

# **Structure, Conduct and Performance of Honey Markets in Zambia's Dryland Forests**

by  
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Thesis presented in fulfilment of the requirements for the degree of Master  
of Science in Forestry in the Faculty of AgriSciences at Stellenbosch  
University



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March 2017

## **DECLARATION**

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## ABSTRACT

This research study assessed the commodity value chain structure, conduct and performance in relation to honey markets in Zambia's dryland forest. The objectives were to (a) identify stakeholder's strategic activities influencing honey markets, (b) assess the demand and supply of honey and bee products, (c) assess effects of the structure of the value chain on markets, and (d) to evaluate the distribution of revenue, costs and profit margin along the value chain. Field surveys were conducted to gather information from 164 stakeholders identified as beekeepers, honey hunters, processors, transporters, wholesalers, retailers, consumers, donors, input suppliers, training institutions and regulatory authorities.

Results indicated that there was a disparity between the years of experience and production volume amongst beekeepers. Older beekeepers with more years of experience used traditional "local style" bark beehives that produced low output volumes while younger beekeepers with less years of experience made use of "modern style", manufactured, *Kenya Top Bar* hives that produced substantially ( $p < 0.05$ ) more honey.

In the Kitwe district, significantly more honey ( $p < 0.05$ ) was supplied to markets in a longer value chain dominated by modern style beekeepers than in the Kapiri Mposhi district where a shorter value chain was dominated by local style beekeepers. The difference was attributed to lower honey volumes for Kapiri Mposhi producers than Kitwe. In addition, Kitwe's profit margin per litre of honey was distributed across all the stakeholders, with the greater share of profit received by wholesalers while in Kapiri Mposhi retailers received the largest profit margin.

Honey output could potentially increase in Zambia if the disparity between experience and output was addressed and financial support given to more experienced honey producers that would enable them to modernise their style of beekeeping. Alternatively, young honey entrepreneurs should be cultivated who are receptive to modern techniques and dynamic in marketing. The Kitwe value chain also illustrated that better organisation along the value chain will increase production

and shift beekeeping from a subsistence focus (as observed at Kapiri Mposhi) to a more commercial focus.

## OPSOMMING

Hierdie navorsingstudie het die kommoditeitswaardeketting se struktuur, gedrag en prestasie in verhouding tot heuningmarkte in Zambië se droëlandwoude ondersoek. Die doelwitte was om (a) belanghebbendes se strategiese aktiwiteite wat heuningmarkte beïnvloed te identifiseer, (b) die aanvraag en voorsiening van heuning en heuningbyprodukte te bepaal, (c) die effekte van die struktuur van die waardeketting op markte te ondersoek, en (d) die verspreiding van inkomste, kostes en winsmarges in die waardeketting te evalueer. Veldopnames is uitgevoer om inligting van 164 belanghebbendes in te samel. Belanghebbendes sluit in byeboere, heuningjagters, verwerkers, vervoerders, groothandelaars, kleinhandelaars, verbruikers, skenkers, insetverskaffers, opleidingsinstansies en regulatoriese instansies.

Resultate het aangedui dat daar 'n dispariteit is tussen die jare ondervinding en produksievolume onder byeboere. Ouer byeboere met meer jare ondervinding gebruik tradisionele "plaaslike styl" baskorwe met lae uitsetvlakke terwyl jonger byeboere met minder jare ondervinding, "moderne styl" vervaardigde "*Kenya Top Bar*" korwe gebruik wat beduidend ( $P < 0.05$ ) meer heuning produseer.

In die Kitwe distrik is beduidend meer heuning ( $P < 0.05$ ) aan markete voorsien deur 'n langer waardeketting wat deur modern style byeboere oorheers is as in die Kapiri Mposhi distrik met 'n korter waardeketting en oorheersend plaaslike styl byeboere. In Kitwe was die winsmarge versprei tussen al die belanghebbendes met 'n groter deel van die wins wat deur groothandelaars ontvang is terwyl kleinhandelaars die meeste wins ontvang het in Kapiri Mposhi.

Heuning uitsette kan potensieel verhoog in Zambië as die dispariteit tussen ondervinding en uitsette aangespreek kan word en finansiële ondersteuning aan byeboere met meer ondervinding gegee kan word. Dit sal hulle instaat stel om hulle styl van byeboerdery te moderniseer. Andersins behoort jong heuning entrepreneurs gekweek te word vir wie modern tegnieke en dinamiese bemarking aanvaarbaar is. Die Kitwe waardeketting het geïllustreer dat beter organisasie langs

die waardeketting produksie kan verbeter en byeboerdery van 'n bestaansfokus (soos waargeneem in Kapiri Mposhi) tot 'n meer kommersiële fokus kan verskuif.

## **DEDICATION**

To my beloved wife, Harriet Mwamba Kwesa Nyawali, my sons Nthowani Nyawali and Yamikani Nyawali, my only daughter Nkumbu Nyawali and my Nephew Peter Nyawali for their understanding and patience during my long absence from home, I dedicate this work.

## ACKNOWLEDGEMENT

I would like to thank God Almighty for His protection and guidance throughout my period of studies at the University of Stellenbosch.

My heartfelt appreciation to the Southern African Science Service Centre for Climate Change and Adaptive Land Use Task 079 and funding number 01LG1201 for the funding without which my studies were not going to be possible. Also to Dr Ben du Toit, who administers this grant funding at Stellenbosch University.

Thanks, are also due to my supervisor Mr Cori Ham, for the valuable mentorship, guidance and advice in working tirelessly to ensure that the document is of academic standard.

I extend my appreciation to all the honey commodity value chain stakeholders in Zambia's dryland forests. Particular mention to the beekeepers and honey hunters in Kapiri Mposhi, Luanshimba area and in Kitwe, Mwekera Multipurpose Cooperative and the Mpongwe Beekeeping Enterprise factory personnel in Mpongwe district. Your sense of seriousness in answering to the study questions invaluable contributed in achieving the outcomes of the study.

Last, but not least, I would like to thank the government of the republic of Zambia, through Mr Richard Banda, the Principal for the Zambia Forestry College, for granting me study leave from my employment during the entire period of my studies in South Africa.

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## ACRONYMS

BCUs	Beekeeping Cooperative Units
CIFOR	Centre for International Forestry Research
CODIT	Institute of Community and Organizational Development
CSO	Central Statistical Office
EIF	Enhanced Integrated Framework
FAO	Food and Agriculture Organisation
FD	Forestry Department
GDP	Gross Domestic Product
GRZ	Government of the Republic of Zambia
HCVC	Honey Commodity Value Chain
IMF	International Monetary Fund
kg	Kilogram
MCTI	Ministry of Commerce, Trade and Industry
MFI	Micro Finance Institutions
mm	Millimetre
NTB	National Board of Trade
NTFP	Non-Timber Forest Products
PRP	Poverty Reduction Programme
SADC	South African Development Community
SNDP	Sixth National Development Plan
SNV	Netherlands Development Organisation
TIPEC-ZAS	Trade and Investment Project for Enhanced Competitiveness of Zambia's Apicultural Sector
ZHPP	Zambia Honey Platform Partnership
ZMW	Zambian Kwacha

# Chapter 1: Introduction

## 1.1 General Introduction

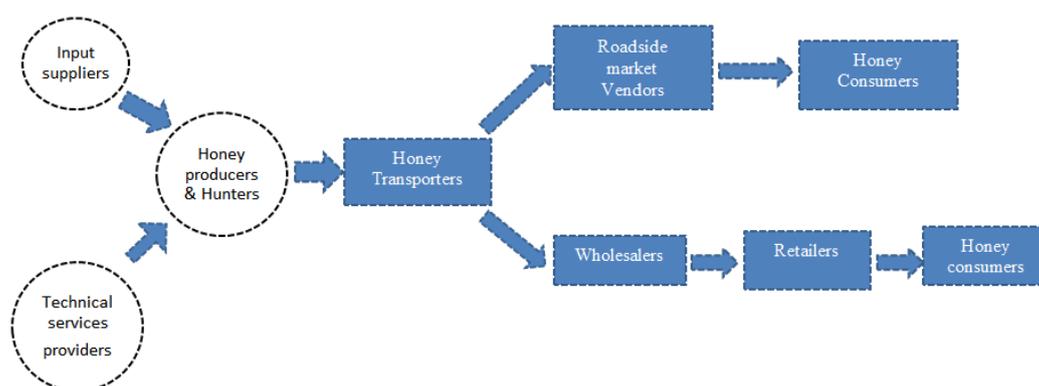
Zambia's traditional export product is copper, which contributes 40% to gross domestic product (GDP), (CSO, 2015). Reduced international copper prices have, however, affected GDP growth and decreased economic growth from a projected 7% to 5.8% (CSO, 2015). This situation has forced Zambia to consider non-traditional export products to increase her foreign exchange reserves (SNDP, 2014; CSO, 2015). The Zambia Apicultural Sector Strategy of 2008 was developed in tandem with the government's policy to support growth and diversification of non-traditional exports thereby recognising the role honey plays in the economic life of the country. Honey exports contributed 0.02% to Zambia's total exports in 2013 and represented 10% of non-traditional exports (EIF, 2013).

Honey exports not only contribute to export earnings but also towards poverty alleviation, in a country where an estimated 70% of the population live in extreme poverty (CSO, 2010). The honey sector is strongly positioned to address poverty because it is rural in nature and the manufacturing process employs many people. For instance, it is estimated that 250 000 farmers and 60 000 households receive support from the sector (EIF, 2013; ITC, 2015). In addition, the sector directly employs 35 000 beekeepers and 6 000 honey hunters who derive 80% of their household income from selling honey (NBT, 2010; EIF, 2013; SNV, 2014).

Zambia's honey industry consists of different stakeholders involved in delivering honey to markets from production areas through the honey commodity value chain (HCVC). A value chain is a network of people and institutions interlinked together because their activities are related in delivering a service or product - in this case honey to end-markets (Gereffi *et al.*, 2001; Gereffi *et al.*, 2005; Bellù, 2013). Honey stakeholders are either directly involved in handling honey (core stakeholders) or supporting stakeholders who assist the core stakeholders in their activities (EIF, 2013).

Core stakeholders are producers, processors (packers), transporters, wholesalers (bulkiers), retailers and consumers. The core stakeholders are assisted by support agencies such as input suppliers, regulatory agencies, donors and training institutions (Mickels-Kokwe, 2006; Tata *et al.*, 2006; NBT, 2010; ITC, 2015).

Input suppliers such as artisans and carpenters begin the process of honey production by providing beekeeping gear to producers. Producers are involved in rearing honeybee colonies for producing honey and supplying markets. Processors (packers) buy raw honey and refine it before selling to wholesalers, who later resell it to retailers. Retailers supply honey to consumers for their use as table and industrial honey. Transporters are involved in the conveyance of honey between the actors through to consumers (Figure 1.1).



**Figure 1.1. Presentation of stakeholders along the honey commodity value chain.**

Management and coordination of the HCVC such as the one described above could be a catalyst to industrial upgrading, economic development, employment creation, and poverty alleviation (Gereffi *et al.*, 2005). The Zambian HCVC is, however, poorly linked to viable economic markets, consequently leading to suboptimal honey production (EIF, 2013). This poor linkage to markets has contributed to the production of only 1 100 metric tons out of an estimated potential of 20 000 metric tons of honey per annum in Zambia (NBT, 2010; SNV, 2014).

The existing HCVC does not provide incentives for actors to thrive and expand production (EIF, 2013). For example, banks and other financial institutions are not aware of the financial risks and uncertainty associated with the HCVC, making it

difficult for them to provide loans and grants to recapitalize beekeeping enterprises (CODIT, 2009; EIF, 2013). This has led to the undercapitalization of the HCVC with a resulting 85% of honey equipment being old or outdated (ITC, 2015; Mwongela and Kalaba, 2015). The use of old equipment and traditional beekeeping methods the world over has been implicated in low honey productivity and poor quality (Gilles, 2014).

A lack of packaging materials, especially in at roadside markets, exacerbates the problems related to honey production and quality. This undifferentiated honey compromises taste and consumer preference in selecting the best honey and in turn affects loyalty and pricing (Lowore and Bradbear, 2013). Thus, until the market develops a level of sophistication, the default position for most consumers is to purchase the lowest priced honey (Mickels-Kokwe, 2006; Lowore, 2014).

The HCVC also performs poorly because of inadequate stakeholder coordination towards the common goal of sustaining honey markets. Despite efforts from private food business operators to organise themselves into a lobbying platform, there is inadequate leadership from competent authorities such as the Veterinary Department in the Ministry of Fisheries and Livestock to drive the honey agenda forward (ZHPP, 2015). The honey sector is visibly fragmented with selected functions spread across government departments, individual companies and beekeeper's cooperative units /associations (SNV, 2014; ZHPP, 2015).

A number of studies to identify and map stakeholders along the HCVC generated information in identifying people and institutions involved in the honey industry in Zambia (Mickels-Kokwe, 2006; NBT, 2010; ITC, 2015). However, information on how the structure, conduct and performance of these stakeholder's impacts on end-markets is currently absent from literature. The purpose of this study was to measure activities performed by different stakeholders along the HCVC and how they impact on competitiveness of honey markets. The aim was to generate information that can be used in recommendations for upgrading HCVC stakeholder's capacities and commercialisation of honey products.

## 1.2 Study Rationale

The availability of a viable honey market should lead to increased investment opportunities for HCVC stakeholders. Investment in the honey sector could trigger an increase in the amount of honey produced from the current 1 100 metric tons to as much as 20 000 metric tons per annum; worth approximately EUR 25 million (NBT 2010; SNV, 2014). Commercialisation of the honey industry also has socio-economic benefits such as increased levels of recapitalisation, economic development in rural areas of Zambia, employment creation and poverty alleviation among rural communities (Total Transformation Agribusiness, 2008; EIF, 2013).

## 1.3 Study Objectives

The goal of this research study was to measure the influence of the current HCVC on markets and devise ways for upgrading and commercialisation of honey and bee products.

The specific objectives were:

- To identify stakeholder activities influencing honey markets.
- To assess the demand and supply of honey and bee products.
- To assess the effects of the value chain structure on markets.
- To evaluate the distribution of revenue, costs and profit margin along the value chain.

## 1.4 Methodology

A field survey approach was followed in assessing the HCVC structure, conduct and performance (SCP) of Zambia's dryland forests based on two types of questionnaires surveys (Babbie, 2001; Mouton, 2013). The first survey was based on an individual questionnaire, aimed at stakeholders involved in the core value chain including honey producers, wholesalers (bulkiers), processors (packers), transporters, retailers and consumers. The second survey used a structured key informant questionnaire, which provided a guided interview framework with value chain support agencies that included input suppliers, regulatory agencies, donors and training institutions (Babbie, 2001).

## 1.5 Outcomes

The planned outcomes of the study are meant to contribute towards improving the HCVC in Zambia. The study evaluated the roles of HCVC actors in upgrading production and market performance and recommendations were made on the changes required at and between value chain levels including production, wholesale, processing, transportation, selling, consumption, support and regulations. It is expected that players in the honey industry will utilise the recommendations to improve the performance of the sector.

Another outcome was increasing support for the commercialisation of honey and bee products in Zambia's dryland forest areas. By assessing the supply and demand of honey and bee products and showing the impact on honey markets, this study crafted recommendations on:

- Consumer taste preferences of honey and bee products;
- Increasing sales and reducing costs of manufacturing honey and bee products along the value chain; and
- Leveraging of honey market opportunities while minimising constraints along the value chain.

## **Chapter 2: Literature Review**

### **2.1 Honey Industry Stakeholders**

Honey markets are linked to production through a network of stakeholders with defined mandates according to their position along the value chain (CODIT, 2009; Mwongela and Kalaba, 2015). Strengthening the linkages and mutually beneficial relationships of stakeholders in value chains can provide solutions to market problems. These market problems are solved when stakeholders pool together their resources, knowledge and capabilities thereby increasing flexibility, productivity, cost reduction and innovations (Wong and Tong, 2012).

Previous studies on value chains and market problems identified persons and organisations that have influence over the Zambian HCVC. They include honey core value chain players - namely producers, processors (packers), transporters, wholesalers (bulkiers), retailers and consumers. Others are support agencies such as input suppliers, regulatory agencies, donors and training institutions (Mickels-Kokwe, 2006; NBT, 2010; Mwongela and Kalaba, 2015). These stakeholders described in Figure 1.1 will be discussed in more detail below.

#### **2.1.1 Input Suppliers**

Input suppliers are directly linked to producers through the exchange of beekeeping gear for cash, barter with honey or other means (CODIT, 2009). Examples are carpenters, tailors, artisans and boilermakers. These people are responsible for making and supplying beehives, protective clothing and honey processing and storage equipment used in the production of honey for markets (NBT, 2010).

#### **2.1.2 Producers**

Producers manage honeybee colonies for the production of honey and bee products. Two categories of producers have been recognised: honey hunters and beekeepers (Mickels-Kokwe, 2006; Total Transformation Agribusiness, 2008, Husselman, 2008).

### **2.1.2.1 Honey Hunters**

Honey hunters are hobbyists and honey collection for them is a seasonal event involving robbing honeybee nests in forests, game management areas and agricultural fields. The feral colonies are usually found nesting in cavities of fallen logs, trees and rocks as well as inside the ceilings of buildings and gantries for power supply lines. There are approximately 6 000 honey hunters spread across Zambia (Mickels-Kokwe, 2006; EIF, 2013).

### **2.1.2.2 Beekeepers**

The definition of a beekeeper is subjective but can be guided by general, set parameters across different continents and countries. For example, most European countries differentiate between commercial and amateur beekeepers based on honeybee colony management (Schweitzer *et al.*, 2013), apiary size (at least 150 colonies to be rated professional) and source of income (beekeeping must be the main source of income to be a professional) (FAO, 2011; Schweitzer *et al.*, 2013; Apimondia, 2015).

In Africa, beekeeping technology remains the main distinguishing factor between types of beekeepers. A study commissioned in Ethiopia described beekeepers as modern or traditional based on technology (Lowore, 2014). Traditional, also known as local style beekeepers, use hives made from locally available materials such as reeds, clay, bamboos, grass, bark and logs (Lowore, 2014). In Zambia, traditional beekeeping is ascribed to methods used by tribes originating from honey producing regions and copied to other parts of the country. For example, the Lunda and Luvale tribes of Kabompo in the North-Western province use mainly hives made from tree bark to hive honeybee colonies (Clauss, 1992; Husselman, 2008; Husselman *et al.*, 2009). Modern beekeepers are individuals and organisations with access to capital, utilising either top bar or frame hives in rearing honeybees (Apimondia, 2015).

In Zambia, honey production and processing are conducted either as a hobby or form of employment alongside other related farming operations (Husselman *et al.*, 2009). Beekeepers are classified as traditional and modern beekeepers based on

the use of either traditional bark hives or manufactured wooden (modern) hives (Ntenga, 1986; Clauss, 1992; Mickels-Kokwe, 2006; Husselman, 2008).

Approximately 85% of the 35 000 beekeepers in Zambia can be classified as traditional beekeepers while 15% are modern beekeepers (Mickels-Kokwe, 2006; Husselman *et al.*, 2009; NBT 2010; EIF 2013; SNV 2014; Mwongela and Kalaba, 2015). Despite the large number of producers, export, regional and local markets are struggling with honey supply problems due to Zambian beekeepers producing honey at subsistence level for economic survival and not for commercial gain (Mickels-Kokwe, 2006; NBT, 2010; Mwongela and Kalaba, 2015; ITC, 2015). Problems such as not fulfilling supply contracts to processors and processors only paying producers after 3 – 4 months (Mickels-Kokwe, 2006; NBT, 2010).

It is estimated that 39% of beekeepers in Zambia, are affiliated members of 43 beekeeping cooperative units (BCUs) distributed in major apicultural districts (EIF, 2013). The Mwinilunga district of the North-Western province of Zambia has the highest number of BCUs with 12 units and 6 000 affiliated members (SNV, 2014) (Table 2.1).

**Table 2.1. Affiliated members to 43 BCUs in major apicultural districts in Zambia (SNV, 2014).**

District	Members	Beekeeping Co-operative Units
Chiyawa	45	1
Kabompo	1 800	6
Kaoma	243	2
Kapiri Mposhi	1 883	5
Kasama	12	1
Masaiti	50	1
Mbala	30	1
Mkushi	572	3
Mpika	14	1
Mpongwe	60	2
Mufumbwe	560	4
Mwinilunga	6 000	12
Petauke	250	2
Zambezi	2 000	2
<b>Total</b>	<b>13 519</b>	<b>43</b>

### 2.1.3 Processors

Processors are individuals and small to medium enterprises (SMEs) who are responsible for adding value to comb honey by processing it into liquid (NTB, 2010). Liquid honey is obtained after removing the wax cappings and whirling the comb in a honey extractor using either centrifugal force or by manual pressing (Total Transformation Agribusiness, 2008). At this stage, physical contaminants are removed and the honey is graded, sieved, filtered and packed (Mickels-Kokwe 2006; NBT, 2010; ITC, 2015).

