

BEEKEEPING INPUT PRODUCTION BUSINESS

TRAINING COURSE FOR YOUTH AGRI-ENTREPRENEURS

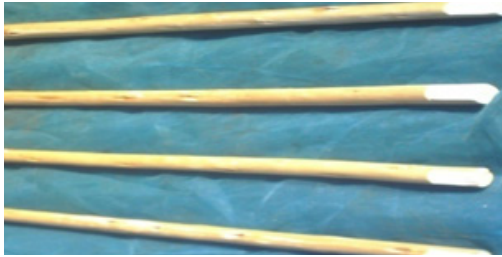
Ethiopian Agricultural Transformation Institute



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OVERVIEW OF THE MODULE

Beekeeping is an important agricultural activity that supports rural livelihoods, biodiversity, and income generation across many parts of Ethiopia. To meet the rising demand for locally made, affordable, and high-quality beekeeping tools, this training module has been developed to equip youth, women, and aspiring agri-entrepreneurs with the practical knowledge and skills required to produce essential beekeeping equipment. Participants will be trained in the production of key tools such as movable frame hives, chefeke hives, protective veils, gloves, and overalls.

The module blends theoretical learning with hands-on practice, ensuring trainees understand material selection, tool design, and construction methods that result in durable and effective beekeeping inputs. In addition to technical skills, the training also incorporates key business management topics including inventory control, cost efficiency, and quality assurance—helping participants to establish and maintain viable micro-enterprises.

This module contributes to broader employment creation and local economic development by promoting domestic production of beekeeping inputs. Reducing reliance on imported equipment allows smallholder beekeepers to access tools more affordably, improving hive productivity and honey yield. By producing and supplying these tools locally, trained individuals can launch their own businesses, generate income, and support the productivity of the beekeeping sector.

As beekeeping continues to grow in popularity and value, local entrepreneurs trained through this program are well-positioned to meet the increasing market demand while creating additional employment within their communities. This approach not only enhances local production capacity but also ensures more value is retained within rural economies.

The module places a strong emphasis on inclusion and equal opportunity, encouraging the full participation of women, youth, and men in beekeeping-related enterprises. By creating an enabling environment for diverse participants to succeed in this sector, the program promotes gender equity and strengthens community resilience. Empowering women to take part in equipment production contributes to a more balanced and sustainable development model where all individuals could become leaders in agribusiness.

In doing so, this training initiative builds both economic and social capital, fostering stronger community ties and supporting long-term development in the apiculture value chain. Ultimately, this program aims to enhance the capacity of local populations to produce, supply, and benefit from quality beekeeping inputs, contributing to food security, income diversification, and sustainable livelihoods in Ethiopia.

The Agriculture-focused Dignified Employment for Youth (ADEY) program is implemented by the Ethiopian Agricultural Transformation Institute in partnership with the Mastercard Foundation to enable 611,343 inclusive and dignified work opportunities for young women and men and support youth entrepreneurship, employability, and sustainable livelihoods in the agribusiness sector.



INTRODUCTION

The beekeeping business employs an extensive variety of equipment, from the apiary to harvesting and processing, transportation, and storage of hive products. Though most beekeeping equipment can be produced locally using locally available materials, most of our beekeepers lack market access to purchase and use the equipment, particularly movable frame hives and personal protection equipment (PPE), such as veils, gloves, and overalls.

Not only lack of market access but also those that are available on the local market lack quality and do not fulfill the set specifications. To enhance the production and productivity of quality honey, standard beekeeping equipment, including movable frame hives, veils, gloves, and overalls, is among the key startup tools and materials. At present, the government has initiated Yelimat Tirufat, which encompasses the expansion of beekeeping and is targeted to produce 478 thousand tones of honey in the coming years.

Thus, the demand for beekeeping equipment, such as movable frame hives (Zander type), veils, gloves, and overalls, becomes higher and becomes a big potential business. The construction of this beekeeping equipment is not a simple task and requires quality materials, specifications, precision and educated and experienced carpenters. Thus, the lack of appropriate beekeeping equipment at the beekeeper level remains the biggest barrier to utilizing the apiculture potential in Ethiopia.

As a result, it is critical to understand the recommended dimensions and how to construct essential pieces of beekeeping equipment for primary production. Therefore, this training module is developed to develop the skills and knowledge of youth entrepreneurs who are willing to engage in the production business of these beekeeping equipment and meet the market demand for quality and standard beekeeping equipment to enhance the production and productivity of the beekeepers and create decent self-employment.

TRAINING METHODOLOGY

The training on producing beekeeping equipment such as hives, veils, and gloves is practical and hands-on. It begins with an orientation on materials, tools, and safety, followed by step-by-step demonstrations and guided practice. Participants learn to measure, cut, and assemble each item correctly. Problem-solving sessions help address common issues, while quality control is emphasized to ensure durable outputs. The training ends with feedback and evaluation, allowing participants to showcase their skills. The full program takes about 16 days and requires materials such as an LCD projector, woodworking, and sewing tools.

TARGET PARTICIPANT

This module is designed for youths (male and female), MSMEs and other Agri-entrepreneurs who have carpentering and sewing knowledge and willing to engage in these beekeeping inputs production business.

SECTION 1. ZANDER HIVE MAKING

1.1. OVERVIEW OF THE SECTION

The Zander hive is crucial in beekeeping due to its well-structured design, which supports efficient colony management and honey production. Its spacious brood chamber and super chambers provide optimal space for bees to build combs, rear brood, and store honey. The hive's precise dimensions and adjustable entrance gate make it adaptable to seasonal changes, helping regulate the hive's environment. Additionally, the hive's robust construction and ease of maintenance ensure durability, making it a reliable choice for beekeepers looking to maintain healthy and productive bee colonies.

The training session on building a Zander hive focuses on equipping participants with the knowledge and skills to construct a functional hive suitable for beekeeping. The hive comprises several key components: the bottom board, brood chamber, and two super chambers, each meticulously designed to provide optimal space for bees and ease of management for beekeepers. Participants learn detailed specifications such as dimensions and materials required for each part, emphasizing the use of well-seasoned timber and precise joinery techniques like tongue and groove joints for durability and stability. Practical aspects such as ensuring proper bee space and incorporating features like a sliding entrance gate for hive management during different seasons are also covered.

During the session, participants gain hands-on experience in assembling the components, ensuring they understand the importance of each part's dimensions and functionality in supporting bee colony health and productivity. Attention is given to finishing techniques to protect hive parts from weather and promote bee comfort, including the application of non-toxic, bee-friendly paints. Throughout, the training emphasizes craftsmanship and attention to detail, ensuring that participants leave with the practical skills needed to construct and maintain Zander hives effectively for sustainable beekeeping practices.



