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ABSTRACT

FARMERS KNOWLEDGE, PRACTICES AND HEALTH PROBLEMS ASSOCIATED WITH PESTICIDE USE IN WEST TRIPOLI, LIBYA

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This study on community perception on honeybee and beekeeping practices and constraints in Tripoli used quantitative method considering 300 respondents and the data was analyzed using SPSS. This study aims to answer the research questions; Does educational background affect knowledge and necessary skills training in beekeeping? Does the community have knowledge and necessary skills about beekeeping? Does age has any relationship with knowledge and necessary skill training about beekeeping? Is there a relationship between gender and constraint associated with beekeeping? Does the methods used in the community associate with the constraints of beekeeping? What are the general constraints and season of production in beekeeping in Tripoli, Libya? In this study the dominant participants were male between the ages of 21 to 30 years old with college degree. The majority of them make use of bamboo as material for traditional hive construction using a traditional method. The period of honey production in Tripoli is between October-November. There is statistically a significant difference between how educational background affect knowledge and necessary skills training about beekeeping. The majority of the people have basic skills and knowledge about beekeeping in the area of Colony split, honeybee colony management, processing, handling and storage and they have the knowledge and the necessary skills in market information and networking. The farmers are also skilled in input utilization. They have bee forage management knowledge and skills in beekeeping. They have all types of training about knowledge and skills required for beekeeping. The community have knowledge and necessary skills about beekeeping. There is no significant ($p = .171 > 0.005$) relationship between factors that determine knowledge and necessary skill training about beekeeping. There is a significant ($p = .000 > 0.05$) relationship

between methods used by the community and the constraints of beekeeping. There is a significant ($p = .000 > 0.05$) relationship between *the general perception, constraints and season of production in beekeeping of the community.* The constraints faced by the Tripoli community are absconding of colonies, lack of bee colonies, droughts, poor societal awareness, pesticide poisoning, lack of training, honeybee diseases and lack of initial capital to start up beekeeping.

Keywords: beekeeping; constraints; beekeeping practices; honeybee; perception

ÖZ

ÇİFTÇİLERİN, ZİRAİ İLAÇLARIN KULLANIMI İLE İLGİLİ BİLGİLERİ, UYGULAMALARI VE SAĞLIK SORUNLARI

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Yüksek Lisans, Çevre Eğitimi ve Yönetimi
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Balarısı ve arıcılık uygulamalarındaki toplum algısı ve Tripoli'deki kısıtlamalar üzerinde yapılan bu çalışmada 300 katılımcı düşünülerek kantitatif yöntem kullanılmış ve çalışma SPSS kullanılarak analiz edilmiştir. Bu çalışmanın amacı; eğitim geçmişinin arıcılık hakkındaki bilgi ve beceri eğitimlerini etkileyip etkilemediğini, toplumun arıcılık hakkında gerekli bilgi ve becerilere sahip olup olmadığını, yaşın, arıcılık hakkında gerekli bilgi ve beceri eğitimi ile ilişkisi olup olmadığını, cinsiyetin arıcılıkla ilgili kısıtlamalar ile ilişkili olup olmadığını, toplumda kullanılan yöntemlerin arıcılık kısıtlamaları ile ilgili olup olmadığını, ve Tripoli Libyadaki arıcılık genel kısıtlamalarının ve üretim mevsiminin ne olduğunu, araştırmaktır. Bu çalışmada baskın katılımcıların çoğunluğu, geleneksel bir yöntem kullanarak geleneksel kovan yapımı için bambuyu malzeme olarak kullanmakta olan ve 21-30 yaşları arasındaki kolej dereceli erkeklerden oluşmakta ve Tripoli'de bal üretim dönemi ise Ekim-Kasım olmaktadır. Eğitim geçmişinin bilgiyi nasıl etkilediği ve arıcılık konusunda gerekli beceri eğtimi arasında istatistiksel olarak anlamlı bir fark vardır. İnsanların çoğunluğu, koloni bölünmesi alanında, bal arısı kolonisi yönetimi, işleme, taşıma ve depolama alanında arıcılık konusunda temel bilgi ve beceriye sahiptir ve ayrıca, piyasa bilgisi ile ağ kurma hakkında bilgi ve gerekli beceriye sahiptirler. Çiftçiler de girdi kullanımı konusunda beceri sahibi olup yiyecek arama yönetimi bilgisine ve arıcılık becerilerine sahipler, arıcılık için gerekli bilgi ve becerilerle ilgili her türlü eğitime sahipler ve toplum da arıcılık konusunda bilgi ve beceri sahibidir. Arıcılık hakkında bilgi ve gerekli beceri eğitimini belirleyen faktörler arasında anlamlı ($p = .171 > 0.005$) ilişki yoktur. Toplumda kullanılan yöntemler ile arıcılık kısıtlamaları arasında anlamlı ($p = .000 > 0.05$) bir ilişki vardır. *Toplumun arıcılığında genel algı, kısıtlamalar ve üretim sezonu arasında önemli (p*

= .000> 0.05) bir ilişki vardır. Tripoli toplumunun karşılaştığı zorluklar; kolonilerin yok oluşu, arı kolonilerinin yokluğu, kuraklıklar, zayıf toplumsal farkındalık, pestisit zehirlenmesi, eğitim eksikliği, bal arısı hastalıkları ve arıcılığı başlatmak için başlangıç sermayesinin olmamasıdır.

Anahtar Kelimeler: arıcılık; kısıtlamalar; arıcılık uygulamaları; balarısı; algı

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To my wonderful course mates, friends and well-wishers, I am grateful.

DECLARATION

I hereby declare that, all the information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

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ABBREVIATIONS

%	:	Percentage
<	:	Less than
CNS	:	Central nervous System
DDT	:	Dichlorodiphenyltrichloroethane
GIT	:	Gastrointestinal Tract
KAP	:	Knowledge, Attitudes, and Practices
OC	:	Organochlorines
OP	:	Organophosphates
OPIDP	:	Organophosphate-Induced Delayed Polyneuropathy
PPEs	:	Personal Protective Equipment

CHAPTER I

INTRODUCTON

The relation between human beings and bees is endemic in Africa where modern beekeeping has taken various forms, starting from wild honey harvesting from hollow nests of bees in hollow trees and clefts. Historically, hunting has been practiced in many countries. However, honey is much less known in the Mediterranean region. Honey hunting charts can be seen in many parts of Africa. In their paintings, bears, hunters and their primitive tools (Crane, 1999), such as the honey pots needed to make such stairs, torches and raids, have been found in rocks in Libya and in many other countries. However, bee records were not found in the North African territories in the western part of Egypt. The earliest possibility concerns Libya, which limits Egypt.

Herodotus (485-425 BC) wrote: “Next to the Maxyes of Libya are the Zaueces, They act as guides for women as they do battle wars. Then their bees are said to make much honey in Gkizantes, but those masters make a lot. Perhaps "Bees" bubbles form and masters made dessert "honey" of dates or other fruits. Herodotus wrote later, that Libyan men were "making honey from the salt fruits of tamarisk". Beekeeping in Libya is traditionally practiced in its first years (Huseyin 2001). Almost all of the traditional hives in North Africa are made from clay, clay or other materials that can be opened at both ends (Crane, 1999).

Brittan (1956), the bee guardian of the King of Libya, Idris El-Senussi, reported that the Libyan beekeepers in Cyrenaica were collecting flocks to put in large, long and wide shallow wooden boxes that could hold 15 carts. Two or three forked cedar sticks were blocked in the middle of the thick goose bush or as columns from front to back. At the front and rear entrances of the beaks, the combs were cut without killing the bees. These boxes, estimated by Brittan, brought about 18 kilos of honey each year (Brittan, 1956). According to what Brittan heard these boxes were being used more than 200 years even before the Turkish era. Brittan reported that most of the family had one or two cells, but there were beekeepers that had 100 beehives in the caves

By the 1950s, Libya was the third poorest nation on the planet. After the disclosure of oil in 1959, the Libyan economy changed drastically. The present day beekeeping has developed in the course of the most recent decades, with the selection of current beekeeping procedures utilizing just removable-outline cells (Brittan, 1956). The effective acquaintance of present-day hives in the East of Libya happened after the attacks of the World War II and was upheld by Olive Britten in 1952 (Showler, 2011). Until today, while the beekeepers in the Western part of Libya utilized the Langstroth hives, hives in the western district were being utilized and thought to have been transported in by the Italians amid the occupation (1911-1932). At that point, in the mid-1960s, European honey bee developments, particularly Italian, A. mellifera ligustica, were the premises of honey business. At present, there are more than 3,000 beekeepers taking care of around 50,000 states (El-Mabrook, 1996).