Inadequate processing equipment is a major challenge to processors (NBT, 2010). It is estimated that 39% of processors lack buckets, drums and centrifuges (NTB, 2010). Processors address the problem of storage by providing buckets to beekeepers at the beginning of the honey season (NBT, 2010; ITC, 2015). The distribution of buckets is also a quality control measure by way of enhanced traceability of honey from the source of production (ITC, 2015).

The relationship between processors and beekeepers is fragile due to the failure by beekeepers to fulfil honey supply orders. Beekeepers often sell honey to other buyers than the ones they have agreements with. This “side selling” makes it very difficult to ensure stable market supply of honey in terms of both quantity and quality (NBT, 2010; ITC, 2015).

There are nine major honey processors in Zambia. They are: Mesh, North Western Beekeepers Association, Forest Fruits, Mwame, Mpongwe Beekeepers, Acomap, Comaco, Miombo and Ubuchi. The largest is Ubuchi who processes 215 tonnes of honey per year (Figure 2.1). The processors are operating in major apicultural districts including Kasama, Mpika, Mwinilunga, Zambezi, Kabompo, Kasempa, Mpongwe, Kapiri Mposhi, Mumbwa, Petauke, Kaoma and Monze (ITC, 2015).



### **2.1.5 Wholesalers**

Wholesalers are bulk buyers of honey from processors who resell to retailers. Their operations of breaking the bulk into smaller units of honey are aligned to the honey-flow season. Although wholesalers could potentially benefit from high profit margins, are they faced with capital constraints related to buying, storing and packaging honey (Karaan *et al.*, 2005; Mickels-Kokwe, 2006; ITC, 2015).

### **2.1.6 Retailers**

Retailers consist of supermarkets, middlemen, vendors, chemists and roadside traders responsible for selling honey in smaller quantities (Mickels-Kokwe, 2006). In shops honey is sold in 250 g, 350 g and 500 g plastic jar containers (ITC, 2015). Honey is also sold in 2.5 litres containers at roadside stalls such as those observed in the Kapiri Mposhi district. However, these markets are very small and characterised by unpredictable selling of honey to passing motorists (Fiona, 2010).

### **2.1.7 Consumers**

In communities where honey is produced it is consumed mostly as an alcoholic beer or wine locally known as “*Imbote*” (Mickels-Kokwe, 2006; NBT, 2010; ITC, 2015). The fact that honey contains antioxidants, minerals, vitamins and proteins makes it an appealing ingredient compared to artificial sweeteners (Serem and Bester, 2012; Nyawali *et al.*, 2014). This has triggered a demand for honey amongst health consciousness consumers (ITC, 2015). There is also a small number of small and medium enterprises (SMEs) that use honey as an ingredient in the making of lotions, hair pomade, soap, baby products, yogurts and drinks (ITC, 2015).

The demand for honey is based on a range of taste and preference criteria set in the mind of consumers who either reject or accept particular types of honey (Ghorbani and Khajehroshanaee, 2009; Sobhy, *et al.*, 2014; Ahmed *et al.*, 2014). In a study on consumer consumption patterns influencing honey demand, honey quality was identified as a major driver of demand (Sobhy, *et al.*, 2014). Quality was described based on characteristics such as sweetness, smoothness, granulated, colour and presence or absence of impurities (Ghorbani and Khajehroshanaee 2009; Masuku, 2013; Sobhy, *et al.*, 2014; Ahmed, 2014). Food quality for honey means being

healthy and safe for consumption, with high nutritional value and quality packaging (Sobhy, *et al.*, 2014).

### 2.1.8 Training Institutions

There is no compulsory training for beekeepers prior to starting a beekeeping enterprise. However, technical support institutions such as colleges and universities are on hand to offer both long and short-term training in beekeeping. These institutions are outsiders to regular honey business and restrict themselves to the role of providing training, research and development (ITC, 2015).

### 2.1.9 Donor Organisations

International organisations working in Zambia provide both financial and technical support to the honey sector (Mwongela and Kalaba, 2015). A review of immediate past facilitation to the honey sector in Zambia showed three critical areas, namely training, supply of inputs and construction of honey bulking centres (ITC, 2015; Mwongela and Kalaba, 2015). Examples of countries and institutions providing support to the honey sector in Zambia are Finland who has collaborated with the International Trade Centre (ITC), the Netherlands Development Organisation (SNV) and the United Nations Development Programme (UNDP) (Table 2.2).

**Table 2.2. Summary of the type of support to the honey sector in the past three years (EIF; 2013; ZHPP, 2015; Mwongela and Kalaba, 2015)**

Organisation	Period	Facilitation		Outcomes
Finland / ITC	2014 -15	Trainer-cum-Counsellors	(i)	Trained advisors on quality and food safety requirement.
			(ii)	Capacities of honey small enterprises on quality and food safety was improved.
SNV	2012 -15	TIPEC-ZAS	(i)	5 000 small producers were integrated in the HCVC.
			(ii)	Improved bekeeping research and development.
			(iii)	5 000 small producers are now selling honey through commercial contracts in participating project areas country wide.
			(iv)	Institutionalised norms and standards in the honey sector.
			(v)	Increased annual honey production from 2 000 to 7 000 metric tons.
UNDP	2014 -15		(i)	Trained community facilitators to train other famers in beekeeping.
			(ii)	Constructed honey bulking centres in Mwinilunga and other project areas.

### **2.1.10 Regulatory Agencies**

Regulatory agencies include competent authorities facilitating effective monitoring of the beekeeping industry including the Veterinary Department, Forestry Department, Zambia Bureau of Standards and Zambia Development Agency (ITC, 2015). Through relevant Acts of parliament, these agencies implement mandates such as authorisation and monitoring, conservation of bee forage, promotion of honey trade, upgrading of skills of HCVC actors through training and extension, facilitation of grant and soft loans, honey testing and certification (Mickels-Kokwe, 2006; Husselman *et al.*, 2009; EIF, 2013; Mwongela and Kalaba, 2015).

## **2.2 Honey Production and Global Markets**

The following section contains a review of honey production and markets status globally. Factors included are demographics of producers, beekeeping technology, flowering plants, honeybees and beekeeping equipment.

### **2.2.1 Age, Gender and Experience of Beekeepers**

The age of beekeepers the world over is heterogeneous and heavily biased towards older male practitioners, with the average age being 42 years (Husselman *et al.*, 2009; FAO, 2011; Gilles, 2014). In a study to determine beekeeping adoption among age groups in Nigeria, it was found that the majority fell between 30-40 years (Bradbear, 2009). In Rwanda, an average youth involvement rate in honey production of 11% across a sample of 17 districts was observed (CODIT, 2009). It is reported that unless interventions are put in place to address age gaps, the enterprise is likely to be dominated by older male beekeepers by the year 2055 (Gilles, 2014).

Women participation in beekeeping remains limited despite their strategic positioning as farm managers and active labourers. In a study to determine the involvement of women in honey enterprise in Rwanda the average involvement rate of women ranged between 18 to 22% across 17 districts (CODIT, 2009). In Zambia, where beekeeping is predominantly a traditional activity, women are on unequal footing with their male counterparts in terms of adoption because the main type of hive made from tree bark requires physical strength to construct (Clauss, 1992). This problem

is compounded with difficulties in climbing trees during hanging of hives, walking long distances to inspect honeybee colonies and transferring honeybee colonies from broken hives (Bradbear, 2009; SNV, 2014).

The honey industry in Zambia is supported by both men and women. Based on the study of ITC, (2015) men are in majority (85%) compared to women. However, the introduction of Kenya Top Bar hives (KTB) (Figure 2.2) has improved women participation in beekeeping. It is estimated that 85% of female beekeepers use KTB hives compared to men (NBT 2010; EIF 2013; SNV 2014; Mwongela and Kalaba, 2015).



**Figure 2.2.** A Kenya Top Bar hive hanged in a tree.

Producer experience seems to be linked to the type of beekeeping. For example, professional beekeepers in Asia had five years of experience compared to 20 year of experience for traditional beekeepers (Lowore, 2014). In Zambia, traditional beekeepers are more experienced than modern beekeepers with experience levels ranging from five to ten years (NBT, 2010).

### **2.2.2 Beekeeping Technology, Honey Quality and Impact on Trees**

Honey demand has triggered sophistication in the types of hives used to increase production. The adoption of beehives has led to a shift from harvesting honey from feral colonies in natural nesting places to capturing bee colonies in manufactured hives. Examples of hives include bark, calabash basket, clay pots, top bars and

frame (Crane, 1983). Despite the wider selection of hives for honey manufacturing available to beekeepers, traditional beekeepers in Zambia predominantly use bark hives (Clauss, 1992) (Figure 2.3). A bark hive is usually 100 cm in length and of diameter ranging from 16 to 32 cm. Bark hives are popular amongst beekeepers because they are very cheap and easy to make from readily available tree species such as *Burkea africana*, *Brachystegia boehmii*, *Brachystegia longifolia*, *Brachystegia spiciformis*, *Chryptosepalum exfoliatum* and *Julbernardia paniculata* (Lowore and Bradbear, 2013; ITC, 2015). However, honey produced in bark hives is generally of poor quality because of the extent to which the structures limit the ability to conduct inspections (Lowore, 2014).



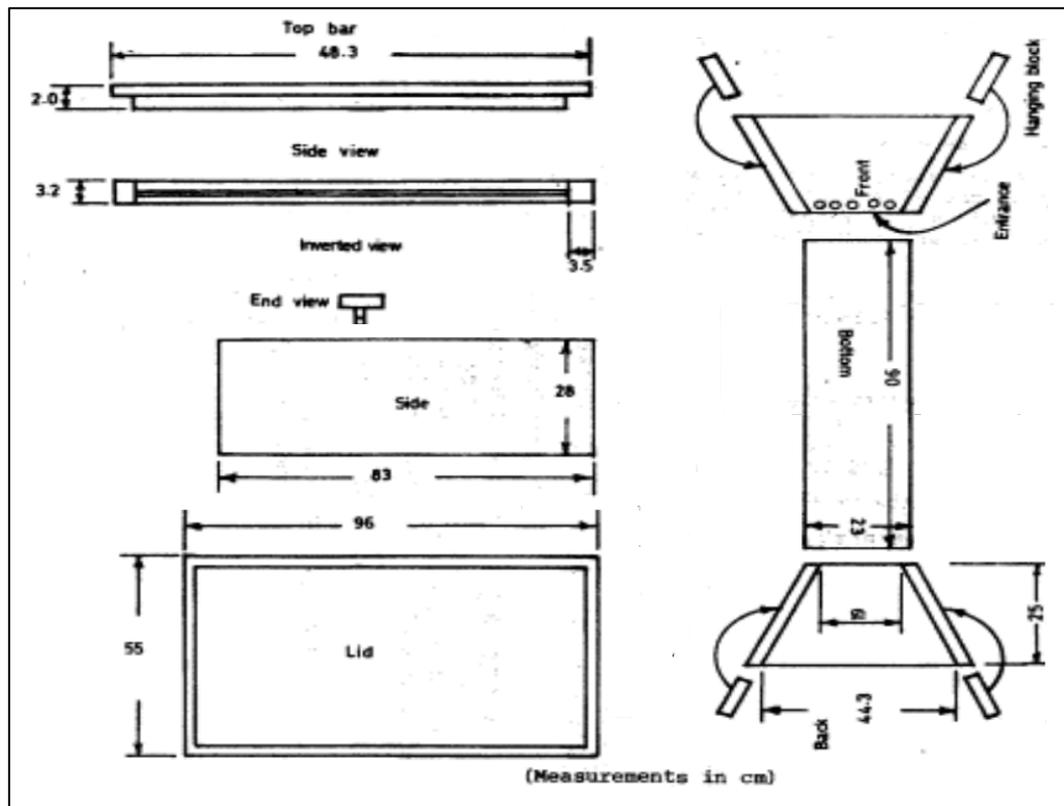
**Figure 2.3. Hanged (left) and newly extracted *Julbernardia paniculata* (right) bark hives.**

Furthermore, bark harvesting for the sole purpose of constructing hives usually conflicts with management of colonies for honey production. Bark harvesting leads to a reduction in flower production due to loss of trees (Tucak *et al.*, 2004). Previous studies showed a sharp increase in the loss of trees due to bark hive construction from 272 900 trees in 1992 to 342 423 in 2004 (Table 2.3). This equates to the destruction of four trees per square kilometre (Clauss, 1992; Mickels-Kokwe, 2006; ITC 2015).

**Table 2.3. Impact of bark hive making on forest resources in North Western province of Zambia (ITC, 2015).**

Parameter	1992 estimation	2004 estimation
Number of bark hives per beekeeper	73	73
Average number of new bark hives per beekeeper per year	29	33
Estimated total number of new bark hives per year	435 000	582 120
Total number of trees destroyed by bark hive making each year	272 900	342 423
Average number of trees destroyed per square kilometre	3.1	4.9

The other type of hive used for honeybee colony rearing is the KTB hive (Tucak *et al.*, 2004; NBT 2010). First designed and produced in Kenya among the Kikuyu people, KTB hive has 33 top bars of 42.2 cm in length (Caroll, 2006). The hives provide enough space for sustaining both the brood and honey (Caroll, 2006) and do not require additional honey supers to be laid on top for bees to store more honey (Figure 2.4).



**Figure 2.4. Construction drawings of Kenyan Top Bar hive (Caroll, 2006).**

### 2.2.3 Honeybee Colonies and Apiaries

Honeybees (*Apis mellifera scutellata* L. Apoidea) are known to occur in all parts of Zambia (Crane 1983; ITC, 2015). They organise themselves as a colony consisting of three different types of bees namely, Worker, Drone and Queen. The population of a strong colony is 60 000 members distributed as follows: one Queen, up to 200 Drones and the remainder are Workers (Ntenga, 1986).

A study in Europe established that each beekeeper possessed an average of 22 colonies (Schweitzer *et al.*, 2013). In a similar study in the Americas, amateur beekeepers managed 25 or fewer bee colonies while commercial beekeepers managed 300 to 60 000 colonies (Schweitzer *et al.*, 2013). In a census to estimate the number of honeybee colonies in Zambia by the Forestry Department, a total of 480 000 honeybee colonies was reported by beekeepers (Kambeu, 2003). The size of population of honeybees has a direct influence on amount of honey supplied on markets.

Honeybee colonies are reared in man-made hives and installed in suitably sited apiaries. Distance from homes, floral sources, labour, markets and transportation are factors considered when locating apiaries (Clauss, 1992; Tucak *et al.*, 2004). Beekeepers spread their hives over large areas to compensate for fluctuations in floral sources and availability of other resources such as suitable temperature, water and shade (Clauss, 1992). A study in six districts of the North-Western province of Zambia revealed that the average distance between an apiary and the home of a beekeeper was 17.5 km (Table 2.4). In Ethiopia, a study showed that there was a negative relationship between honey yield and the distances between apiaries and forests (Lowore, 2014; Sande, 2009).

**Table 2.4. Distances from beekeeper's homes to remotest apiary sites (Clauss, 1992).**

District	Longest distance	Average distance
Mwinilunga	50km	25km
Solwezi	45km	30km
Kasempa	15km	8km
Mufumbwe	40km	20km
Kabompo	20km	16km
Zambezi	40km	6km

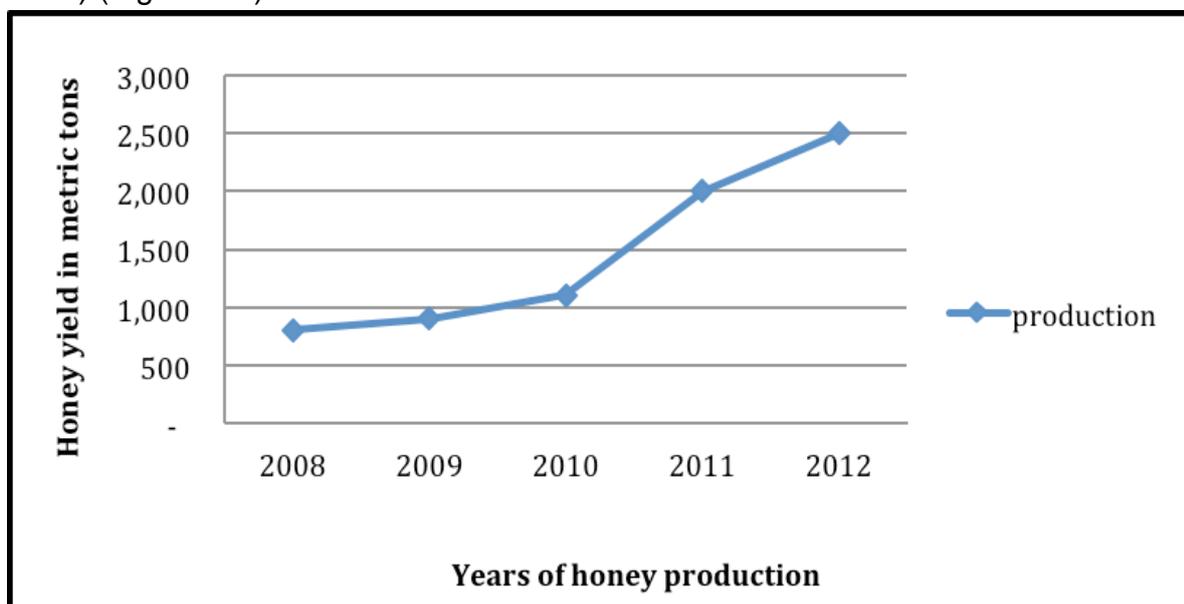
## 2.2.4 Honey Yield

In Uganda, it was found that bark hives produced 6 to 10 kg of honey per annum compared to 8 to 15 kg obtained from KTB hives (Apimondia, 2015). Bark hives also yield a lower amount of honey compared to KTB hives in Zambia (NBT, 2010). It is estimated that the national average honey yield for bark hives is 25 kg, while that of KTB hives is 45 kg (NBT, 2010; ITC, 2015) (Table 2.5).

**Table 2.5. Honey yield based on type of beehive in Zambia (ITC, 2015).**

Type of beehive	Yield	Comb honey (kg)	Liquid honey (kg)
Bark	Maximum	20	10
	Average	15	7.5
	Minimum	10	5
KTB	Maximum	40	20
	Average	30	15
	Minimum	20	10

Zambia's honey production trend from 2008 to 2012 showed a steady increase from 800 metric tons in 2008 to 2 500 metric tons in 2012 (Mickels-Kokwe 2006; EIF, 2013) (Figure 2.5).



**Figure 2.6. Zambia's honey production over a five-year period (Author).**

### 2.2.5 Flower Resources Utilised by Honeybee

Honeybees forage to be rewarded with pollen and nectar from different types of trees, grasses, agricultural crops, horticulture and ornamental plants. The intensity of flowering differs according to years and particular site location, which is probably attributed to response to first rains (Gross and Werner, 1983). The number of flowers blossoming in the apiary environment has a directly influence on the amount of honey in the hive (Gross and Werner, 1983).

Flowers are important because they contribute to honey properties including the addition of phenolics, flavonoids and antioxidants that contribute to making honey a desirable product on markets (Nyawali *et al.*, 2014). Studies to assess the relationship between types of flowers and honey quantity established that when the Miombo woodland leguminous *Fabaceae* family is blooming the amount of honey produced increases (Clauss 1992; d'Alboro *et al.*1988). This positive relationship was used to categorise floral sources in two study areas (Clauss 1992; d'Alboro *et al.*1988; Mickels-Kokwe, 2006). The major floral sources that contribute to nectar and pollen are the tree species *Brachystegia*, *Julbernardia* and *Terminalia* (Mickels-Kokwe, 2006;). Minor flower producing plants also produce nectar and pollen during periods of shortage (Mickels-Kokwe 2006; Husselman *et al.*, 2009) and such plants include grasses, agricultural crops and horticultural plants (Kambeu, 2003). The flowering seasons determine the honey flow seasons (Gross *et al.*, 1983; d'Alboro *et al.*, 1988). In Zambia, the first honey flow season is during the period of April-July while the second honey flow season is October to December (d'Alboro *et al.*, 1988; Mickels-Kokwe, 2006; Husselman *et al.*, 2009).

### 2.3 Honey Value Chain

Honey, like every product, is positioned in a value chain (Mickels-Kokwe, 2006; ILO<sup>1</sup>, 2009; ITC, 2015) where it is transformed by different stakeholders in the process of value addition before being delivered to the final consumers. Bucklin *et al.*, (2004) citing Porter (1985), argues that value chains seek to identify sources of

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<sup>1</sup> United Nations International Labour Organisation

competitiveness by identifying activities that support efficiency and effectiveness in the delivery of the product to end markets.

