	52	114
		% of Total	54.4	45.6	100.0

Percentages and totals are based on respondents.

a. Group

4.3.6.5 Pigeon pea for export market

Farmers interviewed in Babati and Karatu districts identified three pigeon pea varieties which were highly preferred for the export market; ICEAP 00053 and Mali which were preferred by 33.9% and 22% respectively in Babati district (Table 32). Mali and White varieties which were preferred by 13.6% and 27.1% respectively in Karatu district (Table 32). The pigeon pea which is white colored was mostly preferred, but exporters usually purchase all type of pigeon pea for export. This is because some of the pigeon pea is de-hulled processed into (dhal) before it is exported and the other pigeon pea is exported unprocessed.

Table 32: Pigeon pea for export market

			Districts		
			Babati	Karatu	Total
Varieties preferred for export[a]	00053	n	40	0	40
		% within	100.0	0.0	
		% of Total	33.9	0.0	33.9
	Local	n	2	3	5
		% within	40.0	60.0	
		% of Total	1.7	2.5	4.2
	Babati white	n	1	2	3
		% within	33.3	66.7	
		% of Total	0.8	1.7	2.5
	Mali	n	26	16	42
		% within	61.9	38.1	
		% of Total	22.0	13.6	35.6
	Red	n	0	9	9
		% within	0.0	100.0	
		% of Total	0.0	7.6	7.6
	White	n	0	32	32
		% within	0.0	100.0	
		% of Total	0.0	27.1	27.1
Total		n	59	59	118
		% of Total	50.0	50.0	100.0

Percentages and totals are based on respondents.

a. Group

4.3.6.6 Other crops grown by farmers

All farmers interviewed in Babati and Karatu districts did not only grow pigeon pea there were other crops which were grown by farmers. The following were other crops grown by farmers in the region, maize, beans, sunflower, wheat, finger millet, lablab, sorghum, green gram, banana, simsim, sweet potatoes, velvet beans, and common beans (Table 33). With sun flower, maize and beans being among the crops which were highly grown in the districts 46.7% of farmers grew sunflower and 50.8% maize in Babati. Where as 49.2% of farmers grew maize and 27.5% beans in Karatu district (Table 33). Most of pigeon pea farmers in the districts are intercropping pigeon pea with maize this is a crop which almost all pigeon pea farmers are intercropping with maize by 100% (Table 33).

Table 33: Other crops grown by farmers

			Districts		
			Babati	Karatu	Total
Other crops grown[a]	Sunflower	n	56	14	70
		%	46.7	11.7	58.3
	Maize	n	61	59	120
		%	50.8	49.2	100.0
	Beans	n	7	33	40
		%	5.8	27.5	33.3
	Sorghum	n	3	5	8
		%	2.5	4.2	6.7
	Lablab	n	8	0	8
		%	6.7	0.0	6.7
	Simsim	n	2	0	2
		%	1.7	0.0	1.7
	Green gram	n	1	0	1
		%	0.8	0.0	0.8
	Banana	n	1	0	1
		%	0.8	0.0	0.8
	Sweet potato	n	1	0	1
		%	0.8	0.0	0.8
	Velvet beans	n	3	0	3
		%	2.5	0.0	2.5
	Common beans	n	1	0	1
		%	0.8	0.0	0.8
	Wheat	n	0	6	6
		%	0.0	5.0	5.0
	Finger millet	n	0	4	4
		%	0.0	3.3	3.3
Total		n	61	59	120
		%	50.8	49.2	100.0

Percentages and totals are based on respondents.

a. Group

4.4 Pigeon Pea Pricing Structure, Costs and Margins

4.4.1 Pigeon pea pricing structure

4.4.1.1 Pigeon pea prices

The analysis indicates farmers get high price when they sell pigeon pea in tins for the districts. Mean (average) prices were 14 333 Tshs/tin and 16 875 Tshs/tin for Babati and Karatu respectively (Table 34). As compared to when they sell their pigeon pea in Kgs and when they sell in bags for Babati district. This is observed when the prices are

converted into prices for Kgs. The price for the tins was set without considering the weight for some traders, even though there is standard known weight for the tins and bags (Table 34). But most farmers were selling their pigeon pea in terms of bags. this was highly preferred by traders since they new once they purchase pigeon pea in bags they will pay low price for Babati.

Table 34: Pigeon pea prices

Districts	n	Minimum	Maximum	Mean
Babati				
Price for pigeon pea in kilogram (1Kg)	5	650	750	680
Price of pigeon pea in tins (20Kg)	3	14 000	15 000	14 333
Price of pigeon pea in bags (120kg)	60	60 000	102 000	78 878
Karatu				
Price for pigeon pea in kilogram (1Kg)	52	650	1 500	838
Price of pigeon pea in tins (20Kg)	52	13 000	30 000	16 875
Price of pigeon pea in bags (120kg)	50	67 500	180 000	102 030

4.4.1.2 Pigeon pea farm gate price by type of traders

An analysis of the price paid by traders (farm get price), indicates the average price paid by brokers was 60 000 Tshs (Table 35). Brokers paid these farmers such price because they resell their pigeon pea to collectors and other traders in payment of commission i.e. collectors in Babati paid up to 1 950 Tshs/bag as commission to brokers.

The average price paid by collectors was 76 768 and 102 840 Tshs for Babati and Karatu districts respectively (Table 35). Collectors in Babati resell their pigeon pea to others traders as collectors were the major source of supplies to others traders, but for collectors in Karatu since most of the farmers were able to sell direct to the exporter had to pay

higher farm gate price. Farmers in Karatu were organized into farmers group which the exporter assisted them to formulate the groups.

Average price paid by retailers was 80 763 Tshs (Table 35). These retailers had to compete with collectors and their capitals were also big compared to collectors in the village the high price they paid was to make sure they get pigeon pea. The average farm gate price paid by wholesalers was 94 800 Tshs (Table 35). Similarly wholesalers were to compete with retailers and collators. Export Trading Company wholesale office in Babati claimed to be the highest payer in the pigeon pea business and large amount of pigeon pea from farmers was sold to them. Most of these wholesalers had big capital compared to others hence enjoyed economies of scale.

The average price paid by exporters was 102 500 and 104 710 Tshs (Table 35) for Babati and Karatu district. These exporters paid high price as most of them were able to access market direct from outside the country, had storage facilities, and big capital compared to other traders. We get the export price from Babati though they did not sell direct to exporters as farmers knows what the exporters pays in Arusha.

Average price paid by farmers and consumers in Babati were 240 000 Tshs and 150 000 Tshs, (Table 35). It was discovered that most of this pigeon pea is purchased during the planting season so these local consumers and farmers purchased pigeon pea as seeds for planting to their field this is why the price paid was so high.

Table 35: Pigeon pea farm gate price by type of traders

District /Pigeon pea prices paid by actors	N	Minimum	Maximum	Mean
Babati				
Brokers in bags (120kg)	1	60 000	60 000	60 000
Collectors in bags (120Kg)	41	60 000	95 000	76 768
Retailers in bags (120 Kg)	19	60 000	92 000	80 763
Wholesalers in bags (120kg)	5	85 000	102 000	94 800
Exporters in bags (120 Kg)	2	85 000	120 000	102 500
Consumers (local) in bags (120kg)	2	120 000	180 000	150 000
Farmers as seeds in bags (120kg)	1	240 000	240 000	240 000
Karatu				
collectors in bags (120Kg)	47	60 000	180 000	102 840
Exporters in bags (120 Kg)	14	78 000	140 000	104 710
Consumers (local) in bags (120kg)	4	80 000	100 000	89 500

4.4.1.3 Farmers and traders pricing of pigeon pea

Most farmers of pigeon pea interviewed were price takers that they sold pigeon pea depending on the market price. Analysis indicates 91.4% and 90.4% of farmers in Babati and Karatu district respectively sold pigeon pea depending on the market price (Table 36).

There was no way farmers could determine the market prices. Farmers were just depending on traders who have good information on current prices and sell their produce based on the prices set by traders. For this reason traders were able to dominate the pigeon pea prices by baying pigeon pea at the prices they want.

Table 36: Farmers pricing of pigeon pea harvest

		Farmers pricing of pigeon pea harvest															
		Based on market price		Based on the type of client		Based on the market location		Quality of produce and expected production		crosschecking through traders on price		Based on Market price and type of client		Based on market price and location		Total	
		n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Districts	Babati	53	91.4	1	1.7	2	3.4	0	0.0	0	0.0	1	1.7	1	1.7	58	100.0
	Karatu	47	90.4	1	1.9	2	3.8	1	1.9	1	1.9	0	0.0	0	0.0	52	100.0
Total		100	90.9	2	1.8	4	3.6	1	0.9	1	0.9	1	0.9	1	0.9	110	100.0

Similarly most traders of pigeon pea interviewed were price takers that they sold pigeon pea depending on the market price. Analysis indicates 88% and 84% of traders in Babati and Karatu district respectively sold pigeon depending on the market price (Table 37). These traders were buying pigeon depending on the market forces of supply and demand, if there is scarcity price rises and vice versa.

Table 37: Traders pricing of pigeon pea purchased

		The pricing structure of pigeon pea used by traders											
		Based on market price		Based on type of client		Based on the market location		Based on market price and type of client		Based on market price and Location		Total	
		n	%	n	%	n	%	n	%	n	%	n	%
Districts	Babati	22	88.0	1	4.0	0	0.0	1	4.0	1	4.0	25	100.0
	Karatu	21	84.0	1	4.0	2	8.0	1	4.0	0	0.0	25	100.0
Total		43	86.0	2	4.0	2	4.0	2	4.0	1	2.0	50	100.0

4.4.1.4 Price of supplies purchased by traders

Three suppliers of pigeon pea to other traders, farmers, collectors and transporters, but most of the pigeon pea was supplied to other traders by farmers (24 and 25) in Babati and Karatu respectively (Table 38). But due to the competition and presence of many actors in the business the price received by these suppliers were also not uniform, farmers in Babati received higher price 700.87 Tshs/Kg (Table 38) compared to collators and

transporters than farmers in Karatu 668.83 Tshs/Kg (Table 38). The fewer in number of the other actors may have affected the average prices.

Table 38: Prices of supplies purchased by traders

District / suppliers prices	n	Minimum	Maximum	Mean
Babati				
Farmer in Tshs	24	573.33	800.00	700.87
Collector in Tshs	1	687.50	687.50	687.50
Trucker/transporter in Tshs	1	573.33	573.33	573.33
Karatu				
Farmer in Tshs	25	541.67	1000.00	668.83
Collector in Tshs	11	583.33	833.33	696.97
Trucker/transporter in Tshs	1	1 166.67	1 166.67	1 166.67

4.4.1.5 Prices paid by traders

The price for pigeon pea also varies from traders to traders the price has been increasing from the retailers to local consumers and exporters for both districts Babati and Karatu (Table 39). This is because every actor adds value to the pigeon pea he/she purchased from other traders. The value is reflected by the costs incurred by each actor from lowest level in the chain (upstream) to the highest level in the chain (downstream). Others reasons are similar to those explained in (4.4.1.2) which gives the reasons for the price paid by each type of actor in the pigeon pea value chain.

