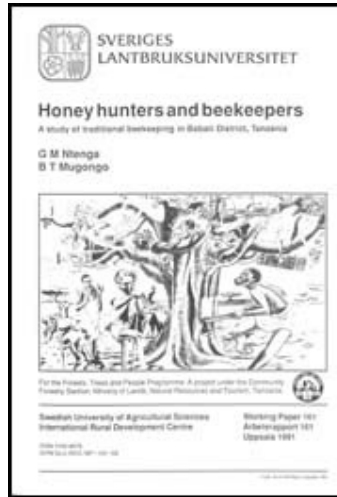


Honey Hunters and Beekeepers: A Study of Traditional ...



Honey Hunters and Beekeepers: A Study of Traditional Beekeeping in Babati District, Tanzania

Author(s): G M Ntenga, B T Mugongo

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FOREWORD



SUMMARY



ACKNOWLEDGEMENTS



1. BEEKEEPING IN TANZANIA



2. METHODOLOGY



3. NOTES ON BABATI DISTRICT



4. TRADITIONAL BEEKEEPING IN BABATI DISTRICT



5. DISCUSSION AND CONCLUSION



6. GENERAL RECOMMENDATIONS



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This study is one in a series of studies from the Tanzanian Forests, Trees and People (FTP) project on various subject related to community forestry, which were made during Phase I

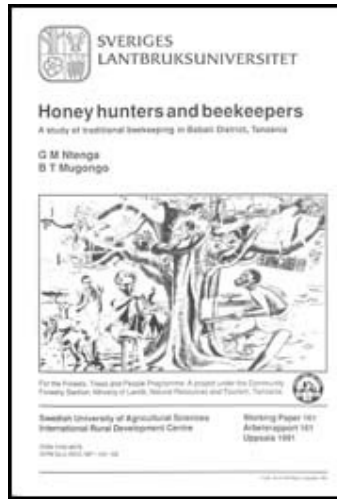
(1986-89) of the Forests, Trees and People Programme financed by SIDA and implemented by FAO and SUAS. The programme aims at identifying and developing ways of supporting people in their efforts to benefit more fully in their management and utilization of trees and forests.

In Tanzania, the FTP project was organized under the Community Forestry Section at Forest and Beekeeping Division, Ministry of Lands, Natural Resources and Tourism. The general objective of the Tanzanian FTP project was to develop guidelines for intensifying the ongoing National Community Forestry Programme through a combination of in-depth studies and field implementation on trial scale.



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I Notes on good colony management

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To be a successful beekeeper, the following principles should be observed:

1. The hives must be good

Hives are the beekeeper's principal tools: they must be made from durable materials, which can withstand sudden changes in the environment. The material must be inexpensive and locally available. Good hives are those which can meet the biological requirements of bees, permitting full development of bee colonies and allowing the beekeeper to collect the crop without

disturbing the bees' nests. They should therefore be able to be opened and closed at will.

2. The hives must be baited and sited in areas where flowering plants are abundant

Hives may be baited with bees-wax, propolis or other materials to attract passing swarms of bees. Plants useful for bees can be learnt from experts or beekeepers and field observations of plants on which bees work during the flowering seasons.

3. The hives must be near permanent sources of water

Water is as essential to bees as it is to other living things. Bees need for diluting their food, especially when they are rearing brood. It is also required for cooling the hives during hot weather through evaporation. Because bees have shorter lives during the active seasons, the water source should not be further than about two kilometres from the hives.

4. The hives must be well-protected and ventilated

Hives can be placed securely in tree tops or on any stands that offer them protection against theft and predators. Bees need ventilation, so it is unwise to place hives in valleys or which will prevent the air from circulating and which are apt to be flooded during rainy seasons. The hives should not be near human settlements, livestock tracks and roads. Bees become aggressive if they sense moving objects or odours from livestock oil, or turned up earth.

5. The beekeeper must use clothing and equipment protective

Protective clothing and equipment should be used in order to prevent excessive bee stings and to increase efficiency and confidence in handling the bees. Excessive bee stings can be dangerous to the beekeeper. In the first place, the beekeeper smoke to control the bees. Smoke irritates the bees which react by rushing to the open cells of honey to feed, the beekeeper can then collect his crop. Secondly, the beekeeper must protect his face by wearing a bee veil or mask and his hands by wearing gloves. An overall will protect other parts of the body.

6. Bees should be inspected regularly

Inspections allow the beekeeper to learn about the bees' and the condition of the hives. Hives may be dislodged by wind, rain or animals and the bees may be attacked by pests or may become diseased. These problems need to be corrected or reported to experts for necessary remedial action.

7. The hives must be stocked with good strains of bees

The most important characteristic the beekeeper looks for is the queen's ability to lay well so that enough bees are available for collecting nectar and pollen which they convert into honey and bees-wax.

The bees must also be industrious and able to defend themselves against enemies. Most of all the bees must be able to store and conserve surplus honey. Reproductive swarming may be adverse if it occurs during the honey flow. This can be avoided by using large bee hives.

8. Honey and bees-wax must be harvested in time

It is important to harvest honey and bees-wax in time, because bees may consume surplus when there is a dearth of nectar and pollen. Harvesting should take place when the important honey plants have lost their flowers; the hum of the bees in the field will have decreased and on occasion bees will be found clustering on the outside of the hive. Large amounts of propolis will have been used by bees to reduce the bee entrances and any other openings. Only combs containing ripe honey should be removed from hives; those with unripe honey should be left in unsealed combs. Combs which have been removed from hives should be placed in clean containers which should be covered by airtight lids to prevent dust, bees and moisture from entering the container.

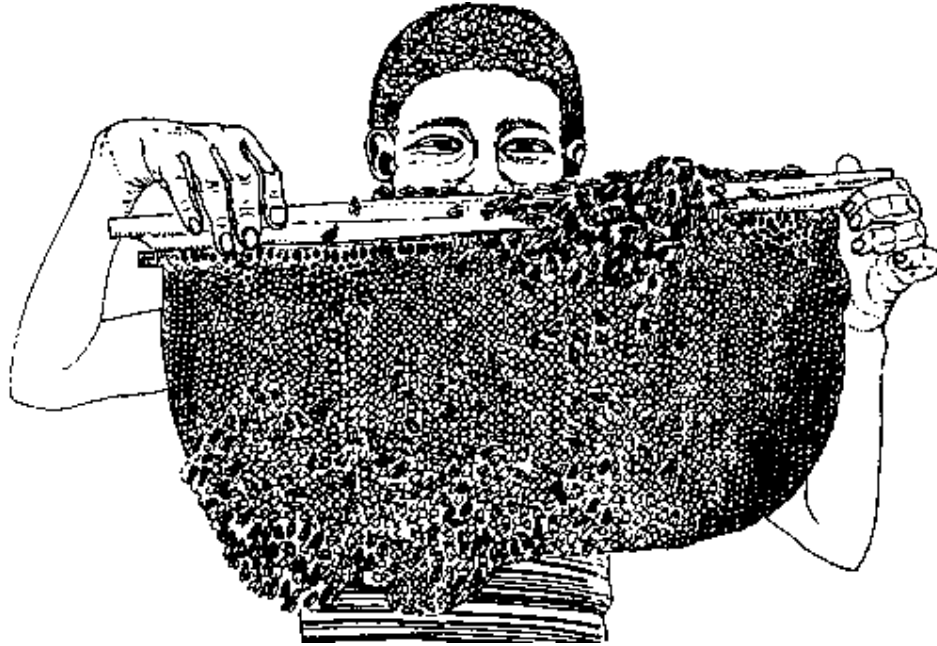
9. The honey and bees-wax must be separated

This can be accomplished by using special honey presses, by draining through coarse cloth or wire meshes or by using extractors, depending on what type of comb has been collected.

10. The honey should be stored in a cool place and bees-wax rendered

The honey that has been separated from bees-wax should be packed in clean containers with airtight lids. The containers may be made of any suitable material. They should not be made of copper, tin or iron as these materials will react with honey and spoil it.

If tin must be used, the containers can be coated on the inside with an acid resistant lacquer or a layer of bees-wax or paraffin wax. The remaining wax material should be rendered into bees-wax, which is a valuable bee product.



II Preparing bees-wax for the market

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Honey mixed with wax is usually sold by the traditional beekeepers in Babati and other outlying districts, despite the

government's effort to encourage the separation of honey and bees-wax.

There are several known methods of rendering bees-wax which have been tried in Tanzania, the Root Wax Press system, the M.G. Wax Extractor and Clarifier, the Hershizer method and so on. All these methods have proved to be inferior to the popular and simple method of bees-wax preparation known as the Tanganyika method. The superiority of this method lies in its simplicity; all necessary materials are readily available at any homestead.

In order to obtain a clean mould of bees-wax using the Tanganyika method, the following steps should be strictly followed:

- 1) The comb from which honey has been extracted should be soaked in clean water for some time to allow the remaining honey to dissolve and to loosen the cocoons in old, used combs.**

2) The soaked comb should then be melted in a vessel containing an equal volume of clean water, stirring all the time to ensure even melting.

3) When all the wax has melted, it should be strained through a suitable strainer, which can be hessian cloth, bark cloth, jute cloth or a rush bag made of leaves and popularly used for straining traditional beer. The molten wax with water is poured into the strainer which is wrung between two sticks.

4) The wax and water are placed into another vessel containing clean cold water. The wax cools and rises to the surface where it can be skimmed off.

5) The skimmed wax should be melted again in a vessel containing an equal volume of clean water, stirring all the time as before.

6) After all the wax has melted, it should be strained through a piece of cotton cloth into a suitable bowl, pan

or other mould previously smeared with soapy water.

7) The mould containing the wax and a little water should then be covered to keep out dust and placed in a cold place where the wax can solidify slowly without cracking.

8) The cold, solid wax should then be shaken out of the mould, and if there is dirt or saponified wax on the bottom, it should be cut or scraped off. The wax is then ready for safe storage or direct sale.

No further cleaning is necessary as the trade required bees-wax which has received the minimum treatment. The colour of the wax which has undergone the above treatment should be yellow, orange or russet. Bees-wax which is brown has been overheated, and grey bees-wax has either been partly decomposed through burning, or adulterated.

111 Financial returns from traditional beekeeping in Babati District

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One interviewed beekeeper at Moyamayoka said that he maintains fifty traditional log hives which he made some five years ago as part of his routine work. It took him about three days to make one hive using traditional tools. The axe blade was purchased from a shop in Babati town, but he made the adze blade by trimming an old worn-out hoe. The blades were then fitted with handles which he made from young trees.

The hives he made average 135 cm long with a 45 cm diameter and are sited in trees near his homestead which is within walking distance of the foot of the Rift Valley. The area also abounds in feral bees, nearly 75 percent of his hives are always occupied and he claims to obtain between 30 and 45 kg of honey from each hive every year. He sells most of his honey locally to the villagers and to Barbaigs and Maasi at the prevailing prices.

From the above information it was possible to arrive at the following conclusions:

- No cash expenditure was incurred for making the hives except for the axe blade purchased from Babati town, then about 20-30 TSh.**
- Between 35 and 45 hives are occupied by bees every year. He collects an average of 1480 kg of honey from his hives.**
- In 1987/88 he sold 1400 kg at 100 TSh per kilogram.**
- No recurrent expenses are incurred as he uses locally made tools to manage his hives and is often assisted by a member of his household.**
- Any possible initial financial costs have already been offset by his annual income.**
- In 1987/88 his income was 140,000 TSh.**

The good market for honey in Babati District clearly makes traditional beekeeping a highly lucrative and reliable occupation. With the above returns, the beekeeper is able to make improvements that will lead to a more comfortable and profitable traditional beekeeping.

IV Terms of Reference

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"More specifically, the Consultant will, in close cooperation with the Counterpart assigned"

- Describe the present methods and technologies of traditional beekeeping in the area.**
- Survey the present utilisation of bee-products and commercial activities related to beekeeping in the District.**

- Note down the traditional and cultural beliefs related to bees and beekeeping.**
- Survey the present extent of beekeeping and estimate the potential.**
- Identify constraints on the improvement of the informal beekeeping sector.**
- Evaluate the present approach to dissemination of 'modern beekeeping' by the FTP-project.**
- Give recommendation to a step-wise development of traditional beekeeping.**
- Give recommendations on appropriate beekeeping equipment for small scale farmers, e.g. hives, smokers, protective clothing, harvesting equipment etc.**
- Recommend a model for a step by step development of the beekeeping activities of the project.**

- Advise the project on the set up of the trial apiary....."

V THE QUESTIONNAIRE

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Forestry

1. What is the type of vegetation found in Babati District?

(a) If diverse, what is the divisional vegetation type?

(b) If diverse still, what is the Ward vegetation type?

2. What are the main tree, shrub and herb species?

Local names? Botanical names?

3. How much plantation forestry is there in the district/division/ward?

- (a) What tree species?**
- (b) How are the tending operations done? At what seasons?**
- (c) When do the plantation trees flower? Yearly or otherwise?**
- (d) Do tending operations coincide with flowering seasons?**
- (e) Do bees work on the flowers of the plantation trees?**

Agriculture

- 1. Type of soil - district? Ward?**
- 2. What types of crops are grown? 3 When is the harvest time?**
- 4. What pests? What pesticides are used at what stage of crop development?**
- 5. Any relations with beekeeping?**

Wildlife

- 1. What is the extent of wildlife protection activities?**
- 2. Which animal predators are common?**
- 3. What do they feed on?**
- 4. What methods of control?**

Livestock

- 1. Any tse-tse endemic areas?**
- 2. What methods of control?**
- 3. Effects of control measures on other insects?**

Beekeeping

- 1. Is beekeeping a tradition in the district/division/ward?**

2. Has there been any encouragement of beekeeping in the district?

3. Who initiated this encouragement?

4. Are wild bees nests commonly found? Where - in trees or ground?

5. Would a promotional project be appreciated?

**6. How many beekeepers are there in the district?
Division/Ward?**

7. How many honey hunters?

8. Which areas have more bees than others?

9. Do beekeepers make their own hives? What tools?

10. Of what materials are they made?

11. What size, shape and how opened?

12. What do beekeepers use to attract bees into their hives?

13. How do beekeepers site their hives?

14. Do the beekeepers go out to inspect their hives before harvest?

15. When is the honey flow and harvest periods? How are they noticed? How much honey and bees-wax per colony?

16. Can the hives, tools and management be improved?

17. What kind of bees are endemic to the district?

18. What are the general characteristics of the bees? Aggressive or defensive?

19. Do the bees migrate from one area to another?

20. What are the main causes of migration?

21. Is absconding by bees from hives common?

22. What are the main causes of absconding?

23. Do the bees split into two or more swarms from established colonies? At what time of the year?

24. Do the bees use a lot of propolis in the hives?

25. Is it any bother to the beekeeper?

26. Are there any bee diseases? Have any dead bees or brood been noticed in hives?

27. Which are the major enemies of bees? Animals? Insects? Have any intruders been noticed in the hives?

28. Is theft of honey common? How is it prevented? Traditionally or conventionally?

29. Are bush fires common? What are their effects on bee colonies?

30. Are there any steps being taken to stop the practice of

starting bush fires? Who is taking these steps?