Albeit huge numbers of these honey bees are kept up in one area (i.e. not moved), despite everything they create a mean of 500,000 kg for each annum. Due to elevated administration challenges, related to constrained botanical assets and honey bee ailments, a few beekeepers needed to decrease their operations. While various beekeepers oversee at least 200 states; the largest share oversee 50 or a couple of more settlements in their apiary to collect respectable measures of honey. Keeping honey bees as a part-time salary is extremely normal in Libya. Subsequently, increased rivalry from nearby apiaries seems to have decreased nectar accessibility.

1.1 Problem

Beekeeping all through the world, swarming is a difficult issue that requires beekeepers in Libya to visit their apiaries every 7-10 days amid solid nectar stream, to control hives for swarm minimization. Habitat in Libya is probably going to be the most noteworthy factor influencing honeybee populaces later on. In spite of the fact that the populace in Libya multiplied in estimate in the vicinity of 1970 and 2000 the significant effects were in the urban areas and different settlements. The decrease in forested territories through land misuse has a more prominent effect. In fact, beekeepers move their honey bee states to these regions during drought and deforestation could influence them radically.

Restrictions on the importation of hive things or beekeeping materials from Egypt are coordinated by the organization/government. The importation of honeybees is denied by the Agricultural Pest sanctioning. These measures could keep the presentation of different nation pest and diseases to which Libyan honey bees are not balanced and to which they could be frail.

1.1.1 Sub problem

1. What is the beekeeping methods practiced in Libya?
2. Does the community have knowledge and necessary skills about beekeeping?
3. What are the commonly used Bee Hives in the community?
4. What season is honey produced?

1.2 Aim of the study

1. To determine beekeeping methods used in the community.
2. To identify the community knowledge and skills in beekeeping.
3. To know the commonly used Bee hives in the community.
4. To determine the honey production season.
5. Does educational background affect knowledge and necessary skills about beekeeping?
6. Does age have any relationship with knowledge and necessary skills about beekeeping?
7. Is there a relationship between gender and constraint associated with beekeeping?
8. Does the methods used in the community associate with the constraints of beekeeping?

1.3 Importance of the Study

Honey yields are all considered low, around 10-15 kg for each hive per annum (Hussein, 2000), as a result of limited honeybee vegetation which needs winter sustaining, the ordinary routine with respect to regional settlements just before honey stream, and the debilitating effects of pesticides and infections. Consequently, enthusiasm for both honey and honey bee packages are always more conspicuous than supply. There is steady enthusiasm for honey bees, with swarms offering for

around 200 LD, which gives beekeepers with additional compensation. Normally, the beekeeping season begins earlier in the eastern locale. However, the usage of different sorts of hives makes it difficult to supply honey bee packages from the Eastern to the Western area. Getting swarms in trap hives (particularly in spring) is a system being used by various beekeepers to manufacture settlement numbers.

1.4 Assumptions

- It is assumed that the number of community members/farmers used in this study represents the farmers in the study area.
- The community members/farmers in the area has knowledge regarding beekeeping, practices and the constraint experience in beekeeping.
- The answer given by community dwellers/farmers who participated in the study were without bias and influence of the researcher.

1.5 Limitations

The limitations in this study are as mentioned below:

- This research is limited to community dwellers/farmers in West Tripoli only.
- The study was only limited to participants of 300 community dwellers/farmers.

1.6 Definitions

Honeybees are insects that go under order Hymenoptera and family Apidae and indicated finish transformation (Bluthgen & Klein, 2011).

Constraint is anything that limits a system or agency from getting its targeted goal (Goldratt, 1990).

CHAPTER II
LITERATURE REVIEW

This chapter gives and overview of what beekeeping entails and giving literature review on what other researchers has carried out with respect to the topic including perception, attitude and practice constrains and also highlighting honeybee sources, plants, pest and diseases in Libya and other part of the world.

2.1 Subspecies of Libya Honey Bee

Because Libya was historically so isolated, its local bees had no outside contact with other bees. The native bees have been described as predominantly of the Taillan race, *A. mellifera intermissa* (Hepburn & Radloff, 1998). Brittan, (1956) wrote in one article, "the race itself seems to be the purest one found this side of the Iron Curtain. [the Libyan bee] is gentle apart from a natural intense fierceness during the great heat of the day, or when very strong through a long period of honey flows". Brother (1954), after a visit to Libya, expressed that honey bee settlements there were impressively more forceful than every one of those he had experienced in the USA. El Banby, (1977) presumed that bees from upper east Libya have a place neither with A. m. *intermissa*. In any case, in view of the morphometric examination of neighboring nations, Ruttner (1988) asserted that Libya honey bees have a place with A. m. *intermissa*, in show disdain toward (Shaibi et al., 2009) explored the bee populaces of A. *mellifera* in the Saharan and waterfront locales of Libya, covering bee biophage and bee conveyance in North Africa. They found that Libyan bees are morphologically and hereditarily unique in relation to nearby subspecies. The greater part of Libyan bees (92%) has a place with the Eastern developmental lineage (O). As they may be, there are additionally neighborhood impacts from imported European creatures. They proposed naming Libyan bees as a different subspecies.

In another investigation, Shaibi and Moritz thought about the El Kufrah undisturbed seaside populace utilizing 15 polymorphic microsatellite loci to survey the recurrence of match, province thickness, hereditary decent variety, and separation populaces. They found that the honeybee populace of the remote desert spring of El

Kufrah was very much disconnected while those of the desert garden of Brak and the beachfront region demonstrated hereditary impressions of introgression by business beekeeping (Shaibi and Moritz, 2010). El Kufrah did not show the endogenous sign of the isolated population suggesting that the founder population is sufficient to provide a viable local survival (Shaibi 2013). Although the bee kingdoms are often imported from Italy and Australia to Libya, these are often the only ones of the time. Libya probably has many health-care columns to provide genetic material for growing healthy queen, but Libya does not have a queen rearing unit.

2.2 Bee Plants

Like most other African nations, pollination adjusting is not carried out or done (Keshlaf, 2002) in Libya. Thus, honey is thought to be the major if not the sole income for beekeepers. There is no substantial size of plantations or other green yields. Beekeepers are asked to give honey to agriculturists as a rental expense for access to a blooming crop.

Subsequently, beekeepers to a great extent depend on non-crop wild plants, diverse types of which happen in various areas of the nation.

Temporary beekeeping is regularly practiced for honey generation (Keshlaf, 2002), the essential honey plants in Libya including; *Eucalyptus spp., Acacia spp., Citrus spp., Pinus spp., Cupressus spp., Thymus vulgaris, Lantana camara, Hisbiscus rosa-sinensis, Medicago sativa* and numerous wild plants (Keshlaf, 2002; Keith, 1970; Hussein, 2000; Rateb and Hussein, 2012; Owayss, 2005; Mohaned et al., 1981). Of those sorts, Eucalyptus honey, from *Eucalyptus* spp., is one of the major honeys conveyed and consumed in Libya especially in the north where there are wide scopes of trees which sprout in November and December. Because of the back to back blooming of the unmistakable *Eucalyptus species*, it is seen as the most crucial wellspring of nectar and tidy to areas in dry season periods (Rateb and Hussein, 2012; Owayss, 2005).

In the western territory of Libya, there are three essential honey streams, the heaviest from spring blossoming plants in late March and April. Various beekeepers move their territories to inclining country discovered east of Tripoli for the second spill out of wild blooms of Sider, *Zizaphus Spina*, from May to June, at that point for the third flow from thyme, T. vulgaris, in June to July. In leave zones, *tamarisk,*

Tamarix nilotica, gives excellent honey stream (Zboray, 2013). In the eastern locale there are other bee plants, for example, *schamiry*, *Arbtus pavarii*, (Keith, 1970) and carob, *Ceratonia siliqua* (Brittan, 1956). Libyans use honey basically for therapeutic purposes, yet also for some carefully assembled sweets, especially Baklava, an outstanding Middle Eastern pastry. Brittan (1956) idolized Libyan honey including stream honey from the carob tree, min honey from the shaiee tree, and hanoon honey from schamiry tree. Raised necessities of Libyan honey was attested by Owayss, (2005) who overviewed the physicochemical properties of Libyan *Eucalyptus* honey.

Table 1

Main Bee Plants in Libya, and its Flowering Period (Keshlaf, 2014)

Common name	**Scientific name**	**Flowering season**
Orange tree	Citrus spp.	March – April
African rue (harmal)	Peganum harmala	April – May
Sedr	Zizaphus Spina Christi	May – June
Thyme (Za'atar)	Thymus capitatus L.	June – July
Tamarix	Tamarix Africana	July – August
Carob tree	Ceratonia siliqua	August- October
Schamiry	Arbtus pavarii	December – January

The Libyan honey market is rich in unifloral honey. Non-commercially made honey brings the first-rate cost, stretching out from 20 to 40 Libyan coffeehouses (LD) (about US $17 to 30) per kg, aside from hanon "intense" honey which gets 70 LD per kg. Most of the honey conveyed by the business beekeepers is sold particularly to customers, oftentimes, along roadsides in amazing glass holders. There is no advancing endeavored, in light of the way that honey is all around sold when the beekeeper produces it. Imported honey is offered in business sectors for US $7 per kg, yet despite its lower esteem, clients lean toward the area honey because of its quality and genuineness.

