THE VALUE CHAIN OF HONEY IN BUKOMBE DISTRICT IN SHINYANGA REGION OF TANZANIA

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ABSTRACT

A study on honey value chain was conducted at Bukombe district in Shinyanga region. Data collection was from September to December 2012 which was the honey flows period for the second harvest. Structured household questionnaires and face to face interview were used in primary data collection. Specifically, the study intended to: (i) determine profitability and market share of honey actors (ii) map the value chain actors of honey in the study area and (iii) evaluate the factors influencing production and supply of honey to the market. The study analytical tool was Gross Margin which used to determine profitability and market share among value chain actors. Multiple regression model was another methods used to evaluate the factors influencing the production and supply of honey to the market. The findings in this study show that the value chain for honey in Bukombe is composed of five main actors that are producers, assemblers, wholesalers, retailers and consumers. In general the study also found Profit margin received by value chain actors ranges from TZS 400 to TZS 2000 per kilogram of honey. Most Beekeepers (99%) produce honey using traditional log and bark hives. Results from Multiple Regression Analysis shows distance to the nearest market was the highest predictor of production and supply of honey at $p< 0.05$. Education level was also significant at ($p< 0.05$). The number of years in honey production (experience) had a significant positive relationship with the supply of honey at $p< 0.05$. The beekeeper's major problems influencing the production and supply of honey found from this study are lack of bee management skills accounting (78.72%), insufficient visits by beekeeping personnel/extension officer (93.3%) and Lack of working equipments

(29%). The study concludes that the value chain for honey in Bukombe Tanzania was characterized by low value addition.

DECLARATION

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

_____ _____

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The above declaration is confirmed by:

_____ _____

Prof. Kadigi, R. M. J. Date

(Supervisor)

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DEDICATION

My work is dedicated to the Almighty God who lead the way throughout my study, Parents father and Mother who both laid my foundation for my education and devoted much of their time, moral and financial support to pay for my education;

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LIST OF ABBREVIATIONS

BDC	Bukombe District Council
BOC	Beekeeping officers
CBOs	Community Based Organizations
FAO	United Nations Food and Agriculture Organization
GDP	Gross Domestic Product
GM	Gross Margin Analysis
IDRC	International for Development Research Centre
KMFR	Kigosi Mwoyowosi Forest Reserve
KTBH	Kenya Tool Box Hives
MIT	Ministry of Industries and Trade
MM	Marketing margin
MNRT	Ministry of Natural Resources and Tourism
MRM	Multiple Regression Model
NBS	National Bureau of Statistics
NGOs	Non -Governmental Organizations
NWRC	Njiro Wildlife Research Centre
PASS	Private Agricultural Sector Support trust
SPSS	Statistical Package for Social Science
SUA	Sokoine University of Agriculture
TAG	Tanzania Assembly of God
TRA	Tanzania Revenue Authority
URT	United Republic of Tanzania

USA	United States of America
VCA	Value Chain Analysis
VIF	Variance Inflation Factor

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information

Almost every society on Earth has known and used honey. Cave paintings near Valencia in Spain depict men gathering honey from 15 000 years ago (Crane 1999 cited by Janet, 2010). In language and literature, religion and folk beliefs, honey symbolizes sweetness of every kind. Tanzania is endowed with favourable environment for the production of honey, beeswax, and other bee products. The country has about 33.5 million hectares of forests and woodlands that are scattered throughout the country and, which are ideal for developing beekeeping industry (Marjo and Feek, 2010).

Almost 20.5 million hectares out of this area comprise unreserved forests woodlands and 13 million hectares of forest and woodland have been gazetted as forest reserves. More than 80 000 hectares of the gazetted forest reserves consist of forest plantations that are also suitable for beekeeping. The mangrove forests of mainland Tanzania that covers about 115 500 hectares are also valuable as bee fodder (Mustalahti and Lund, 2010).

High potential for beekeeping is also found in agricultural land where substantial bee products can be harvested from agricultural crops such as sunflower, green beans, coffee, coconut, and sisal. The presences of both stinging and non-stinging honeybees coupled with the existence of indigenous knowledge in beekeeping provide a great

potential for honey production (Table 1). Tanzania is capable of producing 138 000 metric tons of honey worth 133.3 billion shillings (or US$ 138 000 000) every year and 9 200 metric tons of beeswax worth 35.5 billion shillings (or US$ 36 800 000) annually (PASS, 2010). At present, Tanzania produces about 4 860 tons of honey worth 4.9 billion shillings (or about US$ 5 104 167) and about 324 tons of beeswax worth 648 million shillings (or about US$ 675 000) every year. This is only 3.5% of the existing potential of honey production in the beekeeping industry (PASS, 2010).This production potential of 3.5% is mainly from apiaries which are established and managed by individual beekeepers. According to Workneh and Ranjitha (2011) the colony productivity is dependent on the following main factors: size (volume) of the hive; amount of bee fodder (bee forage) available within the vicinity of the apiary; protection of colony against damage by fire, honey badger (*Mellivora capensis*) and apiary management techniques.

However, the average national colony productivity with cylindrical bark or log hives is 15 kg of honey and One kg of beeswax per year. Tanzania is endowed with unique bee resources and rich indigenous beekeeping knowledge. The bee products such as honey beeswax, propolis and bee resources such as industrious and prolific honeybees (both stinging and stingless) and abundant bee fodder to mention a few are not fully harnessed due to inadequate promotional mechanism (Geofrey, 2010). Beekeeping in Tanzania is mainly rural-based activity which is practiced by local beekeepers in the villages. The prevailing low production potential is linked to poor market, lack of extension services and poor use of and access to improved production technologies (Backeus and Ruffo, 2010).

1.2 Problem Statement and Justification

In Tanzania, Bukombe district is dominated by miombo woodland forests which are suitable for beekeeping activities. However, the existing production of honey as compared to its immense potentials at the macro and micro levels is not encouraging. Thus, from the total 5000 potential tons to be produced, only 800 tons which is equal to 16% is produced (URT, 2013). According to Mwakatobe (2007), the production potential of honey is not exploited fully across the various regions of the country including Bukombe district. The main constraint against the exploitation of the potential in honey industry includes low level of technical know-how, poor access to markets, low value addition and poor quality (Mwakatobe, 2007). In addition, despite the economic potential of the district and the Government's efforts of initiating a strategy of promoting beekeeping activities to improve human welfare through increased household income, the income of people at Bukombe is still low (URT, 2013).

There are few related studies which analysed the value chain of honey. However, such studies have focused on honey marketing in general and therefore there is inadequate information about value chain analysis of honey. Some of these studies include Ntiruhungwa (2007) Beekeeping as a business and value chain linkage among actors in Kilimanjaro, Manyara and Arusha regions, Liaison (2010) Value chain for beekeeping and honey products in Msambweni district and study by Kiondo (1998a) Traditional Beekeeping Success and Constraints in Mbulu district. However, all these studies have not focused on the general performance of value chains on honey.

Therefore, little is known about the general performance of the honey value chain in Bukombe and its contribution to the total household income, leave alone specific problems that face the industry. The findings and knowledge that would be generated from this study will contribute to better understanding on improved strategies for reorienting value chain of honey and market system for the benefit of smallholders farmers and traders in attaining the Vision of National Development Strategy of 2025 under Government programme called MKUKUTA and No.1 Millennium Development Goal which is "Eradication of extreme Poverty and hunger''.

1.3 Research Objectives

1.3.1 Overall objective

The overall objective of this study was to analyse the value chain of honey in Bukombe District.

1.3.2 Specific objectives

i. To determine profitability and market share of honey among actors in the study area.
ii. To map the honey value chain in the study area and.
iii. To evaluate the factors influencing production and supply of honey to the market.

1.3.3 Hypotheses

i. Honey assemblers get the largest market share in the honey value chain.

ii. The value chain for honey in the study area involves many actors with the most prominent being retailers and wholesalers.

iii. Distance to the nearest market, capital, experience in beekeeping, access to extension services, access to credit and individual characteristics are the main factors which influence the production and supply of honey in the study area.

1.4 Scope and Limitations of the Study

The study focused on estimating the profit and marketing margins and costs for value chain actors, mapping actors and identifying factors influencing production and supply of honey to the market in Bukombe district. The area coverage of this study was limited to three Wards in Bukombe district on the basis of their level of honey production. The Honey traders were purposively selected based on their engagement in honey business. Lack of record keeping by chain actors were challenging in collecting relevant information. Thus, key informants and secondary sources were extensively used to complement primary information and to understand rationality behind the status of the value chains.

1.5 Organization of the Study

Chapter One cover introduction, statement of the problem, research objectives, research hypotheses, scope and limitations and organization of the study. The second Chapter has extensively reviewed the available literature on general concepts of honey value chain and empirical research findings of studies executed elsewhere.

The third Chapter presents the research methodology components including description of the study area, types of data, data collection methods and analysis; while Chapter Four presents and discusses the survey results and comparing them with the findings of other studies. Chapter Five presents a conclusion and recommendations of the study.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Global Honey Production and Marketing

The major honey producers in the world are China, USA, the former USSR, Mexico, Argentina and Canada. The key exporters of honey in the world market include China, producing 398 000 metric tons (30-35%), Mexico 55 684 (20%) and Argentina producing 59 000 (15-20%) (FAO, 2011). The three biggest honey importers are Germany, Japan and the USA. The bulk of honey trade in these countries is in the hands of agents and importers; however in Japan much of the honey is imported by trading companies (FAO, 2011). The world demand for honey and beeswax is substantially high and is likely to increase even further (Wilson, 2006).

2.2 Beekeeping Potentials and Honey Production in Tanzania

Tanzania is endowed with favourable environment for the production of honey, beeswax and other bee products. The country has about 33.5 million hectares of forests and woodlands that are scattered throughout the country and which are ideal for carrying out beekeeping activities (Backeus, 2010). Out of these, 20.5 million hectares are unreserved forests and woodlands, while 13 million hectares of forest and woodland are forest reserves (Mwakatobe, 2007). Tanzania is also estimated to have about 9.2 million honeybee colonies whose production potential is about 138 000 tons of honey and 9 200 tons of beeswax per annum (URT, 2012) and which are worth US $ 8 832 million and US $ 147.2 million as per the average prices of the

year 2011, that is, US $ 8 per kg of honey and US $ 16 per kg of beeswax. Currently, Tanzania produces approximately 9000 tons of honey worth TZS 27 billion and 600 tons of Beeswax worth TZS 3 billion. The current utilization of this potential is only about 6.5% annually (URT, 2013). The honey production in Tanzania is carried out using traditional methods that account for 99% of the total production of honey and beeswax in the country and in that respect approximately 95% of all hives are traditional made of log and bark hives (Kajembe, 1994). Others material used for making bee hives include reeds, gourds and pots. In Tanzania beekeepers are estimated to reach 2 million rural people (URT, 2013).

Principally, beekeeping deals with the management of bees and processing of bee products from natural forests, plantations, agricultural land and other habitats. Beekeeping products include honey, beeswax, royal jelly, propolis and pollination services (Geofrey, 2010). Beekeeping is an important income generating activity with high potential for improving incomes especially among the communities living close to the forests and woodlands. For example, Monella *et al*. (2000) found out that in the Miombo woodlands of Tanzania, households derive more than 50% of their cash income from selling non wood products such as honey. Honey was found to be the woodland product with a significant contribution to cash income in six villages of Dodoma, Iringa and Morogoro (Monella *et al.,* 2000). The major areas of honey production in Tanzania are Dodoma, Iringa, Singida, Shinyanga and Tabora Regions. The contribution of honey sub-sector to the GDP was 1% in 2013. Honey is also a source of employment; it provides income to the people, it is also a source of recreation, ecotourism and foreign exchange earnings (URT, 2013).