31. Any other hazards?

32. Who consumes honey and in what form?

33. What are the prices of honey and beeswax per kg./litre?

34. Is the market for bee products open and organised?

35. If market can be better organised, can beekeepers improve their methods of handling bee products?

36. What is the demand like for honey and beeswax?

37. Is transport available to and from production areas?

38. What is the condition of roads/tracks to production areas?

39. What is the effect of the rainy seasons on the road/tracks?

40. What type of containers are commonly used during harvest?

For storage and retailing?

Beekeeping Extension and Education

- 1. Are there any beekeeping extension officers in the district, division, ward?**
- 2. Do they appreciate beekeeping as a rewarding venture?**
- 3. Do they know their work well?**
- 4. How do the beekeepers regard them?**
- 5. How do they travel to meet with the beekeepers?**
- 6. Is beekeeping taught in schools?**
- 7. Is there a Folk Development College in the district? Could it be a suitable place for instructions to beekeepers?**
- 8. Are there any visual aids facilities in the district or region?**

9. How often do they come to the village?

10. Has anyone ever taken a feature article for the radio broadcast?

11. Are there any demonstration apiaries?

12. Is there any other project which could be integrated with beekeeping programme with some advantage to both?

VI Field work calendar

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The schedule was worked out with the Project Manager, Mr. Westman, covering selected villages in the four divisions of the district, including a two-day visit to the neighbouring Hanang District.

DATE

VILLAGE

DIVISION

Dec. 1988

9	Kiongozi	Babati
10	Babati	Babati
12	Mamire/Mutuka	Babati
13	Sigino	Babati
14/15	Hanang District	Babati
16	Babati - Report preparation	
17	Bonga	Gorowa
18	Babati (Sunday)	
19	Riroda	Gorowa
20	Endagwe	Gorowa
21/22	Magugu	Mbugwe
	Magara	Mbugwe

	Moyamayoka	Mbugwe
	Minjingu	Mbugwe
23-26	Babati - Report preparation	
27-30	Maganjwa	Bashnet
	Mandi	Bashnet
	Ufana	Bashnet
	Luxumanda	Bashnet
	Utwari	Bashnet
	Mbulu	Mbulu District

VII List of beekeepers interviewed

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<u>DIVISION</u>	<u>VILLAGE</u>	<u>NAME OF BEEKEEPER</u>	<u>ETHNIC ORIGIN</u>
-----------------	----------------	--------------------------	----------------------

Babati	Babati	Salim Swaleh	
--------	--------	--------------	--

Mamire	1 Iddi Ally	Rangi
	2 Juma Salim	Rangi
	3 Saidi Ahmah	Rangi
	4 Amnasy Tata	Gorowa
Mutuka	1 Nada Konki	Gorowa
	2 Balye Are	Gorowa
Sigino	1 Shami Malaas	Iraqw
	2 Samson Gadiye	Iraqw
	3 Mathayo Dahaye	Iraqw
	4 Fayu Tauru	Iraqw
	5 Elifoo Kimu	Nyaturu
Kiongozi	1 Oye Sella	Iraqw
	2 Mohamed Mugwe	Nyaturu

		3 Bakari O. Churi	Sandawe
Mbugwe	Magugu	1 Saidi A. Mbuya	Gweno
		2 Daudi Mathayo	Nyiramba
		3 Marios	Asian
	Magara	-	-
	Moyamayok	Omari Ikua	Nyaturu
	Minkingu	-	-
Gorowa	Bong	1 Ally Shaushi	Iraqw
		2 Hussein Iwala	Rangi
		3 Sharif M. Bakari	
	Riroda	1 Lagwen Goti	Gorowa
		2 Phillip Iloga	Gorowa
		3 Tisama Heke	
		4 Bahavo Hera	Gorowa

		5 Tarmo Magisa	Gorowa
	Duru	1 Gitedi Kodi	Barabaig
		2 Awaki Niima	Iraqw
	Endagwe	Baran Tlagas	Barabaig
	Hoshan	1 Shauri Himindi	Gorowa
		2 Mathayo Baran	Gorowa
		3 Balabala Qanjolo	Gorowa
Bashnet	Maganjwa	1 Lucas Margwe	Iraqw
		2 Jona Safari	Iraqw
	Mandi	Qawo Dodo	Barabaig
	Ufana	Samson Hanjee	Nyaturu
	Luxumanda	Eli Mrangani	Iraqw
	Utwari	Dagharo Dandwe	Iraqw

Hanang

Mrumba

1 MWEKWA MIMBI

Nyaturu

2 Issa Iddi

Nyaturu

3 Jabir Swaleh

Nyaturu

Diloda

1 Hassan Mgwali

Nyaturu

2 Saidi Sefu

3 Athman Kilongo

Sandawe

4 Hassan Maulid

Sandawe

5 Richard Mgwali

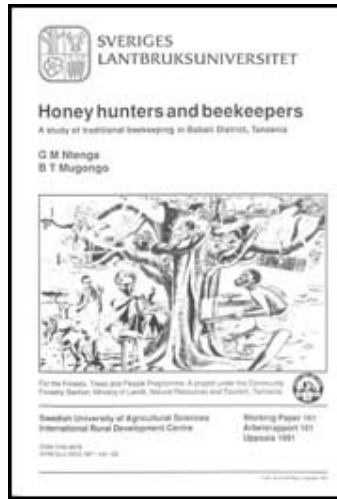
Sandawe



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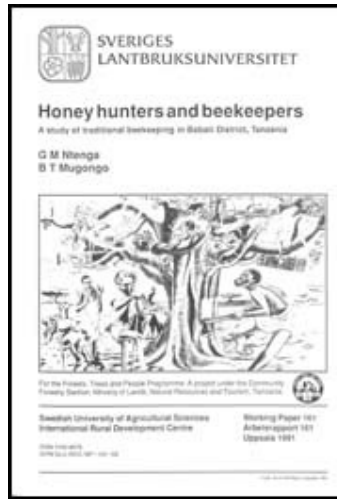


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SUMMARY

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A study of traditional methods of beekeeping in Tanzania is incomplete without an acknowledgement of honey hunting, from which beekeeping has evolved. In Babati District, like in other areas of Tanzania, honey hunting is still practised widely, particularly in reserves such as Tarangire and Manyara National Parks, where bee nests are commonly located in hollow trees. The honey hunters in Babati District are unique in that they carry out their work at night, so that they will not be caught by the reserve guards

Traditional beekeeping in Babati District is a natural resource activity closely linked with other human activities. Like agriculture and livestock raising, beekeeping produces food in

the form of honey and bees-wax as an important raw material. In addition the honeybees are important pollinating agents for many seed and fruit crops. Traditional beekeeping is also associated with the forests, where materials for its establishment are readily available.

Apiaries are located in swamps whenever possible, to ensure a good water supply for the bees, and to provide the beekeepers with a supply of fish. During the honey harvest season, beekeepers may poach for meat, which means that they are directly affected by legislation on wildlife conservation. Because many forests are infested by tsetse flies, the dangers of contracting sleeping sickness increase for beekeepers working in the forests. For this reason, they should have their blood examined each time they return from the forests.

The log hive used by the Gorowa and Iraqw of Babati District resembles other traditional loghives: it is cylindrical and consists of two parts, joined together by rope or wire. An apparently unique feature, however, is an opening which is

often located in the middle of one side of the hive. This opening, called *affku-miringamo* is used as a harvesting gate-The beekeeper can see the hive contents clearly and remove the honey without disturbing the hive and the bees.

The Gorowa and Iraqw beekeepers use a strongly scented plant of the Labiatae family, *Ocimeras Suave*, to bait their hives. The scent which this plant emits, called *moyang*, quickly attracts bees to the hives.

It is common practice to site the hives horizontally, either by placing them between forked branches in trees or by suspending them from tree branches. Bee management practices, particularly towards the end of the flowering season, include checking the flight behaviour of bees and detecting the presence of ripe honey by feeling the weight of the hives or by applying a stick to pierce the combs. If the stick is wet with thick honey it is a sign that the honey is ready for harvesting.

There are several hazards to beekeeping, which include man, the honey badger, various insects and birds. Of these, humans

and honey badgers pose the most serious threats. People have been known to steal honey from hives, and to cause bushfires. The honey badger also takes honey from the hives and can destroy them in the course of its raids. The honey badger, popularly called *Kalaombeitu* by the Gorowa and Iraqw, has reportedly caused the decline of beekeeping in some areas of Babati District.

Among the less serious enemies are the pirate wasp and the wax moth. The pirate wasp catches bees as they fly out of the hive, cutting them in pieces and sucking the contents of the honey sac. The wax moth destroys honey combs which are not well guarded by bees or which have been stored in unprotected places.

The most traditional use of honey is in the preparation of honey beer, which the Barbaigs call *gesuda*. This beer is central to all traditional ceremonies. Among the Gorowa, Iraqw and Barbaig, *gesuda* is a symbol of prestige which makes it requisite to most traditional ceremonies including funerals, enchantments and

exorcisms.

The long history of beekeeping in Babati District, the sound knowledge of beekeepers today, and the strength of traditional markets for honey suggest that beekeeping in Babati District is capable of further development through a well planned extension programme, designed to emphasize the improvement of traditional beekeeping methods.

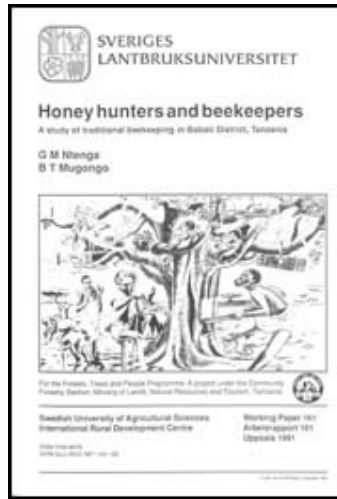


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We wish to express our gratitude to Mr. Peter Westman, the manager of the Forests, Trees and People Project in Babati District, for providing the transport which facilitated our visits to various beekeeping areas and also for providing literature on Babati District, making useful suggestions on our study and arranging for secretarial services.

We are also grateful to Mr. Börje Svensson of Apicultural Consulting Inc. for his critical observations on the first draft of this report and his useful contribution towards improved presentation of the study material.

We thank the divisional and Ward Forest Officers for their active participation in selecting and preparing the leading beekeepers for interviews and discussions. The help of the Village Chairmen

and secretaries concerned in creating appropriate conditions for the study is gratefully acknowledged. The beekeepers who appeared for the interviews and discussions deserve special thanks for freely providing the information given in this report.

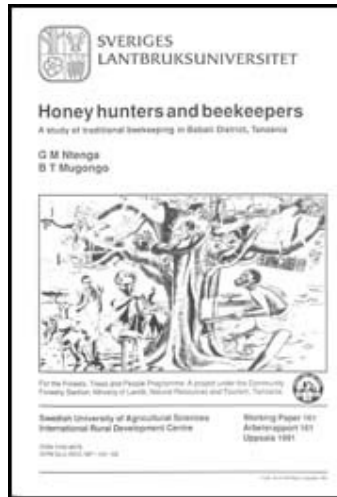
We are also grateful to Mr. J. Madatta, District Beekeeping Officer, Mbulu, for making available to us the records about beekeeping activities before the district was divided into Mbulu and Hanang Districts.

Finally, we wish to thank Messrs Drake, Lyimo and Waziri for their excellent illustrations of this report.



**Honey Hunters and Beekeepers: A Study of
Traditional Beekeeping in Babati District,
Tanzania**

***Author(s): G M Ntenga, B T Mugongo
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1. BEEKEEPING IN TANZANIA

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Beekeeping in Tanzania is closely associated with many other natural resource development concerns, all of which have direct

bearing on community and social welfare.

In the first place, beekeeping is seen as a branch of agriculture and livestock development. It is concerned with the production of food in the form of honey and pollen and of cashcrops in the form of bees-wax, with the potential for producing propolis, royal jelly and bee venom, which have become important raw materials in industrialized countries. The pollination services provided by honeybees to some cultivated crops are of particular importance to horticultural activities, whose success greatly depends on the use of pesticides to control plant and animal pests. The pest control measures must take into consideration the presence of honeybees; the use of pesticides must be regulated and management methods for the beekeeping industry as a whole need to be altered.

The forested areas which offer good potential for livestock development are often infested with tsetse flies and are inhabited by honeybee colonies. The use of fire to control the tsetse flies may cause absconding and migration of bee colonies

and the use of insecticides is dangerous if bees can also be affected. This calls for the use of insecticides which are relatively non-toxic to honeybees. Attempts to localize the spraying should take into account the distances which insecticides can drift.

Secondly, beekeeping in Tanzania is a forest industry, a fact which is demonstrated by the activities of honey hunters and traditional beekeepers. Feral bees are common in the forests and the honey hunters must go there to obtain honey and beeswax. While there, the honey hunters make containers out of the forest trees, and in the process of raiding the bee colonies, they often inadvertently start bush fires.

Thirdly, there are also some relationships between beekeeping and wildlife management. Bees, like many other invertebrate animals, enjoy the protection accorded to all vertebrate animals in game reserves and national parks. Beekeeping in the national parks is forbidden but may be tolerated in game reserves under special conditions. Beekeepers are monitored to ensure that

they do not poach on the reserves. In the Ugalla Game Reserve, beekeeping has been allowed under a permit system for more than twenty years. Similar systems could be developed for other game reserves.

Fourthly, water is an important resource for honeybees. Traditional beekeepers who operate deep in the forest prefer locating their apiaries near rivers and swamps, to ensure a permanent water supply for the bees. The rivers and swamps may be inhabited by fish which attract fishermen, and fishermen often share camps with beekeepers. In many cases, the beekeeper fishes when he has completed his work, returning home with loads of honey, bees-wax and fish.

Finally, the forest environment is a healthy one for the beekeepers, who eat well while they are working, supplementing their diets with honey, bee brood and fish. On the other hand, since most forests are infested by tsetse flies, the beekeepers and fishermen may contract sleeping sickness. It is incumbent upon the extension officials to advise both

groups to get their blood examined whenever they return from the forest. Community development officials prepare the beekeepers and the rural population in general to act upon the advice given by experts.

1.1 The benefits of beekeeping

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The benefits of beekeeping have been clearly described by Drezcher and Crane (1982), but it is better to recount them here in the context of Tanzanian beekeeping.

Traditional beekeeping can be said to be an industry in the simplest sense of the word. Honey and bees-wax can be collected using simple materials and tools which are readily obtainable from the forests and homesteads. In fact, simple bee hives can be made from any receptacle that protects the bees from the elements, allows their natural development, and permits the beekeepers to collect honey without destroying the bee nest.

The beekeepers, on the other hand, are more systematic, particularly in the miombo woodland areas, where the beekeepers often construct forest camps where they live during their beekeeping operations. The building materials are taken from the forest and, in many cases, trees are debarked to provide material for roofing and for rope used to bind together poles and sticks. More trees are debarked or cut for hive making, and as the hives must be big enough to accommodate large bee colonies, older trees are usually used. Such trees can only be found in the more remote forest areas. Tracks leading to the camps are often constructed, which tends to increase the destruction to the forest.

In areas like Babati District, the situation may be different. Dead trees are used to construct trunk hives, but due to expanding agricultural and beekeeping activities, such trees are becoming scarce. If no alternative materials can be found, the beekeepers will not be able to increase the number of their hives and some of them, may be forced to abandon beekeeping altogether.