### **2.3.1 Mapping the Value Chain and Analysis on Costs and Earnings**

Mapping honey value chains means creating a visual representation of the supply chain distribution or networks to final markets (ILO, 2009; Choung, 2014). Honey supply chains express relationships between suppliers of honey, middlemen and end markets. Poor channel relationships between these actors is a root cause for lack of efficiency, effectiveness and poor business performance (Baker and Sinkula, 2005).

Honey commodity mapping to markets provides insight into the costs and earnings of the various value chain actors. It aims to establish the relationship between cost of beekeeping gear and total sales revenue per unit of honey by using Cost Volume Profit (CVP) analysis (Bakengesa and Kaniki, 2014) and profit margin distribution along the value chain (Bakengesa and Kaniki, 2014).

A study in Zambia to apportion sales revenues of honey based on pricing by Mickels-Kokwe (2006), showed that honey is sold based on value added at producer, retailer wholesaler and consumer stages. A more recent study by SNV (2014) described the value per kilogram of honey along the value chain. Producer value was \$2 while that for processors was \$2.50. The share value for wholesaler was \$3-\$4.50 and retailer \$6.50.

## Chapter 3: Methodology

### 3.1 Study Areas

The study was conducted in two Zambian districts of Kapiri Mposhi district situated at 13° 58' 0" South, 28° 41' 0" East in the Central province and Kitwe district situated at 12° 45' 00" South, 28° 15' 00" East in the Copperbelt province (Figure 3.1).

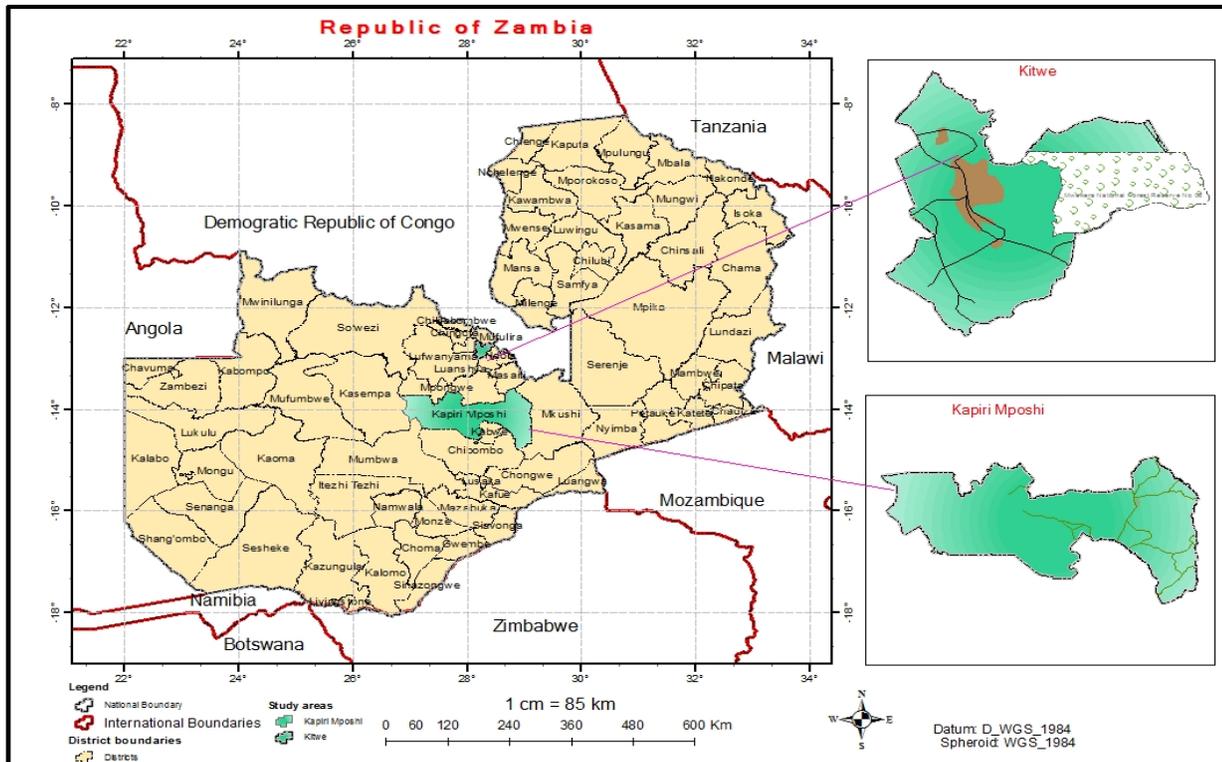


Figure 3.1. Location of Kitwe and Kapiri Mposhi districts in Zambia (CSO, 2010).

Biophysical conditions and other factors supporting beekeeping were used to justify the selection of Kapiri Mposhi and Kitwe districts. In the two districts honeybees (*Apis mellifera scutellata* L. Apoidea) occur in abundance (Crane 1983; Clauss 1992). These honeybees feed on nectar and pollen from flowering plants in the Miombo woodlands and are supported by the availability of water from more than 1 000 mm rainfall per annum (Mickels-Kokwe, 2006). The temperature in the area ranges between 17 to 23 degrees Celsius, also making it suitable for beekeeping (Chidumayo and Gumbo, 2010).

In addition, the two districts have a long history of government and donor support for beekeeping development (Kambeu, 2003; Mickels-Kokwe, 2006). For example, a honey factory was constructed at Mwekera in Kitwe to enable the country to become self-sufficient in processed honey and increase honey exports (Kambeu, 2003). In Kapiri Mposhi district honey trade takes place at roadside stalls (Fiona, 2010).

### 3.2 Structure, Conduct and Performance Model Framework

The data collection process from both the core and the HCVC support agencies was designed based on the Structure, Conduct and Performance (SCP) model framework. The SCP model was developed to illustrate implications of the behaviour associated with the structure of firms and its effects on market performance such as profit maximisation (Gupta, 1983; Reekie, 1984, Hannan, 1991). The central assertion of the model is that performance may be evaluated or predicted based on the observation of structure, conduct and basic conditions of actors such as in the case of the HCVC (Figure 3.2).

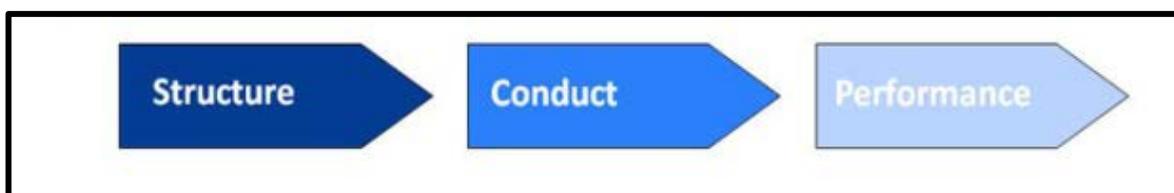


Figure 3.2. Structure, Conduct and Performance model framework (Reekie, 1984).

Data were obtained dealing with the three variables of structure, conduct and performance. For structure, the HCVC stakeholders were identified, their number, size and activities performed to meet demand and supply of honey on markets. In addition, honey sector entry and exit barriers not limited to age, gender, floral availability, beekeeping technology, policies and regulations were explored. The conduct dealt with the behaviour of players in performing critical activities of honey production, processing, transportation, bulk buying and selling (wholesale), reselling (retailing) and consumption. Related to these activities were costs and pricing (Reekie, 1984). Performance focused on the HCVC structure and conduct influence on variables such as honey yield and profits in sustaining markets.

### 3.3 Stakeholder Analysis

Stakeholder analysis is a systematic identification of individuals and organisation with interest in a project or topic (Grimble 1998; Kennon *et al.*, 2010). Stakeholders consisted of those with direct interest because their livelihoods depend on honey (e.g. producers and processors) and indirect interest groups who were concerned with operations of the industry (support institutions and government agencies) (ITC, 2015; Mwongela and Kalaba, 2015). To assist with the initial identification of stakeholders, consultancy reports and publications were reviewed (Mwongela and Kalaba, 2015). Stakeholders were prioritised as either influential or enabling figures in the production and selling of honey and bee products. Influential stakeholders are responsible for daily operations while enablers provide resources to obtain the desired outcome (Kennon *et al.*, 2010). A total of 164 stakeholders were interviewed as followed:

(I) Honey commodity value chain core actors:

1. Producers (local style - 100; modern - 17 and hunters - 5);
2. Processor (1);
3. Transporters (3);
4. Wholesaler (1);
5. Retailers (7); and
6. Consumers (20).

(II) Honey commodity value chain support agencies:

1. Input suppliers (5)
2. Training institution (1)
3. Donor (1)
4. Regulatory authorities (3) (Figure 3.3).

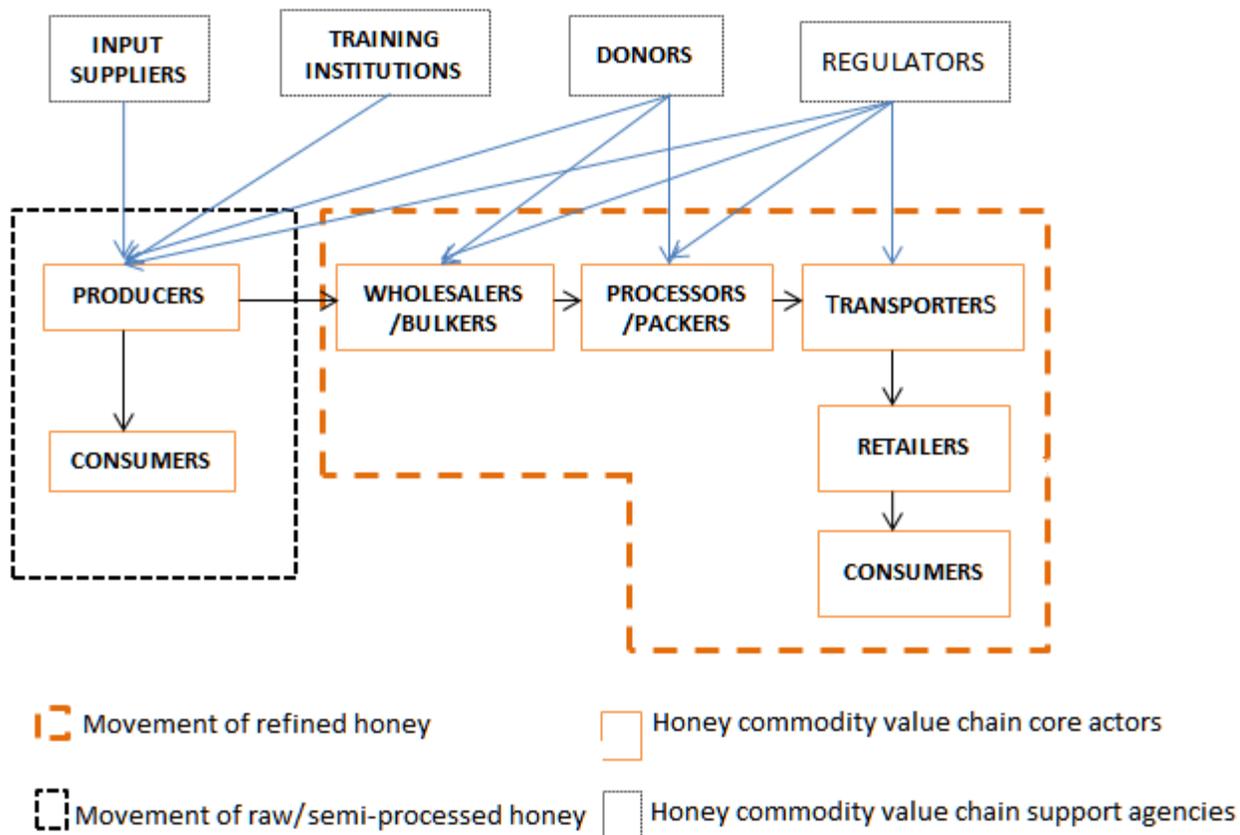


Figure 3.3. Honey industry stakeholder relationships and networks.

### 3.4 Data Collection Techniques and Sampling

Data were collected by means of field surveys (Mouton, 2013). According to Yin (2014), data produced by a survey is inherently statistical in nature and involves inclusion of both open and closed-ended questions in a questionnaire. Survey research is essentially a self-report methodology because respondents are required to provide information regarding themselves that describes their own behaviour, attitudes and opinions in relation to a phenomenon such as honey markets (Babbie, 2001).

This study focused on honey core actors and support agencies as identified in Figure 3.3. Different techniques were used to generate information based on the movement of both raw and refined honey to end markets from the total sample size of beekeepers.

### 3.4.1 Honey Value Chain Core Actors

Individual questionnaires were designed to obtain both quantitative and qualitative information from core actors of the HCVC (Bernard, 2000; Mouton, 2013). The questionnaires consisted of closed-ended questions, which solicited for a single response (for example number of hives) and open-ended questions used to obtain a subjective response or opinion such as the performance of honey markets in relation to the conduct of processors (Babbie, 2001).

A pre-test of questionnaires was conducted in the study areas before the actual survey to review the correctness and errors associated with their design (Babbie, 2001). Pre-testing questionnaires before the main survey is helpful to address many problems including ambiguity of words, misinterpretation of questions and inability to answer a question by respondents (Mouton, 2013). Before pre-testing and the actual survey, two research assistants were trained. The training focused on identification of each component of the HCVC and the types of questions to be administered to meet the objectives of the research study.

In the two study areas data were obtained from core value chain actors using both purposive and cluster sampling (Babbie, 2001). The core actors are producers, wholesalers (bulkers), processors (packers), retailers, transporters and consumers (Mickels-Kokwe, 2006; ITC, 2015; Mwongela and Kalaba, 2015). According to Babbie (2001), purposive sampling is used when units of analysis (individual respondents) possess special experience within a particular work context. Special experience is obtained because such individuals are involved in a particular task, which in this study is the HCVC (Babbie, 2001).

For more than one actor, the second cluster of respondents was reached using a snowball approach, which is an extension of purposive sampling (Babbie, 2001). The sampling process involved asking respondents in the initial cluster to supply names of other participants who also possessed the characteristics of interest to the researcher (Noy, 2007). The snowball method involved drawing sufficient arrows pointing to newly recruited respondents based on the referrals from respondents in the first sample cluster (Urry, 2000; Featherstone *et al.*, 2005) (Figure 3.4).

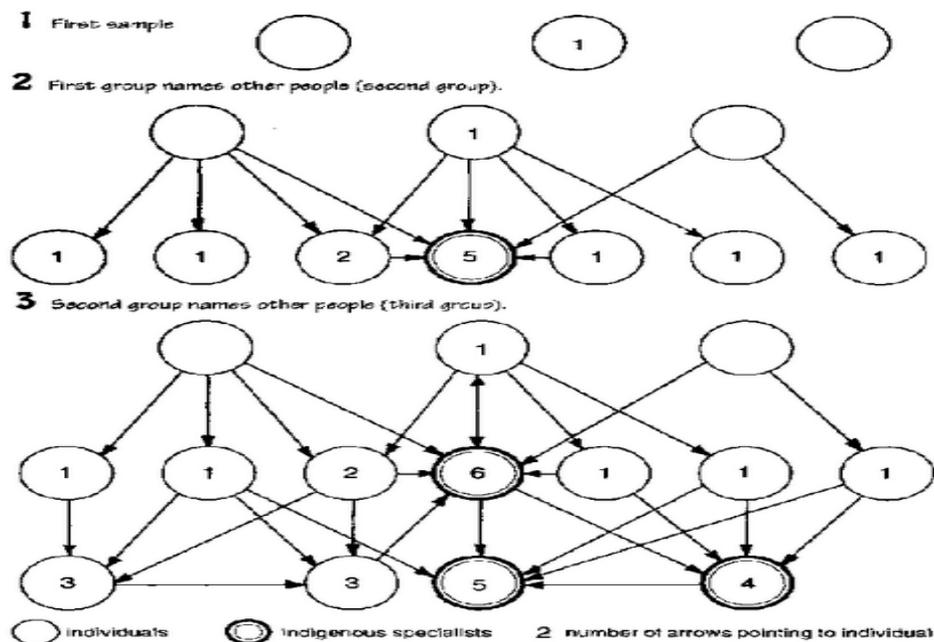


Figure 3.4. Snowball sampling method (Urry, 2000; Featherstone *et al.*, 2005).

### 3.4.1.1 Producers

This study gathered information on three types of producers: local style beekeepers, modern beekeepers and honey hunters (Clauss 1992; Mickels-Kokwe 2006; Husselman *et al.*, 2009). An individual questionnaire was administered to sample respondents from each category (Babbie, 2001). The collected data were on demand and supply of honey on markets, which included operation size, age, gender and experience of producers and flower resources utilised by honeybee colonies (Mickels-Kokwe, 2006; Schweitzer *et al.*, 2013; Chauzat *et al.*, 2013). The number of colonies in the two study areas was calculated from the questionnaires and related to the corresponding amount of honey produced based on a similar study of Schweitzer *et al.*, (2013).

In addition to individual interviews, Focus Group Discussions (FGDs) were held with each of the three categories of producers. The purpose of FGDs was to create a platform for clarification and amendment of grey areas that were otherwise omitted during data collection by means of individual questionnaires (Mouton, 2013). The discussions were facilitated in a participatory manner with the aim of obtaining in-depth details of the issues

surrounding honey markets not limited to honey prices, consumers, sales returns, places where honey was sold and advertising.

In each district the number of local style beekeepers was not clear (Mickels-Kokwe 2006; SNV 2014). Therefore, this research study assumed that the percentage of the population of selected participants could give a positive outcome of 50%, whereby 50% is the estimation of the percentage to use in a sample size of the unknown population (Bryman, 2008). The allowable error of the survey in the unknown population ranges from 1-10% (Noy, 2007).

Therefore, by using the confidence interval of 95% and allowable error of 10% for local style producers, the sample size was calculated using Campbell's (1983) formula cited in Yin (2014).

$$n = \frac{4pq}{l^2}$$

Where;

n = sample size

p = probability of positive outcome (50%) = 0.5

q = probability of negative outcome (1 – p), Which is 50% hence = 0.5

$l^2$  = allowable error = 10%

4 is the Z – value of 95% confidence interval

Therefore;

$$\frac{4 \times 0.5 \times 0.5}{0.1 \times 0.1} = 100 \text{ Local style beekeepers}$$

A cluster of modern beekeepers and honey hunters was drawn from beekeeper registers maintained by the Forestry Departments in Kitwe and Kapiri Mposhi (Mouton, 2013). For each type of producer, a two-way table presenting male and female producers was used to count the number of observations obtained from the questionnaires. The two variables were converted into percentages in order to compare differences in gender among producers

(Babbie, 2001). Types of honeybee flower resources were described by producers based on the level of importance to honeybee colonies (Schweitzer *et al.*, 2013). A producer ranking of the type of floral sources as being of major or minor importance was achieved using a five point Likert scale ranking (1 for very unsatisfied, 5 for very satisfied) (Ghorbani and Khajehroshanaee, 2009).

Average costs of items used in production and supply of honey on markets was determined from the questionnaires (Schweitzer *et al.*, 2013; Masuku, 2013). The costs items included KTB hives, bee veil, boots, white bee overall, transport, labour costs, calico cloth, materials for honey packing such as containers and jar bottles, and taxes (council or company levy). Average sales revenues were also estimated from honey sales offered at different stages of the value chain. The relationship of costs and sales of honey was measured to determine profit or loss of honey enterprise Cost-volume profit (CVP) analysis (Schweitzer *et al.*, 2013; Masuku, 2013; Bakengesa and Kaniki, 2014). In this research study CVP analysis was performed based on the five equations below used in similar studies (Schweitzer *et al.*, 2013; Masuku, 2013; Bakengesa and Kaniki, 2014).

1. Total costs = Total Fixed Cost + Total Variable Costs

2. Honey Sales = Production per year × Price

3. Unit cost of honey (UCH)

$$UCH = \frac{TC}{\text{Total Units of Honey Produced}}$$

Where:

TC = Total Costs

4. Loss / Profit Margin (in units of honey)

$$\text{Loss/ Profit Margin} = \frac{\text{Total Sales} - \text{Total Costs}}{\text{Units of Honey}}$$

## 5. Depreciation using a straight-line method

$$\text{Depreciation Expense: Straight Line Method} = \frac{\text{Depreciable Amount}}{\text{Useful Life}}$$

### **3.4.1.2 Processors /Packers**

Data were collected using an individual processor questionnaire in two study areas (Babbie, 2001). The questionnaire captured questions on methods of cleaning honey from impurities, materials, tools and equipment for separating liquid honey from combs and storage (Schweitzer *et al.*, 2013; Chauzat *et al.*, 2013).

### **3.4.1.3 Transporters**

Transporters were interviewed using an individual questionnaire (Babbie, 2001). The sample individuals were purposively selected after being referred upon by other actors of the HCVC because they owned means of transportation of interest (Urry, 2000; Mouton 2013). Data were collected based on similar studies on mode of transport (via bus, bicycle and light truck and head load), transportation fees per kilogram of honey and haulage (Mickels-Kokwe, 2006; ITC, 2015).