Learning outcome

By the end of this training session on constructing a Zander hive, participants will be able to

- Understand the structure and function of Zander hive components
- Develop skills in assembly of hive parts and joinery techniques
- Implement best practices for finishing and hive Maintenance

Time required: 6 days



Learning question

1. *How do the dimensions and materials of each component of the Zander hive impact the overall health and productivity of a bee colony?*
2. *What joinery techniques are most effective for assembling a durable Zander hive, and why are they important for the stability of the hive?*
3. *How can adjusting the entrance gate and using appropriate finishes improve hive management throughout different seasons?*

1.2. ZANDER HIVE MAKING

Major materials and tools needed for constructing the zander hive are timber (cedar, pine, or other suitable types), Nails, adhesives, Saw, hammer, nails, measuring tape, Paintbrushes, organic paint, multi-purpose woodwork machine, smooth iron sheet, frame wire, scissors, etc. Zander hive has four parts namely

- Bottom board (with entrance gate)
- Brood chamber (with 10 frames),
- Two suppers chambers (with each having 10 frames)

1.2.1. GENERAL DESCRIPTION AND REQUIRED DESIGN

A. Bottom board designs and requirement

- The bottom board is a wooden board on which the brood chamber rests. It is used to raise the hive off the ground and has a ledge around three sides that raises the first brood chamber, leaving an open slit in the front, which is the primary entrance of the hive.
- The bottom board shall be made of well-seasoned, 20 mm thick appropriate wood or material that is not objectionable to bees.
- The dimensions of the board shall be: 460mm X 460 mm X 20 mm
- If it is made by using more than one piece of wood, the pieces shall be joined by tongue and groove joints, and they shall be fixed to the broad chamber.

B. Entrance gate

- An open slit is left on the brood chamber with dimensions of 100 to 150 mm long and 15 mm deep. It shall have a sliding shutter, which reduces the size of the opening to 100 mm during the cold season.
- The entrance gate shall also be provided with a bee landing platform that is rigidly fixed or hinged.
- The dimensions of the landing plate shall be 200 mm long and 30 mm wide.

C. Brood chamber

- A brood chamber is a super or rectangular box fitted with a bottom board and filled with frames in which the queen lays eggs. Cells in which eggs have been laid are called brood cells.
- The brood chamber shall be made of well-seasoned 20 mm timber, which is not objectionable to bees with a thickness of 20 mm
- The dimensions of the brood chambers shall be
- External = 500 mm Length X 450 mm Width X 245 mm Height
- Internal = 460 mm Length X 410 mm Width X 245 mm Height

- Cut 10 mm wide and 16 mm deep in the front and back walls of the brood chamber, so that frames shall rest on these cuts.
- Join the four sides of the chamber by box corner, finger, dovetail, or tongue and groove joints.

D. Honey chambers/supper chambers

- A four-sided box of rectangular cross-section without a top or a bottom in which the super frame is placed.
- Like the brood chamber, suppler chambers shall be made of well-seasoned 20 mm thick timber, which is not objectionable to bees with a thickness of 20 mm
- The dimensions of the suppler chambers shall be
- External= 500 mm Length X 450 mm Width X 245 mm Height
- Internal = 460 mm Length X 410 mm Width X 245 mm Height
- Cut 10 mm wide and 16 mm deep in the front and back walls of the brood chamber, so that frames shall rest on these cuts.
- Join the four sides of the chamber by box corner, finger, dovetail, or tongue and groove joints.
- For lifting or to protect slipping off the hive parts from any mechanical shake, outside support strips 460 mm long at the front and rear sides and 500 mm at the left and right sides and 40 mm wide need to be fixed on all four sides of the outer faces of the side walls.

E. Frames

- A frame of wood of suitable size to hold a comb and create bee space when placed vertically in series in brood and suppler chambers.
- The frame has four sides: a top bar, two sidebars, and a bottom bar.

F. Top bar

- The top bar shall be 20 mm wide, 20 mm thick, and 480 mm in length. It shall be made of well-seasoned wood.
- Preferably, the ends of the side shall be joined to the top bar by tongue and groove joints.

G. Sidebars

- The dimensions of the sidebars are 20 mm thick, 20 mm wide at the end, and 38 mm wide at the top to provide 10 mm bee space.
- Four holes for wire reinforcement shall be made at a distance of 40 mm from the top of the sidebar.
- Alternatively, keeping the width of the sidebar at 20 mm, separate wooden, plastic, or metal bee spaces may be fixed to the sidebars to ensure greater accuracy in bee space between two frames and automatically adjust the distance between the centers of the two adjacent frames.

H. Bottom bars

The bottom bar shall be 20 mm wide, 20 mm thick and 400 mm in length. It shall be made of well-seasoned wood (timber).

Table 1. Dimensions of various parts of Zander hive

HIVE PARTS	LENGTH IN MM	WIDTH IN MM	HEIGHT IN MM
Floorboard	460	460	20
Brood chamber external internal	500 460	460 420	245
Super chamber External Internal	500 460	460 420	245
Frames External Internal	480 400		230 190
Roof (top) External	700	660	35

All dimensions stated in this specification are finished dimensions and shall be measured after the completion of finishing operations, such as planning and sandpapering.

Finishing

- The different parts of the beehives shall have a smooth finish, with the edges trimmed square and smooth.

- Parts of the beehive exposed directly to weather shall be painted with a suitable protective paint.
- The paint shall be nontoxic and shall not have any odor disagreeable to the bees.
- The color of the paint shall be white or yellow.

Jointing

- All joints shall be sound and shall withstand normal use
- For all types of beehives, walls, chambers and roofs shall be joined by special box corner joints, or tongue joints properly nailed.
- When the use of nails for joints is specified, there shall be one nail at each end.
- The distance between two consecutive nails shall not be more than 75.mm.

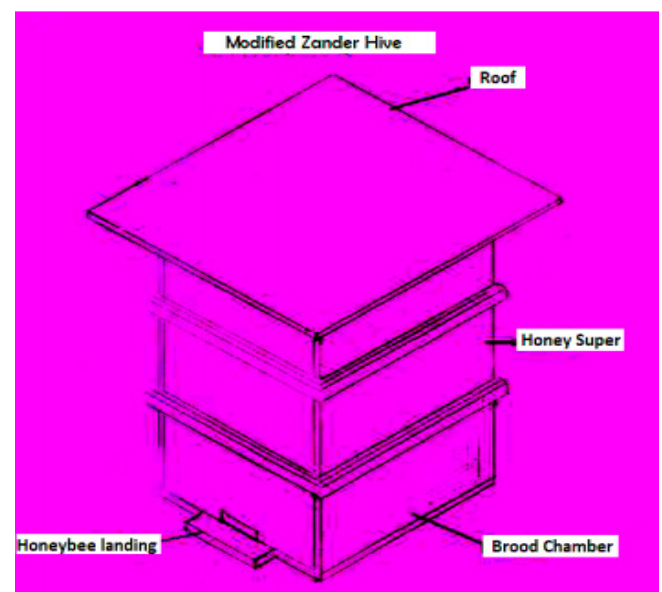
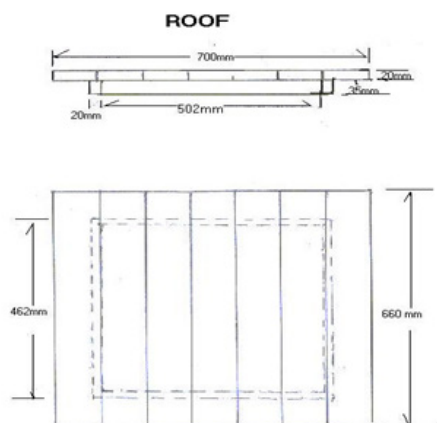


Figure 1. Structure of zander hive

I. Roof or Top cover/lid

The dimension of the top cover is given in Table 1. It is made of not more than three pieces of wood of 20 mm thick. It shall be fixed to the walls with nails. The roof shall be suitably covered with a sheet of metal to protect against rain. The sheet shall extend 30mm down below the top edge of the roof board.



