

**ANALYSIS OF HONEY VALUE CHAIN AND HONEY VALUE ADDING  
ACTIVITIES FOR TRADITIONAL BEEKEEPING: THE CASE OF  
KONGWA DISTRICT, DODOMA**

**BY**

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**A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE  
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## **ABSTRACT**

This study aimed at analyzing the value chain for traditionally produced honey and identifying the most profitable value-adding activity practiced by traditional beekeepers. Specifically, the study intended (i) to analyze the value chain for traditionally produced honey in Kongwa district, (ii) to determine the contribution of honey to traditional beekeeper's household income, (iii) to analyse costs and returns from honey value-adding activities in order to identify the most profitable value-adding activity, and (iv) to identify constraints limiting value addition to honey produced traditionally and recommend strategies to improve the position of traditional beekeepers in the value chain. Data were collected using a semi-structured questionnaire administered to 120 beekeepers randomly selected from four villages in Kongwa district. The results indicate that there is a great potential of honey production in Dodoma region if constraints such as access to reliable markets, lack of knowledge on value addition and poor harvesting equipments are removed. Furthermore, beekeeping was found to contribute about 44% to the income of the sampled households. Three major value adding activities undertaken by the traditional beekeepers are filtering, packaging and quality-testing. Profitability analysis indicates a significant difference in revenue accrued from unprocessed honey and value-added honey through filtering, packaging and quality-testing. Filtering without quality testing and packaging was found to be the most profitable value-adding activity as it yielded higher net revenue than when accompanied by packaging and quality testing. However, unprocessed honey is mainly demanded locally for making local beer. Individual beekeepers cannot access urban, regional

and international markets without adding value to their honey. It is recommended that interventions to promote beekeeping should focus on encouraging formation of marketing associations, modern beekeeping equipments use, imparting knowledge and skills on appropriate beekeeping, post harvest technologies and local production of cheap honey-packaging materials to encourage value addition.

**DECLARATION**

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

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Date

The above declaration confirmed

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Date

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honey to traditional beekeeper’s household income, (iii) to analyse costs and returns from honey value adding activities in order to identify the most profitable value adding activity for honey produced by traditional beekeepers and (iv) to identify constraints limiting value addition to honey produced through traditional methods and recommend strategies to improve the position of traditional beekeepers in the value chain.....53

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**ABBREVIATIONS AND ACRONYMS**

DOBEC	-	Dodoma Beekeepers Cooperative
FAO	-	Food and Agriculture Organization
GDP	-	Gross Domestic Product
Ha	-	Hectares
HCA	-	Honey Care Africa
hh	-	Household
Km <sup>2</sup>	-	Square kilometer
mm	-	Millimeter
MNRT	-	Ministry of Natural Resources and Tourism
MT	-	Metric Tonnes
METL	-	Mohamed Enterprises Tanzania Limited
NBKP	-	National Beekeeping Programme
NBP	-	National Beekeeping Policy
RLDC	-	Rural Livelihood Development Company
STAT	-	Statistical Analysis Software
SPSS	-	Statistical Package for Social Sciences
TFC	-	Total Fixed Cost
TSh	-	Tanzanian Shilling
TVC	-	Total Variable Cost
UK	-	United Kingdom
URT	-	United Republic of Tanzania
USA	-	United States of America

## CHAPTER ONE

### 1.0 INTRODUCTION

#### 1.1 Background Information

##### 1.1.1 Beekeeping in Tanzania

In Tanzania beekeeping is a traditional economic activity. According to Kihwele (1991), over 99% of Tanzanian beekeeping industry (Apiculture) is carried out by forest-based small-scale beekeepers that use indigenous technical knowledge in beekeeping. Traditional beekeeping is the form of beekeeping where activities or techniques are based on methods that are handed down from ancestors to posterity. Usually such methods are passed from one generation to the other by means of oral instruction and also by practice. Traditional beekeeping has been relatively successful for so many years in Tanzania because traditional beekeepers are rich in the knowledge about the honeybees and their management, the phonology of the bee fodder plants and associated beekeeping calendar (Kihwele *et al.*, 1999). In addition to that, beekeeping is one of the most important sub-sectors in the Natural Resources sector in Tanzania. It is also seen as an alternative income generating activity which is doomed with unfavorable soils and climate (Kihwele, 1991). It has been practiced for socio-economic development and conservation of biological diversity (Kihwele *et al.*, 1999). It is the source of food (honey, brood and pollen), medicine, and raw materials for various industries. Beekeeping also provides employment and income to most rural and urban people in Tanzania. Besides playing wider domestic roles in the bees and bee-products industry in Tanzania, beekeeping is also a good source of foreign exchange earnings (Mapolu, 2005).

Beekeeping as a sub-sector can be developed further to become one of the main contributors to GDP in Dodoma region and Tanzania at large since its potential is immense. Principally, beekeeping makes maximum use of existing trees conducive for beekeeping and as such Tanzania is endowed with favorable environment for 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 are ideal for developing beekeeping industry. Almost 0.5 million hectares out of this area are unreserved forests and woodlands, while 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 which cover about 115-500 ha are also valuable as bee fodder. High potential for beekeeping is also found in agricultural land where substantial bee products can be harvested from agricultural crops e.g. sunflower, green beans, coffee, coconut and sisal (Mwakatobe and Mlingwa, 2000).

The potential of beekeeping in Dodoma region is high. Data from Bahi district beekeeping office in Dodoma region indicate that in Itiso division there are 14 625 colonies, in Mundemu division 12 187 colonies, in Mwitikira division 9750 colonies, Mvumi division 2437 colonies, Makang'wa division 4875 colonies and Chilonwa division 7312 colonies. Kondo district is estimated to have more than 250 000 colonies and 90% of its production is based on traditional means (RLDC, 2006).

Approximately 95% of all hives are traditional, including log and bark hives. Others are reeds, gourds, pots etc (Mwakatobe, 2001).

### **1.1.2 Honey production in Tanzania**

Based on statistics of 1998, the annual capacity of Tanzania for honey and beeswax production is 138 000 and 9 200 tons respectively (NBP, 1998). Tanzania's honey is known all over the world due to its natural state compared to honey from other countries (NBP, 1998). However, the country is currently producing 4860 tons of honey and 324 tons of beeswax per year, which represents only 3.5% of the annual production potential of the country beekeeping. Table 1 shows the average honey production in some African countries, including Tanzania. Ten years ago, Tanzania's average yield per hive was 7.7 kg, (Table 1), most of which came from traditional beekeeping. Several authors (Kihwele and Bradbear, 1989; TFAP, 1989; Mlay, 1997) have estimated that the production of bee products could increase by 50% if its potential was optimally exploited.

In the year 2000, the amount of honey produced was worth 4.9 billion shillings and the amount of beeswax produced was worth 648 million shillings. However, it is estimated that the country can support almost 10 million productive bee colonies in its forests, woodlands and farm areas. Each year these bee colonies could provide 9200 tons of beeswax and 138 000 tons of honey (URT, 1998). This means that only 3.5% of the existing potential of the beekeeping industry is being utilized. However, Tanzania's honey is highly demanded in many countries in Europe (e.g. Germany, Holland, England, and Belgium) and other countries in the world due to its organic

nature. Due to an increasing concern from consumers for no or little chemicals in food products, it is expected that the demand for organically produced honey will be even more in the future.

**Table 1: The average honey production in some African countries**

<b>Country</b>	<b>Honey yield (kg/hive)</b>
Burundi	9.8
Ethiopia	8.3
Kenya	5.7
South Africa	17.3
Tanzania	7.7
Uganda	4.0

**Source: Crane (1998)**

### **1.1.3 Policies and Programmes in favor of sustainable beekeeping enterprises in Tanzania**

#### **1.1.3.1 The national beekeeping policy of 1998**

The Government of Tanzania developed the National Beekeeping Policy (NBP) in 1998. The overall goal of the National Beekeeping Policy is to enhance the contribution of the beekeeping sector to the sustainable development of Tanzania and the conservation and management of its natural resources for the benefit of present and future generations. NBP encourages active participation of all stakeholders in establishment and sustainable management of bee reserves and apiaries, promoting beekeeping-based industries and products and promoting sustainable management of beekeeping in cross sectoral areas for ecosystem conservation and management. To enable effective implementation of the NBP, the following two instruments have been put in place.

### **1.1.3.2 The national beekeeping programme**

The National Beekeeping Programme is an instrument designed to put into practice the NBP with emphasis on stakeholders' participation in the planning, management, ownership and sustainable utilization of bee resources for poverty eradication, improved biodiversity development and environmental conservation. The programme has three sub programmes including Beekeeping Development Programme, Legal and Regulatory Framework Programme and Institutional and Human Resources Development Programme.

### **1.1.3.3 The beekeeping Act No. 15, (2002)**

The Beekeeping Act No. 15 of 2002 was enacted by Parliament in April 2002. Its main objectives are: (i) to make provisions for the orderly conduct of beekeeping; (ii) to improve the quality and quantity of bee products; (iii) to prevent and eradicate bee diseases and bee pests, and (iv) to improve revenue collection.

### **1.1.3.4 National forestry policy**

According to URT (1999), the overall goal of the National Forest Policy is to enhance the contribution of the forest sector to the sustainable development of Tanzania and the conservation and management of her natural resources for the benefit of the present and future generations. Income generating activities such as beekeeping are introduced to help improve the incomes of communities, men and women beekeepers, in line with the Tanzania overall development goals. Involvement of communities in forest management including beekeeping has

increased benefits accrued to communities and has also led to considerable improvement in incomes.

#### **1.1.3.5 Beekeeping development project**

The Government of Norway through NORAD is cooperating with the Ministry of Natural Resources and Tourism (MNRT) in supporting beekeeping in five potential Districts (Handeni, Manyoni, Kondoa, Kibondo and Tabora) through the Beekeeping Development Project (BDP). BDP was formed as a strategy to implement the National Beekeeping Policy of 1998. BDP is implementing sub programme of the National Beekeeping Programme of 2001. The purpose of the BDP is to increasingly involve communities and other stakeholders in managing honeybee resources in sustainable manner.

