

BEEKEEPING IN ZIMBABWE

Paper presented at the APIEXPO Africa 2014 held in Harare 6-11th October, 2014.

BY

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October 2014

Abstract

Apiculture in Zimbabwe started as far back as the 18th Century. Evidence of beekeeping is shown by rock paintings in the Matopo Hills. Honey used to be harvested from caves, cliffs, hollows of trees and ground. Modern beekeeping methods were introduced by various actors in the hope of improving the quality and yield of honey. The paper explores the distribution and adoption rates of modern beekeeping technologies and the productivity levels of the different types of hives progressively introduced over time. Zimbabwe has a hive population of 85 794 of which 80% are traditional hives. Midlands province has the highest population of modern bee hives while Matabeleland South province has very little beekeeping activity, has the lowest. Beekeeping is seen as an intervention that can improve both livelihoods of farmers as well as the environment as the need for bee forage inevitably requires conservation of trees and forests. Langstroth hives constitute the lowest number in the country which is 2 215 hives. The statistics availed by Agritex (2014) shows that Zimbabwe has 15 967 beekeepers and has the potential to produce 427 105kg of honey. However the current production is 69 730 kg. In recent years bees have been beneficial in improving crop yields through crop pollination. The Ministry of Agriculture, Mechanisation and Irrigation Development plays a pivotal role in beekeeping training and providing an enabling environment, while other stakeholders such as the Forestry Commission and some NGOs complement the Ministry effort by promoting beekeeping activities. Challenges faced by farmers in beekeeping include, low hive occupancy, low production, poor management and limited markets. The proposed interventions to improve the *status quo* include farmer training, creation of markets, research and development as well as surveillance and control for diseases and pests. The quantities of honey imported into Zimbabwe have been fluctuating over four years with an average import of 19 528kg per annum. The overview of the country beekeeping sub-sector should assist in identifying areas that need improvement and open up investment opportunities for the sector.

1.0 INTRODUCTION

In nearly all countries of the world, bees and their products have wider consumer preference, but provide sustainable livelihoods to many small scale farmers (Hilmi, Bradbear and Mejia 2011). Communities in Zimbabwe recognized the value of beekeeping mostly due to the benefits of the bee products. Some of the bee products include honey which has been widely used as food and traditional medicines. Honey is naturally rich in micro-nutrients and a good source of energy. Further research has proved that propolis is a natural antibiotic and antimycotic. Propolis can be used to boost the immune system (Farrerr *etal* 2004). Honey used to be harvested from the wild before the communities realized the need to domesticate the bees through the use of traditional hives such as bark hives and clay pots. With the advent of science and technology modern systems were introduced. The first officer to undertake beekeeping extension was Papadopoulo in 1962. At that time very few people kept bees probably because there were no advisors and the Zimbabwean bee (*Apis Mellifera adansonii*) was regarded as aggressive (Papadopoulo, 1974). In the later years Kenya top bar and Langstroth hives were introduced.

In 2010 the annual world honey production was 1.54 million MTs of which (26%) was produced by China. Africa contributed (12%) with Ethiopia contributing about 3% (45 300MTs) (USDA, 2012). In Zimbabwe most of the honey is produced by smallholder farmers and the apiculture sector is still at its infancy. Most of the honey production is concentrated in the Midlands, Mashonaland west and Manicaland provinces.

Apiculture has been a life sustaining source of income and livelihoods. It is a low input investment which does not compete with other enterprises in terms of resources. Beekeeping has proved to be important in crop production due to cross pollination. Beekeeping is an aerial activity which does not compete for space with cultivation of crops, but rather complements productivity of crops through crop-pollination by bees (Conrad, 2007, as cited by Chazovachii, Chuma, Mushuku, Chirenje, Chitongo and Mudyariwa (2012). It indeed provides livelihoods for many farming communities with low cost investment, not so sophisticated equipment and can be done on marginal lands. It enhances protection of the environment and natural resources as communities realise greater benefits from managing forests.

The Beekeeping sector faces several challenges such as veldt fires, unavailability of modern hives, low productivity, and poor marketing systems, lack of financial support, poor processing methods, limited skills, pests and diseases. The sector also has weak sanitary and quality assurance service, limited capacity and extension services support.

It is critical that interventions to reduce the increasing threats to apiculture be crafted to reduce the challenges of this sector. The interventions should include strengthening extension systems, Queen bee breeding programs, research, improved marketing systems and development of the apiculture policy. Regulatory service support is also essential to assure the production of a safe product of high quality for ease of market access.

The paper looks at the historical trajectory of beekeeping systems, and production. It also looks at the overview of the beekeeping sector in the country to identify gaps in market access, capacity building and productivity.

2.0 THE HISTORY OF BEEKEEPING IN ZIMBABWE

Apiculture in Zimbabwe dates back to as early as the 18th Century. Evidence of beekeeping is shown by rock paintings in the Matopo hills (Crane, 1990). Zimbabwean communities used to gather honey in the wilderness. Honey was found in the caves, hollows (trees & ground) and cliffs. The local people would light up fires, use toxic smoke from poisonous trees and rubber in harvesting honey. This method of harvesting honey proved to be unsustainable as colonies and habitats were destroyed. As communities later began to realise the importance of beekeeping they devised new methods to attract and domesticate bees through modifying the African drum, clay pot, bark hives, making holes in tree logs and buckets.