Table 1: Honey production potentials and actual production in selected districts year 2001 in Tanzania

High producing area			Medium Producing areas			Un-exploited areas		
District	Potential (Tons)	Actual (Tons)	District	Potential (Tons)	Actual (Tons)	District	Potential (Tons)	Actual (Tons)
Kahama	4 000	500	Kondoa	3 000	300	Lindi	8000	50
Mpanda	8 000	1 500	Kiteto	2 000	250	Songea	6 000	50
Sikonge	6 000	2 000	Babati	1 200	150	Iringa	5 000	40
Urambo	6 000	1 400	Kibondo	4 000	250	Biharamulo	4 000	15
Nzega	4 000	400	Handeni	3 000	150	Kasulu	4 000	5
Tabora	5 000	1 200	Kigoma	3 000	100	Newala	4 000	15
Chunya	6 000	400	Arumeru	1 500	100	Tunduru	4 000	15
Manyoni	8 000	600	Rufiji	2 500	50	Singida	3 000	5
Bukombe	5 000	800	Nkasi	1 500	50	Hai	2 500	5
Total	**52 000**	**8 800**		**21 700**	**1 400**		**40 500**	**200**

Source: National Beekeeping Programme, 2001

2.3 Honey Marketing in Tanzania

2.3.1 Domestic market for honey

According to Konga (2011), the internal markets for honey and beeswax are not well established. The demand for honey as food and as an authentic ingredient in various foods and as a product with healing properties is increasing. About 50% of honey produced is sold locally for the production of honey beer and honey wine and about 10% of honey produced is consumed locally as industrial honey in confectioneries and pharmaceutical industries. At the beekeepers gate, 1 kg of honey is sold between 1.85 US$ and 2 US$ while in cities like Dar-es salaam, Arusha, Moshi, and Mwanza the price of honey is between 4.0 US$ and 6.5 US$ per kg. The potential unexploited markets are large towns, hotels, airlines and tourist centres for properly packed honey in proper packaging materials. Only very small quantities of beeswax are consumed locally in candle making and batiks. The price of 1 kg of beeswax is sold between 3 US$ to 4.5 US$ (MIT, 2012).

2.3.2 International market for honey

The International market requires high standards in terms of quality and traceability. The demand for honey and beeswax in the world market is very high and the demand for Tanzania honey and beeswax exceeds the supply (Kiondo, 1998). The international markets for Tanzanian honey and beeswax are highly competitive in terms of quality about 265 000 metric tons of honey exported to European Union market (Marjo *et al*., 2010). In 1991, Tanzania honey won by 100% the quality test for "organic honey" in the UK. However, quality control in terms of other factors such as Hydroxy methyl furfural (HMF) content, colour, taste, viscosity and aroma,

needs legal directives that will have to be adhered to by all the people handling the honey before it reaches the consumer (MIT, 2012). The amount of honey exported from Tanzania during the period of six years is as shown in Table 2.

Table 2: Amount of honey and beeswax exported for the period from 2006-011

	Honey		Beeswax	
Year	Weight(Kg)	Value (Tzs)	Weight(Kg)	Value (Tzs)
2006	325 729	538 102 710	364 532	2 036 643 691
2007	156 012	218 348 125	320 660	1 909 188 517
2008	612 960	1 199 283 500	580 154	3 653 036 682
2009	485 842	1 097 642 183	556 000	3 525 245 806
2010	428 825	1 271 121 001	568 260	3 731 939 869
2011	34 302	2 181 319 119	534	3 898 239 826

Source: TRA and MNRT Forest and Beekeeping Division, 2013

According to MIT (2012) main buyers of Tanzania honey are the European Union member countries especially the UK, Germany, Belgium, Ireland and Netherlands. Other countries are United Arab Emirates, Oman, India, Iran, Rwanda and Kenya. The main importers of Tanzanian beeswax are Japan, USA, Germany and European Union member countries. Regarding international market prices, the highest quality table honey price is US $ 1200 / ton, while industrial honey is only about US $1000 / ton. The price of beeswax is US$ 5000 per ton (MIT, 2012).

Table 3: Export of natural honey for the period January to September 2010

Natural honey Destination country	FOB Value (TZS.)	Net Weight (Tons)
BELGIUM	99 348 604	42.32
GERMANY	213 185 014	60.00
IRELAND	60 732 223	20.00
INDIA	67 156 598	20.00
IRAN	18 494 490	12.99
KENYA	19 984 000	44.00
OMAN	950 000	1.80
RWANDA	18 875 000	32.37
TOTAL	**498 725 929**	**233.48**

Source: MNRT and TRA (2013)

2.4 Basic Concepts and Definitions

2.4.1 Honey

FAO, (2011) defines honey as 'the natural sweet substance produced by honeybees from the nectar of blossoms or from secretions of living parts of plants or excretions of plant sucking insects on the living parts of plants, which honeybees collect, transform and mixes it with specific substances of their own, store and leave it in the honey comb to ripen and mature'.

2.4.2 Constituents of honey

The major constituents of honey are sugars including fructose, glucose, sucrose, maltose and other di- and trisaccharide sugars. Besides sugars, honey contains a wide variety of chemical components such as proteins, fats, vitamins, minerals, enzymes, amino acids and volatile scented substances (Asressie, 2010). Several of these chemical components are of great importance as they influence the keeping quality,

granulation, texture, as well as the nutritional and medicinal efficacy, of honey (Chala, *et al.* (2012).

2.4.3 Value chain concept

The concept of value chain is defined by Kaplinsky and Morris (2000) as a full range of activities which are required to bring a product or service from conception, through different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers and final disposal after use" These activities include designing, production, marketing and support to get the final product or service to the end consumers.

Similarly, IDRC (2007) defines Value chain as all activities that are undertaken in transforming raw materials into a product that is sold and consumed. These activities include the direct functions of primary production, collection, processing, wholesaling, and retailing as well as the support functions, such as input supply, financial services, transport, packaging and promotion. Activities that comprise a value chain can be contained within a single firm or divided among different firms. Value chain activities can be contained within a single geographical location or spread over wider areas. Dima (2012) describes value chain as a system of independent activities which are connected by linkages. Linkages exist when the way in which one activity is performed affects the costs or effectiveness of other activities, thus serving as an important source of value addition. According to Janet (2010), the ultimate goal of the value chain process is to manage costs so that the

targeted margin will be achieved by the active members. This is achieved by managing customers.

2.4.4 Value chain mapping

Value chain mapping is defined as the interaction of key stakeholders and relevant public and private business development services with the product flows along the value chain (IDRC, 2007). In value chain map the existing actors are represented using boxes with solid outlines, which may encompass several vertically integrated functions. Service functions are represented by dash lines. The potential new actors, markets and linkages are represented by dotted lines. Product and/or service flows between nodes are represented by arrows.

The movement of a good or service between nodes implies that the value is added to the product. The end market segments are placed at the top of the diagram and represented by boxes. Ranges of Gross margins are displayed as χ-γ, where χ is the minimum percentage gross margin for a particular transaction and γ is the maximum percentage. Flows volumes are given along with their units, with flows along potential linkages written in parentheses. Value Chain mapping is made up of three inter-linked components which are Value chain actors, Enabling environment (infrastructure and policies, institutions and processes that shape the market environment) and Service providers (the business or extension services that support the value chains' operations). Having identified the value chain in question, the research has to make decision on what to map in charting a path through complex value chains (Michael and James, 2011). It is likely that all value chains will gain

from constructing a tree of input –output relationship, those may include the following:

- Gross output values;
- Net output values;
- The physical flow of commodities along the chain;
- The flow of services, consultants and skills along the chain.

2.5 Approaches for Analysis

2.5.1 Gross margin (GM)

GM may be defined as the difference between the total revenue and the total variable costs (Lazaro, 2008). The size of gross margin depends on the services provided, market structure, perishability of the products as well as the distance between producers and consumers. The size of the gross margin may also be influenced by market information especially for short run margins. In Tanzania, studies that have employed the GM model include; Lazaro (2008) who assessed the value chain for oranges in Muheza district- Tanga

2.5.2 Marketing margin analysis (MM)

The marketing margin is the percentage of the final weighted average selling price taken by each stage of the marketing chain. The marketing margin also accounts for the difference between the value of sales and purchases at each node. The marketing margin measures the share of the final selling price that is captured by a particular agent in the marketing chain (Tomek and Robinson, 1991).

MM=WSp - WBp/WSp*100……..(1)

Where: WSp is the Selling price and WBp is the Buying price

2.5.3 Multiple Regression analysis model

Multiple Regression analysis model (MRM) is used to study the relationship between a dependent variable and more than one independent variable. The MRM was chosen because it allows the researcher to have an explicit control of many other factors that simultaneously affect the dependent variable (Wiliam, 2002).

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Description of the Study Area

3.1.1 Location

The research was conducted in Bukombe District which is in the western part of Shinyanga region, Tanzania and lies between longitudes 31 32° east and latitudes 3 3.30° south. The district covers an area of 10 482 km^2; out of this, 6 133 km^2 consists of public land while 4 349 km^2 is forest reserves. The district shares a border with Kahama district to the East, Biharamulo district (Kagera) to the North, Kibondo district (Kigoma) to the West, and Urambo district (Tabora) to the South (Kileo, 1995).

3.1.2 Vegetation

The district is covered with Miombo woodlands, dominated by economically important leguminous tree and shrub species including: *Acacia, Brachystegia, Albi zia, Commiphora* and *Dalbergia*. Topographically, the district is characterized by flat, gently undulating plains interspersed with ridges and hill blocks. The general altitude varies from 1000m to 1500m above sea level. The district has mainly clay and sandy soils with significant variation between the hilltops and bottom of the valleys (Kileo, 1995).

3.1.3 Climate

The climate in the district is sub-humid, with annual rainfall varying from about 600mm to 1200mm, with a mean of 900mm. The rainy season begins in November and ends in April-May, with a short dry spell between January and February. Annual temperatures vary from 15° C (59° F) minimum to 30° C (86° F) maximum (Kileo, 1995).

3.1.4 Demography and economic activities

The district has four administrative divisions namely Mbogwe, Ushirombo, Masumbwe and Siloka, 29 wards and 122 villages. The main economic activities of the district are Agriculture, livestock keeping, small scale mining and formal employment (NBS, 2012). Crops grown include: cassava, maize, paddy, sweet potatoes, groundnuts, sunflowers, beans, tobacco and cotton. Non-farm activities include charcoal making, beekeeping, timber logging and small businesses. The area has a human population of 224 542 (NBS, 2012). The dominant ethnic group in the district is the Sukuma; other tribes found in the district include Sumbwa, Ha and Haya.

3.2 Research Design

In order to address the objectives of the study, a structured questionnaire was designed to collect data from market participants. The data gathered included information on the actors in the value chains (that is actors in the supply chain and outlet markets); buying and selling prices for honey; number of years in honey business/production; costs; as well as quantities produced and sold per annum.