Crystallized honey is mainly misinterpreted as an indication of foul play by the producer, so buyers are happy to obtain honey particularly from trustful beekeepers when it has been extricated.

Beekeepers when in doubt do not requeen such states. Regardless, this system at last could include issues like beekeepers are unintentionally deciding for honey bees that are more disposed to swarming. Disregarding the way that there is an extending enthusiasm for stick and other honey bee things to be used generally for standard remedy, the nonappearance of learning and availability of present-day technology for setting up these elective honey bee things mean these beekeepers are relinquishing this wellspring of pay. The primary other honey bee thing is honey bee wax.

2.3 Pest and Diseases

Control of honey bee diseases has always been considered as a crucial bit of good beekeeping. Beekeepers must make sense of how to see signs of honey bee diseases and know the correct exercises for everybody. Most by far of the cosmopolitan honey bee pests and diseases are accessible in Libya (Ghalio, 1997). The honey bee ectoparasite bug, Varroa destructor, is a bona fide hazard to beekeeping in Africa and furthermore, various diverse parts of the world, was represented to be accessible in Libya in 1976 (Crane, 1979). Pest spread to honey bee bundles imported from Bulgaria Fallah, (2000) to Algabal ElZakder which by then spread rapidly all through the country. In a perfect world, the obstruction made by Sahara will keep its spread into the sub-Saharan African honey bee population. Shibi gave a detail that that desert spring of Al Kufrah, in the Libyan desert, (Shaibi, and Moritz, 2010) and Australia are the fundamental sans varroa regions around the globe (Holland, 2012). Attacked European honey bee begins to bite the dust inside two years if left untreated (Gregorc and Planinc, 2002), yet Libyan honey bees seem to have a good clean direct since areas can make more than five years without medicine. Kefuss (1995) found that *A. m. intermissa* provinces from Tunisia, which also occur in Libya, had the most irregular measure of clean direct of a couple of subspecies of A. mellifera (A. *m. mellifera, A. m. ligustica, A. m. carnica, A. m. caucasica*) that he attempted from France, Tunisia and Chile.

The presence of the honey bee parasite, *Braula coeca*, in Africa was represented in Tunisia in 1978 (Smith and Caron, 1985). On account of trade exercises, the parasite spread to Egypt, in the scopes of the Nile Delta, by then into Algeria in 1981 (Smith and Caron, 1985), and consequently into Morocco and Libya. Because of their thoroughly similar appearance, some Libyan beekeepers encounter issues into isolating between varroa bug and honey bee vermin. Libyan beekeepers in like manner have issues with the more unmistakable wax moth, *Galleria mellonella*, which makes the most genuine mischief to put away honey brushes (Ghalio, 1997). In the midst of summer, they can in like manner plague weakened provinces. Various beekeepers avoid attacks by treating set away supers with paradichorobenzene (PDCB). A creating number of beekeepers store their supers in cool rooms to avoid synthetic pollution of honey. Small hive beetle (SHB), Aethina tumida, does not pose a hazard in sub-Saharan Africa since it is endemic to this region (El-Niweiri et al., 2008) and the region honey bees have coevolved with it.

They simply show minor irritations since they swarm weakened provinces (Neumann and Elzen, 2004). In the Northern part of Africa, their quintessence has been represented in Egypt along the Nile stream and in Sudan (Mostafa and Williams, 2000). In any case they don't seem to have developed there as shown by late incredible scale thinks about that watched them to be either not accessible or uncommon (Hassan and Neumann, 2008). Like Varroa parasites, SHB gets the chance to be the most genuine bug when they were displayed to helpless hosts (European strains of honey bees) in the USA and Australia.

A couple of diseases fundamental in temperate beekeeping regions, for instance, European foulbrood, Streptococcus pluton, have been watched on occasion (MK pers. obs.) in early to mid-spring, the period when provinces should make to most outrageous masses. The parasitic diseases chalk brood, Ascosphaera apis, has similarly been represented Ghalio, (1997) and for its organization, beekeepers are urged to keep up swarmed states and to decide for settlements which exhibit insurance, for future honey bee package production. In Africa, American foulbrood, Paenibacillus hatchlings, has not been broken down or analyzed in the south of the Sahara, beside one unverified observation from the Johannesburg region in South

Africa (Govan et al., 1999). An investigation of Libyan honey did not allude to any defilement by Paenibacillus hatchlings spores (Fries et al., 2001). It may be that the diseases are not present in Libya, or that states are tolerant because of their perfect lead or low physiological susceptibility.

It is all around documented or writing that honeybees with the ability to perceive and clear diseases brood can be absolutely AFB safe (Spivak and Gilliam, 1998). The bee-eater, Merops apister, is a winged creature that nourishes on honey bees and different insects. The original of this species typically seen in April-May, with top populaces in July-August. (Keshlaf, 2002 and Alfallah, 2010), showed that bee-eaters did not influence bee flight movement amid their research work. In spite of the fact that forager bees over 90% of bird’s insect diet (Alfallah, 2010), beekeepers regularly disregard these winged animals. They would be viewed as a genuine nuisance on the fact that they arrive prior in the season, particularly amid mating flights of new virgin queens.

2.4 Origin and Evolution of Bees and Beekeeping

Honey bees likely advanced from wasp like progenitors, contemporaneously with the angiosperm plants towards the finish of cretaceous period, 60 to 100 million years prior (Martin, 1976). As indicated by Dietz (1986) the present honey bee fauna likely began more than 70 million years back. Presently, eleven groups of honey bees are the most known, just some of which are distinguished by determined qualities separating them from other honey bee families. There are around 1000 different types (and subvariety), joined with subgenera, roughly 600 nonspecific groups and an expected 20,000 living types of honey bees living on the planet's galleries (Roubik, 1989). Honey bees (Apoidea) have a great family of around 20,000 species, in the request Hymenoptera. The larger part of honey bee species are 'lone' while the minorities are social (bumble bees and stingless honey bees), and just a couple of types of social honey bees, are kept in hives by beekeepers.

There are three groups of social honey bees, which create nectar. These are: the Bombidae, Meliponidae and Apidae (Smith, 1960). The Bombidae are discovered in calm atmospheres. Their homes are little, regularly in the ground and are of no business significance with the exception of as pollinators of specific plants. The

Meliponidae, or stingless honey bees, happen all through the tropical areas of the world. Their settling spots might be gaps in the ground, in empty trees or little cavities in dividers and on the underside of branches. The family Apidae, to which the bumblebee has a place, is indigenous just to Europe, Africa and Asia (FAO, 1986; Crane, 1990).

A bumblebee found in East Africa was accounted for the upper Pleistocene time frame, 100, 000 years prior (Bischoff, 1960 referred by Dietz, 1986). This honey bee could not be separated from the contemporary African bumblebee species (Dietz, 1986). Beekeeping, which is today drilled over a more zone of the world's surface than maybe some other single branch of farming, went through various phases of advancement: nectar hunting, traditional (forest and backyard) and enhanced (movable-frame and movable top-bar) strategies for beekeeping.
It is likely that man chased for wild homes of honey bees and searched for their honey or nectar during its whole existence. Early man likely took nectar from honey bees' homes wherever he discovered them, and the gathering of nectar from wild homes proceeded with the exception of in a few regions where it has been altogether superseded by beekeeping (Crane, 1990).

There are many references to honey in old records and writing, yet the vast majority of them provided no insight in the matter of whether the honey was gotten by honey hunting or beekeeping. Wherever composing was known, honey was mentioned several times in the Holy book of the general population, and it regularly held a position of respect in their rights (FAO, 1986).

The first known confirmation of honey hunting scenes was a sketch made in a stone safe house in the mountains of Eastern Spain in Mesolithic circumstances, most likely dated to around 5000 BC (Dams, 1978 referred to by Crane, 1990). Africa has many shake artistic creations about honey hunting than some other mainland and a portion of the nations, which can be said, are South Africa (Natal), Zimbabwe, Morocco, Libya and Tanzania (HBRC, 1997). Honey hunting has been an exceptionally basic practice even up to present age in many parts of Africa, including Libya. In a few sections of Libya, a few family units completely rely upon honey

chasing and backwoods beekeeping for their whole employment. Honey hunting is likewise basic in peaceful groups in which beekeeping appears to be unimaginable.

Beekeeping legitimately began when man figured out how to protect the eventual fate of the provinces of bees he found in empty tree trucks, shake hole or somewhere else, by a specific measure of care and supervision. Crane (1990) revealed that by 2500 BC, before forest beekeeping is known to have existed, completely fledged beekeeping was being practiced in antiquated Egypt and the most punctual composed records that identify with the keeping of bees in hives are from around 1500 BC. Generally, the first known confirmation of beekeeping has been found in the Africa landmass (Crane, 1990).