### **3.4.1.4 Wholesalers /Bulkers**

This research study utilised interviews guided by individual questionnaire to explore wholesalers' views on honey markets (Mouton 2013). Data were obtained about honey inventory and quantities obtained from processors, methods of honey packing for supply to retailers cost and selling prices, and transportation among other things (Schweitzer *et al.*, 2013; Chauzat *et al.*, 2013).

### **3.4.1.5 Retailers**

Seven retailers in Kapiri Mposhi and Kitwe were interviewed. Respondents provided information about price of honey, methods of honey display and honey packaging and storage materials (ITC, 2015).

### **3.4.1.6 Consumers**

Consumers were people who derived different values from honey including medicinal, nutritional and as an additive to manufacturing processes in the study area. Twenty consumers (ten from each district) participated in the study. Consumer behaviour in relation to taste preference based on honey characteristics was used (Ghorbani and Khajehroshanaee, 2009; Sobhy, *et al.*, 2014). The aim was to measure the degree of sensitive dispersion between reasons of consuming honey and price (Sobhy, *et al.*, 2014).

In conclusion, the assessment of the honey commodity value chain core actors was done by way of mapping the movement of honey to markets for both Kapiri Mposhi and Kitwe districts respectively. A mind mapping (MM) technique developed as a visual tool was used by initially placing honey markets diagrammatically in the centre (Farrand, 2002). The purpose was to show how honey supply chain combinations of producers and markets are linked by the activities of actors along the chain or intermediaries.

### **3.4.2 Support Agencies**

In-depth interviews were carried out with representatives of supporting agencies to generate information on their role in ensuring performance of honey markets. A structured informant questionnaire was administered during the survey consisting of both closed and open-ended questions (Babbie, 2001). The closed ended responses were used in the statistical analysis while open-ended responses were used in descriptive statistics (Bryman, 2008).

Information was also gathered from support agencies selected purposively (Mouton 2013). Purposive sampling technique is one in which the researcher identifies certain respondents as being potentially able to provide significantly revealing descriptions or data on the research subject (Bryman, 2008).

Furthermore, it can be asserted that a purposive sampling process may seek to identify people who, because of their experience or contacts, have insights into the research questions, in this case beekeeping inputs (Mouton, 2013). These were individuals drawn from input suppliers, training institutions, donors and regulatory agencies (Mickels-Kokwe, 2006; ITC, 2015; Mwongela and Kalaba, 2015).

### **3.4.2.1 Input Suppliers**

Five input suppliers were interviewed to obtain information on types of inputs, their corresponding cost prices, and mode of payment. The relationship between cost of beekeeping gear and total sales revenue per unit of honey produced was used in the examination of Cost Volume Profit analysis (CVP) of honey enterprise (Bakengesa and Kaniki, 2014). By using CVP analysis, unit cost and profit or loss margins were estimated along the HCVC (Masusku, 2013; Bakengesa and Kaniki, 2014).

### **3.4.2.2 Training Institution**

One training institution was included in the survey. Information was collected on the available training to honey value chain players (Mwongela and Kalaba, 2015).

### **3.4.2.3 Donors**

One donor present in both study areas at the time of the research study was interviewed. Data was gathered on available empowerment programs to HCVC actors as identified by Mwongela and Kalaba (2015).

### **3.4.2.4 Regulatory Authorities**

Three regulators were identified who set regulations and standards governing honey production and markets. These institutions were engaged on the movement of honeybee colonies and bee disease control, honey certification, market access and inspection of honey and bee products (ZHPP, 2015; Mwongela and Kalaba, 2015).

## **3.5 Data Analysis**

The study findings on structure, conduct and performance of honey value chain actors (support and core actors), were subjected to quantitative and qualitative analysis (Babbie, 2001; Bernard, 2000; Mouton, 2013).

### **3.5.1 Quantitative Analysis**

Data were converted into numeric equivalents for the purposes of quantitative analyses and statistical testing (Mouton, 2013). The converted data were entered into a prepared template in Microsoft Excel and transported into R commander and STATA<sup>®</sup> software for univariate analyses (Mouton, 2013). Most of the univariate analyses make use of frequency or central tendency distributions (Babbie, 2001; Bernard, 2000; Mouton, 2013). Data is reported in the form of tables, charts, graphs and statistics such as frequencies, means and standard deviations (Babbie, 2001). To test the significant at a 5% significance level if the data were normally distributed or different from another population (s) the Pearson Chi-square test was used (Mouton 2013; Yin, 2014).

### **3.5.2 Qualitative Analysis**

Qualitative analysis focused on the HCVC responses for open-ended questions (Mouton 2013). HCVC actors expressed opinions and statements were analysed for honey industry norms, values, practices and concepts in relationship to markets using central themes to derive an overall explanation (Babbie, 200; Mouton, 2013). Careful consideration was taken not to strip meaning from the transcribed text from the questionnaires (Mouton, 2013). In addition, respondents' views that was similar in responding to one theme or concept was put in one category after comparing for variations and nuances in meaning (Mouton, 2013).

## Chapter 4: Results

### 4.1 Honey Industry of Zambia

This chapter describes the analysis and research findings of data obtained through the methods presented in Chapter three. Results on aspects of conduct, organisation and performance of honey industry stakeholder's activities are presented in relation to the functioning of honey markets.

#### 4.1.1 Demographic Characteristics of Stakeholders

This section describes in general honey industry stakeholders and their major roles. In addition, findings about producer's gender, age and years of experience in relation to honey production are presented.

##### 4.1.1.1 Gender

Most honey producers interviewed were male (85%) while only one male processor, working as a manager at a honey factory, was interviewed. One male wholesaler involved in buying and reselling of honey was interviewed. The majority of retailers were females (67%) while the majority of honey transporters (85%) were male. A larger proportion (85%) of honey consumers were females (Table 4.1).

**Table 4.1. Gender distribution of core stakeholders**

Gender	Producers (n = 122)	Wholesalers (n = 1)	Processors (n = 1)	Retailers (n = 7)	Transporters (n = 3)	Consumers (n = 20)	Total (n=154)
Male	85%	100%	100%	33%	85%	85%	84%
Female	15%	0%	0%	67%	15%	15%	16%
	100	100	100	100	100	100	100

##### 4.1.1.2 Age of Honey Producers

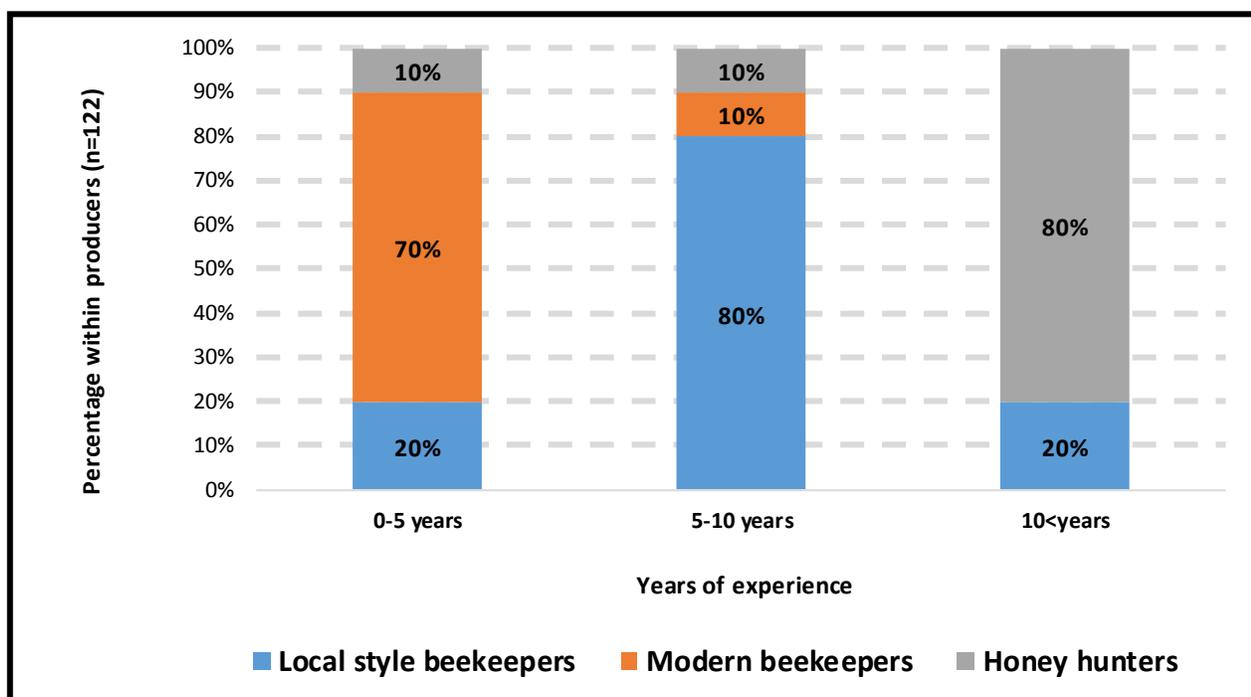
Most of the honey producers interviewed were between the age of 15 to 65 years, with a normal age class distribution around a mean population age of 50 years (Table 4.2).

**Table 4.2. Age distribution of honey producers.**

Age category	Percentage within respondents (n=122)
15-25 years	5%
26-35 years	7%
36-45 years	15%
46-55 years	40%
56-65 years	10%
65< years	5%

#### 4.1.1.3 Producers' Years of Experience

Of the modern beekeepers interviewed 70% were involved in honey production for a period ranging from one month to five years. The majority (80%) of local style beekeepers had been producing and supplying honey to markets for a period ranging from five to ten years, while most honey hunters (80%) had at least ten years of work experience ( Figure 4.1).

**Figure 4.1. Honey producer's years of experience.**

#### 4.1.1.4 Relationship between Age and Type of Beekeeping

Producer's age was related to type of production. Results showed that younger producers (8%) used KTB hives' modern method of beekeeping. Older beekeepers (36 to 65 years)

made use of local style, bark hives while honey hunters were mostly between the ages of 46 to 75 years (Figure 4.2).

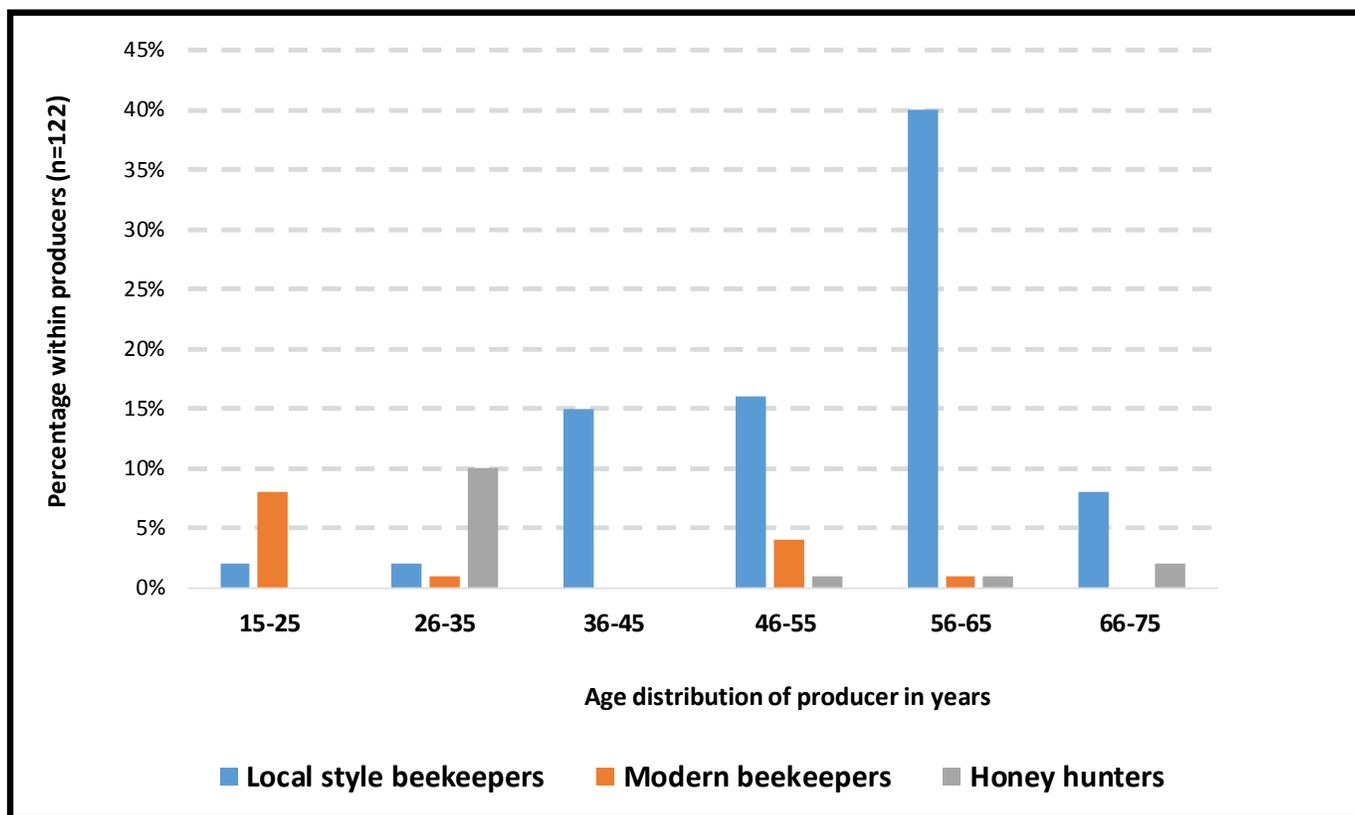


Figure 4.2. Relationship of age and beekeeping method.

#### 4.1.2 Stakeholders' Strategic Activities

Core stakeholders in the honey value chain were producers, wholesalers /bulkers, processors /packers, retailers, transporters and consumers. In the honey sector, these stakeholders can be matched to the following activities: production, processing, transportation, bulk buying, selling and consumption. The observed variations in stakeholder roles and functions showed how important each player was to the delivery of honey to end markets. Producers played for instance, the biggest role in using beekeeping innovations to produce honey but a smaller role in selling, transport and consumption.

Transporters fulfilled no other role outside the transport activity segment while wholesalers were mainly involved in bulk buying and selling and, to a lesser degree, in production and processing (Figure 4.3).

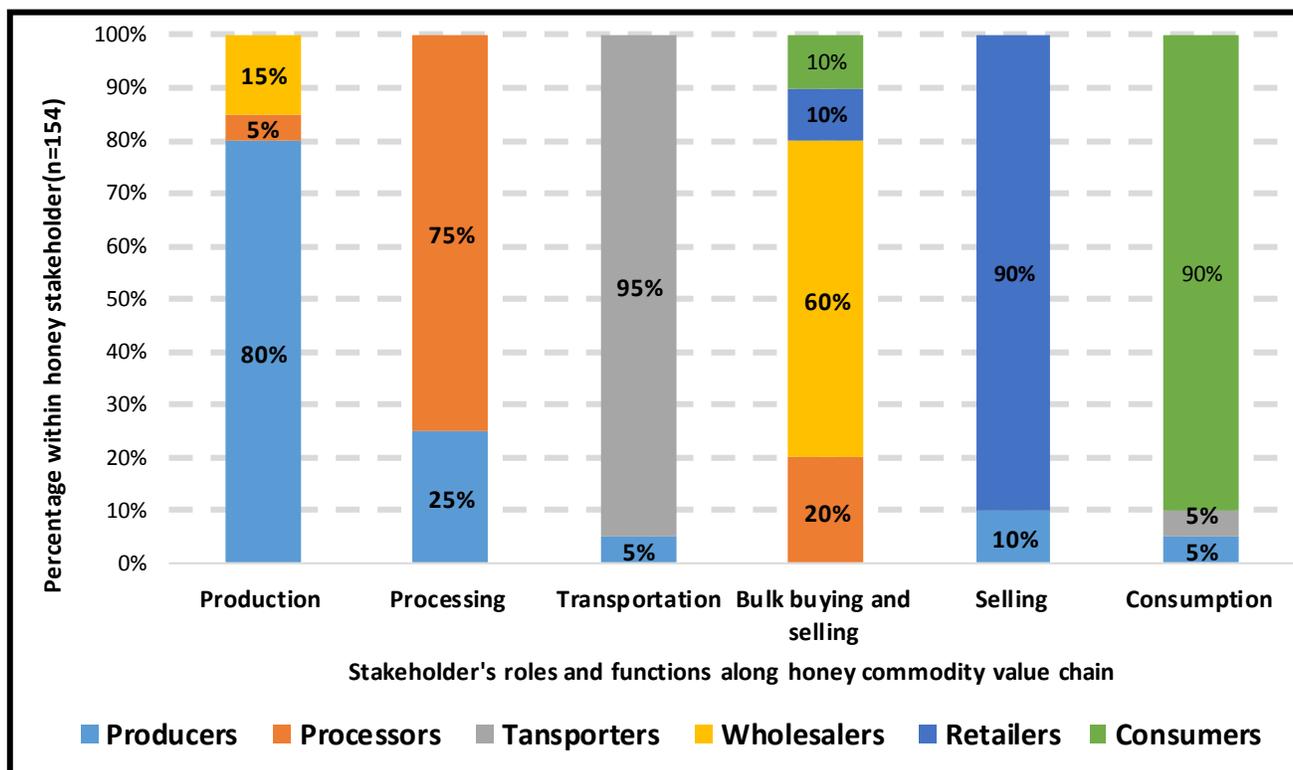


Figure 4.3. Description of core stakeholder's roles and functions.

In the following sections a further analysis of stakeholder's roles and functions is presented in relation to honey market demand and supply.

### 4.1.3 Honey Production

In the production of honey and bee products local style beekeepers and modern beekeepers used technologies to keep honeybees while honey hunters utilised skills and ability to detect feral colonies. Of producers (n = 122) interviewed, local style beekeepers were 83% while 13% were modern beekeepers. Only 4% were honey hunters.

### 4.1.3.1 Characterisation of Honey Producers

An individual was classified as a local style beekeeper when they used locally available materials for keeping honeybee colonies. Examples of locally made hives observed during the survey were from bark, grass, mud, reeds, calabash, and logs. Most of the local style beekeepers (90%) used bark hives harvested from standing trees (n = 100) (Figure 4.4).



**Figure 4.4. Bark hive hanged in a tree for honey production.**

The hives used by those classified as modern beekeepers were constructed based on a specific engineering and carpentry design. The design included specific dimensional measurements of the top bars, frames, sides, base and the top cover. Most (90%) of the identified modern beekeepers (n = 17) used KTB hives (Figure 4.5). The remaining modern beekeepers used either Transitional or Dadant hives.



**Figure 4.5. Kenya Top Bar hive placed on raised timber platforms for honey production.**

Honey hunters are non-professional beekeepers gathering honey from feral colonies in places such as hollow standing trees (Figure 4.6). Study findings showed that honey cropping in naturally occurring wild honeybee colonies was dispersed in location because it only occurred during honey-flow season.



**Figure 4.6. A typical location of a wild honeybee colony in a hollow of standing tree.**

### 4.1.3.2 Factors Influencing Honey Production

A further assessment of honey production was based on determining producers' perceptions regarding factors influencing the amount of honey supplied to end markets. According to respondents, honeybee colony occupation rate (51%), access to technology (33%) and abundance of flowers (16%) were the main factors influencing honey production. None of these factors were significantly more important than the other ( $p > 0.05$ ).

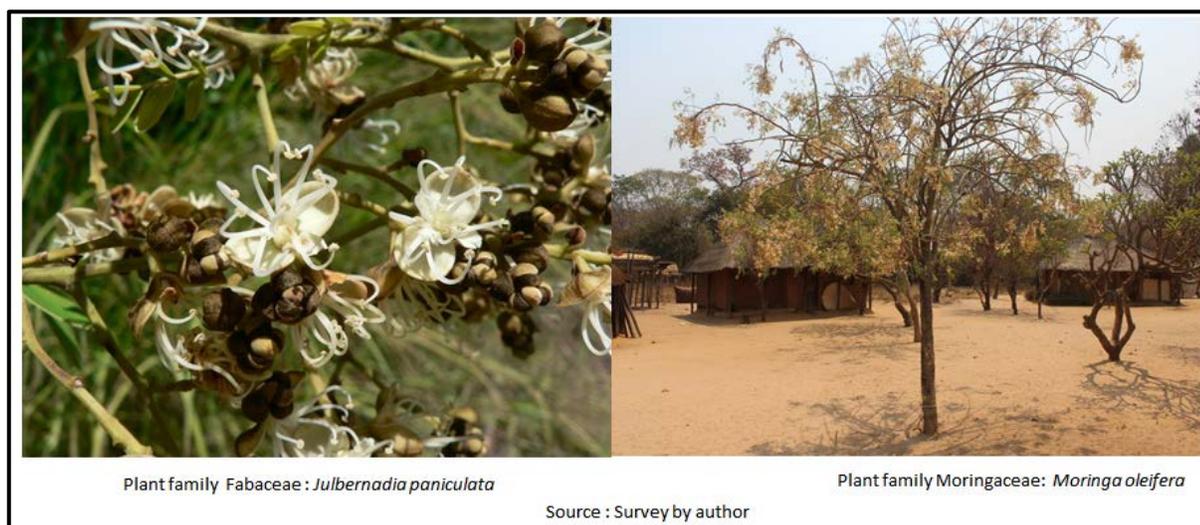
In a focus group discussion both local style and modern beekeepers indicated that KTB hives were more easily occupied by bee colonies than bark hives. In order to test this assertion, equal numbers of hives were randomly selected from the bark and KTB hive group were randomly selected and physically inspected. Results showed that there was a relatively higher but not significantly different ( $p > 0.05$ ) in occupation rate of KTB (60%) compared to bark hive (50%), suggesting a honeybee colony would easily occupy any hive as long as it is suitable for colony development (Table 4.2).