These methods later proved to be ineffective as it was not easy to inspect the colonies, once the combs were removed those with brood could not be returned back into the hive and it was difficult to prevent swarming or to replace the queen. This resulted in low productivity and poor quality honey. The making of bark hives resulted in the destruction of trees. Modern methods of beekeeping were later introduced in the early 1960's and these proved to be very productive and sustainable.

The government promoted the use of the Greek basket-hive from 1962. The adoption rate was high as a thousand white farmers took up the enterprise. At that time, honey production rose from nil to 650 tonnes per annum (Papadopoulos, 1974). The hive is from Greece and is called the "Anastomo" Greek basket-hive. This type of hive is easy to inspect and one can crop the "ripe" honey leaving a fair share for the bees. This method ensured a more sustainable beekeeping system as bee colonies were preserved. In the later years more improved bee hives were introduced by the government. These included the Kenyan Top Bar and the Langstroth hives. Since then, Zimbabwe has witnessed a steady adoption of the modern bee hives. Most of the beekeepers are still using the traditional bee hives.

3.0 CURRENT STATUS OF BEEKEEPING IN ZIMBABWE

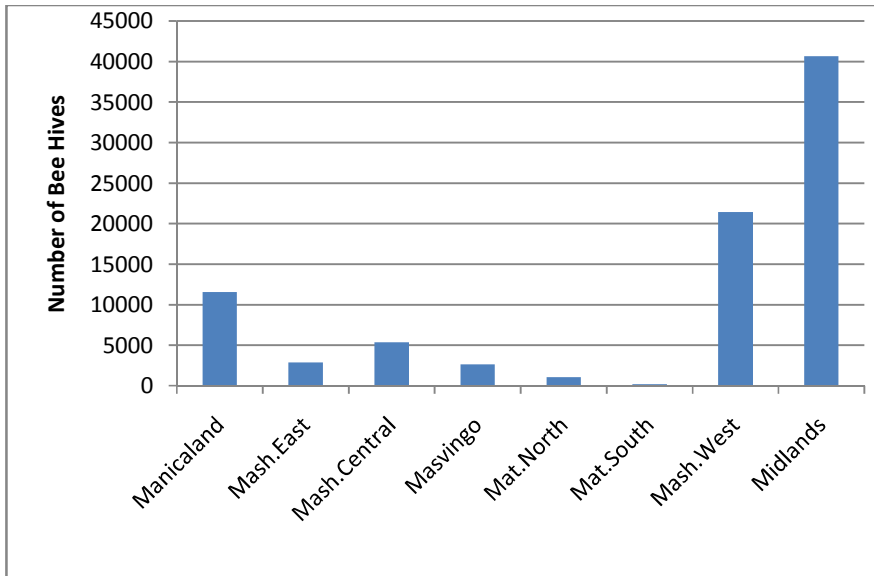
The current situation in Zimbabwe is that beekeepers use three major types of hives namely the Traditional, Kenya Top Bar and Langstroth hives. The total number of hives in the country is 85 794. Midlands province currently has the highest number of hives, followed by Mashonaland West and Manicaland provinces. Matabeleland South has the least number of hives. Table 1 below shows the distribution of hives by type and by province.

