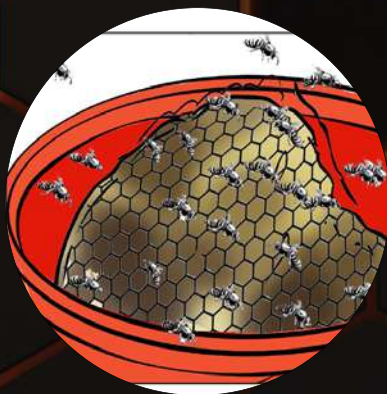
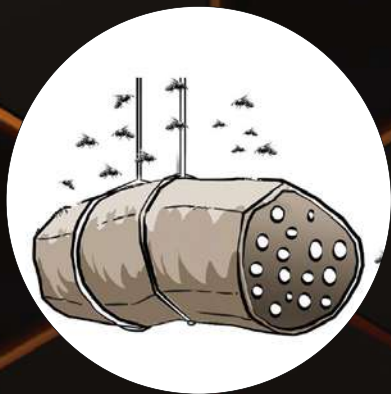


# A GUIDE TO BEE KEEPING



*"If the bee disappeared off the face of the Earth, man would only have four years left to live."*

*Albert Einstein*

## INTRODUCTION

This booklet features practical information on why one should consider beekeeping as an income generating enterprise.

It is a practical guide to production, processing and value addition of honey and other bee products including bees wax, propolis, pollen and bee venom.

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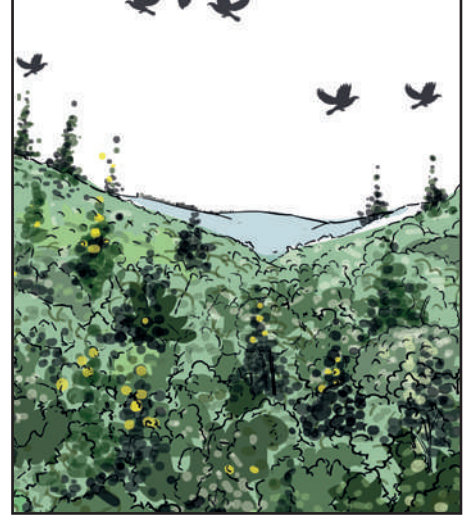
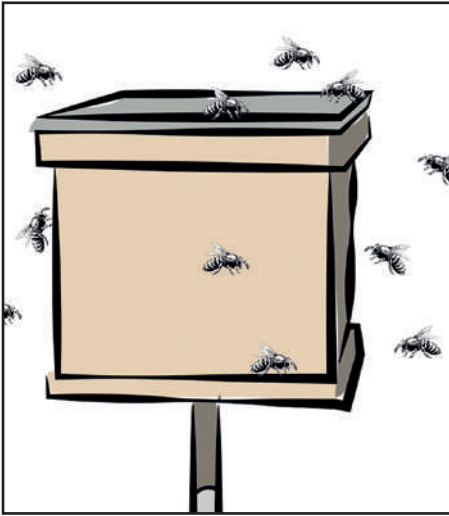
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# I. BENEFITS OF ORGANIC BEE KEEPING

Bee keeping has several advantages.

It helps in sustainable agriculture, in the conservation of biodiversity,

...and can be used as an affordable intergrated approach to protect natural resources.



Anyone can practice bee keeping as there's no age limit. It requires minimal management and the enterprise does not require much space. Bees have no foraging boundaries and can traverse land boundaries to look for nectar, pollen and water.



They contribute to increased production of wild and agricultural crops through pollination.



It provides job opportunities as the products are a source of food, that can be sold and used for medical purposes.



Bee keeping promotes ecotourism (Apitourism) and research opportunities.



From bee keeping, a farmer can generate income from a variety of products including: Honey, bees wax,



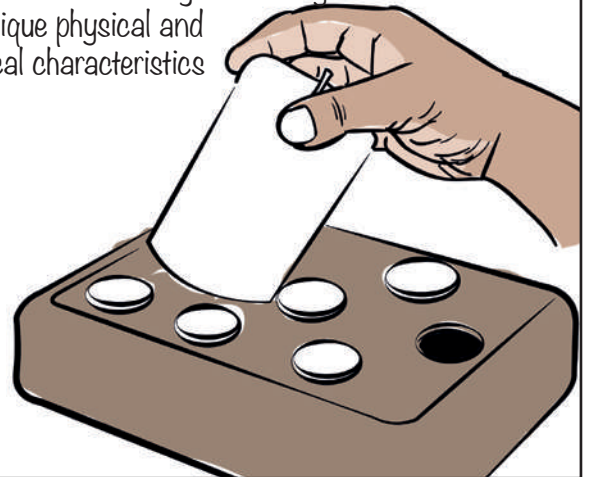
propolis, bee pollen, royal jelly, Bee venom and bee colonies.



Honey is a sweet and viscous fluid derived from the nectar of flowers.



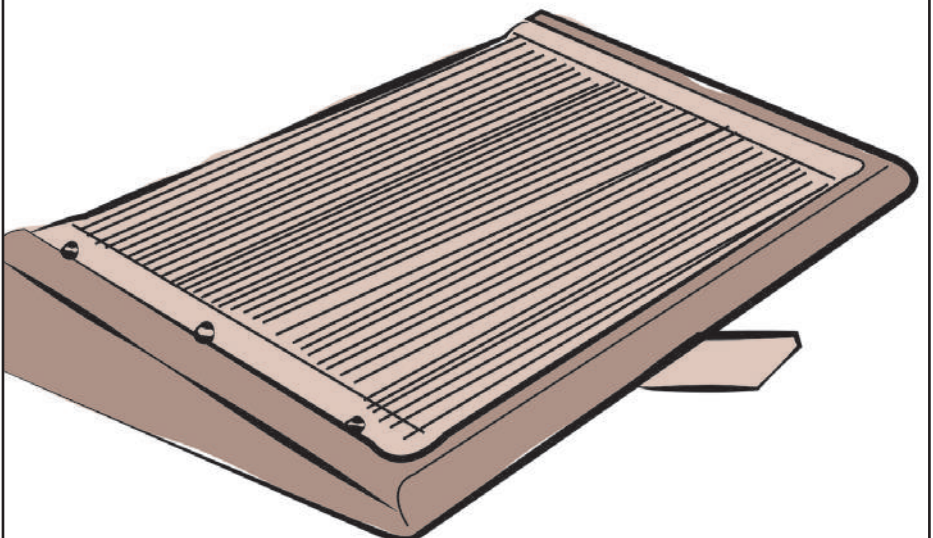
Propolis is a mixture of various amounts of beeswax and resins collected by the honeybees from plants, particularly from flowers and leaf buds. Bees wax is a mixture of various long chain fatty acids. Each wax has unique physical and chemical characteristics



Royal jelly is a secretion by the hypopharyngeal gland of young worker bees to feed young larvae and adult queen bee.

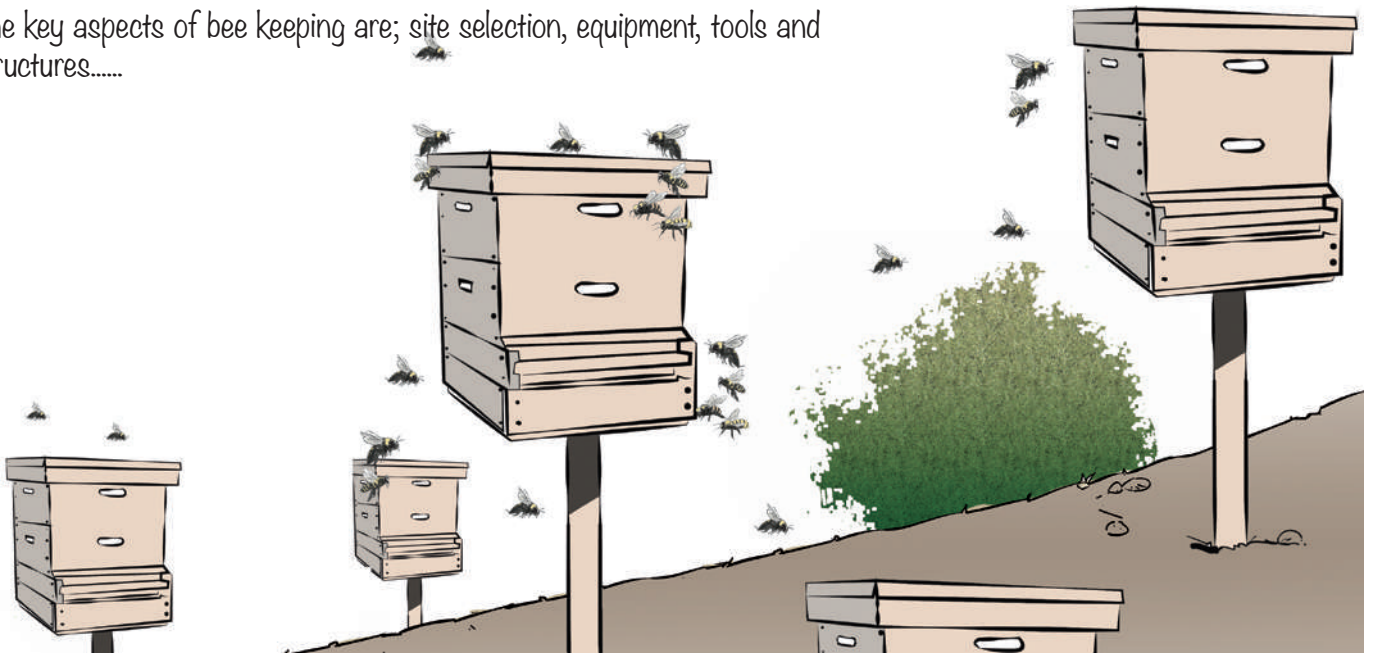


Bee venom is a mixture of proteins and smaller molecules which may produce inflammation. Bee colonies are the producers of all the primary products of bee keeping. They can be obtained through colony multiplication.