Table 39: Prices paid by traders

District / Prices paid	Babati				Karatu			
	n	Min	Max	Mean	n	Min	Max	Mean
Consumers in Tshs	2	675.00	1 000.00	837.50	9	666.67	2 000.00	1 163.00
Hotels/restaurants in Tshs	-	-	-	-	5	750.00	833.33	766.67
Retailers in Tshs	1	625.00	625.00	625.00	4	750.00	1 175.00	938.54
Wholesalers in Tshs	16	583.00	950.00	789.40	19	750.00	1 175.00	942.54
Exporters in Tshs	9	640.00	1 000.00	841.39	7	900.00	1 333.33	1 140.50
Importers in Tshs	1	2 250.00	2 250.00	2 250.00	1	2 250.00	2 250.00	2 250.00

4.4.2 Average total production costs

4.4.2.1 Average total inputs costs

An analysis of inputs costs of production indicates farmers allocated more money for purchase of seed and fertilizer. The average total costs for seeds and fertilizes were 75 560 and 179 710 Tshs for Babati and 60 896 and 96 000 Tshs for Karatu district (Table 40). Generally inputs cost were higher in Babati than Karatu not only because of area cultivated but farmers in Karatu employed more of family labour (implicit cost) than Babati (Table 40).

Usually farmers do not use fertilizer for pigeon pea, but pigeon pea is always intercropped with maize. Since we have the same area and fertilizer is also applied in the same area where pigeon pea is, fertilizers costs were included. The fertilizers applied here were DAP for basal dressing of maize and UREA for top dressing.

Table 40: Average total inputs costs

The average total farming inputs costs incurred by farmers in producing pigeon pea 2010/11 season								
District	Babati				Karatu			
	n	Min	Max	Mean	n	Min	Max	Mean
Seed cost in Tshs	48	5 250	360 000	75 560	49	2 400	280 000	60 896
Fertilizer cost in Tshs	17	10 000	1 250 000	179 710	-	-	-	-
Herbicides cost in Tshs	1	10 000	10 000	10 000	1	96 000	96 000	96 000
Insecticides cost in Tshs	7	3 500	90 000	20 286	1	32 000	32 000	32 000
Total input cost in Tshs	55	10 000	1 360 000	136 260	49	2 400	288 000	63 508

The analysis indicates (Table 41) in Babati only 16.9% of labour employed was family where as it was 63.2% in Karatu districts. Karatu had low labour cost than Babati as most of labour in Babati was family labour compared to Karatu.

Table 41: Type of Labour employed in pigeon pea production

		Type of labour employed in pigeon pea production last season									
		Family labour		Hired labour		Exchange labour		Family & Hired labour		Total	
		n	%	n	%	n	%	n	%	n	%
Districts	Babati	10	16.9	8	13.6	1	1.7	40	67.8	59	100.0
	Karatu	36	63.2	10	17.5	0	0.0	11	19.3	57	100.0
Total		46	39.7	18	15.5	1	0.9	51	44.0	116	100.0

4.4.2.2 Average total labour costs

The labour cost was one of the highest cost farmers incurred in pigeon pea production (Table 42). Looking at the average total labour cost it was high for both districts 609 300 Tshs for Babati and 297 580 Tshs for Karatu district. Among the very high costs were primary cultivation, secondary cultivation and weeding in Babati and primary cultivation, weeding and planting in Karatu district (Table 42). The use of family labour could be the source of cost variation between districts like the cost for planting and

weeding. Primary and secondary cultivation are mostly done by tractors in Babati districts.

Table 42: Average total labour costs

The average total costs employed in pigeon pea production last season 2010/11

District	Babati				Karatu			
	n	Min	Max	Mean	n	Min	Max	Mean
Cost of primary cultivation in Tshs	60	30 000	1 920 000	195 840	33	12 000	180 000	66 576
Cost of secondary cultivation in Tshs	54	30 000	1 920 000	184 470	31	25 000	350 000	11 297
Cost of planting in Tshs	48	4 000	160 000	33 292	18	6 000	350 000	93 833
Cost of weeding in Tshs	57	15 000	900 000	106 780	20	15 000	360 000	111 800
Harvesting cost in Tshs	54	5 000	400 000	55 787	20	8 000	150 000	39 075
Cost of transporting crops to the homestead in Tshs	49	5 000	200 000	39 888	10	15 000	40 000	27 500
Cost of loading crops from the field in Tshs	40	1 000	81 000	17 200	6	10 000	30 000	20 000
Cost of unloading crops at home from field in Tshs	27	1 000	81 000	11 370	4	10 000	20 000	17 500
Cost of shelling pigeon pea from farm in Tshs	47	1 500	100 000	25 527	7	8 000	30 000	20 000
Total Labour cost in Tshs	60	75 000	5 490 000	**609 300**	37	8 000	1 150 000	**297 580**

4.4.2.3 Average total transport costs

Two common types of transport were used in transporting pigeon pea from the farm to the homestead tractors and truck/vehicles. The analysis indicates the cost for the tractor and trucks/vehicles were 7 750 and 56 000 Tshs for Babati. Likewise in Karatu the costs were and 24 786 and 60 000 Tshs (Table 43).

Table 43: Average total transport costs

The average total costs of transporting pigeon pea to the market incurred by farmers

District	Babati				Karatu			
	n	Min	Max	Mean	n	Min	Max	Mean
Transport cost for the tractor in Tshs	2	5 000	10 500	7 750	7	10 000	48 000	24 786
Transport cost for the trucks/vehicles in Tshs	3	36 000	96 000	56 000	1	60 000	60 000	60 000
Total transport cost of pigeon pea in Tshs	5	5 000	96 000	36 700	8	10 000	60 000	29 188

4.4.2.4 Average total costs of pigeon pea marketing 2010/11

Basically two type of marketing costs were incurred by farmers interviewed the cost of information (communication cost) and the tax collected at village borders (levy) this was for those farmers who were transporting their crops across borders. Analysis indicates the average total cost for communication was 3 766 and 4 750 Tshs for Babati and Karatu district respectively (Table 44). The costs for levy was only incurred for farmers in Babati district and it was 5 700 Tshs (Table 44). This implies farmers did not invest much in marketing (little was spent in communication and market research) possibly if farmers invested in marketing would have helped improve the price of their produce, especially in searching for the market before they produce.

Table 44: Average total costs in marketing of pigeon pea 2010/11

District	n	Minimum	Maximum	Mean
Babati				
Communication cost in Tshs	15	500	16 000	3 766.7
Levy cost in Tshs	2	2 400	9 000	5 700.0
Total marketing cost in Tshs	16	500	16 000	4 243.8
Karatu				
Communication cost in Tshs	8	2 000	10 000	4 750.0
Total marketing cost in Tshs	8	2 000	10 000	4 750.0

4.4.2.5 The average total handling costs in pigeon pea production

Farmers were also to handle the pigeon pea for storage and reselling them to other traders the most cost incurred in handling was storage, but these costs were small compared to the fumigation costs (storage) which were paid by traders. Usually farmers don't stay with pigeon pea for long time before it is sold. This is why their costs of handling were small (Table 45).

Table 45: Average total handling costs in pigeon pea production 2010/11season

District	Babati				Karatu			
	n	Min	Max	Mean	n	Min	Max	Mean
Cleaning cost in Tshs	47	1 000	135 000	18 195	15	4 000	24 000	12 867
Packaging cost in Tshs	8	500	90 000	14 962	23	1 000	40 000	11 139
Package cost in Tshs	55	1 000	90 000	11 349	48	600	24 000	7 592
Storage cost in Tshs	8	3 500	35 000	15 388	15	10 000	60 000	28 467
Sewing cost in Tshs	11	250	3 400	727	1	500	500	500
Cost. for string in Tshs	44	50	6 000	1 352	15	4 000	24 000	12 867
Cost for those doing storage in Tshs	6	1 000	9 500	4 500	-	-	-	-
Total handling cost in Tshs	61	2 050	337 000	29 781	52	600	148 000	24 569

4.4.3 Marketing costs incurred by traders

4.4.3.1 Marketing costs incurred by collectors

Collectors in Babati district were incurring high costs in storage (fumigation), transportation, communication, and Tax/Tanzania Revenue Authority (TRA) cost. Collectors in Babati paid on average 3 189 Tshs/120Kg for transport, 90 000 Tshs/season (TRA), 22 500 Tshs fumigation/season and 161 890 Tshs for communications/season (Table 46). The costs for collectors in Babati were high as compared to the costs incurred by collectors in Karatu district (Table 46).Collectors in Karatu district were incurring

high costs in storage (fumigation), transportation, communication, and broker's payments. Karatu collectors paid up to 1 900 Tshs/120kg for transport, 95 000 Tshs for fumigation (storage)/season, 3 000 Tshs as brokers payments and 7 500 Tshs for communication/season (Table 46).