Table 1: Distribution of Hives by Type and by Province

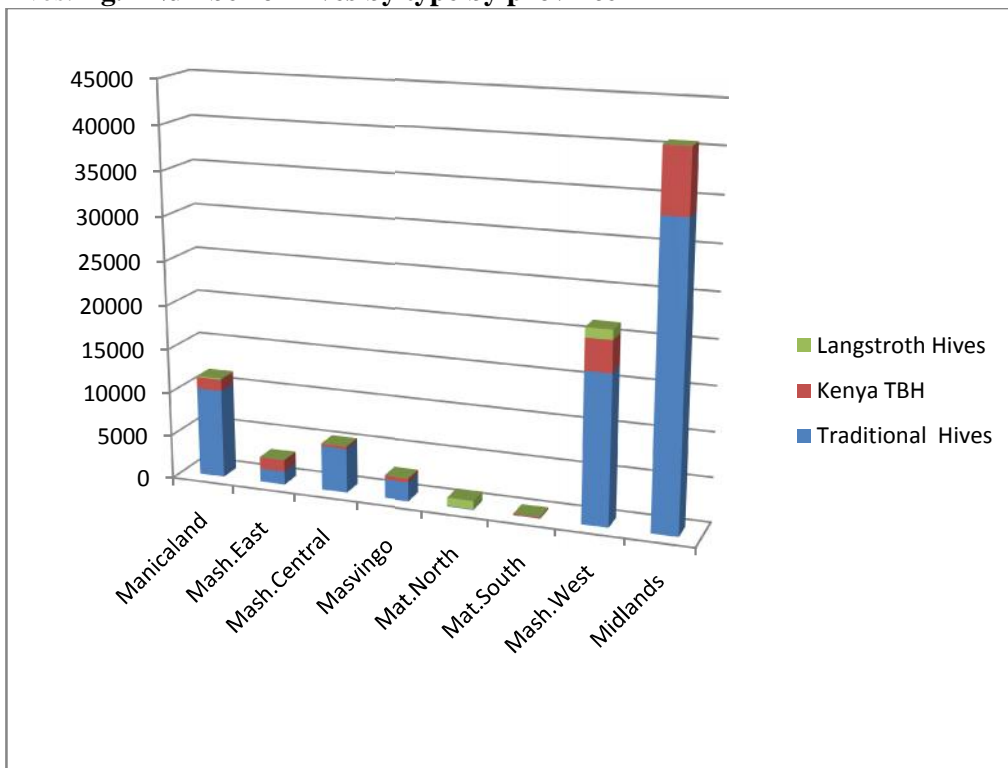
Province	Traditional Hives	Kenya TBH	Langstroth Hives	Provincial Total
Manicaland	10 098	1 324	135	11 557
Mash.East	1 530	1 337	10	2 877
Mash.Central	5 054	274	15	5 343
Masvingo	2 160	435	23	2 718
Mat.North	64	11	954	1 029
Mat.South	38	130	15	183
Mash.West	16 793	3 531	1 100	21 424
Midlands	33 586	7 062	15	40 663
National Total	67 172	14 124	2 215	85 794

Source: Agritex reports, 2014

The reason for Midlands having the highest number of hives could be that it is one of the areas where beekeeping extension started. Matabeleland South has the least number of hives. This may be attributed to type of climate and unavailability of high quality bee forage. **Fig 1: Total number of hives by province**



The traditional hives across the provinces are more than the modern bee hives (Fig 2). This may be due to high cost of modern hives, lack of knowledge and low adoption rate of modern hives. **Fig.2 Number of hives by type by province**



4.0 BEEKEEPING SYSTEMS

4.1 Traditional Hives

Various systems of beekeeping are used in Zimbabwe, traditional and low technology beekeeping with the latter beekeeping employing the use of movable top bars.

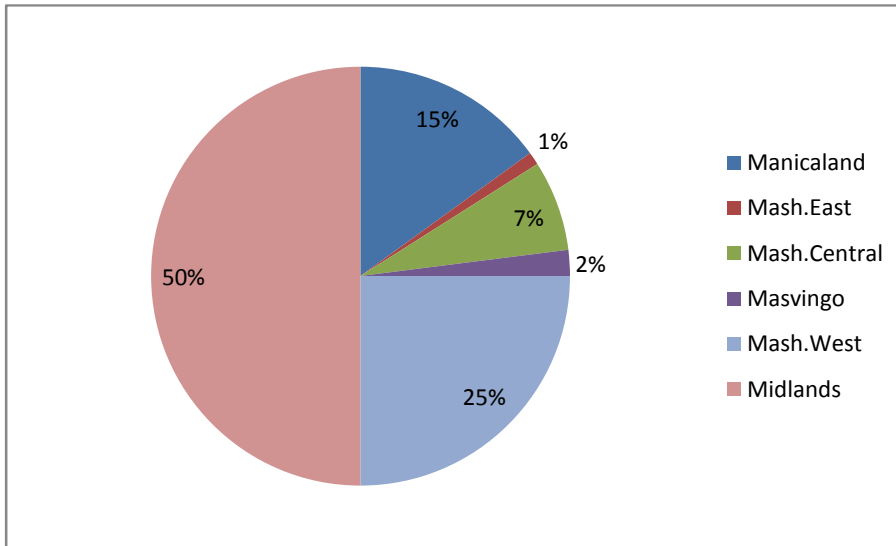
Traditional, low technology is the most common system which is also referred to as the fixed comb hive. Within this system there are various types of hives. The traditional hives include the tree bark, log (Fig 2), clay pot and bucket hives. These have their disadvantages which include that the colony cannot be inspected, the combs with brood cannot be put back once pulled out and it is difficult to prevent swarming or to replace a queen.

Fig 2 Traditional hive



Traditional hives are common throughout Zimbabwe. About 80% of the hives found in Zimbabwe are traditional hives (Table 1). Midlands province has the highest percentage (50%) of traditional hives while Matabeleland north and Matabeleland south have got insignificant numbers. Traditional hives are more in Midlands than in any other province due to the fact that big indigenous trees such as the *Brachystegia* spp are prevalent.