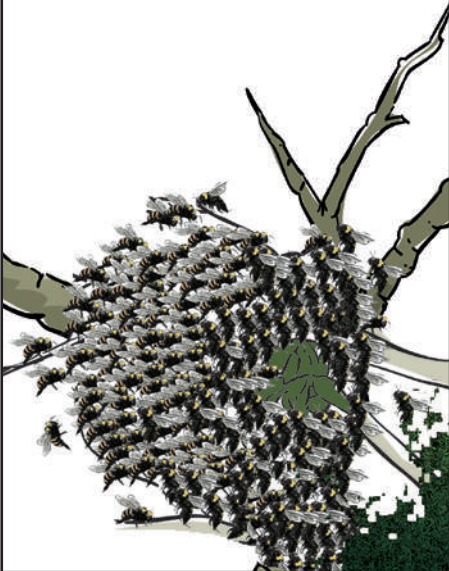


## 2. SITE SELECTION

The key aspects of bee keeping are; site selection, equipment, tools and structures.....



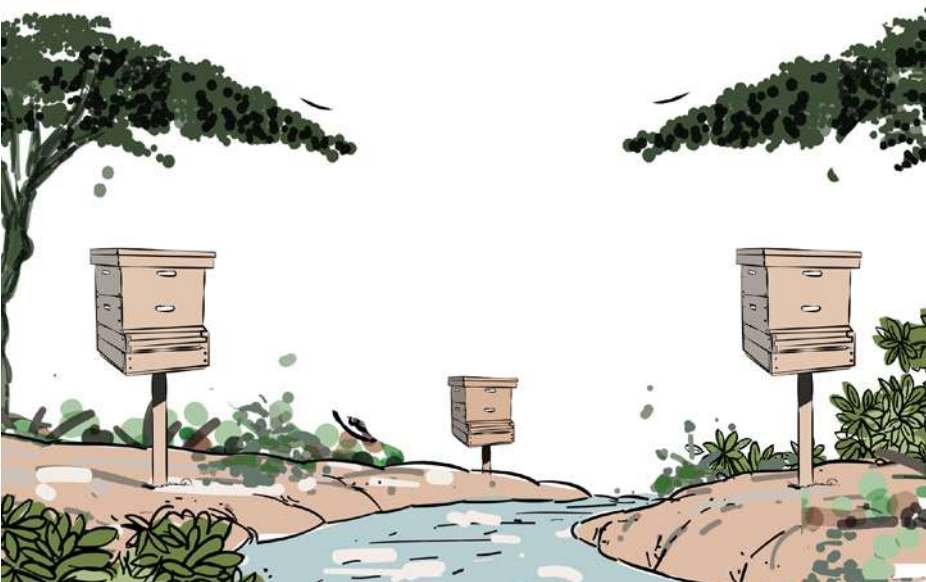
....Colony management and



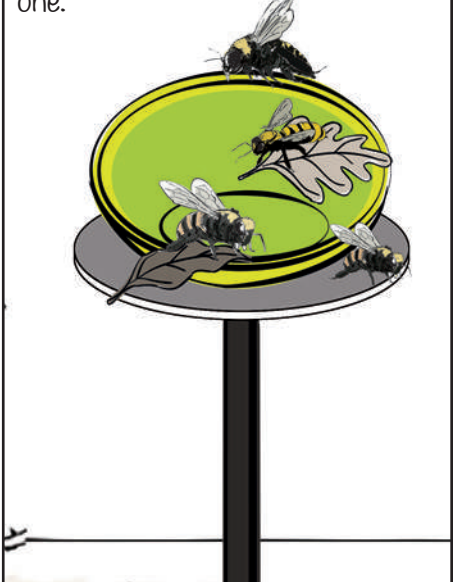
harvesting.



When setting up an apiary site, the farmer should select a site with nectar producing plants. Clean water should be available within a radius of 1 km.



Where there's no natural source of water, the farmer should provide one.



The site should be free from pollution.



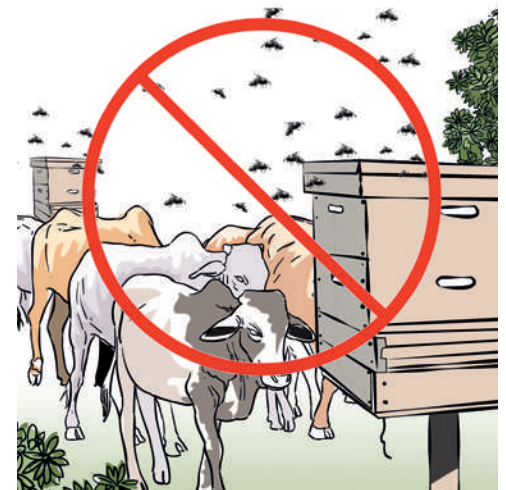
It should also be far by at least 150 mtrs from social amenities like schools, markets and churches.



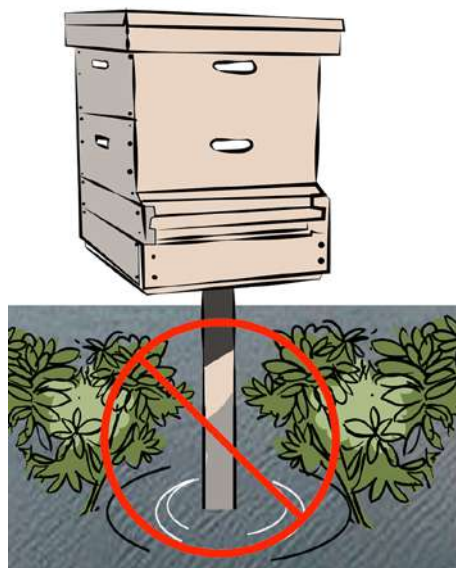
Fence the apiary with a hedge, a fence or establish a bee house.



Apiaries should be cited away from livestock.



Avoid swampy areas and the site should not be prone to floods



The site should be easily accessible for frequent monitoring and inspection.

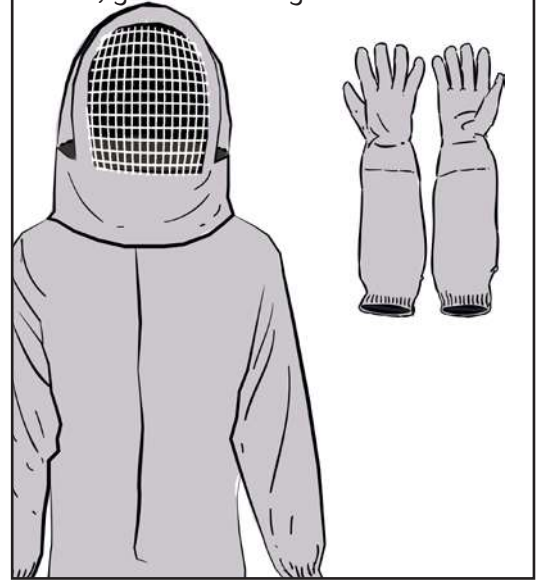


### 3. Equipment, tools and structures

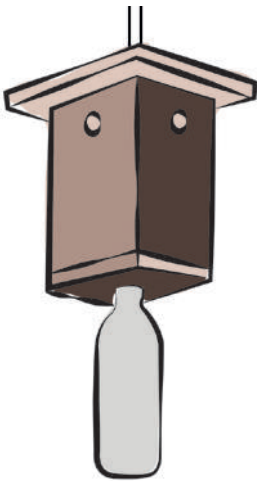
Beekeeping equipment, tools/accessories and structures are divided into production and processing. Production equipment includes; beehive, (traditional and modern).



protective gear which includes, a veil, overall, gumboots and gloves.



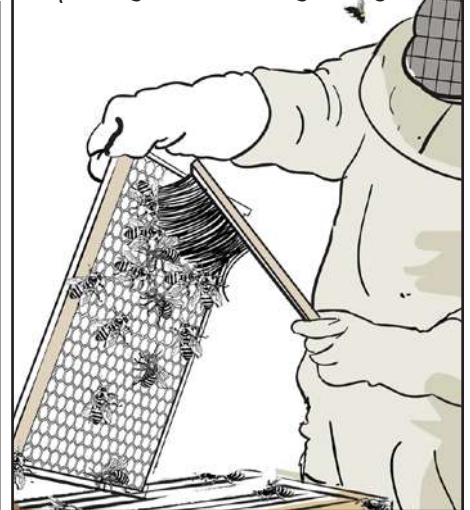
1. Catcher box for helping beekeepers capture and relocate swarms.



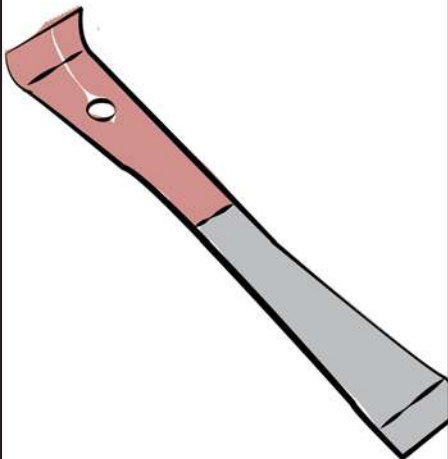
2. Smokers which are used to calm bees when one is harvesting honey and other bee products.



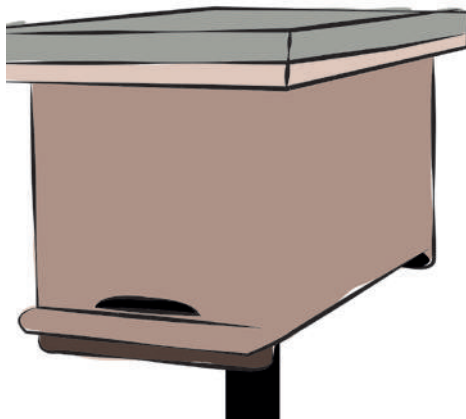
3. Bee brush. Used to gently brush honey bees from frames when inspecting or harvesting honey.