The minimum and maximum prices and quantities produced/traded were also recorded. The Cross sectional design applied during data collection. The choice of this design is based on fact that it enables a researcher to collect data at single points in time, cost-effective and less time consuming and it is useful for descriptive purposes as well as for the determination of the relationship between and among variables at a particular point in time (Babbie, 1995).

3.3 Sampling

3.3.1 Sampling procedure and sample size

Purposive sampling technique was employed. Two divisions namely Siloka and Ushirombo with four wards (Runzewe Mashariki, Uyovu, Namonge and Ushirombo) of which then four villages (Namonge, Kabuhima, Msonga and Katome) were purposively selected, guided by the following criteria:

- Villages where the production of honey is significant by volume; and/or
- Villages where there is significant trade of honey and/or honey products;
- Centres where traders and consumption of honey by volume is significantly high to present an attractive market.

The individual household selection for interview were obtained using Simple random sampling (SRS).Village roaster of beekeepers and traders was used as sampling frame. A sample size of 120 respondents from the area under study was obtained as shown on table 4. The unit of analysis was the household, which is defined by URT (2012) as a group of individuals who live and eat together and share common living arrangement. The heads of the households were interviewed representing other family members because they are the ultimate decision makers

and they are the ones engaged in beekeeping. Honey traders were also selected by using purposive sampling technique. The sites for the trader's survey were market centres, which selected based on the flow of the honey produce in the study district. Three market centres (Runzewe, Msonga and Ushirombo) were sampled. This market centres found to be dominated by few honey traders, only sixteen honey traders (all of them were sampled for the study).

Table 4: Sample size

Ward Name	Village	Sample size
Namonge	Namonge	30
Runzewe Mashariki	Msonga	30
Ushirombo	Katome	30
Uyovu	Kabuhima	30
Total		**120**

Source: Field Survey, 2013

According to Boyd *et al.* (1981) a reasonable representative sample size for a particular population under study should at least be 5% of it. The current study adopted the sample size basing on this schools of thought; in this respect. Overall a total of 120 households were selected for the study. The market centres in Runzewe, Msonga and Ushirombo makes possible to obtain number of honey traders for interview. The number of traders interviewed at each market centre is shown on the Table 5.

Table 5: Number of honey traders interviewed

Market centre	Retailers	Wholesalers	Total
Runzewe	6	2	8
Msonga	3	-	3
Ushirombo	5	-	5
Total	14	2	16

Source: Field survey, 2013

3.3.2 Questionnaires pre - testing

Before starting field data collection, a reconnaissance surveys was conducted so as to provide a general picture and get acquainted with the research area. The aim was to identify and categorize stakeholders and study villages. Due to the local settings of beekeepers, the questionnaires were pretested in Katome village which enabled the researcher to identify weakness, ambiguities and/or omissions in the questions. Necessary modifications were made to suit the prevailing local circumstances. The pre-test exercise helped in checking the validity and reliability of the questionnaire items.

3.4 Data Collection

3.4.1 Primary data

Primary data were collected by using closed and open ended questions which were administered to honey producers and traders in the study area to capture information on socio-economic household characteristics. The descriptive analysis of data involved the use of central measures of tendency including the means and

percentages to describe the general characteristics of producers and participants in the value chain for honey in the study area.

3.4.2 Secondary data

Secondary data were obtained through a review of current literature on various studies. Journals, Books, internet and scientific reports were the main sources of this secondary data. Other sources of secondary information includes Sokoine National Agricultural Library, Bukombe District land and Natural resources office, Ministry of Natural Resources and Tourism- Forest and Beekeeping Division, Private Agriculture Sector Support office-Morogoro, Ministry of Industries, Tanzania Revenue Authority-Bukombe and other published documents.

3.5 Data Analysis

The completed questionnaires were coded and data from open ended questions were categorized into groups to enable easy analysis**.** Qualitative and Quantitative data analysis was done using Statistical Package of Social Science (SPSS version 16) Computer programme. Descriptive Statistics mainly, measures of central tendency and measures of dispersion were used to analyze the quantitative data. The data for the different value chain actors were entered in SPSS and cleaned for any outliers and entry errors. Functional analysis by mapping of the value chain, identification of the roles of the different actors at different stages and quantification of volumes of honey along the value chain. The flow of volumes along the chain was important in categorizing the actors for example a chain could have small and large scale farmers producing the same commodity but have different production approaches.

The Gross Margin and Marketing Margin analyses techniques were used for the analysis of quantitative data to determine profitability and market share of honey value chain which involved attaching prices to the various quantities of outputs and inputs along the value chain. The aim of this analysis was to determine the profit margin to the different agents of the value chain and also determine the value added at each stage of the chain. The Multiple Regression model was used in determining the factors influencing the production and supply of honey to the market in the study area. The specific approaches used in the analysis are presented in the following sub-sections.

3.5.1 Gross margin

Gross margin (GM) may be defined as the difference between total revenue and total variable costs (Lazaro, 2008). This technique was used to determine profitability of honey along the value chain. It was assumed that beekeepers their' own labour is unpaid, since it is difficult to quantify it. The expression used to calculate the GM across to different actors in the value chain is as shown below:

$GM=\sum TR - \sum TVC=\sum PyY-\sum PxX$ .....(2)

Where; GM = Gross margin per kg of honey

$\sum TR$ = Total revenue from sales of one kg of honey.

$\sum TVC$ = Total variable cost spent on producing/marketing of one kg of honey.

Py =Price of honey per kilogram

Px =Price of input used in producing honey per kilogram

Y and X are the quantities of honey produced and inputs used respectively.

3.5.2 Marketing margin analysis

The marketing margin (MM) is the percentage of the final weighted average selling price taken by each stage of the marketing chain (Tomek and Robinson, 1991). It also accounts for the difference between the value of sales and purchases at each node. The MM was used to obtain the market share among different actors. The expression which used to calculate the market share across different value chain actors in the value chain is as shown below:

MM = WSp -WBp/WSp*100..... (3)

Where: WSp is the selling price and

WBp is the buying price of i^{th} actors

The above equation tells us that a higher marketing margin minimizes producer's share and vice versa. It also provides an indication of a fair distribution of shares among production and marketing agents.

3.5.3 Value chain analysis

The value chain analysis was used to identify the activities involved from producer to consumers; analyze profitability in each process; and specify what does and what doesn't add value from the producer's and trader's perspectives. The results of analysis in this case were also used to identify the 'opportunity windows' for improving the value chain for honey in the study area.

3.5.4 Multiple Regression model

The MRM what was used to capture the factors influencing the production and supply of honey for the independent variable and dependent variable is as shown

below: $Yi=\beta_0+X_1\beta_1+X_2\beta_2+X_3\beta_3+X_4\beta_4+X_5\beta_5+X_6\beta_6+\varepsilon_i$……..…….….(4)

Where:

Y_i = Total quantity of honey produced in Kilogram

β_0 = is the constant term of the model without the independent variables.

$\beta_1, \beta_2, \beta_3 \ldots\ldots \beta_6$ = variable coefficient showing the marginal effect of the change in the independent variables on the dependent variables.

X_1 = are socio-economic characteristics

X_2 = distance to the nearest market measured in kilometre

X_3 = capital

X_4 = experience in beekeeping

X_5 = access to extension services

X_6 =access to credit

ε= is a random disturbance term for i^{th} respondent

The above variables tested on collinearity / multicollinearity in order to detect whether or not there is correlation among the independent (X) variables. According to Wiliam (2002), when there is a perfect linear relationship among the predictors, the estimates for a regression model cannot be uniquely computed. The term collinearity implies that the two variables are near perfect linear combinations of one another. When more than two variables are involved, it is often called multicollinearity, although the two terms are often used interchangeably. The results show Variance Inflation Factors (VIF) which measure how much the variance of the estimated coefficients are increased over the case of no correlation among the X variables.

If no two X variables are correlated, then all the VIFs will be less than five (Table 23). If VIF for one of the variables is around or greater than five, there is collinearity associated with that variable, this was not observed in the results of Table 23 which implies that there is no linear relationship between and among two or more of the independent variables.

3.6 Definition of Regression Model Variables

3.6.1 Dependent variable

The dependent variable for this study was the total quantity of honey produced. The Quantity produced is a continuous variable that represents the dependent variable; the actual supply of honey by individual households to the market, which is measured in kilograms.

3.6.2 Independent variables

The explanatory variables expected to influence the dependent variable are the following:

3.6.2.1 Distance to nearest market

It is a continuous variable and is measured in kilometres which farmers spend time travelling to sell their product to the market. If the farmer is located in a far village or at a distance from the market, he or she is weakly accessible to the market. The closer to the market the farmer is the lesser the transportation cost and time he/she would spend. Therefore, it is hypothesized that this variable is positive related to marketable surplus of honey production.

3.6.2.2 Age of the household head

Age is a demographic variable and is measured in years. The expected influence of age is assumed positive; it is a proxy measure of farming experience of a household. It is hypothesized that aged households are believed to be wise and have acquired skills in beekeeping, and hence they produce much and supply more.

3.6.2.3 Education level of the household

It is a continuous variable and refers to the formal schooling of a respondent during the survey period. Formal education determines the readiness of household heads in accepting new ideas and innovations; and it is easy for them to get information on the supply, the demand, and price and this enhances farmers' willingness to produce more and increase volume of sales.

3.6.2.4 Sex of the household head

This is a dummy variable that takes a value of one if the household head is male and zero if otherwise. Both men and women participate in beekeeping and production of honey. Male households have been observed to have a better tendency than female household in beekeeping and producing of honey due to obstacles such as lack of capital and access to credit and extension services.

3.6.2.5 Experience in beekeeping

This is a continuous variable, which refers to the number of years the beekeeper has been engaged in beekeeping activity and is expected to influence positively the supply of honey to the market. As beekeepers become more experienced in

beekeeping, the higher the probability of having an increase in production and hence an increase in the supply. Moreover, beekeepers with longer beekeeping experience will have a cumulative knowledge of the entire farming environment. This in turn enables them to adopt the use of improved box beehives earlier than beekeepers with short beekeeping experience.

3.6.2.6 Extension service access to honey production

This variable is measured as a dummy variable taking a value of one if the beekeeping household has access to honey production extension service and zero if otherwise. Extension service is expected to widen the household's knowledge on the use of improved box beehives technologies and thereby to have a positive impact on honey volume of marketable surplus. Beekeepers that have frequently contact NGOs agents will have better access to information and could adopt better technology that would increase the market of their supply of honey.

3.6.2.7 Access to credit

Access to credit is measured as a dummy variable taking a value of one if the household has access to credit and zero if otherwise. Among other things, credit access is assumed to have a significant positive correlation with marketability of honey.