After the bees have occupied the hives they seek flowers from which they collect nectar and pollen which they convert into honey and bees-wax. In so doing, the bees pollinate the flowering plants and good seeds for regeneration are eventually produced. Consequently, even though certain aspects of beekeeping are destructive to the forest, other aspects are beneficial and the forestry authorities permit beekeeping in many of the reserved areas.

Furthermore, the receptacles can be placed in convenient locations of no other value. Circumstances, however, may dictate the use of specially made constructions, but beekeeping is still inexpensive and can be practised by any energetic person, even if he does not own land.

In areas like Babati District, where land is soon to become scarce due to increased agriculture, it would be advisable to encourage villagers to practise beekeeping, so that the hazards of landlessness can be minimized.

The bees eat nectar and pollen from the flowers. The nectar

provides carbohydrates while pollen is the source of protein. While collecting these food substances the bees pollinate the plants on which they work. The nectar and the pollen produced by cultivated crops such as pigeon peas, sunflowers and beans are otherwise wasted if there are no bees to collect them and convert them into honey and bees-wax. The yield from these crops may also be marginal due to insufficient pollination. Far from competing with agriculture, beekeeping contributes to it.

Beekeeping offers great opportunities for both co-operation and self reliance, as it is normally more successful when practised collectively, and is an avenue for generating income without government support. In the miombo woodland areas, beekeeping is extensively practised under a camping system. A beekeeper's camp is usually shared by two or more beekeepers for mutual protection, assistance and inspiration. The beekeeper co-operative movement in Tabora for the miombo beekeepers is a practical example of successful traditional beekeeping through cooperation.

Traditional beekeeping is a flexible occupation in terms of the time it takes during the year. Beekeepers with large numbers of bee colonies spend from two to four months during the honey harvesting period since this takes place after the rains, there is ample time left for other activities such as field preparation or home maintenance. In most miombo areas the long rains stop in May, when flowering from the main nectar-producing plants may also come to an end. The beekeepers, therefore, go out to the production areas in June, and stay there until the end of August or September, depending on the amount of honey available for harvesting and primary processing. This means that they are "idle" until November, when they begin cultivating their fields and then return to their bees in June.

In the villages, successful beekeepers are recognised by their social behaviour. They are absent from the villages for considerable lengths of time, and upon their return they interrupt social gatherings to announce their harvests and attract people who wish to buy their honey. They often exhibit their affluence by open, lavish spending. Those with 500 to

1000 bee colonies are known to earn 100,000 to 200,000 Tanzanian shillings per year. This is an income far greater than a combination of earnings from other activities. A District Beekeeping Officer's income may be about TSh. 30,000 per year after deducting income taxes. It is clear that large-scale beekeepers in the villages have a solid social and economic position.

Beekeeping can be done on a small-scale in the backyard, moving further afield as operations expand. It can be done first as a hobby, then as a sideline to some other occupation. Beekeeping as a full-time occupation is not yet known in Tanzania. Traditional practices require little seasonal management, and the types of bee hives that have been introduced have not been appropriate. However, beekeeping is still a welcome proposition to a wide sector of the rural population.

The use of domestic utensils and space in the homestead for some beekeeping operations calls for maximum co-operation

among the family members. Beekeeping can promote good relations within a family, especially when older boys and girls can participate.

1.2 Prerequisites for beekeeping

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The successful beekeeper has to be familiar with factors which can influence beekeeping. The bees of the area must be studied in relation to their environment and compared with other strains in other countries. Naturally, bees well-adapted to the area are industrious and capable of being handled in man-made hives. They must also be able to react to changing conditions by adjusting their reproduction, migration, defence and other characteristics to prevailing conditions. For the most part they will reproduce modestly, be good foragers of nectar and pollen, be able to defend themselves against enemies, and have a highly developed instinct to store surplus honey.

Bees in Tanzania have the above qualities and are highly

prolific, vigorous and productive under the conditions existing in the country. They are also able to react to changing conditions and respond to food shortages by migrating from one area to another. They may even desert their nest if attacked by enemies. Since these bees are the best in Tanzania, beekeepers must adjust their methods of management to suit the bees.

The sources of nectar and pollen have to be understood clearly, so that the bee hives can be placed in areas where these sources are abundant. The flowering seasons must be recorded in order to ensure timely harvesting. This is important in the drier parts of the country, where the bees are apt to migrate upon the first sign of food shortages. They consume the stored honey and migrate. If the beekeeper is not familiar with this tendency, his enterprise will be most unprofitable.

The climate and its effects on nectar should also receive attention. It has been observed, particularly in drier regions, that a season of good rainfall is nearly always followed by one of good honey and bees-wax yields.

(a) Good rains enable small herbs to flower and produce nectar and pollen which the bees collect to feed themselves and the brood. As a result the bees are strong when they emerge during the main honey flow. As more bees will have been produced due to the presence of pollen, more nectar will be collected and surplus honey stored.

(b) Good rains will make water available to the bees for longer periods. The bees will therefore stay in the hives and concentrate on gathering food.

(c) If the ground water is near the surface of the soil it will increase moisture, which the plants use for the manufacture of carbohydrates. The carbohydrates are produced in the form of nectar in the flowers, which the bees collect and convert into surplus honey during the major honey flow.

Water is very important to bees, just as it is to other living

things. It is used by the bees to soften brood food and to cool the hives during hot, dry seasons. In areas where the water table is far below the ground surface, bees migrate during the dry seasons, and production of honey and bees-wax in those areas is low.

Hot, dry winds are conducive to heavy transpiration and therefore little nectar is available from the flowers. So the best condition for good nectar is when the air is warm, humid and calm. The minimum annual rainfall for reliable beekeeping has been found to be 30-40" (750-900 mm); when rainfall is below this level, even traditional beekeeping is very uncertain.

In the drier parts of the country like Dodoma, parts of Singida Region, the lower parts of Pare and Mwanga Districts, as well as the Dabil Ward of Bashnet Division in Babati District, rainfall may be below 30" (750 mm), and the beekeepers are compelled to drive out their bees during the harvest period. They know that the bees will migrate during the dry season and they have to wait for new swarms to occupy their hives.

The new swarms may fail to build up the strength necessary for the honey flow, so very little or no surplus honey will be stored. Only one of five years may produce a good harvest of honey in the low rainfall areas. But when rainfall exceeds 40" (900 mm), traditional beekeeping will flourish and modern beekeeping can be successful.

The beekeeper should also be familiar with the pests which may plague the honey bees. Knowledge of the threats to beekeeping will enable the beekeeper to take precautionary measures against them. In Tanzania, driver or safari ants are known to be a serious pest. They can destroy a very strong colony in a matter of minutes. In addition, the "brown-bellied" ants which are commonly found in hollow trees cause the bees to desert the hives whenever they enter the hives and rob honey and brood. Bush fires which are common after the rains are another serious cause of absconding.

Of all animal predators, the honey badger (*Mellivora capencis*) has proved to be the most destructive, particularly in the

miombo woodland areas. This animal, though very small, is extremely strong. It heaves out hives full of bees and honey, and using its claws and teeth, it breaks the hives with remarkable ease to reach the honey which it eats along with bee brood. The honey badger can destroy up to 50% of the hives in a season and has made some beekeepers give up beekeeping. Beekeepers who use hooked sticks to hang their hives experience fewer losses from this animal.

The market situation, as well as legislation pertaining to produce marketing, are important fields of study. When beekeepers can sell their honey and wax at a profit they strive to improve their beekeeping. This has been demonstrated in areas where the market for honey and bees-wax has been organised. The flourishing traditional beekeeping in Tabora and other districts in the western miombo woodlands is due to the presence of strong beekeepers co-operative. The beekeepers have always sold their honey and wax without difficulty and beekeeping in those areas has improved.

Successful beekeeping also depends on knowledge of traditional methods of collecting honey and bees-wax. This knowledge can provide a basis for improvement of these methods. The hives used by the beekeepers should be studied to determine how they can be improved and standardized. Modernisation should not be contemplated or initiated before this knowledge and improvement has been achieved. Handling bees in modern hives requires special skills which can only be obtained through working full-time on a modern bee farm, at least for one active season.

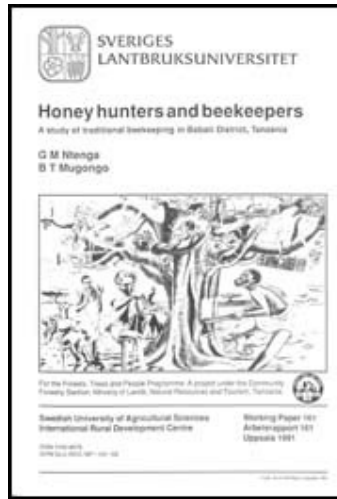


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2. METHODOLOGY

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This study started with a preparatory planning seminar, organised by the District Beekeeping Officer and the Forests, Trees and People Project Staff, for the Ward and Divisional Forest Officers. The Forest Officers later selected the leading traditional beekeepers who appeared for interviews and discussions.

The interviews were conducted under appropriate conditions and, during inspections of their hives, the beekeepers were involved in discussions which produced more information.

A survey of previous studies on beekeeping was undertaken so the consultant could learn about previous government efforts to encourage beekeeping.

A questionnaire (Appendix V) was used selectively during the interviews, depending on the level of the beekeepers' knowledge. On several occasions the interview sessions drew onlookers, villagers who were happy to share their experiences and comment on the beekeepers' remarks.

In rare cases such as at Duru, Endagwe and Mande, where the principal informants were Barabaig, and at Maganjwa and Utwari, where the beekeepers had not been to school, an interpreter was needed. One of the village leaders or someone from the group of onlookers interpreted.

Questions about the methods for making traditional hives and the nature of tools used were asked. The next priority was to determine how the traditional beekeepers attracted bee swarms to their hives and how they tell whether or not honey is ripe and ready for harvesting. The method and containers used for harvesting honey, as well as the traditional uses of honey, were of particular interest. After they had clearly understood the purpose of the interviews, the informants apparently enjoyed

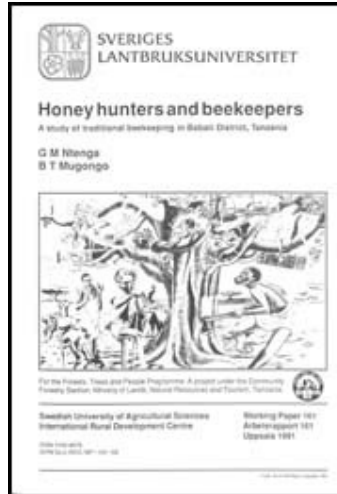
supplying information.

In most cases interviews were conducted in the open and visits to apiaries and examinations of bee hives and other implements were made. Practical demonstrations of honey harvesting were not possible, because the harvest season had just ended.

The consultant was able to visit Hanang District where he inspected bee houses used by the Nyaturu at Mramba Village.

Traditional beekeepers everywhere in Tanzania are extremely distrustful of any form of government intervention. In Babati District, where such interventions are practically unknown (except in a few isolated cases such as in Bonga, Gidas and Quash), the consultant met with such suspicion that it took some time to reassure the beekeepers that only information was asked of them. This affected the sequence of questioning considerably. The question of "how many hives" the beekeeper possessed soon became irrelevant, as he would first say a small number and then, when he was more confident of the consultant, he would give a larger number. However, he never

would say the true number of hives he had. Responses to the question of annual harvest were similarly unreliable.



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3. NOTES ON BABATI DISTRICT

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Babati is situated in Arusha Region of north-central Tanzania

(Fig.1). The District is divided into four administrative units, Babati, Bashnet, Gorowa and Magugu Divisions, which are further divided into 21 wards made up of 81 villages (Fig. 2). The district covers 606,929 km² with most parts situated in the Rift Valley between 1,000 and 2,000 metres above sea level. The district is bordered on the east by Kiteto District and by Monduli District to the north. To the north-west, west and south it is bordered by, respectively, Mbulu, Hanang and Kondoa Districts.

The population of the District was estimated at approximately 208,000 in the 1988 census. The main ethnic groups are the Iraqw and Gorowa, agropastoral people of Cushitic origin, and the Bantu speaking Mbugwe, Irangi and Nyaturu. The Hamitic Maasai and Barabaig who practise a pastoral mode of production also live in the area. In addition to these groups, people from the high-potential areas of Arusha and Kilimanjaro and the drier areas of the south migrate to the area.

Two rainy seasons prevail in the district: the short rains lasting from October to December and the long rains from February to

May, accounting for an average annual rainfall of 750 mm. The wettest areas may receive up to 1200 mm, while the driest may get below 500 mm rainfall each year. The temperature averages 23.5°C, with the highlands being much cooler.

The major economic activities are agriculture and livestock husbandry. Thirty per cent of the district is suitable for cultivation, with potential irrigation on about 12,000 ha in the Kiru Valley, of which only about 2,000 ha are utilized. Both small-scale and large-scale commercial farming are practised. Large-scale farming occurs in the Kiru-Dareda Valley and Magara areas, now still on lease. The main cultivated crops are maize, sorghum, beans, pigeon-peas and wheat.

Cash crops include groundnuts, sunflowers, cotton, sugar-cane and coffee. The district enjoys self-sufficiency in food production with surplus available to supply to other districts.

Livestock husbandry is the next most important economic activity, accounting for about 457,000 head of livestock. The district, however, is infested with tse-tse flies, *Glossina sp.*,

which spread sleeping sickness to humans and trypanosomiasis to cattle which causes the loss of about 600 head of cattle annually.

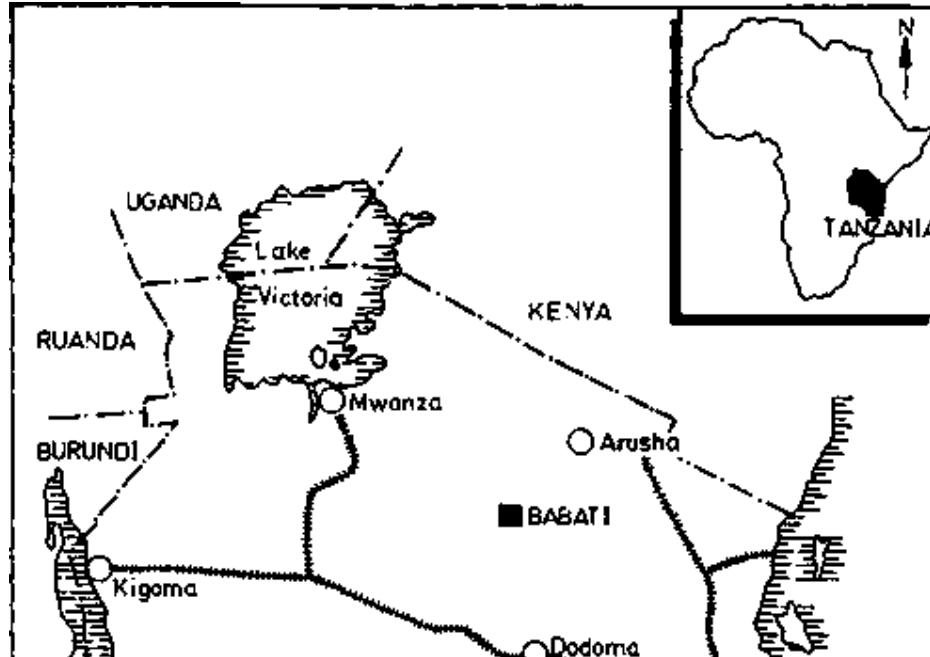
Methods of controlling the tse-tse fly include brush-burning, which not only drives off the insects but also destroys regeneration and causes honeybees and other useful insects to migrate. In the 1970's, attempts were made to spray the infested areas, particularly Magugu, with Thiodan. It is not clear why this scheme was discontinued. Probably the effect of Thiodan on other insects was found to be serious. The district plans to resume the spraying programme in the near future.