Beekeeping up to 1500 AD proceeded in the customary frame utilizing primitive hives. Of the considerable number of districts under thought, tropical Africa has the most established convention of beekeeping and still with primitive hives (FAO, 1986). In the era of 1650 and 1850 AD many hives with top-bars and edges were invented, yet after these two centuries of exertion there was still disappointment on the fundamental point: whatever bars or frames were utilized, the bees joined their comb to the walls of the hive also, and the combs could, in this way, just be expelled from the hive by removing them. Lorenzo Lorraine Langstroth made the progression, which changed this, in 1851 when he found commonsense versatile frames hives with a proper 'bee-space'. The example of present day beekeeping was in this manner set up in the era of 1850 and 1900 AD. Distinctive hardware were invented in this period, however Langstroth progress in 1851 remains the fundamental standard of the box hive, and hence of our present beekeeping (Crane, 1976).

2.5 The Importance of Bees

Honey bees are responsible for 90% of commercial pollination, which makes them one of the most important species on the planet (Genersch et al., 2010). There will be many plants in the world to pollute the flowering plant cover without bees. Bees are the basis of biological diversity; the inseminated species cross and keep them stable. In addition, fruit and seed plants depend on GDP as the main export, which is important as an economic support system in terms of countries such as

Libya. In Africa, honey is the basis of this multi-billion dollar industry (ALLSOP & Cherry, 2004). In addition to bees, they produce products such as beeswax and propolis bees used for cosmetics. Bees are also used to produce pollen aggregates and vitamins rich in bee milk, collected and used for health products (Genersch et al., 2010; Casalado & Capasso, 2002; Azeez & Akankuku, 2012).

2.5.1 Important Races of Honeybee

Apidae: Apinae (honeybees) and *Meliponinae* (stingless bees). *Apinae* has only one species, *Apis,* and about nine species, *Apis mellifera* species. *Apis mellifera* ("honey-bee") is one of the most successful species in the animal kingdom. For the same species, the semi-desert has been adapted to as many different environmental conditions as possible to survive in tropical regions and climate conditions (Ruttner, 1986). Based on beekeeping and world beekeeping industry, *Apis mellifera's* breeds and strains are the most important element in the world. These bees are unique to Africa and Europe. At the same time, they have been introduced to the New World (Americans, Australia, New Zealand and the Pacific Islands) since 1500, when local bees did not exist (Crane, 1976). For the first time, the European *Apis mellifera* is examined and even the closest attention is paid. *Apis dorsata* and *Apis florea* are limited to tropical Asia and form a comb in any open, unprotected or semi-protected area. Old *Apis Cera* and *Apis mellifera*. The tropics of the world have spread only in the northern temperate zone of the Old World in the age of evolution. It builds a nest into a space, each consisting of several parallel vertical ridges and often up to ten; thus, it can be managed for honey production and pollination of crops.

Apis mellifera is now the most productive and widely distributed in almost all places of the world. The tropical subspecies of Apis mellifera are smaller and have thinner abdomen than the subspecies of the temperate zone. As a rule, less convenient for handling and management, easy to dig. In addition, the entire colony can be lifted as a result of damage or deterioration of its nests or lack of food. In addition, there is a warning about the stigma of the sickle, which allows many "enemies" to survive in the African tropics, where they can attack them (Crane, 1990, Hackett, 2004).There are a wide variety of beekeepers in the world. Adzhar (1990) noted that the polar regions of the bees were scattered all over the world except for

the severe colds. It is said to be a very interesting place to live in a garden on the roof of New York (Vivian, 1985). For example, in Addis Ababa, the capital of Ethiopia, there are many beekeepers where green eucalyptus dominates vegetation.

2.5.2 Importance of Beekeeping in Libya

It is likely that third world countries will improve their living standards by helping peasant farmers and developing beekeeping activities (Robinson, 1980). Beekeeping has many advantages that help farmers improve their beekeeping. The advantages can be listed for socio-economic consequences of beekeeping.

For example, successful beekeepers increase subsistence agriculture and socio-economic status of farmers in developing countries. This means that the family can be provided with food. In addition, the importance of apiculture is important:

- The bees are cosmopolitan: they adapt to a wide variety of conditions. On a much lower ground, at an altitude of less than 400 m. Cattle breeding can be severely limited due to flowering vegetables or other reasons, the product can be obtained from beekeeping.
- Small farmers and landless peasants can keep bees. The hive takes up very little space and the bees can gather nectar and pollen from everywhere they can; for this reason, wild, cultivated and desert areas are valuable for beekeeping. Beekeeping does not compete for resources with other agricultural endeavors and can be run with other agricultural activities: Man cannot utilize nectar and pollen in the absence of beekeeping.
- Beekeeping do not violate the ecological balance, for example cultivating crops and livestock applications.
- Investment and operating costs are relatively low, with minimal risk. Beekeeping is possible even for people with few resources; they can be obtained in the wild, the equipment can be produced locally and in most cases they do not need beekeeping assistance.
- In the world, honeybees provide dusting services. It is an indispensable activity in the production process of these products and fruits. Beekeeping therefore, plays an important role in the agricultural economy as a whole.
- Bee produces honey, wax and propolis. The shelf life of these products is extended and can be sold locally or abroad.

- Amount of time that can vary depending on the interest of the beekeepers in free time, side effects or full employment participation. Regardless of the intensity of the bees; honey and wax can be harvested. The whole family can become involved since men, women, or elder children can do the work in most cases at home. That means, it can help efficient utilization of family labor.
- The beekeeper can develop useful knowledge and skills and encourage self-sufficiency.
- Other local traders benefit from the production and sale of products.

2.6 Beekeeping and the Environment

Beekeeping is an indispensable part of the agricultural economy in developing countries. Current interest concerns the nature of the environment affected by the environment (Martin, 1976).

In addition, people with high-sighted vision are warned about saving resources. In these conditions, bees are a perfect resource for such great value in the well-being of the people. In short, there is a high level of adaptation to a wide range of agricultural systems, land degradation and environmental disproportion.

2.6.1 Benefits of Development Beekeeping

There are also a number of advantages that come as a result of development projects. Some, such as income, certified vocational training and natural products, can be quantified (Randall et al., 2004). Some, such as empowerment, trust and environmental appraisal, draw less attention (Buch & Dixon, 2009). Less concrete factors play a decisive role in the solution of social problems that have previously damaged disadvantaged communities. Beekeeping is a powerful tool for physical and mental rehabilitation. There is no other activity that brings together many skills and opportunities such as creating, maintaining, cleaning and managing your own beehive (Allsop et al., 2000). Beekeeping is the preferred method of rehabilitation for those with basic financial support, craftsmanship and experience working on the street.

"Deeper learning" is a process by which one can perceive what is learned in a situation and apply it to new situations (ie, Transmission) "(Pellegrino &Hilton, 2012). This is a deeper study of the development of conservation projects for bees.

There are also direct and indirect indicators of the competency (Alsop et al., 2006). These dimensions of empowerment have been implemented throughout the process and strengthened throughout the project. The link to the project was measured by participation, decision-making and reporting for participation (Alsop et al., 2006). Many people define this measure as a direction of empowerment. In this study, these dimensions of the authority were applied by asking for information from all participants (Allsop et al., 2000).

There are many examples of beekeeping projects in Asia, Europe and neighboring African countries (Illgner et al., 1998, Fombad, 2005). These projects are a perfect benchmark for success factors and the major constraints they face. Comparing the constraints and success of the beekeeping project in Libya will be useful for supporting future research and future projects. Together with the decisive qualities of success, it was important to work on the development of beekeeping projects in Tripoli's research and development work in Libya. These limitations identified in beekeeping include: lack of feed for bees, lack of qualified personnel, and problems with training and marketing.

2.6.2 Improved beekeeping technology development

As stated in Holeta Bee Research Center (2004) the foundation of the whole of our modern beekeeping technology development can be traced back to the Langstroth`s practical application of the concept of the bee space in 1851. The rapid development of modern beekeeping can be attributed to four very important discoveries;

1. The construction of movable frame hives in 1806.
2. The application of `bee space` by Langstroth in 1851, and the subsequent development of the modern movable frame hive. Bee space which is 9.5mm air gap between the frames or combs and the hive walls and covers respected by bees. Bee space has high value in the development of improved box hive. If the bee space is wider, unwanted comb is built which makes it difficult to move frames freely.
3. The development of bee wax foundations press in 1857, which make sheets of bee wax with identification of the cell bases.

4. The discovery of centrifugal honey extractor in 1865. In the same year, queen excluder was invented. It helps to protect queen and drone from passing to the honey chamber i.e. the brood could be kept out of the honey stored frames.

   Generally, the pattern of improved beekeeping was established in the half century between 1851 and 1900.