**Table 4.3. Sampled beehives honeybees' occupation rate percentage.**

Type of hive	Number of beehives (n = 10)
KTB	60%
Bark	50%

Results were also obtained on the access to beekeeping technology and showed that initial capital influenced the availability of beekeeping technologies to different categories of honey producers. Of the total number of producers ( $n = 122$ ) interviewed, 83% were relegated to using bark hives due to among other reasons capital deficiencies. Only 13% utilised KTB while the remainder (4%) did not own any form of hives because they were honey hunters. In line with this observation, beekeepers ( $n = 117$ ; local and modern) were asked about the method of procuring beekeeping tools and materials. Most (47%) exchanged honey for materials in a barter system, 35% made use of free government grants and only 18% paid cash for tools and materials. There was no significant difference between the methods used to acquire capital items ( $p > 0.05$ ).

Availability of flower resources utilized by honeybee colonies also affects honey production and subsequently honey supply on the market. The majority of producers (80%) said that when flowers of Miombo woodland trees are blooming, there is an equal response in the amount of honey harvested. There was a significant difference ( $p < 0.05$ ) in the importance of flowering species used by honeybees. Most beekeepers (60%) indicated that miombo trees species such as *Brachystegia* and *Julbernardia*, were very important for honey production while 30% also identified other trees such as *Chryptosepalum exfoliatum* and *Parinari curatellifolia*. A small number of beekeepers (10%) identified exotic trees such as *Mangifera indica* and *Moringa oleifera* as important sources of nectar (Figure 4.7).



**Figure 4.7. Natural flowers of *Julbernardia* spp. (left) and planted flowers of *Moringa oleifera*. (right).**

Availability of flowers was linked to seasons of the year when the identified trees bloom. Major nectar and pollen producing tree species flower in the first (January to March) and last quarter of the year (October to December). For the remaining seasons of the year, colonies depended on planted plants, agricultural crops, grasses and food supplements from beekeepers (Figure 4.8).

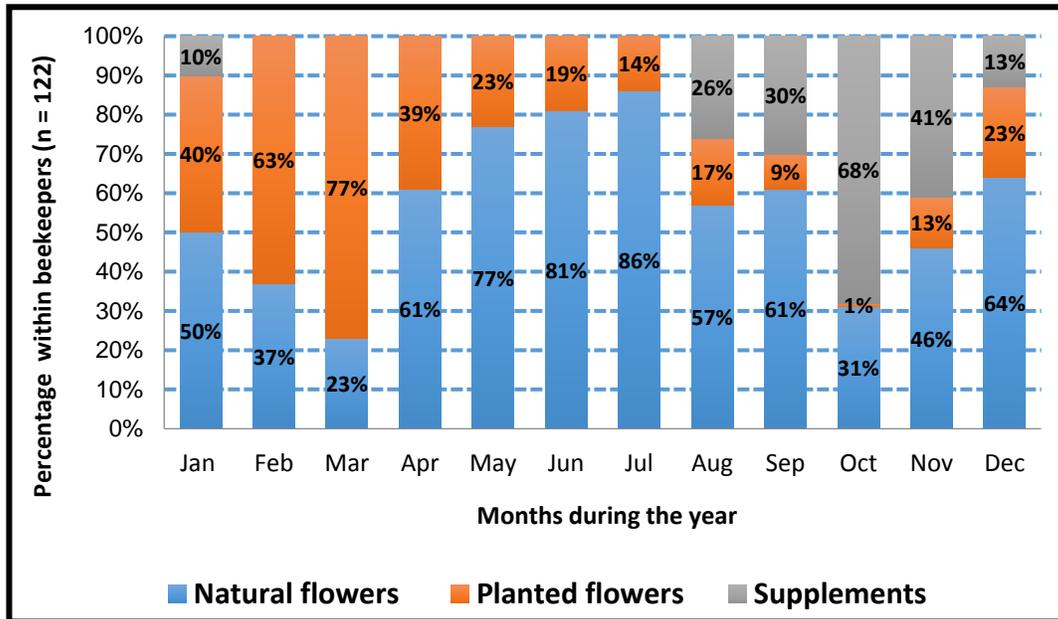


Figure 4.8. The four seasons of the year affecting flower abundance and honey production.

Beekeepers (n = 117) were interviewed about possible interventions to manage the starvation of honeybee colonies (dearth period) when the trees are out of flowers. Beekeepers responses and expressions were captured as verbatim and presented below:

- “We do nothing because we want our production to be natural.”
- “We provide sugar syrup made from dissolving cane sugar into water.”
- “We give powder meal made from cereals such as cassava, maize, and ”
- “We give them honey from the previous harvest.”

Honey handling in the Kapiri Mposhi and Kitwe districts was influenced by the organizational structure of the HCVC stakeholders. From the mind mapping exercise, it was established that the value chains in the two districts differ.

In Kapiri Mposhi district the 100 local style beekeepers interviewed used bark hives and operated as individual beekeepers. These beekeepers sold honey directly to roadside retailers while in Kitwe, the 17 modern beekeepers belonged to the Mwekera Multipurpose Beekeeping Cooperative and operated as a producer group. Modern beekeepers

surrendered honey combs for further value addition to processors along the value chain. The operations of the two types of beekeepers based on two routes to markets were an important phenomenon identified in this study. A comparison was made between them to establish which route influenced markets in terms of maximising value at the least possible costs to customers (Figure 4.9).

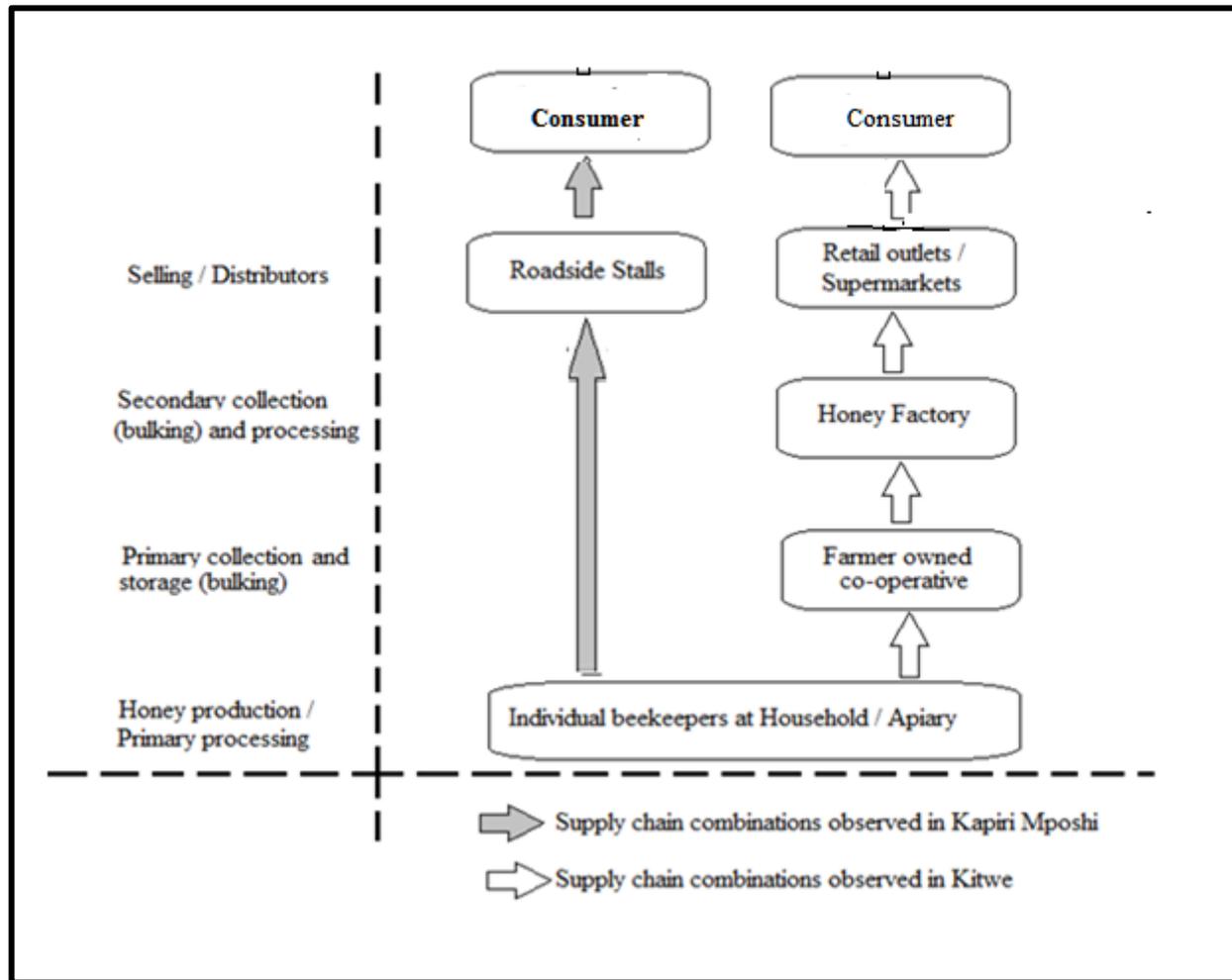


Figure 4.9. Kapiri Mposhi and Kitwe districts' value chains.

#### 4.1.4 Honey Processing

Honey processing was an extension of production by individual beekeepers in Kapiri Mposhi. Processing activities were done haphazardly without any defined procedure by individual beekeepers. It was however, possible to evaluate processing activities based on cleaning, grading, sieving and filtering for the 100 local style beekeepers. The calculated

average farm gate price for comb honey in Kapiri Mposhi district was K8 per kilogram while processed liquid honey was K25 per litre. In Kitwe honey was bought from modern beekeepers as crushed or semi-processed combs at farm gate price of K12 per kilogram and passed through a refining process at the honey processor facility (Figure 4.10).



**Figure 4.10. Crushed or semi-processed honey ready to be sold to processors.**

Processing operations involved four major stages:

- a) *Honey pressing* – Crushed comb honey was packed in a calico filter cloth and pressed under a high centrifugal force in a centrifuge tank or human pressure using manual hand press;
- b) *Removal of waste* - Straining of honey using a strainer to remove physical contaminants. Seven physical contaminants removed from honey during the cleaning process in order of ranking were dead bees (Table 4.4)
- c) *Honey settling* - Liquid honey was made to stand in a storage container for 24 hours before bottling; and
- d) *Skimming* – Sediment and air bubbles were skimmed off the honey before bottling

**Table 4.4. Physical contaminants found in honey during processing.**

Major physical contaminant	Per cent	Rank
Dead bees	39%	1
Bess wax	20%	2
Leaves	11%	3
Brood	10%	4
Wood chips	9%	5
Bee body parts	8%	6
Stones	3%	7
<b>Total %</b>	<b>100</b>	

Other issues not directly related to honey product characteristics but important to processing were the use of obsolete equipment (62%), unsustainable honey inventory because of the failure of producers to honour sale agreements (36%) and incidences of the buckets provided by the processors to producers as part of quality control process being lost (2%).

After processing and packing, processors hired transporters to convey honey to different markets dominated by wholesalers. The average price per litre of processed honey by processors sold to wholesalers spiked higher from K12 at producer level (for honey combs) to K51.14 due to the value addition process for liquid honey.

#### **4.1.5 Transporting Honey**

Honey was transported in three types of containers for both the shorter Kapiri Mposhi and longer Kitwe beehive to market routes. Most transporters (57%) utilised 20 litres closed containers, 34% used buckets closed with a lid and only 9% used cartons of jar bottles.

For Kapiri Mposhi district, local style beekeepers transported honey either as head load or on bicycles, while in Kitwe district, honey was conveyed as comb honey using hired trucks by wholesalers. Most transporters (65%) in the study areas were bicycle owners, followed by people carrying on their heads (29%) and a few (6%) hiring buses and vehicles.

### 4.1.6 Honey Buying and Reselling

A wholesaler bought processed honey for resale to retailers in supermarkets in Kitwe. The wholesaler average price for honey was K67.5 per litre an increase from K51.14 processors' price. The difference was attributed to the added mark-up value due to handling costs incurred by a wholesaler by offloading the honey to retailers.

### 4.1.7 Honey Selling

In Kitwe, retail outlets such as supermarkets sold refined honey at an average price of K78.14 per litre. The typical container was a 500 g jar bottle with a product label. In Kapiri Mposhi the average retail price for liquid honey by roadside traders was K40 per litre. Liquid honey was sold after repacking in 2.5 litres containers bought from Kifco Packaging Manufacturers in Kabwe district. The trading place was an open area, 20 meters from the roadside into the road reserve. The operations were marked by the presence of honey in unbranded 2.5 litres plastic containers displayed in direct sunlight (Figure 4.11).



Figure 4.11. A typical honey road stall at Luanshimba in the Kapiri Mposhi district.

#### 4.1.7.1 Constraints Related to Honey Selling

The main honey selling constraints reported by retailers were price competition from other sweeteners such as cane sugar (50%); crystallisation of honey (23%) and poor access to quality packaging (14%). Other problems were selling honey in identical packaging to competitors due to lack of labelling (9%) and inconsistent supply of preferred honey by producers (4%) (Table 4.5).

**Table 4.5. Market challenges experienced in two study areas**

<b>Challenges encountered</b>	<b>Percentage of retailers (n = 7)</b>
Honey is expensive compared to cane sugar	50%
Problem with honey crystallisation	23%
Poor quality packaging materials not of food grade	14%
Identical display with inadequate labelling of honey	9%
Inconsistent honey market supply for preferred honeys	4%

#### 4.1.7.2 Opportunities of Honey Selling

Retailers reported that opportunities included easy entry into the market regardless of the way honey was packaged (42%) and lucrative profits (38%) associated with selling honey out of season because of its self-preserving characteristics. Therefore, some traders interviewed (20%) said the longer shelf life of honey was an opportunity associated with self-preserving characteristics was an opportunity (Table 4.6).

**Table 4.6. Opportunities of the honey industry**

<b>Reason for opportunities in honey market</b>	<b>Proportion of retailers (n = 7)</b>
Easy entry in the market and assured market share in whatever form honey is presented to consumers	42%
Higher profit paid to processors by markets	38%
The self-preserving properties of honey was an opportunity for retailers to sell it at higher profit margin when honey is in short supply	20%

## 4.1.8 Honey Consumption

### 4.1.8.1 Honey Utilisation Values among Consumers

Consumption of honey was assessed focusing on utilisation values among consumers in the study areas. Of the people interviewed (n = 20), honey was utilised for brewing a local beer “*Imbote*” (39%), bread spread (22%), sweetener in beverages (20%) and 19% used it for medication (High /low blood pressure, diabetes skin moisturizer, acne removal, cough remedy, snake bites, dog bites, burns and flu treatment). There was no significant difference ( $p > 0.05$ ) in the utilisation importance of honey (Table 4.7).

**Table 4.7. List of common honey utilisation values**

Purpose for honey use	Proportion of consumers (n = 20)
Local Beer	39%
Bread Spread	22%
Sweetener (Tea/Porridge)	20%
Medicine	19%

### 4.1.8.2 Honey Taste and Preferences

Different attributes influenced consumer preference for honey. Consumers said they would buy the honey when its quality is good (20%), properly packaged (18%), priced right (17%), pure (13%), good brand name (9%) organic (8%), natural (7%), good colour (5%), good taste (2%) and display of expiry date (1%) (Table 4.8).

**Table 4.8. Consumer honey taste and preferences.**

Honey Characteristic	Proportion of consumers (n = 20)
Quality honey	20%
Packaging	18%
Price	17%
Honey purity	13%
Brand name	9%
Organically produced	8%
Naturalness without additives	7%
Colour	5%
Taste	2%
Display of expiry date	1%

### 4.1.9 Support Agencies

Support agencies were outside the core value chain in the two study areas. Their role and functions were to facilitate and influence activities of the core value chain actors in the delivery of honey and bee products at different markets. Four categories of support agencies were reported among the core value chain actors (n = 154) as people who helped them to fulfil their mandates to produce, process, transport, buy, sell and consume honey and bee products. These were donors, input suppliers, training institutions and regulators. However, among the core value chain actors there was no mention of banks and micro financial institutions providing financial services to the sector (Table 4.9).

**Table 4.9. Type and distribution of support agencies mentioned by respondents in Kapiri Mposhi and Kitwe.**

Donors	Input suppliers	Training institution	Regulators	Total
(n = 1)	(n = 5)	(n = 1)	(n = 3)	(n=10)

The core groups' identification of support agencies was based on the type of support provided to them in sustaining honey markets. Major roles were authorisation, training, input supply and financial aid to the HCVC actors (Table 4.10).

**Table 4.10. Support agencies roles and functions.**

Support Agency	Critical functions and roles reported amongst core stakeholders
Regulators	Special authorization through legal instruments (e.g. ACT) Trade and market linkages Control of honeybee diseases
Donors	Finances for inputs and training to producers and processors
Training Institutions	Research and development Training of the HCVC players
Input suppliers	Selling of beekeeping gear

## 4.2 Honey Production Costs, Revenues and Profits

This section will focus on the analysis of revenue, costs and profits of the Kapiri Mposhi and Kitwe districts' value chains as illustrated in Figure 4.9.

### 4.2.1 Colony Size and Honey Yield

Honeybee colony size and honey yield was assessed between two types of beekeepers on the shorter beehive to market route in Kapiri Mposhi and longer beehive to market route in Kitwe (Table 4.10). Kapiri Mposhi was dominated by local style beekeepers that used bark harvested from trees to keep honeybee colonies. In contrast, all beekeepers in Kitwe were modern style with KTB hives.

The number of colonies kept by local and modern style beekeepers varied (Table 4.11). On average local style beekeepers in Kapiri Mposhi kept significantly more honeybee colonies (61 colonies per beekeeper) compared to modern beekeepers (15 colonies per beekeeper) in Kitwe ( $P < 0.05$ ).

**Table 4. 11. Number of honeybee colonies maintained by beekeepers.**

Statistics	Honeybee Colonies	
	Bark	KTB
Mean	61	15
SD	72	7
Minimum	3	3
Maximum	360	29
N	100	17
p-value	<0.05	

For the observed average number of bark hives (61 colonies per beekeeper) the average corresponding honey yield was 136.82 kilograms per annum (two honey flow seasons). The average honey yield for modern beekeepers utilising KTB hives (15 colonies per beekeeper) was 560 kilograms per annum (Table 4.12). The amount of honey produced per season from an average of 15 KTB hives was significantly more ( $p < 0.05$ ) than that produced from an average of 61 bark hives. For each bark hive 2.24 kilograms was harvested compared to 37.33 kilograms from KTB hives.

**Table 4.12. Comb honey yield (kg) from bark and Kenya Top Bar hives.**

Statistics	Comb honey in kilogramme	
	Bark	KTBH
Mean	136.82	560
SD	56	82
Minimum	2	50
Maximum	232	408
N	100	17
p-value	<0.05	

## 4.2.2 Kapiri Mposhi Value Chain Costs, Revenues and Profits

The findings presented in this section are on honey production items and total honey sales along the Kapiri Mposhi value chain. The purpose was to examine total cost, unit cost, profits and profit margins based on the short beehive route to markets. Results are presented with a focus on the distribution of costs, revenues and profits along the value chain.

### 4.2.2.1 Producer Costs, Revenues and Profits

Producer costs, revenues and profits analysis focused on types of beekeeping in relation to colony sizes and honey yield (refer to table 4.11 and 4.12). Producer's income obtained from total sales of comb honey at K8/kg was K1 094.56. Total production costs (Sum of Fixed and Variable Costs) of labour, transport, bee veils, boots and overalls was K736.16. If all comb honey was sold by producers, the total profit of K358.40 was obtained. Cost per unit was K 5.38 /kg while profit per kilogram of honey was K2.62 (Table 4.13).