Since agriculture is expanding rapidly, the traditional grazing lands of the pastoralists are being utilized for cultivation, and the pastoralists are being forced onto marginal land.

The main types of natural vegetation may be divided into mountain rain forests, miomba woodlands, wooded grasslands, Acacia-Combretum-Cornmiphora bush/shrublands and grasslands. The Acacia-Combretum-Commiphora

bush/shrublands and miombo woodlands are predominant (Fig. 3).

The forested areas of the district have not yet been surveyed, but the reservation forests consist of about 40,525 ha while national parks account for about 111,000 ha.



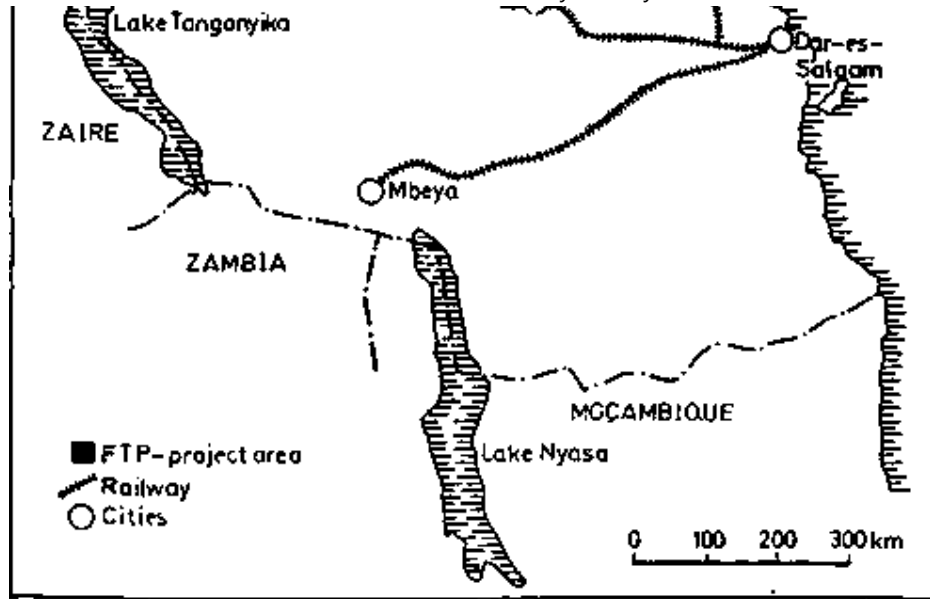


Figure 1. Map of Tanzania.

**BABATI DISTRICT
ADMINISTRATIVE BOUNDARIES**

LEGEND
— District boundaries



- Divisional boundaries
- Lakes
- Major roads
- Minor roads
- District center
- Division centers
- Other important village centers

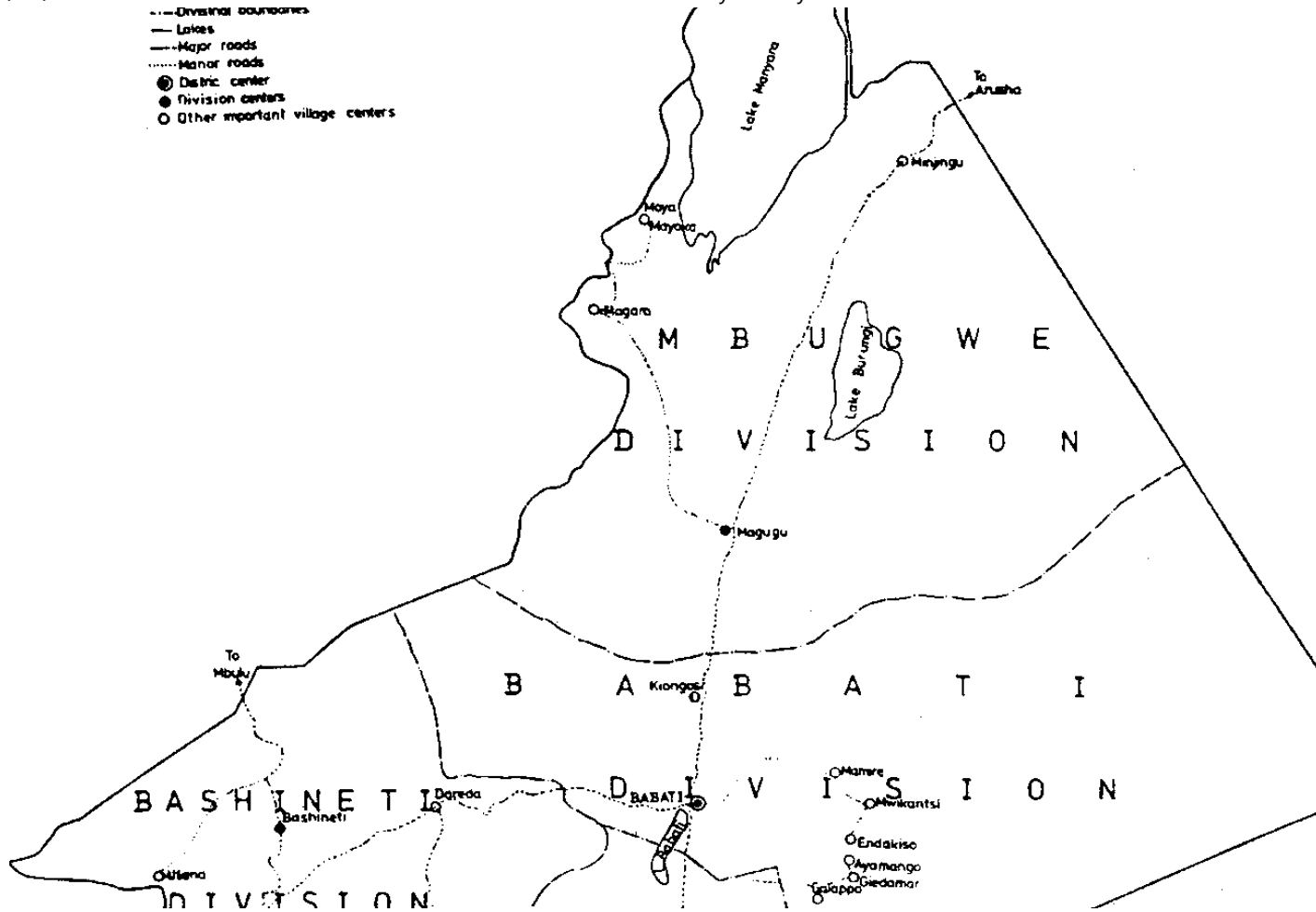
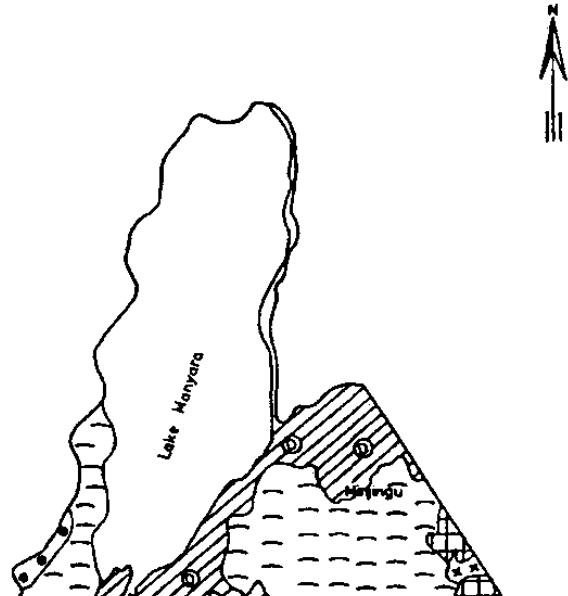







Figure 2.

NATURAL VEGETATION
OF
BABATI DISTRICT

LEGEND	
	MOUNTAIN RAIN FOREST
	POOMBO WOODLANDS
	BORASSUS-CORDIA-CROTON-ACACIA XANTHOPLOEA-POLYCANTHA-SIBERIANA GROUND WATER WOODLANDS/WOODED GRASSLAND
	COMBRETUM-HYPHANTHEMIA WOODED GRASSLAND
	ACACIA KIRKII-MELLIFERA-NILOTICA-LANNEA HUMILIS BUSH/SHRUBLAND
	ACACIA TORTILIS-COMMIPHORA BUSH/SHRUBLANDS
	ACACIA DALBERGIA-EUPHORBIA-GREWIA-LANNEA BUSH/SHRUBLAND
	RHUS-DODONEA SHRUBLAND
	PENNISETUM MEZIANUM GRASSLAND
	PENNISETUM STRAMINEUM GRASSLAND
	CYPERACEA SWAMP



	DIPLACHNE FUSCA-CHLORIS GAVANA-OEISSA
	IAEGERI-SPOROBULUSSP GRASSLAND
	PRUTEA GRASSLAND

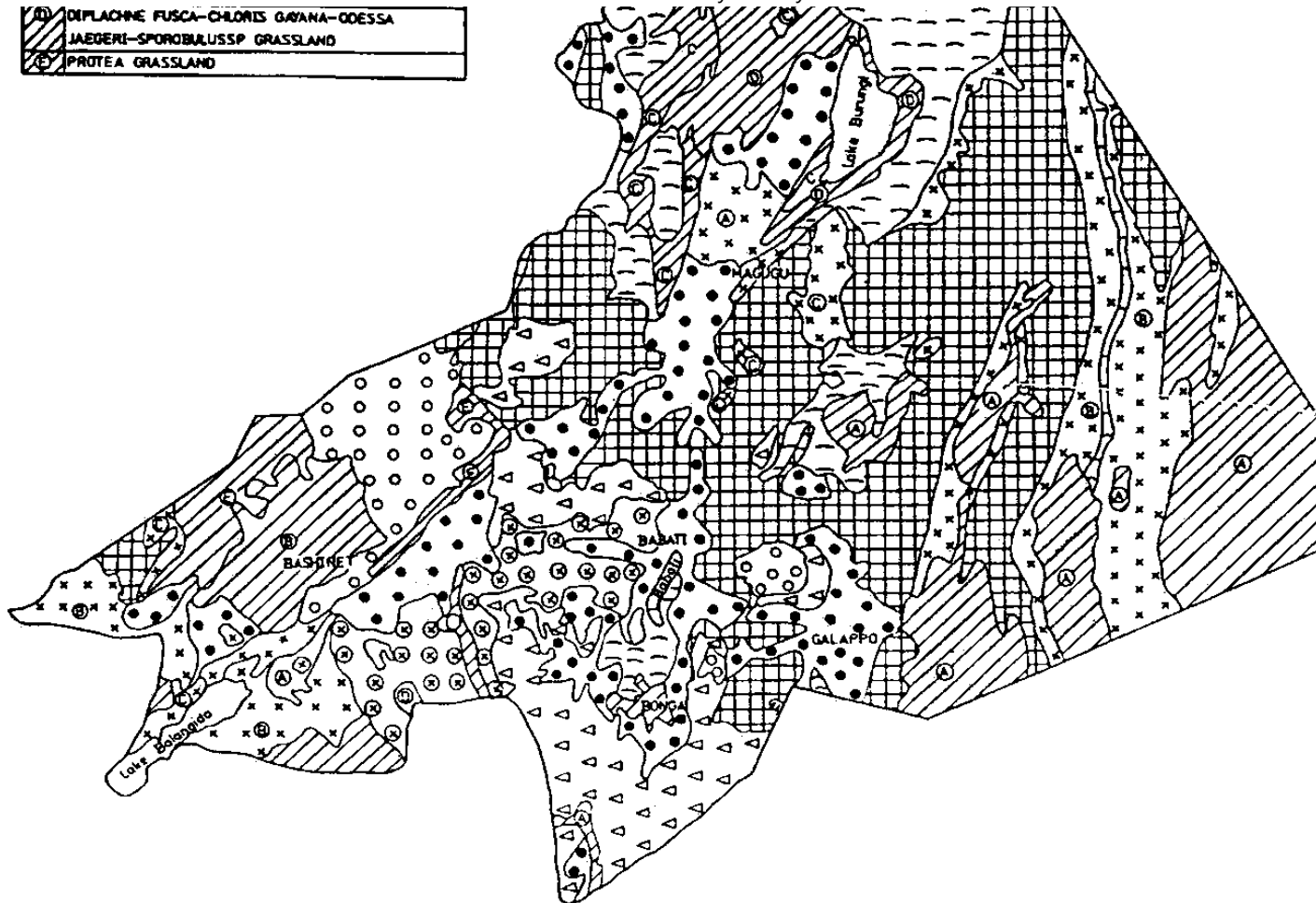
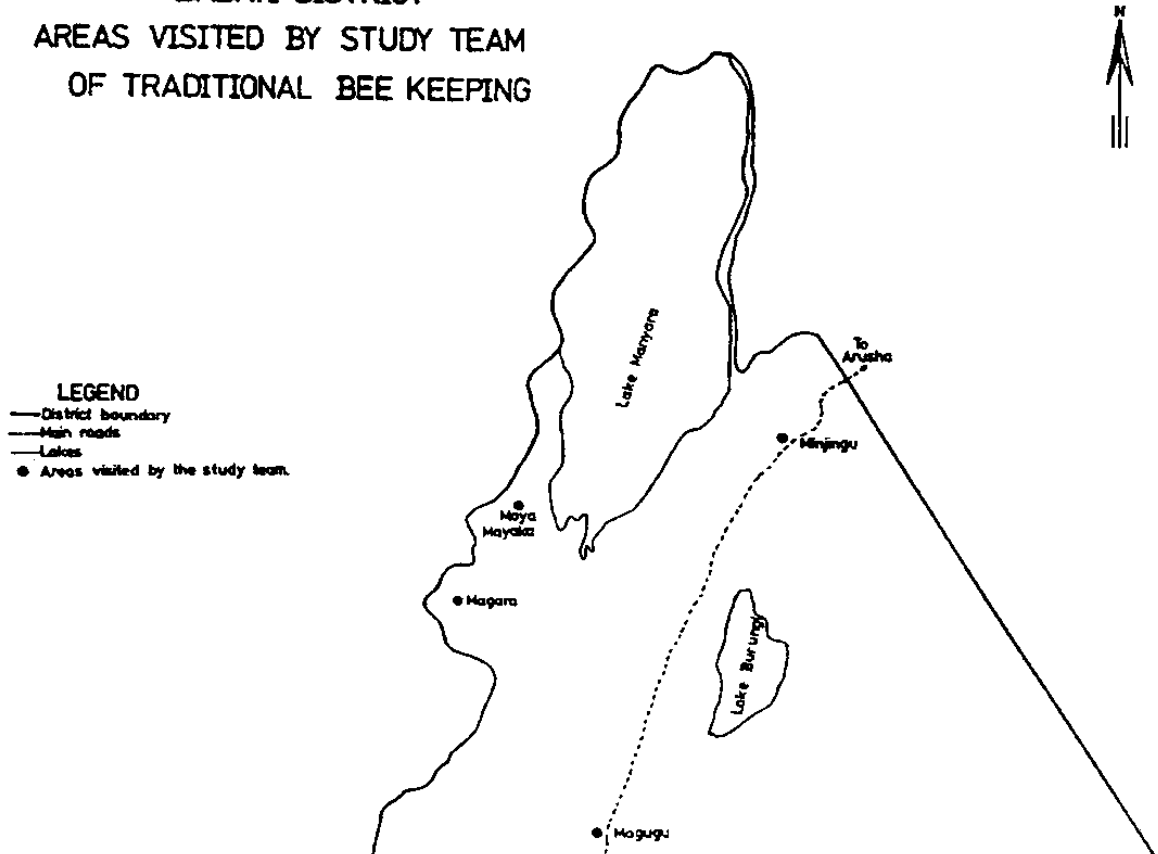


Figure 3.

