REPORT ON COMMERCIAL BEE KEEPING TRAINING (APICULTURE LEVE ONE)

Venue: NEW APOSTOLIC CHURCH – KIBAIGWA.

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Acknowledgements.

I would like to record my sincere appreciation to Kujenga Maisha East Africa and the community/Church groups for giving us the opportunity to facilitate the course. I do also recognize the effort of the New Apostolic Church for the wonderful mobilization they did to bring the participants for the training. Other thanks goes to Mr. Johnny Aura and Madam Rosslyn Kulohoma who assisted us in more than one way and provided a conducive environment to see the training a success. Not forgetting the catering crew and the hotel maintenance staff that ensured the participants comfort throughout the training period.

Many thanks goes to all participants for the cooperation they showed during the intensive three days of training and it is my hope that all they learnt will be shared with other community members who didn't get the opportunity to attend the course.

Ayub Omondi & Joash Osanjo.

Executive Summary.

The training on Apiculture Level one focused on Bee keeping as an income generating activity like other Agri-business practices. The training aimed at equipping the participants with most relevant and practical skills on handling Bees for maximum production.
The training covered a period of four days at the New Apostolic church, which saw 21 farmers participate in both the theory and hands-on practical sessions that were most encouraged by the participants. During the learning sessions participants went through various bee keeping skills and knowledge that included;

- Introduction to Bee keeping.
- Social Organization of bees and Hierarchy of colony.
- Importance of beekeeping.
- Bee keeping equipment and tools.
- How bees communicate.
- Lang'stroth hive technology.
- Colony Management skills.
- Apiary site selection and management.
- Bee products and their uses.
- Bee pests and diseases.
- Types of bees.
- Bee keeping Records.

The training was an interactive one with participants getting to prove what they had heard before about bees and its economic importance to both human and environment. It was a chance for them to have hands-on practical handling of bees something they had believed to be impossible.

Practical sessions were carried out on how to inspect, super, check & control pests and harvesting.

A staff from Bee Keeping Consultants team facilitated the entire training session with a vast experience in bee keeping trainings. The firm currently offers short courses in sustainable bee keeping both level one and two, which is value addition besides produces quality bee keeping equipment and the best Langstroth hives. They also guarantee the best rate market for quality honey at competitive farm gate prices.

The training venue was very ideal for both the participants and the facilitator as it provided a quite environment away from public destruction.

OBJECTIVE OF THE TRAINING

- To impart knowledge on the best approaches towards poverty eradication through bee keeping

- To provide an opportunity to sharing experiences and learning new technologies in commercial bee keeping using Langstroth hive.
- To enable civil society organization and government to have an opportunity to appreciate bee keeping as a viable and sustainable project.

INTRODUCTION.

The first session started at 9.30 am, the facilitator led the introduction session where members introduced themselves to the workshop. There were 22 participants in the workshop. In-attendance was two KUMEA representatives, Mr. Johnny Aura and Madam Rosslyn Kulohoma.

Workshop Norms.

The participants agreed on the following as the workshop set rules.

- Participatory, everybody contributing during the session.
- No unnecessary movement in the class.
- One at a time when given the opportunity to speak.
- Mobile phones be put off or on vibration when in class.
- Keeping time always during the workshop.
- Kiswahili language to be mode of communication through out the training.

Workshop Responsibilities.

For the smooth running of the workshop it was necessary to have the following responsibilities taken care of;

Time Keeper – Mrs. Joyce Mhoga.
Welfare. – Mr. Peter Majela.
Secretary – Mr. Amos Lesilwa.
Spiritual Leader – Mr. George Chitemo.

PARTICIPANTS EXPECTATIONS.

The participants had the following expectations from the workshop;

1. To be empowered on bee keeping [skills].
2. To know the importance of bee keeping.
3. To know the methods of bee keeping and how to care for bees.
4. To know the requirement of bees.
5. To know the problems experienced in bee keeping and how they can be encountered.
6. To know how to maintain bee hives.
7. Site selection of a potential apiary.
8. To get the information on potential market openings.
9. Possible uses of honey.
10. Bee keeping equipments and their uses.