### 4.2.2.2 Processor Costs, Revenues and Profits

There was no formal processor observed in Kapiri Mposhi because producers had the choice to either sell honey as comb (at a profit of K2.62/ kg) or process it into liquid honey and sell directly to roadside traders. However, in instances where honey was processed, they incurred additional costs and a loss in product quantity when converting honey combs into liquid honey. This study showed that comb honey recovery rate was 650 ml (65%) of liquid honey per kilogram. If the same average amount of comb honey (136.82 kg) was processed, at 65% recovery rate, liquid honey yield was 88.9 litres (136.82 X 0.65) per year.

Liquid honey was sold at K25 /litre thus generating a total revenue of K2 222.50 for the 88.9 litres of honey produced. From this amount the total profit was K1 033.60 after incurring total costs of K1 188.90. Unit cost was K13.37 /litre, while profit was K11.62 /litre (Table 4.14).

#### **4.2.2.1 Transporters**

Transporters in Kapiri Mposhi considered the honey transportation business as an occasional occurrence tied to two honey flow seasons. Therefore, it was not a major focus of their transportation business. To transport a kilogram of comb honey, a fee of K0.25 was paid by producers to transporters (included in the producer costs, revenue and profits in Table 4.13.).

#### **4.2.2.2 Retailer Costs, Revenues and Profits**

The 88.9 litres of honey bought at K25.00 by roadside traders at the Luanshimba honey market in the Kapiri Mposhi district was resold at a mark-up price of K40.00 to generate total revenue of K3 556. From this a total profit of K1 188.50 was obtained after spending K2 367.50. The unit cost of honey was K26.63/litre and profit K13.37/litre (Table 4.15).

**Table 4.13. Producer Costs, Revenues and Profits for Kapiri Mposhi.**

Cost items <sup>2</sup>	Unit Measure <sup>3</sup>	Total Units <sup>4</sup>	Unit Cost (ZMW) <sup>5</sup>	Total Capital Cost (ZMW) <sup>6</sup>	Life Span (Years) <sup>7</sup>	Depreciation (Years) <sup>8</sup>	Total Cost (ZMW)
A. Total Honey Sales	Kilogram per year	136.82	8.00				1 094.56
<b>B1. Fixed Costs</b>							
Bark Hive	Per piece	61	-				-
Bee Veil	Per piece	1	36.00	36.00	5	7.20	7.20
Boots	Per pair	1	45.00	45.00	5	9.00	9.00
White Bee Overall	Per piece	1	60.00	60.00	2	30.00	30.00
<b>B2. Variable Costs</b>							
Transport	Kilogram per year	136.82	0.25.				34.21
Labour Costs	Per hive	61	10.75				655.75
<b>Total Costs</b>							<b>736.16</b>
<b>Unit Costs of Honey /Kg</b>							<b>5.38</b>
<b>Profit / Loss Margin/Kg</b>							<b>2.62</b>

<sup>2</sup>Cost items are revenues and expenditures that were recognised for that fiscal year in two study areas.

<sup>3</sup>Unit is the most basic element of measurement on which estimates of revenues and costs were based for an average HCVC actor.

<sup>4</sup>Total units estimate the number required for the size of production based on study findings.

<sup>5</sup>Unit cost is the cost in Zambian Kwacha at the time which was 1US\$ = ZMW13.90.

<sup>6</sup>Total capital cost were one-off expenditures on beekeeping gear reported by respondents required to set up an enterprise.

<sup>7</sup>Life span was the reported number of years for which a particular beekeeping gear was useful for production.

<sup>8</sup>Depreciation was estimated using a straight-line method to allocate cost evenly throughout the useful life of a beekeeping gear.

**Table 4.14. Processing Costs, Revenues and Profits for Kapiri Mposhi.**

Cost items	Unit Measure	Total Units	Unit Cost (ZMW)	Total Capital Cost (ZMW)	Life Span (Years)	Depreciation (Years)	Total Cost (ZMW)
A. Total Honey Sales	Litres per year	88.9	25.00				2 222.50
Harvesting Costs (table 4.12)	Kilogram per year	136.82	5.38				736.16
Calico Cloth	Per 5 meters	1	29	29.00	2	14.50	14.50
20 litres Containers	Per piece	16	54.78	876.48	2	438.24	438.24
<b>Total Production Costs</b>							<b>1 188.90</b>
<b>Unit Costs of Honey /Litre</b>							<b>13.37</b>
<b>Profit / Loss Margin /Litre</b>							<b>11.62</b>

**Table 4.15. Retailing Costs, Revenues and Profits for Kapiri Mposhi.**

Cost items	Unit Measure	Total Units	Unit Cost (ZMW)	Total Cost (ZMW)
Liquid Honey Sales	Litres per year	88.9	40	3 556.00
Taxes (council or company levy)	Per month	6	5	30.00
Liquid Honey Purchases	Litres per year	88.9	25.00	2 222.50
2.5 litre Containers	Per piece	23	5	115
<b>Total Costs /Litre</b>				<b>2367.50</b>
<b>Unit Costs of Honey /Litre</b>				<b>26.63</b>
<b>Profit / Loss Margin /Litre</b>				<b>13.37</b>

### 4.2.2.3 Consumers

Consumers utilised honey for different values in Kapiri Mposhi value chain. The average consumer price for liquid honey was K40 per litre.

### 4.2.2.4 Unit Cost and Profit / Loss along Kapiri Mposhi Value Chain

The Kapiri Mposhi value chain summary to show unit cost and profit /loss along the value chain is summarised in Table 4.16.

**Table 4.16. Unit costs and loss / profit margins along the Kapiri Mposhi value chain**

Value chain stages	Producer	Processor	Transporter	Wholesaler	Retailer	Consumer
<b>Unit Cost</b>	5.38	13.37	-	-	26.63	40
<b>Profit /Loss Margin</b>	2.62	11.62	0.25	-	13.37	-

## 4.2.3 Kitwe Value Chain Costs, Sales and Profits

The findings on costs, revenues and profits presented in this section are related to honey production items and total honey sales along the Kitwe value chain. The Kitwe value chain contained more elements than the Kapiri Mposhi value chain (Figure10).

### 4.2.3.1 Producers Costs, Revenues and Profits

Producer costs, revenues and profits analysis focused on types of beekeeping in relationship to colony sizes and honey yield (refer to table 4.10 and 4.11). This study showed that Kitwe apiaries dominated by modern beekeepers produced on average 560 kg of comb honey per

year, which was sold at K12 /kg to obtain a revenue of K6 720 /beekeeper. The total costs for producing comb honey were K5 058.85, yielding a total profit of K1 661.15. The unit cost was K9.03 /kg and profit K2.97 /kg (Table 4.17).

#### **4.2.3.1 Processor Costs, Revenues and Profits**

In the Kitwe route to markets, a higher recovery rate of liquid honey from comb honey was observed at a processor facility than at Kapiri Mposhi. Results showed that one-kilogram of comb honey, equated to 800 ml of honey (80% recovery). Therefore, based on the assumption that one modern style producer sells on average 560 kg of comb honey per year to a single processor at a recovery rate of 80%, the total amount of honey was 448 litres. The total costs of processing 448 litres were K19 880.24 and honey was sold at K51.14/litre to generate total revenue of K22 910.72. The total profit obtained by processors was K3 030.48. In addition, the unit cost was K44.38 /litre while the profit margin was K6.76 /litre (Table 4.18).

#### **4.2.3.3 Transporters**

Transporters in Kitwe also charged K0.25/ kg to transport honey. This was the amount paid by the rest of stakeholders along the HCVC and was treated as a variable cost and included in the processing costs.

#### **4.2.3.4 Wholesaler Costs, Revenues and Profits**

In Kitwe, assuming that the wholesaler bought all the honey (448 litres) supplied by the processor for resale to retailers, a total profit of K1 986.16 was obtained. Results showed that the total profit was generated at a total cost of K24 893. 84 while unit costs were K55.56 /litre and profit K4.43 /litre (Table 4.19)

**Table 4.17. Production Costs, Revenues and Profits for Kitwe**

Cost items	Unit Measure	Total Units	Unit Cost (ZMW)	Total Capital Cost (ZMW)	Life Span (Years)	Depreciation (Years)	Total Cost (ZMW)
A. Total Honey Sales	Kilograms per year	560	12				6 720.00
<b>B1. Fixed Costs</b>							
Kenya Top Bar Hive	Per piece	14	130.00	1,820.00	5	364.00	364.00
Bee Smoker	Per piece	1	70.00	70.00	5	14.00	14.00
Hive Tool	Per piece	1	9.18	9.18	5	1.84	1.84
Swarm Box	Per piece	1	56.67	56.67	5	11.33	11.33
Bee Wax	Per 14 hives	1	4.98	4.98	5	1.00	1.00
Bee Veil	Per piece	1	32.20	32.20	2	16.10	16.10
Bee Gloves	Per piece	1	12.60	12.60	2	6.30	6.30
Bee Brush	Per piece	1	6.67	6.67	2	3.34	3.34
Boots	Per piece	1	72.78	72.78	2	36.39	36.39
White Bee Overall	Per piece	1	67.67	67.67	2	33.84	33.84
<b>B2. Variable Costs</b>							
Transport	Kilogram per year	560	0.25	140			140.00
Labour	Per hive	14	316.48	4430.72			4 430.72
<b>Total Costs /Kg</b>							<b>5 058.85</b>
<b>Unit Costs of Honey /Kg</b>							<b>9.03</b>
<b>Profit / Loss Margin /Kg</b>							<b>2.97</b>

**Table 4.18. Processing Costs, Revenues and Profits for Kitwe**

Cost items	Unit Measure	Total Units	Unit Cost (ZMW)	Total Capital Cost (ZMW)	Life Span (Years)	Depreciation (Years)	Total Cost (ZMW)
A. Total Honey Sales	Litres per year	448	51.14				22 910.72
<b>B1. Fixed Costs</b>							
Honey Press	Per piece	1	370	370.00	10	37.00	37.00
Honey Storage Tanks	Per piece	1	560	560.00	10	56.00	56.00
Calico Cloth	≠ Per 5 meters	2	29	58.00	2	29.00	29.00
Bucket with Lid	Per piece	16	54.78	876.48	2	438.24	438.24
<b>B2. Variable Costs</b>							
Comb Honey Purchases	Kilogram per year	560	12				6 720.00
Processing Plant Employee	6 months (2 seasons)	6	800				4 800.00
Factory Manager	6 months (2 seasons)	6	1200				7 200.00
Electricity	Tariff /month	6	100				600.00
<b>Total Costs /Litre</b>							<b>19 880.24</b>
<b>Unit Costs of Honey /Litre</b>							<b>44.38</b>
<b>Profit / Loss Margin /Litre</b>							<b>6.76</b>

**Table 4.19. Buying and Reselling Costs, Revenues and Profits for Kitwe**

Cost items	Unit Measure	Total Units	Unit Cost (ZMW)	Total Cost (ZMW)
<b>Liquid Honey Sales</b>	Litres per year	448	60	26 880.00
Taxes (council levy, company)	Per month	6	5	30.00
Honey Shop (Rent)	Per month	6	50	300.00
<b>Variable Costs</b>				-
Liquid Honey Purchases	Litres per year	448	51.14	22 910.72
500g Jar Bottles	Per piece	896	0.6	537.60
Marketing (Labels)	Per piece	896	1.12	1 003.52
Transport	per liter	448	0.25	112.00
<b>Total Costs /Litre</b>				<b>24 893.84</b>
<b>Unit Costs of Honey /Litre</b>				<b>55.56</b>
<b>Profit / Loss Margin /Litre</b>				<b>4.43</b>

#### 4.2.3.5 Retailer Costs, Revenues and Profits

Retail shops sold honey at K78.14 per litre to generate a total revenue of K35 006.72, which translated to a total profit of K2 696.72. The total costs of selling were K3 2310 at a unit cost of K72.12/litre and a profit of K6.02/litre (Table 4.20).

**Table 4.20. Retailing Costs, Revenues and Profits for Kitwe**

Cost items	Unit Measure	Total Units	Unit Cost (ZMW)	Total Cost (ZMW)
Liquid Honey Sales	Litres per year	448	78.14	35 006.72
Taxes (council levy, company)	Per month	6	5	30.00
Honey Shop (Rent)	Per month	6	50	300.00
<b>Variable Costs</b>				-
Liquid Honey Purchases	Litres per year	448	60	26 880.00
Shopkeeper	Per month	6	800	4 800.00
Electricity	Per month	6	50	300.00
<b>Total Costs /Litre</b>				<b>32 310.00</b>
<b>Unit Costs /Litre</b>				<b>72.12</b>
<b>Profit / Loss Marg /Litre in</b>				<b>6.02</b>

#### 4.2.3.6 Consumers

Consumers utilising honey for different values in Kitwe value chain. This study revealed consumers paid an average price of K78.14 per litre of honey.

#### 4.2.3.7 Unit Cost and Profit / Loss along Kitwe Value Chain

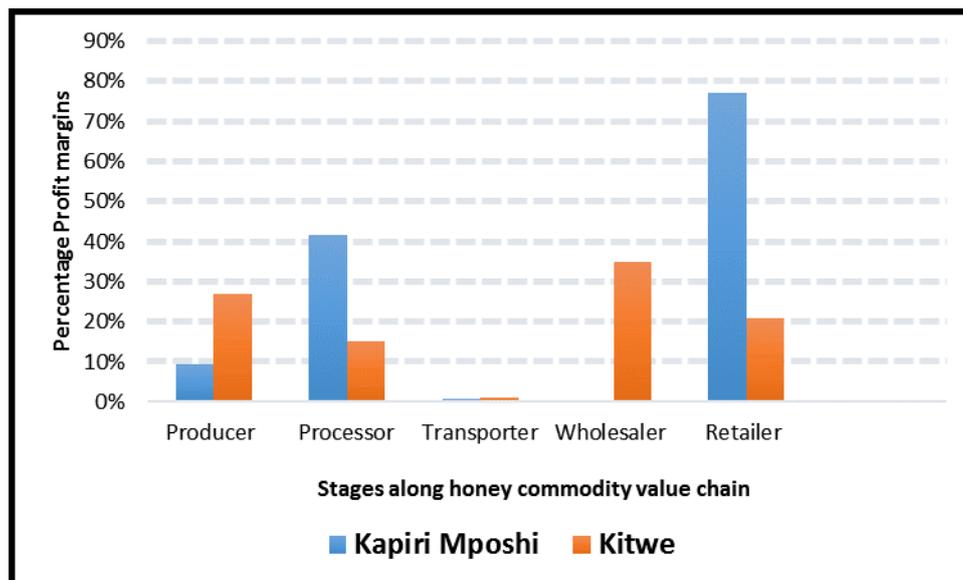
The summary of the Kitwe value chain to show unit cost and profit /loss along the value chain is tabulated below (Table 4.21).

**Table 4.21. Unit costs and loss / profit margins along Kitwe value chain**

Value chain stages	Producer	Processor	Transporters	Wholesaler	Retailer	Consumer
<b>Unit Cost</b>	9.03	44.38	-	55.56	72.12	78.14
<b>Profit /Loss Margin</b>	2.97	6.76	0.25	4.43	6.02	-

### 4.3 Distribution of Costs and Profits along Kapiri Mposhi and Kitwe Value Chains

Profit margin percentages share rewarded to stakeholders in the two honey value chains differed. Total income (difference in kilograms of total honey sales and total cost) for Kitwe producers was more (K1 661.50) than Kapiri Mposhi (K358.40) because of higher honey volumes. In addition, Kitwe profit margin per litre of honey was distributed across all the stakeholders, with greater share obtaining at wholesaler stage (35%) and lowest to transporters (1%). In Kapiri Mposhi a higher profit margin (77%) per litre of honey was distributed to retailers than beekeepers (13%) compared to the producers at Kapiri and Kitwe on total income (Figure 4.12).

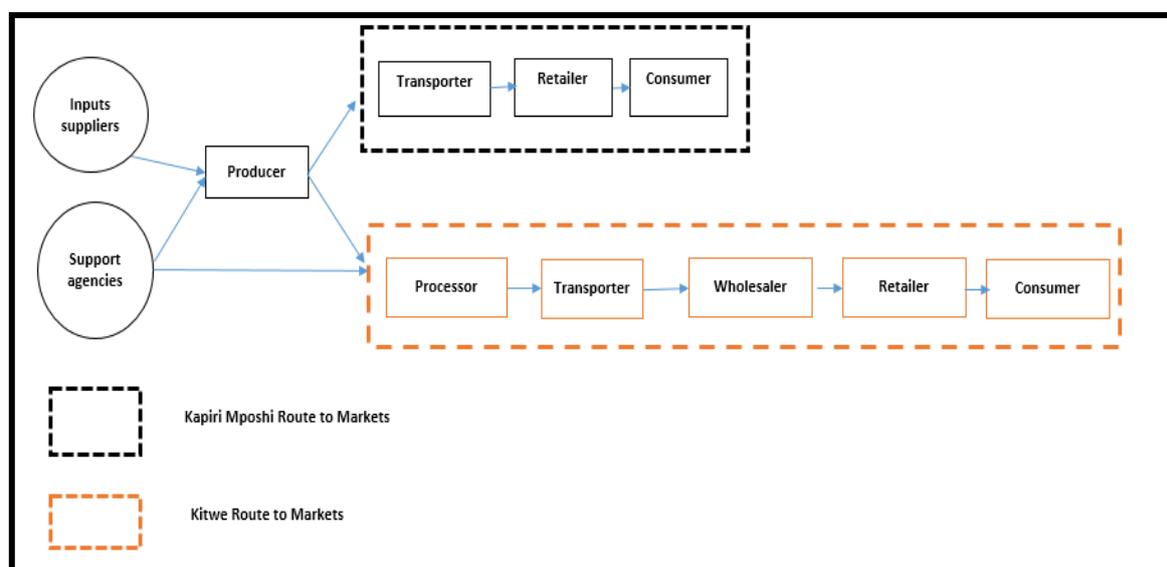


**Figure 4.12. Profit margin percentage distribution along the two value chains.**

## Chapter 5: Discussion

### 5.1 Zambia's Honey Value Chains to Markets

This research study assessed annual activities in the apiaries dominated by local style beekeepers in Kapiri Mposhi and modern beekeepers in Kitwe districts respectively. The study took place in the main honey flow season of April to June 2015 and minor honey flow season of December 2015 to February 2016. The first objective was to identify activities conducted by different actors in the two honey value chains. Using consumer markets as the focus and final destination for honey and bee products, a mind-mapping tool was used to link activities of stakeholders to markets (Farrand *et.al.*, 2002). Study findings showed that in Kitwe district, honey passed through six main stages of production: processing, transportation, bulk buying and reselling, selling and consumption. In Kapiri Mposhi individual beekeepers sold their honey directly to roadside traders after value-adding activities, including honey processing and filtering (Figure 5.1).



**Figure 5.1. Presentation of stakeholders along honey commodity value chain of Kapiri Mposhi and Kitwe districts.**

The observed differences in the two districts were because the Kapiri Mposhi producers, dominated by local style beekeepers, operated as individual entrepreneurs while in Kitwe, producers, who were mainly modern beekeepers, were

affiliated to the Mwekera Multipurpose Beekeeping Cooperative group. The differences between individual beekeepers and those affiliated to producer groups' orientation to markets were also observed in similar studies (Mickels-Kokwe 2006; Lowore and Bradbear, 2013). The implication is that since beekeepers are at the initial stage of the HCVC, their decision in terms of offering honey on markets also determined the stakeholders along the value chain. Mickels-Kokwe (2006) observed that beekeepers in producer groups are often linked to longer value chains where success is attributed to beekeepers having group benefits. This includes access to products and services in the form of training, market linkages, information, communication and extension (Mickels-Kokwe, 2006; Lowore and Bradbear, 2013).

Apart from core actors, support agencies including regulators, donors, training institutions and input suppliers were also identified as important institutions and individuals, influencing honey markets. However, banks and micro-finance institutions were missing on the list of the identified stakeholders. Support agencies provide services aimed at adding value to honey and bee products such as input support, control of honeybee diseases, authorization through permits and certificates, market linkages and training (CODIT, 2009; NBT, 2010; ITC, 2015). But, the non-involvement of the banks and micro-finance institutions was in disagreement with other value chain stakeholder's composition. For example, in Ethiopia, the country with the largest number of honeybee colonies in Africa, all the support agencies were present, including banks and micro-finance institutions (Apimondia, 2015). In Rwanda, all the support agencies, including banks and micro-finance institutions, also existed within the honey value chain (CODIT, 2009). Therefore, as a country the honey industry should be geared through an apex body such as the ZHPP to engage banks to support the sector.

The peculiar absence of banks and microfinance institutions in Zambia's honey value chains is a cause for concern if the honey industry is to grow. For example, inclusion of the two stakeholders in other food value chains in Zambia, such as maize has facilitated access of farmers to loans and other input support through the farmer support input programme (SNDP, 2014).