BABATI DISTRICT AREAS VISITED BY STUDY TEAM OF TRADITIONAL BEE KEEPING



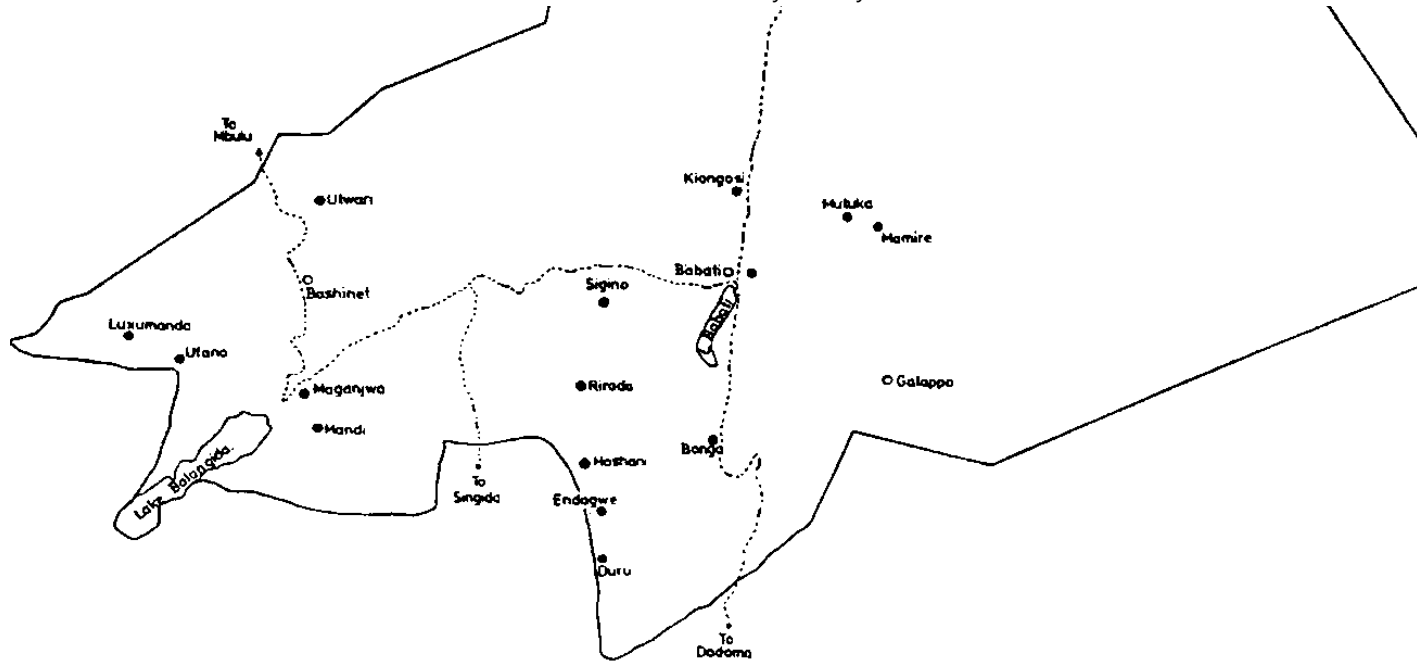


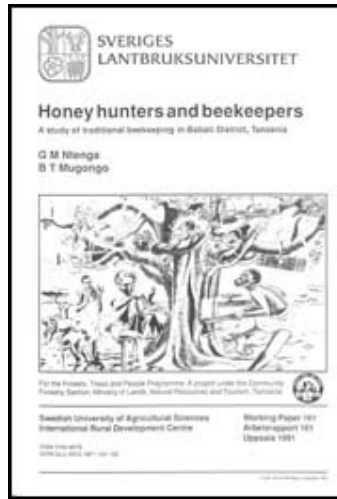
Figure 4.

F. LYIMO 1988





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4. TRADITIONAL BEEKEEPING IN BABATI DISTRICT

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4.1 The honevbees of Babati District

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The honeybees commonly found in Babati District are the popular *Apis mellifera scutellata*. They are known to be vicious and aggressive, becoming more docile in the higher zones of the district. Beekeepers at Bonga, Sigino and Utwari reported broad, black bees, suggesting the presence of the *monticola* species. *Monticola* bees were not reported in hives, but were usually encountered in hollow trees and were not aggressive.

Migration of bees is common in July, August and October in Sigino area, mostly from the caves in the Bohong Gitzimi - a depression which is reserved by the Iraqw for traditional worship and remembrance of the dead.

Mount Hanag is believed to harbour a lot of bees, which start migrating to other areas in February.



Figure 5. A worker bee collecting honey and nectar.

At Mamir village bees are seen to migrate from the Qaraa mountains in the south towards the Tarangire National Park in the north, during November and December. The bees return in March and April, when the sunflowers are in full bloom.

Reproductive swarming occurs in September. Poor handling of the bees during harvest time may cause absconding, which is commonly experienced between July and September.

In 1987 there was a marked scarcity of bees around Mamire and Mutuka, a condition attributed to dry conditions in the area. Generally, hives are readily occupied by bees as soon as they are sited. *Daari* may be practised in some areas - a curse to prevent bees from occupying hives in a given area. *Daari* was reported by interviewed beekeepers at Mutuka. To reverse the effect of *Daari*, the tribe tries to determine who has cursed the hives, using the same method as that used to find a thief (see 4.10) The culprit receives the same punishment as a thief.



Figure 6. A beekeeper making his own loghive using an axe and an adze.

4.2 Making the traditional hive

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A traditional hive is made using two principal tools, the axe and the adze. The axe is used to cut the log into the appropriate length. The log is usually carried home where it is split into two parts. The axe is needed to make some slits along the middle of the log. Three or more slits are needed, depending on the length of the log and the hardness of the wood. Wooden wedges previously prepared or, if the beekeeper can afford them, axe blades are inserted and hammered into the slits with a mallet. The mallet is actually a club made from a tree branch; it is rounded and heavy at one end. After the log has been split, the parts are hollowed out using the axe. Then the adze is used to smooth the inside. About 10-15 cm of the wood is preserved at each end, so that when the two halves of the log are rejoined the ends will be completely sealed.

Beekeepers attempt to split the log into two equal parts, but if one part is accidentally made larger than the other, the Gorowa,

Iraqw, Rangi and Nyaturu are not dissatisfied. (The Arusha and Meru beekeepers deliberately try to make one part of the hive larger than the other). The part which looks larger than the other is always placed on top of the smaller part when rejoining them to form a hive. According to Omari Ikua of Moyamayoka, the upper part is called *iyu* (female) and the lower part *tatra* (male) by the Nyaturu. The other tribes consider the upper part as male and the lower part as female.

The hive is always cylindrical. The size of the "standard" hive is one and a half forearms, i.e. the beekeeper uses his forearm to measure the length of the hive. This should measure approximately one meter. The inside diameter varies from 30 cm for a standard hive to 60 cm for an extra large hive.

The hives of Idi Ali of Mamire measured 90 cm in diameter, while those of Oye Sella at Kiongozi were 170 cm long and 60 cm in diameter. The reasons for making such big hives were to allow for bigger crops and to avoid the necessity of making more hives when suitable trees are scarce.

After the hive has been completed, an opening, *afkumaringi* (Iraqw and Gorowa), is made through the centre of the hive by notching both parts of the hive. The opening varies with a minimum of 15 cm by 8 cm and may be rectangular in shape. Through this opening the beekeeper collects the crop. When asked whether such an opening is big enough to allow a full sized comb to be taken out intact, the beekeepers said that they normally cut the combs into pieces which can easily be removed. The opening is provided with a wooden cover, *ghambari* (Iraqw), specially made to fit over the opening. One end of the *ghambari* is inserted into the opening and held in position by the rim and the other end is secured by a peg. The cover is perforated with holes which allow bees to pass through. The number of these perforations may vary from seven to twelve.

Most hives made by the Rangi do not have a harvesting gate. At harvest time the hive must be opened to expose the honey comb.

It takes about three days to make a standard hive and five days to make a large hive. Dead logs are preferred for making log hives, probably because they split more easily than the green ones.

Some of the trees most favoured for hive construction are listed below:

<u>Local Name</u>		<u>Botanical Name</u>
Dunkta	(Gorowa)	<i>Acacia magnii</i>
Narilai	(Iraqw)	<i>Acacia xanthoploea</i>
Amafugwi	(Gorowa)	<i>Acacia polyacantha</i>
Mpongo	(Sandawe)	?
Moi	(Gorowa)	<i>Albizzia versicolor</i>
Tlahmo	(Iraqw)	<i>Acacia sp.</i>
Walooi	(Barbaig)	<i>Brachystegia spp.</i>
Hewasi	(Gorowa)	<i>Brachvsteaia sp.</i>

Nyimo	(Iraqw)	?
Mpome	(Swahili)	<i>Commiphora africana</i>
Mringaringa	(Chagga)	<i>Cordia abyssinica</i>
Mkuyu	(Swahili)	<i>Ficus sp.</i>
Kavilia	(Swahili)	<i>Grevillea robusta</i>
Danusu	(Rangi)	<i>Kigelia aetiopica</i>
Mhinga	(Swahili)	<i>Pterocarpus angolensis</i>
Amy	(Gorowa)	?
Simeh	(Barbaig)	<i>Albizia petersianana</i>

At Sigino village, gourds and even a plastic pail had been placed in shrubs. Some of the gourds and the plastic pail had bees in them. The beekeepers there desperately need hive-making materials. Sigino village is more or less completely deforested according to Eliafoo Kimu, one of the interviewed beekeepers.

The scarcity of logs for hives began to be felt in 1975 and since then the beekeepers have practically stopped making new hives. This is probably the only area where other types of hives, particularly the plank and transitional hive, can be successfully introduced. The use of the mud and wattle type of transitional hive could first be tried here, before introducing it to other areas of Babati District. Furthermore, log hives made out of Minyaa, *Phenix reclinata*, could be drawn from the Magugu/Minjingu area where stands of this tree are numerous.

An intensive tree planting programme should be launched in Sigino, in order to provide hive-making materials. *Grevillea robusta* is one of the fast-growing tree species and is known to be suitable for hives. This species should be preferred to any other tree species for planting in Sigino.



Figure 7. A broken bucket and an old sack can be made into a beehive.



Figure 8. This beehive is made from a gourd.

4.3 Baiting and siting the hives

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Baiting hives to attract swarms of bees is a common practice among traditional beekeepers. In areas where bees-wax has been known for many years, it is considered the only genuine baiting material. In other areas, other materials are used, but the most common material mentioned and exhibited by many beekeepers during the study was a small herb of the Labiatae family, *Ocium suave*. This plant grows wild in the fields, particularly around homes and in those fields which have either been abandoned or left fallow. When its leaves are taken and rubbed between the fingers, a very strong scent is emitted, *moi*. This is the herb used by most beekeepers in Babati District. The plant is usually uprooted whole (as it is often small) and its leaves are rubbed against the inside walls of the hives. After this operation, the remains are placed underneath the cover of the harvesting gate and left there permanently. The plant is popularly known as *Moyangw* or *Sorryangw* by the Gorowa and Iraqw people.

There are a few beekeepers (like Ali Shaushi) who do not bother to bait the hives at all. Ali claims that bees will always occupy

unbaited hives. A common belief, however, apparently substantiated, is that baited hives are more readily occupied than unbaited ones.

Beekeepers who use more advanced techniques, like Oye Sella of Kiongzi and Iddi Ali of Mamire, probably use bees-wax to bait their hives. To bait his hives, Sella begins by drawing parallel lines in charcoal on the inside wall of the top part of the hive. Then he uses bees-wax to trace the charcoal lines. He makes sure that the distance between the parallel lines is even throughout the length of the hive and he claims to be familiar with the natural comb spacing of the bees, (3.2 cm). The parallel lines may be drawn across or lengthwise, but he prefers drawing them across, because it is easier to handle combs built this way. The bees will always follow the lines when building the combs.

Iddi Ali does not use charcoal but bees-wax to draw lines obliquely across or lengthwise. He prefers drawing them lengthwise because most of his hives hang vertically, which

induces bees to build their combs vertically even in unbaited hives. Salim Swaleh of Babati uses a twig of an epiphyte which grows on the *Waara* (Sandawe) tree, *Dombeya schupangae*. The twig is placed in the hive and left there. It is believed to attract bees and induces them to produce a lot of good-tasting honey. Daudi Mattayo of Magugu village uses the remains from traditional beer brewing to bait his hives. He rubs the inside of the hives with these remains and claims that his hives always receive swarms immediately after siting. He also uses the labiate herb *Ocimum suave*.

Baiting hives is such an important issue that some beekeepers tend to go to extremes by using strange substances. Traditional baiting is analogous to the modern use of comb foundation. Comb foundation is made of bees-wax in the form of a sheet, with the cell impression embossed on the sheet. Comb foundation plays the same role as the traditional baiting of the hives with bees-wax. But the modern beekeeper seeks other advantages when he uses the foundation. He hopes to encourage the bees to build combs speedily, to encourage the

bees to build combs with even cells, to ensure that the combs are straight and strong and to prevent the bees from producing too much wax for comb building.

In traditional circles, any material which is not harmful to the bees and beekeeper, but is capable of attracting bees into hives, is just as good a bait as comb foundation.

After the hives have been baited, they are ready for siting. Most beekeepers of the Iraqw and Gorowa tribes prefer perching their hives between forked branches in trees. This is logical, considering that the hives have openings for harvesting. If the hives have to be hung, they are secured horizontally. But the Irangi beekeepers who use hives without the harvesting opening hang them vertically. A hooked stick is attached securely to the hive with rope from *Acacia* trees and hooked to a branch in a tree. The hives may be sited in tall trees or in short ones, depending on the availability of such trees. In extreme cases, like around the Sigino village where trees are hard to come by, the hives may be sited in bushes or other

places.

While siting the hive, the Gorowa and Iraqw beekeepers utter some words to call in the bees, "Come without delay, all the bees from Mount Hanang. This year should not elapse, come without delay," or "This is the main house; bees, come."

While uttering these words, the beekeepers drum the hive with their hands or with dry sticks from the branches of the tree in which the hive is being placed.