Table 46: Marketing costs incurred by collectors

District	Babati				Karatu			
	n	Min	Max	Mean	n	Min	Max	Mean
Cleaning cost in Tshs per bag	1	2 500	2 500	2 500	6	200	1 000	533
Loading cost in Tshs per bag	9	300	500	456	10	500	500	500
Unloading cost in Tshs per bag	9	300	550	439	10	500	500	500
Transportation cost in Tshs per bag	9	400	5 000	3 189	10	500	4 500	1 900
Packaging cost in Tshs per bag	3	300	1 000	533	4	200	500	350
Weighing cost in Tshs per bag	3	300	2 000	878	1	150	150	150
Sewing cost in Tshs per bag	1	100	100	100	1	100	100	100
Package(bags) cost in Tshs per bag	7	900	1 000	986	9	500	900	644
Brokers/collectors cost in Tshs per bag	5	1 000	4 500	1 950	1	3 000	3 000	3 000
TRA cost in Tshs per year (annum)	1	90 000	90 000	90 000	-	-	-	-
Tax collected at village borders (levy) in Tshs per bag	2	500	1 000	750	4	600	1 000	700
Fumigation cost in Tshs per season	2	10 000	35 000	22 500	5	50 000	150 000	95 000
Communication cost in Tshs per season	9	2 000	450 000	161 890	10	2 000	20 000	7 500

4.4.3.2 Marketing costs incurred by retailers

It was observed that the costs were increasing downstream the chain. Retailers incurred high cost of transport, communication, storage and (TRA) in total compared to collectors. Retailers in Babati paid up to 3 967 Tshs/120Kg for transport, 711 670 Tshs/ season (TRA), 507 500 Tshs for fumigation (storage)/season and 470 710 Tshs for communication (Table 47). If we compare the two traders in total retailers incurred high cost for these few mention cost than collectors. Collectors just specialize in the village

but retailers have to move the product to the market far from village this is why their cost is also very high. Sometimes these collectors have to wait for the pigeon pea at their business place where they also pay high price than the farm gate price. This is the reason stated that cost also reflects the price set by these traders. Karatu retailers paid fewer costs than retailers in Babati district i.e. 2 908 Tshs/120kg for transport, 60 000 Tshs/season for storage (fumigation) and 90 000 Tshs for communication (Table 47). However the costs incurred by retailers were high compared to the cost incurred by collectors

Table 47: Marketing costs incurred by retailers

District	Babati				Karatu			
	n	Min	Max	Mean	n	Min	Max	Mean
Cleaning cost in Tshs per bag	2	50	100	75	-	-	-	-
Loading cost in Tshs per bag	6	300	1 000	547	7	300	500	414
Unloading cost in Tshs per bag	6	300	1 000	650	7	200	500	357
Transportation cost in Tshs per bag	6	1 000	5 000	3 967	6	200	10 000	2 908
Packaging cost in Tshs per bag	3	100	120	107	-	-	-	-
Weighing cost in Tshs per bag	3	50	200	123	-	-	-	-
Sewing cost in Tshs per bag	2	30	120	75	-	-	-	-
Package(bags) cost in Tshs per bag	6	800	1 000	967	3	850	1 150	1 000
Brokers/collectors cost in Tshs per bag	5	1 000	2 400	1 620	4	300	5 000	2 675
TRA cost in Tshs per year (annum)	6	90 000	150 000	711 670	-	-	-	-
Tax collected at village borders (levy) in Tshs per bag	6	500	1 250	878	5	500	18 000	4 000
Fumigation cost in Tshs per season	4	10 000	1 200 000	507 500	1	60 000	60 000	60 000
Communication cost in Tshs per season	7	30 000	1 880 000	470 710	2	30 000	150 000	90 000

4.4.3.3 The marketing costs incurred by wholesalers

Similarly the cost were increasing as we move to wholesalers the marketing cost of the wholesalers were also higher than those incurred by collectors in total. In Babati

wholesalers paid up to 5 780 Tshs/bag for the transport, 1 495 200 Tshs for (TRA), 56 675 Tshs for storage and 496 290 Tshs for communication (Table 48). These costs still show the trend of increasing downstream value chain. Note as we go higher in the chain also these big traders were very afraid of reflecting all the cost incurred like the (TRA) cost for fear of disclosing their information. Karatu wholesalers paid up to 1 493 Tshs for transport, 316 670 Tshs for fumigation (storage), 105 000 Tshs for communication and 5 000 Tshs sewing costs (Table 48). This still show the trend of increasing as compared to the costs incurred by collectors and retailers. Traders have been reflecting these costs to the price paid by their buyers.

Table 48: Marketing costs incurred by wholesalers

District	Babati				Karatu			
	n	Min	Max	Mean	n	Min	Max	Mean
Cleaning cost in Tshs per bag	4	120	1 200	880	3	500	2 000	1 167
Loading cost in Tshs per bag	6	144	600	431	7	500	500	500
Unloading cost in Tshs per bag	4	500	600	525	6	500	500	500
Transportation cost in Tshs per bag	5	1 000	10 200	5 780	7	500	3 500	1 493
Packaging cost in Tshs per bag	4	96	6 000	2 374	2	1000	1 000	1 000
Weighing cost in Tshs per bag	2	60	1 000	530	4	200	500	300
Sewing cost in Tshs per bag	1	42	42	42	1	5 000	5 000	5 000
Package(bags) cost in Tshs per bag	5	700	1 688	1 078	7	500	1 000	857
Brokers/collectors cost in Tshs per bag	6	120	1 800	1 120	1	1 000	1 000	1 000
TRA cost in Tshs per year (annum)	4	291 000	3 500 000	1 495 200	-	-	-	-
Tax collected at village borders (levy) in Tshs per bag	7	500	3 600	1 350	1	500	500	500
Fumigation cost in Tshs per season	4	500	150 000	56 675	6	100 000	1 000 000	316 670
Communication cost in Tshs per season	7	234 000	900 000	496 290	7	10 000	450 000	105 000

4.4.3.4 The marketing costs incurred by exporters

The survey found that as moving downstream the information acquisition becomes more difficult, i.e. most of the information were not disclosed by the exporters they would always pretend they are missing some of the information among the highest cost which were expected and were not disclosed was the TRA cost incurred by these exporters. I only managed to get among the high costs discussed the cost of transportation which was high 5 400 Tshs/bag for Babati and 9 000 Tshs/bag for Karatu (Table 49), and the cost of communication for Babati district which was 900 000 Tshs (Table 49). It was expected exporters to receive high cost but they did not disclose a lot of information concerning their business. But we have some information on the cost which was not so much exiting as other traders.

Table 49: The marketing costs incurred by exporters

District	Babati				Karatu			
	n	Min	Max	Mean	n	Min	Max	Mean
Cleaning cost in Tshs per bag	1	120	120	120	-	-	-	-
Loading cost in Tshs per bag	1	180	180	180	1	500	500	500
Unloading cost in Tshs per bag	1	180	180	180	1	500	500	500
Transportation cost in Tshs per bag	1	5 400	5 400	5 400	1	9 000	9 000	9 000
Packaging cost in Tshs per bag	1	120	120	120	1	1 000	1 000	1 000
Weighing cost in Tshs per bag	1	240	240	240	-	-	-	-
Sewing cost in Tshs per bag	1	120	120	120	-	-	-	-
The tax collected at village borders (levy) in Tshs per bag	-	-	-	-	1	670	670	670
Package(bags) cost in Tshs per bag	1	1 800	1 800	1 800	1	1 000	1 000	1 000
Communication cost in Tshs per season	1	900 000	900 000	900 000	-	-	-	-
The export tax or permit in Tshs per bag	-	-	-	-	1	10 000	10 000	10 000

4.4.4 Marketing Margin

4.4.4.1 Gross margin received by farmers in Babati and Karatu districts

The analysis indicates the average gross revenue for Babati was 954 740 Tshs, average total costs of production was 743 880 Tshs and the gross margin was 210 860 Tshs

(Table 50). The average gross revenue for Karatu was 745 820 Tshs, average total costs of production was 261 190 Tshs and the gross margin was 484 630 Tshs (Table 50). Looking at the total revenues Babati received higher revenue than Karatu, on the other hand average total cost of production for Babati was also high than Karatu as a result the gross margin for Karatu was higher than Babati. The difference in gross margin between the two districts is highly contributed by the type of labour employed in the production. Since Karatu employed high family labour (implicit cost) earned high gross margin. The use of family labour was minimal in Babati district and earned low gross margin. The analysis indicates in Babati about 16.9% of labour employed was family where as it was 63.2% in Karatu districts.

Table 50: Gross margin received by farmers in Babati and Karatu districts

District	n	Minimum	Maximum	Mean
Babati				
Total (gross) revenue received by farmers in pigeon pea production in Tshs	62	75 000	6 140 000	954 740
Average total cost incurred by farmers in pigeon pea production	62	35 000	6 440 000	743 880
Gross margin farmers are getting from pigeon pea production	62	-1 620 000	2 460 000	210 860
Karatu				
Total (gross) revenue received by farmers in pigeon pea production in Tshs	60	0.00	3 120 000	745 820
Total cost incurred by farmers in pigeon pea production	60	0.00	1 430 000	261 190
Gross margin farmers are getting from pigeon pea production	60	-1 350 000	2 530 000	484 630
Total				
Total (gross) revenue received by farmers in pigeon pea production in Tshs	122	0.00	6 140 000	851 990
Total cost incurred by farmers in pigeon pea production	122	0.00	6 440 000	506 490
Gross margin farmers are getting from pigeon pea production	122	-1 620 000	2 530 000	345 500

4.4.4.2 Marketing margin each type of trader is receiving

Analysis indicates the marketing margin for collectors was very small, for Babati district 1.94% for collectors and 12.14% for retailers but the marketing margin for wholesalers and exporters were 11.21% for wholesalers and 16.70% for exporters slightly higher for

exporters (Table 51). The margin usually reflects the costs incurred and profit set by traders, but may be due to the variation in price (price fluctuation) these small traders' collectors and retailers did not get high profit, as for exporters their margin was high. Many wholesalers and exporters have storage facilities to store their produce and their large in capital enables them to stay with pigeon pea for long time. They usually keep large stock in their store until they are assured of good price i.e. the Export Trading Company still had huge stock of pigeon pea in Babati by the time I visited them waiting for good price, both during the preliminary and main survey.

Traders in Karatu district margins were high and reflect the costs each trader was incurring and the profit set to them, as the margin was increasing moving high in the chain. Collectors had the margin of 4.04%, retailers 28.74%, wholesalers 29.04% and exporters 41.36% (Table 51). These margins reflected the costs incurred and profit set by these traders as cost were increasing moving high in the chain the margin were also increasing i.e. the export value chain (collectors – wholesalers – exporters).

Table 51: The marketing margin each type of trader is receiving

The type of trader District	The price of pigeon pea paid to farmers	The price paid by traders	The marketing margin	The mark up
Babati				
Collectors	687.50	700.87	1.94	1.90
Retailers	625.00	700.87	12.14	10.83
Wholesalers	700.87	789.40	11.21	12.63
Exporters	700.87	841.39	16.70	20.05
Karatu				
Collectors	668.83	696.97	4.04	4.20
Retailers	668.83	938.54	28.74	40.33
Wholesalers	668.83	942.54	29.04	40.92
Exporters	668.83	1 140.50	41.36	70.52

4.5 Pigeon Pea Trading Information

4.5.1 Source of supplies purchased by traders

An analysis of the source of supplies indicates the main source of supplies to other traders interviewed were farmers 92% and 56% for Babati and Karatu district respectively (Table 52). Even though traders did not only purchase direct from farmers other sources of supplies were also available (Table 52).

