



CAMEROON GENDER AND ENVIRONMENT WATCH (CAMGEW)

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CAMGEW ARTICLE

PRODUCTION OF OKU WHITE HONEY IN KILUM-IJIM MOUNTAIN FOREST

Introduction of CAMGEW

Cameroon Gender and Environment Watch (CAMGEW) is a nonprofit created in 2007 with authorization number N° 000998/RDA/JO6/BAPP to tackle environmental and gender issues in Cameroon. CAMGEW works locally and thinks globally, integrating gender in solving environmental problems in Cameroon. CAMGEW believes that the future of our mother planet-earth is in our hands and also that the planet can be sustained by putting social and environmental justice at the centre of development. CAMGEW seeks to achieve her objectives by liaising with like-minded organizations worldwide. She has resolved to function according to core values of honesty, engagement and dedication in respect of its constitution. CAMGEW has as **vision** “Changing lives of women, children and communities while protecting the environment and as **mission** to fight poverty; promote sound environmental management, gender balance and economic sustainable development.

Introduction of Oku White Honey site

The Kilum Mountain Range and the Ijim Ridge are covered with a montane forest called Kilum-Ijim forest that is peculiar in producing Oku White Honey. The Kilum-Ijim forest is part of the Western Highlands of Cameroon commonly referred to as the Bamenda Highlands. The Kilum Mountain is found in two tribes Nso and Oku which are in Bui Administrative Division in the North West Region of Cameroon. The Ijim Ridge is found in the Kom tribe in Boyo Division of the North West Region of Cameroon.

The Kilum-Ijim Community forest covers an area of 20.000 hectares and is located on Mount Kilum (3.011m) and the adjoining Ijim Ridge (2.000-2.500m). About 44 communities live in the Kilum-Ijim Community Forest. The contiguous Kilum and Ijim Mountain Forests are located between latitude 6°0TN and 6°1TN and Longitude 10°20'E and 10°35'E. The highest altitude of this mountain forest that is at 3011m has a large crater lake called Lake Oku that is found along the Cameroon Volcanic line. The Kilum-

Ijim forest region has a natural setting with about 80% of the population based there made up of natives of Nso, Oku and Kom tribes, some of whom come in from close towns in these tribes to farm. The Kilum-Ijim region is known nationally for its traditional healers as they have many medicinal plants due to the bio-diverse forest. Oku is strong in this domain.

The area around the Kilum-Ijim Forest is one of the most densely populated parts of Cameroon. It is estimated that close to 300,000 people live within a day's walk to the forest. This population is attracted by rich volcanic soils and the near temperate climate that favours the cultivation of crops such as coffee, beans, maize, Irish potatoes and a wide variety of vegetables (onions, tomatoes, cabbages, carrots etc.). The potatoes and beans are exported to other parts of the country as well as to neighbouring countries like Central African Republic, Gabon, Equatorial Guinea, etc. These crops are gradually replacing coffee as the main cash crop of the area because of the dramatic decline in coffee prices in the mid 1980s. Infrastructure in the area is generally poor. Farm-to-market roads are poor and make evacuation of farm produce very difficult. Bee farming is practiced in the forest and Oku White Honey demand has increased above its supply especially after Oku White Honey was certified as a Geographical Indication Product by African Intellectual Property Right Organisation.

Kilum-Ijim forest has a rich ecosystem with non timber forest products like honey, mushrooms, medicinal plants (like *Prunus africana*, *Pittosporum veridiflorum*, *Agauria salicifolia*), alpine bamboos, wood for firewood and carving, spices, additives(colourings, preservatives and flavourings), etc but suffers from forest degradation due to animal encroachment, farming, poaching and forest exploitation. Some trees in this forest that produce flowers that is collected by bees to produce Oku White Honey are *Nuxia congesta*, *prunus africana*, *Schefflera abyssinica*, etc. This forest is predominantly montane, in which trees are too small and inaccessible to be of interest to commercial loggers. These products could better serve the community and fight poverty if forest income generation activities are promoted and a workable benefit sharing mechanism put in place. The forest has a high potential to improve the living standards of local people but this potential is under exploited or unblocked. Many forest people depend on these products for their livelihoods. These services and products cannot be available if the forest is destroyed too. The region is known nationally for its traditional healers and the forest is rich in *Prunus africana* that is harvested by forest exploiters after paying fees to the community. Bee farming could earn a lot of money for the population as the forest is vast for this activity to be practiced. The Oku Honey Cooperative Society the largest organised bee farming group in the region that promote bee farming has a low membership despite the fact that she buys honey upfront, provide technical and material support to its members and community. There is need to build the capacity of local people on bee farming and other forest income generating activities. With a good forest ecosystem benefit-sharing mechanism put in place the living standards of the