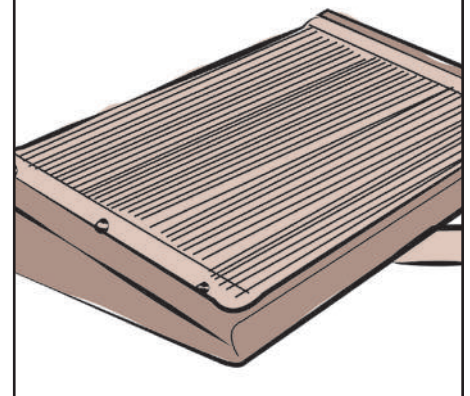
4. Hive tool is used to open the hive, lift and shift frames or other hive parts, scrape away wax and propolis.



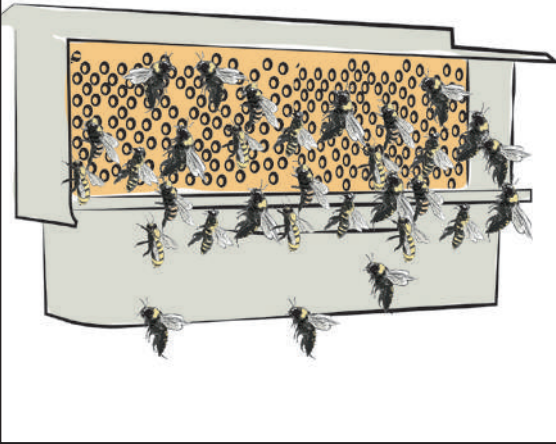
5. Bee lure is used to attract swarms.



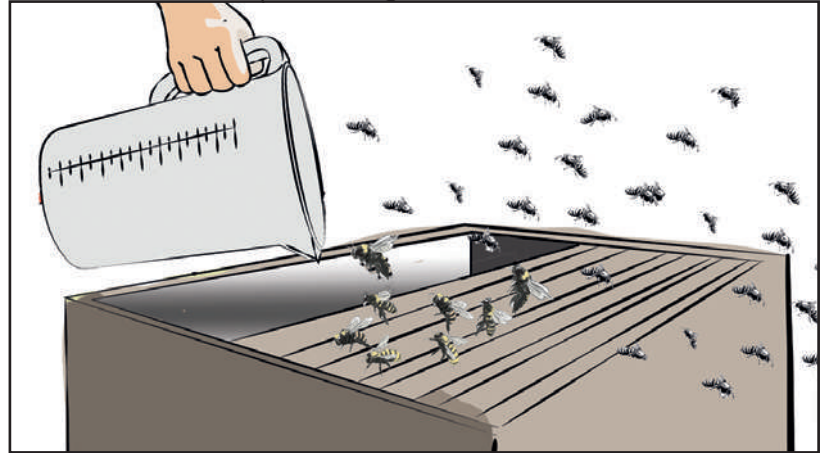
6. Bee venom collector that is used for collecting venom of the honey bee without injuring the bee.



Pollen trap. These allow beekeepers to remove a portion of the pollen from pollen foragers while still allowing some pollen into the hive.



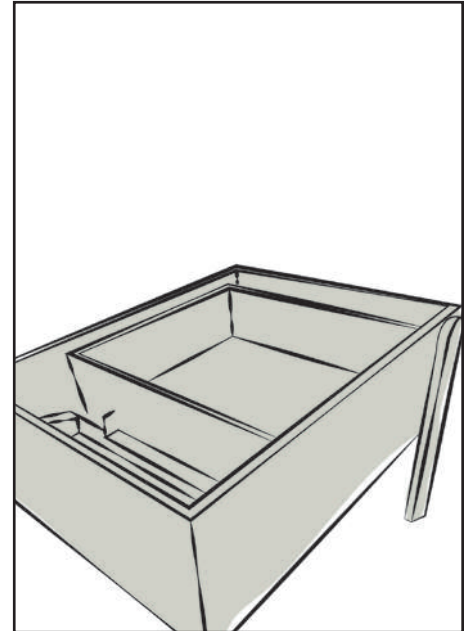
Feeder boxes are shallow boxes with a plastic reservoir to hold syrup, and hardware cloth to allow bees access to the syrup, while preventing them from drowning. Propolis collector is a grooved screen made from flexible food-grade plastic. The perforations are too small for the bees to pass through.



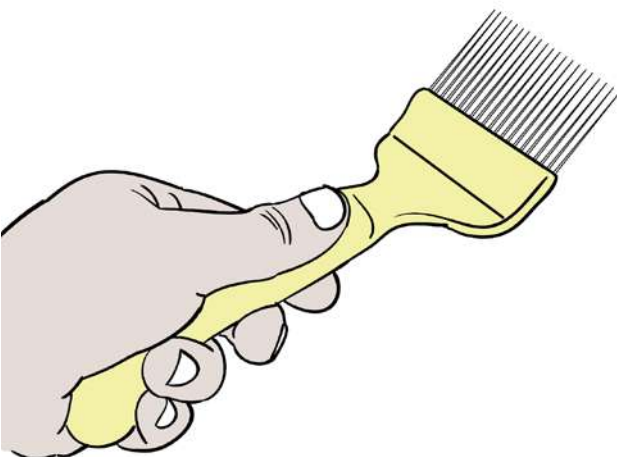
Processing equipment includes: Food grade bucket that is airtight and non-metallic. Honey is acidic thus can corrode metals.



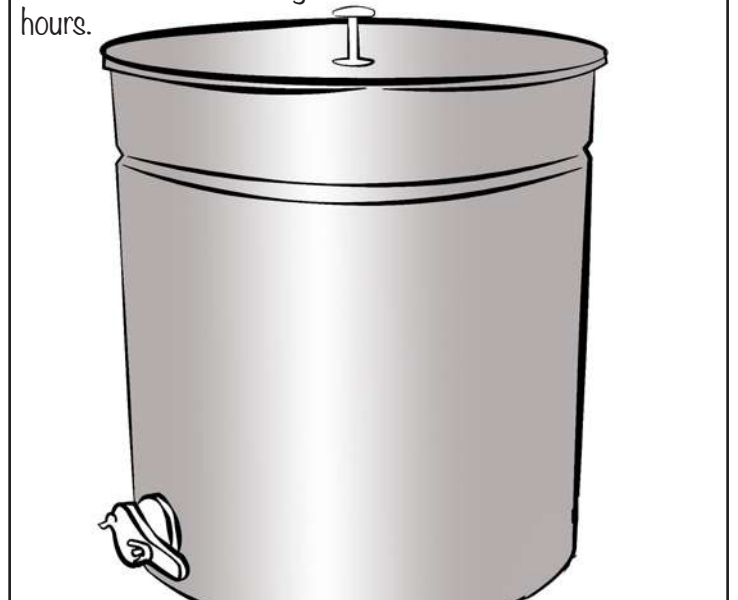
A weighing balance, honey extractor.



Uncapping knife / fork. Uncapping knives slice wax cappings from the honey frames.



Settling tank/Honey warmers are used to hold honey until it is bottled. This holding should be for at least for 24 hours.

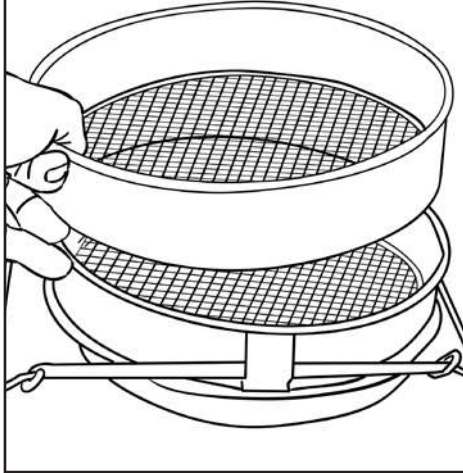




Honey jars for packaging and storing honey.



Honey strainers designed with two separate screens for effective honey filtering



Wax mold are designed spaces where molten wax is poured into and left until set, to take the shape of the space.



## 4 TYPES OF HIVES

### 4.i Traditional hives

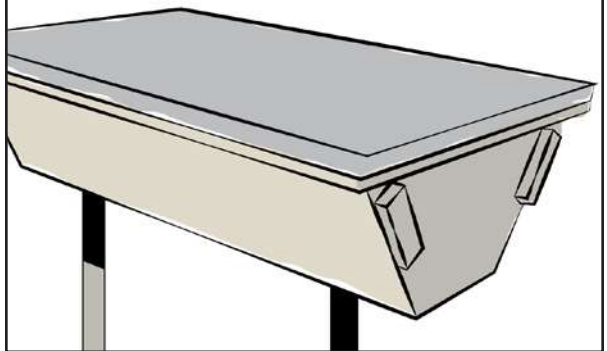
The hive is the bees' home. There are different types of hives commonly used in bee keeping. Traditional hives; fixed comb hives like log, basket, pots and guards.

Traditional hives are constructed or made using locally available materials by traditional bee keepers.



### 4.ii Modern hives.

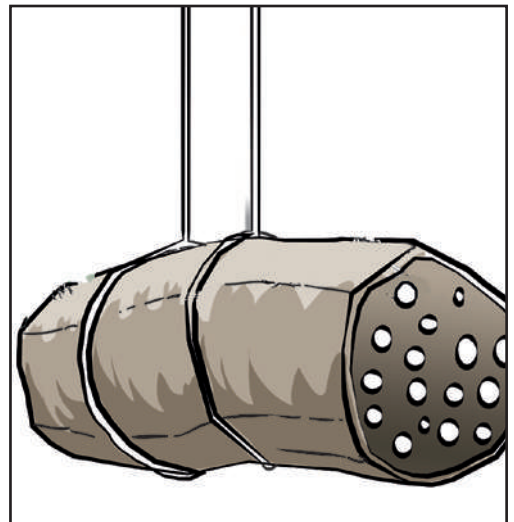
These are movable frame hives/ bars like Langstroth hive and Kenya top bar hives.