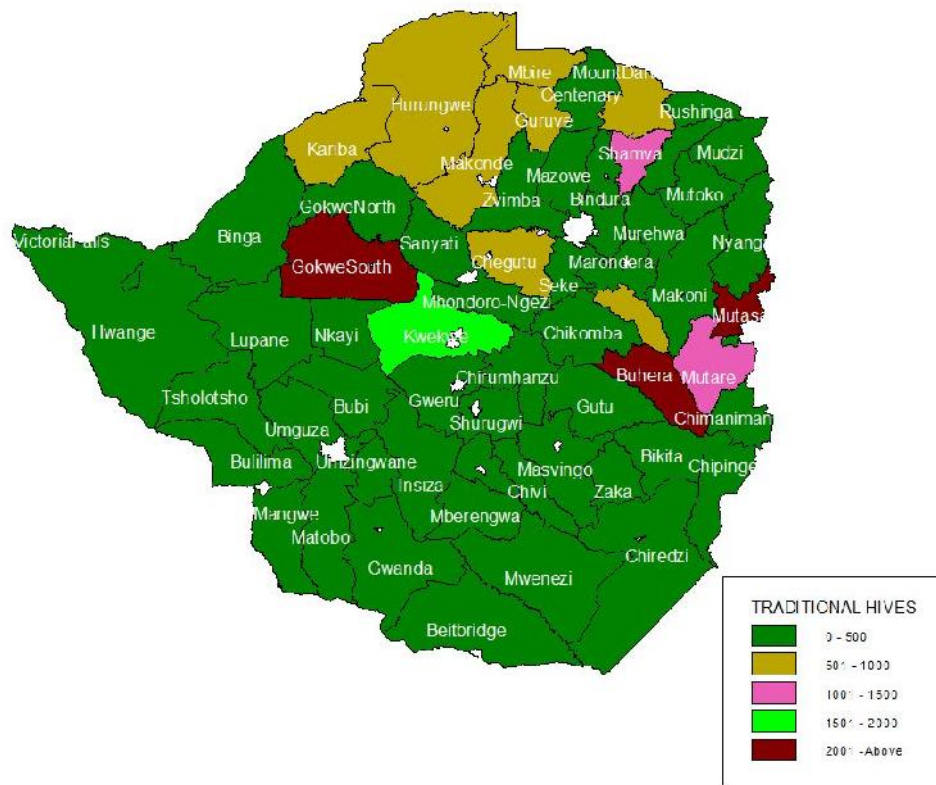
Fig 3 Distribution of traditional hives by province



4.1.1 Distribution of Traditional hives by district

Gokwe South and Buhera have the highest number of traditional hives (Fig 4). Zimbabwe has got a conducive environment for *Apis Mellifera* and it includes a warm climate and a belt of *Brachstegia and Julbernadia* spp woodland (Crane, 1990). Most of the districts have traditional bee hives ranging between zero and five hundred (0-500).

Fig 4 Map showing Distribution of traditional hives by district



Source: Agritex records, 2014

4.2 Kenya Top Bar Hives

The Kenya Top Bar hive is an improved hive that is being promoted. To date, a total of 7 601 KTB hives have been mounted throughout country.

Fig 5 Kenya Top Bar hive mounted



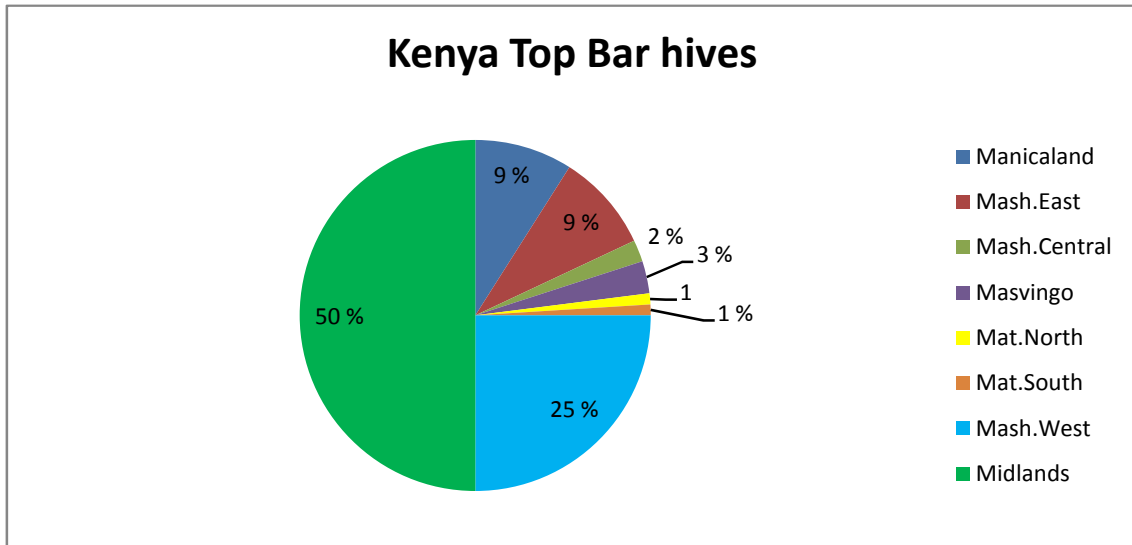
Fig 6 Kenya Top bar hive being inspected



Midlands and Mashonaland West are recording the high use of the Kenya top Bar Hives (Fig 5). This is due to the fact that a considerable number of NGOs which support beekeeping