### **1.2 Problem Statement and Justification**

The economic potential of the beekeeping sector is large, amounting to 138 000 tons of honey and 92 000 tons of beeswax. However, actual production of honey and beeswax stood at 4860 tons and 324 tons respectively which is only 3.5% of the potential production of honey and beeswax (NBP, 1998). The main constraint which hinders the exploitation of the potential includes low level of technical know-how, poor access to markets, low value addition and poor quality. In addition to the constraints mentioned above, most traditional beekeepers sell their honey without adding value, thus earning less income from honey than they would earn if they would add value to their honey. Therefore, there is a need to analyse the value chain for traditionally produced honey and the value adding activities, and analyse the

profitability of each value adding activity by measuring the costs involved in production and the revenues obtained from sales of the produced honey.

There are few related studies which analyzed value adding activities in honey. Most of the studies embarked on honey marketing in general and therefore there is inadequate information about value adding activities to traditionally produced honey. Mkamba (2006) conducted a study on Analysis of Factors Affecting Marketing of Honey in Tabora and Dar-Es-Salaam Regions, while Mwakatobe and Mlingwa (2000) analyzed Bee Products Marketing in Tanzania.

Ntenga and Mugongo (1991) indicate that areas where traditional beekeeping has been best documented are the western miombo zone, comprising Tabora Region, Kahama District of Shinyanga Region, Kasulu and Kibondo Districts in Kigoma Region, Mpanda District of Rukwa region, Chunya District of Mbeya Region and Manyoni District of Singida Region; followed by the Southern Miombo zone comprising Ruvuma and Lindi Regions. There is very little information concerning traditional beekeeping in Dodoma region.

In the aspect of value adding activities, a baseline study carried out by the Swiss company for rural development based in Dodoma in 2006 showed that 85% of the rural beekeepers use traditional means for honey and beeswax production (RLDC, 2006). The report added that the value adding activities are too tedious and costly for them in such a way that they do not achieve the quality demanded by the local traders. Ntenga and Mugongo (1991) found that, many beekeepers produce low



quality bee products due to lack of effective quality control and inspection systems as well as lack of value adding skills and it is literally proclaimed that honey produced through traditional beekeeping is far beaten up in terms of price in the market just because value adding is not done properly or not done at all.

It should be known that value addition to traditionally produced honey has an effect in the prices of honey. During the period 2003/04, the price of honey in Dodoma increased from TShs. 15 000 per 30kg container in June 2003 to 18 000 TShs by June 2004 in a local market, yet these prices were low. However, the price could increase up to 25 000 per 30kg container if the honey produced through traditional techniques undergoes preliminary value adding procedures (RLDC, 2006). This shows that if traditional beekeepers could improve their ways of conducting value adding activities they would earn more income out of beekeeping, hence move themselves out of abject poverty. Low value addition has led to the failure for the small exporters from the developing countries to compete in the international market. This is mainly due to the low quality honey from those countries. Considering that, value addition to traditionally produced honey is imperative in order not only to compete in the international market, but also attract local consumers hence capture the domestic market.

This study therefore analyzed the value chain for traditionally produced honey, evaluated different value adding activities which could be carried out by traditional beekeepers. In addition to that, the study analyzed the profitability of each value adding activity using revenue-cost analysis approach and finally the study suggested

the most profitable value adding activity and value chain strand to be adopted by traditional beekeepers for profitable and sustainable beekeeping in the study area and Tanzania as a whole.

### **1.3 Objectives**

#### **1.3.1 General objective**

The main objective of this study was to analyze the value chain for traditionally produced honey and identify the most profitable value adding activity carried out by traditional beekeepers.

#### **1.3.2 Specific objectives**

- (i) To analyze the value chain for traditionally produced honey in Kongwa district, Dodoma region.
- (ii) To determine the contribution of honey to traditional beekeeper's household income.
- (iii) To analyse costs and returns from honey value adding activities in order to identify the most profitable value adding activity for honey produced by traditional beekeepers.
- (iv) To identify constraints limiting value addition to honey produced through traditional methods and recommend strategies/interventions to improve the position of traditional beekeepers in the value chain.

## **CHAPTER TWO**

### **2.0 LITERATURE REVIEW**

#### **2.1 The Value Chain Concept**

The value chain methodology is a tradition developed from two strains of literature: the business literature on strategy and organization of Porter (Porter 1990), and developed in numerous studies in the late 1990s.

According to Tradecraft (2007), value chain concept is a framework for conducting business transactions that is responsive to the needs of the consumer; that involves trust and open communication between its participants; and it results in mutually beneficial outcomes for all participating parties. The essence of value chain is to create and manage a vertical alliance or strategic network between a number of independent business organisations in order to meet the needs of targeted consumer(s). This strategic alliance is formed to meet specific market objectives and often is created when organisations have a shared vision and common goals. It allows for mutual decision-making as well as the sharing of risks and benefits. Value chain analysis (VCA) is thus expected to shed more light on the strategies for developing commercial orientation of future support activities of the relevant stakeholders in the sub sector.

The “value chain” is defined by Kaplinsky as “the full range of activities which are required to bring a product or service from conception, through the intermediary phases of production, delivery to final consumers, and final disposal after use”

(Kaplinsky and Morris, 2001). Briefly, such analysis focuses on the interaction of actors along each step of the production system (from raw producer to consumer) as well as the linkages within each set of actors. Such an approach thus considers international trade relations as being part of a series of networks of producers, exporters, importers, and retailers, whereby knowledge and relationships are developed to gain access to markets and suppliers.

Kaplinsky and Morris (2001) observe that in the course of globalization, there has been a perception that the gap in incomes within and between countries has increased. They argue that value chain analysis can help to explain this lacuna, particularly in a dynamic perspective. First, by mapping the range of activities in the chain it provides the capacity to decompose total value chain earnings into the rewards that are achieved by different parties in the chain. Other ways of viewing global distributional patterns provide only partial insights into these phenomena. For example, trade statistics only provide data on aggregate, gross returns rather than on net earnings, and branch-specific analyses (agriculture, industry, services) only capture part of the story. Secondly, a value chain perspective analyses the way in which particular firms, regions and countries are linked to the global economy. This mode of insertion will determine to a large extent the distributional outcomes of global production systems and the capacity which individual producers have to upgrade their operations and thus to launch themselves onto a path of sustainable income growth.

A major benefit of value-chain analysis is through the identification of the nature and extent of barriers to entry along the chain. As a result, such an approach is amenable to explain many of the distributional outcomes that occur in the course of globalization as well as the evolution of such relationships over time (Kaplinsky and Morris, 2001).

Value chain analysis has been applied to the understanding of commodity chains and export strategies in a number of developing countries. Dolan, Humphrey, and Harris-Pascal used this approach to analyze the impact of consolidation and market power in the UK supermarket industry on fresh vegetable suppliers in developing countries, Dolan *et al.* (1998). The authors note that this commodity chain is a buyer-driven chain, with specifications and standards determined by the supermarkets and enforced upon the suppliers. While this presents opportunities for value-adding by potential exporters who can meet the strict standards of these retailers, numerous challenges exist for suppliers in developing countries. These challenges include producing high-quality produce that is reliably supplied, low cost, ethically produced, and safe, that continually innovates to meet the changing needs of consumers. This has consequently restricted access to these commodities chains. The rewards for such value-adding are significant – the authors note that the price of various types of packaged carrots earn a premium of 7 to 15 times that of ordinary bulk carrots. Yet there is constant pressure among actors in the chain to maintain and upgrade their positions and continually upgrade and innovate to stay ahead of potential competitors. These pressures put exporters in a tenuous position vis-à-vis

retailers, who are argued to have greater power and leverage in the chain. As a result, exporters and suppliers need to find way to diversify.

## **2.2 Approaches and Methodologies used in Past Value Chain Studies**

A study of Value chain for honey and Beeswax in Tanzania by Tradecraft (2007) used step-by-step value chain analysis. Data collection was guided by step-by-step value chain analysis approach. Primary and secondary data was collected for honey and beeswax in terms of the present and prospective situation. Basic information on the state-of-the-art of honey and beeswax industry globally and Tanzania in particular was also collected and compiled. The consultants reviewed literatures and past studies on best practices in beekeeping technologies. Although the research focus was Tabora region, honey and beeswax sub-sector map for Tanzania was then sketched. This map depicted all existing channels. A number of overlays were then added on the map to intensify the sub sector picture. Thereafter potential channels to be developed to a value chain were identified. Along the selected channels followed identification of constraints and opportunities and corresponding strategies to be employed by honey and beeswax stakeholders to cub constraints and tap opportunities.

The researchers identified critical success factors (consumer focused) for the value chain to be effective and sustainable. Eventually, the processing and analysis of data and discussion of possible strategic options were conducted using sub sector business services (SBS) approach and recommendations were put forward. The SBS approach has been devised to identify opportunities and constraints along the honey and

beeswax chain in this study. This methodology is employed to identify interventions that can assist to make use of opportunities and address the constraints. The SBS approach attempts to combine the strengths of sub sector analysis and business service market development approaches. While sub sector analysis can identify constraints (which limit small scale producer's growth and income potential in this case); a business service orientation can promote commercial opportunity for honey and beeswax stakeholders in the Tanzania to address the constraints. In the process of recommending strategic choices for stakeholder the value chain development approach has been adopted whereby for each stage in the chain all possible upgrading strategies are examined.

The approach seeks to identify entry points for facilitating win-win strategies for the participation of all actors in the particular chain. During analysis, sub sector mapping was employed and overlays inserted to understand the sub sector dynamics better. Profitability analysis of various primary actors were undertaken to have a good understanding of the sub sector and hence identification of value chains for development.

*A study on the performance of the value chain for cassava in the eastern zone of Tanzania* by Njau (2008) used a questionnaire with both close and open-ended questions for collecting qualitative and quantitative information. The questionnaire was administered to sampled households in the study area and the traders in the central markets in Tanga and Coast regions. The performances of different actors along the value chain were evaluated using the Gross margin approach. This study

adopted the use of semi-structured questionnaire with both close and open-ended questions for collecting both qualitative and quantitative information. However, this study used profitability analysis approach to determine the most profitable value adding activity.