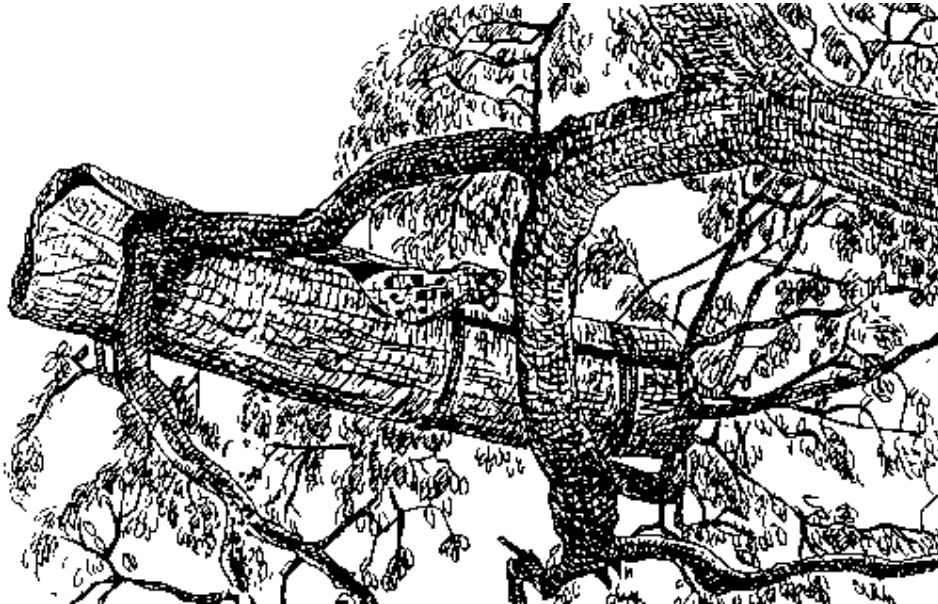


Figure 9. A log hive with harvest opening sited in a tree.

4.4 Honey plants of Babati District

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During the field work it was found that the beekeepers have some knowledge of important honey plants. The following list

was given by the beekeepers who were interviewed at different places.

<u>Local Name</u>		<u>Botanical Name</u>
Mgunga chuma	(Swahili)	<i>Acacia albida</i>
Mtakaiko	(Nyaturu)	<i>Acacia seyal</i>
Narilai	(Iraqw)	<i>Acacia xanthoploea</i>
Tshmu	(Iraqw)	<i>Acacia tortilis</i>
Mkunungu	(Irangi)	<i>Acacia sp.</i>
Tlahemo	(Iraqw)	<i>Acacia siberiana</i>
Mpangwe	(Nyaturu)	<i>Bidens pilosa</i>
Hewasi	(Gorowa)	<i>Brachystegia spp.</i>
Gendamo	(Iraqw)	<i>Combretum zeyheri</i>
Mlandala	(General)	<i>Combretum goetzei</i>
Gutaati	(Iraaw)	<i>Dombeva rotundiflora</i>

Mattar	(Iraqw)	<i>Hoslundia opposita</i>
Alizeti	(Swahili)	<i>Helianthus annuus</i>
Mofumbu	(Nyaturu)	<i>Julbernardia globiflora</i>
Kungungu	(Nyaturu)	<i>Kigelia africana</i>
Mwembe	(Swahili)	<i>Mangifera indica</i>
Harii	(Irangi)	<i>Rauvofia caffra</i>
Msis	(Nyaturu)	<i>Tamarindus indica</i>
Mbuku	(Irangi)	<i>Terminalia mollis</i>
Mtukutu	(Swahili)	<i>Veronia colorata</i>
Ankway	(Gorowa)	<i>Microglossa oblongifolia</i>
Kantsi	(Gorowa)	?
Batlaa	(Gorowa)	?
Mkitakita	(Nyaturu)	<i>Harrisonia abyssinica</i>
Mnangana	(Nyaturu)	?

When Mbuku, *Terminalia mollis*, is in full bloom, people in the village at Mamire develop the flu and sneeze frequently, but the honey from this tree is pleasant and not harmful, according to the beekeepers at Mamire. Another peculiar phenomenon regarding *Mnang'ana, Grevia sp.*, is that when it is in flower the bees in hives become extremely vicious. This was reported by beekeepers at Diloda in Hanang District. Both plants are important nectar sources, responsible for the minor honey flow between December and February.

The flowering season is generally associated with the beginning of the rains and the end of the rainy season. The main honey flow therefore occurs between April and June in most areas, but may occur as late as July and August in areas like Hoshan and Moyamayoka. The end of the flowering season invites the harvest period which takes place from July and August through September and October. The flowering season for the minor honey flow occurs from October to December and January, and this honey may be collected in February and March.

4.5 Colony management

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In traditional beekeeping there is no systematic seasonal management similar to that practised by modern frame hive beekeepers. In modern beekeeping seasonal management starts with cleaning the hives and providing them with new comb foundation or drawn comb, feeding the weak colonies or uniting them, replacing old queens with new ones, shaking swarms and rearing queens. The bees must be inspected after every nine to fourteen days for diseases and other abnormalities such as pest attacks, swarming must be monitored and finally, general supervision practices and harvesting are carried out. Such details are absent from traditional beekeeping.

The traditional beekeepers, however, know that better production is achieved when the colonies are shaded and are within reasonable proximity to water sources. They know that if ants or wax moths attack the bees, the bees will abscond. It is common to find some wild animals of the civet family, Garangw

(Iraqw), in hives before the bees, or bees may just confine themselves to one corner of the hive if this animal is present. The traditional beekeepers are aware of such possibilities and therefore inspect their hives to remove the "nests" of this animal and to clean and rebait the empty hives. A few weeks before harvest time, the hives may be inspected to see which of them can be harvested.

Oye Sella has gone further. His large hives are harvest every other year, and every February he inspects them, removing one or two combs of honey and brood in order "to encourage the bees to build more combs, raise more brood and store more surplus honey." This is one of the most interesting aspects of beekeeping management the study could find, which challenged further investigation and verification.

4.6 Harvesting

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It has been observed that the main honey flow in Babati District

occurs between April and June, with a minor honey flow taking place between November and January. The traditional beekeepers know these seasons and the plants responsible for the annual honey crops which they get from their bee colonies. The end of the flowering season marks the beginning of the harvest time, which starts in July, stretching to September for the main honey crop, and again from February to March for the lesser honey crop.

When the last of the flowers on the main honey plants have withered, the beekeepers know that ripe honey is ready for harvesting. Other indications are when the hum of bees in the fields has stopped and when the bees show signs of congestion in hives and are seen clustering outside the hives during the day and at night Still other indications are that large quantities of propolis are seen around the hive entrances, as well as around undesirable openings and cracks, and the bees fly slowly. Such bees may miss the entrance and tumble in a drunken manner and others may be seen grappling with each other playfully. At this time the slightest disturbance will arouse them into

unanticipated aggressiveness.

Beekeepers who prefer large hives have a reason for maintaining smaller ones. They use the smaller hives to ascertain the presence of ripe honey by harvesting from them first. Some beekeepers who hang their hives on a slant, like Saidi Msuya of Magugu, will be sure of ripe honey when the hives have shifted to a level position. According to Hassan Mgwali of Diloda, beekeepers go out early in the morning to feel the weight of a number of hives before starting to harvest.

Other beekeepers use small sticks which they dip into the hive through the harvesting door to pierce the combs. The stick is dipped first in one end of the hive and then in the other. If the stick is wet with honey, then it is time for harvesting.

It is clear that the traditional beekeepers use many indicators to determine the time for harvesting, just as the modern frame hive beekeepers peer into the supers to see if the bees have filled them with ripe honey.

Once they are sure that a honey crop can be harvested, they prepare for the harvest by taking with them the following items:

- A climbing rope, which is also used for lowering the hives to the ground if necessary. This is often made of sisal fibre and is strong and thick enough (about 2.5 cm in diameter) to stand the weights of the hives and the beekeepers. The Iraqw have a special name for the rope, *hima*, while the Nyaturu call it *ibagha*.**
- A wooden trough, about 60 cm by 30 cm, called *soli* (Nyaturu) or a specially made skin container the size of a bucket (20 l.), called *utafali*, or a wide brimmed *qwalmo* (Iraqw) made by cutting the top third of a gourd is used to receive the honey comb from the hive.**
- A smoker, *qanqari* (Iraqw), which may be made of wooden splints tied together in a bundle, a piece of sisal pole, the fruit of *Kigelia africana*, or *dororo* (Iraqw) and epiphyte commonly found on *Brachystegia microphylla*. Even castor oil plants (*Ricinus communis*) may be used.**

A small brimmed gourd may also be taken if the honey comb is to be broken into small pieces at the harvesting site. This is normally used for storing honey, and as soon as it is filled, it is covered and sealed with cow dung mixed with ash.



Figure 10. A traditional beekeeper prepares for harvesting

honey and bees-wax.

Harvesting begins at dusk and continues until late at night. The beekeeper, often with an assistant, lights the smoker, strips off his clothes and climbs the tree in which the hive is located.

A fire may be made at the foot of the tree, but this is not necessary when harvesting is done in the tree.

The beekeeper opens the harvesting door and blows smoke into the hive. The bees run off the combs, allowing him to break them with his bare hands. He puts the harvested honey combs in the harvesting container which, when full, is lowered to the ground using the rope. The assistant receives the container and starts breaking the combs into small chunks, then he transfers the chunk honey to a special storage gourd, dahngw (Iraqw). While harvesting, the beekeeper makes sure that only smoke reaches the bees and should the smoker burst into flames, the fire is put out by rubbing the smoker against a branch of the tree.

The beekeeper uses several methods to keep the bees from stinging. He may take one comb of honey, break it into two pieces and place one on each tip of the hive. The bees gather on these pieces of combs to try to rob the honey. The beekeeper will then be free to harvest. The beekeeper may also smear the back of his head with honey to attract the bees. His arms and body may also be smeared with honey so that the bees concentrate on sucking the honey while the harvest is done. After harvesting, the remaining bees are shaken off and he walks away without being stung too much. Most beekeepers become immune to stings after a couple of days, others bathe in hot water when swelling occurs.

The harvesting procedure is the same for hives which have to be lowered to the ground, except that a fire has to be made at the foot of the tree to provide light and smoke to control the bees. However, when harvesting is carried out deep in the forest, a fire may be necessary in both cases to ward off dangerous animals.

Many beekeepers appreciate the fact that bees will stay on in the hives if they have enough food. They therefore make sure that some brood, nanagi (Iraqw), and pollen, tlaqsi (Iraqw), are left in the hive with two or more combs of honey. In the drier parts of the district like Dabil, where the beekeepers know that bees must migrate during the coming dry season, all the honey combs are removed. Brood may also be taken out for consumption, as it is said to prevent the drowsiness caused by eating large quantities of honey.

The amount of honey taken from traditional hives varies considerably from one area to another, even among different beekeepers, all depending on the capacity of the hives. Small hives in favourable years can produce 2 1/2 to 5 l, medium-sized hives can produce anything up to 20 l. The large to extra-large hives are reported to produce 20-60 l. in good seasons.

In places like Dabil, where honey is harvested frequently as three times per year, the yields may be well below 2 l. per harvest. The frequent harvests are influenced by the large

demand for honey in the area.

It is generally acknowledged, however, that production from a hive depends very much on the time of harvesting, climatic conditions, vegetation, water and the amount of time the beekeeper is prepared to devote to maintaining the bee-colonies. Some of the practices necessary for successful beekeeping are set out in Appendix 6.3. These are well-known to many traditional beekeepers.

Some of the traditional beekeepers have not learned when to harvest. One informant from Kiongozi complained that he gets very little from his hives. When asked when he collects his honey, he said in April, contrary to the normal harvest period in the area. July - August or February - April are the months when the flowering seasons begin and the bee start preparing for the honey flow.

The frequent harvests in Dabil indicate a similar lack of knowledge. In the drier parts of Bashnet, honey harvesting is done just once, between July and September. This clearly

demonstrates the importance of knowing the main honey plants and the prevailing conditions.

4.7 Marketing

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After the beekeepers have collected honey from their beehives, they store it until people want to buy it.

Principal buyers in most areas of Babati District are the Barbaigs who use honey in their numerous traditional ceremonies. Since the Gorowa and Iraqw people maintain traditions very similar to those of the Barbaigs, they also buy honey from the beekeepers. In all villages studied, it was reported that the demand for honey is almost insatiable, and at Ufana in Bashnet Division, honey from Singida Region is regularly imported into the area. It was said that the traders from Singida deliberately mix honey with an equal volume of sand to exploit the market situation.

The extent of this market is well known, as shown by the following excerpt from a letter by the former Chief Field Officer, Tabora, to the Commissioner for Ujamaa Villages, Dar es Salaam, in 1970:

"We have recommended that the production of crude honey (honey with combs) be given encouragement where its production has developed into a tradition. The market for this honey exists in Northern Tanganyika and Kenya. But in the event of the market being saturated, we would have to consider setting up refinery plants at certain centres..." The letter also implies that when the beekeepers are reluctant to separate honey from wax and render the latter into marketable bees-wax, the promotion of beekeeping should continue with a view to saturating the crude honey market.

This would then pave the way for production of the valuable, foreign exchange-earning bees-wax from these areas, including Babati District.

The prices for crude honey vary considerably with the

containers. Retailing gourds of 2 1/2 l. may fetch between 300-500 TSh. The 5-litre gourd is priced at about 100 TSh. The debe or the 20-litre gourd is the wholesale container and fetches 2,500 -4,000 TSh.

Cases of selling 20 litres of honey at between 6,000-8,000 were reported at Hoshan. The prices are negotiated with the beekeepers, and fluctuate according to season and the business acumen of the beekeeper.

The market for clear honey also exists in urban centres. Marios of Magugu markets his honey for 300 TSh/300 gr at Arusha and it sells very fast. Tabora honey which is packed by G-F Dewji in Arusha could be seen in some stores in Mbulu Township. Honey is apparently in high demand even in Babati township itself. A 500 gr honey jar will readily sell at 100 TSh.

Beekeepers are eager for instructions on how to prepare beeswax. Some beekeepers who have visited Kondoa and Dingida village areas have seen their fellow beekeepers preparing the product, but they regard the process as one requiring special

skills.

At Bonga it was learnt that a beekeeping instructor used to advocate the separation of bees-wax from honey and taught how to prepare clean cakes of this product some twenty years ago. Since this instructor "disappeared" no one else has demonstrated the process.

In the 1960's, a campaign was launched in Arusha Region to salvage bees-wax from the remains of traditional beer brewing. In his report of 3 October 1969, J. Sawe, former Assistant Field Officer for Arusha Region, said: "TSh. 280/kg were realised at Katesh from bees-wax salvaged.... The Barbaigs are not beekeepers but are fond of beer made out of honey."

This was a last resort effort, made after realising that the traditions of the Barbaigs required wax to be present in honey, because the bees-wax fortified the beer and was the only sure indication that the honey was genuine. Such beliefs are now disappearing and the Barbaigs are reportedly accepting clear honey. The way is therefore open for building up a market for

both honey and bees-wax. At Diloda in Hanang District, where the beekeepers prepare bees-wax for sale, it was reported that the price of bees-wax at Singida was on the order of 260 TSh. per kg.