2.7 Honeybee Production Systems in Libya

In Libya, there are enough water resources and honey bees to create a fertile ground for beekeeping development. The country is doing honey hunting and beekeeping for honey use. Honey hunting is a common practice in Libya where wild colonies of bees live in hollow trees and caves. At present, beekeeping in the country is carried out in the following systems:

2.7.1 Migratory Beekeeping

Hives are also systematically migrating to produce honey, as well as for pollination purposes. Migration of hives is an advantageous way of extending the duration of honey flow and there are tools that make it possible. Migration beekeeping (in general, migratory beekeeping is a word - a distance) can be particularly useful when there are a number of blooming seasons, stretching along the width at latitude and altitude in the country. Nuru (2002) reported that beekeepers were acting to better feed their colonies. According to the same source, in some places beekeepers carry their colonies not only for better food but also for other seasonal diseases. Experienced beekeepers carry their hives once a year to the wonderful honey area and it is possible to harvest 2-3 times of the bee (Keralealem, 2005).

2.7.2 Traditional Beekeeping

Traditional beekeeping in Libya is the oldest and richest experience that people spend thousands of years on (Fichtl and Admasu, 1994; Mammo, 1973) using the same old traditional methods of beekeeping. Traditional beekeeping. There are two kinds of beekeeping in the back garden. Especially in some places in the western and southern regions of the country, forests are beekeeping hung in the traditional hives of a variety of trees. Relatively better governance in the backyard is common in other parts of the country's traditional beekeeping (Nuru, 2002).

Traditional beekeeping is often practiced in different types of traditional hives. The traditional hive is the most versatile type known as the simple cylindrical type. Beekeeping began with the traditional hives, which were attached to the top and sides of the hive and the beekeeper could not easily remove them. In the primitive form only one end of the barrel can be opened, but each of the further forms must be provided with a cover. One way of keeping and bees varies from type to type. The following basic design options based on locally available materials for the construction of hives, environmental conditions and regulations used for storage of bees in this country in general: hollowed logs, bark hive, bamboo or reed grass hive, mud (clay) hive, animal dung (mixed with ash) hive, woven straw hive, gourd hive, earthen pot hive and so on. Beekeepers are experienced and skilled in the use of these facilities. Gezahegne (2001) stated that a control farmer estimated the average number of raw honey obtained from a traditional beehive is 5 kg / cu / year. On the other hand, West Showa Region (Edessa, 2005) has been 6.1 kg / cu / year, based on a survey of the amount of honey, traditional hives collected. Traditional farming is practiced by millions of fixed comb hives, especially in remote regions of the country. Modern frame hives can produce about 8-10% of their weight and small honey amount in the period before the introduction of this fixed comb hives. This harvest is achieved with minimum cost and labor, and it is worth the people who live in this marginal entity.

2.7.3 Modern System of Beekeeping

Nowadays beekeeping methods aim to obtain the most harvesting honey in the season after season without damaging the honey (Nicola, 2002). The modern bridge with a still frame consists of a layer of overlapping rectangular cow bins (graduated bodies). The number of boxes varies seasonally depending on the population size of the bees. In 1851 Lorenzo Lorraine Langstroth in the United States (Crane, 1976, Vivian, 1985). It then developed its own mobile frame hibernation in different countries (eg, Zander, Dadant) and Langstroth - a prototype mobile square hinge used today. In many countries, Langstroth hive boxes have proven to be suitable for transport and management. Portable frame barrel columns allow you to direct and use higher technology in higher efficiency and quality.

2.7.4 Economic Importance of Beekeeping in Libya

Beekeeping has been part of the agricultural system in Libya since ancient times. This is long before the other agricultural systems. Beekeeping is a very old and rooted practice in the country, and it is estimated that approximately one million farmers continue to be bred (Mammo, 1973). Beekeeping plays an important role both in the country and in the presence of small farmers. This is a great way to improve the quality of food and drink. Beekeeping has many advantages that help farmers make bees. The socio-economic consequences of beekeeping and the main products of beekeeping are as follows:

2.7.4.1 Honey Production

Honey, a natural product of bees, is defined as the sweetest bait of man. It is an excellent source of energy because it contains simple sugars ready for assimilation when it is available. Honey contains more than 180 elements and various applications (HBRC, 1997). Due to its use for the production of traditional drink "Tej" (honey bee), there is a strong local demand for honey. Many honeys are traditionally fermented to make "Thai"Edessa (2002). It is estimated that 85% of the total honey amount is on the market for the use of Thai products and 15% of all honey is consumed at home.

2.7.4.2 Bee wax Production

In various parts of the country the honey wax collection is insignificant and the honey wax produced by the bees harvested by the beekeepers. There are very few practical values for beekeepers (Fichtl and Admasu1994) because the beekeepers do not bother collecting it and they do not know people make local wax for money because wax is usually kept or discarded. Like honey, wax is a multipurpose natural bee product used in more than 300 products. Honey and wax play a major role in the cultural and religious life of people in the country.

2.7.4.3 Crop Pollination

Bees are an integral part of the agricultural system. Although the value of bees is assumed to be the culmination, it plays an important role in national food production and the renewal of plant species. Honeybees are the most important pollens in the world. (EARO, 2002). Nevertheless, it is important to remember that

there is no doubt about the value of service. Hackett (2004) estimated the pollution value of bees in the United States. Agriculture will cost 14 billion dollars each year. Honeybee is also believed to have played an important role in the Libyan economy through pollen services. It is one of the most important factors affecting crop production and seeds.

2.7.4.4 Source of Immediate Cash Income

It is believed that beekeeping plays an important role and that small farmers are one of the options for subsistence. It does not only serve as an additional source of income, it is also totally dependent on honey beekeeping and sales to ensure the livelihood of many people. Nuru (2002) stated that bees and their products provide direct cash income for beekeeping. In fields where honey production is not attractive, beekeepers can sell their colonies on the market. In this respect, bees serve as "near cash" that attracts money. Beekeeping is a potential source of income and a tool for rural communities. In some tribes, the entire life of the society depends on the sale of honey only.

2.7.5 Honey Quality

In honey bee there is a complex mixture of carbohydrates, especially glucose and fructose; Other sugars are found in traces depending on the origin of the flowers. It also contains organic acids, lactones, amino acids, minerals, vitamins, enzymes, phenolic compounds, volatile compounds, pollen, waxes and pigments (Crane, 1980). The contents of these components are found in the most important deterministic properties of honey (Sahinler and Gül, 2004).

Honey chemical composition is based on plant resources that can be influenced by other factors such as climate, harvesting and storage conditions (Crane, 1980). Neglected use of honey may degrade quality. Moisture and moisture content exceed 21% among the factors affecting high temperature. Fermentation leads to high levels of hydroxymethylfurfural (HMF), loss of enzyme activity, taste changes, darkening and microbial growth (Moguel et al., 2005). Above all, the quality of the honey market and the availability of information about local investors involved in the collection and processing of honey.

2.7.6 Major Constraints in Beekeeping

Libya has a vast potential for beekeeping; both for local use and export. However, like other livestock sectors, this sub-sector has also come to an end with complex restrictions. The existing constraints on the production of the country's beekeeping sub-sector will vary depending on the agricultural ecology of the districts where the activities are conducted (Edessa, 2002). Production restrictions also apply to varieties, socio-economic conditions, cultural practices, climate (season of the year) and bee behavior. The lower bounds are the unpleasant behavior of the bears (aggressiveness, entanglement and disguised behavior) according to HBRC (1997), Ayalew (2001) and Edessa (2002); lack of qualified staff and educational institutions; the low-tech level used; high price of advanced beekeeping technologies; destruction of drought and natural vegetation; management and marketing restrictions of postharvest products; the random use of pesticides; honey bee, harmful and predator diseases; poor extension services; lack of coordination between research, extension and farmers; lack of beekeeping policy; lack of records and relevant information; and insufficient research institutions to solve these problems. However, all these problems cannot be an obstacle for the whole country and cannot be important at the same time for every place. For this reason, restrictions should be defined at the relevant places to determine appropriate development measures.

However, the vast majority of beekeeping production relies on traditional production systems that cannot always be applied locally to the results of research conducted in the station.

No doubt that farmers can work for government and various organizations have undertaken many projects due to inadequate management of beekeeping in order to increase bee production due to beekeeping, and above all, awareness and lack of interest of beekeepers. Likewise, it was not applied based on the identification of the potentials, constraints, attitudes and economic levels of the communities. For this reason, it is very important to identify potential development constraints. Beekeeping potential beekeepers should be supported by research and knowledge of indigenous populations, which should be assessed. In this context, it is important to conduct a survey to assess the situation at the root-base level: to identify

beekeeping situations, opportunities, socio-economic importance, relationships and analysis prior to development programs.