Table 52: Source of supplies purchased by traders

		Source of the produce (supplies) purchased by traders											
		Farmer		Farmer & Collector		Farmer, Collector & Transporter		Collectors		Farmer and Retailer		Total	
		n	%	n	%	n	%	n	%	n	%	n	%
Districts	Babati	23	92.0	0	0.0	0	0.0	1	4.0	1	4.0	25	100.0
	Karatu	14	56.0	10	40.0	1	4.0	0	0.0	0	0.0	25	100.0
Total		37	74.0	10	20.0	1	2.0	1	2.0	1	2.0	50	100.0

4.5.2 The contractual arrangements

There were three types of contracts traders had with their pigeon pea suppliers. The analysis indicated that 33.3% of traders their contract was written but not binding in anyway, 33.3% of traders their contracts was based on price contract between a farmer and exporter. And 33.3% of traders their contracts was written contract and binding in terms of quality and price of pigeon pea that they purchase from them (Table 53). Basically there were 3 traders with these types of contracts; Kilimo Market which made a contract with farmers which was written but not binding in anyway this is an exporter specialized in Karatu district. The Export Trading Company (ETC) Babati warehouse made a contract with farmers which were written contract and binding in terms of quality and price of pigeon pea that they purchase from them. The Export Trading Company in Arusha or Dar es Salaam made a contract with a farmer which is pricing contract between

a farmer and exporter. This company set the minimum price of pigeon pea they purchase from farmers who supplies pigeon pea to them (Table 53).

The duration of the contracts for all the three companies was one year, only differs on when the contracts starts and ends; the contact for the Export Trading Company Babati wholesale office starts in December and ends up in November. Export Trading Company exporters and processing industry Arusha office starts in January and ends in November while the contracts for the Kilimo Market starts in January and end up in December (Table 53)

Table 53: The contractual arrangements

District		Frequency	Percent
The type of contracts traders have with their pigeon pea suppliers			
Babati	Pricing contract between farmer and exporter	1	50.0
	Written contract and binding in terms of quality and price of pigeon pea that in purchase from them	1	50.0
Karatu	Written but not binding in any way	1	100.0
Total	Written but not binding in any way	1	33.3
	Pricing contract between farmer and exporter	1	33.3
	Written contract and binding in terms of quality and price of pigeon pea that in purchase from them	1	33.3
The duration of the contract in years			
Babati	1 year	2	8.0
Karatu	1 year	1	4.0
Total	1 year	3	6.0
The starting of the contract in months			
Babati	December	1	4.0
	January	1	4.0
Karatu	January	1	4.0
Total	December	1	2.0
	January	2	4.0
The end of the contract in months			
Babati	December	1	4.0
	November	1	4.0
Karatu	December	1	4.0
Total	December	2	4.0
	November	1	2.0

4.5.3 The obligations, penalties and enforcement of the contracts

The obligation of the Export Trading Company (ETC) in Babati districts was to supply seeds to farmers, and farmers supplied with seeds must sell their produce to the (ETC). The obligation for the (ETC) Arusha processing industry was (ETC) gives farmers the minimum guarantee of price not less than 700 Tshs/Kg for their pigeon pea harvest likewise farmers were obliged to supply the (ETC) with dry and clean pigeon pea. Whereas the obligations for the Kilimo Market and their farmers were to maintain the East African standards e.g. moisture content not more than 11%, foreign materials not more than 1% in pigeon pea, and pigeon pea for export has to be fumigated (Table 54).

The Kilimo Market did not set any penalty to farmers for the breach of the contracts between them and farmers. The Export Trading Company (ETC) claimed that they are the biggest traders of pigeon pea in Tanzania and that their price is the best hence no possibility of the farmers to sale their produce to another buyer (Table 54).

The enforcement of the contracts for Kilimo Market was between farmers and the Kilimo Market themselves, whereas the Export Trading Company contracts were enforced by the village officers, agricultural officers and the farmers Savings, Credit and Cooperatives Society (SACCOS) (Table 54).

Table 54: The contractual arrangements

District		Frequency	Percent
	The obligation for each part with supplier		
Babati	Export trading company supply seeds. Farmers must sell their produce to Export trading company	1	4.0
	Farmers should supply clean and dry pigeon pea, .ETC gives Minimum guarantee of 700	1	4.0
Karatu	Maintaining East Africa standards	1	4.0
Total	Export trading company supply seeds, Farmers must sell their produce to Export trading company	1	2.0
	Farmers should supply clean and dry pigeon pea, .ETC gives Minimum guarantee of 700	1	2.0
	Maintaining East Africa standards	1	2.0
	The penalties for breaching the contract with suppliers		
Babati	No penalties	1	4.0
	The price paid by ETC is the beating price no possibility of selling to another buyer	1	4.0
Karatu	No penalties	1	4.0
Total	No penalties	2	4.0
	The price paid by ETC is the beating price no possibility of selling to another buyer	1	2.0
	Who are to enforce the contract with supplier		
Babati	The price paid by ETC is the beating price no possibility of selling to another buyer	1	4.0
	Village officers. Agricultural officers, & Farmers SACCOS	1	4.0
Karatu	Kilimo market and Farmers	1	4.0
Total	Kilimo market and Farmers	1	2.0
	The price paid by ETC is the beating price no possibility of selling to another buyer	1	2.0
	Village officers, Agricultural officers, & Farmers SACCOS	1	2.0

4.5.4 Market outlet for pigeon pea

An analysis of the market outlet indicates that most of pigeon pea goes to wholesalers and exporters by 71.4% and 32.7% respectively for Babati district, where as in Karatu pigeon pea purchased by traders most of it went to individual, hotels and wholesalers (Table 55).

Table 55: Market outlet for pigeon pea

			Districts		
			Babati	Karatu	Total
Market outlets pigeon pea was sold[a]	Exporter	n	9	7	16
		% within district	37.5	28.0	
		% of Total	18.4	14.3	32.7
	Individual consumer	n	2	9	11
		% within district	8.3	36.0	
		% of Total	4.1	18.4	22.4
	Wholesalers	n	16	19	35
		% within district	66.7	76.0	
		% of Total	32.7	38.8	71.4
	Retailer	n	1	4	5
		% within district	4.2	16.0	
		% of Total	2.0	8.2	10.2
	Hotels and Restaurants	n	0	5	5
		% within district	0.0	20.0	
		% of Total	0.0	10.2	10.2
	Importer	n	1	1	2
		% within district	4.2	4.0	
		% of Total	2.0	2.0	4.1
Total		m	24	25	49
		% of Total	49.0	51.0	100.0

Percentages and totals are based on respondents.

a. Group

4.5.5 Trader's organizations

There were two major traders' organizations which existed in the region, for Babati and Karatu districts collectors and wholesaler's organizations; the analysis indicates there were very few members of the organizations 4% and 12% of collector's organization in Babati and Karatu respectively and 4% and 24% of wholesaler's organizations in Babati and Karatu district respectively (Table 56). This shows the marketing of pigeon pea was not very governed since many actors act independently without control of any organization or the government. For such business environment it is very easy for cartel to set price and take control over the market as it was mentioned among the problems traders faced.

Table 56: Trader's organizations

District	The organization which traders belong	Frequency	Percent
Babati	Collectors	1	4.0
	Wholesalers	1	4.0
Karatu	Collectors	3	12.0
	Wholesalers	6	24.0
Total	Wholesalers	7	63.6
	Collectors	4	36.4

4.5.6 The quantity handled by traders in bags

An analysis of quantity handled shows in average the number of bags of (120kg) purchased in Babati and Karatu were 4 749 and 293 respectively (Table 57). These averages are affected by the huge quantity purchased by exporters i.e. the 50 000 and 1 887 maxima (Table 57) which were purchased by Export Trading Company (ETC) and Kilimo Market in Babati and Karatu district respectively. The quantities sold at the domestic market were 3 126 and 207 for Babati and Karatu with the maximum of 33 333 from ETC warehouse (wholesale) at Babati district which went to ETC Arusha (exporters) (Table 57). Not all the quantity purchased was sold some of the quantity was kept in traders store (stock). This analysis indicates the quantities exported were 16 667 and 1 867 for Babati and Karatu respectively (Table 57). Noted in the analysis this amount was from the two companies ETC and Kilimo market. The quantity sold at domestic market some of it was purchased by the exporters through their wholesaler's agent and warehouse in the village and some went to the local consumers, this is why huge quantity of pigeon pea went for export market.

Table 57: Quantity handled

District				
The number of bags of 120Kg purchased last season (2010/2011) by traders				
	n	Minimum	Maximum	Mean
Babati	25	40.00	50 000.00	4 749
Karatu	25	2.00	1 866.67	293
Total	50	2.00	50 000.00	2 521
The number of bags of 120 Kg sold at the domestic market last season (2010/2011) by traders				
	n	Minimum	Maximum	Mean
Babati	21	40.00	33 333.33	3 126
Karatu	11	2.00	800.00	207
Total	32	2.00	33 333.33	2 123
The number of bags of 120Kg exported last season (2010/2011) by traders				
Babati	1	16 666.67	16 666.67	16 667
Karatu	1	1 866.67	1 866.67	1 867
Total	2	1 866.67	16 666.67	9 267

4.6 Key Actors in the Pigeon pea Export Oriented Market Value Chain.

4.6.1 Key actors in the pigeon pea value chain

A survey identified nine actors in pigeon pea value chain for export and domestic value chain, including input suppliers, farmers, brokers, collectors, wholesalers, retailers, consumers (local, hotels, restaurants, and farmers), exporters and processing industries for export. Actors in the chain exhibited a more than one way interaction between the chain members, i.e. farmers sold direct to exporters, local consumers or via the longest domestic value chain of farmer-broker-collector-wholesalers-retailers-local consumers or farmers-broker-collector-wholesalers-exporters and processing industries for export (Fig 4).