local people will improve and they will see the need to engage in forest ecosystem management. Environmental education is important to tackle forest degradation through behavioural change and to instil in young people the spirit to grow and participate in forest management. Protecting the forest enable it to generate water, fresh air, serve as carbon sink, source of beneficial insects, protect endangered species like *Bannerman's turaco* (an endemic and endangered bird specie only found in the Bamenda Highland Forest region with Kilum-Ijim having its largest remaining forest) etc all of which are indirect benefits to village dweller.



A map presenting the Kilum-Ijim site

Bee farming in Kilum mountain forest

Bee farming in the Kilum mountain forest is a little different from bee farming in other areas. The honey produced in this forest and the Ijim forest range is white in nature and is called Oku White Honey. It is only peculiar to this Kilum-Ijim forest. It is highly medicinal, nutritious with a strong flavour. It treats so many diseases and has a high economic value. It was recently certified by African Intellectual Property Right Organisation as a Geographical Indication Product. Presently, it has a high potential market locally and internationally. The production of this honey is different from other honey production because it is laborious. The real quantity of honey produced in this forest is not known because statistics are not available.



Beehive with bees in the forest

Hive construction: Production of this honey starts with the construction of beehives that is done locally using local materials like raphia and alpine (Indian) bamboos. The hives are constructed in a cylindrical form and wrapped with grass. Kenyan Top Bar hives are not used in kilim. The bee farmers complain that it does not do well in this forest. Many bee farmers in Ijim forest use but Kenyan Top Bar Hives and could harvest honey many times. The local beehives are tied to keep them warm and prevent rain water from penetrating inside. Bees do not like cold inside the hives and water to touch them. The hive is ready for transportation when the lids are inserted into the constructed cylinder and mud rubbed on its periphery to allow bees use only the prepared entrance.



Beehive construction



Production of beehive lids



Beehive lid fitted with bee inlet/outlet



Beehive lid fitted at the back of beehive

Transportation to colonisation sites in the valleys: The constructed hives are transported by bee farmers living around the Kilum forest to the valleys where colonisation (trapping of bees) takes place. These valleys are found below the Forest Mountains and are located many kilometres away from forest. Some of the areas where people in Oku colonise hives are Mbam-Oku, Din in Noni above 15 km distance, Tadu, Babessi, Ndop, Sop, etc. The hives are carried by head trekking down the hills to the valleys where they are colonised. The folk sticks are prepared and pinned on the ground before the hives are placed on top. In some cases, they are placed on dwarf trees with branches. Colonisation is good in valleys because valleys are hot and have flowers continuously. The Kilum forest has much flowers only periodically and that is why there is need to propagate those trees or plants that flower when the blossom of flowers is over. Trapping bees or colonisation is usually carried out during the swarming season from October to June and swarming season also coincides with the harvesting season. In May and June it is highest because bees leave many hives in the forest after honey is harvested and move down the valleys. What disturbs colonisation in the valleys is rampant bushfires resulting from burnt farms and grazers who burn the hills, hives are also pushed down by grazing cattle and also cattle that come to waterside to drink water. Colonisation is best around river banks. When colonised hives are close to farms, bees disturb farmers from carrying out their activities and this result sometimes into conflicts. The problems could be difficult to handle when it involve two tribes especially when people from one tribe move to another tribe in the valleys to do colonisation. There is need to foster solidarity between these tribes by involving them in the honey production business. People in the valley could construct hives and sell to people in the hill or their community member for colonisation, they could construct and colonise hives to sell to those in the hills, enter into partnership with people in the hills to carryout Oku White Honey production business or organise themselves in a cooperative to produce their own honey though not white for the market.