Bar Hive (KTBH), is crafted using locally available materials like bamboo and eucalyptus poles instead of traditional timber. This makes it an economically viable option for beekeepers, especially in regions where timber is scarce or expensive. By utilizing these readily available materials, the production costs are kept low, and the need for expensive accessories like casting molds and extractors is avoided. This allows smallholder beekeepers to start and expand their beekeeping ventures with minimal investment.

Despite the change in materials, the Chefeka hive retains the user-friendly design features of the KTBH, offering a simple structure that makes managing the hive, inspecting the bees, and harvesting honey straightforward.

This makes the Chefeka hive a practical and sustainable choice for beekeeping, encouraging its adoption in rural communities and enhancing local income opportunities through honey production. The training session is designed to equip participants with the skills needed to construct Chefeka hives for both commercial purposes and personal honey production, empowering them to boost their livelihoods through sustainable beekeeping.



Post assessment questions

1. Can you describe the purpose of the brood chamber and super chambers in the Zander hive and how their design supports bee colony management?
2. What are the steps involved in constructing a frame with proper bee space, and why is maintaining accurate bee space critical for the hive?
3. How would you ensure that the Zander hive is weather-resistant and safe for bees, and what considerations are important when selecting finishing materials?

KEY MESSAGE

The Zander hive is a vital tool for beekeeping, designed to create an optimal environment for bees and facilitate efficient colony management. Its sturdy construction, precise dimensions, and adaptability make it ideal for promoting healthy bee colonies and maximizing honey production.

SECTION 2. “CHEFEKA” HIVE MAKING (TOP BAR HIVE MADE FROM CHEFEKA)

2.1. OVERVIEW

The Chefeka hive, similar in design to the Kenya Top



Learning outcome

At the end of the session the trainees will be able to acquire practical skills in constructing Chefeka hives using locally sourced materials like bamboo and eucalyptus,

Time required: 3 days



Learning question

- How does the use of locally available materials like bamboo and eucalyptus make the Chefeka hive more cost-effective for smallholder beekeepers?
- What are the critical steps in constructing a Chefeka hive that ensure its durability and effectiveness for honey production?

Chefeka hive can be constructed using Bamboo (Arundinaria alpine), shenbeko (Arundinaria donax), shemel (Oxytenathera abyssinica), eucalyptus sticks, nails, wire, sisal rope, plastic cover or corrugated iron sheet and mixed mud.

The design to construct the chefeka hive is like the top bar hive construction, with some modifications based on the specifications illustrated in the following sketch. It has multistage steps, starting with material

preparation and finished products:

- Fixing the side walls
- Construction and plastering of the walls
- Groove making for partition board and plastering
- Top bars preparation
- Lid/ roof construction.

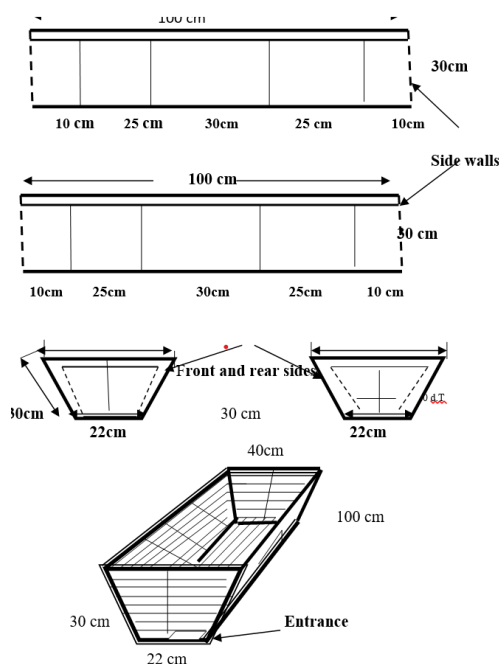


Figure 2. "Chefeka" hive diagram and dimension

2.2. PROCEDURES TO CONSTRUCT "CHEFEKA" HIVES

2.2.1. MATERIAL PREPARATION

- Cut four uniform and solid eucalyptus sticks (1m length each) for the two side walls.

- Cut two (40 cm) and two (22 cm) uniform and solid sticks for the front and rear walls, respectively.
- Prepare another uniform and six pairs of solid sticks (30 cm in length) for the inside wall enforcement.

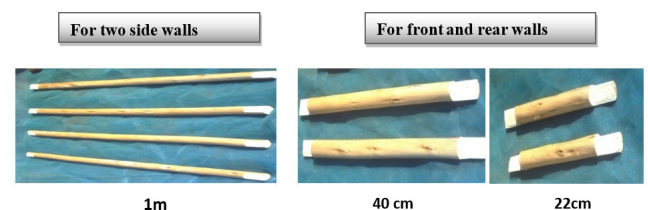


Figure 3. Parts, measurement and number of each part

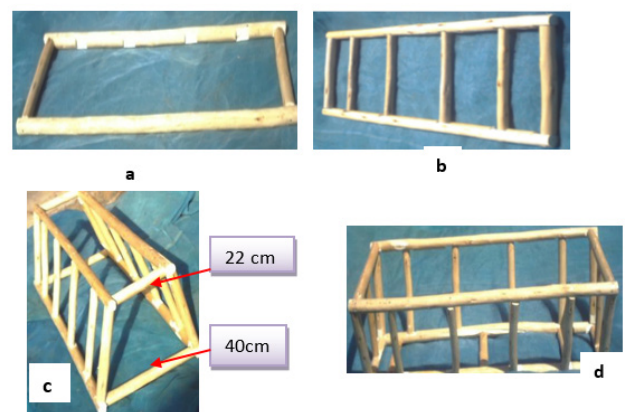


Figure 4. Fixing side walls of "Chefeka" hive

- First, fix the two pairs of side walls by using 30 cm long solid sticks at the edge (a).
- Then fix another solid stick at 10 cm and 25 cm from both the left and right sides (b).
- Each side must be constructed separately with the same procedure (c).
- Then fix the two sides at the top with 40cm solid stick and bottom ends with 22cm ones(d).

Construction of the hive walls

- Construct first the front and then the rear walls using split *Arundinaria alpine* (bamboo) sticks and fix them using sisal ropes.
- Then construct the two side walls with the same procedure.
- Make a groove in the middle of the hive for inserting the partition board, which is used to minimize the hive volume during the dearth period after finishing fixing of the two sidewalls.
- Plaster the internal walls using mud and/or cow dung.