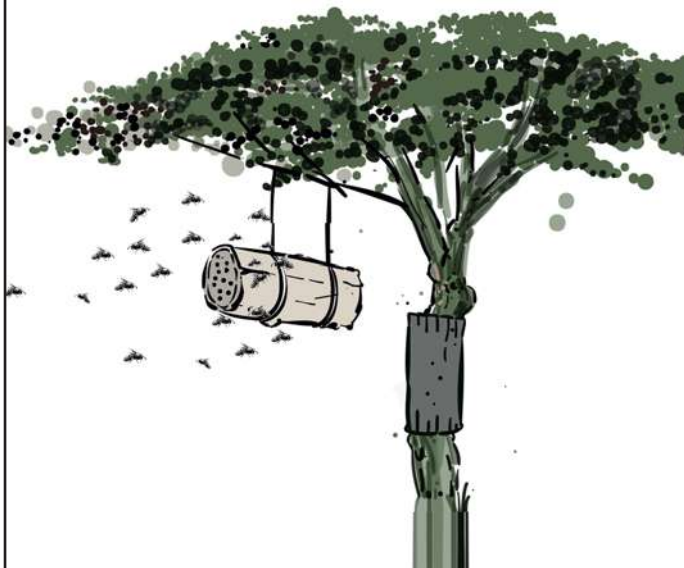
Traditional hives are cheaper to acquire and make. They give plenty of bees wax and propolis and provide a natural habitat for the bees.



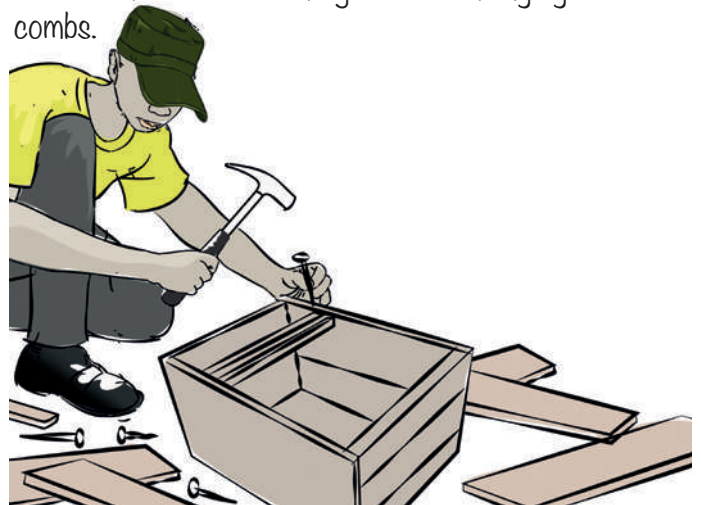
However, they are not durable. It is difficult to manipulate bees in them. It is difficult to distinguish ripe or unripe hive from outside.



Traditional hives are usually hanged high up on trees making it inappropriate for most people to handle them.



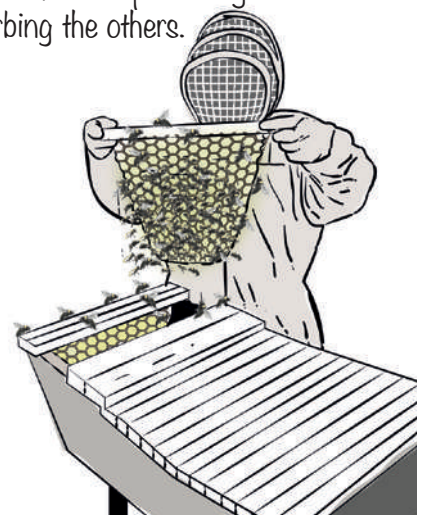
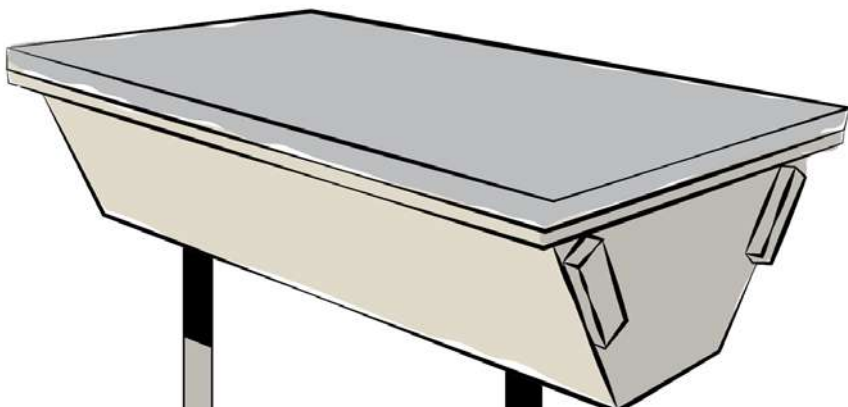
Modern hives are constructed to make it easy to manipulate bees and handle the bees products easily. They contain movable frames or top bars that can be removed and returned easily without damaging the combs.



#### 4.iii. Kenya Top bar hive

Kenya Top Bar Hive was developed in Kenya. It has 26 pieces of top bars and each is treated with bees wax to guide the bees on where to attach the combs. Top Bar hives are inexpensive to make.

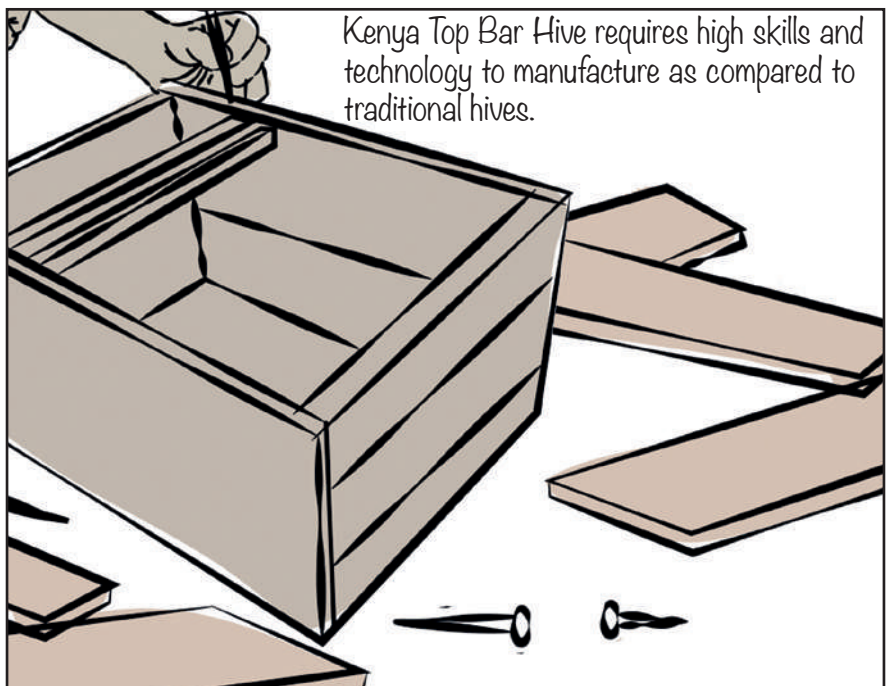
The combs are arranged in such a way that they can be accessed with ease and independently without disturbing the others.



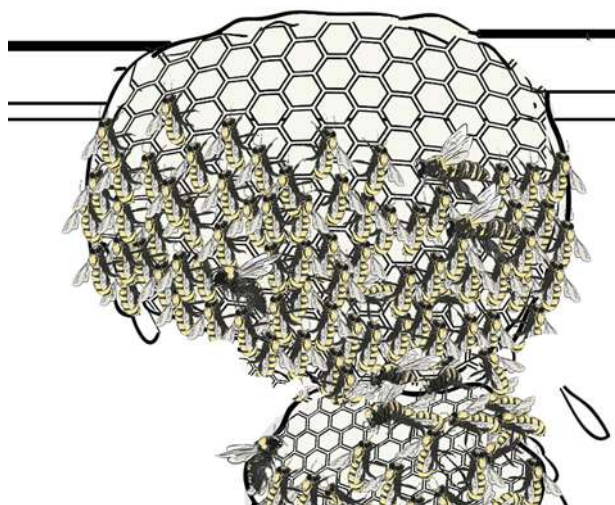
Harvesting is easy and possible to select sealed combed honey.



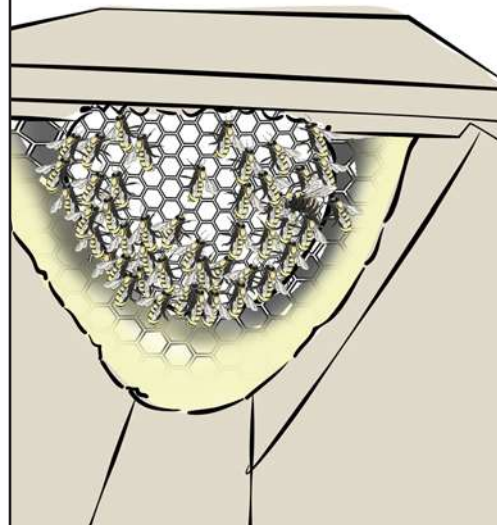
Kenya Top Bar Hive requires high skills and technology to manufacture as compared to traditional hives.



However, honeycombs easily break while in transit. They are as well destroyed during harvesting and this means bees must work hard to build again.



Harvesting from a KTBH is done once in a season.



#### 4.iv. Langstroth hive

Langstroth hive is a bit more complex than the Kenya Top Bar hive. It is made up of the floor-board, brood chamber and wired frames.