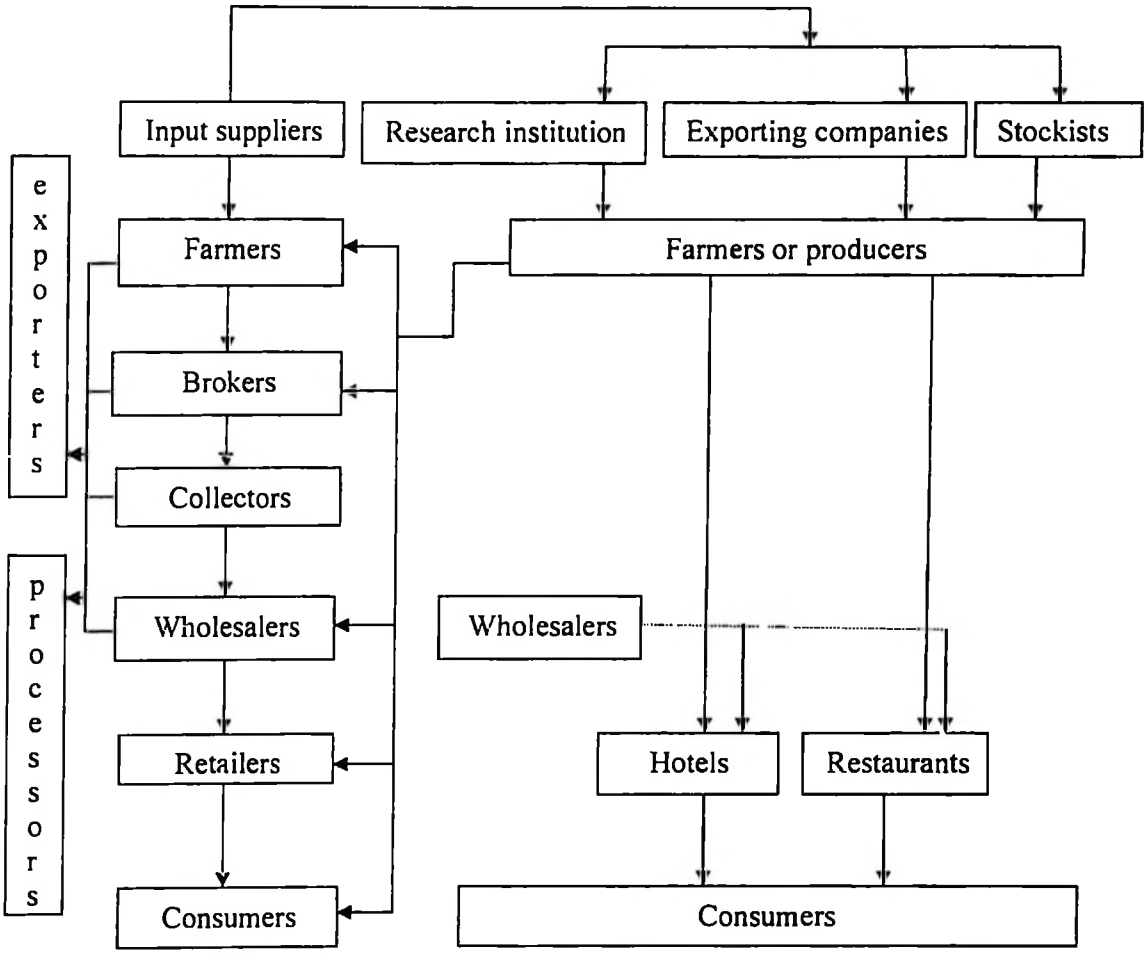

Figure 5: Key actors in pigeon pea value chain in Babati and Karatu districts

Key: ⟶ Pigeon pea value chain

4.6.2 Exporting countries of destination for pigeon pea

The pigeon pea crops market is mainly found wherever the Indian people have migrated to since they are the most consumers of the crop. So many countries have been importing pigeon pea but in different percentage some of the countries which are the pigeon pea export destination are India, China, Pakistan, Japan, Turkey, Dubai, Kenya, United Kingdom, Bulmer, Australia and the United State of America, the distribution is also shown (Table 58).

Table 58: Exporting countries of destination for pigeon pea

			Districts		
			Babati	Karatu	Total
Exporting countries of destination[a]	China	n	3	0	3
		%	30.0	0.0	30.0
	India	n	8	1	9
		%	80.0	10.0	90.0
	Pakistan	n	2	0	2
		%	20.0	0.0	20.0
	Japan	n	2	0	2
		%	20.0	0.0	20.0
	Turkey	n	3	0	3
		%	30.0	0.0	30.0
	Dubai	n	1	0	1
		%	10.0	0.0	10.0
	Kenya	n	2	1	3
		%	20.0	10.0	30.0
	United Kingdom (UK)	n	1	0	1
		%	10.0	0.0	10.0
	United States of America (USA)	n	1	0	1
		%	10.0	0.0	10.0
	Bummer	n	0	1	1
		%	0.0	10.0	10.0
	Australia	n	0	1	1
		%	0.0	10.0	10.0
Total		n	9	1	10
		%	90.0	10.0	100.0

Percentages and totals are based on respondents.

a. Group

4.7 Constraints Facing Different Actors within the Value Chain

4.7.1 Ranking of the marketing problems experienced by farmers

An analysis of the marketing problems ranking was done by identifying the problem with high frequency (absolute ranking by farmers) and percentage as the most important and high in rank as mentioned by farmers. This analysis identified nine ranks of the marketing problems in Babati (Table 59) with price fluctuation, no assurance of market and low price ranked high by farmers in the district (Table 59). This analysis indicates the marketing for pigeon pea in Babati district was more challenging as compared to Karatu district as many problems were experienced in Babati.

Likewise farmers in Karatu district identified one major problem experienced (Table 59) as low price was ranked high by farmers. In Karatu district farmers were assured of the market by Kilimo Market (KM) as the KM entered contract with them, for Babati district there were so many actors who bought pigeon pea without contracts only Export Trading Company (ETC) established a contract which was new to farmers last season compared to KM which started three years back. Besides Kilimo market having the long lasting contracts relation with their farmers. They also helped farmers to form farmers group which were organized to form farmer's organization as Farmers Saving and Credit Cooperatives Society (SACCOS). Under the assistance of National Microfinance Bank (NMB) this SACCOS was registered and farmers were able to sell their produce under the crop receipt system.

Some of the marketing problems were mention by a few farmers as shown by the number of frequency. Some of them were only mention by one farmer as a problem in the marketing of pigeon pea. The problem of high priority was to be mention by a large number of farmers, thus for the problems which were having a frequency of just one, were treated low ranked and are of equal importance.

Table 59: Ranking of the marketing problems experienced by farmers

			Districts		
			Babati	Karatu	Total
Marketing problems experienced by farmers[a]	Price fluctuation (Rice and fall)	n	45	0	45
		%	72.6	0.0	72.6
	No assurance of market	n	34	0	34
		%	54.8	0.0	54.8
	Low price	n	17	4	21
		%	27.4	6.5	33.9
	Few collectors and no competition	n	10	0	10
		%	16.1	0.0	16.1
	No permanent price	n	12	0	12
		%	19.4	0.0	19.4
	Government does not set price	n	7	0	7
		%	11.3	0.0	11.3
	Higher cost of production	n	3	0	3
		%	4.8	0.0	4.8
	Traders cheat farmers on price	n	2	0	2
		%	3.2	0.0	3.2
	Collectors set price	n	1	0	1
		%	1.6	0.0	1.6
	Inputs were expensive	n	2	0	2
		%	3.2	0.0	3.2
	No exporters and good price	n	1	0	1
		%	1.6	0.0	1.6
	Low production	n	2	0	2
		%	3.2	0.0	3.2
	Farmers not recognized by government	n	1	0	1
		%	1.6	0.0	1.6
	Collectors and retailers want more profit	n	1	0	1
		%	1.6	0.0	1.6
	Long distance from market	m	1	0	1
		%	1.6	0.0	1.6
Total		n	58	4	62
		%	93.5	6.5	100.0

Percentages and totals are based on respondents.

a. Group

4.7.2 Marketing problems faced by each type of traders

4.7.2.1 Ranking of the marketing problems experienced by collectors

Collectors are small business men/women specialize in collecting pigeon pea in the village with some of them farmers who collects pigeon pea from other farmers and sell it to other traders. The ranking of the marketing problems was done by identifying the

problem which has been high in frequency mention by traders as the one in high rank. Collectors in Babati and Karatu district identified five ranks of the marketing problems (Table 60) with price fluctuation, completion with big companies and low price being high in ranks for Babati and price fluctuation, poor quality of pigeon pea, lack of market and lack of marketing information being high in ranks for Karatu (Table 60).

Table 60: Ranking of the marketing problems experienced by collectors

Trader				Districts Babati	Karatu	Total
Collector	Marketing problems faced[a]	Rise and fall of price (price fluctuation)	n	7	4	11
			%	35.0	20.0	55.0
		Competition with big buyers	n	4	0	4
			%	20.0	0.0	20.0
		Low price	n	5	1	6
			%	25.0	5.0	30.0
		Low production (harvest)	n	3	0	3
			%	15.0	0.0	15.0
		Brokers price competition	n	1	0	1
			%	5.0	0.0	5.0
		Poor quality of pigeon pea (dirty)	n	1	7	8
			%	5.0	35.0	40.0
		No buyers or market	n	2	3	5
			%	10.0	15.0	25.0
		Government doesn't set prices	N	1	0	1
			%	5.0	0.0	5.0
		Government gives few traders permit to export pigeon pea	n	1	0	1
			%	5.0	0.0	5.0
		Lack of marketing information	n	0	3	3
			%	0.0	15.0	15.0
		There is no standard price	n	0	1	1
			%	0.0	5.0	5.0
		Pigeon pea altered by insects	n	0	3	3
			%	0.0	15.0	15.0
	Total		n	10	10	20
			%	50.0	50.0	100.0

Percentages and totals are based on respondents.

a. Group

4.7.2.2 Ranking of the marketing problems experienced by retailers

An analysis indicates retailers in Babati district have many problems compared to retailers in Karatu district, retailers in Babati identified four ranks of the marketing problems experienced by them, where as retailers in Karatu district identified two ranks of the marketing problems which they experienced. With price fluctuation, competition, no buyer or market and lack of capital are high in ranks for Babati (Table 61) and lack of capital, knowledge and poor quality for pigeon pea being highly ranked by Karatu district (Table 61).

Table 61: Ranking of the marketing problems experienced by retailers

				Districts		
				Babati	Karatu	Total
Retailer	Marketing problems faced[a]	Rise and fall of price (price fluctuation)	n	6	0	6
			%	54.5	0.0	54.5
		Competition with big buyers	n	5	0	5
			%	45.5	0.0	45.5
		Low price	n	0	1	1
			%	0.0	9.1	9.1
		Poor quality of pigeon pea (dirty)	n	0	2	2
			%	0.0	18.2	18.2
		No buyers or market	n	2	0	2
			%	18.2	0.0	18.2
		Government doesn't set prices	n	2	0	2
			%	18.2	0.0	18.2
		Health hazards	n	1	0	1
			%	9.1	0.0	9.1
		Fake chemicals	n	1	0	1
			%	9.1	0.0	9.1
		Wholesalers want to get more profit	n	1	0	1
			%	9.1	0.0	9.1
		Farmers don't know the market	n	1	0	1
			%	9.1	0.0	9.1
		Due to free market buyers buy at their own price	n	1	0	1
			%	9.1	0.0	9.1
		Lack of capital	n	2	2	4
			%	18.2	18.2	36.4
		Lack of knowledge	n	0	2	2
			%	0.0	18.2	18.2
	Total		n	7	4	11
			%	63.6	36.4	100.0

Percentages and totals are based on respondents.

a. Group

4.7.2.3 Ranking of the marketing problems experienced by wholesalers

The ranking of the marketing problems were decreasing as moving high in the value chain wholesalers identified three ranks of the marketing problems experienced by them for both districts Babati and Karatu district. With rise and fall of price and competition with big companies being highly in ranks in Babati and poor quality of the product and low price being highly ranked in Karatu (Table 62).