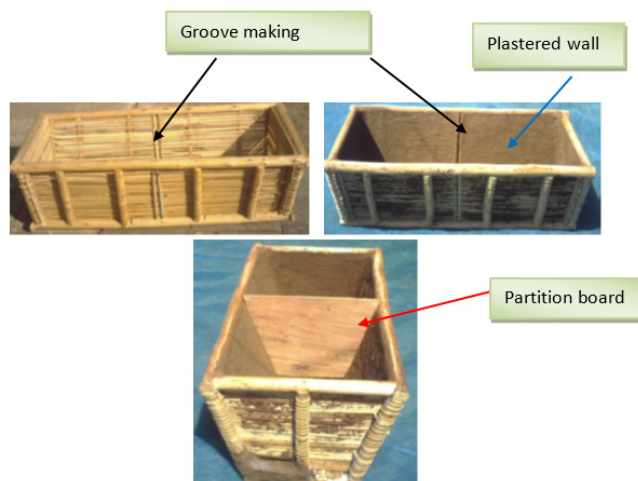


Figure 5. Steps in constructing the hive walls

Preparation of the Top-bars

Production of a suitable top bar is the most important part of movable hive construction. The major production cost of a hive (labor and time) goes to produce top bars. As a result, top-bar frames must be prepared with the following design using different materials: prepare the bar uniformly 3.2cm thick and 48cm long with half cut at 4cm at both ends

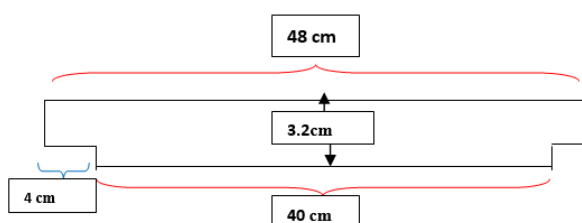


Figure 6. Specification for width and length of top-bar frames

Prepare top-bars from the different materials shown in the figures below as specified above.



Figure 7. Top bars made from different materials

Then fit the top-bars to the hives as shown in the figure below.



Figure 8. Chefeka hives with top bars

Materials and construction of roof/cover

- Cut two uniform and solid Eucalyptus sticks (110 cm in length each) for the two longer sides.
- Cut two uniform and solid Eucalyptus sticks (60 cm in length each) for the two shorter (width) sides
- Assemble using nails, overlapping the longer sides (10 cm) at the end of each 60 cm stick.
- Then fix another solid stick that may be 60 cm or less than 60 cm at 15 cm, measuring from

both the left and right sides of the lid across its length.

- Fix the additional two solid sticks at about 38 cm, measuring from both ends across the length.
- Prepare a plastic or iron sheet by directly measuring the material on the prepared framework (the size of the cover plastic or sheet can be 120 cm by 70 cm or more, depending on the diameter of the sticks used).
- Prepare splits of *Arundinaria alpine* (bamboo) and fix, using sisal ropes, the inner part of the lid that serves as an insulator.

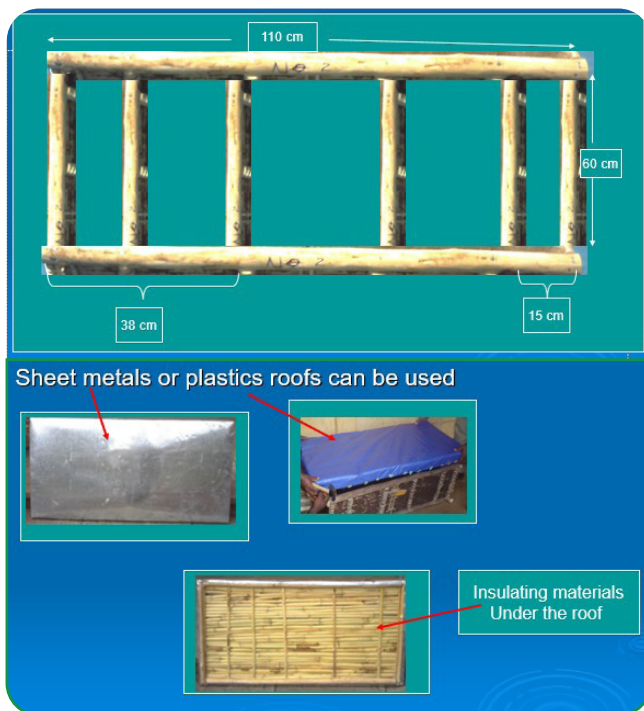


Figure 8. Chefeka hives with top bars



Post-assessment

1. Can you describe the step-by-step process of constructing a Chefeka hive and identify which materials are used for each stage?
2. How would you assess the benefits of using the Chefeka hive over traditional beehives in terms of cost, ease of construction, and suitability for smallholder beekeeping?



Key message

The Chefeka hive training empowers beekeepers to build cost-effective hives from local materials, enhancing honey production and income

SECTION 3. BEE VEIL AND OVERALL PLAN

3.1. OVERVIEW

Creating bee veils and beekeeping overalls involves precise craftsmanship and attention to detail, crucial for both the safety of beekeepers and the success of their operations. The veil, an essential component, is meticulously constructed to ensure protection while allowing necessary airflow and visibility. Typically made from durable fabric and fine black mesh, it shields the face from bee stings without compromising comfort. This is critical as bee stings can cause severe allergic reactions, making protective gear indispensable in beekeeping activities.

Moreover, the overalls, crafted with considerations of durability and functionality, provide full-body protection against bee stings and environmental elements. They are designed with features such as self-locking zippers, elasticized cuffs, and multiple pockets for tools, enhancing efficiency during hive inspections and honey collection. Properly fitted overalls prevent bees from entering clothing gaps, reducing the risk of stings and ensuring a safer working environment.

Training in veil and overall production is vital for beekeeping businesses. It equips individuals with the skills to create reliable protective gear tailored to beekeepers' needs, fostering safety and productivity. Such training emphasizes quality control, sourcing materials like sturdy fabrics and specialized zippers, and adhering to ergonomic designs that prioritize comfort and functionality. Ultimately, mastering the art of veil and overall making not only supports beekeepers' safety but also contributes to sustainable beekeeping practices, essential for maintaining healthy bee populations and maximizing honey production.



Learning outcome

- Understanding the importance of protective Gear, veil and overall, in Beekeeping
- Gain hands-on experience in designing and assembling bee veils and overalls, learning techniques such as cutting, stitching, and fitting materials like fabric, mesh, and zippers to create durable, comfortable gear

Time required: 4 days



Learning question

1. What are the key steps involved in assembling a bee veil and overall, and how does each step contribute to the functionality of the protective gear?
2. Why is it important for beekeepers to wear well-fitted veils and overalls, and how do these protect against bee stings?

Table 2. Inputs required

NO	RESOURCES REQUIRED	SOURCES
1	Sewing machine	From suppliers
2	Soft leather	Tanneries, shops
3	Soft latex gloves	Laboratory equipment sellers
4	Smooth and light colour khaki cloth	Garment shops
5	Elastic of code 16	Garment shops
6	Strong black nylon net/mesh	Garment shops
7	Wire ring	
8	Zipper	Garment shops

3.2. BEE VEIL MAKING

- The most important piece of the bee suit is the veil for covering the face.
- The size will vary depending on the size of the hat, which in turn depends on the size of the individual.
- The fabric is thick enough to keep out bees, but thin enough to pierce with a sewing needle

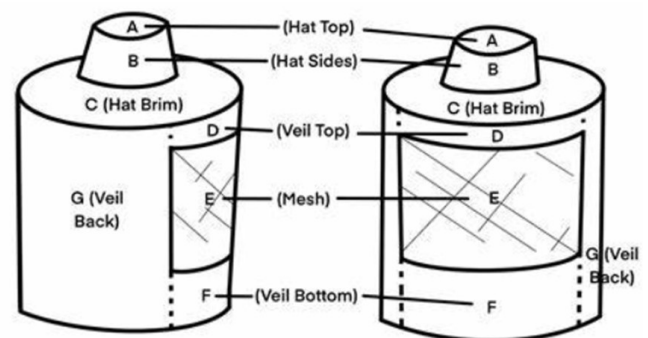


Figure 10. The structures of bee veils

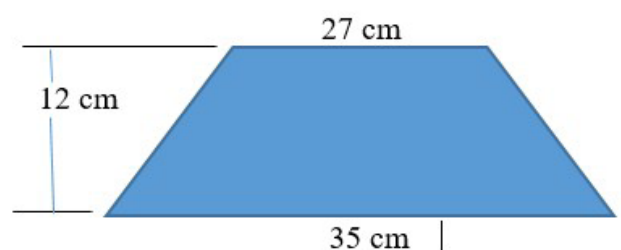
Materials

kaki cloth material, tape measure, scissors, hand needle/ sewing machine, nylon thread, elastic, wire.