Transportation of beehives by vehicle



Transportation of beehives by head

Transportation of colonised hives to the Kilum forest: When hives are colonised, the bee farmer has to monitor the hive to know when it was colonised and the quantity of bees in the colony before the hive is transported to the forest. If the bee colony is small then it will be necessary to keep it to grow big. Whether the colony is big or small the bees need to be allowed to adapt to the hive before they are moved to the forest. The hives are moved to the forest from November to March. This is done by head and trekking up the hills. It is necessary to place the hives in the valley early enough to trap bees. Easy bee trapping is condition by the area of positioning hive, the positioning of hive, the time of mounting hive, the quality of hive and good luck. Carrying the hive to the forest needs care because combs have a positioning that need not to be altered and also because combs are delicate. Bees do not want any disturbance. Before carrying the hive its position of mounting is noted and maintained. The bee farmer goes to the valley in the evening and wait for bees to enter the hives in the evening before the bee entrance in the hive is blocked. When the hive is blocked, it is allowed for a while to make sure that all is okay before it is carried either on the shoulder or on the head. It is carried gently and movement is gently. Many bee farmers transport the hives in the night when it is cold direct to the forest in the prepared site with folk sticks. It could be transported and placed close to the forest in the night and then carried to the forest early in the morning as from 5 to 6 am. When it is place in the prepared folk sticks in the forest, the farmer makes sure that it maintains the same mounting position as in the valley. He now roofs the hive again with grass and then opens the blocked bee entrance while running because bees are very wild at this moment. A bee suit, gloves and boots are needed. Many bee farmers do not have these materials. Trees in the forest blossom with flowers between October and June. Problems faced at this stage are:

- some bee farmers cut young trees to produce folk sticks to mount their hives and this destroy the forest,
- the hive could be poorly handled during transportation and combs will break. This will cause bees to leave the hive,
- the hive could be poorly mounted not taking into consideration its mounting placement in the valley and combs will not lay in the right position. This can cause bees to leave the hive,
- the direction of placing the hive considering the sun and wind position could affect the bees,
- the position in the forest especially the area of the forest. If it is too dense bees will not like it and can also leave because they need sunlight.

In some cases the hive to be transferred could have much brown honey in them and this will make it heavy. The hive will be harvested to reduce the honey and make it lighter to be carried. After harvesting the hive it must be allowed for bees to adapt for some days or weeks before it is transported. You must have skills in carrying hives or you pay somebody to do the transportation. Some people with trucks or pick-up vehicles

use it but must drive gently. Some people use trucks that carry sand from the valley to transport their hives. When sand is already in trucks, the colonised hives are placed inside the sand and then transported to the forest. To do this, you need a vehicle but you could pay but it is expensive and because of the uncertainty of bees staying in the hives when transported farmers do not use this method.

Honey harvesting at Kilum forest: From November to June there is much flower production by trees and shrubs in the forest. During this period you can hear bees busy on trees, harvesting nectar and pollen. If the rains do not start earlier than March heavily, farmers will be sure of a great harvest but when the rains start heavily like in 2013, nectar is washed from flowers and there is low honey production. In ending April to May and early June bee farmers harvest honey. Like in Oku, this is the period one can reap the fruits of his labour. Some years are usually having dry season harvest done in the months of February and March. Tropical bees are very aggressive, so the best time to be harvesting honey should be in the evening hours from 5 pm and in the morning periods as from 6:30 to 8 am. This is good time because most of the bee keepers do harvesting without protecting themselves with bee suits. But above all harvesting in broad day light is preferable and is the best because you can be seeing the internal part of the hive and even the combs before cutting. While we recommend the mornings and the evening time is because insects in general are less active in cool weathers. Harvesting is done by two persons. They need bee suits, gloves and boots in two pairs to put on to prevent stings from bees and to respect sanitation and hygiene norms. They need two plastic buckets for harvesting. One of the buckets will be used to harvest ripe honey combs (capped honey) and the other to put uncapped or brood honey. The bee smoker is used continuously to smoke the hives and send the weakened bees away from the combs. Not all the honey combs are harvested from the bee hives. We should know that we are just thieves that steal bee food (honey) and must keep some for them to eat. The harvesting knives plus containers must be clean and dry for honey does not need water content to be high. Many people do not have modern honey harvesting equipment and when they harvest honey with poor harvesting materials they add impurities to honey and when they use fire instead of smokers they burn the bees and in most cases forget to put off the fire and this result in bushfire in the forest that destroy the forest and mounted hives. This is common in dry season honey harvesting. Honey in hives produced by bees is clean and impurities get into it only during harvesting, draining or packaging. The harvested combs are broken to pieces while in the bucket. All combs produced in the forest are white and the honey is white because of the flowers that bees feed on in the forest. You could discover some brown or dark brown combs and honey in the hives that was produced when the hives were in the valley. In a good hive a bucket of crude honey can be harvested but this is rare now in the Kilum forest.