Table 62: Ranking of the marketing problems experienced by wholesalers

				Districts		
				Babati	Karatu	Total
Wholesaler	Marketing problems faced[a]	Rise and fall of price (price fluctuation)	n	5	0	5
			%	38.5	0.0	38.5
		Competition with big buyers	n	4	1	5
			%	30.8	7.7	38.5
		Low price	n	2	4	6
			%	15.4	30.8	46.2
		Poor quality of pigeon pea (dirty)	n	0	5	5
			%	0.0	38.5	38.5
		Government doesn't set prices	n	1	0	1
			%	7.7	0.0	7.7
		Due to free market buyers buy at their own price	n	1	0	1
			%	7.7	0.0	7.7
		Payment to collectors	n	1	0	1
			%	7.7	0.0	7.7
		Availability of monopoly market	n	1	0	1
			%	7.7	0.0	7.7
		Market not available	n	0	1	1
			%	0.0	7.7	7.7
		Price not stable	n	1	1	2
			%	7.7	7.7	15.4
		Challenges of weighing produces	n	0	1	1
			%	0.0	7.7	7.7
		High tax	n	1	1	2
			%	7.7	7.7	15.4
		High transportation cost	n	0	1	1
			%	0.0	7.7	7.7
	Total		n	6	7	13
			%	46.2	53.8	100.0

Percentages and totals are based on respondents.

a. Group

4.7.2.4 Ranking of the marketing problems experienced by Exporters

Exporters experienced few problems as compared to other traders. Exporters in Babati mentioned the Requirements of the Radio Atomic certificate as the constraint to them in exporting pigeon pea (Table 63). Where as in Karatu district exporters mention the difficult in accessing India market, lack of capital and the tendency of cartel to set price for pigeon pea as the limitation to exporting pigeon pea (Table 63).

Table 63: Ranking of the marketing problems experienced by exporters

				Districts		
				Babati	Karatu	Total
Exporter	Marketing problems faced[a]	Lack of capital	n	0	1	1
			%	0.0	50.0	50.0
		Radio Atomic Certificate	n	1	0	1
			%	50.0	0.0	50.0
		Limited access to Indian market	n	0	1	1
			%	0.0	50.0	50.0
		Cartel sets prices	n	0	1	1
			%	0.0	50.0	50.0
	Total		n	1	1	2
			%	50.0	50.0	100.0

Percentages and totals are based on respondents.

a. Group

4.8 The Hypothesis put Forward in the Study

4.8.1 First hypothesis

It was hypothesized farmers with high profitability/gross margins, access to extension services, and large areas are likely to involve in production of pigeon pea for export. The analysis indicates the participation in export market (selling to exporters) was influenced by gross margins received by farmers and main occupations of farmers. Gross margin was positive and significant at 5% whereas main occupation was negative and significant at 5% (Table 64). Therefore gross margin has positive influence on pigeon pea production for export and main occupation has negative influence on pigeon pea production for export

Table 64: Participation of farmers in pigeon pea export oriented market

Logistic regression				Number of obs		103
				LR chi2(6)		13.10
				Prob > chi2		0.04
Log likelihood = -34.389853				Pseudo R2		0.16
partfmex	Coef.	Std. Err.	Z	P>|z|	95% Conf	Interval
age	0.03	0.03	1.33	0.26	-0.23	0.09
gender	Omitted	-	-	-	-	-
edulevel	0.01	0.11	0.90	0.37	-0.12	0.32
mainoccu	-1.82	0.83	-2.18	0.03	-3.46	-0.18
areacult	-0.44	0.35	-1.26	0.20	-1.11	0.24
accext	-1.02	0.81	-1.25	0.21	-2.60	0.59
grossmgn	$1.20e^{-06}$	$5.23e^{-07}$	2.34	0.02	$-1.93e^{-07}$	$2.20e^{-06}$
-const	-1.64	2.00	-0.82	0.41	-5.58	2.29

Variables which entered in the model were dummy participation in pigeon pea production for export (partfmex), age, dummy gender, education level (edulevel),dummy main occupation (mainoccu), area cultivated in hectares (areacult), dummy access to extension services (accext) and gross margin in Tshs (grossmgn).

4.8.2 Second Hypothesis

It was hypothesized costs and prices are related to the marketing margins different actors receive in the value chain for pigeon pea export oriented market. Correlation analysis between total costs incurred by actors and their marketing margin was run (Table 65). The result indicates a positive and strong relationship but not significant relation between costs and margin for Babati. A negative and week relationship but not significant relation between costs and margins for Karatu was also observed. Therefore there is strong and positive relation in Babati and a week and negative relation in Karatu between costs and margins which are not significant (Table 65).

Table 65: Correlation analysis between costs and prices

District			Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Babati	Interval by Interval	Pearson's R	0.503	0.364	0.823	0.497[c]
	Ordinal by Ordinal	Spearman Correlation	0.200	0.693	0.289	0.800[c]
	N of Valid Cases		4			
Karatu	Interval by Interval	Pearson's R	-0.021	0.366	-0.030	0.979[c]
	Ordinal by Ordinal	Spearman Correlation	-0.200	0.693	-0.289	0.800[c]
	N of Valid Cases		4			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Correlation analysis between prices and margins for actors was run. Test indicates a positive and strong relation between prices and margins for Babati but not significant and strong and positive relation for Karatu which is significant (Table 66). Therefore there is a strong and positive relation between prices and margins which is not significant for Babati and a strong and positive relation which is significant for Karatu.

Table 66: Correlation analysis between prices and margins

District			Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Babati	Interval by Interval	Pearson's R	0.510	0.282	0.838	0.490[c]
	Ordinal by Ordinal	Spearman Correlation	0.400	0.574	0.617	0.600[c]
	N of Valid Cases		4			
Karatu	Interval by Interval	Pearson's R	0.987	0.007	8.709	0.013[c]
	Ordinal by Ordinal	Spearman Correlation	1.000	0.000[c]		
	N of Valid Cases		4			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

4.8.3 Third hypothesis

It was also hypothesized the constraints different actors faces are related to the requirement of the export market for pigeon pea. Very few problems traders faced

associate with the requirement of the export oriented market i.e. The need for The Radio Atomic Certificate (RAC), the lack of capital to export pigeon pea, difficulties in accessing Indian market and cartel setting price (Table 61). Therefore problems traders' faced were not necessarily associated with export market requirements.

4.8.4 Fourth hypothesis

It was also hypothesized the number of actors in the pigeon pea export oriented market is related to the efficiency in the value chain. The number of actors in the pigeon pea export market has contributed to the good price farmers are receiving farmers have been able to sell their pigeon pea at competitive prices due to the availability of many buyers who compete on price and increase the price of farm produce i.e. Table 67 indicates the number of farmers who were selling direct to exporters. Therefore existence of many buyers has contributed to the prices received at farm gate.

Table 67: Participation of farmers in export market

			Districts		
			Babati	Karatu	Total
Participation of farmers in export market (selling to exporters)	Yes	n	0	14	14
		%	0.0	100.0	100.0
	No	n	62	46	108
		%	57.4	42.6	100.0
Total		n	62	60	122
		%	50.8	49.2	100.0

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusions

5.1.1 Profitability/gross margins of investing in pigeon pea production

Pigeon pea production was found profitable farming business for Farmers and traders. The employment of family labour made farmers in Karatu more profitable than Babati as the gross margin for Karatu was higher than Babati. Traders were able to receive profit as reflected by the marketing margins received, only retailers and collectors in Babati district received low margin. This was due to competition, price fluctuation and inability to own storage facilities for these small traders.

The introduction of new varieties in Babati and Karatu district has assisted farmers to catch up the export market, but still there are farmers who plant the long maturity varieties. These varieties mature at the time when the world market for the pigeon pea is saturated with pigeon pea from world best producing countries, like India and Myanmar whose pigeon pea is harvested around late October. Good varieties may help to improve the profitability of pigeon pea business.

5.1.2 Pigeon pea pricing structure costs and margin

Pigeon pea marketing costs were relating to the marketing margin. As the costs were increasing moving downstream the marketing margins were also increasing. Traders translated the high in costs of marketing into the final price received by their buyers.

5.1.3 Constraints faced different actors in the value chain

The marketing of agricultural products experience similar problems. It was observed that, the marketing of pigeon pea experienced many problems. Price fluctuation, Low price, unavailability of market, and high transport cost were among the problems experienced by all types of actors in the pigeon pea business; farmers, collectors, retailers, wholesalers and exporters. The extent of these problems varies due to economies of scale; the marketing problems were decreasing as moving high in the chain. The ability to own storage facilities, capital, skills and access to market were among the key cause of the decreasing trend in these marketing problems.

The pigeon pea framers in Karatu and Babati districts complained of the Government not setting price for pigeon pea. It was observed during the survey that, only a few farmers were organized into farmers Savings and Credit Cooperatives Society (SACCOS). These SACCOS were registered and complied with the government crop receipt system which was organized by National Microfinance Bank (NMB) in Karatu district, but these farmers group received the lowest price. The price set was 650 Tshs/Kg but there were numerous middlemen who purchased pigeon pea at the price higher than 650 Tshs/kg, and most of these farmers group were organized by the Kilimo Market who basically buys large amount of pigeon pea from Karatu farmers.

5.1.4 Key actors in the pigeon pea value chain

Agricultural production and marketing is characterized by presence of many actors in the business (perfect competition). The availability of many actors in pigeon pea business; input suppliers, farmers, collectors, retailers, wholesalers, exporters, brokers and processing industries for export made the price for pigeon pea received by actors more

efficient i.e. the price received by farmers were different and high due to the presence of many actors in the business.

However the study revealed the gap of information creation between the producers of pigeon pea and the buyers of pigeon pea. To large extent pigeon pea trader's access limited information on pigeon pea marketing, but it was very hard for farmers to receive adequate information on pigeon pea marketing like price. This information gap between actors was to some extent the course of price variation between producers.

5.2 Recommendations

5.2.1 Stabilization of pigeon pea price

The ministry of agriculture should set the researched indicative minimum price for pigeon pea in the area but, should not restrict others traders who wish to pay more than the indicative price. The system of organizing the market for the pigeon pea need to be established as currently pigeon pea actors acts independently, they are not controlled by anyone they may decide to set price according to their will.

5.2.2 Pigeon pea indicative price

It is possible to announce the indicative prices at the authority so as farmers may know at what prices their pigeon pea is selling, and consider that indicative prices before they decide to sell their pigeon pea harvest.