Method 1

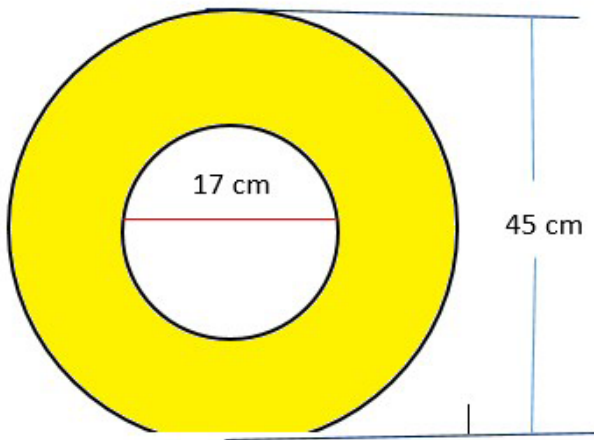
Instructions

- Cut 2 round pieces of cloth with a diameter of 18 cm for the top of the hat (1)
- Cut 4 pieces of cloth for the sides of the hat



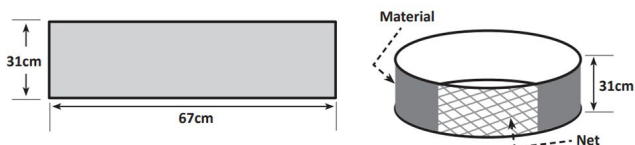
Hat side (2)

- Cut 2 round piece of for the hat base/brim (circular with a hole of 17 cm in the center)

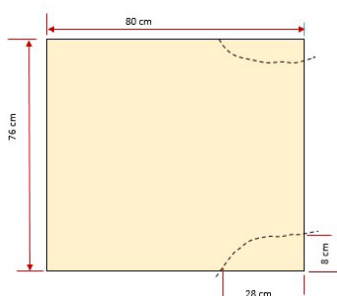


Hat base (hat brim) (3)

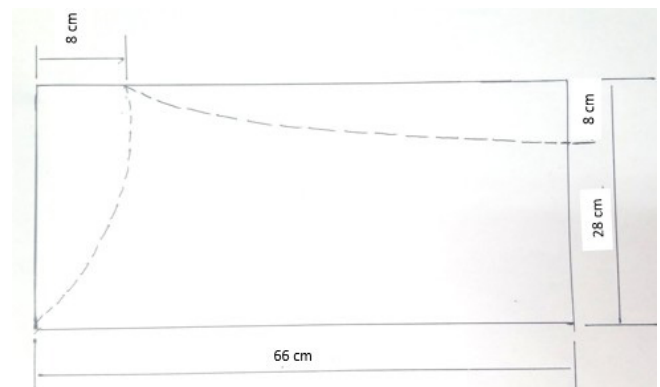
- To assemble a hat, stitch together 1 round top (no. 1), 2 pieces of sides (no. 2), and 1 base (no. 3)
- Fit two hats together, fold the base over a 125 cm ring wire and sew
- Cut a black net measuring 63 cm x 31 cm
- Cut a cloth measuring 67 cm x 31 cm
- Sew the net (no. 6) and cloth (no. 7) on either side of 31 cm to make it round



- Cut cloth to size 160 cm x 11 cm
- Fold it in half to make it 160 cm x 5.5 cm
- Sew around the above net and cloth
- Take a 160 cm by 76 cm piece of cloth and fold it in half to make an 80 cm by 76 cm piece. By doing this, you get two pieces of cloth for the front and back of the veil.



- Take a 66 cm by 56 cm piece of cloth and fold it in half to make a 66 cm by 28 cm piece. By doing this, you get a piece of cloth for one hand of the veil. Repeat this step for the second hand.

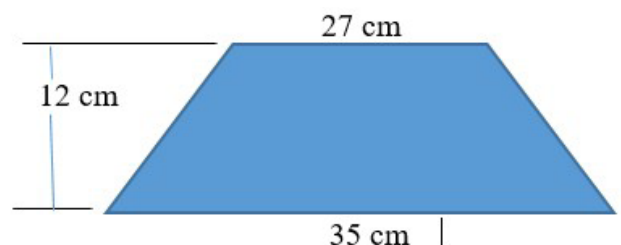


- Next, cut one piece that is 13 cm by 18 cm for the upper pocket.
- Begin sewing the piece from the cut side and sew to No. 12.
- Adjust the collar according to the size of the round veil bottom.
- After that, fix the bottom of the veil to the collar of the jacket.
- Add elastic to the ends of both hands and the bottom of the jacket.

Method 2

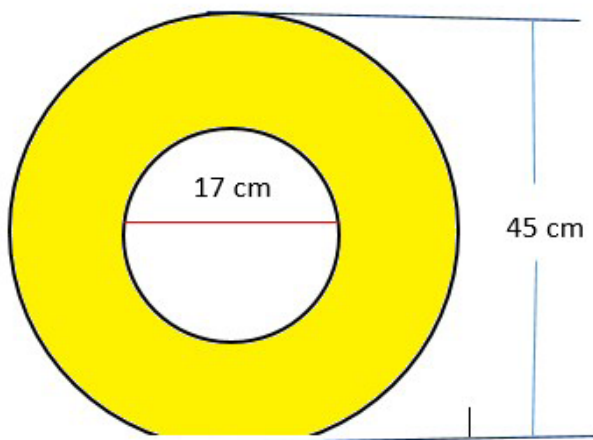
Instructions

- Cut two round pieces of cloth with a diameter of 18 cm for the top of the hat
- Cut four pieces of cloth for the sides of the hat



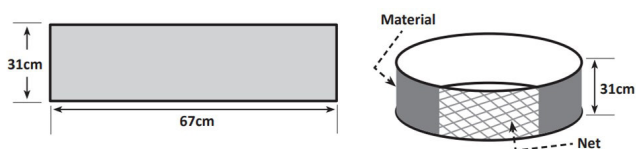
Hat side

- Cut two round pieces of for the hat base/brim (circular with a hole of 17 cm in the center)



Hat base (hat brim)

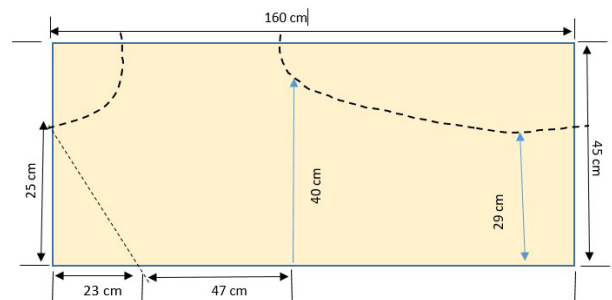
- To assemble a hat, stitch together 1 round top (no. 1), 2 pieces of sides (no. 2), and 1 base (no. 3)
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- Cut a black net measuring 63 cm x 31 cm
- Cut a cloth measuring 67 cm x 31 cm
- Sew the net (no. 6) and cloth (no. 7) on either side of 31 cm to make it round