3.7 Conceptual Framework

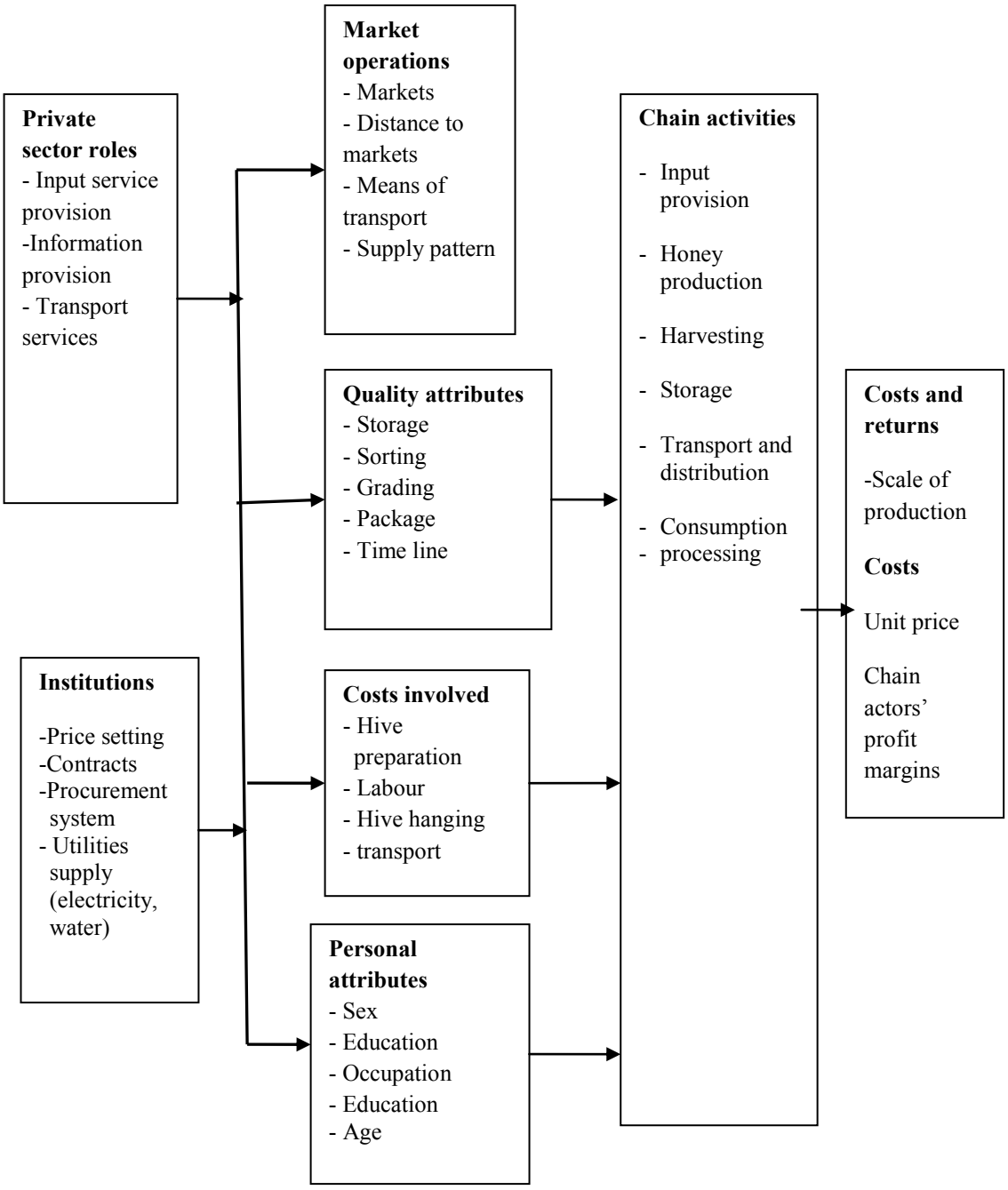

Figure 1: Conceptual framework for modified from Lazaro (2008)

The framework have four components that in one way they can influence the production of honey, these includes institutional, market operations, private sector and chain activities. Institutions and private sector components have actions that affect chain actors. This is due to the nature of business environment involved, for example private sector can influence price setting of honey for traders not willing to pay the price that beekeepers are selling their produce, similarly if private sector stop providing transport services, it is likely the honey marketing be affected and which lead to some unnecessary wastage of meager profit among chain actors.

Moreover, private sector action (companies providing extension services, inputs) and institutions (like Tanzania Bureau of Standards) affect quality attributes. This is due to the fact that things like provision of storage facilities, sorting, grading and meeting timeline depends on the capacity of the sector performing a task and institutions governing the process.

Market operations, quality attributes, costs incurred and chain actors' attributes do influence chain activities performed. These range from input provision and honey production to consumption. Activities made here determine if honey will be transported to the place of demand at the right time or not. Chain activities carried out also lead to the determination of scale of produce traded, cost incurred by chain actors, profit margins and the unit price at each node of the value chain. The market operations such as distance to the nearest market, means of transports do affect the price and availability of honey to the market. It is hypothesized that the distances to the nearest market have positive relationship with the supply of honey to the market.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

This chapter presents the results of the analysis and discussion of the existing honey value chain in the study area; its profitability and market shares to different chain actors as well as the problems and constraints facing honey producers and other actors in the value chain.

4.1 Social-economic Characteristics of Household Heads

4.1.1 Sex of the head of household

As shown in Table 6, male-headed and female-headed households constituted 84% and 16 % respectively of the total sampled households.

Table 6: Sex of head of household

Sex	Percentage
Males	84
Females	16
Total	100

Sources: field survey, 2013

The above observation indicates that honey production activities are dominated by males headed households; this could probably be because most households are headed by males and female headed households take granted that honey production is the male activity.

This very limited number of female participation agrees with Wagayehu and Nuru (2011), who found the bee industry is mainly dominated by males in most areas of Ethiopia especially in the production, baiting and hanging of hives and a little bit of female participation in processing. This is so because women cannot climb trees to hang the hives. Similar observation by Kajembe and Mwihomeka (2001) concluded that, the typical situation in Tanzania and more particularly in rural areas most households are headed by males.

4.1.2 Age of head of household

The result on Table 7 shows that 34.6% of head of households were aged between 36 and 45 years, 32.7% were aged between 46 and 55 years and 21.2% were aged between 18 and 35 years and 11.5 % were aged above 55 years. The mean age head of the households in four villages was 44 years with a standard deviation of 9.85 years, which is an active working age group with probable family responsibilities. These people keep bees for the purposes of supporting their family members using cash generated from honey products. These findings was contrary with that of Kajembe and Mwihomeka (2001) where it was reported that the age of 18 and 55 years is being for active and productive group.

Table 7: Age of head of household

Age group	Percentage
18-35 years	21.2
36-45 years	34.6
46-55 years	32.7
Above 55 years old	11.5
Total	100

Source: Field survey, 2013

4.1.3 Marital status for the head of household

Marital status was one of the household characteristics which were considered during the study. The findings from Table 8 show that out of the total households interviewed 94.2% were married while 4.8% were unmarried/single and 1% was divorced. This implies that honey production activities are dominated by married people and the reason could be that they keep bees for the purpose of supporting their family members using cash generated by selling honey products. This finding also concur with that of Raufu *et al.* (2012) who found that, majority of the married women in Nigeria engage in non timber forest products especially beekeeping to serve as financial support to the husband and children.

Table 8: Marital status for the head of household

Marital status	Percentage
Unmarried/single	4.8
Married	94.2
Divorced/separated	1
Total	100

Source: Field survey, 2013

4.1.4 Education level heads of households

The level of education for the head of households are presented in Table 9 indicating that 78.8% of the heads of households attained primary education, 7.7% had attended secondary education and 13.5 % had not attended school at all (Illiterate).

Table 9: Education level head of households (n=120)

Education level	Percentage
Not attended school	13.5
Primary	78.8
Secondary	7.7
Above Secondary	-
Total	100

Source: Field survey, 2013

The findings in Table 9 indicate that most of the beekeepers attained school (primary and secondary), which implies that most of the heads of household can learn better on bee behaviour and colony management once trained on various production aspects such as bee feeding, proper honey harvesting practices and record keeping, as means of adding value to the honey products with minimal difficulties. The findings are in agreement with that of Gichora (2003) where it was reported that, for more advanced beekeeping, one should have a good grasp of bee Biology and behaviour of bees for better colony management. Moreover, for illiterate people there is a need of intensive training and persuading of beekeepers through practical approach on beekeeping. The high level of illiteracy (13.5%) in the district is a drawback to the effectiveness and efficiency of honey production.

4.1.5 Occupation of heads of households

Apart from beekeeping activity, Table 10 shows the occupation of honey producers. The findings show that 49% of the respondents were engaged in crop farming, 46.2% were engaged on both crop farming and livestock keeping. Other economic

activities include nomadic practices accounting for 1% and business and farming which account for 3.8% of the total.

Table 10: Distribution of honey producers based on occupation (n=120)

Activity	Percentage
Farming	49
Nomadic	1
Farming and livestock keeping	46.2
Business and farming	3.8
Total	100

Source: Field survey, 2013

4.1.6 Experience of honey producers

The findings show that years of experience of producers' in honey production ranges from 1 to 51 years with a mean of 16.71 years and standard deviation of 10.31 years. These findings implies that in the study area people start engaging in beekeeping at early age of 22 years accumulate experience and move on until become older. Moreover, similar findings reported by Gichora (2003), age ranges from 18 to 45 years is thus one could expect the situation where people are actively engaged helping older beekeepers to undertake basic tasks. Based on their exposure, young people gradually move on to become independent beekeepers as soon as they can obtain their own hives. They continue accumulating experience by seeking technical advice from fellow beekeepers whenever necessary.

Table 11: Age and experiences in honey production for producers

	Total Sample (n=120)			
Socio-economic indicators	Minimum	Maximum	Mean	S.D
Age of household (yrs)	22	70	44.25	9.85
Experience (yrs)	1	51	16.71	10.31

Source: Field survey, 2013

4.2 Honey Production and Beekeeping Practices

4.2.1 Honeybee source and ownership

The findings from the study show that most of the sources of bee colonies are traditional acquisition from ancestors through inheritance. Majority (99%) of interviewed respondents reported to be practicing Beekeeping using use traditional hives. This type of beekeeping practice includes the use of traditional techniques of harvesting honey and beeswax from bees, using various traditional styles of hives and other equipment. This method of honey production agree with that reported by Kajembe (1994) who found that, Beekeeping in Tanzania is carried out using traditional methods that account for 99% of the total production of honey and beeswax in the country.

These hives are fixed comb type because the combs are attached from the top and sides of the hive itself and the beekeeper cannot remove and replace them. In some traditional hives only one end of the hive could be opened, but in most types each end of the cylinder is fitted with a removable lead. Since many of the hives during honey harvesting were “beyond the reach of a man’s arm” and only one end works at a time, some combs would be left intact without being harvested. The study

reveals further that there were a few modern hives used by the Kondebona beekeepers association. According to the interviewed respondents, apiaries are owned individually with a few being owned by beekeepers groups/cooperative. These apiaries were found in the Kigosi Mwoyowosi forest reserve. However, the study shows the average number of hives owned with individuals or group in Msonga, Kabuhima, Namonge and Ushirombo can range from 10 to 404 hives per producer.

4.2.2 Hives site placement

In Bukombe district most of the beekeepers do keep their bee colonies in Kigosi Mwoyowosi Forest Reserve, as revealed by the interviewed respondents. The study findings show that 99% of the hives are kept by hanging on the trees in the Mwoyowosi forest and 1% of the hives are hung on the trees near the homesteads (Table 12). These findings agree with that of Kajembe (1994) which states that, over 99% of Tanzanian beekeeping industry is carried out by forest based small scale beekeepers that use indigenous technical knowledge in beekeeping by hanging their hive on trees in forests.