5.2.3 Contribution of research and extension

The research and extension stuffs need to educate farmers on when to fetch good prices for their produce. There is a need to give marketing and entrepreneur skills to these farmers, it seems that farmers are aware of the export market but still need entrepreneur

skills, farmers must learn how to research on the market for their produce before they decide to produce a particular crop. This will help to improve the profitability of their pigeon pea farming business.

5.2.3 Promotion of pigeon pea

If you read on literature the news about pigeon pea talks about Babati and northern zone of Tanzania, but pigeon pea could be promoted to other areas which have the potential of producing the crop since the market for pigeon pea is clear. It needs to be promoted to other areas and save as a cash income to the poor house hold farmers in the rural areas like those in Babati and Karatu districts.

5.3 Suggested Area for further Study

If fund and time allows a research may be conducted to research on the demand side for pigeon pea to the importing countries. Pigeon pea from Babati is said to be the best preferred produce but farmers and actors in the pigeon pea may wish to know how much their produce is demanded, and by which countries, farmers may boost production if they are aware of the demand for their produce rather than understanding the local market. Most of the information on pigeon pea business was availed to big traders only.

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APPENDICES

Appendix 1: Producer's questionnaire for pigeon pea marketing

Questionnaire No .....Date of Interview .....
Division .....Ward.....Village.....
Interviewers name.....
Name of respondent .....

A. Socio – demographic information

1. Age in years .....
2. Sex ..... (1 = Male, 2 = Female)
3. Marital status of the head of household ..... (1 = Married, 2 = Single, 3 = Divorced, 4 = Widowed).
4. Level of education ..... (Years spent in school)
5. How many people belong to the family and share the same meal? .....
6. What is your main occupation? .....

B. Farming information

7. Do you grow pigeon pea? ..... (1 = yes, 2 = No)
8. What is the main reason for growing pigeon pea (7) above? ..... (1= selling for export market, 2 = family consumption 3 = Available domestic market 4 = others specify .....
9. Did you directly export any of the pigeon pea that you produced last season (2010/11)? ..... (1 = Yes, 2 = No)
10. How many hectares of pigeon pea did you grow last season (2010/11)? .....
11. How many varieties of pigeon pea did you grow? .....
12. Can you mention the varieties you grew (11) above? (1 = ...2 = ...3 = ...4 = ...5 =.....6 =.....)
13. What is the reason for growing each of the variety (12) above?

No.	Name of variety	Reason for cultivating
1		
2		
3		
4		

14. Where is the origin of each variety that you cultivated last season? (1 = ...2 = ... 3 = ...4 = ...5 = ...6 = ...)
15. Which varieties are preferred for export market? ..... (1, 2, 3, 4, 5, or 6)
16. How many bags of pigeon pea did you harvest last season (2010/2011)? .....
17. Indicate the amount of product consumed of the pigeon pea harvested last season (2010/2011) below

Products	**Amount consumed** (in Kg, Tins or Bags)
1. Fresh pigeon pea	
2. Dry pigeon pea	
3. Others specify	

18. Indicate the amount sold of the pigeon pea harvested last season 2010/2011 below

Type of buyer	**Amount sold** (in Kg, Tins or Bags)
1. Collector	
2. Retailer	
3. Wholesaler	
4. Exporter	
5. Consumer (local)	
6. Others specify	

19. What prices did you receive when you sold pigeon pea in the following quantities?

Quantity	**Prices**
1. Kilogram (1Kg)	
2. Tin (20Kg)	
3 Bags (120 Kg)	
4. Others specify	

20. What prices did you receive when you sold pigeon pea to the following buyers?

Type of buyer	Prices
1. Collector	
2. Retailer	
3. Wholesaler	
4. Exporter	
5. Consumer	
6. Others specify	

21. Why do you think they charge such a price? (Explain) for each buyer

Type of buyer	Reason for the price they pay (charge)
1. Collector	
2. Retailer	
3. Wholesaler	
4. Exporter	
5. Others specify	

22. Where is the main market for pigeon pea?
    .....
23. Do you access extension services in your focus on pigeon pea & last production season? ..... (1 = Yes, 2 = No)
24. Do you grow other crops in your farm? ..... (1 = Yes, 2 = No)
    If the answer to question 24 is no go to question 26
25. If the answer to question 24 is yes mention the other crops that you grow
    .....

C. Farming input costs

26. Indicate the inputs used in producing pigeon pea last season

Inputs used	(Quantity) i.e. in Kg	Unit price in (Tshs)	Total costs
1. Seeds			
2. Fertilizer			
3. Herbicides			
4. Pesticides			
5. Insecticides			
6. Others mention them			

27. Which type of labour did you employ in pigeon pea production? .....
(1 = Family labour, 2 = Hired labour, 3 = Exchange labour, 4 = Family & Hired Labour, 5 = Hired and Exchange Labour, 6 = All Family, Hired and Exchange Labour)

D. Indicate the costs of labour employed in pigeon pea production last season

Activity	Labour cost (Tshs/man day or piece of work	Total cost
1. Cultivation (Primary)		
2. Cultivation (Secondary)		
2. Planting		
3. Weeding		
4. Harvesting		
5. Transporting		
6. Loading		
7. Unloading		
8. Shelling		
9. Others mention them		

28. How do you sell your pigeon pea?
.....
a) Sell at home to farm collectors
b) Transport and sell the pigeon peas to the market place

29. Which type of trader bought pigeon pea at home?
.....
If you did not transport Pigeon pea go to question 31

30. How did you transport the pigeon pea to the market place? .....

E. Transport cost to the market

Means of transport	Cost in (Tshs/kg or Bag)	Total cost
1. Wheel barrow		
2. Tractor		
3. Scania		
4. Trucks/vehicles		
5. Bicycle		
6. Others mention them		

31. Mention other marketing costs incurred in selling your pigeon pea last season

Type of cost	Cost in Tshs	Total cost
1. Communications		
2. Levy		
3. Others specify		

32. Indicate the handling cost incurred before selling of pigeon pea

F. Handling costs

Handling costs	Cost in (Tshs/kg or Bag)	Total cost
1. Cleaning		
2. Packaging		
3. Package		
4. Storage		
5. Sewing		
6. Thread		
7. Payment to those doing the storage		
8. Others specify		

G General market associated questions

33. Did you experience any marketing problems in marketing of pigeon pea last season? ..... (1 =Yes, 2 = No)

34. If yes can you list all the marketing problems you faced last season?

.....

.....

35. Can you rank the marketing problems in order of importance you have mentioned above (1)..... (2)..... (3)..... (4).....

36. How do you price your produce? ..... (1 = Based on market price, 2 = Based on the type of client, 3 = Based on the market location, 4 = Based on the income of client) 5. Others specify.....

THANK YOU FOR YOUR COOPERATION

Appendix 2: Questionnaire for pigeon pea traders. Collectors / Retailers / Wholesalers and Exporters Questionnaire

A. Tracking information

1. Name of the market .....
2. Name of the respondent .....
3. Age ..... (In years)
4. Sex ..... (1 = Male, 2 = Female)
5. Marital status of the head of household ..... (1 = Married, 2 = Single, 3 = Divorced, 4 = Widowed)
6. Level of education ..... (Years spent in school)
7. How may people belong to your family and share the same meal .....

B. Source of the produce

8. What was the source (s) (suppliers) of pigeon pea that you purchase last season?
   Supplier 1
   .....
   Supplier 2
   .....
   Supplier 3
   .....

9. At what prices did you purchase pigeon peas last season?

Supplier market	Prices (Tshs/ Bag or Kg)
1. Producer/farmer	
2. Collectors	
3. Trucker/transporter	
4. Retailer	
5. Wholesalers	
6. Others specify	

10. Do you have any contractual arrangements with your pigeon pea suppliers? .....
    (1 Yes, 2 = NO)
    If no to question 10 go to question 16
11. If Yes to question 10 how would you describe the contractual arrangement that you have with your pigeon pea suppliers
    a. Written contact and binding in terms of quantity and price of pigeon pea that I purchase from them
    b. Written but not binding in any way
    c. Verbal non-binding
    d) Verbal and binding in terms of quantity and price of pigeon pea that I purchase from them
    e) Other specify
    .....

12. For the contract you entered indicate the following

Contract duration in (years, months, weeks, or days)	Starting time in (years, months, weeks, or days)	Ending time in (years, months, weeks, or days)

13. What are the obligations for each party? .....
14. What are the penalties for breaching the contract? .....
15. Who are to enforce the contracts you have entered? .....

C. Market Outlets and Prices

16. Indicate the market outlet where you sell your pigeon pea and price received

Outlet market	Price (Tshs / Bag or kg)
1. Individual consumer	
2. Hotel / restaurant	
3. Retailer	
4. Wholesalers	
5. Direct export	
6. Others (specify)	

17. Do you have any contractual arrangements with your pigeon pea buyers? ..... (1 = Yes, 2 = NO)
    If no to question 17 go to question 23
18. If yes to question 17 how would you describe the contractual arrangement that you have with your pigeon pea buyers
    a. Written contact and binding in terms of quantity and price of pigeon pea that I sell to them
    b. Written but not binding in any way
    c. Verbal non-binding
    d) Verbal and binding in terms of quantity and price of pigeon pea that I sell to them
    e) Other specify
    .....
19. For the contract you entered indicate the following

Contract duration in (years, months, weeks, or days)	Starting time in (years, months, weeks, or days)	Ending time in (years, months, weeks, or days)

20. What are the obligations for each party? .....
21. What are the penalties for breaching the contract? .....
22. Who are to enforce the contracts you have entered? .....

23. Do you have any of the following organizations? ..... (1 = Wholesalers, 2 = Retailers, 3 = Collectors, 4 = Others specify
    .....
24. Which organization do you belong (23) above? ..... (1, 2, 3, or 4)
25. How many intermediaries are involved in the market of pigeon pea? Tick if apply (1= Wholesalers 2 = Retailers 3 = collectors 3 = Exporters others mention them.....

D. Marketing Costs

26. Indicate the expenses you incur in selling your produce

Item	Description	Costs (Tshs) per. unit
1. Cleaning charges		
2. Loading		
3. Unloading		
4. Transportation		
5. Packaging		
6. Weighing		
7. Sewing		
8. Package (bags)		
9. Payment to brokers and or collectors		
10. TRA fee per year		
11. Tax collected at village borders		
12. Fumigation (storage)		
13. Communication		
14. Export tax or permits		
15. Export rules & regulations		
16. Others mention them		

27. Do you own / operate means of transport? ..... (1 = Yes, 2 = No). If yes indicate the type of transport capacity and ownership.