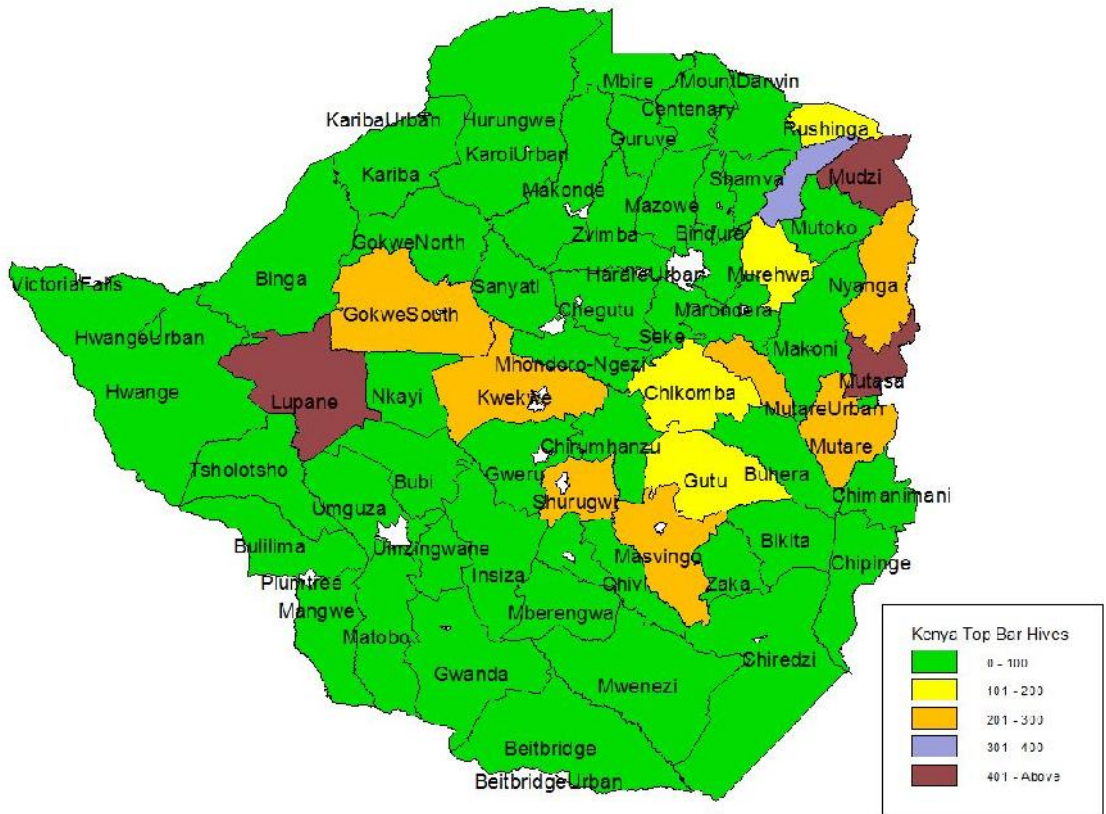
projects operate in these provinces. Low numbers of Kenya top bar hives are in Matabeleland North and Matabeleland South.

Fig .5 Number of Kenya Top bar Hives by province



Lupane and Mutare districts have the highest use of the Kenya top bar hives. This is due to the support given to the communities by a number of NGOS. Most districts have low numbers of top bar hives.

Fig 6 Number of Kenya top bar hives by district



4.3 The Langstroth Hive

The adoption rate of this technology has been very low. This has been attributed to the high cost involved in the acquisition of this type of hive. The technology is good because it produces high quality honey. It is expected that through increased mobilisation and awareness campaign, there will be improved uptake.

Fig 7 The Langstroth hive



Zimbabwe has a Langstroth hive population of 2 215, of which 48% are in Mashonaland West Province. The existence of donor support in Matabeleland North and Mashonaland West explains the high percentages of Langstroth hives as compared to other provinces (Fig 8). Low numbers of this type have been recorded in Mashonaland Central, Masvingo and Matabeleland south where the numbers are insignificant.