A cross sectional study was conducted from November 2008 to March 2009 in Wukro Woreda to determine the prevalence of bee lice and other constraints to honey bee production in the area. The result revealed an overall Braula coeca (bee louse) prevalence of 4% in the brood and 5.5% in the adult honey bees, respectively. The prevalence of louse infestation recorded in brood and adult bee of the three peasant associations of Wukro Woreda were, 3.3%, 5% in Genfel, 4.9%, 6% in Adikisandid and 3%, 5%, Aynalem, respectively. Failure to increase the bee's welfare level may be due to the inadequacy of protective equipment such as beekeeping and suits and gloves (Adeday et al., 2012). These are the most important tools for beekeeping as they provide the necessary confidence in the management of honey. Instead of focusing only on the socio-economic conditions of farmers for beekeeping (Amulen et al., 2017). It has been reported that Beekeeping creates jobs for livelihoods and needs for landless men and women. Despite the increase in honey production, the tendency of traditional beekeeping to beige has decreased. For honey management, bee hive management, colony feeding and honey treatment should be done to develop training and capacity (Abadi et al., 2016). In a cross-sectional study involving 90 households in selected areas, current beekeeping practices, production capacity and production constraints were analyzed. In the research area, the majority of beekeepers (72%) have only traditional hives and honey is produced for domestic consumption. Men are dominant in beekeeping. Despite the large number of large farmers in the region, this area is very interesting high demand at national and international level for agricultural, pazara access and beekeeping products (Teklu & Dinku, 2016).

A specially designed 97 households for the study carried out on a cross section here, for the assessment of current application beekeeping, production capacity and production constraints. Only the traditional hives are found in the majority of the study area (99%) and honey is produced for domestic consumption. Men are dominant in beekeeping. Kate edulis (khat), a mild stimulant, is a major source of income for residents. Sufficient for the bees, the poor market, the main issues faced by the subsector in the field of bee harmfulness to promote the lack of

trained agents' lack. Insect killers, insecticides, and birds together, pests, insecticides and predators, lack of education, lack of bee water feeding, or post Serda et al., 2015). A total of 75 beekeepers engaged in modern beekeeping were searched and interviewed. A visual assessment of the beekeepers and an internal check of the suspicious columns were conducted to acknowledge the relevant information recorded by respondents. The resulting beekeeping in the study area showed a low yield, with high concealment and abundant potential stern bees along with honeybees centered on colonnades with 62.7% lower control methods (Toler and Dezhen 2014).

CHAPTER III

METHODS

The methods used in this study is detailed in this chapter which explains some basic models that will be applicable in this research by focusing on the data collection, application of the collected data tools, and data analysis which is carried out to determine community perception of honeybee and beekeeping practices and constraints in Tripoli.

Gichora (2003) noted that for more advanced beekeeping, one should have a good grasp of bee biology and behavior of bees for better colony management. Moreover, for illiterate people there is a need of intensive training and persuading beekeepers before distributing movable frame hives. Therefore, according to the result of this study the high level of illiteracy (15.1%) in the district limits the effectiveness of formal training programs and requires more emphasis to be placed on practical demonstration of essential concepts especially in improved beekeeping.

3.1 Research Model

This study mainly aimed at getting the community farmers' perceptions on their constraints and beekeeping practices in Tripoli, Libya. This study is based on field research carried out in Tripoli, Libya in 2017. For the reliability of this study, the research questionnaire was adopted from Abadi et al., (2016) as a quantitative method and by also getting information from focus group discussion, articles, textbooks, and studies on the subject and internet source.

3.2 Participants and sample

The study was carried out in Tripoli. It is a cross-sectional studt among 300 farmers in the community of Tripoli, Libya. This study concentrated on the adult population. The criteria for eligibility in this study included (i) the community farmer above 18 years (ii) the respondent's willingness to oblige to the study protocols and complete the study.

The farmers from the community were given an organized questionnaire obtained from Abadi et al., (2016). The questionnaire focused on gender, age, education, local people's awareness of the cause and consequences of forest degradation

and attitude towards forest resource conservation practice, source of information towards forest degradation and conservation, source of information for the local people's attitude towards forest degradation and conservation practices, perception of the actual and potential socio-economic and environmental benefits from the surrounding forest, benefits from forest resource, and factors that determine local people's attitude towards forest degradation and conservation (See detailed questionnaire Appendix I).

Table 1 displays the demographic results of the farmers. 47 (15.7%), 122 (40.7%), 59 (19.7%), 55 (18.3%) and 17 (5.7%) of the farmers were < 20 years, between 21 - 30 years, 31 - 40 years and 41 – 50 and 51 - 60 years respectively.

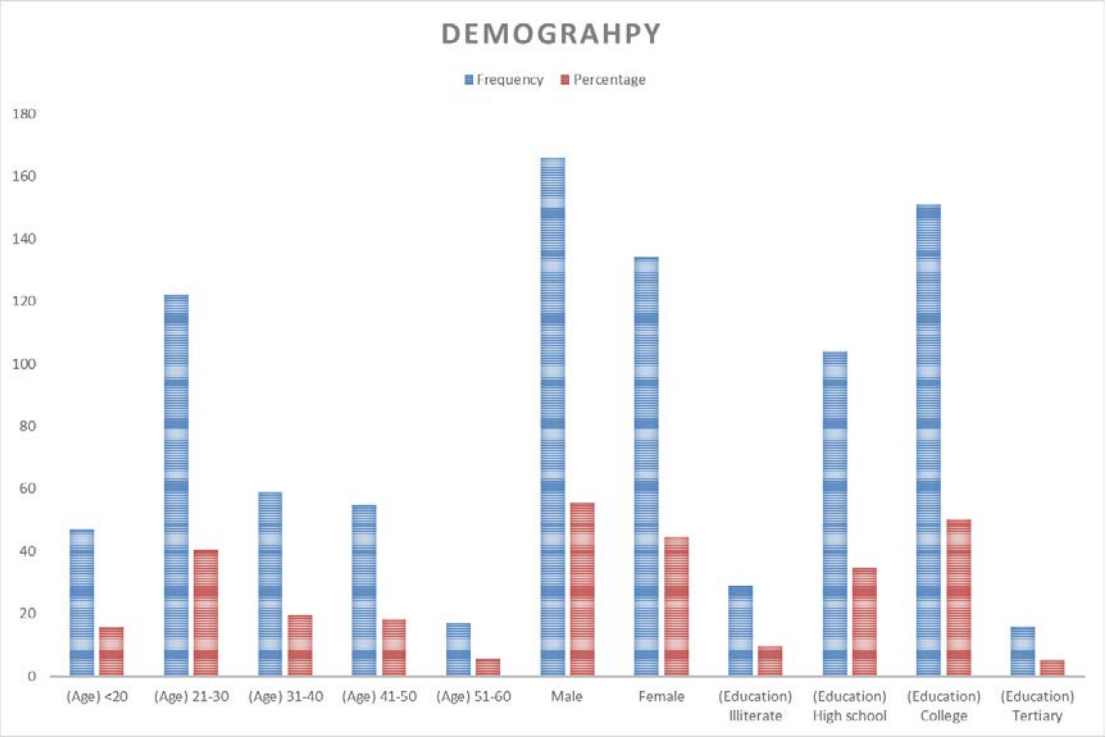

Figure 1: Demographic distribution

Table 2:

Demographic distribution (n = 300)

Demographic category	Frequency	Percentage
Age		
<20	47	15.7
21-30	122	40.7
31-40	59	19.7
41-50	55	18.3
51-60	17	5.7
Total	300	100
Gender		
Male	166	55.3
Female	134	44.7
Total	300	100
Educational level		
Illiterate	29	9.7
High school	104	34.7
College	151	50.3
Tertiary	16	5.3
Total	300	100

In addition, 166 (55.3%) of the famers were male while 134 (44.7%) were female. This shows that gender was distributed appropriately. Also, 104 (34.7 %), 151 (50.3%), and 16 (5.3 %) of farmers attended high school, college and tertiary respectively. Only 17 (5.7%) of them were illiterate.

3.3 Data Gathering Tools

In this study the data collection tools were Personal Information, Environmental Perceptions, Knowledge and Behavior Scale Test and Information test.

3.4 Scoring Scale Classification of the Substance

The community perception of honeybee and beekeeping practices and constraints in Tripoli were revealed and interpreted based on the administered survey questions.

3.5 Data Analysis

The associations between perception, beekeeping practices and constraints associated with beekeeping were explored by means of t-test, ANOVA and descriptive statistics. Data were analyzed using the statistical software SPSS 20.0. No laboratory or medical tests were conducted.

3.6 Research Ethics

For the research to be reliable, valid and scientific process research ethics were considered, the people that participated in the studies were given direct questions. Throughout the study, the researcher exhibited an objective attitude that displayed a good work behavior that did not affect the study.