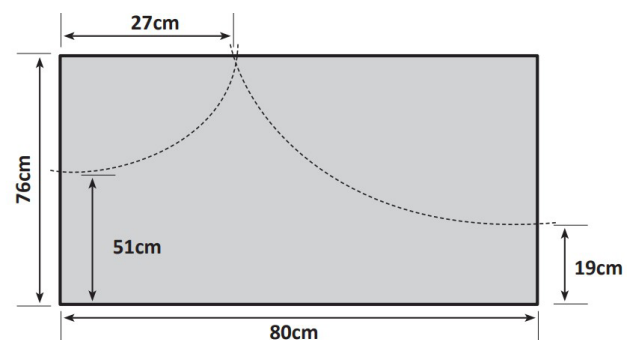
- Cut cloth to size 160 cm x 11 cm
- Fold it in half to make it 160 cm x 5.5 cm
- Sew around the above net and cloth
- Fix two 56 cm long self-locking jacket zippers, starting in the middle back on either side
- Sew the complete piece onto the hat brim
- Place another ring wire at the bottom of the veil (on the other side of the round net and cloth)

3.3. OVERALL MAKING

- Get a piece of cloth 160 cm x 90 cm then fold it into two to get 45 cm x 160 cm
 - You will get two pieces; one for the left and one for the right.



- Take an 80 cm by 76 cm piece of cloth. By doing this you get one side of a hand.



- Cut two sections that are 26 cm by 29 cm to use as the down pockets.
- Next, cut one piece that is 13 cm by 18 cm for the upper pocket.
- Begin sewing the left and right parts in No. 1 at the thighs and back.
- Next, fix a 76 cm zip at the front.
- Adjust a collar in accordance with the overall size.
- After that, fix the two lower pockets and the upper pocket.
- Add elastic to the back, arms and legs.
- Sew the second part of the zip from the veil.
- Put the flap with stick-on at the front and back, where the zip starts and ends.



Post-assessment

1. Explain the key features of a well-constructed bee veil and overall. How do these features enhance the safety and comfort of beekeepers while working with bees?
2. Describe the process you followed to create a bee veil. What challenges did you encounter during assembly, and how did you address them to ensure the veil was functional and durable?



Key message

Producing high-quality protective gear like bee veils and overalls is essential for ensuring beekeeper safety and boosting productivity in honey production. This commitment to durability and comfort can enhance a beekeeping business's reputation and sustainability.

SECTION 4. BEE GLOVES MAKING

4.1. OVERVIEW

Bee gloves are an essential part of a beekeeper's protective gear, providing crucial protection against stings and enhancing comfort while working with bees. Designed primarily from durable materials like leather, cotton, or canvas, these gloves ensure adequate coverage and breathability, allowing beekeepers to perform their tasks with confidence. A snug yet flexible fit is important for maintaining dexterity, enabling beekeepers to handle tools and manipulate hive components effectively while minimizing the risk of injury.

Training in glove making is invaluable, as it empowers beekeepers to create customized, well-fitting gloves that enhance their safety and efficiency. The business of making and selling bee gloves presents a unique

opportunity for entrepreneurs in the beekeeping industry. As beekeeping continues to grow in popularity, the demand for high-quality protective gear is on the rise



Learning outcome

- Participants will learn the essential techniques for designing and manufacturing bee gloves, including material selection, cutting, sewing, and assembly methods that ensure both safety and comfort

Time required: 2 days

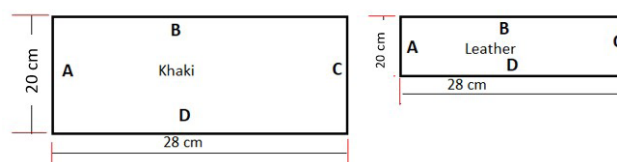


Learning question

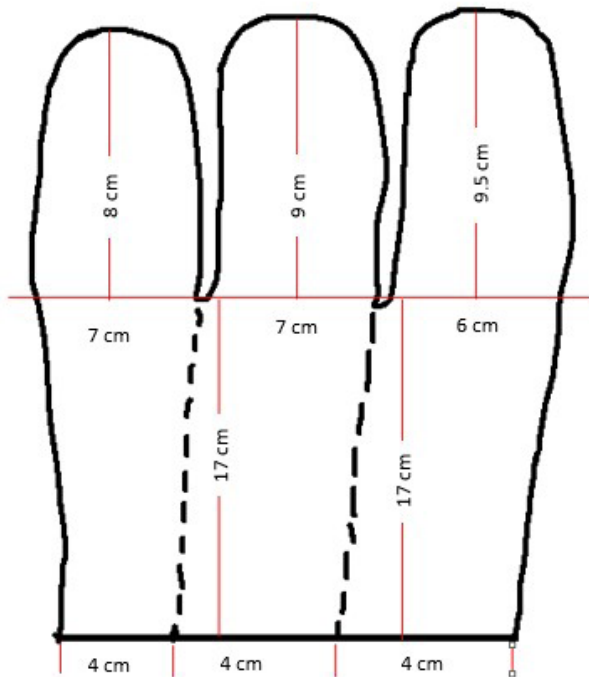
- What are the key materials and techniques required for creating durable and effective bee gloves?
- How can entrepreneurs effectively market their bee gloves to reach a wider audience within the beekeeping community?

Bee glove plan

- Prepare a piece of cloth measuring 28 cm by 20 cm and sew side A to side C.
- Cut a piece of leather 28 cm by 10 cm, sew side A to side C.
- Sew side B of the cloth to side D of the leather.

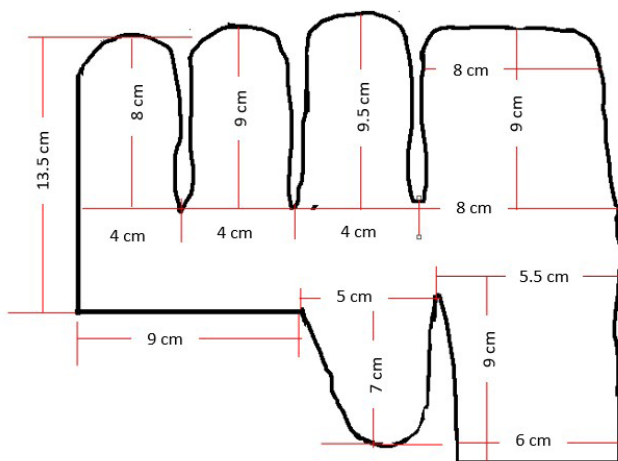


- Cut a piece of leather for the back of the hand for three fingers (pinky, ring and middle).

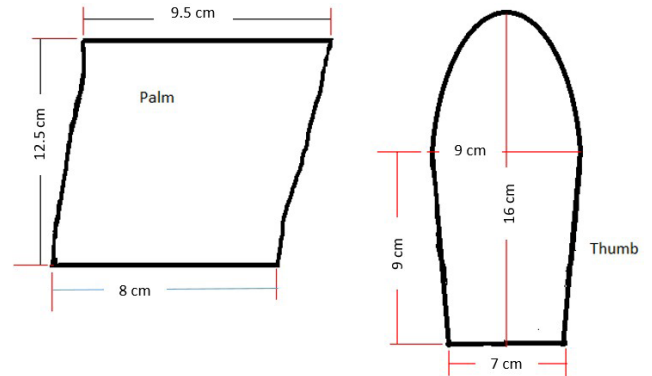


Back part of the glove

- Cut a piece of leather for the front part of the glove for five fingers.