Another study on *the honey value chain analysis for SNV Central Portfolio* by Kasongo (2007) used sub sector analysis approach which involved understanding of sub sector farmers' key farm level production characteristics, establishing linkages between farm level decisions and the market structure. The approach was also used to identify constraints and opportunities for increasing the sub sector's productivity and identifying interventions to tap opportunities and reduce constraints. Detailed information was collected using focus group discussions with beekeepers and other actors in the chain. This study also analyzed the production characteristics of traditional beekeepers and established linkages to different markets in the value chain. The study also identified different constraints underlying traditional beekeeping in the study area and in Tanzania.

A study on *Marketing of Bee Products in Tanzania* by Mwakatobe and Mlingwa (2006) used semi-structured questionnaires which were administered to salesmen and women, individuals and customers of bee products in order to collect qualitative and quantitative information. This study adopted this approach by administering a semi-structured questionnaire to sampled traditional beekeepers, both men and women.



A comparative analysis of beekeeping and crop production in Adamawa state conducted in 2006 by El- Sahab Hong, Ja' Afar-Furo and Suleiman used the Cost-Revenue Analysis to determine the most profitable value adding activity. This study adopted Cost-Revenue Analysis Method for Quantitative Analysis and both semi-structured and structured questionnaires have been adopted in this study.

A study on rice value chain analysis in Cambodia carried out by Agrifood Consulting International in 2002 concentrated on the linkages between each of the actors along the value chain, from input supplies for rice production, through to the final milled product and all the associated byproducts and value added products derived from rice. While providing a detailed breakdown of the costs, profits and margins along each level of the chain, the analysis identified the key constraints and linkages at each level of the chain. This study adopted this approach, by identifying the input suppliers first, through to the final consumers, both local and international. In addition, along the value chain, several constraints hindering the beekeeping sector in Tanzania were identified.

### **2.3 Beekeeping Activities**

The current beekeeping practices are mainly traditional, based on indigenous technical knowledge on hive construction, management of honey colonies, harvesting and processing of hive products. It is said that the current beekeeping is an advanced stage of honey hunting (Kihwele, 1983).

Indigenous knowledge is a broader term covering all knowledge considered to be characteristics of a certain group (Kihwele, 1991). Indigenous knowledge means it originated or developed naturally in particular land, region or environment.

Local beekeepers have much to learn from scientists, but so do scientists have much to learn from beekeepers. Lines of communication have not been effectively opened in their direction. Indigenous knowledge of beekeepers, which can be utilized in managing forest-bee ecosystems to guarantee their sustainable use and stability, should be utilized. Local people generally have little formal education (Katani, 1999). However, local knowledge makes the baseline for much of modern science and technologies. There is tendency therefore among the elite to treat them with contempt. Local knowledge is important but apparently not rewarded equitably. There are very interesting roles played by traditional beekeepers in conservation of natural resources especially in forest conservation and bee management.

#### **2.4 Honey Processing/Value Adding**

Krell (1991) noted that, value can be added to honey in a variety of ways but additional and perhaps better opportunities for further added value from the keeping of bees will arise from the use of other hive products such as wax. In Ethiopia, wax is much in demand for the making of votive candles. This has been very much a byproduct of honey production but is a valuable product in itself and other possible outputs have rarely been considered. The uses of wax include making candles, used in cosmetics, in food technology, in varnishes and polishes and in medicine as well.

In addition, royal jelly, fed by bees to very young larvae and to larvae that will develop into queens and used by people as a dietary supplement, pollen, venom and queens for the formation of new colonies (Krell,1996).

Local beekeepers in developing countries use locally available materials for processing and storage of honey-bee products. In Zambia for instance, beekeepers use calabashes or old plastic containers, pierce holes at the bottom, about 1cm wide. Then they spread a layer of clean, coarse grass on top of the holes to strain honey (Kimbi *et al.*, 1998). In Mbulu district, some beekeepers use plastic containers to store honey but the majority use variable sizes of local containers called Dahang or Sepay. Dahang containers are larger than Sepay, the former containing about 4-5 litres while the latter are of 1-2 litres capacity (Kiondo, 1998). Lack of capital causes some beekeepers in Handeni district and elsewhere in Tanzania to leave honey in the forest due to lack of storage facilities (Masalu, 1997).

## **2.5 Honey Marketing**

There are good internal and external markets for natural honey. International demand greatly exceeds supply as it is not only a food but also has therapeutic properties if unprocessed. Value could be added through packaging and by the use of a range of different presentations. Most added value for African honey is likely to arise in the future from supplying niche markets. There are substantial opportunities on the world market especially as African honey can be considered as mainly organic (Morse and Calderone, 2000).

According to Mapolu (2005), the internal markets for honey are not well established. Demand for honey as food and as an authentic ingredient in various foods and as a product with healing qualities is increasing. About 50% of honey produced is sold locally for honey beer and honey wine production and about 10% of honey produced are consumed locally as industrial honey in confectioneries and pharmaceutical industries. At the beekeepers gate 1 kg of honey is selling between 0.6 US\$ and 0.9 US\$ while in cities like Dar-es salaam, Arusha, Moshi etc the price of honey is between 1.0 US\$ and 2.5 US\$ per kg. The potential unexploited markets are large towns, hotels, airlines and tourist centres if packed in proper packaging materials. In the domestic market, the key players are beekeepers, private traders, processors, associations and honey beer brewers.

Demand for honey in the world market is very high and the demand for Tanzania honey exceeds supply. The international markets for Tanzanian honey and beeswax are highly competitive in terms of quality. In 1991, Tanzania honey won by 100% the quality test for "organic honey" in UK. However, quality control in terms of other factors such as "HMF", color, taste, viscosity and aroma, needs legal directives that will have to be adhered to by all people handling the honey before it reaches the consumer (URT, 1998).

According to Mwakatobe and Mlingwa (2000), about 64% of the honey produced ends in the local community for home use as well as preparation of local brew. The remaining is transported to markets in urban centres; some is supplied to packers who are largely women groups/enterprises involved in food packing. Larger packers

are few; the conspicuous ones in the market are Dabaga Ltd and Honey Care Ltd. In some areas, beekeepers associations are involved in marketing of member products e.g. Caritas in Tabora is facilitating marketing development for the honey produced by the association they helped to establish. It has been noted however that lack of information is limiting the understanding of marketing dynamics of the chain because more honey is traded under informal channels.

## **2.6 Constraints in Beekeeping Sector**

According to Bradbear (2009), beekeepers and honey hunters living in or near to forest, or working in other remote and poor areas are likely to encounter many constraints when it comes to finding a market for their products. These constraints are likely to include, lack of access to suitable containers for storing, transporting and marketing honey, poor diversity of retail packaging materials, lack of roads, lack of transport, lack of communication possibilities, lack of bargaining power, lack of organizational support, lack of training and technical advice, or poor quality training, poor market access, lack of appropriately-trained support personnel or information materials, low product prices, few social linkages with other producers and few social linkages with potential buyers.

In URT (1998), it is noted that constraints faced by beekeepers in Tanzania include, lack of appropriate equipments, storage facilities, packaging materials and obsolete technologies used, poor honey handling methods used to maintain quality and quantity and the beekeeping industry in general. Supporting services offered to the beekeepers are weak in such area as local processing and commercial arrangements.

Also inadequate extension services and poor research facilities have further hampered the development of the industry.

### **2.6.1 Lack of capital**

The development of the beekeeping sector has been dominated by a high dependence on the private sector. Public financing and Sectoral self-financing mechanisms have remained undeveloped. Private sector financing has been low due to lack of appropriate financing mechanisms. Support from development partner has been minimal (URT, 1998).

### **2.6.2 Lack of adequate and appropriate processing and storage facilities of**

#### **Honey-bee products**

Lack of capital has effect of purchasing power of the storage facilities like plastic containers (buckets, drums, and bottles) and processing facilities like honey press. This constraint has a negative impact on the quality and quantity of honey to the consumer (URT, 1998).

### **2.6.3 Lack of extension services**

The problem of inefficient beekeeping extension services is among the most critical problems in East Africa resulting in low productivity (Masalu, 1997). Due to this problem, goods and services of the beekeeping sector have remained low in terms of quality and quantity. The number of beekeepers is still small, and as a result the national production of the honey is less than 5% of the of the production potential (URT, 1998).

According to Aidoo (1999), extension and regulatory programs have played the important role in helping beekeepers succeed. This may include technical support or stock development, training the beekeepers to extend beekeeping skills and information, providing support services for marketing such as quality assurances, and implementing resistance management program to protect effective products used to control diseases and pests.

Ogaba (2002) adds that, constraints to development of beekeeping in Uganda include, but not limited to Lack of policy and registration, training and information, quality of honey and beeswax, limited market access and limited access to production credit.

A report of Production and marketing situation for honey and wax (bee products) Tanzania, funded by the FOCAL Programme at Sokoine University of Agriculture (2006) identified several problems in the beekeeping industry in Tanzania. In that report, lack of markets for the bee keeping products was mentioned as one of the problems contributing to low income realized by beekeepers. Many factors contribute to this. The most frequently mentioned factors are problems in market accessibility; lack of joint efforts in marketing, lack of/low levels of market information and low entrepreneurship skills. During discussion in district workshops other factors related to marketing were also mentioned such as lack of transportation from remote production areas to consuming areas and lack of training in market survey and entrepreneurship.

Information obtained from this study also indicated that both consumers and traders are complaining about poor quality of bee products, for example honey mixed with impurities, poorly processed and having excessive moisture contents. The problem of quality products is aggravated by lack of nationwide standards for beekeeping products. As a result many buyers or consumers demand individual quality standards that are often confusing to the beekeepers.

Furthermore it was noted that the problem of quality of products become crucial because many people involved in this business are not knowledgeable about the standards required. This calls for the development and dissemination of harmonized standards.