Table 12: Site or placement of hives (n=120)

Site placement of hive	Percentage
Hanging on trees in the forests	99
Hanging on trees near homestead	1
Total	**100**

Source: Field survey, 2013

4.2.3 Honey production

Most (99%) of the beekeepers interviewed reported to be using traditional hives and their annual honey production ranged from five to 2800 kilograms for the 2008/09 harvest season with a mean of 435.40 and standard deviation of 2018.81. These findings comply with that of Kajembe (1994) which states that beekeeping in Tanzania is carried out using traditional methods that account for 99% of the total production of honey bees.

In Bukombe district honeybee production was in a decreasing trend in recent four years from 2008-011 (Table 13) revealed by respondents was due to shortage of bee forages, drought, pesticides and herbicide application to livestock that nomads graze in Kigosi Mwoyowosi Forest reserve. This finding relates with that stated by Desalegn (2010) in Ethiopia, occurrence of drought have direct relationship with chalk brood disease which affect the production of honey. The lack of skills on honey production and poor management, presence of pests and predators such as monkeys and lack of extension services and credits are the reasons that affect production of honey revealed by respondents. For example in the production season 2009/010, the occurrence of drought affected producers resulting to having less harvest and zero harvest.

Table 13: Honey average production (n=120)

Season production (Kg)	Minimum	Maximum	Mean	S.D
2008/09	5	2 800	435.40	2 018.81
2009/010	0	7 700	779.55	1 099.30
2010/011	10	6 300	624	891.30

Source: Field survey, 2013

4.2.4 Honey production at household level

The amount of honey produced from one bee hive per year varies from village to Village, which is determined by the existences of plenty pollen and nectar source plants and the level of management and inputs. The maximum amount of honey harvested from traditional and modern hives per season in the study area from 3.5 to 5 kilogram. These findings indicate the existence of a room for increasing performances of these beehives through good management practices coupled with favorable beekeeping environment. The sample respondents produce honey at household level mainly through indigenous means with most beekeepers using traditional log and bark hives. Due to their topology, background and design characteristics, traditional hives are universally low yielding in terms of honey production which is the main verifiable indicator.

4.2.5 Beekeeping equipments

The findings show that when sample respondents were asked to list the equipment they use, they cited a wide range of equipment that go hand in hand with traditional beekeeping practices. In traditional beekeeping system one can find equipment such as smoker, bucket, knife, honey containers, bee brush, local overall cloth and queen cage. These types of equipment are either made by beekeepers themselves or purchased from local artisans. All the sampled respondents (100%) reported to have been using locally made beekeeping equipment (materials) in their areas. It was also reported by the respondents that protective clothes were rarely used. The findings concur with that of Nicola (2010) where it was reported that traditional equipments are commonly used in traditional beekeeping system in Africa. Moreover, the

protective clothes are reported not to be sting proof from honeybee stings, and this discourages beekeepers from harvesting and conducting regular hive inspections.

4.2.6 Use of inputs in honey production

The use of inputs such as modern hives such as langstroth or KTBH in honey production in Bukombe district (as reported by respondents) was reported to be very low (Table 14), only traditional hives made by local artisans are commonly used. About 92.31% of the respondents use traditional hives for beekeeping and only 7.69 % to use modern beehives equipment such as overalls and honey extractors which are also made locally. This agrees and fall within the line of Kihwele (1993) contended that, in traditional beekeeping the use of modern inputs such hives has been relatively not successful for so many years in Tanzania because, traditional beekeepers are rich in the knowledge about honeybees and their management the phonology of the bee folder plants and the association beekeeping calendar. Moreover in the study area there are few available input suppliers sell inputs at high prices making them unaffordable to many beekeepers. For example a complete modern langstroth or KTBH hive with a brood-box, queen excluder and super chamber cost approximately TZS 40 000 up 60 000 ($ 25-37).

Table 14: Use of inputs in beekeeping

Input	Percentage
Modern hives	7.69
Traditional hives	92.31
Total	100

Source: Field survey, 2013

4.2.7 Extension services

The findings in Table 15 show that 93.3% of the respondents were never visited by bee extension officers for advice, 1.9% received extension services from the government through District Council Beekeeping division and 5.7% of the respondents received extension services from individuals trained on beekeeping who were residing in the villages. As it can be noted from this finding, lack of access to extension services by beekeepers is one of the notorious problems in Bukombe district. Accordingly, stakeholders and government need to address the problem of lack of extension services to honey producers as to boost the production of this sector. These findings comply with Mwakatobe (2007) who argued that lack of extension services for beekeepers in Tanzania is one of the major problems facing the beekeeping subsector.

Table 15: Use of extension services

Source of extension service	Percentage
Government (Bee division)	1.9
Individual trained on beekeeping	5.7
Never	93.3
Total	100

Source: Field survey, 2013

4.2.8 Availability and source of credit

Table 16 shows that 89.4% of the respondents interviewed do not have access to credits from either formal or informal, and 10.6% do access credit from relatives and friends. There are no financial institutions which provide credit to actors in the honey value chain in the study area.

Table 16: Availability and sources of credit

Source	Percentage
Formal Financial institution	0
Friends and Relatives	10.6
No. access to credit	89.4
Total	100

Source: Field survey, 2013

4.3 Harvesting, Collection and Marketing of Raw Honey

4.3.1 Honey harvesting

Honey harvesting is seasonal depending on weather changes. Beekeepers in the study area indicated that it takes a maximum of four to six months from the date when the hives are colonized till the harvesting time, thus resulting in two high seasons. The first high season for honey production is between May and July and the second season high is between October and December. The indicated harvesting period that is first and second seasons in the study area found to comply with that reported in Ethiopia by Wagayehu and Nuru (2011). However, discussions with sampled respondents revealed that some beekeepers do harvest unripe honey due to lack of enough skills to assess whether or not the honey is ripe and ready for harvest. The reason could be lack of skills to detect appropriate time when hives are ready for harvest.

Table 17: Honey seasonality flow harvesting

Season of harvesting	Percentage
October-December	10.6
May- July	89.4

Source: Field survey, 2013

However, during focus group discussions it was revealed that some of the beekeepers do harvest unripe honey due to lack of enough skills in assessing as to when the honey is ripe and ready for harvest. The findings in Table 17 show that 89.4% of the beekeepers harvest their hive products between May and July and a few 10.6% of the respondents reported to have been harvesting honey in the second season of October through December. This implies that people have no knowledge on harvesting practices and how to determine as to whether or not the hives are ready for harvesting. Harvesting techniques depend on the type of hives owned by the producer. Producers with traditional hives harvest by cutting across and removing the central comb, which sometimes leads to harvesting raw honey or honey mixed with larvae.

Most producers do harvest honey themselves although there are some community members who have specialized on hive management and harvesting. Where hive owners invite specialized persons to harvest the honey, payment is made in cash or in kind. The average cash payment is TZS 1000 for one to three hives. Payment in kind is made through the equivalent honey quantity which is five to one ratio of the quantity harvested. The payment structure is neither fixed nor defined and usually depend on personal negotiations and mutual understanding between the hive owner and the harvester. Most of the beekeepers interviewed reported to have been removing all the honeycombs and brood combs from the hive and mix the pollen, brood and honey for sale or for own consumption. All (100%) of them remove all seal honey and brood parts from the hives. This finding concur with Kandemir (2010) reported similar method of honey harvesting in Turkey of which beekeepers

remove all seal honey and brood parts from hive using smoke which is used to drive the bees.

4.3.2 Honey transportation

The results from study shows that 88.46% of the producers and traders from among the respondents interviewed reported to have been using motorcycles and 11.54% reported to have been using bicycles in transporting the honey from the field, that is, Kigosi Mwoyowosi forest reserve to the homes or to the market. These means of transport (motorcycles and motorbikes) are privately owned. Transport costs in Namonge, Runzewe, Msonga and Katome villages range from 30 000 to 80 000 per trip (KMFR to Runzewe centre) for those who are using motorcycles popularly known as “BODABODA” and between TZS 20 000 and TZS 50 000 per trip for those using bicycles. Poor rural roads particularly feeder roads are the main challenge leading to high transportation costs, deterioration of the product quality and physical losses as pointed out by the respondents interviewed.

4.3.3 Packaging of honey

It was found that most of value chain actors sell their honey in villages and centre markets in different package available containers. Most of them pack honey locally using plastic containers of 5 litres to 20 litres that were used for storing other items such as cooking oil and drinks. The honey which is sold by traders along the roadsides at Ushirombo and Runzewe areas was normally packed in jars of 1 litre, 5 litres, 10 litres and 20 litres, which are made of glass or plastic materials which were previous used for storing hard drinks (Konyagi, Amarula, and Whisk). About 100%

of the traders (assemblers, wholesalers and retailers) interviewed were using plastic or bottle containers to pack honey before sold to consumers. This finding concur with that of Konga (2011), who states that beekeepers sell their honey at villages and market centres in whatever containers available such as beer/soft drink bottles or glass or plastic jars.

4.3.4 Honey marketing channels

More than 60% of beekeepers sell their produce to retailers, while 23.08%, 12.5% and 1.92% sell their produce to consumers, assemblers and wholesalers respectively (Field survey, 2013). There are four marketing channels for raw honey identified which include the following:

a) Beekeepers - household consumers in Runzewe, Ushirombo and Kahama

   This is the minor channel which involves beekeepers harvesting honey and selling directly to household consumers located within the villages and town centres of Runzewe, Ushirombo and Kahama. It was observed that a total of 76 440 kilograms of honey which is equal to 11.93% are marketed through this channel.

b) Beekeepers – Assemblers (Runzewe/Msonga) - Wholesalers located in Runzewe (Yasin) – Retailers (Runzewe, Ushirombo and Katome) - household Consumers (Runzewe, Katome, Ushirombo, Masumbwe and Kahama town). In this channel, large quantity of honey is marketed. It was reported that beekeepers do sell honey to assemblers found at Runzewe and Msonga centres who then sell to wholesalers located at Runzewe and the

chain continues to retailers and finally consumers in Runzewe, Ushirombo and Kahama.

c) Beekeepers-Wholesalers (Runzewe)-Retailers (Runzewe,Nyakanazi) then to household/individual consumers (Runzewe, Ushirombo, Nyakanazi). In this channel beekeepers harvest honey, sell to wholesalers who then sell to retailers and finally retailers sell to consumers.

d) Beekeepers-Retailers (in Runzewe, Ushirombo, Nyakanazi) – Consumers in households, truck drivers at Nyakanazi, Runzewe, Kahama, Ushirombo and other consumers abroad. Large quantities of honey produced (more than 300 tons) accounting for more than 60% of the produce is passed and marketed through this channel. Normally beekeepers sell the honey to retailers who then end up selling the honey to consumers. These results concur with those of Konga (2011), who reported honey passes four different marketing channels before reaching to final consumer in Lushoto district.

It was also observed from the study, the local market for the honey along the value chain appears not to be saturated. Most beekeepers did not have stocks of honey at the time of the interview. Generally, the quoted prices for honey were slightly higher in Ushirombo than in Runzewe and Msonga centres. The production of honey on these localities was also low with an average output of 2.36 kg per hive. The economies of scale remain a key issue which needs to be addressed; as it affects the marketing of honey and its by-products. Locally, honey market was relatively stable with only four main categories of buyers namely assemblers, retailers, consumers

and wholesalers. Buying prices of Kondebona beekeepers association were reported to be lower than prices offered by local and external buying agents. For example, buying price of honey for Kondebona Association was TZS 3000 per kilogram, while the same kilogram was worth TZS 3500 to 6000 when sold to other buying agents. Thus, beekeepers preferred selling their honey to retailers and assemblers instead of the association.