- Cut pieces of leather for the palm area and back of the thumb.



Front part of the glove (right hand)

- Assemble the four pieces together and turn the finished glove inside out.
- Sew No. 7 to side B of No. 3.
- Add elastic to the side D of the cloth (No. 3).



Post assessment questions

1. Describe the steps involved in the production of bee gloves, highlighting any specific challenges you might encounter.
2. List materials required for making bee gloves.



Key message

Creating and selling bee gloves meets the growing demand in the beekeeping industry, while equipping entrepreneurs with essential production and marketing skills.

SECTION 5. RECARD KEEPING

5.1. OVERVIEW

Effective record-keeping facilitates better inventory and cost management. By tracking raw materials, labour, and overhead expenses, businesses can optimize their inventory levels and reduce waste,

leading to significant cost savings. Comprehensive records also support financial reporting and compliance with industry regulations, which are crucial for sustaining operations and avoiding legal complications. This level of organization aids in setting competitive prices and making informed business decisions, contributing to the overall profitability and growth of the enterprise.

Furthermore, maintaining records plays a critical role in customer service and product improvement. Detailed logs of production processes and customer feedback allow businesses to address queries, handle returns, and implement warranties efficiently. Recording customer reviews and suggestions provides valuable insights for refining product designs and enhancing manufacturing techniques. This continuous feedback loop not only helps in meeting customer expectations but also drives innovation and long-term success in the competitive beekeeping tool-making market.

Time required: 2hrs

5.2. POINTS TO RECORD IN BEEKEEPING TOOL MAKING

- **Material Specifications:** Document types, sources, and quantities of materials used (e.g., types of wood, fabric for veils, etc.).
- **Production Process:** Detail each step of the manufacturing process, including machinery used, assembly techniques, and quality checks.
- **Product Specifications:** Record dimensions, design features, and any customization options available.
- **Inventory Levels:** Track raw materials, work-in-progress items, and finished goods.
- **Costs:** Log material costs, labour expenses, overhead, and any other costs associated with production.
- **Sales and Distribution:** Keep records of sales orders, customer information, delivery dates, and shipping details.
- **Customer Feedback:** Record customer reviews, complaints, and suggestions for product improvements.
- **Maintenance and Repairs:** Document any issues encountered with tools post-sale and the actions taken to resolve them.

6. FINANCIAL FEASIBILITY

Financial feasibility describes whether agri-business is financially viable. It involves determining initial investment (resource) requirement to start the business, estimating production cost, operation expenses, and sales revenue. These are used to determine the initial investment requirement, profitability of the business, break-even point (minimum level of production) to attain the profit zone and pay-back period (number of years required to recover initial investment). These series procedures are used to make wise decisions to accept or reject the agribusiness investment alternative.

6.1. INITIAL INVESTMENT

- Initial investment is the minimum capital requirement to start the business.
- Example of initial investment requirement to start beekeeping inputs, includes tools and equipment, raw materials, working tools and materials, working capital, etc.

Table 3. Template to estimate initial investment requirement for agri-business

DESCRIPTION	TOTAL COST	REMARK
Tools and equipment		
Raw materials		
Working area rent		
Working capital		
Etc		
Total		

6.2. LONG-TERM INVESTMENT

- Long-term investment in agri-business involves all asset requirement for the business which can serve for more than one year.
- Example tools and equipment, sewing machines, multipurpose woodwork machine, storage, etc.

Table 4. Template to calculate total cost for acquisition of long-term investment

TYPES OF INVESTMENT	UNIT OF MEASUREMENT	QUANTITY	UNIT COST	TOTAL COST
Woodwork machine				
Sewing machine				
Stores				



6.3. WORKING CAPITAL

Working capital for the planned agri-business includes all payments requirement for day-to-day operating activities such as production costs and operating expenses.

Example

- Production costs include cost of raw materials(inputs), transport cost, labor cost etc.
- Operating expenses includes administrative salary, sales commission, promotion, etc.
- Working capital excludes long term investments such as warehouse, tools and equipment, Processing materials, etc.

a. Production cost

- Production costs are a key component in agri-business.
- It includes all costs associated with production including value addition to make the product ready for sale.

Table 5. Template for estimating production cost per hive for beekeeping inputs production

TYPE OF COSTS	UNIT OF MEASUREMENT	QUANTITY	UNIT COST	TOTAL COST
Leather	meter			
Kaki fabrics	meter			
Timbers	meter			
Labor cost	No.			
Loading and unloading	Man-day			
Transporting	Pack			
Total				

b. Operating expenses

- Operating expenses are all costs not directly associated with production.
- They are common costs incurred for administrative and selling activities.
- Example administrative salary, promotion cost, sales commission, transport cost to sale, etc.

Table 6. Template to estimate operating expenses for agri-business

TYPES OF COSTS	TOTAL COSTS
Administrative salary	
Utility (electric, water, tele.)	
Interest	
Promotion	
Sales commotion	
Tax	
Etc...	

6.4. ESTIMATED PRODUCTION AND SALE REVENUE

- Production volume is the main source of revenue for the agri-business to generate profit.
- Producers should determine the estimated average production volume from the planned production season.

FORMULA 1

Total production = Average production per given raw materials X total materials used

After determining the estimated volume of production, it is possible to determine the expected sales revenue for the planned production.

FORMULA 2

Total sales revenue = Total production volume X unit selling price

Table 7. Template for estimating volume of production and sale revenue

A	B	C	D	E	F	G
TYPES OF PRODUCTS	TYPE OF INPUTS PRODUCED	NUMBER	ESTIMATED PRODUCTION/ GIVEN VOLUME	TOTAL PRODUCTION (D X E)	ESTIMATED SELLING PRICE/UNIT	TOTAL SALES REVENUE (F X G)
Hive	Zander					
	Chefeka					
Protective gears	Veil					
	Overall					
	Gloves					

6.5. PROFIT AND LOSS STATEMENT

- The primary objective of any business is to generate profit.
- Profit and loss statement is the main tool to calculate profitability of the business.
- It is used to accept or reject the investment based on estimated profit.

FORMULA 3

- Gross profit = Total sales revenue – Cost of goods sold*
- Net profit = Gross profit – Total operating expenses*

Table 8. Template for profit and loss statement preparation

DESCRIPTION		
Sales Revenue		
Sale of beeswax		
Total Sales revenue		
Cost of goods sold		
Beeswax production cost		
Ending inventory		
Cost of goods sold		
Gross profit		
Operating Expenses		
Salary if any		
Utility (electric, water, tele.)		
Interest		
Promotion		
Depreciation		
Tax if any		
Total operating expense		
Net profit		

6.6. BALANCE SHEET

Balance sheet used to know the total resource owned, amount of claim by creditors and amount of owners' equity

- Balance sheet contains asset, liability, and own capital
- Assets are all resources available for use or for sale

Example cash, inventory, warehouse, land, equipment etc.