Langstroth hives are long lasting. Honey from them can be harvested twice in a season.



Langstroth hives are more expensive than KTBH. They require technical management skills to maintain and handle.



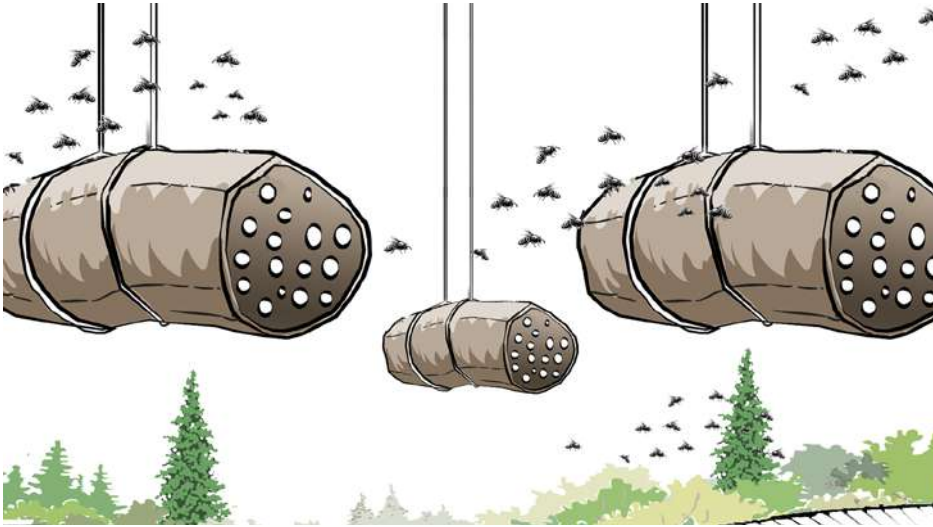
One requires a honey extractor to process honey, and this comes with an additional cost.



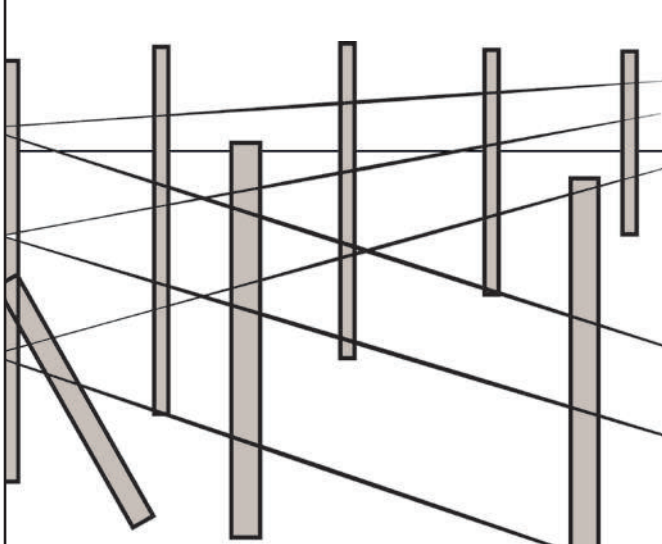
## 5. Setting up an apiary

An apiary is a place where bee hives are kept for the purpose of rearing bees. Bees forage in a radius of 3 km from the apiary.

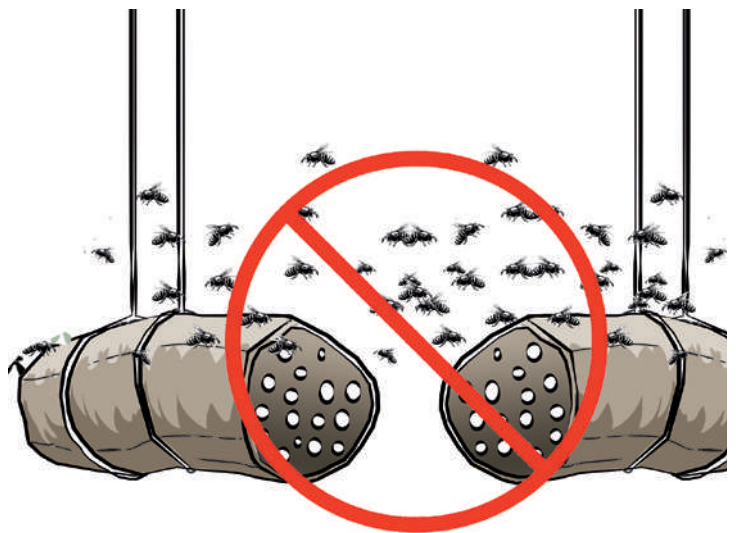
To set up an apiary, start by clearing the site.



Fence the area and set up the hives. The hives can be suspended on trees or placed on the hives stand.



Do not have the hive openings face each other as bees can be aggressive against each other.



Clear bushes around the apiary



Oil and grease wires and stands to keep away pests and predators.



Do not throw or bury empty infested combs. Instead, burn the infested combs to prevent multiplication of pests



Burning will prevent the recurring infestation of the apiary.



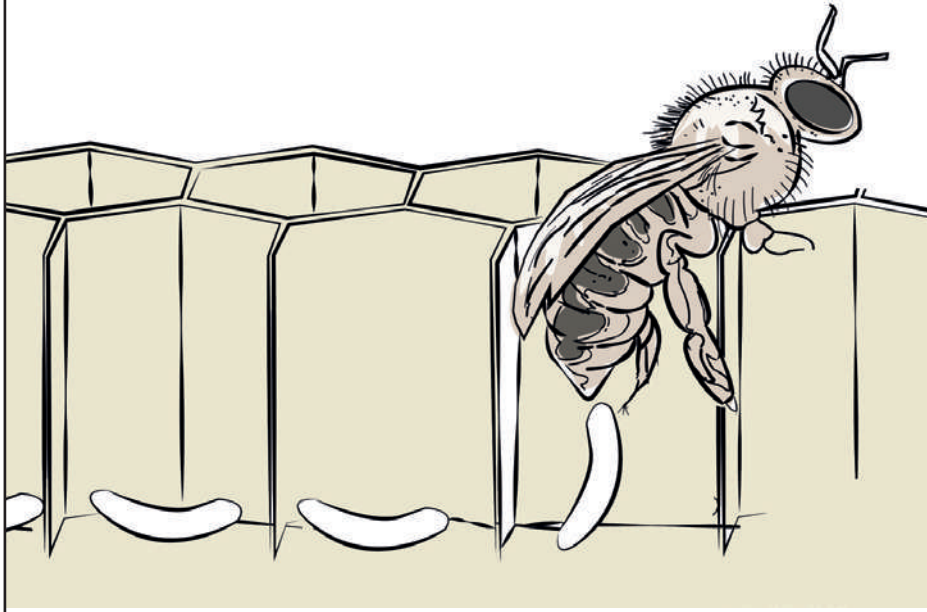
Provide fresh water from the apiary. Bees need as much water as pollen and nectar. A colony requires up to several litres of water in a day



Cultivate pollen and nectar producing plants and crops.



Make regular inspection of the apiary to check on the strength of the apiary. See if the queen is present. Newly laid eggs can prove she is present.



Always wear light colored clothes and visit the hives early in the morning or late in the evening.



When opening, use a hive tool or knife to separate bars that are glued together by propolis



Keep the bars in the same order and try not to squash any bees when replacing them in the hive.



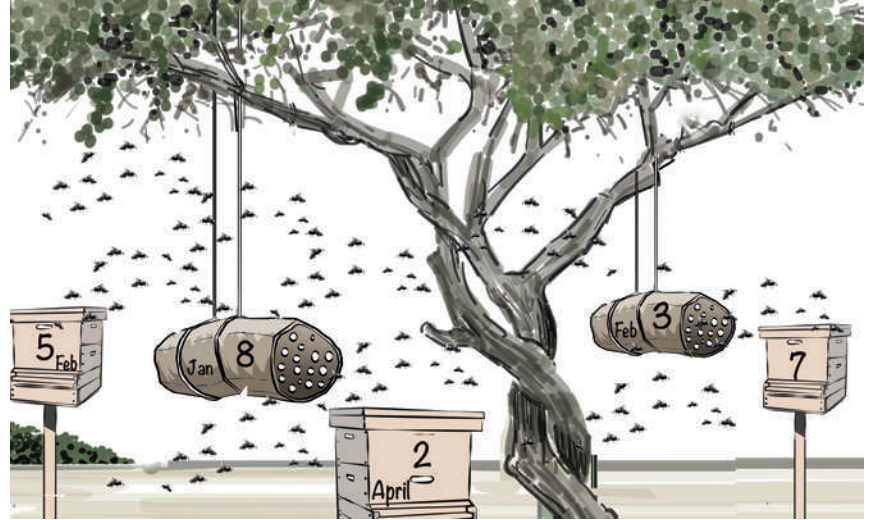
Keep empty combs for processing wax. Make sure the top bars are pushed together so that no gap exists.



Pay regular visits to your apiary for familiarization with bees. Maintain records of your apiary.

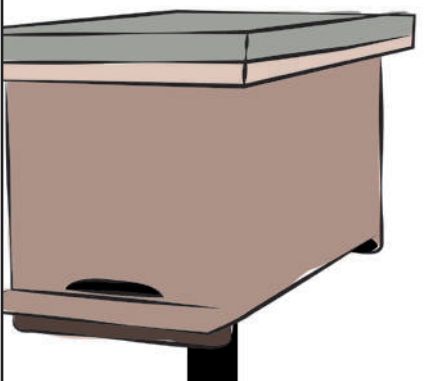


This should include, hive identification, day and time of hive establishment and production of the bees. Behavior of the bees can give information on their status.