The findings show that 62.5% of the honey produced was sold to retailers at a price ranging from TZs 3000 to 3250 per kilogram. Retailers do collect honey from beekeepers through agents who move from one house to another during harvesting time. The findings also indicates that apart from retailers, other buyers of honey from beekeepers include households consumers, assemblers and wholesalers accounting for 23.08%, 7.69%, 4.81% and 1.92% of honey buyers respectively. Marketing channels for raw honey show a systematic flow of the honey from producers to consumers. Beekeepers were the primary producers of honey which becomes the first point in the marketing channel. They sell the honey to different traders. The study identified four marketing channels all of which start with the beekeepers, and then the product passes through different routes.

The first channel involves beekeepers at homestead who were selling a volume of 260 000 kg of honey directly to household consumers. The second channel was honey producers sold the honey to assemblers who then sell it to wholesalers; the wholesalers sell the honey to retailers who end up selling the honey to consumers. The volume traded in this channel was 136 045 kg. The third channel starts with the

honey producers and ends up with wholesalers who then sell the honey to retailers, and then to consumers. A total of 84 500 kg was traded through this route. The fourth channel was the honey producers who sell to retailers who in turn sell the honey to consumers (households, travellers by the roadsides, restaurants and exporters). This was the significant large amount of honey marketed through this channel in the study area accounting for more than 60% (472 485 kg) of the honey produced.

4.4 Honey Processing Practices

In Bukombe area, the processing of honey was mainly done through local methods (sieving using cloth, hand squeezing and fish nets). This was mainly due to lack of skills and equipment for processing the honey. The findings indicate that sieving was done by 72.11%, followed by Hand squeezing (6.73%) and 1.92% used fish nets/clothes to purify the honey harvested. The remaining 19.23% of the beekeepers used other forms of processing. When assessing honey quality management activities, there is a possibility that at a farm level of the processing stage, the quality of honey is likely to be compromised through inclusion of foreign substances and impurities, unhygienic handling techniques and malicious practices. This claim was made by traders interviewed in Runzewe who reported to have been receiving poor quality honey from beekeepers. These findings show improvement when compared with Liaison (2010) who reported that, very little or no processing of honey was being done on the honey harvested in Mswambweni district due to lack of skills in processing, lack of processing equipment by local beekeepers.

4.5 Demand for Honey

The local demand for honey in most of the areas surveyed was high. This demand for honey was subjected to the forces of demand and supply whereby when the supply is high the demand is low and vice versa. However, all the beekeepers interviewed indicated that the supply of honey to various market segments (neighbours, local shops and other traders) was low during offseason.

4.6 Prices, Marketing and Profit Margins analysis along the Value Chain

4.6.1 Source of honey

Beekeepers and honey assemblers were reported to be the main source of honey marketed by retailers and wholesalers in the study area. About 81.2% of the honey among traders was from beekeepers and 18.8% came from assemblers (Table 18). The supplier of this honey, that is, the beekeepers and honey assemblers was paid TZS 3000 to 3500 per kilogram of honey in the study area.

Table 18: Source of honey (n=120)

Source of Honey	Percentage
Beekeepers	81.2
Honey Assemblers	18.8

Source: Field Survey Data, 2013

4.6.2 Honey customers

The study findings show that 56.2% of the main customers of honey in Bukombe district are household consumers, and 25% were on transit consumers and honey exporters which account to 18.8% (Table 19). The honey which was sold to the

household consumers is consumed within regions the country in different way; for example in many societies honey is used in traditional medicines and as an integral part of traditional health care. From this findings honey produced in Bukombe was consumed locally for food, for other uses such as in traditional treatment and for making local beer-*Gwagwa* and *Wanzuki* the local brew and wine.

Table 19: Honey customers (n=120)

Customer	Percentage
Household consumers	56.2
Honey exporters	18.8
On transit consumers	25.0

Field Survey Data, 2013

Honey exporters (18.8%) of the traded honey in Bukombe district export to East and Central Africa countries such as Rwanda, Burundi, Uganda and Congo DRC. On transit trucks drivers on the way to these countries are the means of transporting of honey purchased by exporters to their respective borders.

4.6.3 Prices

Table 20 shows the maximum, the minimum and the average prices of honey in the year 2012. The average prices for honey per kilogram were TZS 4590 and TZS 3500 for raw and boiled honey. Usually, honey traders purchase the honey at beekeepers homestead using containers of five to twenty litres by volume. The honey prices vary among traders.

Table 20: Prices

Hive product	Maximum(TZS)	Minimum (TZS)	Average price(TZS)
Raw honey	6 500	3 250	4 590
Boiled honey	5 500	3 000	3 500
Beeswax	7 500	5 000	6 700

Source: Field Data, 2013

4.6.3.1 Prices along the honey value chain

Tanzanian honey fetched between 1.8 and 2.5 USD per kilogram while the honey from Kenya fetched between 4.0 and 5.0 USD at the international market in 2011. In the export market, Tanzanian honey products do not rank highly in terms of quality when compared to Kenya's honey products (MIT, 2012).

From the research findings the prices of honey in the study area found to vary from one node to another. It was observed that beekeepers received significantly lower prices of TZS 3000 per kg than the prices received by assemblers, wholesalers and retailers. In both value chain nodes the honey was bought/sold in terms of kilograms. Assemblers, wholesalers were buying raw honey from beekeepers at TZS 3000 to 3500 and retailers were buying raw honey from wholesalers at TZS 4000 per kilogram. Retailers were selling honey at the highest prices (TZS 5000) than all other value chain actors; this could be because they incur costs of transportation and purchasing of containers for storage.

4.6.3.2 Marketing margins along the value chain

Table 21 show gross margins received by different honey value chain actors. A large gross marketing margin (TZS 2000) was acquired by retailers while assemblers had relatively lower gross margin (TZS 400). These finding concur with Konga (2011) who reported that, in Lushoto district retailers obtain maximum profit than other traders. The market shares among the value chain actors were 40%, for retailers, 27.31% producers, 20.93% wholesalers and 11.76% assembler.

Table 21: Distribution of gross marketing margins and market participants share

Actor	Average buying Price TZS/Kg	Average selling Price TZS/Kg	Market margin TZS/Kg	Market share (%)
Beekeeper	0	3 000	-	27.31
Assemblers	3 000	3 400	400	11.76
Retailers	3 000	5 000	2 000	40
Wholesaler	3 400	4 300	900	20.93

Source: Field survey data, 2013

4.6.3.3 Profitability analysis along honey value chain

The survey revealed that honey traders (Assemblers, wholesalers, retailers) in all categories in Bukombe district receives a profit margin in average ranging from TZS 1725 to TZS 3400 per kilogram of honey. The variable costs for selling one kilogram of honey and Beeswax are transport, labour, storage and packaging. Since the retailers purchase the produce directly from the beekeepers, the buying prices are relatively lower than those offered by assemblers, so more profit is possible. Selling season was also a major factor in determining the level of gross margins for

retailers. As shown in Table 22, the margins were higher during the low season than in the peak season. During the low season retailers tend to charge higher prices because of low supplies of the produce.

4.6.3.4 Gross margins for retailers at Runzewe markets

The findings of the analysis for the gross margins received by retailers at Runzewe market as shown in Table 22 indicate that in the domestic market, the retailers at Runzewe market obtained the highest gross margins (TZS 3400 per kilogram). These findings imply that the profit margins were related to the prices from the producer to the market, mainly due to increasing transport costs as the produce was moved from producers to the market place.

Table 22: Profitability of retailers

Item	Quantity (Kg)	Price/Unit	Total
Honey output/kg	1	4 500	4 500
Total Revenue			**4 500**
Variable costs			
Transport	1	500	100
Labour	1	300	300
Storage	1	500	500
Container	1	200	200
Total Variable costs (TVC)			**1 100**
Gross Margin(GM)			3 400

Source: Field survey data, 2013

The beekeepers in the study area have a profit margin of TZS 1725 per kilogram. The main variable costs include hive construction, inspection, apiary cleaning, packaging, purchase of wire for hanging the hives on trees, and transport.

Table 23: Beekeepers gross margins

Variable	Unit	Price/kg	Total
Honey Output	1	3 000	3 000
Total Revenue	1	3 000	3 000
Variable costs			
Hive construction	1	10	10
Hive inspection	1	110	110
Apiary cleaning	1	110	110
Packaging	1	15	15
Purchase of wire for hive hanging	1	30	30
Transport from forest to home	1	1 000	1 000
Total Variable costs			**1 275**
Gross Margin			1 725
GM as % of sale			57.50%

Source: Field survey, 2013

4.6.3.5 Value chain mapping

Value chain mapping is the interaction of key stakeholders and relevant public and private business development services with the product flows along the value chain. The chain actors are represented using boxes with solid outlines which include; Beekeepers (individual beekeepers, beekeepers cooperatives), traders and the market which are the consumers. The support services are indicated using boxes with doted lines, in the case study the main support services in the supply chain was extension services from LGA, TAMISEMI and MNRT. Transportation services among honey beekeepers and assemblers to wholesalers/retailers traders was mainly done using bicycles and motorbikes owned privately. Retailers located in Msonga and Runzewe use trucks in transporting honey to consumers in other towns such as Ushirombo, Kahama, Geita and Mwanza.

In general, assemblers, retailers and wholesalers play the role of distribution, transporting and marketing of the honey from beekeepers to the end market (consumers in town/centres). The inputs supplied in the study area were mainly log hives local artisans in Runzewe, Namonge, Ushirombo and Katome. Honey flows from beekeepers to consumers in the study area pass through four channels.

The flow of honey volumes in kilograms and the market shares in percentages for different actors are given along the chain with their units, with flows along potential linkages written in parentheses from one node to another as shown in the value chain map in the figure 2.