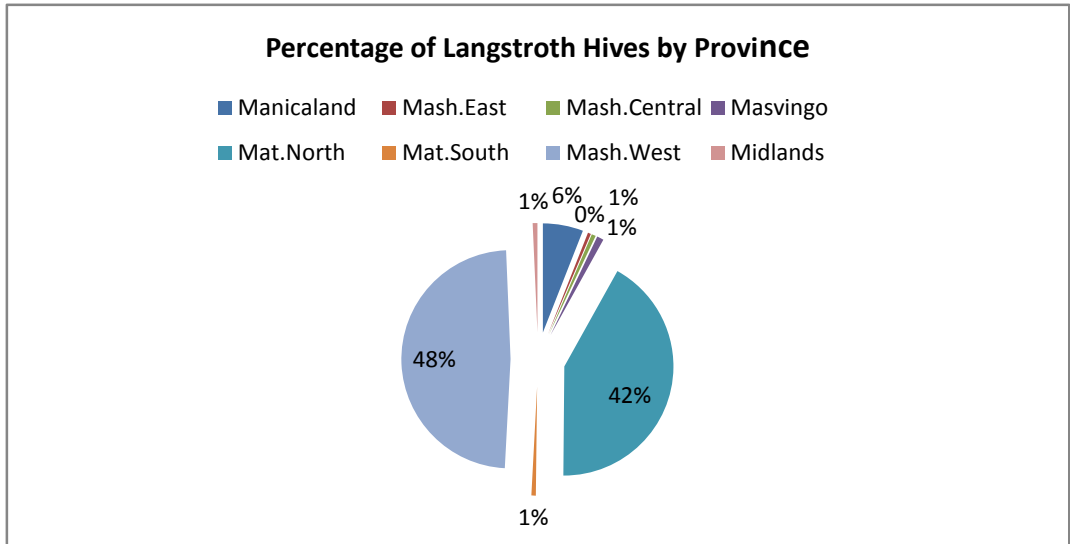


Fig 8: Percentage of Langstroth hives per Province

5.0 HONEY AND WAX PRODUCTION

On a global scale, China is the most significant producer of honey, having produced 398,000 MTs, or (26%) of the global share by volume in 2010. Ethiopia is the largest honey producing country in Africa and one of the top ten producing countries in the world (USDA, 20 13).

In Zimbabwe, the annual estimated production is approximately 427 105kgs. By July 2014, Mashonaland West province had produced 35 480kgs of honey. During the same period Matabeleland south produced 595kg of honey. Most of the honey is sold in combs thus the wax is not rendered as in Midlands, Masvingo, Matabeleland North and Matabeleland south provinces. The production level is low and this may be due to low hive occupancy, poor hive management such as irregular cropping because of lack of markets. This can be improved with increased awareness and training.

Table 2 Number of Beekeepers and Honey Production as at 2014

Province	Number of Beekeepers	Number of hives	Honey Production (kg)	Wax Production (kg)
Midlands	7 535	40 663	2 152	0
Manicaland	1 817	11 557	20 838	660
Mashonaland West	2 030	21 424	35 480	28.7
Mash.East	1 615	2 877	4 939	824
Masvingo	1 015	2 718	1 250	0

Mashonaland Central	1 239	5 343	3 361	153.5
Mat. North	642	1 029	1 115	0
Mat.South	24	183	595	0
Total	15 967	85 794	69 730	16 66.2

Source: Agritex records, 2014

Honey bee populations have declined dramatically worldwide in the past ten years due to a number of factors including human intervention. The bee bank in Zimbabwe has gone down drastically and this has a negative impact on hive occupation. The hive occupancy is estimated at (40%), with a hive population of 85 794, the estimated production is 427 105kg per annum (Table 3). The average import for the past four years is 19 528kg. The national demand is about 446 633kg.

The country's current economic blueprint, ZIMASSET, sets a target of 500 000 litres of honey to be achieved by 2018. This is an achievable target if farmers are trained in beekeeping and hive management. Access to capital and markets are some of the aspects which can lead the farmers to achieve the set target.

Table 3 Estimated honey production

	Production range (kgs)	Average yield(kg)	No. of hives	Hive occupancy (40%)	Expected Production (kg)
Traditional hive	10-15	12	67 172	26 868.8	322 425.6
Kenya Top bar hive	10-20	15	14 124	5649.6	84 744
Langstroth hives	20-25	22,5	2 215	886	19 935
Total			85794		427 104.6

Source: Agritex records, 2014

6.0 BEEKEEPING INTERVENTIONS

Economic marginalization, the frequent failure of past development interventions, and the need of local communities in rural Africa to secure economic survival have focused on self-reliance strategies such as beekeeping (Illinger, *et al*, 1998). Beekeeping interventions are valuable particularly to small scale farmers (Bradbear, 2009). One major intervention in beekeeping targeting smallholder farmers was done by Zimbabwe Farmers Development Trust (ZFDT).

ZFDT was a non-governmental organisation whose thrust was on development of projects focusing on improved agricultural production, employment creation, income generation and reduction of rural poverty through beekeeping. ZFDT was formed in 1992 to anchor sustainable livelihoods development through encouraging and helping farmers to diversify their agricultural activities such as beekeeping to create new income sources and protecting the natural resources. Beekeeping was seen as a means through which small scale farmers in the marginal areas such as Buhera and Hurungwe could enhance their incomes. The organization successfully operated in Mutoko, Nyanga, Mutare, Hurungwe, Makonde, Buhera and Mutasa Districts, creating jobs and generating income for rural people. ZFDT trained a total of 1 079 farmers who subsequently produced 31 568kgs of honey (ZFDT, 2001). Smallholder farmers responded overwhelmingly to the honey production initiative. However the production of the honey declined due to uncompetitive prices offered to farmers as well as inability to penetrate foreign markets.