The way combs that have white honey are placed in a beehive in the forest

CAMGEW has never harvested this and many bee farmers testify same but say that in the 1990s this was possible. This year 2014, CAMGEW harvested five hives to get a bucket of crude honey and another farmer harvested 11 hives to get a 30 litre container of honey. This was in Emfve mii Community forest in Oku that is highly degraded. Honey production in Kilum-Ijim forest had dropped and this may be linked to the following factors:

- The poor harvesting of *Prunus africana* a native dominant tree of this forest that lead to the killing of nearly all of these trees. This tree produces many flowers and is also medicinal. The barks of this tree were harvested and sold to pharmaceutical companies in Europe to produce prostate cancer medicine. The barks are also used locally to treat malaria.
- Bees no longer have comfort in the forest year round and leave some hives after harvesting
- Poor harvesting of honey from the hives led to bees leaving the hives
- Forest destruction by firewood fetchers and carvers who indiscriminately cut forest trees whether young or old for firewood or carving
- Bees are affected by diseases that are not yet discovered and in some cases you could visit a hive and discovered that all bees have died in the hives. It is difficult to tell whether bees get these diseases in the forest or bring them from the valleys.
- Poor hive construction could be another reason that bees leave the hives.
- Few persons in Kilum-Ijim engaged in bee farming
- Lack of bee farming facilities for honey harvesting, processing, packaging and marketing
- The government has not organized and invested in the sector of honey sector in Cameroon

What happens to beehives in the forest after honey is harvested

After honey is harvested in the forest between May and June some bee colonies decide to leave the hives to the valleys but some colonies enter hives mounted in the forest. Bees hardly enter other hives in the forest we they are leaving their hives. Some colonies leave from July to September when the rains get heavy while other colonies stay in the forest. Many reasons are advanced for bee colonies leaving the hives and the forest. They are as follows:

- Honey is poorly harvested from hives either burning bees with the use of fire instead of smokers or removing all the honey from the hives leaving bees hungry.
- There are few flowers in the forest from July to September and so bees leave to the valleys where there is enough food.
- The forest become cold from July to September with heavy rains and bees find it difficult to adapt so the move to the valleys where it is warm
- Some hives are poorly constructed and during heavy rains water enters the beehives and send bees away.
- There are some diseases that attack bees from July to September and kill all of them in the hives and so bees leave the hives and forest to avoid these diseases.



This bee farmer harvested White honey from his hives in early May 2014 and by early June 2014 bees left the beehives down to the valley. He is carrying the hives down to the valleys (Mbam) to trap the bees and bring them back to the forest by November 2014

The processing of honey from Kilum: It is recommended that honey harvested be drained within 24 hours of harvesting because it easily clots. The honey is processed through filtering using calibrated micron mesh made out of steel to get well refined honey. It is placed on the top micron mesh with large holes to drain naturally to the other smaller micron mesh. Many farmers process their honey in groups or individually but they do not have good honey processing equipment. Only stainless steel meshes are recommended to be used in draining honey. This is not locally available but it is also expensive to get. Extractors can also be used in honey draining but in this case combs could not be broken during harvesting and honey processing could be done at anytime because the extractor could be regulated to melt the clotted honey. Extractors are expensive and are not locally available so they are not used in the Kilum area. Local people use baskets fabricated with local materials like raphia bamboo to drain honey. Others use calibrated plastics dishes to drain the honey. In Ijim forest honey is mostly processed by individual farmers.

Honey processing by Oku Honey Cooperative Society (OHCS): The OHCS collect honey from her members and process for them. To maintain quality, she observe the honey to make sure it is white honey coming from the Kilum-Ijim forest and also that the hygienic and sanitation quality of the honey is high. She measures the water content of the honey using the refractometer to make sure that the water content of the honey is within acceptable level. The decision is then made to accept or refuse the honey. The accepted honey is poured on the calibrated micron mesh where it drain naturally and refine honey is collected in large storage containers ready for packaging. The OHCS is the existing model honey processing unit. They have many members and they buy honey upfront. They have honey harvesting equipment that their farmers borrow to use. She is more organized and this has helped them get government and international support.