## **CHAPTER THREE**

### **3.0 METHODOLOGY**

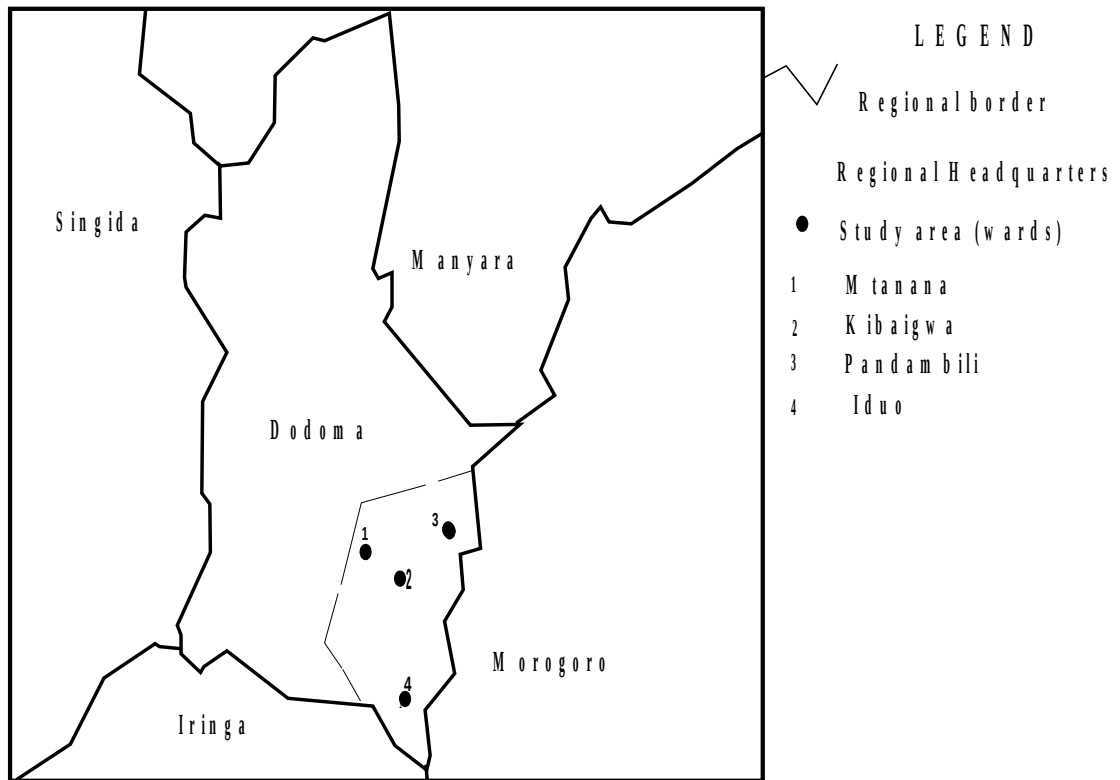
#### **3.1 The Study Area**

The study was conducted in Kongwa district, Dodoma region. This area was selected due to its beekeeping potential as it is inhabited by so many traditional beekeepers as revealed by data from Dodoma regional office and thorough literature review, particularly the study by Tradecraft (2007) on value chain for honey and beeswax in Tanzania which was conducted in Tabora region. The region is mainly characterized by bush and thickets type of vegetation, with numerous traditional beekeepers. Dodoma region, particularly Kongwa district, which was selected for this study is also characterized by bushy and thicket type of vegetation, with numerous traditional beekeepers. The only difference between the two regions, and which forms the basis of the study area selection, is that while Tabora has been studied in terms of beekeeping, the potential of Dodoma region in terms of beekeeping has not been adequately studied. Other districts of Dodoma region with comparable traditional beekeeping potential include Kondoa and Bahi. However, the district was chosen due to the fact that no study on traditional beekeeping has been done before. In addition, large number of traditional beekeepers and accessibility from major roads were the other criteria for choosing Kongwa district.

##### **3.1.1 Geographical location and administrative units**

Dodoma Region lies at 4° to 7° latitude South and 35° – 37° longitude East. It is a region centrally positioned in Tanzania. The region is the 12th largest in the country

and covers an area of 41 310 km<sup>2</sup> equivalent to 5% of the total area of Tanzania Mainland. Administratively, Dodoma region has five rural districts and one urban District namely: Bahi, Chamwino, Kondoa, Mpwapwa, Dodoma Urban and Kongwa district where the study was conducted. The district lies at 6.198 latitude South and 36.417 Longitude East. Kongwa district has fourteen wards, namely Chamkoroma, Hogoro, Iduo, Kibaigwa, Kongwa, Mkoka, Mlali, Mtanana, Njoge, Pandambili, Sagara, Sejeli, Ugogoni and Zoissa. This study covered only four of the above-mentioned wards of Kongwa district, namely Mtanana, Kibaigwa, Pandambili and Iduo as shown in Fig. 1.



**Figure 1:** A map of Dodoma region showing the study sites

### 3.1.2 Vegetation

The characteristic vegetation of the region is of bush or thicket type, which is widespread throughout the area which favors beekeeping. Depressions and seasonally wet areas with impeded drainage support grasses and sometimes a mixture of grasses mixed with woody plants. Wherever the natural vegetation has been changed by agricultural activities, regenerating bushes mixed with annual herbs and grasses forming a type of induced vegetation are found. Most of the hill ranges, steep

slopes and protected forest reserves are covered with large woody plants, which form good watershed protective covers.

### **3.1.3 Climate**

Dodoma Region has a savanna type of climate, which is characterized by a long dry season lasting between late April and early December, and a short single wet season occurring during the remaining months. In the long dry season, persistent desiccating winds and low humidity contribute to high evapo-transpiration and to soil erosion.

The average rainfall for Dodoma town is 570mm, and about 85% of this falls in the months between December and April. Rainfall figures are higher in the more agriculturally productive parts of Mpwapwa and Kondoa Districts. Apart from the rainfall being relatively low, it is rather unpredictable in frequency and amount. It is this unreliable rainfall, which has imposed a pattern of risk aversion in traditional agriculture and is a serious constraint on present efforts to improve crop yields.

### **3.1.4 Overview of the regional economy**

The region is almost entirely dependent on agriculture and livestock production, which are locally practiced, largely at household level. There is small-scale processing of agricultural and livestock products. Agriculture is characterized by low productivity resulting from low and erratic rainfall, high evapo-transpiration and low moisture holding capacity. These conditions, compounded by poor farming practices and overstocking/overgrazing make the region susceptible to extensive soil erosion. The main staples grown in the region include sorghum, bulrush millet, cassava and

maize, while major cash crops are groundnuts, sunflower, sesame and to a lesser extent castor, and pigeon peas. In the late 1970s and early 1980s, grapes and paddy emerged as important cash and food crops respectively. Livestock is the second contributor to the regional economy. The region ranks third in the country in terms of livestock numbers, which include cattle, goats and sheep. Poultry and piggery farming for commercial purposes are mainly confined to urban and trading centres. Besides, local chickens abound in the region, which is in high demand in the Dar es Salaam market.

Natural resources, which include forestry, wildlife, beekeeping, fishing and mining, is another sector which people are engaged in for their livelihoods. Products such as timber, logs, poles, wildlife, honey beeswax, fish, salt and gold are locally harvested. However, the contribution of natural resources to the economy of the region is minimal because of poor technological capacities. The industrial sector is yet to take shape, apart from a few small scale processing industries such as oil extraction, carpentry, pottery, blacksmith, wood **carving**, whose operation are mostly confined to urban and trading centres.

#### **3.1.4.1 GDP and per capita income**

The Regional average Gross Domestic Product (GDP) at current prices is TShs. 262 955 billion (2001) which is about 3.5% annual contribution to the national GDP, ranking twelfth region in Tanzania mainland, from fourteenth position in 1991 when the regional GDP was TShs 34.4 billion. The average annual per capita income at current prices is estimated at TShs. 154 772 (2001). In the absence of traditional cash

crops such as tea, coffee, cotton, it is estimated that between 60% and 70% of the annual income is derived from the proceeds of which traditionally used to be categorized as food crops which include: maize, sorghum, beans, pearl millet, oilseeds, cassava and paddy. Animal husbandry is the second dominant economic activity in the region. Proceeds from livestock products are estimated to account for 35% of the annual regional GDP.

### **3.1.5 Areas suitable for beekeeping**

Beekeeping is practiced in the Miombo woodlands using mainly traditional technology. There is a big potential in the region as the Miombo woodlands found all over the region are very good for beekeeping particularly organic honey production. The area under reserved forest is 156 331 ha, found in all five districts. These forests are mainly for protective purposes rather than production. In [Kondoa district](#) , there is one game reserve known as Swagaswaga, covering 7100 ha and Game controlled area known as Nkungunero with an area of 70 000 ha. In [Mpwapwa District](#), there is a game controlled area known as Rudi with an area of 136 450 ha, in addition, there is a man-made Mtera dam covering 66 000 km<sup>2</sup>, the dam covers parts of Mpwapwa and Dodoma Rural Districts. Mtera Dam is a big potential for fishing industry.

With regard to beekeeping activity, almost all the six districts of Dodoma region are equally engaged in beekeeping with more than ten thousand beekeepers and about 150 000 hives, and a potential of producing over a million litres of honey and 20 tons of beeswax a year. However, Dodoma region does not even appear on the national map of honey producers in Tanzania. It is estimated that proceeds from honey and

wax contributes about 20% annually to the income of the households in Dodoma region.

### **3.2 Research Design**

Cross sectional survey was used in which data were collected at a single point in time. The target group of this study was traditional beekeepers from selected villages in Kongwa district, Dodoma region. Moreover, some traders, processors and consumers were interviewed to collect information on trade, processing and consumption of honey. Both probability and non probability sampling techniques were used.

### **3.3 Sampling**

This study covered four villages purposively sampled to reflect traditional beekeeping. Multistage sampling technique was applied, coupled with random and purposive sampling techniques to get the required sample. One district (Kongwa) with high potential for honey production was purposively selected out of six districts of Dodoma region, followed by a purposive selection of 4 out of 14 wards of Kongwa district. The wards were Mtanana, Kibaigwa, Iduo and Pandambili. As stated in section 3.1, the district has been chosen due to its relatively easy accessibility from the main roads and large number of traditional beekeepers. Kondoia and Chamwino districts have a high number of traditional beekeepers, but they are situated far away from main roads and the roads are very rough.