In recent years more interventions in the beekeeping sector have been instituted by International Labour Organisation(ILO), Environment Africa, Carbon Green Africa, World Wide Fund (WWF), Sustainable Agriculture Trust (SAT), Reduced Emissions from Deforestation and Forest Degradation (REDD), Southern Alliance For Indigenous Resources (SAFIRE) and International Rescue Committee (IRC). The Forestry Commission has also come handy in the promotion of beekeeping by training beekeepers as a strategy for enhancing the conservation of trees and forests. The initiatives have created employment, raised the standard of living of farmers and ensured food and nutrition security amongst the small holder farmers.

The Ministry of Agriculture, Mechanisation and Irrigation Development has made significant strides in promoting training in beekeeping through the establishment of an Apiculture Section. The first Apiculturist in Zimbabwe was Mrs Papadopoulo who was appointed on 11th of July, 1962 (Papadopoulo, 1974). During her initial stint in the bee sector, she trained one thousand white farmers, who produced 650t/yr (Papadopoulo, 1974). The Apiculture Section's responsibilities include the provision of beekeeping training to the extension staff. The Ministry trained 395 extension staff from 1989 to 2006. The extension staff, then in turn, trained farmers. Mr Mike Schmolke played an important role in beekeeping as he was one of the pioneers of beekeeping extension particularly in the rural areas (Nyatsande, 2014. personal communication).

This approach has helped the adoption process of modern methods in beekeeping. There was a significant increase in honey production.

The Ministry of Women's Affairs, Gender and Community Development recently enlisted the services of the Forestry Commission in training programmes which resulted in 225 groups and 9713 people trained in beekeeping in 2014. The Ministry of Small and Medium Enterprises equipped communities with entrepreneurial skills to enable the beneficiaries to run beekeeping projects along business lines.

Equipment suppliers in Zimbabwe are few and sometimes they do not stock important basic equipment necessary for beekeeping. The main suppliers are John Rau (Pvt) Ltd, Oregano Seven and ZimApiculture Trust. ZimApiculture Trust supplied 500 Kenya Top Bar hives to 207 households in Guruve in 2013 under the Australian Direct Aid Program and 430 hives to 152 households in 2014.

The Department of Livestock Veterinary Services is responsible for administering for Bees Act. The Act empowers the Division of Veterinary Services (DVS) to deploy inspectors for the surveillance and monitoring for the bee health and diseases as well as for the prevention of entry, establishment and spread of exotic diseases and pests through movement of bees and honey and related materials and equipment by way of trade. The Division of Livestock Production and Development has the mandate and will be mainstreaming apiculture in its extension services towards improved production and quality assurance services.

On the issue of diseases the Veterinary department under the Ministry of Agriculture, Mechanization and Irrigation Development is responsible for administering the Bees Act Chapter 19:02. The Act empowers the Department to have inspectors for the bee diseases and to control the movement of bees and honey within the country and across the borders.

7.0 CHALLENGES IN BEEKEEPING

Beekeeping, like any other enterprise, has its own challenges. The major challenges in beekeeping are low hive occupancy, high cost of modern hives and equipment, low market prices, limited market information and lack of institutional support.

In Zimbabwe, hive occupancy ranges from (30%) to (60%), this result in low production and wastage of resources. This state of affairs is not conducive for farmer and other entrepreneurs from significantly investing in the apiculture sector as more than half of the hives would be unoccupied.

Most of the hives found in the country are traditional hives, and this may be due to the high cost of the modern hives such as the Langstroth hive which costs about USD \$200. The honey extractors are also beyond the means of most farmers.

Low market prices and limited market information are some of the challenges facing the beekeepers. There are no efficient and organized markets for the honey producers. The major markets for honey are pharmaceuticals, supermarkets, hotels and hospitals. The price of unprocessed honey ranges from \$1.50 - \$2.50/kg. Currently the demand for honey is high as it outstrips supply.

Beekeeping equipment which can be used in the value chain is scarce and expensive, hence putting it beyond the reach of many farmers.

There is little research on apiculture yet the industry has potential for growth.

8.0 PROPOSED INTERVENTIONS

Timely and appropriate interventions particularly in the small holder sector may alleviate poverty and raise the standard of living.

The industry could realise its potential if the Ministry of Agriculture, Mechanisation and Irrigation Development, in collaboration with its stakeholders, steps up training in beekeeping for both staff and farmers. Long term extension programmes need to be designed to match the needs and expectations of the beneficiaries.

Creation of viable markets can motivate the trained farmers towards sustained production. Market linkages would make farmers aware of market information and thus would know where to sell their produce. Stimulation of local production and trade of beekeeping

equipment is vital to reduce costs and create additional jobs and empower all the value chain actors.

Improvement of bee forage also enhances productivity and cushions the environment from climate change through carbon sequestration.

There is need to invest in research and development to develop appropriate beekeeping and processing systems for the promotion of the industry and improvement in the understanding of the bee sector. The Government of Zimbabwe should consider setting up a research and training institution for beekeeping.

9.0 BEE DISEASES IN ZIMBABWE

Information on bee diseases in Zimbabwe is presently scanty. Among some of the confirmed bee health issues are Varroa mites which were recorded in Chiredzi, Beitbridge, Chipinge, Masvingo, Bulawayo, Nyanga, Shangani and Gweru in 2006. The small beehive was reported in some parts of the country.