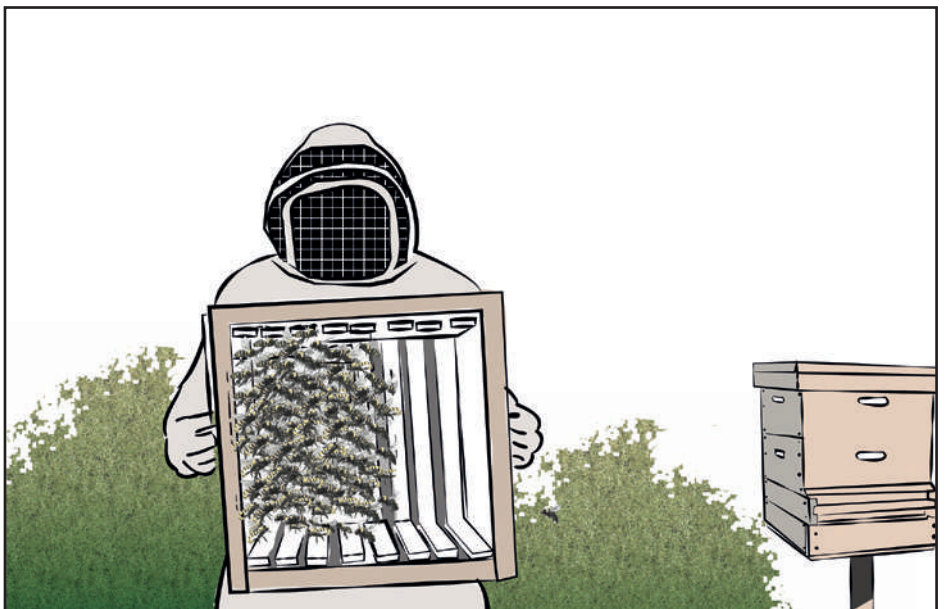


## 6. HIVE STOCKING

Once you establish the apiary, the next step is to colonize the hives through hive stocking. Trap the bees into the hive using comb starters, attractants and lures.



Ensure that the queen is among the bees you are targeting. Attract the bees into a close and tight catcher box to avoid disturbance.



Do not transfer the colony on a sunny day. Instead do it at night. Put the catcher box 2-3 days in a dark and calm place to stabilize.



Establish a forage to feed the bees by planting crops that produce nectar near your apiary.



A beekeeper should regularly inspect their hives. Check the presence of pests and predators on the food comb or in the drone and the queen cell. If the room isn't enough for the bees, remove some of the brood combs and unite with a weaker colony.



## 7. COMMON PESTS, PREDATORS AND DISEASES

Common pests and predators include humans, large hive beetles, monkeys, bird eaters, snakes and lizards.



Honey badgers too destroy hives and feed on the honey. Raise hives by at least one meter to keep honey badgers out of reach. Use mabati at the hives' base stands to deter badgers from climbing up.



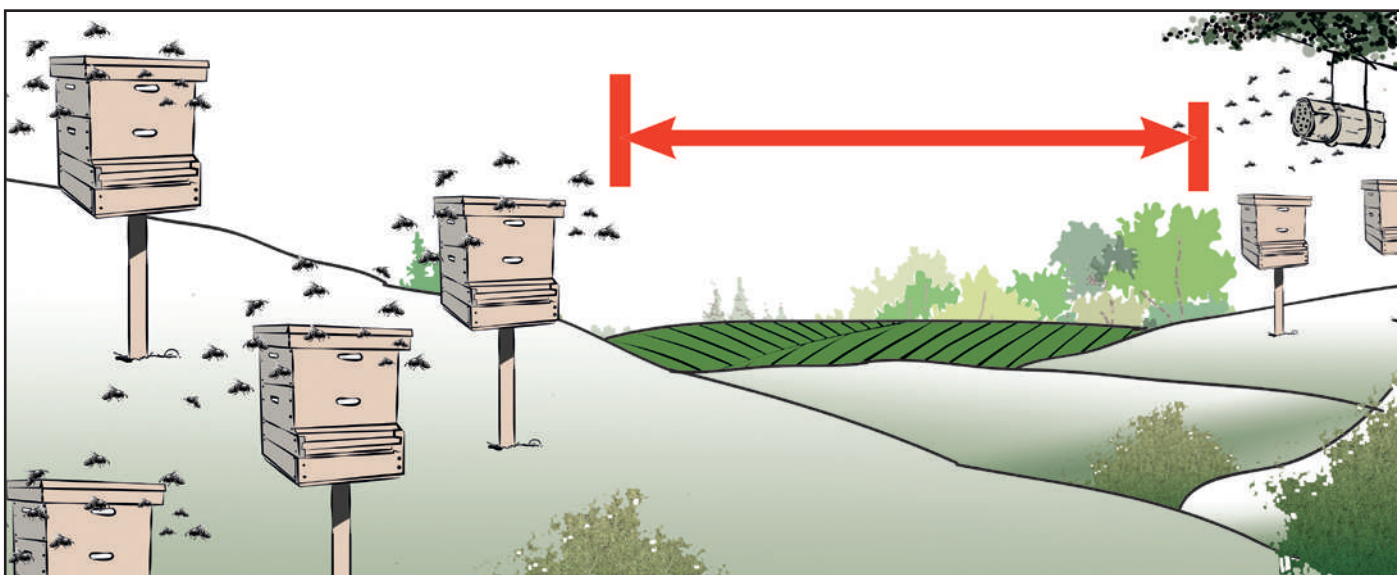
To manage diseases in the apiary, observe general apiary hygiene. Avoid or minimize buying used hives or if used, disinfect them before setting.



Seal cracks or openings in hives to avoid predator entry.



Avoid inbreeding as it weakens the immunity system of the colony. Promote good forage for the bees.

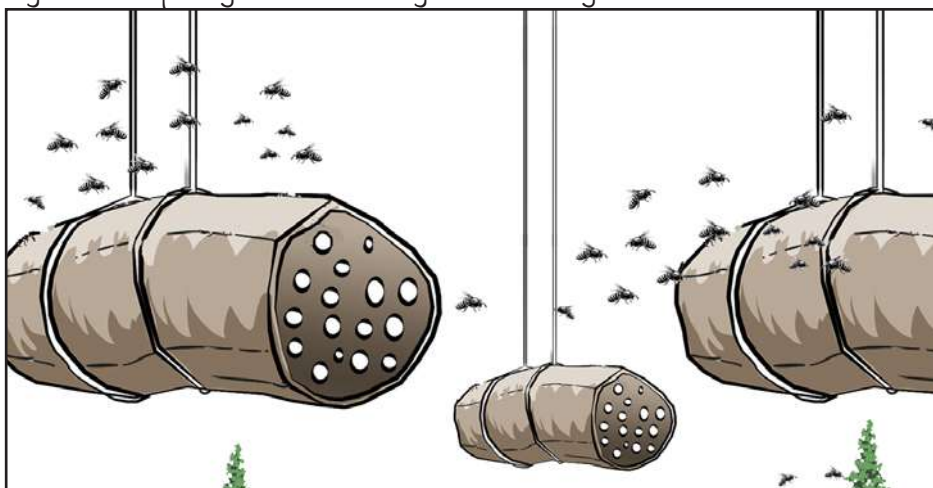


## 8. HARVESTING AND PROCESSING OF BEE PRODUCTS

Honey is a natural viscous liquid that is sweet. Its composition varies particularly with its water content.



The first step in honey harvesting is assembling tools and equipment. Understand the seasonal cycle and stages of the colonies for proper management. Inspect your hives for signs of maturity for harvest.





A gentle knock along the length of the hive producing a solid sound is an indication that combs are filled with honey. A hollow sound is an indication that combs are empty.



Put on your protective gear and light your smoker. The smoke comes from burnt material such as semi dry grass, wood shaving or dry bean husks. Identify the hive to harvest and start with the less aggressive and finish with the most aggressive.



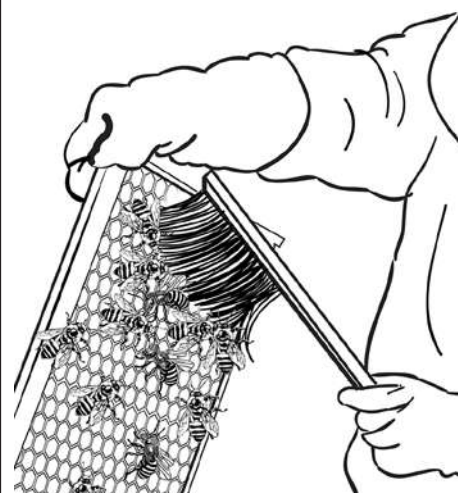
Smoke the hive starting from behind, then sides then the front side.



Open the hive lid using the hive tool and smoke the bees again from the top after opening.



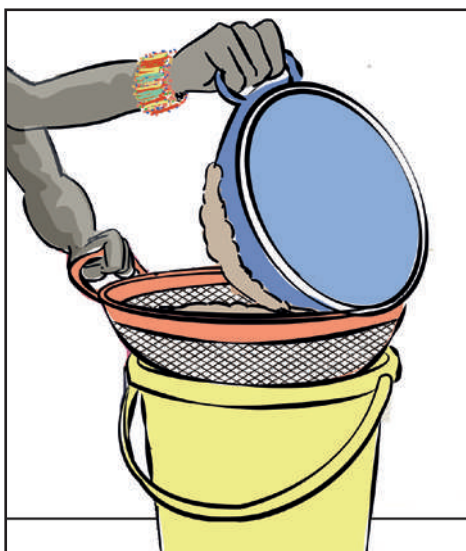
Put honey combs in clean honey comb trays and use a bee brush to remove the remaining bees.