The purposive sampling procedure was followed by random selection of one village from each ward. In each village a sampling frame (number of beekeepers in the whole district) was obtained from Kongwa district beekeeping division and finally a simple random sampling technique was employed to obtain the beekeepers to be interviewed.

Random approach for selecting one village in each of the four wards which constituted the study area was preferred due to the fact that all the villages were considered to be homogenous in terms of beekeeping. Random selection of beekeeping households in each of the selected villages was employed in order to give each beekeeping household an equal chance in the study as they were all homogenous in terms of beekeeping.

The study started with large sampling units that are why a multistage sampling approach had to be applied. First of all, it started with districts in Dodoma region, and then it went down to selecting one district in the region. Thereafter it went down to wards in the district, thereby going down to selecting 4 wards in the district. From the wards it went down to villages and finally beekeeping households in the villages. Purposive sampling was deliberately employed in selecting the district and the villages, the reason being high potential of honey production, which was the ultimate aim of this study.

A total of 120 beekeeping households, which constituted 24% of the beekeeping households in the study area, were chosen for interview as summarized in Table 2.



This sample size was considered optimum for carrying out any statistical analyses. Kothari (2004) points out that the sample size should neither be excessively large nor too small. It should be optimal.

**Table 2: Distribution of sampled households by ward and village**

<b>Ward</b>	<b>Village</b>	<b>Number of households in each village</b>	<b>Number of beekeeping households</b>	<b>Number of sampled households</b>
Iduo	Iduo	255	125	30
Kibaigwa	Ndulugumi	324	135	30
Mtanana	Mtanana “A”	211	112	30
Pandambili	Vihingo	198	123	30
<b>Total</b>		<b>988</b>	<b>495</b>	<b>120</b>

### 3.4 Data Collection

Both secondary and primary data were collected. Secondary data were collected through review of various documents found particularly in the beekeepers’ association offices of Iduo and Kibaigwa villages. In addition, the secondary data were obtained from Kongwa district beekeeping division. The secondary data collected include honey pricing, internal and external buyers and quality assurance and processing. The main instrument for collecting the primary data was the semi-structured questionnaire which was used to collect both, qualitative and quantitative information. In this study, 120 questionnaires were administered to beekeeping households, coupled with Focus Group discussions with specific groups including local traders, middlemen and leaders of the beekeeping associations as a means of triangulating the data obtained through household questionnaire attached as appendix

1. To understand different value adding activities undertaken and the associated constraints, a thorough value chain analysis and mapping was carried out.

### **3.5 Data Analysis**

Both qualitative and quantitative analyses were done using Statistical Package for Social Sciences (SPSS) computer program version 11.5.

#### **3.5.1 Qualitative analyses**

Descriptive and inferential statistics such as frequencies, ranges, averages, percentages and cross tabulations were computed. Qualitative analysis also aided in identifying the value adding activities which were carried out by the traditional beekeepers and to study the economic constraints towards value addition to honey produced through traditional beekeeping and how they separately affect the returns from honey, consequently the income of the rural households.

#### **3.5.2 Quantitative analysis**

This involved analysis of revenues and costs (profitability analysis) associated with various value adding activities to determine the most profitable value adding activity. First of all, the total costs for each value-adding activity were computed based on the data collected from the field. Using the quantities of honey produced, sold and price of honey per litre, gross revenue from every value-adding activity was calculated, which enabled the computation of Net Revenue (NR) per annum as follows;

$$\mathbf{NR = GR - TC}$$

Where;

NR is Net Revenue

GR is Gross Revenue

TC is Total Cost

Having obtained the net revenue of each value-adding activity, the computation of return on every one Tanzania shilling invested in each value-adding activity was undertaken by dividing the net revenue of a value-adding activity with its corresponding total cost. In addition, the net revenue per litre was also computed. This was important for determining the most profitable value-adding activity worth being undertaken by a traditional beekeeper.

## **CHAPTER FOUR**

### **4.0 RESULTS AND DISCUSSION**

#### **4.1 Overview**

This chapter presents the results of analysis of value chain and value adding activities for traditional beekeeping in Kongwa district, Dodoma region. It starts with a presentation of the characteristics of respondents in terms of age, sex and income generating activities of the beekeeping households. In addition, the chapter also presents a description of the traditional beekeeping value chain and different actors in the value chain, profitability analysis of the value adding activities and presentation of constraints facing traditional beekeepers and the beekeeping sector in Tanzania.

#### **4.2 Characteristics of Respondents and Sampled Households**

In this study, 120 beekeepers, representing the beekeeping households in the study area were interviewed, 94 being men, equivalent to 78% and 26 being women, equivalent to 22% (Table 3). As shown in Table 3, most of the respondents were males. In terms of age, the majority were in the active age group of between 18 and 40 years.

**Table 3: Age and sex distribution of respondents**

Age group	Sex		Percent (%)
	Male	Female	
18-40 years	48	18	55.0
41-60 years	40	8	40.0
>60 years	6	0	5.0
<b>Total</b>	<b>94</b>	<b>26</b>	<b>100.0</b>

### 4.3 Contribution of Beekeeping to Household Income

The results in Table 4 show that the sampled households were found to undertake other income generating activities in addition to beekeeping. These activities include agriculture, livestock keeping and petty trade. Table 4 also shows the incomes from income generating activities and the proportion of each of these incomes as compared to the total household income. The results in Table 4 indicate that beekeeping contributes 43.8% to household income, followed by agriculture, which contributes approximately 26% of the household income per year. Livestock keeping and petty trade contribute 22.4% and 8% respectively.

**Table 4: Average Income of beekeepers per year from different income generating activities**

Income Generating activity	Average income per year per household (TShs)	Percent (%)
Beekeeping	733 675.20	43.8
Agriculture	433 368.00	25.8
Livestock	375 317.00	22.4
Petty Trade	134 000.00	8.0

### 4.4 The Value Chain for Traditionally Produced Honey

Fig. 2 shows the structure of the value chain map for traditionally produced honey in Kongwa district. The value chain operates in three levels namely local level in rural areas, urban areas in Tanzania and regional and international level. The results

indicate that 81.8% of the honey in the study area is consumed in rural areas. Only 14.2 and 4% is sold to consumers in urban areas and regional/international markets respectively as shown in Fig. 2.

There are 5 value chain strands through which honey passes from beekeepers to the ultimate consumers. These are;

**Strand I:** Beekeepers → Local low income consumers in rural areas

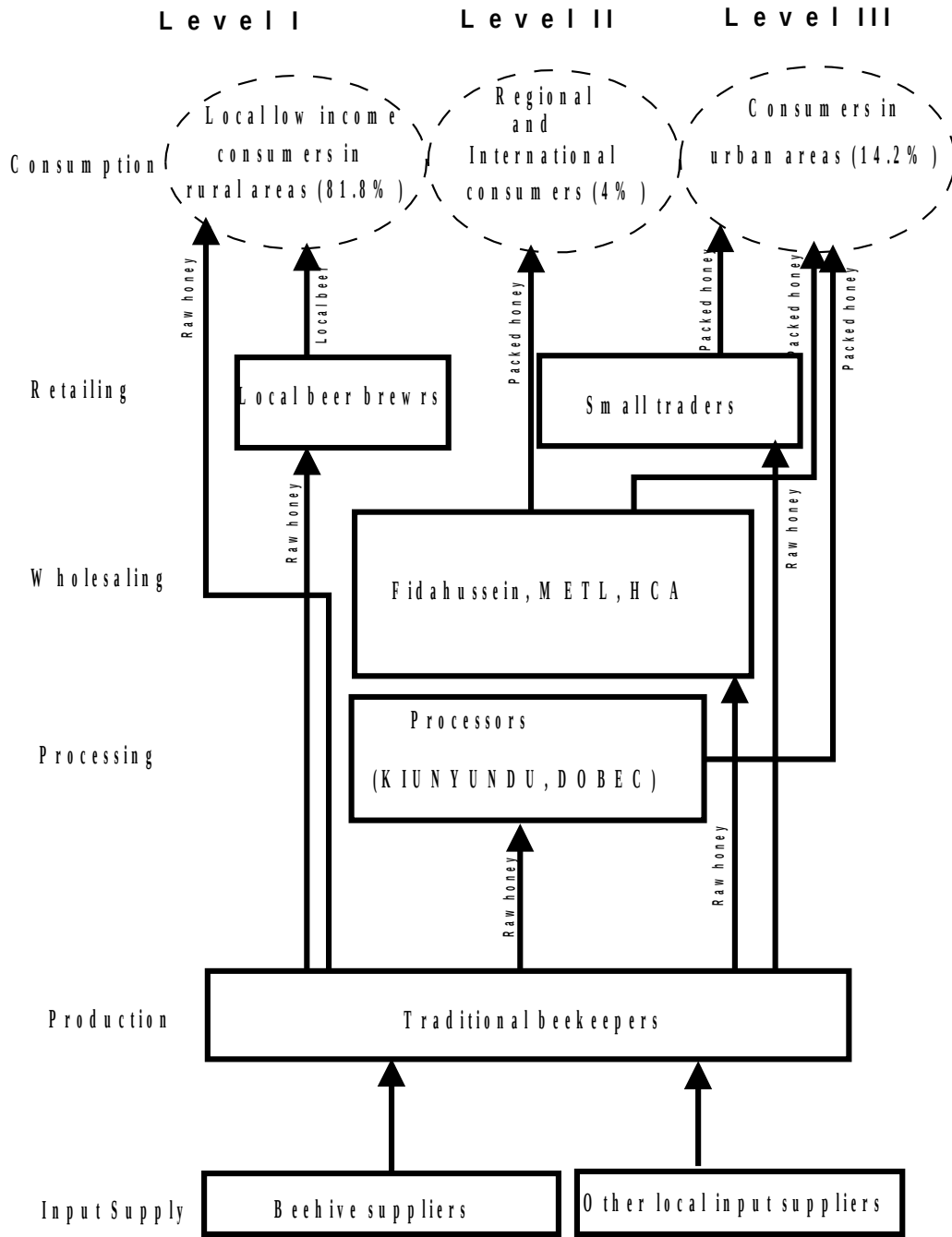
**Strand II:** Beekeepers → local beer brewers → Local low income consumers in rural areas

**Strand III:** Beekeepers → Processors-consumers in urban areas

**Strand IV:** Beekeepers → Wholesalers → consumers in urban areas and regional and international consumers

**Strand V:** Beekeepers → Small traders → consumers in urban areas

In strand I, raw honey is sold directly to local consumers while in strand II, raw honey passes from beekeepers to local beer brewers who process it and sell local brew to consumers in their villages. In strand III, raw honey from beekeepers is sold to processors who add value then sell packed honey to consumers in urban areas. The major product passing through strand IV is raw honey from traditional beekeepers to a wholesaler who processes the honey and sells it to consumers in urban areas and regional and international markets. In Strand V, beekeepers sell raw honey to small traders who process and sell it to consumers in urban areas as packed honey in small amounts.