3.7 Reliability of the study

Table 3 shows the summary of the test of the four constructs using Cronbach's Alpha reliability. The construct reliability should exceed 0.7 to fall within acceptable level. (Fraenkel, Wallen 2000). The reliability of the construct of this study ranges from .951 to 0.963 which indicates a good internal consistency.

Table 3.

Reliability - Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
MI22	2.8596	.210	.951	.951
CB22	2.8241	.262	.958	.954
KB22	3.0345	.227	.928	.963

CHAPTER IV

RESULTS AND DISCUSSION

This chapter gives detailed statistical analysis of the study on Community perception of honeybee and beekeeping practices and constraints in Tripoli with its interpretation according to the respondents results from the questionnaire administered to answer all the research questions regarding this study.

Table 4 indicates that to the materials for traditional beehive construction which in item 19: 241 (80.3) respondents said “YES” to the use of bamboo while 59 (19.7%) said “NO”. Item 20 shows that 22 (7.3%) respondents said “YES” to using tree branch and tendril as material for construction of traditional hives while 278 (92.7%) said “NO”, item 21: 58 (19.3%) said “YES” that they used clay as material for traditional hives while 242 (80.7%) said “NO” and item 22: 92 (30.7%) said “YES” to using animal dung as material for traditional hive while 208 (69.3%) said “NO”. Therefore, they make use of bamboo as material for traditional hive construction.

Table 4.

Materials for traditional hive construction.

No	Items	Yes	No
19	Bamboo	241 (80.3)	59 (19.7%)
20	Tree branch and tendril	22 (7.3%)	278 (92.7%)
21	Clay	58 (19.3%)	242 (80.7%)
22	Animal dung	92 (30.7%)	208 (69.3)

On the methods of beekeeping (Table 5) in the community for item 23 282 (94.0%) of the respondents said “YES” that they to the use of traditional method as beekeeping method while 18 (6.0%) said “NO”. In item 24, 104 (35.7%) said “YES” to the use of modern method, while 196 (65.3%) said “NO”. This indicates that the community of Tripoli use traditional methods in beekeeping.

Table 5.

Are you aware of the types of beekeeping methods?

No	Items	Yes	No
23	Traditional	282 (94.0%)	18 (6.0%)
24	Modern	104 (35.7%)	196 (65.3%)

In Tripoli the honey production period was assessed as seen in Table 6. Item 19 shows that 12 (4.0%) of the respondents said that January-February was the period for honey production, 10 (3.3%) said May-June while 278 (92.7) said October-November. Therefore, the period of honey production in Tripoli is October-November.

Table 6.

Honey production period

No	Items	**Tick**
19	January-February	12 (4.0%)
	May-June	10 (3.3%)
	October-November	278 (92.7%)

4.1 R1: Does educational background affect knowledge and necessary skills training in beekeeping?

T-test was employed to examine the effect of educational background affect knowledge and necessary skills training in beekeeping at $p = 0.05$. The results are displayed in Table 4. The t-test results, however, showed that there was a statistically significant difference ($t (299) = .58.61$, $p = .000 > 0.05$) between the effect of educational background affect knowledge and necessary skills training in beekeeping. The indication here is that educational background affect knowledge and necessary skills training in beekeeping training.

Table 7.

T-Test

		t-test value= 0					
		t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
						Lower	Upper
perception	Education Level	58.61	299	.000	2.51333	2.4289	2.5977
	KB22	90.26	299	.000	1.32458	1.2957	1.3535

4.2 RQ2: Does the community have knowledge and the necessary skills in beekeeping?

As indicated in Table 5 the majority of the people agreed with items 1 to item 8: That is, item 1: Colony split with 192 (65.7%) “YES” and 103 (34.3%) “NO”, item 2: 199 (66.3%) respondents said “YES” on honeybee colony management while 101 (33.7%) said “NO”, item 3: 286 (95.3%) said “YES” that they have skill in processing, handling & storage while 14 (4.7%) said “NO” and item 4: 198 (66.0%) have knowledge and the necessary skill in market information & networking, but 102 (34.0%) do not. Item 5: 282 (94.0%) said “YES” about their skill in input utilization, while 18 (6.0%) said “NO”, item 6: 197 (65.7%) said “YES” that they have Bee forage management knowledge and skills in beekeeping while 103 (34.3%) said “NO” that they do not have that knowledge and skill asked. In item 7: 198 (66.0%) said “YES” that they have all types of training in knowledge and skills required for beekeeping while 102 (34.0%) said “NO” that they do not have that training skills in beekeeping and to item 8, 64 (21.3%) of respondents said “YES” while 236 (78.7%) said “NO” contradicting their previous answer which stated that they have all types of training which in this case maybe because most of the training they had is individual based training and development on beekeeping, but not an organized training from the government of community leaders or farmers association in the community. Table 8 shows the assessment of the questions.

Table 8.

Community knowledge and necessary skills in beekeeping

No	Items	Yes	No
1	Colony split	192 (65.7%)	103 (34.3%)
2	Honeybee colony management	199 (66.3%)	101 (33.7%)
3	Processing, handling & storage	286 (95.3%)	14 (4.7%)
4	Market information & networking	198 (66.0%)	102 (34.0%)
5	Input utilization	282 (94.0%)	18 (6.0%)
6	Bee forage management	197 (65.7%)	103 (34.3%)
7	All types of training	198 (66.0%)	102 (34.0%)
8	No training	64 (21.3%)	236 (78.7%)

4.3 RQ3: Does age have any relationship with knowledge and the necessary skill training in beekeeping?

Pearson Correlation was employed to assess whether there was a relationship between age and knowledge and the necessary skill training in beekeeping. In Table 9, there is no correlation between the two variables. Therefore, there is no significant ($p = .171 > 0.005$) relationship between factors that determine knowledge and the necessary skill training in beekeeping.

Table 9.
Correlations

		Age Group	KB22
Age Group	Pearson Correlation	1	-.079
	Sig. (2-tailed)		.171
	N	300	300
KB22	Pearson Correlation	-.079	1
	Sig. (2-tailed)	.171	
	N	300	300

4.4 RQ4: Is there a relationship between gender and constraint associated with beekeeping?

The Levene's independent sample t-test was employed to examine the effect of gender on constraint associated with beekeeping at p = 0.05. The results are displayed in Table 7. The t-test results, however, showed that there was no statistically significant difference (t (298) = .103, p = .918 > 0.05) between a male and female and constraints associated with beekeeping. Therefore, gender do not have any relationship with constraints associated with beekeeping from the community.

Table 10.
Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
CB22	Equal variances assumed	.070	.791	.103	298	.918	.00256	.02489	-.04642	.05154
	Equal variances not assumed			.103	285.910	.918	.00256	.02486	-.04638	.05150

4.5 RQ5: Do the methods used in the community associate with the constraints of beekeeping?

Pearson Correlation was used to investigate the relationship between methods used in the community and the constraints of beekeeping. As seen in Table 8, there is a correlation between the two variables. Therefore, there is a significant (p = .000 > 0.05) relationship between the methods used in the community and the constraints of beekeeping.

Table 11.
Correlations

		CB22	methods
CB22	Pearson Correlation	1	.947**
	Sig. (2-tailed)		.000
	N	300	300
methods	Pearson Correlation	.947**	1
	Sig. (2-tailed)	.000	
	N	300	300

4.6 RQ6: What is the general perception, constraints and season of production in beekeeping of the community?

Pearson Correlation was used to investigate the relationship between *the general perception, constraints and season of production in beekeeping of the community*. From Table 9, shows a correlation between the two variables. Therefore, there is a significant (p = .000 > 0.05) relationship between *the general perception, constraints and season of production in beekeeping of the community*.

Table 12.
Correlations

		CB22	Honey production period
CB22	Pearson Correlation	1	.345**
	Sig. (2-tailed)		.000
	N	300	300
Honey production period	Pearson Correlation	.345**	1
	Sig. (2-tailed)	.000	
	N	300	300

4.7 Beekeeping Constraints in Tripoli

The constraints of beekeeping are shown in Table 13. In item 9, 167 (56.7%) faces a constraint of colony absconding while 133 (43.3%) said "NO". In item 10, 45 (15.0%) said "YES" that they lack enough space while 245 (85.0%) says NO, item 11: 283 (94.3%) said "YES" that drought is one of the constraint faced in beekeeping, 17 (5.7%) said "NO". In item 12: 211 (69.6%) of the respondents says

that poor society awareness is part of beekeeping constraints while 89 (30.4%) said "NO". In item 13, 280 (93.3%) said "YES" to pesticides poisoning, 20 (6.7%) said "NO". In item 14, 198 (66.0%) said "YES" to lack of training while 20 (6.7%) said "NO". In item 15, 172 (57.3) said "YES" to honeybee diseases while 128 (43.7%) said "NO". In item 16, 200 (66.7%) said "YES" to the shortage of bee colonies while 100 (32.3%) said "NO". In item 17, 252 (84.0%) said "YES" for lack of initial capital while 48 (16.0%) said "NO". In item 18: 92 (30.7) said "YES" that shortage of modern colonies is part of the constraints they face as beekeepers while 208 (69.3%) said "NO" and item 19 shows that 47 (15.7%) said "YES" that lack of experience sharing visit is a constraint to them in beekeeping while 245 (84.3%) said "NO". Therefore, the constraints faced by the Tripoli community are absconding of colonies, lack of bee colonies, droughts, poor societal awareness, pesticide poisoning, lack of training, honeybee diseases and lack of initial capital to start up beekeeping.