11. To know the Nature of bees.
12. To know the methods of harvesting honey/timing when to harvest.
13. To know the possible dangers of bees.
14. To know the benefits of bee keeping as an enterprise.
15. To know the type of bees and types of honey.
16. To know the bee foraging plants.
17. Possible side effects of honey if there is.
18. Human activities that hinders bee keeping.
19. Bee keeping by-products and their uses.
20. How to preserve honey.
21. To interact with different people.
22. To provide a forum for networking with stakeholders in bee keeping industry.

Introduction to Bee Keeping.

The facilitator took the participants through the introduction to bee keeping session where the following were covered as key areas;

BEE KEEPING defined as the art of having bees for honey and other bee products for income.
Bee keeping was agreed to be an activity from long time done with our great grand fathers basically for honey production. They had methods they used to get hold of the bees and get the products which they always wanted.
The following are some of the ways they used to keep bees;

- The Gourds.
- The pots.
- The natural trees and caves.
- The log Hives.
- The house.

In the olden days bee keeping was important as they got very important products from it like honey, brood and the propolis.

HONEY.

Honey was important in so many ways in the traditional era.

- As food.
- For income, barter trade.
- As medicine.
    - For coughs.
    - Delivered mothers.
    - Healing wounds.
    - Chest problems.
- Used as part of dowry in some communities.
- Used on reconciliation ceremonies and oath procedures in other communities.

BROOD.

Brood was basically meant for the old people. They could go to the apiary and remove the combs with the young bees which are one to two weeks. At these age the bees has got the better part of the nutrients which the old men always targeted for the royal jelly.

PROPOLIS.

This was harvested at small quantities which traditionally were used to mend the leaking water containers. It also came out at the workshop that in the olden era, the old men were chewing propolis for some medical reasons.

IMPORTANCE OF BEE KEEPING IN THE MODERN ERA.

This was discussed with the participants and the following came out clearly in addition to the importance in the traditional era. To improve the understanding, these was categorized in two;

Importance to the environment.

- Pollination.
- Helps in balancing the ecosystem.
- Encourages afforestation and agro-forestry.
- Environmentally friendly.

Importance to the Farmer.

- Income generation.
- A source of medicine.
- Foreign exchange earner.
- Pollination.
- Promotes gender equity.
- Completely sustainable.
- Security purposes.

Bee Products and Their Uses.

1. Honey:
    - Food.
    - Medicine.
    - Income generator.
    - Brewing liquor.
    - Preservative.
    - Raw material for cosmetics.
2. Wax:
    - Raw material for shoe polish, candles, matches and comb foundation.
3. Pollen:
    - Highly rich in protein used to make capsules and health foods.
4. Propolis:

- Used in manufacture of tar, gum, glue and other antibiotics.

5. Bee Venom:
    - Raw material for making medicine [anti-venom].
6. Royal Jelly:
    - Manufacture of health foods.

SOCIAL ORGANIZATION OF BEES.

The participants were taken through the bee caste as follows;

Types of bees Making a Colony.

- Queen.
- Drone.
- Worker.

QUEEN.

- The true mother of all bees in a colony.
- Lays eggs and gives instructions in the colony.
- Owns the ruling power of the colony.
- It can live for 3-5 years depending on the environment.
- Has the capacity to lay between 1500-3000 eggs per day as per age and environment.
- The only first female sensitive bee in the colony.
- It has short wings which does not reach the entire body for the following reasons;
    - To show her purity.
    - To ease mating.
    - To ease laying of eggs in the cell.
- It has a V- shaped abdomen for accurate laying in the cells.
- Has a shiny thorax and abdomen.
- Has a curved sting only used to fight rival queens.
- After hatching into adult queen stays in the hive for 5 days during which she is being taught on colony management by nurse bees.
- The sixth day she goes for mating.
- She mates 8-10 drones after which she remains fertile for the rest of her life.
- Only the strongest 8-10 drones shall mate the queen.
- The queen is fed on royal jelly through her life time, the royal jelly is secreted by nurse bees body. This is for the queen to lay more eggs and stay longer.
- With exception of her mating, the queen leaves the hive only when accompanying a swarm or absconding.
- She communicates with the rest of the colony by use pheromone.

DRONES

- This is the only male bee in the colony.
- They are shorter, thicker, bulkier than any other bee in the colony.
- They have no sting .
- They have no means of gathering nectar, pollen, water and even feeding themselves.
- They are fed by workers.
- Have the duty of mating the queen only.
- They can leave for at least three months.
- Normally expelled or killed from during draught.
- Die after mating.

WORKERS.