**Figure 2: Value chain map for traditionally produced honey**

## **4.5 Actors in the Traditional Beekeeping Value Chain**

### **4.5.1 Input suppliers**

These can be categorized into suppliers of beehives, mainly traditional beehives which are to a large extent the types of beehives used by the traditional beekeepers, and suppliers of other materials such as sieves, buckets, ropes, containers and matches which are needed by traditional beekeepers. Traditional (small scale, rural) beekeepers in Tanzania use either bark or log hives. Bark hives are preferred to log hives simply because they are easy to make. A beekeeper could make more than 20 bark hives for the time used to make one log hive. Bark hives are made by stripping barks off a live tree.

### **4.5.2 Producers (traditional beekeepers)**

This group is mainly composed of the traditional beekeepers. These are the primary producers in the beekeeping value chain. However, modern beekeeping is practiced in the area, though to a lesser degree. Kiunyundu beekeepers group is the only group in the study area that practices beekeeping using modern equipment such as modern beehives, smokers and bee suits.

### **4.5.3 Processors**

Dodoma Beekeeping and Cooperative Society (DOBEC), KIUNYUNDU, Mohamed Enterprises Tanzania limited, and Fidahusseini are the organizations processing the honey from traditional beekeepers.



#### **4.5.4 Wholesalers**

In addition to processing the honey, Fidahussein and Mohamed Enterprises Tanzania Limited (METL) are the most prominent wholesalers for the honey produced by beekeepers in the study area.

#### **4.5.5 Retailers**

Two types of retailers were observed namely retailers of packed honey and retailers of local brew. Most of the honey produced by sampled traditional beekeepers ended up in the hands of local brewers. About 70.8% of the sampled beekeepers mentioned local brewers as major buyers of their honey. There were also retailers of packed honey from within and outside Kongwa district who usually come to buy honey in the study area. Sampled beekeepers mentioned buyers from Kilosa district in Morogoro region, Kiteto district in Manyara region and buyers from Kilindi district in Tanga region.

#### **4.5.6 Consumers**

The group of consumers consists of consumers in rural areas who buy honey directly from the traditional beekeepers for their daily consumption, consumers who buy local brew made up of honey and consumers in the urban areas. Furthermore, there are regional and international consumers who buy the honey from wholesalers.

### **4.6 Honey Value Adding Activities**

Results in Table 5 show that most traditional beekeepers in the study area do not add value to their honey. Only 34.2% of traditional beekeepers interviewed added value

to their honey. The principal reason given by the beekeepers was lack of markets for value added honey. The only reliable buyers are local beer brewers in their neighborhoods who do not need processed honey. According to Mapolu (2005), the internal markets for honey are not well established. About 50% of honey produced is sold locally for honey beer and honey wine production.

**Table 5: Responses on whether or not traditional beekeepers are adding value to their honey**

<b>Respondents who</b>	<b>Number</b>	<b>Percent (%)</b>
Added value to their honey	41	34.2
Did not add value to their honey	79	65.8
<b>Total</b>	<b>120</b>	<b>100.0</b>

Table 6 shows the value adding activities and the proportion (%) of undertaking such value adding activities by the interviewed beekeepers. The value adding activities reported were filtering, packaging and quality testing. Filtering was the most common and simplest value adding activity undertaken by most (73.2%) of the sampled traditional beekeepers in the study area, while 22% were undertaking packaging. Only 4.8% of them reported doing quality testing as shown in Table 6.

**Table 6: Responses by traditional beekeepers on value adding activities**

<b>Value Adding Activity</b>	<b>Number of Responses</b>	<b>Percent</b>
Filtering	30	73.2
Packaging	9	22.0
Quality testing	2	4.8
Total	41	100.0

Filtering starts by separating the honey from the honey combs. This is achieved by squeezing the combs, oozing the honey out of them. After this first stage, the beekeepers use sieves to get out the particles which penetrated through during the squeezing process. Packaging involves putting filtered honey into clean, sterilized and labeled containers presented as Fig. 3, which shows a bottle commonly used by KIUNYUNDU group in Kibaigwa ward, Kongwa district, for packaging their honey.

Quality testing usually involves analyzing the water content of honey, microbial and chemical contamination. This process involves taking the honey samples to certified laboratories, a process which in spite of adding value to the honey, is rarely practiced by traditional beekeepers. In principle, quality tested honey usually passes all the preceding two processes, i.e. Quality tested honey has been well filtered and ends up being well packed.



**Figure 3: Bottled honey from Kiunyundu group in Kibaigwa Ward, Kongwa district.**

#### **4.7 Ranking of Different Value Adding Activities by Level of Tediousness**

When the respondents were asked for their views on which value adding activity among those they undertake is the simplest and which is the most tedious, 56.7% filtering ranked as least tedious process and about 30.0% ranked it as tedious process while about 6.7% said it is very tedious and the remaining 6.7% went for extremely tedious as shown in Table 7.

The results in Table 7 also show that 93.3% of respondents ranked packaging as an extremely tedious value adding process, 0.8% ranked it as very tedious process whereby 1.7% of the respondents ranked packaging as tedious process and 4.2% of the respondents interviewed ranked packaging as the least tedious process. Kihwele (1983) reported that about 15 – 20% of the honeybee colonies are not harvested every year due to lack of bee protective and scarcity of appropriate containers. Some beekeepers could only harvest 50% of their colonies due to lack of storage containers that are used for carrying honey from the field and for marketing.

About 98% of the interviewed traditional beekeepers ranked quality testing as extremely tedious value adding activity and about 1.7% said it is very tedious and only 0.8% said it is least tedious as shown in Table 7. Generally, the results in table 7 indicate that filtering is the least tedious value adding activity while quality testing is the most tedious value adding activity.

**Table 7: Proportion (%) of respondents ranking the different value adding activities by level of tediousness**

Rank	Value adding activity		
	Filtering	Packaging	Quality testing
Extremely tedious	6.7	93.3	97.5
Very tedious	6.7	0.8	1.7
Tedious	30.0	1.7	0.0
Least Tedious	56.7	4.2	0.8

## 4.8 Analysis of Revenue and Costs Associated with Unprocessed and Value

### Added Honey

#### 4.8.1 Price, revenue and cost analysis for unprocessed honey

Table 8 presents information on price, revenues and costs incurred in unprocessed (raw) honey. The selling price of raw honey ranged from TShs 1000 to TShs 1500 per litre with an average price of TShs 1324 per litre. This price was obtained by most beekeepers interviewed (81.8%). Total cost for raw honey per year was TSh. 53 500 whilst net revenue per annum and net revenue per litre obtained from raw honey per household were TSh. 455 976.20 and 1 184.97 respectively, ending up with a return to investment of TSh 8.52 in every one Tanzanian shilling invested.

**Table 8: Prices, revenue and cost analysis for unprocessed honey**

<b>Item</b>	<b>Amount</b>
Quantity Sold (Litres) per year	384.80
Price per litre (TShs)	1324.00
<b>Total Revenues</b>	<b>509 475.20</b>
<b>Item/service</b>	
1. Labor	15 000.00
2. Matches	500.00
3. Batteries	1 000.00
4. 30 beehives (Traditional) 30@1000	30 000.00
5. Buckets	5 000.00
6. Torch	1 000.00
7. Rope	1 000.00
<b>Total Cost</b>	<b>53 500.00</b>
<b>Net Revenue</b>	<b>455 975.20</b>
<b>Net revenue per litre</b>	<b>1 184.97</b>
<b>Returns per TSh invested in filtering</b>	<b>8.52</b>

#### 4.8.2 Price, revenue and costs associated with filtered honey

Table 9 presents information on price, revenues and costs incurred in filtering honey. The selling price of filtered honey ranged from TShs 1000 to TShs 3000 per litre with a mean of TShs 2124 per litre. This price was obtained by most beekeepers

(73.2%) who added value to their honey. Results in Table 9 show that value adding beekeepers are able to sell filtered honey up to TShs 3000 per litre which is above mean price. The standard deviation of filtered honey price per litre is 312, implying that the price of filtered honey did not vary from the mean with 14.7% coefficient of variation.

Results in Table 9 also indicate that a traditional beekeeper incurred about TShs. 56 500 as production cost. Furthermore, the results in Table 9 indicate that on average a traditional beekeeper sold 146.4 litres of filtered honey per year. This amounts to a total of TShs. of 310 953.60 as revenue from filtered honey and TShs. 1 738.07 as net revenue per litre. The results also show that the return to investment in honey filtering is TShs. 4.5 per every Tanzanian shilling invested.