Babati Township is the main trading centre, and lies on the Great North Road, linking it with Arusha to the north and Dodoma to the south. Babati Township can also be reached from Singida to the West by an all-weather dirt road, which branches off at Dared to reach Mbulu Township through Bashnet Division. Most villages are connected to the main road by several seasonal roads and tracks, which can easily be upgraded to all-weather status, particularly those used by the settler farmers in the Kiru-Magara Valley. Transportation of honey and bees-wax in Babati cannot be said to be difficult. The use of bicycles may be limited by the hills surrounding some villages like Sigino, but donkeys in those areas offer an alternative means of delivering the goods to the nearest village or main road.

4.8 The hazards of beekeeping in Babati District

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There are several hazards which threaten the beekeepers and the honeybees. The honey badger, *Mellivora capensis*, or *Kalambeitu* (Gorowa and Iraqw) ranks high on the list of more serious hazards. It was reported to have caused the decline of beekeeping at Minjingu village, where its persistent raids on bee colonies have induced the beekeepers to abandon beekeeping and turn to other economic activities.

The badger can climb trees and push down hives from between forked branches where they may be lodged or lift hives hanging from hooked sticks, dropping them to the ground. Such hives inevitably break, exposing the bees and the honey comb. The animal then climbs down to the broken hives and, allegedly, blows his foul wind at the bees, killing them instantly! Some other observant beekeepers reported that when the animal turns his hind quarters towards the hives, he flings the tail at the bees. The bees then get caught in the dense hairs of his tail and the badger throws them aside to clear the honey combs.

This action may be repeated several times and the badger may be stung many times, which explains the mass of dead bees found after such raids.

These reports are obviously open to further investigation. But Musa Maimu (1982) supported the first observation when he stated that the honey badger is a very fierce animal which likes to bite the teats and male organs of fighting animals and that he kills bees when he passes gas. The honey badger invariably leaves behind a malodorous smell and a large number of dead bees at the site.

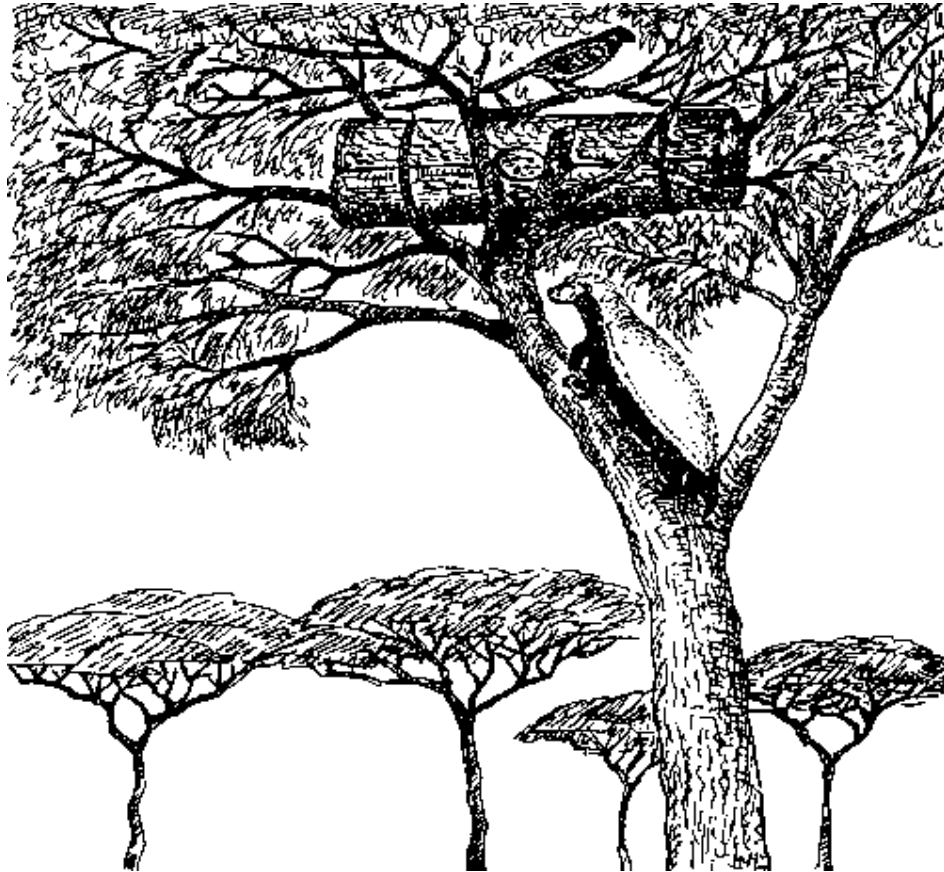


Figure 11. A honey badger approaching a loghive.

Since the honey badger usually raids hives at night, his biology and behaviour are rather difficult to observe. Beekeepers who have encountered him during the day have always reported similar actions and because of the scanty information on the animal, methods designed to fight him are haphazard. Nevertheless, there are known ways of combating the honey badger. Sometimes it is shot, but only wealthy beekeepers can afford guns.

Fertilizers like Rogor or insecticides like Theodan are sometimes used to poison the badger. A beekeeper in Handeni District reported that he eliminated a honey badger from his apiary by poisoning it with Theodan. Theodan is sprinkled onto chicken offal, which is placed in the apiary at dusk. The honey badger will go for the offal before raiding a bee colony. In his experience, once a honey badger has been killed, two to five years of peaceful beekeeping follow. This, however, was refuted by Marios of Magugu whose hives have been continually attacked, even after he killed one or more badgers. This is maybe because of several honey badger families in his area.

Beekeepers at Mamire place thorny branches around the bole of the tree in which hives are sited. They claim that the thorns successfully deter the badgers, but that the ladders must be taken down after harvesting to prevent the badger from using them to get at the hives.

Other reported methods of controlling the honey badger at Mrumba in Hanang District are keeping bees in simple huts near or within homesteads and planting *Minyughe* plants around the walls. When the honey badger comes, he will be blinded by the poisonous latex produced in the leaves of the plant, which he cannot avoid touching. Furthermore, because the bee huts are nearby, the beekeepers can easily chase the badger out.

Silberrad (1976) suggests that a fence of chain link wire netting, buried in the ground and turned outward keeps the honey badger out. Tying the hives securely with wires will prevent the badger from breaking them.

Fighting the honey badger is a formidable undertaking, as has already been reported by Smith (1960). Omar Ikua of

Moyamayoka adds that when the badger is in company of his female partner he easily becomes irate and aggressive, attacking the male organs.

Theft was reported as only sporadic, because people fear condemnation and witchcraft, particularly the Gorowa and Iraqw. At Mutuka and Riroda it was reported that when someone steals honey, tribal elders, over 50 years old, take the remains from the hive and throw them into a hole of an occupied ant hill. The elders utter an incantation, "The man who stole honey from this hive, for which the owner toiled and perspired, should perish. The owner shall not return to the hive again. May the door to the thief's home be completely sealed. No one in his clan shall bring forth children and the clan shall never extend any more in this world". If anyone else steals honey from the same hive, this enchantment will affect him. This action, however, may only be taken after the identity of the thief has been ascertained by the elders, lest it should be directed at an animal like the honey badger.

If the thief is not known, the owner of the stolen honey reports to the elders, who in turn summon some villagers, including the women. Honey in a special gourd is brought so that everyone present can taste it. Normally the thief confesses. In order to be exculpated, the thief must pay the fine of one sheep and one young cow. He prepares honey beer which one of the elders imbibes from a special gourd and spits, uttering words to the effect that the thief shall not be condemned.

In other instances a honey badger's rib is ground and mixed with some other materials by a tribal doctor. Each hive is then treated with the mixture. A thief who steals honey from treated hives will perish. This is the Sandawe way of preventing theft.

The pirate wasps, *Palarus latifrons* or *nimbaanjuki* (Nyaturu), were reported to be endemic to the drier parts of the district and the consultant saw them in action at Mrumba, flying around the bee hut of Mr Mweka Mimbi. The wasps are usually associated with dry conditions and reportedly intensify their raids during July and August. During the raids, the bees stay in

the hives, alert, with their heads towards the hive entrances. An artificial period of dearth is thus created by the presence of the wasps, and the bees become unprecedentedly aggressive. Any bee that ventures out will be caught and torn to pieces by the wasps which suck the contents of the bee's crop.

Dragon flies, *Heminax sp*, or *Piro* (Iraqw), are also common. They catch bees on the wing and cut them into two pieces, carrying off the abdomen from which they suck the contents.

Safari red ants, *Dorylidae*, or *Tahhahhani* (Gorowa), sugar ants, *Masasagw* (Gorowa) and brown-bellied ants, *Tsalame* (Gorowa), are common enemies of bee colonies and frequently cause absconding. The brown-bellied ants are commonly found in hollow trees particularly *Ficus* and *Heeria Spp*. If such a tree is rapped upon, the ants come out in multitudes with their bellies raised, running madly around. The colour of their bellies was described by one beekeeper as "like tea without milk."



Figure 12. Wax moth larvae destroying the combs.



Figure 13. Large hive beetle.

Small hive beetles, *Aethna tumida*, and large hive beetles, *Holplostomus fuliginus*, are known to the beekeepers as honey eaters, as is the death head hawk, *Acherontia atropos*, which was reported at Moymayoka and Ufana. Lesser wax moths, *Galleria mellonela*, are also common and do considerable damage to the stored combs, according to Marios of Magugu.

The honey guide bird, *Indicator indicator*, or *Tigri* (Gorowa),

was mentioned at Mutuka as a bee brood eater and is often seen accompanying the honey badger or the honey hunters. It nearly always shows the way to bees nests. The bird feeds on waxcomb and bee brood and often completes the work of the honey badger. The little bee-eater, *Mellitophagus pusillus*, and the bee-eater *Metropidae*, are other birds which prey on bees.

Little is known about the occurrence of bee diseases, but cases of dead bees, particularly drones, *gangarjerii* (Gorowa), were reported by many beekeepers. Drones are known to be starved by the worker bees and evicted from the hives when there is a shortage of nectar. Sometimes they are found dead inside the hives. Dead brood is often encountered in hives from which bees have absconded, leaving honey and brood behind. Generally, the beekeepers admitted that it is practically impossible to detect bee diseases, as the hives are opened at night during harvest time, which occurs only once or twice a year.

Snakes are known to live in hives with bees, but it is not clear if

they feed on any hive products. A snake's presence in the hive is signalled by a nicely rounded hole through the propolis around the hive entrances. The round holes can also be encountered in the honey combs inside the hive. The beekeepers may notice them during pre-harvest inspections and will then wait to harvest the hives until the snake has been killed or ousted from the hive. No beekeeper could really describe the fight, but it is clearly frightful, for most such snakes belong to the highly venomous group of green mambas of the genus Dendroaspis. The bees usually do not construct combs in the part of the hive inhabited by the snake.

Bush fires are rare in Babati District because most areas are pasture lands where cattle graze when fires are most likely. Cattle herders and beekeepers alike know the damage that could be caused by fire and often co-operate with other villagers to put it out when it occurs. But when fires spread and cannot be controlled, they cause bees to abscond.

Finally, it is worth noting that every May, bees may be found

dead, often when a plant called dadhraos is in full bloom. This was reported by Nada Konki and Balye Ara of Mutuka village, who denied having seen any spraying activities with pesticides. The possibility that this plant has poisonous nectar should be investigated.

4.9 Constraints to traditional beekeeping

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Samson Hanjee of Ufana in Bashnet Division, probably the only real traditional beekeeper with Standard Seven education, expressed his concern over the constraints to traditional beekeeping. He made the following observations:

1. There are currently no scientific techniques which can support traditional methods, and there are no experts who tour the villages to advise the beekeepers.

He cited an example of how he attempted to separate brood from honey in his log hives. He failed, because his traditional"

queen excluder did not work, he believed that the worker bees transferred the eggs from the brood chamber to the honey section.

He hit upon the idea of leaving some wood unchopped about one third from one end of his log hive, so that one third of the hive could be a brood chamber and the rest a section for honey. He drilled holes through the wood, but they were too large and the queen had access to the honey section. When he made the partition thinner, it snapped when the holes were made. He decided to abandon the entire idea.

The hive Hanjee envisioned was similar to the African long-hive developed by Hubert (1964). This hive consisted of two chambers with a recess in the centre fitted with coffee wire, five meshes to an inch. The chambers were provided with M.D. frames, eleven to each chamber. The idea was successful, but due to the large surface area of the brood nest, the bees were slow to cross the queen excluder, and started work in the honey section towards the end of the honey flow. Before

improvements could be made, its use was abandoned in favour of the present versions of movable comb hive.



Figure 14. Extra large hive.

2. Traditional beekeeping is not uniform, beehives and operations have not been standardized, every beekeeper works a little differently. During the fieldwork it was observed that traditional hives vary markedly in size, the smallest measuring 99 cm long with a 30 cm diameter and the largest, 172 cm long with a 60 cm diameter. This variation is inevitable, since the unit measure is the forearm or an axe handle. Thicker trunks produce hives with wider circumferences.

3. The traditional smoker often causes bush fires. A reliable smoker will enclose the fire and the prevent sparks and flames.

4. The honey badger is a continuing threat to the beekeeping industry. There were conflicting reports regarding this animal. Some beekeepers mistook this animal for another nocturnal animal which preys on chicken and birds and may also eat the remains left by the honey badger. But knowledgeable beekeepers distinguish between two kinds of honey badgers, the common one with white hair on its back and the solid black badger which is said to be very dangerous.

5. There is no organised market for honey and the beekeepers do not know how to prepare bees-wax for the market. Attempts to remedy these problems should receive priority. When beekeepers can sell their products easily and at a fair price they receive the encouragement they need to develop their skills and methods of beekeeping.

6. Production from traditional hives is too low, about 10 litres per hive in most cases. Instructions on the proper construction of hives, and on siting them in areas where flowering plants are abundant and water is available for most of the year are needed. Unplanned harvesting should give way to planned harvesting, even if it is only done once a year.

The above problems enumerated by Hanjee call for practical long-term solutions.

4.10 Prohibitions

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There are certain rules of conduct which the beekeeper and other members of society must follow, particularly among the Iraqw.

It is forbidden to burn honey. If honey is burnt, leopards will invade the beekeepers' home. A similar prohibition exists among the Nyaturu tribesmen, who believe that lions will come to the beekeepers' area if bees-wax is burnt.

It is a common misconception that women are prohibited from keeping bees. This is not true. Beekeeping is just such a cumbersome operation that it is reserved for men only. Beekeeping, however, is prohibited among the Par and Gweno women.

It is a grave offence to steal honey from a hive. The offence carries a heavy fine of one bull which is slaughtered for the elders' feast. The thief may be punished in other ways, if the complainant so desires, but this is rare because the whole clan is affected. If the thief is not discovered, the Barabaigs prepare *gesuda* to which they add some medicine. They drink *gesuda*,

reciting enchantments which will cause the thief to repeat his crime. The second time, it is believed, the thief will be caught. Theft is rarely perpetrated among the Gorowa and Iraqw, for fear of these penalties. However, the younger generation is reportedly indifferent to these traditional beliefs. Those from whom honey is stolen do not press charges.