- These are the smallest underdeveloped female bees in a colony.
- Forms the largest population in a colony.
- Has got sting to protect the colony.
- The experience a well organized division of labor.

Under workers we have:
Foragers-bring forage [food and water] to the hive.
Scouts-looks for forage sites and knew homes.
Soldiers-these ensures the security of the colony.
Nurses-takes care of the queen, feeds the young and the drones in the colony.

- Workers have pollen baskets used to collect pollen.
- Have a lifespan of 6-8 weeks in hardship areas and up to 4 months in a good environment.

COMMUNICATIONS OF BEES.

Bees like any other living organism to communicate on a particular set ways. There are three main ways on how bees communicate;

- Pheromone.
- Dances.
- Buzzing

PHEROMONE.

This is a micro-chemical secreted by the queen bee to communicate different messages to the rest of the colony. It has other millions of micro-chemicals.

DANCES.

These are systems done by scout bees to indicate the distance of food, new homes and forage from the colony.

Types of dances.

1. Round dance: these indicates that the food is near
2. Wag tail dance: these indicates far away food source.

BEE SPECIES.

There are two main species , the **honey bee** and the **sting-less bees** which are not however the main focus of the training;

HONEY BEES

A few species of bees are kept to produce honey. In East Africa we have **APIS MELLIFERA** which is very important specie for honey production and originates from Africa.

Under the Apis Mellifera we have the following:

1. **Apis Mellifera Scutellata**

- Small with relatively short tongue.
- The bees are highly aggressive.
- Has great tendency to reproduce (swarm) and abscond (migrate).
- They are commonly found in plains.
- Massive flowering attributes to their high reproduction rate which occurs in plains first before rains.
- They are able to nest in a broad in a wide range of sites, from cavities to open nests.

2. **Apis Mellifera Monticola**

- Are well referred to as mountain bees.
- They are large dark gentle race with longer airs than other African bees.
- The bee inhabits places where clouds, mist, and nocturnal ground frost obscure the sun.
- It is the largest bee in Africa.
- It has the tendency to reduce brood rearing at the first sign of forage decline and may not migrate.
- They are less productive and less vicious than other species.

3. **Apis Mellifera Litorea**

- The specie normally inhabits lowlands and along the coastal lines.
- They does not migrate as much as the Apis Mellifera Scutellata.
- They have the tendency to rear brood throughout the year due to availability of forage along the coast.

STING-LESS BEES (MELIPONICULTURE).

These are bees with no sting, they equally produce good quality honey and when taken good care of can give better harvests. They are available and sold in colonies. Like any other bee, the sting less bees work to save honey for future but when put together with stinging bees would always be robbed of their honey.

LANG'STROTH TECHNOLOGY

These being the peak of the training the participants were successfully taken through the components of the Langstroth hive along side practical demonstration where they were able to identify the components and their uses by the end of the session.

COMPONENTS

-Floor: provide the base to the hive.
-Entrance: getting in and out of the hives.
-Brood box: holds the queen and the brood.
-Brood frames: holds the combs for the brood.
-Queen excluder: excludes the queen from the super box.
-Super box : where bees store pure honey.
-Cover : protect hives from direct rain and sunlight.

These was then followed with an explanation on how the Langstroth hive operates. The participants after getting the concept were therefore to give the advantages and disadvantages as compared to other hives. They had the following list which was agreed upon after logical discussions.

Advantages of Langstroth hive.

- Clean honey produced hence high income.
- Ease in harvesting, inspection, and pest control.
- Reduced work for bees
- Durable and portable.
- Bees are not killed during harvesting and inspection.
- More than one product can be harvested e.g. propolis, honey, pollen, wax, royal jelly.
- Gender neutral and requires less space of land.
- Market of Langstroth products is readily available.

Disadvantages

- Expensive to acquire.
- Requires skills due to the many components.
- Extraction of honey requires the use of machine for effective processing.

SITE SELECTION AND APIARY MANAGEMENT.

Once the hive has been colonized the farmer should be ready to transfer the hive to the apiary. This is the place set aside for the bee keeping. When the brooder has been set for batting, the farmer should immediately prepare the apiary as the hive could be colonized anytime,

The best apiary should therefore have the following points considered:

- Should be under a shade, the early morning sun and late evening sun if possible should catch the hives (no direct hot sunlight , wind or rain)
- Enclosed in a thick live fence possibly trimmed at 7-8 feet high to reduce aggressiveness.
- Avoid busy and noisy areas (public places, grazing areas, markets, roads, near machines and schools)
- Availability of forage and water should be checked as bees would work well within 2km. to get water and forage.
- Must be kept clean as always and secured.