Honey Draining by Oku Honey Cooperative Society

Honey packaging: Honey is packaged in different containers. Many persons buying honey to carry out of Kilum area decide to buy it in 20 litres containers and then package it in the sizes they want. Around Kilum, honey is package in 1 litre, 0.5 litre and sometimes 0.3 litres. The labeling differ from producer,

processing unit or buyer but what mostly future as part of the labeling is the identification that it is Oku White Honey from the Oku Forest Honey or Kilum Forest. There is need to harmonize the labeling of this honey using the certification norms. Many bee farmers have been complaining in Ijim that there is no market for white honey in their area.

Honey marketing: The Oku White Honey is sold locally, nationally and internationally. In Oku and Kilum the forces of demand and supply have influenced the price of this honey in recent years. The certification of this honey has increased its demand. The quantity demanded is less than the supply and this is testified by the fact that Oku White Honey totally goes out of stock before the next harvesting season. We think that it is because they are not yet organize to have their product grouped together for a large or steady market to develop. There is need to organize Oku White Honey bee farmers in Ijim to get a market and assure the sanitation and hygiene of their products to secure a market.

How CAMGEW is trying to increase Oku White honey production

Cameroon Gender and Environment Watch (CAMGEW), an organization based in Oku has been working to increase Oku White Honey production from Kilum forest. This honey cannot be produced if the forest disappears. To increase Oku White Honey production CAMGEW has been doing the following:

- Carrying out bee farming training to engage many Kilum Community Members in sustainable bee farming. CAMGEW has trained 338 persons from different villages in bee farming in 9 different training workshops. CAMGEW did this training in partnership with Oku Honey Cooperative Society that has skills in bee farming training. The training goes on for two days with theoretical lessons and practical lessons on hive construction, honey harvesting, honey processing, etc. Our trainings have been offered for free with funds from various donors. We need more support to do more training in all the villages surrounding Kilum forest. CAMGEW won the 2013 Pan African Award for Entrepreneurship in Education organized by Teach a Man to Fish –UK for the quality of bee farming training she has offered to Kilum forest community.
- CAMGEW since 2012 have planted 17000 bee loving trees of *Prunus africana* in the forest for regeneration and increase in bee loving trees to put up honey production. This has been done with bee farmers and members of the Kilum forest community in the Oku Community forest. More trees that are native and bee loving needs to be planted in the Kilum-Ijim forest.
- CAMGEW has continuously carried out environmental education in schools to build future nature lovers and communities to change behaviours from destroying the Kilum forest. The destruction of Kilum forest goes with the destruction of bee loving trees.

- CAMGEW through Vocational Training Centre in the dress making department have trained her trainers to produce bee suits that are now being made available to members of Kilum forest community at an affordable price.
- CAMGEW also have some bee farming equipment like smokers, boots, gloves and few bee suits to lend to community members.
- CAMGEW is available to community members to give advice on bee farming and forest conservation
- CAMGEW is engaged in agroforestry at the periphery of the forest to increase number agroforestry trees and shrubs that are soil conserving and bee loving. This is aimed providing opportunities for bees to have flowers to feed from especially when there are few flowers in the forest.
- Creating a Kilum forest Multi-stakeholder platform for a participatory approach in forest decisions making.
- Farmers in Ijim forest climb up trees to place their Kenyan Top Bar hives and use ladders prepared with alpine bamboos. They complain that they donot have a good life span and therefore gets broken. They say it is risky using it and there is need for good and strong ladders to improve on bee farming in Ijim. This information was gotten from bee farmers at Fundong.
- More research needs to be done in the forest in various aspects.

Some identified problems faced by bees in the Kilum-Ijim Forest

Bees in this forest face some threats from birds, animals and other insects. CAMGEW has been working with bee farmers and gathered this as information from them that is link to bees threats.