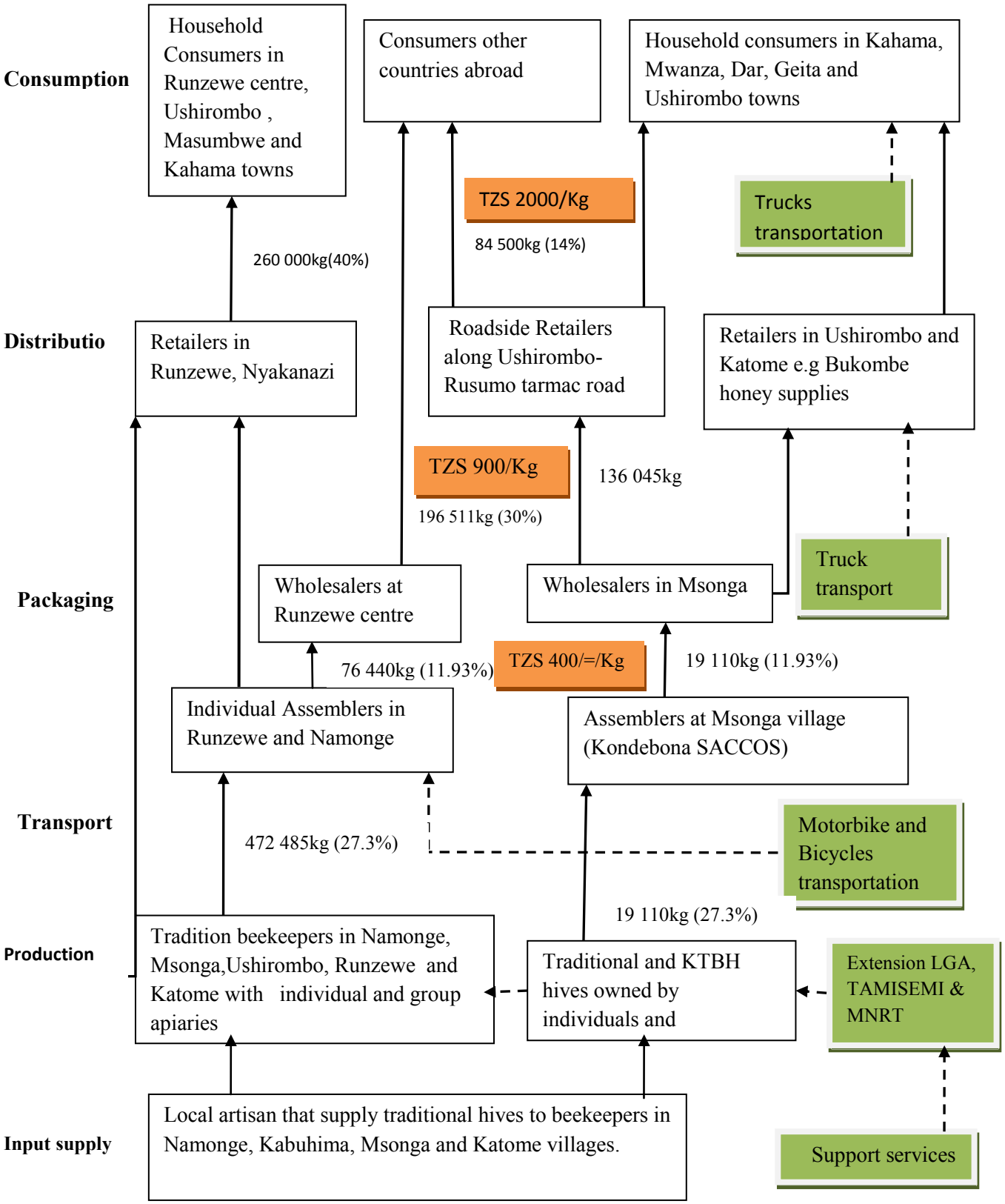

Figure 2: Honey value chain map in Bukombe district

4.7 Market Costs among Honey Traders

The breakdown of the costs incurred by assemblers, wholesalers, and retailers in the marketing of honey as shown in Table 24 consists of charges for storage, transportation, loading, offloading and containers. These variable costs tended to vary slightly in Runzewe, Ushirombo and Msonga market centres. Retailers in the study area were observed to have extra costs of handling, repackaging, storage and transportation of which this could lead consumers buying honey at high prices. The findings in Table 24 show that honey assemblers in all locations have the same average operating expenses (market costs).

Table 24: Market costs among traders

Market costs items	Marketing costs per location TZS/kg			
	Runzewe	Msonga	Ushirombo	Average
Transportation	50	30	100	60
Storage	100	100	100	100
Loading	5	5	5	5
Offloading	5	5	5	5
Honey container	200	200	200	200
Total	**360**	**340**	**410**	**370**

Source: Field survey data, 2013

Table 25 show the average market costs for the wholesaler in the honey value chain at Runzewe, Msonga and Ushirombo marketing centres, and which stood at TZS 200 for purchasing honey containers, TZS 100 for storage, TZS 30 transport and TZS 5 for loading/offloading per kilogram of honey.

Table 25: Market costs wholesaler

Market costs items	Location in TZS/kg			
	Runzewe	Msonga	Ushirombo	Average
Transportation	30	-	-	30
Storage	100	100	100	100
Loading	5	5	5	5
Offloading	5	5	5	5
Honey container	200	200	200	200
Total	**340**	**310**	**310**	**320**

Source: Field survey data, 2013

According to the findings, the average net profits received by different traders at Runzewe, Msonga and Ushirombo market centres was TZS 400 for assemblers and TZS 500 for wholesaler; while the average net profit for retailers was TZS 2000 per kilogram. Honey retailers (TZS 2000) receive a higher average net profit than all the other actors in the value chain.

4.8 Results of the Multiple Regressions Analysis

Table 26 presents the predictors that influence the production and supply of honey to the market whereby regression was significant $p< 0.01$ and $p<0.05$.Therefore the predictors were education level of beekeepers, age the head of household, experience in honey production, access to credit and distance to the nearest market. The model selected five predictors to determine the production and supply of honey in the study area. The regression model explained 65% of the variations in the factors affecting the production of honey as indicated by the R^2 (Table 26). The

results indicate further that four of the five predictors included in the analysis, that is, education level of beekeepers, number of years in honey production, distance to the nearest market, and age of the head of household were statistically significant ($P<0.01$) and ($P<0.05$). This implies that the four predictors had an impact on the production and supply of honey in the study area than others. An increase in size of these predictors brought about an increase in the production and supply of honey at magnitudes indicated by their respective coefficients, and thus contributing to an increase of income as well as poverty reduction.

Table 26: Regression results on factors influencing the production and supply of honey to the market

Independent variables	Standardized Coefficients		t-value	Sig.	Collinearity Statistics	
	Std. Error	Beta (β)			Tolerance	VIF
Constant	2172.506		4.2956	0.795		
Education level of beekeeper	298.6082	0.270578788	4.5877	0.000*	0.826540175	1.20986
Age of head of household(years)	235.9885	0.234181038	3.4502	0.002**	0.647613421	1.54413
Number of years in honey production	188.0679	0.484840592	4.9435	0.000*	0.663511371	1.50713
Access to credit	347.2068	-0.115880602	1.268	0.514	0.937405992	1.06677
Distance to the nearest market	307.4281	0.668554788	3.4104	0.00294**	0.779794695	1.28239

R^2=0.653
Adjusted R^2= 0.63
* Significant at 1%.....level
** Significant at 5%.....level

From the above multiple regressions analysis results (Table 26), distance to the nearest market was the highest predictor of production and supply of honey than other predictors though was significant (P<0.05). The regression coefficient shows that distance to the nearest market and productions of honey are positively related, which implies that as the nearer to the market the beekeepers reside the more they supply the honey due to the minimum cost they incur on transporting the produce; this is unlike those beekeepers who reside further away from the nearest market. The output of this category of beekeepers would have high transport costs which would, in turn, reduce farmers' decision to engage in honey production which, and thus, affecting the supply and availability of honey in the market. This finding is more less the same as that of Beyene and Maiko (2014) who argued that, closeness to the nearest market like big city and towns beekeepers can produce more and sell their honey easily.

Education level and production of honey were also positively related. From the results of the analysis, an increase in education level increases production of honey. These findings concur with Chala, *et al*. (2012) who argued that education improves the beekeeping household ability to acquire new idea production related and market information, which in turn improves productivity and thereby increase marketable supply of honey. Moreover, farmers with higher levels of education are likely to adopt improved practices that have a high probability of increasing production and other quality related practices that contribute to value addition. The number of years in honey production had a standardized regression coefficient of 0.48, which is significant at 1% ($p < 0.01$). The regression coefficient indicates that experience and production of honey are positively related. This implies that more experienced

beekeepers have knowledge on traditional honey production system and are faster to accept new ideas and adopt new technologies than less traditionally experienced beekeepers. Moreover, more experience leads to high production and supply of honey due to the fact that farmers have learned best practices such as bee feeding and management that contribute higher production of honey. Similar findings by Shelix (2011) who reported that, in Malawi older beekeepers are getting more honey as may have more experience, resources or authority that would give them more possibilities for trying new innovations.

The analysis result in Table 26 indicates that, age of the farmers (beekeepers) has a parabolic effect on the level of honey production with an average of 48 years even though age was significant at 5%. This means that farmers aged above 48 years are most likely to have lower level of participation on apiaries activities such as cleaning, inspection and harvesting. The result supports the hypothesis that with the expectation of risk aversion behavior of aged beekeepers for fear of absconding and other unexpected events, it is uncertain for these beekeepers to increase the number of traditional or improved hive as age of the beekeepers increases above 48 years.

The results in Table 26 show further that access to credit influenced the annual production and supply of honey negatively and was not found statistically significant. This implies that as the number of beekeepers increased in having access to credit, there is a decrease in the production of honey. However, further observations showed that majority of the beekeepers had a problem with cash handling; it was pointed out by some respondents that beekeepers do abandon apiary

activities either for local breweries or switch to other income generating activities when they get cash which on the other hand leads to reduction in the production as well as the supply of honey.

CHAPTER FIVE

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

From this study it can be concluded that there is low value addition of honey among actors, though retailers have higher profit margin when compared with other value chain actors. The value chain for honey in the study area constituted a number of actors which include beekeepers, assemblers, wholesalers and retailers who, to a large extent are the key actors along the value chain. Retailers to a greater extent dominated the market in Runzewe, Msonga and Ushirombo market centres, more than 60% of the honey produced in Bukombe district is purchased from Beekeepers is marketed through retailers. On other hand, the retailers are having large market shares than other value chain actors.

The Low honey value addition from actors is contributed by some traditional practices, for example assemblers, wholesalers and retailers in Bukombe district do sell honey packed in a wide range of package containers such as bottles and plastic which originally used as packaging materials of other products such as cooking oils, household cleaners, hard drinks, water and gasoline. This implies that value chain actors do not have the skills and knowledge on good practices in packaging requirements of honey, which need the bottle or package container to be not only leak proof and airtight so as to safely contain the product, but it should also present the product in an attractive form, enticing the consumer to buy the product contained inside. In addition, honey marketed by retailers along road side in Bukombe was

found to be packed in the containers which were kept on open tables and thereby being exposed to sunlight which causes loss of honey quality with time, due to progressive chemical and enzymatic activities activated by direct sunlight. Standard honey is normally kept in storage rooms with temperatures nearing 20^0C and a relative humidity of less than 65%. Storage of honey at more than 25 ^{0}C causes an increase of loss of quality hence low value addition.

5.2 Recommendations

In view of the research findings, in order to improve productivity and sustainability in the supply of honey in Bukombe District and contribute to income poverty reduction, there is need for the government to promote efficient use of modern beehives, training of beekeepers on best management handling practices and processing along with the inaction of policies, which would harness market incentives. Improvement of the market opportunities and extension services will also motivate beekeepers to engage in honey production and thus improve the supply and production of the product.

Value addition can be achieved by strengthening/forming beekeepers groups or associations accompanied with efforts to produce cheap packaging materials. Since individual beekeepers produce small quantities, there is need to collect the honey in bulk and market it in large volumes to reduce transaction costs. Therefore, beekeepers should be encouraged to form marketing groups or associations that will enable to sell honey in aggregates and at the same time encouraging more buyers to enter market. This can be spearheaded by SIDO which is currently promoting

development of small and medium enterprises in the country. Overall, the present findings on honey value chain were only based on the household's level of production and income from the honey. Therefore, to get a wider and clear picture of the flow, distribution and market of honey in the study area, an assessment to evaluate the existing flow of information and market information sharing among value chain actors is recommended.