Lack of involvement of banks could be attributed to, among other factors, inadequate information on the supply of honey from the forests to markets thus making it difficult for financial institutions to assess the risk associated with finance to the honey industry (Bucklin *et al.*, 1996). Therefore, unless supply chains involved in the movement of honey from the forests to markets are fully documented according to the different production stages, discussed below, financing options to the honey sector will be limited only to donors and government.

### **5.1.1 Honey Production Stage**

#### **5.1.1.1 Age Distribution of Honey Producers**

Honey producers interviewed were between the ages of 29 to 74 years old, with a normal age class distribution around a mean population age of 50 years. The mean age of producers was reported in similar studies citing traditional methods of honeybee husbandry as the major reason for older cohort's recruitment to the profession (Gilles 2014; Apimondia, 2015). This implies that older people influence honey offerings on markets, as young beekeepers are few (8%) and marginalized. The smaller number and marginalisation of youths was attributed to limited information about beekeeping, associated products and benefits (Gilles 2014; Apimondia, 2015). Thus, deliberate efforts by older cohorts, development agencies and government departments to coach the youths is likely to bring many on board.

The low participation of youths in beekeeping negatively impacts on the future of the industry. It concentrates the experience of rearing honeybees for honey production amongst the older generation thus, impeding the future prospects of the enterprise (CODIT 2009). Therefore, unless deliberate efforts to facilitate coaching of young beekeepers by older beekeepers are promoted, the gap in age difference will continue to widen at an increasing rate and it will become less likely that younger beekeepers are in a position to continue the enterprise.

#### **5.1.1.2 Producers' Gender**

The majority of honey producers interviewed were male (85%), similar to other studies in the region. For example, in the 17 districts of Rwanda, women participation in supplying markets with honey and bee products ranged from 15 to 22%

(CODIT, 2013). In Zambia, previous studies have confirmed that beekeeping is a traditionally male dominated occupation (Clauss, 1992; ITC 2015).

Women involvement in producing honey and bee products remains limited despite the role that they can play in the honey value chain (Bradbear, 2009; FAO, 2011). Participation of women is an opportunity to increase the cadre of people apart from men to attend to honeybee colonies. The implication of this is that there is a higher likelihood of being able to detect threats to honeybee colonies (such as theft of honey, destruction of honeybees by wild fires, pests and predators and diseases) and the enterprise in general when both men and women are involved (CODIT, 2009; ITC 2015). In addition, provision of food supplements to honeybees during starvation (dearth period) could be better achieved if both men and women participated as women would give an extra hand. Therefore, unless females are incorporated to enhance colony productivity, male producers will find it difficult to attend to honeybee colonies because often they are away from home in instances where apiaries are constructed at homesteads. In addition, involvement of women in production would also be in line with Millennium Development Goal number 3 of 2008, which focuses on equity and women empowerment in all spheres of economic development (FAO, 2011).

#### **5.1.1.3 Beekeepers Experience**

The study showed that local style beekeepers were more experienced (10 years) compared to modern beekeepers (5 years). Although hunters have more years of experience (10 years) than beekeepers, they were only active during honeyflow seasons. The NBT (2010) also confirmed that traditional beekeepers were more experienced in producing honey than modern beekeepers in Zambia. The implication is that with increased number of years of experience one would expect that local style beekeeper's practical knowledge and skills have been developed to a level of increasing honey yield per cropping. However, this was not the case as it was established that modern beekeepers obtained significantly more ( $p < 0.05$ ) comb honey compared to local style beekeepers due to the use of manufactured beehives. Therefore, unless the experienced beekeepers are equipped with the right production kits, honey supply will still remain low while demand continues to rise.

Currently, only 1 100 metric tons of an estimated 20 000 metric tons of honey per annum is produced in Zambia (NBT 2010; SNV 2014).

#### **5.1.1.4 Beekeeping Methods**

Honey is produced in Zambia though either traditional or modern hive technology (EIF, 2013; ITC, 2014; Mwongela and Kalaba 2015). Local style beekeepers (83%) utilised bark as a hiving tool for honeybee colonies while modern beekeepers (13%) used KTB hives. Honey hunters (4%) depended on wild nesting places of honeybee colonies such as tree crevices for honey and bee products.

Types of methods used in producing honey and bee products were related to honey yield per year and showed that 2 kilograms of comb honey were supplied from bark hives compared to 20 kilograms from KTB hive. Although in both cases the recorded amount of honey was below the national average of 25 kilograms for bark hive and 45 kg (NBT, 2010; ITC, 2015), it was observed that KTB contributed significantly ( $p < 0.05$ ) more honey to the markets compared to using bark hives.

The KTB hive has an inherent advantage over the bark hive in the way that it is designed and constructed. The design and construction of the hive allows more space for sustenance of both the brood, adult honeybees and honey stocks (Clauss, 1992; Carroll, 2006). In addition, the construction of KTB hive facilitates easy application of honeybee's attractants such as beeswax. Ahmed *et al.*, (2005), also noted that when beeswax is used as an attractant in the form of a strip on the top bar of a KTB hive, it results in easier occupation of honeybee colonies. Furthermore, the amount of honey is also attributed to the longer life span of the colony in the hive because occupation is faster than in bark hives. This study established on a hive-to-hive basis that honeybee colony occupation was higher (60%) in KTB hive compared to bark hive (50%). Although results showed a relatively higher occupation in KTB hive than bark hive, it was not significantly different ( $p > 0.05$ ), suggesting a honeybee colony would occupy any hive if suitable for colony development.

Success in beekeeping primarily results from the utilisation of improved beekeeping technologies that are suitable for local honeybee types and ecological conditions

(Ntenga, 1986; Hasan and Süleyman, 2010). Constructing bark hives offers an easy way of entering the honey business because it requires virtually no capital investment (Bradbear, 2009; Jones and Bradbear, 2014). This was supported by Lowore and Bradbear (2013) in Uganda who noted that local style hives have low initial costs and therefore, easily accessible for low-income households.

However, traditional types of beekeeping that use bark harvested from standing trees is said to contribute to 11% deforestation in Zambia (Clauss, 1992; ITC, 2015). Investing in KTB hives is costly in the initial year but has a higher likelihood of returns on investment based on the quantities of honey and longer life span in production. Li *et al.*, (2010) states that the higher the level of output of equipment used in production, the lower per unit cost of that equipment, resulting in an economy of scale.

The number of honeybee colonies kept in bark hives were significantly more compared to KTB hives ( $p < 0.05$ ). This was because no initial costs were paid in terms of licence fees to cut the trees and extract the bark. Utilisation of bark in honey production among local style beekeepers (83%) requires that suitable tree species be felled to construct the hive from them. Tree species used to extract bark for making hives include *Burkea africana*, *Brachystegia boehmii*, *Brachystegia longifolia*, *Brachystegia spiciformis*, *Chryptosepalum exfoliatum* and *Julbernardia paniculata* (Clauss, 1992; Mickels-Kokwe, 2006; Husselman 2008). The cutting of these trees raises another problem by reducing the number of flowers in the apiary environment, since these trees produce 60% of nectar and pollen (Clauss, 1992). Bark harvesting for hive making was estimated at 150 hives per beekeeper translating into 224 trees per km<sup>2</sup> loss annually (Clauss, 1992; Mickels-Kokwe, 2006; ITC, 2015).

Apart from the above mentioned challenges the study showed several opportunities. Most beekeepers (47%) are willing to barter for equipment and supplies. This meant that instead of paying in cash, a beekeeper would pay in the form of honey equivalent to the price of the item obtained. In addition, another opportunity lies in the Zambian government's willingness to fund beekeeping activities as a poverty

reduction strategy. The government opportunity was reported by 35% of the respondents interviewed. In conclusion, the presence of donors who offered hives in exchange for honey and sometimes as a grant aid in the study area was an opportunity reported by 18% of respondents. Donors working in Zambia provide both financial and technical support to the honey sector (ITC, 2015; Mwongela and Kalaba, 2015).

Loss of floral trees to agents of deforestation such as charcoal manufacturing, settlements, agriculture and late fires has stimulated producer's interest in planting trees such as *Moringa oleifera* to support honeybee colonies. Furthermore, the study revealed that maintenance feeding during dearth (starvation) period of honeybee colonies using ground maize, soy flour, honey and sucrose help to maintain colonies (Mwongela and Kalaba, 2015). Therefore, the beekeepers that have not adopted tree planting for nectar and pollen to feed the honeybee colonies could be encouraged to plant flower blossoming plants to retain colonies in the hives.

### **5.1.2 Honey Processing Stage**

Processors (packers) process honey combs into liquid honey. This study showed that the processing activities followed a sequence of four main activities: pressing, removal of waste, settling and skimming, as also observed by Mickels-Kokwe (2006) in a similar study. The main problem was that there were no legally binding sales contracts between producers and processors. This study finding was similar to CODIT (2009), stating that in the honey sector, usually "verbal contracts" are utilized, a situation that has been blamed for failure to honour sale agreements. This implied that there is a growing mistrust between producers and processors which is creating anxiety and uncertainty in the honey supply side of honey markets. Therefore, unless legal contracts are put in place the flow of honey to processors and subsequently to different markets will continue to remain unreliable (Mickels-Kokwe, 2006).

### 5.1.3 Honey Transportation Stage

Transporters owned the means of transportation and were hired by owners of honey to help them convey it from one point to the other along the HCVC. The first group of people that utilised transporters was the producers. Honey was conveyed from the apiaries to homesteads in smaller amount after every cropping as head load over a short distance. Wholesalers bulked the honey from the producers and shipped it to a processor facility using light trucks and public buses because of large consignment. Processed honey was obtained from processors and transported by the retailers to end-markets using hired light trucks.

This study established that buses, trucks and bicycles were the forms of transportation available to producers, wholesalers, processors and retailers. Of these transport modes, 63% used buses, 27% used trucks and 10% bicycles.

Distance and quantity of honey were the major determinants on the selection of the mode of transport (ITC, 2015). Furthermore, regardless of distances and quantity, maintaining honey quality and wholesomeness was the major concern for honey markets (ITC, 2015). Therefore, in transporting honey from production areas to different markets, the HCVC actors should pay particular attention to honey quality and integrity, which according to this study is influenced by distance and mode of transportation.

Challenges of transportation included leakages and spillage of honey while it was being hauled over longer distances. This was because the 20 litre plastic containers mainly used for transport were not air or water tight enough to prevent leakages (ITC, 2015). In addition, remoteness of apiary locations was another constraint impacting negatively on markets (Mickels-Kokwe, 2006). Another problem was poor road networks and the quality of roads connecting apiaries to markets. Therefore, improved road networks and reduced costs of distribution would help in reducing the final price of honey. In addition, using containerized trucks to transport honey over longer haulage distances reduced reported cases of leakages and honey quality. Despite the challenges experienced by people hiring transporters to convey honey along the HCVC, transporters were not affected in any way because they could load honey with other goods as one consignment.

#### **5.1.4 Honey Buying and Reselling (Wholesaler) Stage**

The only wholesaler included in this study was observed in Kitwe. The wholesaler's roles and responsibilities are performed through associations, BCUs and community based organisation (CBO) (Jones and Bradbear, 2014). For example, collective marketing is one of the roles performed by the wholesaler as they engage retailers to buy honey (Jones and Bradbear, 2014). Collective marketing to retailers of processed honey increased the acceptability of honey in higher income market such as supermarkets because of clear traceability of honey sources, sustainability of supply and volumes. A similar study on fruits indicated that adaptation and acceptability in higher niche markets could earn a net profit in the region of 14–28%. This estimation holds because consumers in higher income markets are often associated with higher spending power (Akinnifesi *et al.*, 2008; Li *et al.*, 2010).

#### **5.1.5 Honey Selling Stage**

In Kitwe, honey retailers were supermarkets selling different quantities of honey on their shelves. Three major types of packaging were 250 g, 350 g and 500 g plastic jar bottles. In Kapiri Mposhi, honey was sold mainly in 2.5 litre unmarked plastic containers and disused beverage bottles such as Coca cola and Fanta bottles. The findings were similar to the honey market survey of Luansimba roadside traders in Kapiri Mposhi (Fiona, 2010). Generic marketing certainly has a place even in modern markets, but is more associated with mass-produced products that are consumed in large quantities as opposed to niche-oriented seasonal products such as honey (Baker and Sinkula, 2005; Akinnifesi *et al.*, 2008).

Thus, having honey marketed as a generic product is an indication of the markets' inefficiency (Akinnifesi *et al.*, 2008). This implies that in Kapiri Mposhi, where honey was sold in undifferentiated containers, the markets were not properly serviced as consumers had difficulties in selecting the best honey. In addition, generic selling of honey only proved the assertions that sellers are in business only to survive and not as a commercial venture (Mickels-Kokwe, 2006; NBT, 2010; Hasan, and Süleyman, 2010). According to Akinnifesi *et al.*, (2008), sellers of natural products such as fruits and honey do not pay particular attention to packaging because their target market is

entirely local. However, the local markets are assumed to be low-income markets by and large, with limited ability to pay high premium price that significantly contribute to the profit margins (Akinnifesi *et al.*, 2008). The implication is arguably that there is a need to re-focus activities of sellers to include marketing and branding so as to derive greater benefits from honey such as increased profit margins. Thus, until the market develops a level of sophistication in terms of packaging, the default position is for most consumers to purchase the lowest priced honey from the lowest bidder (Lowore and Bradbear, 2013).

### **5.1.6 Honey Consumption Stage**

The market survey to establish consumer behaviour towards honey and bee products focused on taste and preference. Ramadhani (2002), in a similar market survey on fruits asked consumers the following question “if you have enough money to buy fruits of your preference what properties are you likely to consider?”.

The same question was asked in this study about honey and bee products. Honey quality, which according to consumers in the study meant the absence of impurities, ranked highly (19.6%). Physical or chemical impurities affect the integrity and wholesomeness of honey as a food commodity (ITC, 2015). The preference for quality implies that consumers are likely to pay a higher premium price for honey if they know that the quality is good. However, quality characteristic driven demand was an acquired behaviour learnt over a period (Mickels-Kokwe, 2006; NBT, 2010).

Generally, consumers demanded that honey be available on markets all year around without cutting supply, similar to other food products in conventional markets (Akinnifesi *et al.*, 2008). A key implication is that although the supply of honey is dependent on the seasons of the year, HCVC actors should seek ways and means to maintain honey supply. This calls for the adaptation of honey and bee products to meet the demand by improving the consistency in the quantity and nature of the supply.

This study established that the constraints of honey markets observed by most consumers (50.1%) was that honey was expensive compared to other sweeteners

such as cane sugar. The problem of higher honey prices related to lack of information about sources of cheaper honey (NBT, 2010). Competitive honey prices are a prerequisite for a viable honey business (NBT, 2010). This implied that the right prices should be set by sellers of honey that will not discourage consumers from buying honey. Therefore, efforts by Zambia Development Agency working with International Trade Centre should be supported to ensure improved visibility of honey to consumers at competitive prices (ITC, 2015).

## **5.2 The Distribution of Profit Margins along the Value Chain**

The analyses of revenues and costs were used to explain profit margin percentage distributed to actors on the markets along the value chain. This study established that honey business is profitable, similar to findings of other studies (Mickels-Kokwe 2006; NBT 2010; Baker and Sinkula, 2005; Fiona, 2010). However, total income was influenced by volumes of honey sold on different markets and total costs. Kitwe producer's total income was more (K1 661.50) than Kapiri Mposhi (K358.40) because of higher honey volumes. In a similar study, it was established that increased honey yield triggered by among other things improved production methods influenced total incomes of beekeepers (CODIT, 2009, NBT, 2010; Fiona, 2010). The finding suggests that incomes difference between beekeepers was only going to improve especially among the local style in the Kapiri Mposhi value chain if they considered graduating to improved methods of production such as using KTB hives.

The higher profit margin percentage (35%) was rewarded to wholesalers in a longer beehive to market route in Kitwe district. The NTB (2010) also in a similar study noted that wholesalers obtained increased profits because they took on processing, packing and distribution of honey and bee products. This suggests that producers benefit more if they moved up the ladder and take up additional roles in the HCVC. This was confirmed at Kapiri Mposhi where producers could earn a substantially higher profit when they sell liquid honey versus comb honey.

In the shorter beehive to market route of Kapiri Mposhi, a greater profit margin percentage (77%) was rewarded to retailers. The findings were similar to Fiona (2010), whose study findings showed that the Luanshimba roadside market in Kapiri

Mposhi was selling the honey at the most expensive price in the entire country. At the time honey was sold at USD 1.7 per kilogram (Mickels-Kokwe 2006; NBT, 2010; Fiona, 2010). However, this market is very small and characterised by unpredictable selling of honey to passing motorists (Mickels-Kokwe, 2006). Therefore, this research study showed that, based on routes to markets, costs can be compared to revenues to determine investment that maximizes profit, while also satisfying consumers demand for honey and bee products.

### **5.3 Government Policies and Donor Support towards Markets Development**

A reported suite of support on finances for training and inputs to enhance trade and increase honey market visibility was identified among processors, retailers and producers (49%). This implied that actors along the HCVC could access money to enable them to become competitive on the market by improving packaging and branding, and improved trade and market linkages to local, regional and international markets (EIF 2013; ITC, 2015).

Examples of institutions and countries providing support to the honey sector in Zambia are Finland who have collaborated with the International Trade Centre (ITC), Netherlands Development Organisation (SNV) and United Nations Development Agency (UNDP) (EIF 2013; ITC, 2015). The support given included branding and advertisement of processors' honey, training advisors and build capacities of enterprises on quality and food safety requirement, similar to findings by other studies (ITC, 2015; Mwongela and Kalaba, 2015).

Strengthening of linkages and mutually beneficial relationships of stakeholders in value chains can provide solutions to market problems (Bucklin *et al.*, 1996). These market problems are solved when stakeholders pool their resources, knowledge and capabilities thereby increasing flexibility, productivity, cost reduction and innovations (Jones and Bradbear, 2014). However, coordination and communication remains a challenge in a sector with visible signs of fragmentation (ZHPP, 2015). A competent authority such as the Veterinary Department in the Ministry of Fisheries and Livestock could assume leadership roles to organise the sector around topics such

as disease management. Thus, streamline the operations of the honey industry because in many honey producing countries the department is considered the competent authority.

## Chapter 6: Conclusion and Recommendation

### 6.1 Conclusion

Honey markets in Zambia have received considerable attention with past interventions targeting mainly producers and ignoring the other HCVC stakeholders. The piece meal approach aimed at addressing value chain challenges in relation to markets has been implicated in the low performance of the honey sector. Currently, honey markets cannot be sustained because only 1 100 out of estimated 20 000 metric tons of honey per annum is being produced (Mwongela and Kalaba, 2015; ITC, 2015).

The focus of this research study was on the entire value chain structure, conduct and performance towards honey markets. In Kapiri Mposhi markets were supported by mainly local style beekeepers operating as individual entrepreneurs. Local style beekeepers sold honey directly to roadside retailers, with the inclusion of transporters and consumers in this value chain. The composition of the stakeholders for the Kitwe district was different from Kapiri Mposhi because it constituted six levels - namely beekeepers, processors, transporters, wholesalers, retailers and consumers. This study established that those beekeepers in producer groups are often linked to a longer value chain.

Apart from core actors, support agencies including regulators, donors, training institutions and input suppliers were also identified as important institutions and individuals, influencing honey markets. Support agencies provide services aimed at adding value to honey and bee products including input support, control of honeybee diseases, authorization through permits and certificates, market linkages and training

Honey supply was influenced by honey producers, whose age class distribution was around a mean population age of 50 years. This research study showed that beekeeping is a male dominated occupation with traditional hives being used as tools of production. In addition, the study showed that between two types of beekeepers, those utilising the local style were more experienced (10 years)

compared to modern beekeepers (5 years). As such, there is a need for the experienced traditional beekeepers to coach the young and emerging beekeepers who have the right technologies for producing honey but are of little experience.

Consumer demand for honey was based on quality. This meant that consumers' willingness to buy a particular type of honey was assured as long as the quality of honey was maintained. Thus, sellers must ensure that honey sold on different markets is of good quality in order to maintain consumer's goodwill and loyalty. However, generic honey marketing in Kapiri Mposhi characterised by similar packaging in 2.5 litres plastic containers and disused beverage bottles such as Coca cola and Fanta negatively impacted on consumer demand for honey. In addition, having honey marketed as a generic product is an indication of the market's inefficiency, which only proved the assertions that sellers are in the honey business only to survive and not as a commercial venture. Thus, until the market develops a level of sophistication in terms of packaging, the default position is for most consumers to purchase the lowest priced honey from the lowest bidder.

The analyses of revenues and costs showed that honey business is profitable. The higher profit margin percentage was rewarded to wholesalers in a longer beehive to market route in Kitwe district because they took on processing, packing and distribution of honey and bee products. This implies that producers would benefit more if they moved up the ladder and take up additional roles in the HCVC. In addition, the shorter beehive to market route in Kapiri Mposhi greater profit margin percentage was rewarded to retailers. However, this market is very small and characterised by unpredictable selling of honey to passing motorists.