- There is a rat with a large tale called honeybarger (the name I got from local people) enters the beehive in the forest and use its tail (swinging) to chase away bees and eat the honey. This causes bees to leave the hives.
- There are some birds that when a hive is prepared with a large landing board space, they fly and land on this landing board and eat the bees as they land before they enter the beehive through the entrance.
- There is an insect that kills bees in hives. The bee farmers told us that this insect is red and some are black in colour. Inside a beehive they develop a coat. They burst and sock abdomens of bees. This is common on Kenyan Top Bar Hives. When you look up top of the zinc placed on these hives you will see the death bees and these insects. The insects always look as non living things but when you touch them, you discover that they move and are alive. It moves with the coat and when you

touch hard it moves out of the coat. It is a little bigger than the bees. This information was gotten from Ijim forest area where Kenyan Top Bar Hives are used.

Turning Problems in the Kilum-Ijim forest into opportunities

Kilum-Ijim forest have these problems that could be turned into opportunities.

- There is the presence of Eucalyptus trees in all parts of this forest that are matured. Eucalyptus tree is an invasive (non native) specie in this forest. It disturbs forest ecology because this forest host many watersheds for many rivers that take their rise from the forest. The tap root goes deep to the soil. This tree is known to transpire much water from the forest and where the tree is found there is limitation in biodiversity. The advantage with this tree is that its wood is hard and it grows fast. These trees could be fell down and replace with native forest trees and its wood use to make beehives for bee farmers. This could happen with a good partnership between forest management institutions, the local government (council), government Ministry of Forestry and Wildlife, non governmental organizations and the community.
- The grazers especially in Ijim with cattle burn the grasslands in the dry to get new grass for their cattle when the rains come. The forest in Ijim is found in ranges with much grass land. The dominant population settled here are the bororo. The bororos are one of the indigenous people in Cameroon with less literacy rates and opportunities for livelihood improvement. They use the Oku White Honey to produce their traditional medicine that they use regularly. When the grass is burnt sometimes it destroy the forest or the hives of bee farmers in the colonization zones. In Ijim colonization is close to forest periphery where grazing occurs. Many grazers are interested in honey. They do not practice bee farming. Engaging them in bee farming through training and provision of materials and equipment will help prevent bushfires and improve their livelihoods. Pasture improvement could also solve the problem of bushfires.

Research opportunities and studies identified by CAMGEW in the Kilum Forest

- Studies on the quantity of honey and wax produce around Kilum-Ijim forest and projection of its future production;
- Carryout research on the trees that flowers in the forest in the rainy season when many bees leave forest hives perhaps because of lack of flowers;
- Carryout research on what causes bees to leave hives in the Kilum-Ijim forest;
- Carryout research on bee diseases in Kilum-Ijim forest and valleys where colonization takes place
- Carryout research on what causes bees to die in the hives in Kilum-Ijim Forest

- Determine the rate of beehive colonization in various colonization sites and in the forest to make conclusion of the best colonization sites;
- Determine the best hive type suitable in the Kilum-Ijim forest;
- Prepare a management plan for the 17000 *Prunus africana* trees she has planted in the Kilum forest at Oku Community Forest to ensure their sustainability and make sure that the trees grow properly, harvested sustainably, more trees planted and money gotten used to help the forest people. This will ensure its growth and flower production; etc.

CAMGEW will be ready to host any person or institution in Oku that can help her in these areas of research or study to promote bee farming or Oku White Honey production in Oku.

The role of women in bee farming

Bee farming has been considered a masculine activity here in Kilum-Ijim forest. Oku White Honey that is produce only in this forest price has increase and its demand is more than its supply after its certification as a Geographical Indication Product by the African Intellectual Property Right Organisation. This makes bee farming in this forest a source of livelihood that fights poverty and unemployment. Women make up 51% of the Cameroon population and there is nowhere women should be kept out of economic activity if Cameroon should achieve her dream of emergence by 2035. There is need for women to benefit from training opportunities on bee farming and opportunities that may follow on apiculture materials and equipment. Women can invest in the sector. A proper bee farming always need at least 2 persons especially harvesting and processing. Here in Kilum-Ijim area each bee farmers invites another man to do honey harvesting and this invited person is paid directly with money or indirectly through harvested honey. The participation of a couple that is a man and his wife in the harvesting process can increase family income and reduce expenditure out of the family.

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Information given in this article has been gathered from bee farmers during our organized bee farming trainings, our organized field visits to the various parts of the forest, interviews with bee farmers, experience gotten from our demonstration beehives in the forest and reading of various documents

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