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APPENDICES

Appendix 1: Questionnaires used for collecting honey value chain data

Part I: BEEKEEPERS QUESTIONNAIRE

A. General information

1. Name of respondent……Name of interviewer……

2. Region ……. 3. District ……4. Division ……

5. Ward…… 6. Village ……..

7. Sex …… 8. Age …….

9. Date of interview…….

B: Social Economic Household characteristics

10. Name of house hold head…….

11. Number of years lived in the area ……

12. Religion of household Circle the appropriate answer

a. Muslim

b. TAG

c. Catholic

d. Other specify…….

13. Age of the house hold head……

14. Marital status: Circle one 1. Married 2. Single 3. Widowed 4. Divorced

15. What is your main occupation……..

C: Honeybee ownership

16. Do you keep honeybees? 1. Yes ….. 2. No……

17. If yes, when did you start beekeeping? ……..year (s).

18. How you start beekeeping? Source of bees, quantity and type of technologies used for the first time.

No	Sources	Quantity	Traditional	Intermediate	Movable-frame
a	Gift from parents				
b	Catching swarms				
c	Buying				
d	Trained				
e	Interest				

19. If the answer for question 18 is buying, does the bee colony sale in your Locality?

1. Yes…… 2. No…….

20. If yes, what is the price of one colony? ……..TZS

21. How many honeybee colonies do you owned? Give the quantity of honey produced for the last three years

Year	Traditional		Intermediate		Movable-frame	
	No	Produce	No	Produce	No	Produce
2009						
2010						
2011						

22. Where did you keep your bee colonies?

No	Site or placement of hive	Traditional	Intermediate	Movable-frame
1	Backyard			
2	Under the eaves of the house			
3	Inside the house			
4	Hanging on trees near homestead			
5	Hanging on trees in forests			
6	Others (specify)			

23. What is the trend of your colony number and honey yield (in question 22)?

1. Increasing 2. Stable 3. Decreasing

24. If there is an increase in trend in number of bee colonies and honey yield over the

years, what are the causes?

1. Good market price
2. Added more bee colonies
3. Use of new technologies
4. Use of extension services
5. Experience in beekeeping
6. Others (specify) …….....

25. If there is a decrease in trend in the number of bee colonies and honey yields over the year, what are the causes in order of importance?

No	Causes	Rank	Season of occurrence	Measures taken
1	Lack of bee forage			
2	Lack of water			
3	Drought (lack of rainfall)			
4	Lack of extension services			
5	Absconding			
6	Increased cost of production			
7	Lack of credit			
8	Pests and predators			
9	Decrease in price of honey			
10.	Other specify			

D: BEEKEEPING EQUIPMENTS AND PROTECTIVE MATERIALS

26. What beekeeping equipments and protective materials you have or available to you when ever required?

……

……

27. What are the smoking materials you are using?

1……

2. …….

3…….

4……..

28. List the amount of your beehive products and frequency of harvest per annum.

Hive product	**Amount harvest**	**Period of harvesting**	**Frequency per year**
Honey			
Beeswax			

29. While harvesting does you remove all honeycombs? 1. Yes ….. 2. No……

30. Do you harvest all brood combs? 1. Yes ……. 2. No……..

31. If no how much honey /no of combs/ left? ……..kg

32. While harvesting does your bee colony evacuate? 1. Yes……2. No……..

33. Give only one major home use of honey. Circle the appropriate use

1. As a food
2. As a medicine
3. for beverages
4. for cultural and ritual ceremonies
5. Others

(specify):……

34. Among the following which is the main source of crude beeswax you collect.

1. Empty honeycomb during harvesting
2. Discarded, old and broken combs
3. Uncapping and spout beeswax
4. From colony absconding hives
5. After home utilization of honey
6. Others, specify…….

35. Why you are collecting crude beeswax? Choose one use

1. For income generation
2. Candle making
3. Foundation sheet making
4. Religious and cultural use
5. Others, specify:……

36. If you don't collect/produce beeswax what is (are) the reason (s)?

1. Lack of market
2. Lack of knowledge
3. Lack of processing skills
4. Lack of processing materials
5. Others specify: ……

37. Do you collect propolis? 1. Yes ……. 2. No……

37.1 If yes, for what purpose you are using the propolis?

1. For sale (marketing) 1.
2. As a medicine to treat diseases
3. Others specify: ……

37.2 If your response is no, what is (are) the reason (s)?

1. Lack of market
2. Lack of knowledge
3. Others specify: ……

38. What are the sale prices of your beehive products?

Hive product	**Selling price(TZS)**
Honey	
Beesawax	

E: POST HARVEST MANAGEMENT

39. Do you strain your honey? 1. Yes…….. 2. No……..

40. If yes, what materials do you use for straining?

1. Honey extractor
2. Honey presser
3. Cloth
4. Sieve
5. Decantation
6. Using hand

41. If you strain, what is the advantage and price of 1 kg strained honey?

Advantage: ……

41.1. Price of 1 kg strained honey: ……TZS

42. If you don't strain your honey why? (Circle one or more).

1. Lack of materials
2. Lack of knowledge how to strain
3. Consumer do not prefer strained honey
4. The amount of honey will be reduced if strained
5. Others specify: ……

43. For how long do you store your honey? (Circle one only).

1. I don't store, I will sale / it will be consumed during harvesting
2. One to six months 3. Seven to twelve months
4. One year to two years 5. More than two years

44. For what reason do you store honey? ……

45. What is the maximum storage year of your honey?.....Years.

46. List the container you have been used to store your honey, price, service years

No	Types of container used	Price(TZS)	Service(years)	Problems observed by using it
1	Gourd			
2	Earthen pots			
3	Tin			
4	Plastic			

F: CREDIT SOURCES AND AVAILABILITY

47. Do you ever-obtained credit for your beekeeping operations? 1. Yes …… 2. No……..

48. If yes in question 47, for what purposes you get credit.....

49 Who are / were your sources of credits? (Circle one or more).

1. Micro finance institutions (name it): …….
2. Service cooperatives 5. Relatives
3. Ministry of Agriculture 6. Individual lenders
4. NGO 7. Others, specify: …….

G: BEEKEEPING EXTENSION SERVICES

50. Do you receive extension services in honey production operations? 1. Yes…….2.No……..

51 If yes in section 50, above which organization/division

.1.Government (Beekeeping department)

2. NGOs

3. Individual trained on beekeeping

H: MARKETING ACTIVITIES

52. Do you sale your honey? 1. Yes 2. No

53	Where do you sell your honey?	1. Assemblers 2.Traders 3. Consumers 4.Other (specify)
54	How much do you sell per kg?	
55	What are the maximum amount of honey in kg do you sell per week/month/year	
56	What problems do you face in honey marketing? (Specify)….	
57	In your opinion, what needs to be done to improve honey marketing?	

58. What distance do you travel to reach the nearest market to sell your hive products?

1. 0.5 to 5km
2. 5 to 10km
3. Above 10km

59. What is the annual income from sale of hive products?

No	**Types of produce**	**Quantity**	**Unit price (TZS)**	**Total price (TZS)**	**When do you sell****
1	Honey				
2	Crude beeswax				
3	Propolis				
4	Bee colonies				

**1. At harvesting 2*. After harvesting

60. What are the factors that govern the price of the honey in your locality?

1. Seasons of the year
2. Colours and taste of the honey
3. Distance from market
4. Traditional ceremonies
5. Others (specify)…

61. During this harvesting season what is the price of 1 kg of honey…….

62. Who are your customers? Circle one option

1. 'Honey Assemblers
2. Retailers
3. Wholesalers
4. Consumers
6. Beekeepers co-operative
7. Others /specify….

60. How do you evaluate the local market price? Circle one 1. High 2. Medium and 3. Low

61. How is the price trend of honey in your locality?

No	**Price trend**	**Reasons**
1.	Increasing	
2.	Stable	
3.	Decreasing	

62. How did you fix the price of honey? Tick one answer

1. Consideration labour and other cost incurred [ ]
2. Market force (supply and demand) [ ]
3. Colour of honey [ ]

4. Table honey and crude honey [ ]

5. Customs and Traditional ceremonies [ ]

6. Others (specify…

63. Where is your major sell place? Tick (More than one answer is possible)

1. In your home [ ]

2. Nearby market place [ ]

3. Major honey market place [ ]

4. Beekeepers cooperatives [ ]

5. Other (specify)…….. [ ]

64. What is the demand of honey in the market? Circle one answer

1. Very high 2. High 3. Medium 4. Low 5. Very low

65. What is the supply of honey in the market?

1. Excess 2. Enough 3. Not enough

66. How did you transport the honey if you are selling in the market?

1. Containers a. Same b. Different

2. Means of transportation /specify/

67. List problems you have been come across to bring your product to market……

……

……

……

……

I: COSTS INVOLVED IN PRODUCTION OF HONEY

68. What are the labour requirements for honeybee production systems?

No	Activities	Performed by	No of days (hours) required/hive	Estimated costs (TZS)
1	Hive construction			
2	Hive plastering			
3	Hive smoking			
4	Hive inspection			
5	Apiary cleaning			
6	Swarm control			
7	Transferring			
8	Supering			
9	Harvesting			
11	Processing of products			
12	Sale of bee products			
13	Feeding			
14	Watering			

67. After harvesting your honey. Do you transport for marketing? 1 Yes… 2. No…..

69.1 If yes how much does it costs……TZS

70. Apart from beekeeping what other activities do you perform?.....

THANK YOU FOR YOUR COOPERATION

Appendix 2: HONEY TRADERS QUESTIONNAIRE (ASSEMBLERS, WHOLESALERS AND RETAILERS)

Name of Respondent…….Date of interview……

Ward…….. District…….. Region…….

A: Household demographic and socio-economic characteristics

Q No.	**Question**	**Answer/response**
01.	Name of the village	
02.	Name of shop	
03.	Gender of respondent	1.Male 2.Female (Tick one)
04.	Age of the respondent.	
05.	Marital status	1.Married 2.Single 3.Divorced 4.Widowed (Tick one)
06.	Education level of respondent	1.None 2.Primary 3.Secondary 4.Other (specify)
07.	Years in Honey business	
08	Type of trade	1. Assembler 2.Retailers 3.Wholesaler 3.Middlemen 4. Other specify…….

B: HONEY MARKETING INFORMATION AND MARKET CONDITIONS

09.	What is the source of Honey you sell?	1. Beekeepers 2.Honey assemblers 3. Other (specify)
10.	How much do you pay to the supplier of this honey per kg?	TZS
11.	Who are your main customers?	1.Households 2.Hotels 3.Honey exporters 4.Other (specify)
12.	How much kilograms of honey do you sell per week/month/year	
13.	What problems do you face in honey marketing? (Specify)….	
14.	In your opinion, what needs to be done to improve honey marketing?	

C: Transportation facilities

14. How do you transfer your bee products (honey and beeswax) from homesteads to market…....……

15. What is the transport cost per kg.....

D: INCOME SOURCE DURING LAST WEEK/MONTH /YEAR

Activity/business line.	Quantity/number sold	Selling price	Total Revenue
Bee products (honey and beeswax)			
Other (specify)			

E: COST IN HONEY MARKETING

Item	**Cost**
Transport	
Labour cost	
Storage	
Packaging	
Other costs (specify)	

F: OTHER ACTIVITY PERFORMED BESIDES HONEY BEE MARKETING

17. In addition to honeybee as a source of income what other important type of activity / activities do you perform to increase your income (specify)……..…

18. What is the average income from non Honey marketing activities per week/month/year…….

THANK YOU FOR YOUR COOPERATION AND MAY "GOD BLESS YOU"