**Table 9: Prices, revenue and cost analysis for filtering**

<b>Item</b>	<b>Amount</b>
Quantity Sold (Litres) per year	146.40
Price per litre (TShs)	2 124.00
<b>Total Revenue</b>	<b>310 953.60</b>
<b>Item/Service</b>	

1. Labor	15 000.00
2. Matches	500.00
3. Batteries	1000.00
4. 30 beehives (Traditional) @1000	30 000.00
5. Sieve Hiring at TShs 3000 per season	3 000.00
6. Buckets	5 000.00
7. Torch	1 000.00
8. Rope	1 000.00
<b>Total Cost</b>	<b>56 500.00</b>
<b>Net Revenue</b>	<b>254 453.60</b>
<b>Net revenue per litre</b>	<b>1 738.07</b>
<b>Returns per TSh. invested in filtering</b>	<b>4.5</b>

#### 4.8.3 Price, revenue and costs associated with packed honey

Table 10 presents information on price, revenues and costs incurred in packaged honey. The selling price of packaged honey ranged from TShs 3000 to TShs 4000 per litre with a mean of TShs 3573 per litre. As shown in Table 10, the investment cost for packaging honey amounted to TSh. 100 500. Further, the results in Table 10 show that on average a traditional beekeeper sold 44 litres of packaged honey per year. Therefore, total revenue from packaged honey amounts to TShs. 157 212. Consequently, the net revenue per annum and net revenue per litre from packaged honey were found to be TShs. 56 712 and 1 288.90 respectively, hence ending up with TShs. 0.56 per every 1 Tanzanian shilling invested.

**Table 10: Prices, revenue and cost analysis for filtered and packed honey**

<b>Item</b>	<b>Amount</b>
Quantity Sold (Litres)	44.00
Price per litre (TShs)	3 573.00
<b>Total Revenue</b>	<b>157 212.00</b>
<b>Item/Service</b>	
1. Labor	15 000.00
2. Matches	500.00
3. Batteries	1 000.00
4. Packaging containers (TShs 500@44)	22 000.00



5. Labeling cost (TShs 500@44)	22 000.00
6. 30 beehives (Traditional) @1000	30 000.00
7. Sieve Hiring at TShs 3000 per season	3 000.00
8. Buckets	5 000.00
9. Torch	1 000.00
10. Rope	1 000.00
<b>Total Cost</b>	<b>100 500.00</b>
<b>Net Revenue</b>	<b>56 712.00</b>
<b>Net revenue per litre</b>	<b>1 288.90</b>
<b>Returns per TSh invested in</b>	<b>0.56</b>

#### **packaging**

#### **4.8.4 Price, revenue and costs associated with quality tested and packed honey**

Table 11 presents information on price, revenues and costs incurred in quality tested and packaged honey. The selling price of packaged honey ranged from TShs 3000 to TShs 4,500 per litre with a mean of TShs 3889 per litre. As shown in Table 11, the cost of production for quality tested and packaged honey amounts to TShs. 70 900. Further, the results show that on average a traditional beekeeper sells 9.6 litres of quality tested honey per year. This is the least amount sold by a traditional beekeeper. Results in Table 11 also show the revenue from quality tested honey to be TShs. 37 334.40. Consequently, the net revenue per year and the net revenue per litre from packaged honey were TShs. -33 565.60 and -3 496.42 respectively. The net revenues become negative since the costs of production are higher than the revenue accrued, hence ending up with TShs. -0.47 per every 1 Tanzanian shilling invested.

**Table 11: Prices, revenue and cost analysis for quality testing**

<b>Item</b>	<b>Amount</b>
Quantity Sold (Litres)	9.60
Price per litre (TShs)	3 889.00
<b>Total Revenues</b>	<b>37 334.40</b>
<b>Input</b>	
1. Labor	15 000.00
2. Matches	500.00
3. Batteries	1 000.00
4. Laboratory analysis (TShs 500@9.6)	4 800.00
5. Packaging containers (TShs 500@9.6)	4 800.00
6. Labeling cost (TShs 500@9.6)	4 800.00
7. Beehive (Traditional) 30@1000	30 000.00
8. Sieve Hiring at TShs 3000 per season	3 000.00
9. Buckets	5 000.00
10. Torch	1 000.00
11. Rope	1 000.00
<b>Total Cost</b>	<b>70 900.00</b>
<b>Net Revenue</b>	<b>-33 565.60</b>
<b>Net revenue per litre</b>	<b>-3 496.42</b>
<b>Returns per TSh invested in quality testing</b>	<b>-0.47</b>

#### **4.9 Comparative Profitability Analysis of Unprocessed and Value Added Honey**

Table 12 summarizes net revenues and returns to investment for unprocessed and value added honey. For filtering, the return for every one Tanzanian shilling invested is 4.5 Tanzanian shillings, while for packaged honey, 0.56 Tanzanian shilling is gained for every one Tanzanian shilling invested. For quality tested honey, 0.46 of a Tanzanian shilling is lost for every one Tanzanian shilling invested. However, due to

the bulky quantities sold without value addition, comparatively, traditional beekeepers earn more income when they sell raw honey since its market is readily available. The analysis showed that 8.52 Tanzanian shillings are gained for every shilling invested (Table 12). The returns to investment for filtered, packed, quality-tested and unprocessed honey emanate from their corresponding net revenues and production costs needed for each product. Net revenue for unprocessed (raw) honey per household per year is the highest, followed by the net revenue obtained from filtered honey. This is due to the fact that less investment is needed as compared to packed and quality tested-honey which require relatively more inputs than filtered and unprocessed honey, while the quantities sold per year are considerably low as shown in Table 8, 9, 10, and 11. These results agree with the results from the study conducted by Tradecraft (2007). In the results of that study, it was observed that packaged table honey sold in the local market (street vendors) is done without any standardization. The main issue is the heavy investments costs that are involved in appropriate packaging and branding initiatives for the Tanzanian honey.

**Table 12: Summary of net revenues and returns to investment of unprocessed and value added honey**

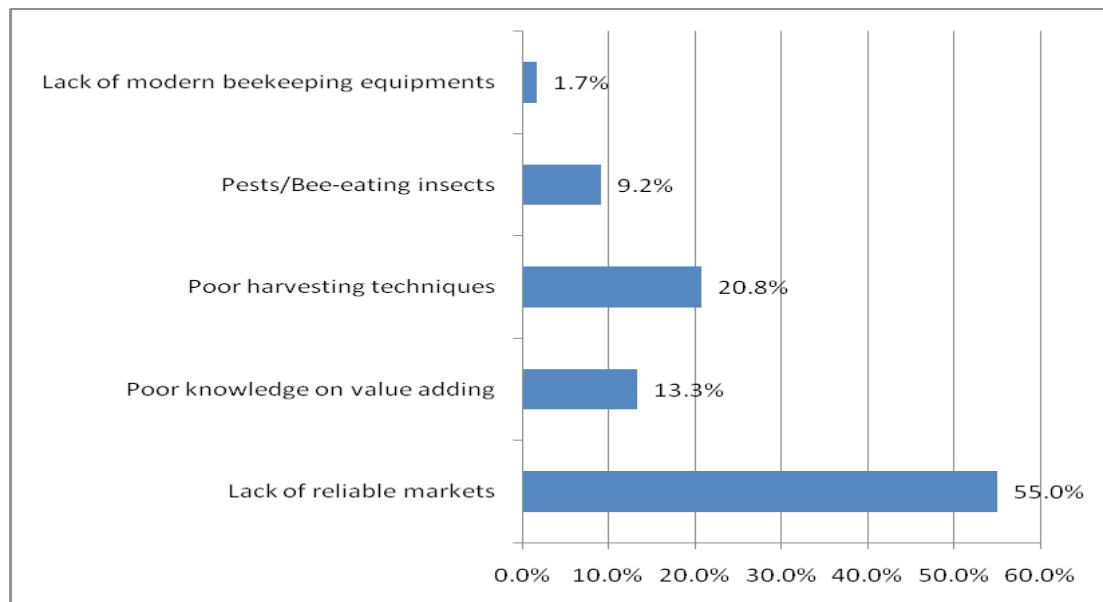
<b>Type of honey</b>	<b>Net revenue per annum</b>	<b>Net revenue per litre</b>	<b>Return to investment</b>
Unprocessed honey	455 975.20	1 184.97	8.52
Filtered honey	254 453.60	1 738.07	4.50
Filtered and packed honey	56 712.00	1 288.90	0.56
Filtered, packed and quality-tested honey	-33 565.60	-3 496.42	-0.47

#### **4.10 Constraints on Value Addition to Traditionally Produced Honey**

Results summarized in Table 13 and Fig. 4 show that lack of reliable markets is the most prominent constraint facing the traditional beekeepers in the study area as 55% of the interviewed traditional beekeepers pointed out so. Furthermore, the respondents said lack of reliable markets hinders them from adding value to their honey in spite of knowing that value added honey fetched a higher price than raw honey. Apart from lack of reliable markets, Table 13 and Fig. 4 also show other constraints to value addition. These include poor harvesting techniques (20.8%), poor knowledge on value adding (13.3 %,) pests (9.2%) and lack of modern beekeeping equipments represented by 1.7% of the interviewed traditional beekeepers. The results conform with what is reported by URT (1998) that constraints faced by traditional beekeepers in adding value to their honey include lack of appropriate equipments, poor storage and packaging facilities, obsolete technologies used, poor honey handling methods used to maintain quality and insufficient supporting services offered to beekeepers. The results also are in line with what is reported in the study carried out by Sokoine University of Agriculture, funded by the FOCAL Programme known as “*The production and marketing situation for honey and wax (bee products) in Tanzania*” (2006) that lack of reliable markets is one of the key constraints facing the beekeeping sector in Tanzania.

**Table 13: Responses on economic constraints towards value addition to honey produced through traditional beekeeping**

<b>Constraint</b>	<b>Number of respondents</b>	<b>Percentage</b>
Lack of reliable markets	66	55.0
Poor harvesting techniques	25	20.8
Poor knowledge on value adding	16	13.3
Pests/Bee-eating insects	11	9.2
Lack of modern beekeeping equipments	2	1.7
<b>Total</b>	<b>120</b>	<b>100.0</b>



**Figure 4: Constraints for traditional beekeeping development**

## **CHAPTER FIVE**

### **5.0 CONCLUSION AND RECOMMENDATIONS**

The main objective of this study was to analyze the value chain for traditionally produced honey and identify the most profitable value adding activity carried out by traditional beekeepers. More specifically, the study sought to achieve four objectives namely (i) to analyze the value chain for traditionally produced honey in Kongwa district, Dodoma region, (ii) to determine the contribution of honey to traditional beekeeper's household income, (iii) to analyse costs and returns from honey value adding activities in order to identify the most profitable value adding activity for honey produced by traditional beekeepers and (iv) to identify constraints limiting value addition to honey produced through traditional methods and recommend strategies to improve the position of traditional beekeepers in the value chain.