## **6.1 Recommendations**

The research study recommends that to address the market problems associated with the study sites the industry must be commercialised by way of treating honey production as a business venture. In addition, investing in the longer value chain will enhance honey product market features on local, regional and international markets. Enhancing honey product market features could lead to adaptation and acceptability in higher niche markets and earn a net profit in the region of 14–28%. This

estimation holds because consumers in higher income markets are often associated with higher spending power. Finally, it is recommended that efforts and energies are directed towards increased sales volume to increase profit margins distributed along the value chain (Table 6.1).

**Table 6.1. Recommendations on interventions along the Honey Value Chains**

What to do? Recommendations	Intervention along the value chain	How to do it and expected future outcomes
<b>1. Commercialisation of honey product</b>	Producer, Processor, Consumer	<p><b>Producer</b></p> <p>Entrench local style beekeepers (83%) with experience of more than 10 years in a more efficient method of producing honey through investing in KTB hives. Provide protective clothing to beekeepers to reduce number of bees killed during cropping operations, which find themselves as physical contaminants challenges at processor stage.</p> <p><b>Outcome:</b> Utilising the KTB hives obtained more comb honey compared to bark hive; KTB hive production-incorporated women (15%) and increased youth participation (8%). Therefore, would reduce youth unemployment</p> <p><b>Processor</b></p> <p>Empower producers (83%) in traditional methods with processing equipment to upscale honey recovery rate from 65% to 80%.</p> <p><b>Outcome:</b> Reduced case of physical contaminants</p> <p><b>Processor / Consumer</b></p> <p>Invest in good quality food grade packaging with clear labelling (physical trait which means free of physical contaminants such as dead bees).</p> <p><b>Outcome:</b> Based on consumer behaviour theory the market could be segmented as such. i.e. the higher the quality of honey the higher the price the consumer is willing to pay.</p>
<b>2. Investing in the Longer Chain</b>	Producer, Processor, Transporter, Wholesaler, Retailer and Consumer	<p>Producer, processor, transporter, wholesaler, retailer and consumer support aimed at addressing markets challenges should be sustained from donors and government.</p> <p><b>Outcome:</b> Orienting activities adding value creates employment opportunities for citizens especially the youths. Incorporate missing actors in the HCVC structure of Zambia's dryland forests, especially banks and micro-finance institutions. Facilitated access of value chain actors to products and services such as loans and other input support in production, processing and marketing, currently only limited to donors and government.</p>
<b>3. Increasing Honey Profit</b>	Producer, Processor, Retailer	<p>Producers, processors and retailers should sell more honey at competitive prices by leveraging on activities such as value addition by way of packing and quality assurance to post higher profit growth.</p> <p>More young entrepreneurs should be cultivated that are receptive to modern techniques and dynamic marketing.</p> <p><b>Outcome:</b> More people will be recruited into production because of the returns from honey sales.</p>



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# Appendices

## HONEY HUNTERS QUESTIONNAIRE

**Interviewer's Name:** .....**Date:** ...../...../2015

Q1. Name of Respondent:  
*Surname:*..... *First name:* .....

Q2. Gender of respondent: (*Indicate*): [ ] Female [ ] Male

Q3. How long have you been a Honey Hunter?

5-10 years		10-15 years		15-20 years		20 years <	
------------	--	-------------	--	-------------	--	------------	--

Q4. Have you received any beekeeping training in the last 3 years?  
 .....

Q5. Which organisations are responsible for mentoring and training?  
 .....

Q6. Which locations in order of ranking are the major occurrences of feral honeybee colonies?  
 .....

Q7. What are basic processing procedures for separating honey from combs?  
 .....

Q8. What processing materials, equipment and tools do you use?  
 .....

Q9. What straining materials, equipment and tools do you use for cleaning your honey?  
 .....

Q10. How do you maintain honey quality during processing on the following?

a) Colour  
 .....

b) Smell  
 .....

c) Cleanliness.....

- Q11. How is honey prepared for the market after processing?  
.....
- Q12. In what packaging material is honey transported to customers?  
.....
- Q13. Who are your major honey customers?  
.....
- Q14. What mode of transport is used to transport honey to customers?  
.....
- Q15. What is the price for transporting one 20 litres of honey?  
.....
- Q16. How many man-hours are spent on cropping one feral colony and cost of labour per hour?  
.....
- Q17. Do you use any form of beekeeping tools, materials or equipment when working with honeybee feral colonies?  
.....
- Q18. If YES please give me a list?  
.....
- Q19. What is the cost price for each beekeeping tool, equipment and material listed?  
.....
- Q20. Who are the suppliers of the said beekeeping gear?  
.....

**SEASONALITY OF HONEY SUPPLY AND DEMAND**

- Q21. What is the average number of harvests per year?  
.....
- Q22. What is the average harvest load per colony?  
.....
- Q23. What forms of packaging do you sell your honey?  
.....
- Q24. What is the price of honey per kilogram?  
.....
- Q25. What is the most preferred honey colour by your customers?  
.....
- Q26. How do you ensure continuous supply of preferred honey colour to your customers?  
.....
- Q27. Do you keep records of feral colonies that you work with?  
.....
- Q28. If YES, kindly avail me the records?  
.....

**Any Other Comment:**  
.....

## LOCAL STYLE (TRADITIONAL) BEEKEEPER QUESTIONNAIRE

Interviewer's Name: .....Date: ...../...../2015

Q1. Name of Respondent:  
Surname:..... First name: .....

Q2. Gender of respondent: (Indicate): [ ] Female [ ] Male

Q3. How long have you been a local style beekeeper?

5-10 years		10-15 years		15-20 years		20 years <	
------------	--	-------------	--	-------------	--	------------	--

Q4. Have you received any beekeeping training in the last 3 years?  
.....

Q5 Inventory of honeybee colonies and technologies

Hives	Occupied	Not Occupied	Total
1 Bark hive			
2 Log hive			
3 Calabash			
4 Grass Hive			
5 Reed mat			
Others specify			
6			
7			
8			
9			
10			
	Total		

Q6. Which other equipment is used in production?

Other equipment, tools and materials	Number	Remarks
1 Beeveil		
2 Beegloves		
3 Beeoverall		
4 Heavysocks		
5 Boots		
6 Beebrush		
7 Hivetool		
8 Calico cloth		
9 Honey press		
10 Others specify		
11		
12		
13		
14		
15		

### BEEKEEPING ATTITUDES, SKILLS AND KNOWLEDGE

Q7. Which organisations are responsible for mentoring and training?  
.....

Q8. What are basic processing procedures for separating honey from combs?  
.....

Q9. What processing materials, equipment and tools do you use?  
.....

Q10. What straining materials, equipment and tools do you use for cleaning your honey?

.....  
Q11. How do you maintain honey quality during processing on the following?

a) Colour

.....  
b) Smell

.....  
c) Cleanliness

.....  
Q12. How is honey prepared for the market after processing?  
.....  
.....  
.....

Q13. In what packaging material is honey transported to customers?

.....  
Q14. What mode of transport is used to transport honey to customers?

.....  
Q15. Are you meeting the current demand for honey by your customers?

.....  
Q16. If NO, what are the major challenges?

.....  
Q17. How are you managing these challenges?

.....  
Q18. What is the most preferred honey colour by your customers?

.....  
Q19. How do you ensure continuous supply of preferred honey colour to your customers?  
.....

**HONEYBEE FOOD RESOURCES**

Q20. What nectar and pollen producing plants support your honeybee colonies?

.....  
Q21. When do these flower (Beekeeping calendar)?

.....  
Q22. What food do you feed your colonies during dearth period?

.....  
Q23. Are you experiencing loss of nectar and pollen producing trees to agents of deforestation?

.....  
Q24. What are the causes of deforestation?  
.....

**COOPERATIVE SOCIETIES /ASSOCIATION AFFILIATION**

Q25. Are you a member of any organisation related to beekeeping?

.....  
Q26. What is the name of the Cooperative Societies / Association?

.....  
Q27. What are the benefits of affiliating yourself to such organisations?  
.....

**SEASONALITY OF HONEY SUPPLY AND DEMAND**

Q28. What is the average number of harvests per year?

.....

Q29. What is the average harvest load per hive? (Refer to hive type and correspond yield)

.....

Q30. What is the farm gate price of honey per kilogram?

.....

Q31 Do you keep production records for colonies?

.....

Q32 if YES, kindly avail me the records?

.....

**HONEYPRODUCTION COSTS**

Q33. What are the variable costs of production?

Variable costs of honey production for one honeyflow season	Unit	Price	Total Cost
Labour for inspecting per hive			
Labour for harvesting			
Containers			
Transport cost per 20 litre container			
Drugs and medicaments			
Honey tax per 20 litres			
Labelling			
Electricity			
Water			
Rent			
Advertising and promotions			
<b>Others specify</b>			

**Any Other Comment:**

.....

## INDUSTRIAL (MODERN) BEEKEEPER QUESTIONNAIRE

Interviewer's Name: .....Date: ...../...../2015

Q1. Name of Respondent:  
Surname:..... First name: .....

Q2. Gender of respondent: (*Indicate*): [ ] Female [ ] Male

Q3. How long have you been a modern beekeeper?

5-10 years	10-15 years	15-20 years	20 years <
------------	-------------	-------------	------------

Q4. Have you received any beekeeping training in the last 3 years?  
.....

Q5 Inventory of honeybee colonies and technologies

Hives	Occupied	Not Occupied	Total
1 Langstroth			
2 Langstroth hive complete with a brood-box, queen excluder and super chamber			
3 Kenyan Top Bar			
4 Tanzanian Top Bar			
5 Transitional			
Others specify			
6			
7			
8			
9			
10			
Total			

Q6. What is the cost?

Hives	Cost Price	Remarks
1 Langstroth		
2 Langstroth hive complete with a brood-box, queen excluder and super chamber		
3 Kenyan Top Bar		
4 Tanzanian Top Bar		
5 Transitional		
Other equipment, tools and materials		
1 Beeveil		
2 Beegloves		
3 Beeoverall		
4 Heavysocks		
5 Boots		
6 Beebrush		
7 Hivetool		
8 Calico cloth		
9 Honey press		
10 Others specify		
11		
12		
13		
14		
15		

### BEEKEEPING ATTITUDES, SKILLS AND KNOWLEDGE

Q7. Which organisations are responsible for mentoring and training?  
.....

- Q8. What are basic processing procedures for separating honey from combs?  
.....
- Q9. What processing materials, equipment and tools do you use?  
.....
- Q10. What straining materials, equipment and tools do you use for cleaning your honey?  
.....
- Q11. How do you maintain honey quality during processing on the following?  
a) Colour  
.....  
b) Smell  
.....  
c) Cleanliness  
.....
- Q12. How is honey prepared for the market after processing?  
.....
- Q13. In what packaging material is honey transported to customers?  
.....
- Q15. What mode of transport is used to transport honey to customers?  
.....
- Q16. Are you meeting the current demand for honey by your customers?  
.....
- Q17. If NO, what are the major challenges?  
.....
- Q18. How are you managing these challenges?  
.....
- Q19. What is the most preferred honey colour by your customers?  
.....
- Q20. How do you ensure continuous supply of preferred honey colour to your customers?  
.....

**HONEYBEE FOOD RESOURCES**

- Q21. What nectar and pollen producing plants support your honeybee colonies?  
.....
- Q22. When do these flower (Beekeeping calendar)?  
.....
- Q23. What food do you feed your colonies during dearth period?  
.....
- Q24. Are you experiencing loss of nectar and pollen producing trees to agents of deforestation?  
.....
- Q25. What are the causes of deforestation?  
.....

**COOPERATIVE SOCIETIES /ASSOCIATION AFFILIATION**

- Q26. Are you a member of any organisation related to beekeeping?  
.....

Q27. What is the name of the Cooperative Societies / Association?  
 .....

Q28. What are the benefits of affiliating yourself to such organisations?  
 .....

**SEASONALITY OF HONEY SUPPLY AND DEMAND**

Q29. What is the average number of harvests per year?  
 .....

Q30. What is the average harvest load per hive? (Refer to hive type and correspond yield)  
 .....

Q31. What is the farm gate price of honey per kilogram?  
 .....

Q32 Do you keep production records for colonies?  
 .....

Q33 if YES, kindly avail me the records?  
 .....

**HONEY PRODUCTION COSTS**

Q34. What are the variable costs of production?

Variable costs of honey production for one honeyflow season	Unit	Price	Total Cost
Labour for inspecting per hive			
Labour for harvesting			
Containers			
Transport cost per 20 litre container			
Drugs and medicaments			
Honey tax per 20 litres			
Labelling			
Electricity			
Water			
Rent			
Advertising and promotions			
<b>Others specify</b>			

**Any Other Comment:**  
 .....

## CONSUMER QUESTIONNAIRE

Interviewer's

Name: ..... Date...../...../2015

Q1. Name of Respondent: ..... Contact details:.....

Q2. Gender of respondent: (*Indicate*): 1.  Female 2.  Male.

Q3. Name of the business premises e.g.(Hotel).....

Q4. Type of consumer: (*Indicate*): 1.  Table 2.  Local Brew 3.

Others specify: .....

Q5. How long have you been consuming honey?  
.....

Q6. Who are the sellers of honey for your use?

Category of Supplier	Indicate Name
Vendors	
Supermarkets	
Open markets	
Producers	

Q7. What is your monthly requirement for honey orders?  
.....

Q8. Do honey sellers meet your honey monthly requirement? (Tick)

Response	Tick
Yes	
No	

Q9. If NO, how do you maintain continuous consumption?  
.....

Q10. Do you have contract (s) with honey sellers?

Response	Tick
Yes	
No	

Q11. If YES, what is the type of Contract for selling honey?

Response	Tick
Weekly	
Season	
Monthly	
Quarterly	

Q12. What is the purchasing price of honey for each honey packaging or measurement?

Unit Measure	Packaging	Unit Price


Q12. When buying honey, what characteristics do your customers consider? (0-2)

No.	Characteristics	Rank
1		
2		
3		
4		
5		
6		

Q13. How often in a month do you replace honey stock on the shelves?

Response	Tick
Weekly	
Fortnight	
Monthly	

Others specify

.....

**Any Other Comment:**

.....

## INPUT SUPPLIERS QUESTIONNAIRE

Interviewer's

Name:.....Date...../...../2015

Q1. Name of Respondent: .....Contact details:.....

Q2. Gender of respondent: (*Indicate*): 1. [ ] Female 2.[ ] Male.

Q3. Name of the business premises

.....  
Q4. Type of Input Supplier: (*Indicate*): 1. [ ] Carpentry 2.[ ] Government. 3.

NGO[ ] Others specify: .....

Q5. How long have you been an input supplier? .....

Q6. Which of this beekeeping gear do you supply?and at what price?

Beekeeping Gear	Tick	Price
Kenya Top Bar Hive		
Bee Veil		
Bee Smoker		
Bee Boots		
Bee Gloves		
Honey Press		
Calico Cloth		
Bucket with lid		
Bark Hive		
Settling Storage Tank		
Hanging Wire Rope		
Knife		
Axe		
Hive Tool		
Machete		
2.5 Containers		
1 litre containers		
500ml Jar		
350ml Jar		
Honey label		

Q7. When selling inputs what is the most preferred method of payment in order of rank? (0-2)

No.	Method of payment	Rank
1	Credit	
2	Part-payment	
3	Credit /Loan	
4	Barter	
5	Grant	

Q8. What are the challenges of beekeeping gear provision?

.....

Q9. What is the major source of your inputs (raw materials) used in making the beekeeping gear?  
.....

Q10. In case of input gears that are not locally made, where are these sourced from?  
.....

Q11. Who are your major customers or beneficiaries for the beekeeping gear?  
.....

**Any Other Comment:**  
.....

## PROCESSORS QUESTIONNAIRE

Interviewer's

Name: ..... Date...../...../2015

Q1. Name of Respondent: ..... Contact details:.....

Q2. Gender of respondent: (*Indicate*): 1. [ ] Female 2.[ ] Male.

Q3. Name of Institution  
.....

Q4. Type of Institution: (*Indicate*): [ ] Processor 2.[ ] Packer 3. [ ] Company

4. [ ] Cooperatives /Associations 5. [ ] Others specify

Q5. Job title of the respondent: .....

Q6. Contact Details: .....,.....

Q7. How long have you been in honey business?  
.....

Q8. Where is the source of your honey feed stock for your processing plant?  
.....

Q9. In what form do you purchase your honey feed stock (comb or pressed honey)?  
(Tick)?

Response	Tick
Comb honey	
Pressed honey (liquid)	

Q10. Are the identified sources of honey meeting your monthly requirement for the processing plant? (Tick)

Response	Tick
Yes	
No	

Q11. If NO, what is the monthly shortfall?  
.....

Q12. What is your offer farm gate price per kilogram of?

a) Comb honey.....

b) Liquid honey.....

Q13. What would be your offer price at processing plant/factor facility per kilogram of ?

a) Comb honey.....

b) Liquid honey.....

Q14. What payment modalities should producers expect from you? (0-2)

No.	Method of payment	Rank
1	Credit	
2	Part-payment	
3	Credit /Loan	
4	Barter	
5	Grant	



Q15. What is the cost of processing 1 tonne of honey?

Description of equipment/labour	Number of pieces/units	Unit Price

Q16. What is the cost of storing 1 tonne of honey?

Description of storage equipment	Number of item	Unit Price
Buckets		
Reservoir tanks		
20 litres containers		
Metallic buckets		

Q17. What is the cost of honey packaging?

Description of packaging material	Number of pieces	Unit Price
Bottles (300 g; 500g/ 750 g) jar bottles		
Drums (210 liter)		
Packs (Dozen)		

Q18. What is the selling price of honey for each honey packaging or measurement?

Description of packaging material	Number of pieces	Unit Price
Bottles (300 g; 500g/ 750 g) jar bottles		
Drums (210 liter)		
Packs (Dozen)		

**Any Other Comment:**

.....

## RETAILERS QUESTIONNAIRE

Interviewer's

Name: ..... Date...../...../2015

Q1. Name of Respondent: ..... Contact details:.....

Q2. Gender of respondent: (*Indicate*): 1. [ ] Female 2.[ ] Male.

Q3. Name of the business premises .....

Q4. Type of retailer: (*Indicate*): .....

Q5. Who are your suppliers of honey that you are selling?

Category of Supplier	Indicate Name
Wholesale	
Processors	
Producers	
Vendors	

Q6. What is your monthly requirement for honey orders?.....

Q7. Do honey suppliers meet your monthly needs for selling to your customers?  
(Tick)

Response	Tick
Yes	
No	

Q8. If NO, how do you maintain continuous supply of honey to your customers?

Q9. Do you have contract (s) with buyers of your honey?

Response	Tick
Yes	
No	

Q10. If YES, what is the type of Contract of supplying honey?

Response	Tick
Weekly	
Season	
Monthly	
Quarterly	

Q11. What is the selling price of honey for each honey packaging or measurement?

Unit Measure	Packaging	Unit Price
300 ml	Squeeze bottles	
500 ml	Jars	
2.5 litres	Containers	

Q12. When buying honey, what characteristics do your customers consider? (0-2)

No.	Characteristics	Rank
1	Distance	
2	Price	
3	Quality	
4	Contamination	
5	Trained beekeepers	
6	Quantity	

Q13. How often in a month do you replace honey stock on the shelves?

Response	Tick
Weekly	
Fortnight	

Q14. Do you think labels on honey packaging containers have sufficient information for your customers to select the honey?

Response	Tick
Yes	
No	

Q15. If YES, what is this information? .....

Q16. What makes your customers loyal to your type of honey? .....

**Any Other Comment:**

.....

## SUPPORT AGENCIES QUESTIONNAIRE

Interviewer's

Name: ..... Date...../...../2015

Q1. Name of Respondent: ..... Contact details:.....

Q2. Gender of respondent: (*Indicate*): 1. [ ] Female 2.[ ] Male.

Q3. Name of Institution

Q4. Type of Institution: (*Indicate*): [ ] Government 2.[ ] Parastatal. 3. [ ] NGO

4. [ ] Cooperatives /Associations 5. [ ] Others specify

Q5. Job title of respondent: .....

Q6. Contact Details: .....,.....

Q7. How long have you been supporting honey business?

Q8. List services and products your organisation support honey value chain players?

Q9. Who are the major beneficiaries of your support in the honey value chain?

Q10. When providing input support, what is the most preferred method? (0-2)

No.	Method of payment	Rank
1	Credit	
2	Part-payment	
3	Credit /Loan	
4	Barter	
5	Grant	

Q11. What type of legislation influence performance of honey and beeswax production?

Regulations	Type of regulations (Examples)	Level of influence (0-2)
Policies (Health/Veterinary/Forestry Dept.)		
Honey product safety (Council/Health)		
Honey products standards (ZABS)		
Trade and marketing (ZDA)		
Movement of bee and honey		
Others specify		

**Any Other Comment:**

.....