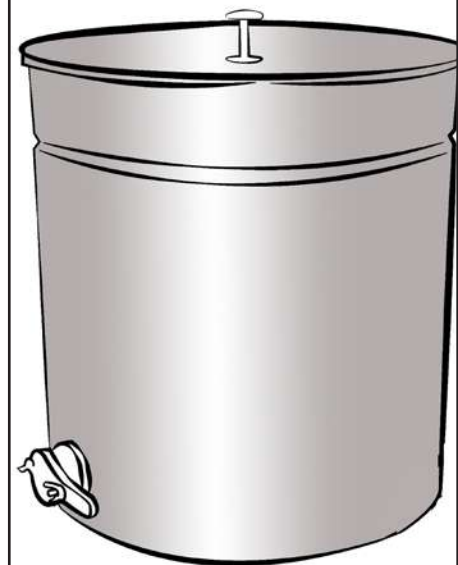
To extract honey from a hive, place honey frames on the uncapping tray then uncapp them using the uncapping fork.



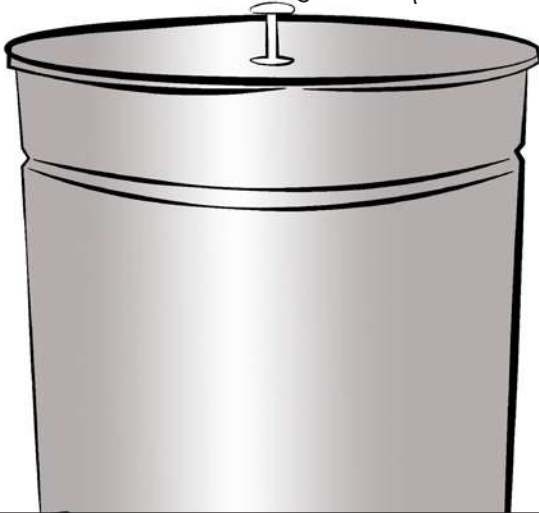
Place the uncapped frames inside the centrifuge and manually or automatically extract the honey



Open the centrifuge tap to drain the honey into a holding bucket, through a sieve.



Use a refractometre to measure the moisture content. If it surpasses 20%, it means honey was harvested immaturity. Let it cool overnight. Once settled, remove any wax or pollen that may settle on the top.



Package in plastic bottles or glass jars and seal, ready for the market.



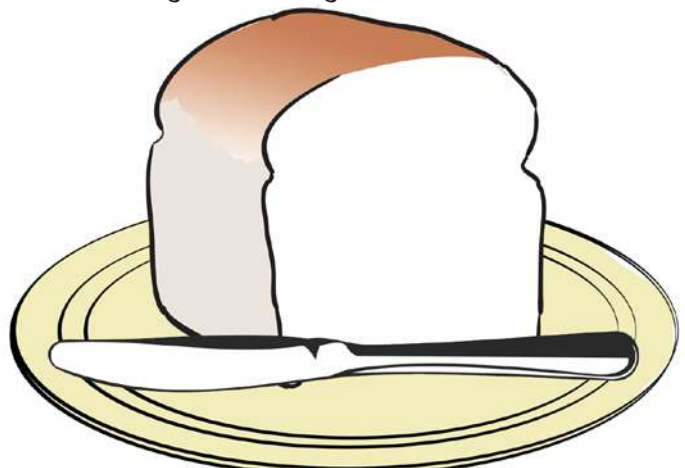
## 9. PRODUCTS FROM BEE KEEPING

### 9.i HONEY

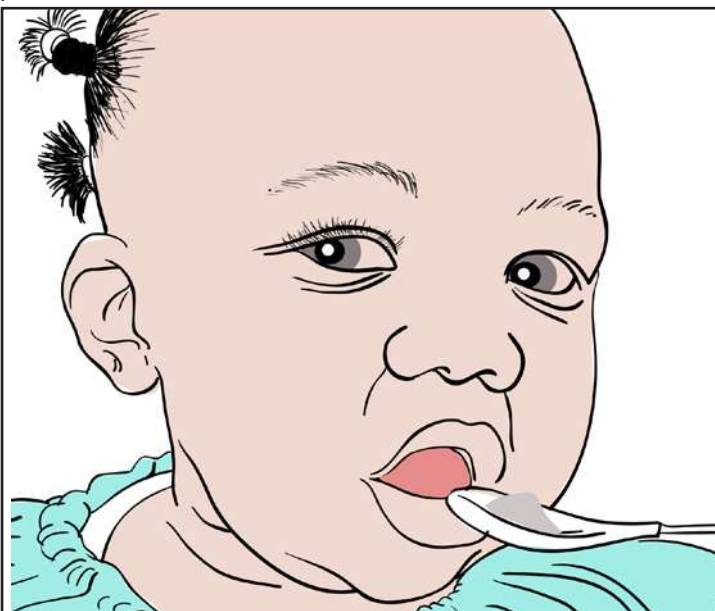
Filtered honey may be obtained from extraction and put into jars of different quantities.



Blended honey is a mixture of honey from different ecological zones of dark colored honey mixed with light colored honey. Common uses of honey include being used as food, as a substitute of sugar in cooking....



As a drug or a sweetening agent in drugs. Also, as a preservative...



.... or used in making alcoholic beverages.



## 9.ii WAX

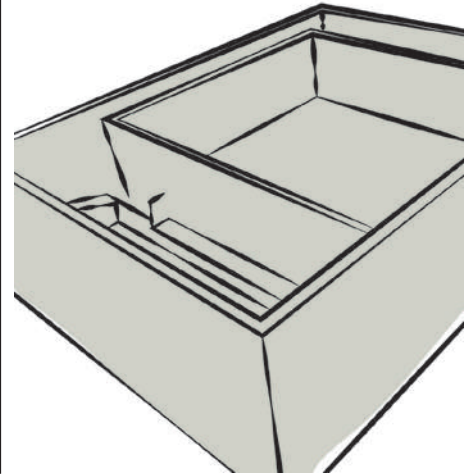
Wax is the material used by honeybees in the construction of their combs. Virgin beeswax immediately after being extracted is white.



There are different ways of processing beeswax. Heating method where combs are heated in water then the solution is sieved through a cotton bag



Solar extraction where an equipment called solar wax melter is used to extract wax directly from the combs



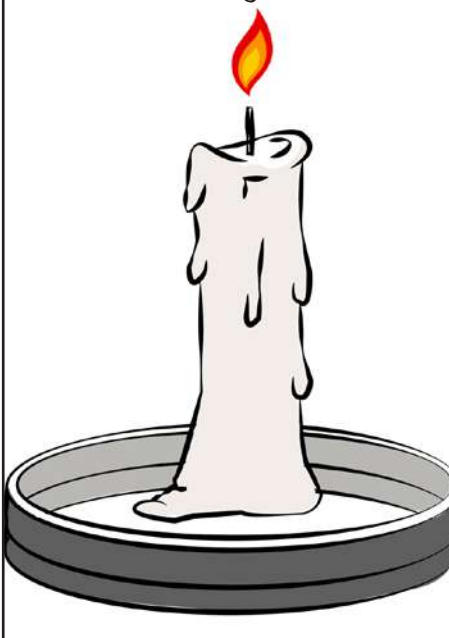
For the steam melting method, combs from hives are taken and placed inside the steam melter machine. Bees wax can be used to make a variety of household items including shoe polish.



Cosmetics such as lipstick, lip balms soaps



Candles and waxing threads.



Wax is used in designing patterns on fabrics in the textile industry and...



in pharmaceuticals to make capsules, pills and drugs.



### 9.iii Propolis

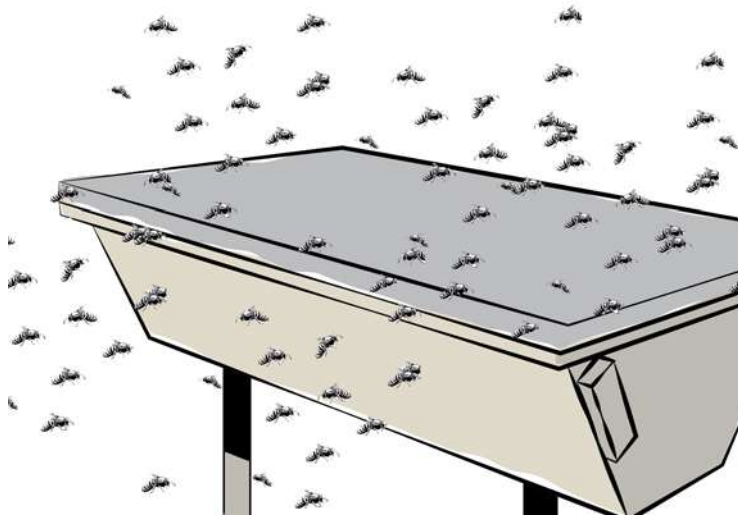
Propolis is a mixture of beeswax and resins collected from plants particularly from flowers and leaf buds.



The composition depends on the type of plants accessed by bees. This makes it have different color, odour and medicinal characteristics due to different sources and the seasons of the year.



Propolis can only be acquired from KTBH, log hives and traditional hives. Very little can be obtained from Langstroth hives.



Propolis is harvested by either scrubbing it from the hive using the hive tool or by using the propolis screen.



It is used in cosmetics, making dermatological creams, dental care..



Treating respiratory infections....

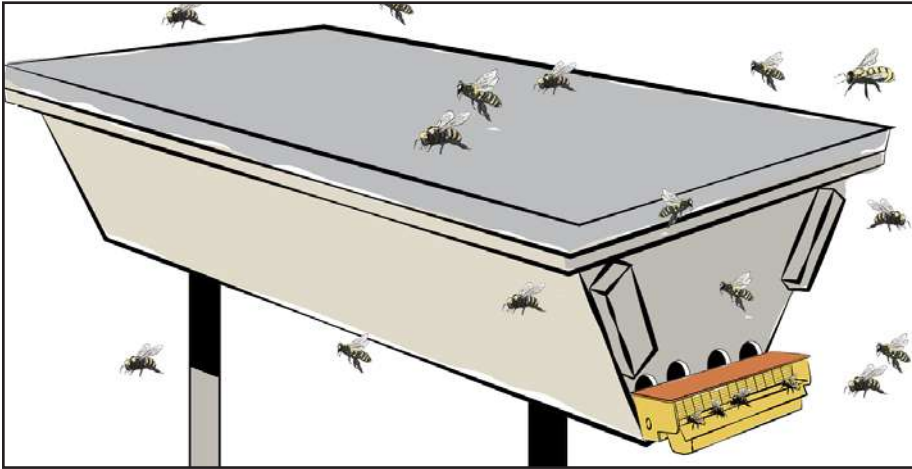


and as a bee lure.