Type of transport	Capacity (give units)	Ownership (1 = own, 2 = hired)
1. Pick up		
2. Truck		
3. Tricycle		
4. Bicycle		
5. Oxen / donkey carts		
6. Push carts		
7. Others specify		

E. Quantity of produce handled

28. How many bags or kilograms did you purchase last season? .....
29. How many bags or kilograms did you sell last season? .....
30. Out of the amount of pigeon pea you purchased last season how many bags did you sell at the domestic (local) market?
    .....
31. Out of the amount of pigeon pea that you purchased did you sell any outside the country (export)? (1 = Yes, 2 = No)

Get the amount exported if the answer is Yes .....

32. What are the exporting countries of destination? .....
33. Are there any factors that are preventing you from exporting your pigeon pea?
    .....
34. How do you price your product? ..... (1 = Based on market price, 2 = Based on the type of client, 3 = Based on the market location, 4 = Based on the income of client) 5. Others specify .....
35. What kind of marketing information are you receiving?

(Tick all that apply) a) Price ..... b) Product quality..... c) Product physical traits .....d) Crop high in demand ..... e) others specify
.....

36. Are there any marketing problems in marketing of pigeon pea? .....
(1 =Yes, 2 = No)
37. If yes can you list (in order of importance starting with....) all the marketing problems you are facing?
.....
.....

THANK YOU FOR YOUR COOPERATION

Appendix 3: Checklist for conducting preliminary survey on pigeon pea production and marketing for export

Producer checklist
Key informants: Major pigeon pea producers

A. Production information
- Size of the area where pigeon pea is grown
- The amount of pigeon pea harvested
- Varieties of pigeon pea which are grown in the area
- Varieties which are preferred for export
- Reasons for growing different varieties
- The origin of the varieties
- The weight of one bag of pigeon pea
- The access to extension services

B. Marketing information
- Selling price for one bag of pigeon pea
- Price of one bag of pigeon pea sold domestically
- Price of one bag of pigeon pea sold for export
- The main market for pigeon pea
- Amount of pigeon pea consumed
- The amount of pigeon pea sold
- Price of one bag for different varieties
- Different quantities sold by farmers
- Different prices farmers receive from different buyers

C. Production cost (input cost in pigeon pea production)
- Seeds
- Fertilizer
- Herbicides
- Insecticides
- Pesticides
- Other input costs

D. Production cost (labor cost employed in production)
- The type of labor employed in pigeon pea production, family, hired, or exchange
- All activities which need labor in pigeon pea production i.e. weeding,
- Cost for each activity employed in pigeon pea production

E. Handling cost
- Processing cost
- Storage
- Packaging
- Others

F. Transport cost
- Means of transport used
- Cost for each means of transport

G. Revenue from pigeon pea farming

- Amount of pigeon pea sold
- Sale price for the pigeon pea sold

H. Other information

- Pricing structure
- Constraints associated with marketing pigeon pea

Appendix 4: Check list for conducting preliminary survey on pigeon pea marketing for export oriented market

Trader's checklist
Key informants: major wholesalers, retailers, and collectors

A. Source of suppliers
- Suppliers of pigeon pea
- Price of the supplies from each supplier
- Contractual arrangements with suppliers
- Type of contractual arrangement

B. Market outlets
- The market outlet where pigeon pea is sold
- Price at each market outlet where pigeon pea is sold
- Contractual arrangement with buyers
- Type of contractual arrangement

C. Marketing costs incurred
- Type of all costs which traders incurred
- The cost of each cost in Tshs per unit

D. Means of transportation
- Type of transport owned by traders
- Type of transport hired
- Capacity of the transport

E. Quantity handled
- Number of bags purchased last season
- Number of bags sold last season
- Amount of pigeon pea sold outside the country
- Amount of pigeon pea sold domestically

F. Other information
- Pricing structure
- Retailers, wholesalers or collectors organization
- Marketing information which are received
- All marketing constraints faced by each trader
- Export taxes (if any), permits etc.
- Export rules & regulations

G. Marketing intermediaries
- Intermediaries which belong to retailers, wholesalers or collectors organization
- Number of intermediaries which are involved in pigeon pea export marketing
- Country of destination (importing country)

Appendix 5: World pigeon pea production in tones 2000-05

Table 2: World pigeon pea production in tones 2000-05

Countries	Years					
	2000	2001	2002	2003	2004	2005
Bahamas	115	110	115	120	125	98
Bangladesh	3 000	2 000	2 000	2 000	2 000	1 005
Burundi	1 800	2 337	2 308	2 462	2 325	2 015
Comoros	290	300	325	320	302	262
Democratic Republic of the Congo	6 471	6 628	6 780	6 840	6 900	6 960
Dominican Republic	13 213	20 095	26 551	27 173	22 588	17 952
Grenada	611	641	689	761	738	500
Haiti	2 449	2 600	2 650	2 600	2 400	2 600
India	2 694 000	2 246 500	2 259 800	2 185 800	2 346 400	2 346 900
Jamaica	1 228	1 348	1 186	954	978	584
Kenya	65 604	73 463	93 203	98 280	105 571	96 092
Malawi	99 261	105 849	105 315	116 985	93 084	63 883
Myanmar	182 000	315 000	459 000	435 000	477 000	547 000
Nepal	22 471	20 936	25 000	25 153	19 468	17 841
Pakistan	0	0	0	0	0	0
Panama	2 063	1 908	1 940	1 943	1 946	1 949
Philippines					956	1 039
Puerto Rico	100	150	350	357	192	218
Trinidad and Tobago	785	1 642	2 780	1 486	1 487	953
Uganda	78 000	80 000	82 000	84 000	84 000	85 000
United Republic of Tanzania	47 869	51 109	48 000	49 000	47 128	48 000
Venezuela (Bolivarian Republic of)	1 990	1 475	1 958	2 652	3 076	1 787

Source: FAOSTAT, 2012.

NB: India, Myanmar, Kenya, Malawi, Uganda, and Tanzania are the six best producer of the crop in the world. Sidram, (2008) seems to refer India in his data, yet his results differ with FAOSTAT data if we compute the average for pigeon pea production (Table 2).

Appendix 6: The world pigeon pea area harvested in ha 2000-05

Table 3: The world pigeon pea area harvested in ha 2000-05

Countries	Years					
	2 000	2 001	2 002	2 003	2 004	2 005
Bahamas	170	160	170	175	180	146
Bangladesh	5 260	4 047	4 047	4 047	3 237	2 110
Burundi	2 226	2 184	2 221	2 389	2 404	2 423
Comoros	513	420	427	440	443	447
Democratic Republic of the Congo	9 500	8 915	9 600	9 689	9 622	9 708
Dominican Republic	14 000	21 000	28 000	28 404	22 031	17 895
Grenada	482	457	406	520	406	520
Haiti	6 838	6 500	6 600	6 500	6 000	6 500
India	3 427 000	3 632 300	3 327 700	3 358 900	3 515 600	3 518 500
Jamaica	1 228	1 165	1 035	926	899	563
Kenya	171 842	164 001	164 453	183 612	195 307	180 240
Malawi	137 057	135 608	139 652	147 659	138 585	155 990
Myanmar	306 000	358 000	483 000	511 000	520 000	550 000
Nepal	22 711	24 035	28 000	27 948	22 459	19 337
Pakistan	0	0	0	0	0	0
Panama	4 600	4 250	4 300	4 949	4 350	4 149
Philippines					796	799
Puerto Rico	75	120	290	309	206	272
Trinidad and Tobago	1 000	1 600	2 500	1 500	1 171	900
Uganda	78 000	80 000	82 000	84 000	84 000	85 000
United Republic of Tanzania	66 000	64 756	68 000	64 958	65 000	66 000
Venezuela (Bolivarian Republic of)	2 494	1 948	2 512	3 240	3 940	2 270

Source: FAOSTAT, 2012.

NB: India, Myanmar, Kenya, Malawi, Uganda and Tanzania are among the six countries with largest areas of pigeon pea harvested in the world.

Appendix 7: The world pigeon pea yield in Hg/ha 2000-05

Table 4: The world pigeon pea yield in Hg/ha 2000-05

Countries	Years					
	2 000	2 001	2 002	2 003	2 004	2 005
Bahamas	6 764.71	6 875.00	6 764.71	6 857.14	6 944.44	6 712.33
Bangladesh	5 703.42	4 941.93	4 941.93	4 941.93	6 178.56	4 763.03
Burundi	8 086.25	10 700.55	10 391.72	10 305.57	9 671.38	8 316.14
Comoros	5 653.02	7 142.86	7 611.24	7 272.73	6 817.16	5 861.30
Democratic Republic of the Congo	6 811.58	7 434.66	7 062.50	7 059.55	7 171.07	7 169.34
Dominican Republic	9 437.86	9 569.05	9 482.50	9 566.61	10 252.83	10 031.85
Grenada	12 676.35	14 026.26	16 970.44	14 634.62	18 177.34	9 615.38
Haiti	3 581.46	4 000.00	4 015.15	4 000.00	4 000.00	4 000.00
India	7 861.10	6 184.79	6 790.88	6 507.49	6 674.25	6 670.17
Jamaica	10 000.00	11 570.82	11 458.94	10 302.38	10 878.75	10 373.00
Kenya	3 817.69	4 479.42	5 667.46	5 352.59	5 405.39	5 331.34
Malawi	7 242.32	7 805.51	7 541.25	7 922.65	6 716.74	4 095.33
Myanmar	5 947.71	8 798.88	9 503.11	8 512.72	9 173.08	9 945.45
Nepal	9 894.32	8 710.63	8 928.57	8 999.93	8 668.24	9 226.35
Panama	4 484.78	4 489.41	4 511.63	3 926.05	4 473.56	4 697.52
Philippines					12 010.05	13 003.75
Puerto Rico	13 333.33	12 500.00	12 068.97	11 553.40	9 320.39	8 014.71
Trinidad and Tobago	7 850.00	10 262.50	11 120.00	9 906.67	12 698.55	10 583.33
Uganda	10 000.00	10 000.00	10 000.00	10 000.00	10 000.00	10 000.00
United Republic of Tanzania	7 252.88	7 892.55	7 058.82	7 543.34	7 250.46	7 272.73
Venezuela (Bolivarian Republic of)	7 979.15	7 571.87	7 794.59	8 185.19	7 807.11	7 872.25

Source: FAOSTAT, 2012.

NB: The productivity for pigeon pea in the world is good for most of the countries growing the crop showing that the crop has potential of growing in different part of the world. Grenada, Jamaica, Puerto Rico, and Uganda have great potential in terms of productivity over the world. All Tables (2,3 and 4) shows when people refers pigeon pea production, area cultivated and yield most would consider India since it is the biggest producer and their large in area and number may have affected the contribution of the crop statistics in the world by other countries i.e. if one computes the average.