Goal Post Method

- Raise the bee hive a few feet from the ground (9 feet minimum)
- The 6 gauge wire should be used to hang the hives.
- The height of the hive from the ground should be 2 feet and the wire hangs 6 feet from the cross bar.
- From one hive to the next should be a minimum of 2 feet and from the post Should be 1.5 feet.

Stand Method.

- The hives should be raised 2 – 2.5 feets from the ground, if a farmer could get steel stands but when wooden stands are used then Ant precautions must be considered.
- The other details remain the same as the goal post method up to including spacing.

Bee Foraging Plants

Bees shall visit all nectar rewarding plants for their forage. The following gives a list of all plants; but not comprehensive:

- Fruit trees; banana, mangoes, guavas, oranges, lemon, pawpaw, avocado e.t.c.
- Vegetables; beans, soya, sweet potatoes e.t.c.
- Oil crops; maize, groundnuts, sunflower, simsim e.t.c.
- Fibre crops; sisal, cassava e.t.c.
- Trees; acacia, euphorbia, moringa, gravellia, eucalyptus, calendar, bottle brush, mwarubaini e.t.c

COLONY TRAPPING PROCEDURE

Bees normally create colonies naturally a process referred to as **swarming**. On the other note a colony can decide to leave a particular place for good to settle some where else due to some reasons a process called **absconding**

In both ways a potential farmer would be targeting a colony from either processes hence must introduce a more conducive environment in form of a hive for the wild bees

to colonize, the following are some of the steps considered to ensure a prompt colonization with Langstroth.

- Ensure your brood box is clean and properly waxed (comb starters fixed)
- Identify a proper catching site which should be bees route and not far from apiary site. These could be high on a tall tree as bees tend to move little bit higher during swarming or absconding.
- Using a binding wire (greased) tie the brood box and raise it higher on the tree and the end of the wire tied at a reachable height to ease transfer once the hive has been colonised.
- The brooder should be left there for one month as you keep on checking for the colonization progress.
- After a month lest the hive remain un -colonized , lower the brooder and check to clean in case of pest attack then possibly change catching site.

OPERATION AND MAINTAINANCE OF BEE KEEPING EQUIPMENT

For effective management of honey bee colony a potential bee keeper must have the following equipment:

i. **Bee suit**: protects the body (light coloured as bees are not irritated with light colours)
ii. **Bee veil**: protect the face and the head.
iii. **Smoker**: disconnects communication of bees.
iv. **Gumboots:** protects the foot.
v. **Hive tool**: opening lids and bars.
vi. **Bee brush**: removing bees from your cloth and comb (soft fibre)
vii. **Torch**: light source.
viii. **Rubber gloves** :protects hands.

COLONY MANAGEMENT

HIVE INSPECTION.

This is a process carried out to monitor the progress of each colony. It is therefore required to be carried out at interval of two weeks.

Things to establish during inspection:

- Updating the records.
- The progress of the colony.
- Find out whether ready for supering or not.
- Know if honey is ready.
- Check for availability of predators and pests.

INSPECTION PROCEDURE.

- Light the smoker and keep it working.
- Dress accordingly i.e. make good all the zips.
- Ensure availability of all you need.

- Keep movements slow and deliberate.
- Wherever possible work your hives early in the morning or late in the evening to avoid working during rains or hot sun.
- Avoid strong odours when going to the apiary.
- Avoid wearing bright colours or dark colours.
- Avoid flight paths of the bees.
- Lift the frames carefully and check properly to your satisfaction.
- Replace the checked frames exactly on the space provided and never break the combs.
- Avoid dismantling all the frames at ago as these could expose the queen -which might lead to swarming.
- Under favourable conditions supering should be done six months after catching and first harvesting at the ninth month.

Factors to determine how first a colony needs a super:

- Type of colony i.e. strong or weak colony.
- General management i.e. regular inspection.
- Forage/ food availability and water.