### 9.iv Pollen

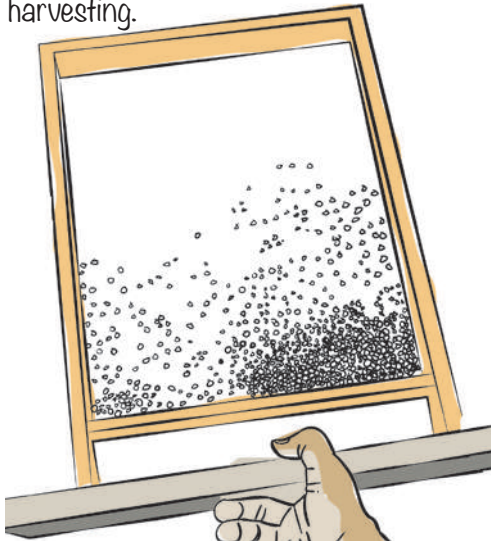
Pollen is relatively simple to harvest from the hive using a pollen trap fitted to the hive entrance. When bees pass through the trap, a grid knocks the pollen out of the pollen baskets on their back legs and it falls into a tray from which it is collected.



Extreme care should be taken to ensure that pollen is not contaminated by bees collecting from flowers treated with pesticides..



Processing of pollen entails drying of the grains as soon as possible after harvesting.

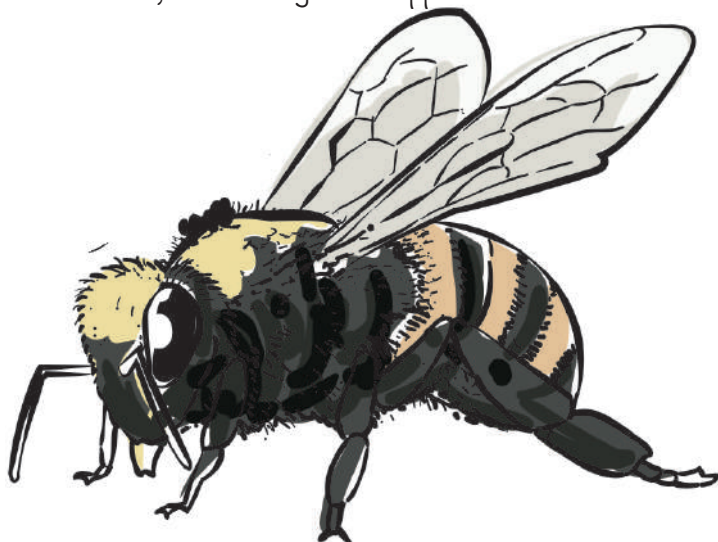


Pollen is used as medicine, as food, in cosmetics and for pollution monitoring when examined.

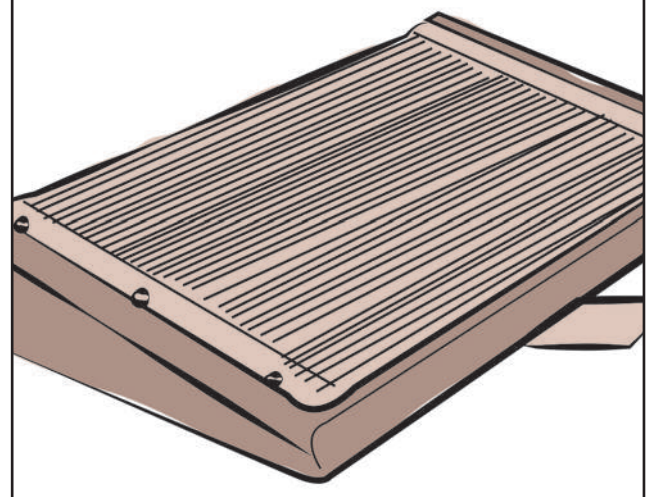


### 9.v Bee Venom

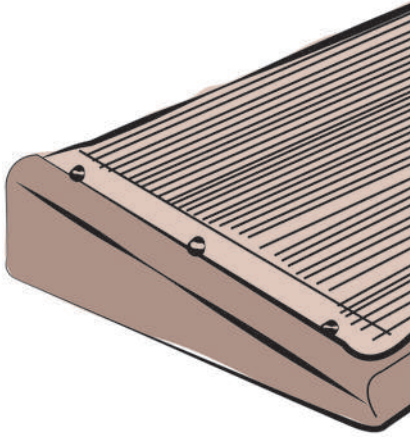
Honeybees have a sting which injects venom in the body of the enemy. Though venom is considered poisonous as it may lead to death, it has many useful applications.



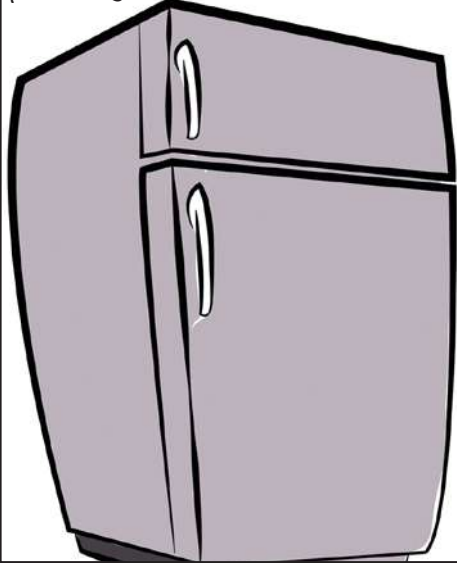
harvesting of bee venom requires high skills and equipment and is therefore not to be done by any bee keeper.



After venom is collected using a venom collector, it is put in a dark bottle in a dark place.



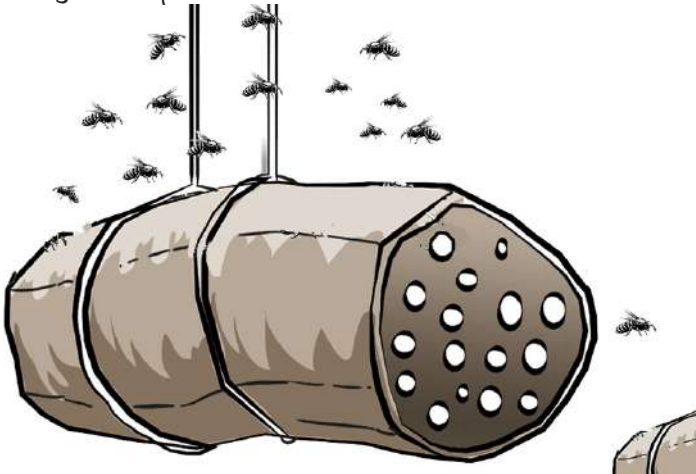
It should be stored refrigerated or preferably frozen.



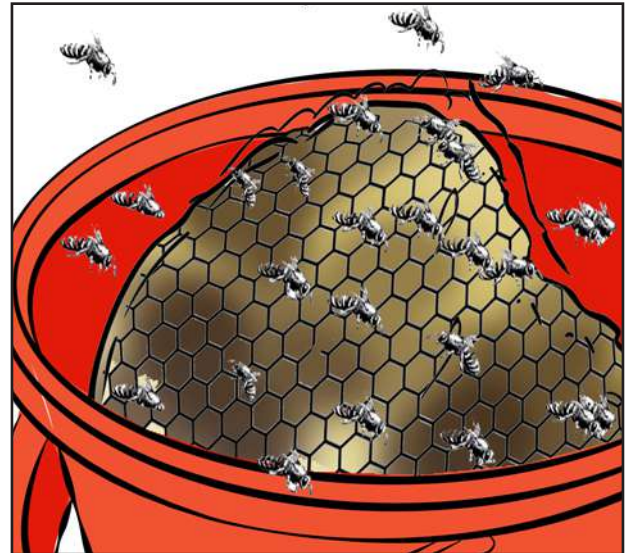
Bee venom is generally used for medicinal purpose.



Despite the very high demand for bee products, only a few farmers have ventured into the bee keeping enterprise. This is due to the fact that many lack knowledge on production and processing of bee products.



Others sell bee products in crude form fetching them little returns..



Whatever type of bee products you produce, you can easily find a market for it. An average production of 20kgs per occupied hive is achievable and could rise to 30kgs depending on the management.



Value added products from basic bee products can increase household incomes and improve livelihoods.



**Information contained in this module was compiled with  
contribution from**

Fredrick Ochieng - BvAT  
Faith Maiyo - BvAT  
Caroline Mwendwa - BvAT  
Hudson Shiraku - BvAT  
Njeri Kinuthia - BvAT  
Elias Biwott - BvAT  
Pamela Otieno - BvAT  
Ruth Mugar - BvAT  
Dr. Nkoba Kiatoko - ICIPE  
Fredrick Odera - APK  
Gibson Akaranga - Bee keeper  
Rosebella Osore - Bee keeper  
Aska Obaigwa - Bee keeper  
Julius Mutuku - Bee keeper  
Eric Agesa - Kakamega County Government Representative

**In partnership with**  
Research Institute of Organic Agriculture (FiBL)

**Illustrations & Design**  
Samuel Muigai (Igah)  
Simon Thangu

Biovision Africa Trust

P. O. Box 30772 – 00100, Kasarani

Off Thika Rd, Nairobi Kenya

Email: [info@biovisionafricatrust.org](mailto:info@biovisionafricatrust.org)

Tel: +254 (0) 719052113