Major diseases of economic importance have not been reported in Zimbabwe such as American foul brood and European foul brood. Research and intensive surveillance need to be implemented to establish the occurrence and patterns of endemic health problems.

Both passive and active disease and pest surveillance are being strengthened to establish the nature of endemic and emerging diseases affecting the country, international surveillance will also be implemented to improve on sanitary assurance services for trade. This will prepare us to prevent incursions of diseases and pests from other parts of the globe, especially now through unscrupulous trading via mail order and the internet. Bee producers are expected to participate in disease surveillance by reporting colony collapses and other health issues to DVS for vigilance, prompt reporting and an early warning system for appropriate measures to be instituted in case of confirmed diseases and pests. These will be in turn monitored for risk reduction to boost production and to enable international certification in support of export. A clear system of health surveillance is a necessary tool for sanitary safety assurance and health certification for those who may wish to export.

Extension support to disseminate knowledge and technologies on appropriate use of agricultural, environmental pesticides and antibiotics to both crop farmers and beekeepers needs to be strengthened.

The Department of Livestock Production and Veterinary Services has therefore begun to build the capacity of its wildlife Veterinary Unit to address this need and will be organising extension units for both health and husbandry to improve its nationwide coverage on apiculture and producer training. Codes of practice for producers and processors and standard operating for regulatory and port health staff are being developed.

10.0 PROCESSING OF HONEY (VALUE ADDITION)

Processing of honey has been a challenge among the beekeepers. Most of the honey has been fetching low prices as beekeepers would sell unprocessed honey. However the quality is high as it complies with the COMESA SAZHAS 349:2004, Food and Food standards Regulations, 2001 specifications requirements. Most of the honey is sold as comb honey instead of liquid honey. Training and processing machinery are a major requirement if beekeepers are to add value to their honey. Most of the processing is being done at commercial level by commercial

entities such as Vaida Chemicals. The company processes products like honey, wax and propolis into other usable products in the cosmetology sector.

11.0 ACCESS TO FINANCE BEEKEEPING PROJECTS

Mobilising finance to support beekeeping projects is critical as this is one area which can improve the livelihoods of the smallholder beekeepers and also conserves the environment. Beekeeping is a low input enterprise which works in harmony with nature. There is need for financial institutions to support beekeeping activities. Therefore it is critical that more emphasis be put on promoting beekeeping projects.

12.0 DEMAND FOR HONEY

There is currently a high shortage of honey and bee related products such as beeswax in the market. The demand for honey has been on the increase and this has been attributed to its benefits. These include its medicinal properties and the sugar which is directly absorbed into the body system. Zimbabwe has been importing honey to meet its national requirement and there were no exports during the same period (Table 3).

Table3 Zimbabwe Honey imports (2009-2012)

Year	2009		2010		2011		2012	
Partner \ Indicators	Mass (Kg)	USD	Mass (Kg)	USD	Mass (Kg)	USD	Mass (Kg)	USD
AE:United Arab Emirates	-	-	-	-	-	-	605	429
CN:China	-	-	-	-	-	-	-	-
EG:Egypt	-	-	-	-	-	-	816	2,962
GB:United Kingdom	-	-	-	-	-	-	234	107
MW:Malawi	-	-	-	-	-	-	10,556	45,195
NL:Netherlands	-	-	-	-	-	-	208	1,016
ZA:South Africa	14,166	95,315	2,483	23,078	2,752	13,611	807	6,010
ZM:Zambia	5,500		12,023					70,345

		2,465		23,442	10,563	45,503	17,400	
TOTAL	19666	97780	14506	46520	13315	59144	30625	1260624

Source: ZIMSTATS 2014

13.0 CONCLUSION

Over the past 10 years, Zimbabwe has realised a substantial increase in the number of beekeepers and number of hives. This has been attributed to an increase in the interventions promoted by the Zimbabwean government in partnership with development partners and NGO's. This has seen the Zimbabwean Economic blueprint acknowledging the potential of this sector in economic development. A target is set to annually produce 500 000 Litres of honey. This target is expected to meet the domestic demand and the surplus will be exported to the regional and international markets. The beekeeping systems prevalent in Zimbabwe include the traditional hives, and modern hives such as the Kenyan top bar hives and the Langstroth. More yields are obtained from the modern hives though in terms of production the traditional hives are contributing more because they are the widely used hives around the country. Beekeeping has contributed in the protection of natural resources as small holder farmers become more sensitive to the resources as they provide them with improved incomes and an improved livelihood. The institutional framework is already available with five key Ministries expected to take a lead role in mobilising, training and creating awareness on the opportunities which can be attained from beekeeping. These Ministries have various roles with the Ministry of Industry and Commerce coordinating the processors. Ministry of Agriculture, Mechanisation and Irrigation development provides the technical expertise in training the beekeepers and also regulating the sector through administering the Bees Act. The APIEXPO 2014 provides an opportunity for the small holder beekeepers to link up with local and regional markets, and to learn new beekeeping techniques.

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