Data for the study were collected from 120 randomly selected beekeepers using semi structured questionnaires, entered into Statistical Package for Social Sciences (SPSS) version 11.5 for processing and analysis. This chapter presents conclusion and recommendations emerging from the findings of this study.

#### **5.1 Conclusion**

Profitability analysis showed that unprocessed honey was the most profitable business to traditional beekeepers in the study area as compared to value added honey. This suggests that there is no incentive for adding value to honey if value added honey provides less income than unprocessed honey. However, the market for

raw honey is narrow as most of it is sold locally for making local beer. There is therefore need to add value to honey to meet requirements for urban, regional and international markets. The profitability analysis indicates that adding value by only filtering the honey provides higher net revenue than when filtering is accompanied by quality testing and packaging which are necessary value adding activities for improving beekeepers' access to urban, regional and international markets. This suggests the need for interventions that will reduce costs of testing the quality of honey and costs of packaging materials. In addition, profitability analysis also showed that filtered honey had the highest net revenue per litre, followed by packaged honey, with quality-tested honey coming last.

## **5.2 Recommendations**

### **5.2.1 Promotion of beekeeping**

The results of this study indicated that honey contributes more to the household income than livestock keeping, petty trade and agriculture. Therefore, in order to counter the effects of poverty and to improve the living standards of the rural people, beekeeping should be encouraged among the rural communities in Tanzania.

### **5.2.2 Training**

The study found that inadequate knowledge on value addition and poor harvesting techniques are among the constraints facing traditional beekeepers. Therefore, there is need for training traditional beekeepers on appropriate beekeeping, honey harvesting and post harvest technologies.

### **5.2.3 Access to modern beekeeping equipments**

Destruction of bees by pests was also one of the constraints perceived by the interviewed beekeepers. This might be associated with lack of use of modern beekeeping equipments. Modern beekeeping equipments can be accessed locally from institutions such as SIDO. Beekeepers can be linked to these institutions by the district beekeeping department.

### **5.2.4 Establishment and strengthening of beekeepers marketing groups/associations**

Interviewed beekeepers reported unreliable markets locally as one of the constraints they faced, implying the need to access distant markets in urban areas in the country and/or regional and international markets. Since individual beekeepers produce small quantities of honey there is need to bulk the honey and market it in large volumes to reduce transaction costs. Thus beekeepers should be encouraged to form marketing groups or associations. This can be spearheaded by the district cooperative officer in collaboration with NGOs/CBOs operating in the district. Membership to the groups or associations should be voluntary rather than mandatory through creating awareness on their benefits. Once the groups or associations have been formed, training on group dynamics, leadership and management should be conducted because history of cooperatives shows that failure of most cooperatives is due to poor leadership and management, including poor financial management.



### **5.2.5 Value addition**

Formation of marketing groups/associations alone would not ensure access to niche markets in urban, regional and international markets as they require properly packaged quality honey. At the same time, quality testing and packaging are costly and reduce profits. Therefore, efforts to strengthen/form groups or associations should be accompanied with efforts to produce cheap packaging materials locally. This can be spearheaded by SIDO which is currently promoting development of small and medium enterprises in the country.

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## APPENDICES

### Appendix 1: Questionnaire for Traditional Beekeepers

#### A. Identification Variables

Questionnaire number	
1. District	
2. Ward	
3. Village	
4. Date of interview	
5. Name of respondent	
6. Address of respondent	
7. Age of respondent (Years)	
8. Relationship with Household Head	i. HH Head [ ] ii. Wife [ ] iii. Son [ ] iv. Daughter [ ] v. Grandson [ ] vi. Granddaughter [ ] vii. Other relation [ ] Specify.....
9. Sex	a. Male [ ] b. Female [ ]

#### B. Information about Traditional Beekeeping

1. Did you produce honey last season?  
(a) YES [ ] (b) NO [ ]
2. If yes, how much? (Litres).....
3. How many beehives do you have?  
Traditional..... (# :). Modern..... (#).....
4. What was the expected production last season?  
(Litres) .....
5. Are you comfortable with the current production and harvesting methods?  
YES [ ] NO [ ]

If NO, What do you suggest?

- (a).....
- (b).....
- (c).....

6. What are the constraints behind your production trend?

- (a).....
- (b).....
- (c).....
- (d).....

7. How much did you sell your honey? (TShs/L) .....

8. To whom did you sell your honey?

S/No.	Name of buyer	Where is the buyer from?			
		Country	Region	District	Ward/Village
1.					
2.					
3.					
4.					

9. Are you comfortable with the current buying prices?

YES [ ] NO [ ]

Give comments with regard to the current price?

- (a).....
- (b).....
- (c).....
- (d).....

10. What are your suggestions on honey pricing in general?

- (a).....
- (b).....
- (c).....

11. (i.) Have you ever received any training from any organization/Institution?

YES [ ] NO [ ]

(ii.) If Yes, Name the organization and the type of Training you have received.

(a) Organization.....

(b) Type of Training .....

12. (i.) Have you ever received any beekeeping equipments?

YES [ ] NO [ ]

(ii) If Yes, name the type of equipments you have received

(a).....

(b).....

(c).....

(d).....

13. What do you think are the major problems facing you in the whole process of honey production?

(a).....

(b).....

(c).....

(d).....

14. What do you think are the possible solutions to those problems?

(a).....

(b).....

(c).....

(d).....

**C. Information About Value Adding Activities**

14. How do you usually harvest your honey?

(a) Smoking the bees

(b) Wearing bee suits and gloves

(c) Setting bush fires to chase away the bees

(d) Others, please specify.....

15. Do you usually process the honey? YES [ ] NO [ ]

16. (i) If Yes, please mention the value adding activities you undertake.

a. ....

b. ....

c. ....

d. ....

(ii) If No, proceed to part D of the questionnaire?

.....

17. Is there any difference in price between raw and processed honey?

YES [ ] NO [ ]

18. Please, indicate price in TSH of honey that has undergone one of the processing methods you apply to your honey

a) .....TSH/ Kg.....

b) .....TSH/ Kg.....

c) .....TSH/ Kg.....

d) .....TSH/ Kg.....

e) .....TSH/ Kg.....

19. Please indicate the inputs required and the associated cost for each value adding activity you have indicated.

a. Value adding activity

S/No.	Input	Unit Cost	Total	Variable	Fixed
1.					
2.					
3.					
4.					
5.					

b. Value adding activity

S/No.	Input	Unit Cost	Total per	Variable	Fixed
1.					

2.					
3.					
4.					
5.					

c. Value adding activity

S/No.	Input	Unit Cost	Total per	Variable	Fixed
1.					
2.					
3.					
4.					

d. Value adding activity

S/No.	Input	Unit Cost	Total per	Variable	Fixed
1.					
2.					
3.					
4.					

e. Value adding activity

S/No.	Input	Unit Cost	Total per	Variable	Fixed
1.					
2.					
3.					
4.					

20. Can you mention the inputs that you buy every harvesting season out of the inputs you have mentioned above?

21. Which of the above activities is tedious, taking into account the resources and technologies available around your neighborhood?

Value Adding Activity	Extremely Tedious (1)	Very Tedious (2)	Tedious (3)	Least Tedious (4)
1.				
2.				
3.				
4.				

**D: Other Sources of Household Income (Economic Activities)**

## 22. Livestock

<b>Livestock</b>	<b>Category</b>	<b>Produced /Owned #</b>	<b>Sold #</b>	<b>Cash Income from sold .000</b>	<b>Average price Tsh/unit</b>
Poultry (all birds)	Meat	[ ]	[ ]	[ ]	[ ]
	Eggs	[ ]	[ ]	[ ]	[ ]
Cattle	Dairy cow	[ ]	[ ]	[ ]	[ ]
	Dairy calf	[ ]	[ ]	[ ]	[ ]
	Milk	[ ]	[ ]	[ ]	[ ]
	Local				
	Ox	[ ]	[ ]	[ ]	[ ]
	Local cow	[ ]	[ ]	[ ]	[ ]
	Local calf	[ ]	[ ]	[ ]	[ ]
Goats	Young	[ ]	[ ]	[ ]	[ ]
	Old	[ ]	[ ]	[ ]	[ ]
	Milk	[ ]	[ ]	[ ]	[ ]
Sheep	Young	[ ]	[ ]	[ ]	[ ]
	Old	[ ]	[ ]	[ ]	[ ]
Others		[ ]	[ ]	[ ]	[ ]
		[ ]	[ ]	[ ]	[ ]
<b>TOTAL</b>					

## 23. Agriculture:

Agriculture Crops	Production, consumption and sales				Average price (Tsh)	Income from sold (Tsh)
	Area (acres)	Produced (kg)	Consumed (kg)	Sold (kg)		
1. Maize						
2. Beans						
3. Sorghum						
4. Millet						
5. Paddy						
6. Cassava						
7. Sesame						
8. Sunflower						
9. Fruits						
10. Others						
<b>TOTAL</b>						

## 24. Petty Trade:

Type	How often in a month	Income in last 12 months (TShs)
1.		
2.		
3.		
4.		
5.		
6.		

25. Please indicate the inputs for each of the other income generating activities you have indicated above other than beekeeping.

**a. Livestock**

S/No.	Input	Unit Cost	Total per	Variable	Fixed
1.					
2.					
3.					
4.					

**b. Agriculture:**

S/No.	Input	Unit Cost	Total per	Variable	Fixed
1.					
2.					
3.					

**c. Petty trade**

S/No.	Input	Unit Cost	Total per	Variable	Fixed
1.					
2.					