Table 13.

Constraints associated with beekeeping

No	**Items**	**Yes**	**No**
9	Colony absconding	167 (56.7%)	133 (43.3%)
10	Lack of enough space	45 (15.0%)	245 (85.0%)
11	Droughts	283 (94.3%)	17 (5.7%)
12	Poor society awareness	211 (69.6%)	89 (30.4%)
13	Pesticides poisoning	280 (93.3%)	20 (6.7%)
14	Lack of training	198 (66.0%)	102 (34.0%)
15	Honeybee diseases	172 (57.3)	128 (43.7%)
16	Shortage of bee colonies	200 (66.7%)	100 (32.3%)
17	Lack of initial capital	252 (84.0%)	48 (16.0%)
18	Shortage of modern bee hives	92 (30.7)	208 (69.3%)
19	Lack of experience sharing visit	47 (15.7%)	245 (84.3%)

CHAPTER V

CONCLUSION AND RECOMMENDATION

In this research the dominant participants were male between the ages of 21 to 30 years with college degree. According to Gichora (2003) there should be advanced beekeeping knowledge about bee biology and behavior of bees for better colony management. Moreover, for illiterate people there is a need for intensive training. According to the result of this study the level of illiteracy is (9.7%) but high college educational level, though the illiteracy in the community, can limit the effectiveness of formal training programs and requires more emphasis to be placed on practical demonstration of essential concepts especially in improved beekeeping methods.

The communities in Tripoli of Libya majorly make use of bamboo as material for traditional hive construction by traditional method for beekeeping and the period of honey production in Tripoli is October-November, which also corresponds to the period of honey production in Asgede Tsimbla District, Kenya as reported by Gidey et al., 2012.

5.1 Does educational background affect knowledge and necessary skills training in beekeeping?

There is a statistically significant difference between how educational background affect knowledge and necessary skills training in beekeeping. Therefore, educational background affects knowledge and necessary skills training in beekeeping. This study agrees with those of Chuma et al., (2012) and Matanmi et al., (2008) who found that 80% of the beekeepers in Nigeria had received post-secondary education. On the other hand, they were in disagreement with Ndyomugyenyi et al., (2008) who also found beekeepers to have low education levels.

5.2 Does the community have knowledge and necessary skills in beekeeping?

As indicated in the results the majority of the people have basic skills and knowledge in beekeeping in the area of Colony split, honeybee colony management, processing, handling & storage and they have knowledge and the necessary skill in market information and networking. In a similar study Bekele (2015) reported that access to extension services such as market information and beekeeping training as the most crucial factor influencing production of honey and other bee products.

The farmers are also skilled in input utilization, they have bee forage management knowledge and skills in beekeeping, they have all types of training about knowledge and skills required for beekeeping, the community have knowledge and necessary skills in beekeeping.

5.3 Does age have any relationship with knowledge and necessary skill training in beekeeping?

There is no significant ($p = .171 > 0.005$) relationship between factors that determine knowledge and necessary skill training in beekeeping.

5.4 Is there a relationship between gender and constraint associated with beekeeping?

The results showed that there was no statistically significant difference ($t(298) = .103$, $p = .918 > 0.05$) between a male and female and constraints associated with beekeeping. Therefore, gender does not have any relationship with constraints associated with beekeeping from the community.

5.5 Does the methods used in the community associate with the constraints of beekeeping?

Pearson Correlation was used to investigate the relationship between methods used in the community and the constraints of beekeeping. As seen in Table 8, there is a correlation between the two variables. Therefore, there is a significant ($p = .000 > 0.05$) relationship between methods used in the community and the constraints of beekeeping.

5.6 What is the general perception, constraints and season of production in beekeeping of the community?

There is a significant ($p = .000 > 0.05$) relationship between *the general perception, constraints and season of production in beekeeping of the community*.

5.7 Beekeeping constraints in Tripoli of Libya

The constraints faced by the Tripoli community are absconding of colonies, lack of bee colonies, droughts, poor societal awareness, pesticide poisoning, lack of training, honeybee diseases and lack of initial capital to start up beekeeping. This study corresponds with the study of Xie et al., (2008) which states that increased use of pesticides, reduced extensive grazing and harvesting of alfalfa before blooming to maximize protein content significantly reduce bee forage available for pollen and nectar collection by bees. Other studies affirm that major ecological and biological constraints previously focused on were inadequate bee forage, limited land for expansion, pesticide poisoning, predators, pests, diseases and death of the colony (Crane, 1990; Yirga and Teferi, 2010; Pokhrel, 2009; Qaiser et al., 2013).

In terms of lack of training as a constraint other studies shows that technical constraints were lack of knowledge on suitable management methods of tropical bee races and species, lack of skilled trainers and training opportunities, lack of dissemination of new research information especially that related to disease control and inadequate beekeeping equipment (Bradbear).

Apart from the explained above diseases are also seen in this study to be a constraints and as previously stated in other studies of (Meixner, 2010; Shimanuki et al., 1980) they were also a major concern in beekeeping and more so those affecting the brood because they quickly weaken the colony. Other environmental constraints are bee forage availability and weather conditions which affect the quantity of honey yield (Babatunde et al., 2007; Le Conte and Navajas; Meixner, 2010).

5.8 Recommendation

- To build future beekeeping acceptance rates, this study suggests that programs that promotes beekeeping as a source of supplementary wage to

connect the current production and showcasing information loopholes and furthermore guarantee that agriculturists are sorted out in groups should be designed

- A partnership between the private and public sectors is needed to help fill the gaps in public services. These partnerships will be useful as most NGO programs are short-lived. NGOs have long since deserted the desire to increase sustainability in spreading information on beekeeping.

- The government should also adopt policies to reduce the renewal of the behavior of distribution of workers. This will increase the number of farmers engaged in beekeeping within the framework of state-financed programs.

- The study also suggests that farmers invest in propolis and wax production, taking into account high prices as a source of income.

- Subsidies for beekeeping for production should also be provided to beekeeper. These interventions will lead to the passage of formal products from already known informal channels for the marketing of bee products. A well-organized honey market is recommended to increase the current flow of honey.

- Finally, there is a need for long-term studies to explain why most beekeepers do not go into wax and propolis production.

- In addition, future researchers can focus on how to promote beekeeping among educated farmers. The reason for this is that the current education is mostly carried out by uneducated farmers.

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Appendix 1

Questionnaire

Dear respondents

The objective of the questionnaire is to collect information about ***Community perception on honeybee and beekeeping practices and constraints in Tripoli***. The information you provide will be valuable for academic purposes of Near East University, Turkish Republic of north Cyprus TRNC. Therefore, your genuine, honest, and prompt response is a valuable input for the quality and successful completion of the research. The information you give will be used only for academic purposes and will be kept confidential.

I. Demographic Data

i. Sex: Male ( ) Female ( )

ii. Age: < 20 ( ) 21-30 ( ) 31-40 ( ) 41- 50 ( ) 51 -60 ( ) >60 ( )

iii. Educational background: Illiterate ( ) High School ( ) College ( ) Tertiary ( )

I. Demographic Data

i. Sex: Male ( ) Female ( )

ii. Age: < 20 ( ) 21-30 ( ) 31-40 ( ) 41- 50 ( ) 51 -60 ( ) >60 ( )

iii. Educational background: Illiterate ( ) High School ( ) College ( ) Tertiary ( )

II. Knowledge and necessary skills training about beekeeping.

No	Items	Yes	No
1	Colony split		
2	Honeybee colony management		
3	Processing, handling & storage		
4	Market information & networking		
5	Input utilization		

6	Bee forage management		
7	All types of training		
8	No training		

III. Constraints associated with beekeeping

9	Colony absconding	Yes	No
10	Lack of enough space		
11	Droughts		
12	Poor society awareness		
13	Pesticides poisoning		
14	Lack of training		
15	Honeybee diseases		
16	Shortage of bee colonies		
17	Lack of initial capital		
18	Shortage of modern bee hives		
19	Lack of experience sharing visit		

IV. Materials for traditional hive construction.

Are you aware of the materials for traditional hive production?.

No	Items	Yes	No
20	Bamboo		
21	Tree branch & tendril		
22	Clay		
23	Animal dung		
	Are you aware of the types of beekeeping methods?.		
24	Traditional		
25	Modern		

26	**Honey production period**	**Tick**
	January-February	
	May-June	
	October-November	

Thesis

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