- Liabilities are all debts obtained from bank, microfinances, individuals or others
- Own equity/capital involves own/member contribution, grant/donation, etc

FORMULA 4

Total Asset = Total liability + Total own capital

Table 9. Template for balance sheet preparation

DESCRIPTION		
Asset		
Current asset		
Cash		
Inventory		
Total current asset		
Fixed asset		
Tools and equipment		
Warehouse		
Land		
Total fixed asset		
Total asset		
Liability and Capital		
Liability		
Bank loan		
Debt from relative		
Total liability		
Owners capital		
Own capital contribution		
Grant/donation		

Total owners' capital		
Total liability and capital		

6.7. CASH FLOW STATEMENT

- Cash flow is all cash inflow and outflow for any purpose in the business operation

Example:

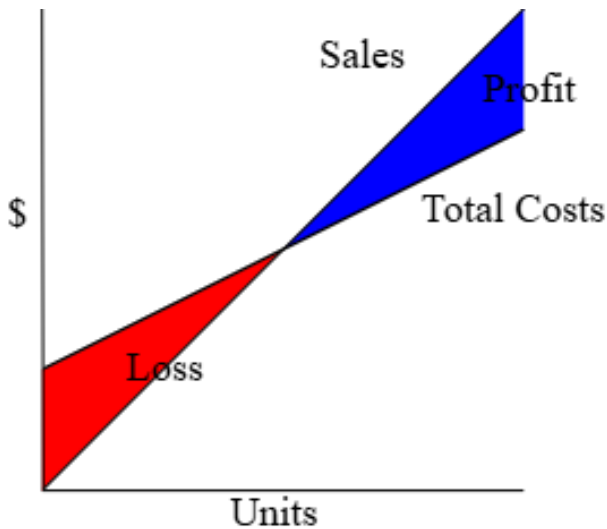
- Cash inflows include sale of seed/seedling, debt obtained from banks, members capital contribution, etc.
- Cash out flow includes purchase of input, payment for construction, repayment of debt, payment for salary, etc.

FORMULA 5

Beginning cash balance + total cash inflow = ending cash balance + total cash out flow

Table 10. Template for cash flow statement preparation

DESCRIPTION	AMOUNT OF OUTFLOW	AMOUNT OF INFLOW
Owners' investment		
Debt		
Grant		
Sale of beekeeping inputs		
Wate house construction cost		
Purchase of equipment		
Purchase of input		
Land rent		
Irrigation cost		
Labor cost		
Cash Operating costs		
Ending cash balance		
Total		



6.8. BREAK EVEN ANALYSIS

- Break even analysis is used to determine the minimum level of production to cover total cost
- At break-even point no profit no loss
- To make profit, level of production and sale should exceed/greater than breakeven point.
- Fixed costs are fixed in total amount regardless of increase/decrease in volume of production.

Example depreciation, warehouse rent, administrative salary, promotion cost, etc.

- Variable costs varied in total in response to increase/decrease in level of production

Example production costs, packaging cost, loading and unloading, etc.

FORMULA 6

Break-even point = Fixed cost / (Unit selling price – unit Variable cost)

6.9. PAYBACK PERIOD

Payback period is used to determine number of years/ periods it takes to recover initial investment.

FORMULA 7

1. When the annual profit of the business is uniform/equal

Payback period = Initial investment / annual profit

2. When the annual profit fluctuate/vary from year to year

Payback period = # of year before coverage + uncovered amount / profit of the next year



Payback Period

The amount of time it takes to recover the cost of an investment.



Post assessment questions

1. How can customer segmentation improve demand estimation for agricultural products, and what are some effective methods for identifying these segments?
2. What strategies can be employed to create demand for new agricultural products, and why is building customer trust important in this process?
3. Explain the role of a reliable distribution network in the delivery of agricultural products and how it impacts overall sales and customer satisfaction?
4. How would you calculate the break-even point for an agribusiness venture, and why is understanding this point critical for decision-making?



Key message

Success in agribusiness depends on understanding and meeting customer needs through strategic marketing and financial planning.

POTENTIAL RISKS AND POSSIBLE MITIGATION STRATEGIES

Proactively identification of the risks and implementing robust mitigation strategies in the beekeeping tool-making business can safeguard the operations, maintain product quality, and ensure long-term success. Key areas, potential risks and mitigation methods are indicated on the table below.

Time required: 2hrs

Table 12. potential risks and mitigation methods

NO	KEY AREAS	POTENTIAL KEY RISKS	POSSIBLE MITIGATION METHODS
	Quality Control Issues	Variability in product quality	Implement stringent quality control processes, including regular inspections. Standardized production procedures, and thorough testing of finished products. Maintain detailed records of quality checks and promptly address any identified issues.
	Supply Chain Disruptions	Delays or shortages in the supply of raw materials	Develop relationships with multiple suppliers to ensure a steady supply of materials. Maintain an adequate inventory buffer to manage unexpected disruptions and regularly review and update supply chain strategies.
	Regulatory Non-Compliance	Failing to comply with regulations and safety standards.	Stay informed about relevant regulations and ensure all products meet or exceed industry standards. Keep comprehensive records of compliances Conduct regular audits and updates
	Cost Overruns	Unexpected increases in material, labour, or overhead costs	Conduct regular cost analyses and implement efficient inventory and cost management practices. Negotiate favorable terms with suppliers and explore cost-saving technologies and production methods.
	Intellectual Property Theft	Copy of design by competitors	Protect intellectual property through patents, trademarks, and copyrights Implement confidentiality agreements with employees and partners, Regularly monitor the market for potential infringements
	Customer Complaints and Returns	High rates of customer complaints and product returns	Focus on customer service excellence by promptly addressing complaints and implementing feedback for product improvements Offer warranties and hassle-free return policies to build customer trust and loyalty
	Technological Obsolescence	Rapid advancements in technology	Invest in research and development to stay ahead of technological trends Regularly update equipment and processes to incorporate the latest advancements and improve product offerings

Annex

1. Material Specifications Sheet

DATE	MATERIAL TYPE	SUPPLIER	QUANTITY PURCHASED	UNIT COST	TOTAL COST	BATCH NO.	REMARKS
	Pine wood						

2. Production Process Log

DATE	PRODUCT ID	PROCESS STEP	MACHIN/TOOL USED	OPERATOR NAME	TIME SPENT	QUALITY CHECK	REMARK
		Cut/assembly					

3. Customer Feedback

DATE	CUSTOMER ID	PROCESS STEP	PRODUCT ID	FEED BACK	ACTION TAKEN	RESOLUTION DATE	REMARK
		Cut/assembly	Bee veil/hive/ glove	Compliant/ suggestion/ compliment			

4. Expense Record Sheet

DATE	EXPENSE CATEGORY	DESCRIPTION	SUPPLIER	AMOUNT(BIRR)	PAYMENT METHOD	INVOICE NO.	REMARK
	Raw Materials	#Timber for hives	Kebede	2000/Birr	Credit card		Grade A
	Labor	Worker salary			Bank transfer		Monthly payroll
	Overhead	Rent for workshop			Cheque		Paid for july
	Utility	Electric bill			Online payment		
	Marketing	Online ads	Ad agency		Credit card		Campaign August

5. Income Record Sheet

DATE	INCOME SOURCE	DESCRIPTION	CUSTOMER NAME	AMOUNT(BIRR)	PAYMENT METHOD	INVOICE NO.	REMARK
	Product sale	#Hive	AAA		Bank transfer		Bulk order