MERGING WEAK COLONIES

At times a colony become hopeless, queen less, it is advisable to unite such a colony with another. The usual method is by a use of newspaper to create a common enemy between the two colonies. In the process of chewing the paper the two colonies become friends to fight the common enemy and overlook the strange bees and work as a team. The is to be removed after three days.

NB: A queen less colony shall have cells empty and without eggs.

BEE PESTS AND PREDATORS.

1. Honey badger: prevent using goal post.
2. Hive beetles: Prevent by regular inspection.
   - Use goal post method of hanging.
3. Human
4. Ants /white ants/termites (black and red).
   - Use ant killers.
   - Goal posts which are treated.
5. Wax moth.
   - Regular Inspection.
   - Keep apiary clean.
   - Cannot survive in a strong colony.

PRACTICAL SESSION.

The participants went as a team of the 21 farmers for the practical training where the following were drawn from the demonstration site;

- How to use the modern bee keeping equipments.
- Colony management practices.
- Supering – introduction of pure honey storage chamber.
- Features of a potential apiary.

In the practical session the participants were able to handle one of the hives infected with wax moth and red ants which was an additional learning point. On the practical session the participants were also taken through on how to take care of the bee keeping equipment as they conduct the procedures. They had an opportunity to conduct cleaning of the hive and supered two hives which were ready. These as well happened to be a plus for the host farmer who for along time had not known how his colonies were doing.

From the practical sessions, the recap clearly shown that the participants who had been fearing bees were now rearing to go and could share their learning points.

RECORD KEEPING.

1. **Harvesting records.**

These was to show the income flow in the farmers household from the bee keeping project as an enterprise.

The participants were taken through the major contents of harvesting records:

- Date
- Number of the hive - brooder number.
  -super number.
- Gross weight of the super box.
- Empty weight of the super box.
- Net weight of honey.
- Price per unit quantity
- Total income.

1. **Harvesting record.**

Name:----------

Date	Brooder no.	Super no.	Gross wt.	Empty wt.	Honey wt.	Amount

2. **Inspection and apiary management records.**

Name:----------

Date	Brooder no.	Super no.	Brood condition.	Super condition	Apiary condition.	Comment

3. **Tools and equipment records.**

Name:----------

Date.	Person loaned [details]	Equipment type & no.	Equipment condition.	Returning Date.	Comment

4. **Inventory Record**

Date	**Equipment**	**Qty (Pcs)**	**Status**

FIELD VISIT.

- The team had a chance to visit an established Apiary in Dodoma owned and managed by the former Prime Minister Hon. Mizengo Pinda (***Photos attached***)
- The farm which is owned by the former Prime Minister Hon. Mizengo Pinde sits on a 70 hec. piece of land and is involved in crop husbandry, Animal husbandry and Apiculture.
- Of great interest for the trainees was Beekeeping. The trainees had an opportunity to see an established apiary, Langstroth Bee hives and improved Langstroth Bee hives for collection of pollen and propolis.
- During the introductory note by Hon. Pinde, the trainees were taken through steps of establishing successful apiaries, challenges of Beekeeping and identification quality honey.
- Lastly Mr. Pinde indicated that he was willing to buy well-processed, quality honey from the group at competitive prices and that the groups were welcome for advice and exchange programs at any time.

- Mr. Pinde also emphasized that for the groups to remain sustainable, they had to venture in different income generating activities and acquire cheap loans from friendly financial institutions.

FINAL SUBMISSION FROM TRAINEES AND ORGANIZERS

- All trainees were generally satisfied with the content and mode of the training.
- Most trainees and to a larger extend, the four groups were more confident after the training and committed to greatly improve their Beekeeping practices.
- All the groups however requested for a follow-up training and the availability of a bee expert to continue guiding then until they are full established.
- The organizers through the 2 representatives were equally happy with the outcome of the training of training and hopped that bee project would this time around greatly improve and remain self-sustainable.
- The former Prime minister congratulated the groups and KUMEA for the good initiative and encourages the groups to diversify and embrace modern farming techniques in order to be sustainable.

PICTURES DURING THE FIELD VISIT.

Apiary site.

The Former Prime Minister, Hon. Mizengo Pinda sharing with the team.

A participant hands-on with the demonstration.

On the Former Prime Ministers Farm, where participants went through the modern bee keeping technology.

Learning process, a participant leading the session.

Joash, the facilitator leading the session on the theories of bee keeping.

As a recap, a participant taking the lead to help deepen the understanding.

Training session in progress.