It is traditionally prohibited to take brood from the hives without a good reason. Brood may be collected if it is to be eaten together with honey to counteract the sedative effects of honey, or if it is used along with warmed up leaves to remove honey from the hands.

It is also prohibited to take the combs from bee hives, which would cause the bees to migrate.

It is prohibited to site hives in any tree which a fellow beekeeper uses. It is also forbidden to cut down such trees, and trees in which there are beehives.

These prohibitions generally reflect the respect which the

beekeeper is expected to show for his fellow men and their possessions.

4.11 Traditional uses of honey

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Honey is traditionally used for four main purposes. It provides complementary nourishment, medicine, a good, lasting beer and it is important in many rituals performed by the various ethnic groups of Babati.

Food

Raw honey provides a ready source of energy. Mixed with cereal flour, it is eaten by mothers who have recently given birth to help them recuperate.

Honey is also used as a famine reserve during periods of scarcity. The Sandawe mix sorghum with honey and form it into a cake which can be stored for many years.

Medicine

Honey is popularly used as an ingredient in many local medicines. Mixed with animal fat, it is taken for dysentery and general stomach problems. Applied as a lotion, it is used to heal burns and wounds. Mixed with tea, it is drunk to cure coughing and sore throats.

Honey beer

The majority of honey is reserved for brewing honey beer, *gesuda*, the Barbaig name which is widely known among all the other ethnic groups of the district.

***Gesuda* has a magic-religious significance for the Barbaig, as well as for the Iraqw and Gorowa tribes. "It is considered to be of sacred origin because the secret of its preparation is believed to have been handed down by the God Aset to mortal man in the person of Ghambideg".**

Ghambideg, a legendary figure, then instructed his children,

who were twins and capable of full speech at birth, to tell others to use honey beer. Mythological and supernatural validation re-enforces the Barbaigs belief that honey beer is a sacred drink made known to man through divine revelation. (Klima, 1969)

Women are allowed to eat raw honey, but drinking honey beer is considered to be the exclusive right of men.

Large gourds are obtained from neighbouring agricultural groups and when converted into brewing-gourds, *Geskweg* (Barbaig) or *Ona* (Iraqw), they become endowed with special magical powers. Some of these gourds are very old and have gained additional magical and mystical properties from having been used for generations by influential elders who have long since joined the ancestral spirits.

The *Geskweg* is a large calabash with a capacity of about 40 litres. This is filled with 18-20 litres of ordinary cold water to which is added 4 litres of honey, which is stirred until it has dissolved. Pieces of the root of a plant called *garegihhi* are

added to the brew as "brewers yeast." The geskweg is closed with a lid which fits smoothly to the brim. It is then placed in a warm room, close to the fire place for one day before it is ready for consumption. It can be kept up to three days if a stronger beer is desired.

The Iraqw prepare two alcoholic drinks with honey, *Ganguli*, which is very similar to *gesuda*, and *xangay*, which is ordinary local beer (burra) with honey added after the beer is ready.

There are few objects a Barbaig is traditionally allowed to exchange for cattle; maize and honey are, however, two of these. Buying honey requires a capital outlay, but can help raise the buyer's status if he arranges good beer parties. Honey beer can also mobilize workers or help the owner win communal resources.

4.12 The ritual importance of honey and honey beer

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The ritual drinking of honey beer is a necessary and, to the Barbaig, vital part of every major ceremony. Honey actually accompanies individuals through all of life's important events from the cradle to the grave.

The delivery of a newborn is celebrated with a *gesuda* party. If the baby is a breech birth, a *gesuda* ceremony is necessary to lift the curse of evil spirits. *Gesuda* is used for the same reason if a cow fails to deliver or gives birth to twins.

**"When the father of an uncircumcised boy decides that he can supply sufficient number of gallons of raw honey with which to brew honey beer, he sends word of the circumcision ceremony. Preparations are made to brew large quantities of honey beer which will be consumed by male elders as a part of the ritual."
(Klima 1969)**

The boys drink *gesuda* immediately before and after the circumcision to reduce the pain. Among the Iraqw, one of the elders takes a mouthful of honey mixed with water and blows it over the body of the youth just before the operation. It is said

that this prevents inflammation of the wound. Among the Barbaigs, *gesuda* is drunk on the day when the circumcised boys leave for ritual purification of the area.

***Gesuda* is, of course, the centre of all marriage ceremonies. The bridegroom is first required to present one debe (20 l) of honey and two cakes of tobacco to the family of his future wife. The bride-price binds the bride to her suitor. If she refuses to marry him she will be forced to return to him.**

After the marriage which, of course, is celebrated with *gesuda*, the bridegroom may take his bride to his home. When he visits, the father of the bride will not eat any food there until *gesuda* has been prepared for the purpose of welcoming him to the married couple's home.

If misfortunes have occurred because an ancestral spirit is angry at the neglect of his kinsmen, a man can take ritual action to appease his ancestors.

"He brews a pot of honey beer, the sacred drink and invites two

old men, (believed to be close to become ancestors) to a beer drink. Some of the honey beer is poured on the ground in the living space, and the cattle kraal. Two young men are delegated to bring a gourd of honey beer to the funerary monument or sacred grave of the dead ancestor who it is believed has been "throwing" misfortunes on the man's homestead. After propitiating the ancestor by pouring the honey beer into a hole in the side of the earthen monument, if death or sickness continues to trouble the homestead, the only remaining solution is to move to a new neighbourhood." (Klima 1969)

When an important male elder passes away, the family might decide to have a funeral, *bungeda*. This is the most significant and elaborate ritual in Barabaig society for the funeral will last eight to nine months, during which time honey beer is consumed at various stages. To be able to arrange for such a funeral, married sons must be in possession of sufficient wealth to buy the honey required to brew large quantities of honey beer (Klima, 1969).

The beer is drunk on the funeral day at the burial place to take away the curse of death from other members of the clan. This is repeated on the third day and, thereafter, every month for eight consecutive months.

Honey is also important in juridical rituals. A person suspecting another of theft or any other crime, summons the elders, who proceed to a termite mound. A small trench is dug across the termite hill and the accuser and the suspect sit opposite each other with the trench between them. Honey is brought in a calabash and the suspect is asked by the elders to eat it first, saying, "I eat this honey knowing that the accusation is false, but if it was true I should not take long before dying."

The elders then ask him to cross over to the other side of the trench. Then the complainant is asked to eat the honey, saying "I eat this honey because my accusation is true, if it was false, this honey should not take me far, it should not take long before I die."

He then crosses the trench to the other side. If the accusation is

true then the suspect will soon die; if it is false the complainant will die.

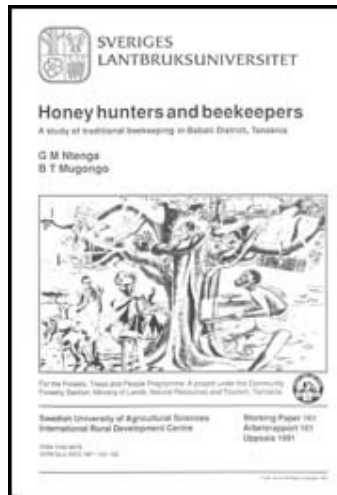
If the elders condemn a person, they do so over a drink of *gesuda*, taken from a special calabash called *gudugda* in Barbaig, or *gurmi* in Iraqw. The *gudugda* is usually made from selected gourds with long necks. *Gesuda* is also used when a person confesses to an offence. The offender is required to prepare *gesuda* for the confession ceremony.

If cattle are unexplainably dying, the herd owner invites other elders for a beer party. A pot of honey beer is brewed in anticipation of the return of the cattle herd. In the evening when the cows return to the kraal, the elders spray honey beer on the back of each animal as it passes through the gate. After the ritual, the elders resume their beer drinking.

"If a black snake is found in the home of someone of a priestly clan, it is a sign that something is wrong. The man of the house brews some honey beer and pours an offering on the ground near the house, saying, "Here is your beer, father, watch my

house, don't hide anything if you see something wrong. (Klima 1969).

Honey beer is also used for welcoming an important guest, for cattle transactions, and so forth. There are so many ceremonies associated with *gesuda* honey in Barabaig society that it can be considered essential to social and ritual life.



Honey Hunters and Beekeepers: A Study of Traditional Beekeeping in Babati District, Tanzania

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5. DISCUSSION AND CONCLUSION

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5.1 Rationale

The importance of district studies on traditional bee-keeping was remarked upon by Ntenga in 1976:

"Chandler (1975) has set a good example by studying in detail the traditional methods of beekeeping among Wameru in Arusha Region. Such studies are needed in other areas, for they throw light on problems hitherto unnoticed, and make it easier to decide on the best line of approach in developing beekeeping in a given area."

The lack of such studies in many beekeeping areas in Tanzania has made it difficult to develop the industry in those districts.

In the case of Babati District, the virtual absence of official records of beekeeping information may be attributed to two major administrative changes which took place in the last two decades. Babati District was in Mbulu District until the early 1970's, when it was detached to form what came to be known

as Hanang District. In 1986, a further split created Babati and Hanang Districts. Under such circumstances, official records are bound to be misplaced or lost.

An interview with the Ward Secretary in Babati, Mr. Y. Emay, however, revealed that when he was a beekeeping extension officer for Babati, 1967-71, he was concerned with beekeeping in Gidas, Boay, Babati and Bonga areas. During that period he sited frame hives at Bonga, started apiaries for the primary schools at Gidas and Boay, and set up others near the Roman Catholic Church at Boay and Mrara in Babati area.

From these hives, Mr. Emay obtained honey and bees-wax which he sold to earn revenue for the District Council. He identified good beekeeping areas in the Haraa forest around Bonga, the foot of Mt. Qaraa, Qash, Tsamasi, Kiru, Mamire and Gidas in the present Babati and Gorowa Divisions.

Further evidence of beekeeping development activities in Babati District is found in the Mbulu beekeeping office. In 1973 and 1975 Mr. M. Lucas, then Beekeeping Officer for Arusha Region

became personally involved in encouraging the farmers in the Kiru Valley to keep bees for bean pollination.

This information is too scanty to give a complete picture of earlier beekeeping efforts. This study, however, focuses on existing forms of traditional beekeeping in Babati district and may be seen as the first of its kind. It is of particular importance because it concerns a district which is practically representative of the whole country in terms of its diverse climates, topography, vegetation and soils, as well as human activities.

Previous studies by Drescher (1974) on Handeni District and Chandler (1975) on Ameru District, have concerned areas with singular characteristics. These were preceded by a superficial study of beekeeping in Kondoa District by forestry experts in 1970, leading to the establishment of the Dodoma Soil Conservation Project (HADO), along with the present Dryland Beekeeping Project. Again, Kondoa district has characteristics unique to itself.

Areas where traditional beekeeping has been best documented

are the western miombo zone, comprising the present Tabora Region, Kahama District of Shinyanga Region, Kasulu and Kibondo Districts in Kigoma Region, Mpanda District of Rukwa region, Chunya District of Mbeya Region and Manyoni District of Singida Region; followed by the southern Miombo zone comprising Ruvuma and Lindi Regions. Beekeeping development activities sponsored by the government were centred at Tabora and Songea for several years, and the beekeepers there strongly depend on honey and bees-wax for their cash earnings. Due to the similarity of beekeeping methods in these areas, as well as the readiness with which information could reach the beekeeping officials, in-depth knowledge of traditional beekeeping has been easily documented.



Figure 15. Traditional beekeeping in the miombo forest.

It should be mentioned, however, that such studies need to be supported by a clear organisational strategy for implementing

the recommendations aimed at instituting commercial development of beekeeping.

In Babati District beekeeping is widely practised by villagers who inherited the tradition from their forefathers and maintain it to this day. Many beekeepers who are not native to the district have brought the tradition from their places of origin, such as the Irangi, Waassi and the Sandawe from Kondoa District, and the Nyaturu and Nyiramba from Singida Region. Beekeeping is also an age-old traditional occupation of indigenous Iraqw and Gorowa tribesmen. It has been perpetuated by the two indigenous tribes because honey is valued for certain traditional ceremonies and for the Barbaigs' *gesuda*. Beekeeping supplements the incomes of immigrant tribesman through sales and honey is used on occasions similar to those for which *gesuda* is prepared.

The foregoing observations can now be summarised as follows:

- 1. The potential for beekeeping and its development in Babati District is very high.**

2. Traditional beekeeping is widely practised by the rural population, particularly the Gorowa, Iraqw and Nyaturu.

3. The demand for honey is nearly insatiable within the district and in the neighbouring districts. Surplus honey can also easily be sold to urban centres in Arusha, Kilimanjaro and Singida Kegions.

4. Improved extension services can greatly improve and increase beekeeping, as practising beekeepers are eager to receive advice geared towards making beekeeping a more lucrative enterprise.

The existing forested areas, excluding those occupied by the national parks, give Babati District the potential for about 75,000 productive bee colonies. This represents an annual production capacity of approximately 1,250,000 kg of honey, worth 250 million TSh, and about 75,000 kg of bees-wax, worth 21,5 million TSh, based on the 1988 domestic market prices.

It is estimated that there are currently about 6,000 productive bee colonies in traditional bee hives. Annual production from these colonies ranges from 60,000 to 90,000 kg of honey mixed with comb. The value of this honey ranges from 6 to 9 million TSh.

Bees-wax is not separated from the honey, but is just thrown away, at a loss of 1.8 and 2.7 million TSh.

Today's production of honey in Babati District is only 8% of the potential. Production can be raised through a well-organised extension and education programme. Honey hunting is practised widely by the people living near the national parks, particularly the Tarangire National Park, where it was reported that the honey hunters carry out their operations during the night and return to their homes with their harvest the same night. The honey hunters are sometimes beekeepers. In villages like Kiongozxi and Sigino, trees suitable for hives are no longer available and expansion of beekeeping is virtually impossible. This is why Sella of Kiongozi makes extra large hives, and why

honey hunting is performed in the national parks.

One conclusion of this study is that beekeeping in Babati District is highly capable of development, as long as the resources available can be mobilised under a well-planned and carefully supervised beekeeping development project. The beekeepers in the district are fully aware of the benefits that are and could be derived from keeping bees, especially benefits occurring from profitable sales of honey and beeswax. Beekeepers are also aware of the problems which beset their work and are prepared to accept any measures designed to improve it.

The development of beekeeping in Babati District lags far behind that of other districts in Tanzania. The district is made up of the most fertile as well as the poorest lands, the wettest as well as the driest areas, highlands as well as lowlands and, what is more, the vegetation cover varies considerably. These conditions are excellent for a beekeeping industry. Modern frame hive beekeeping is possible, particularly in the highland

zones, if the threats to bee colonies could be brought under control. Migratory beekeeping is also possible and can be practised inexpensively, the district being small and flowers easily accessible.

Beekeeping in Babati District has not been developed due to three main factors: the development and administrative authorities' previous lack of interest; the presence of a thriving crude honey market within and in the neighbourhood, and the clandestine style of beekeeping done by the beekeepers.

The information now available on Babati District should facilitate the drawing up of workable plans for the development of the beekeeping industry. An impressive start has been made, development of the beekeeping industry. An impressive start has been made, but "*kutangulia si kufika*" - going ahead is not arriving.

5.2 The honeybee

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The honeybees found in most parts of Tanzania are the popular *Apis mellifera scutellata* (Lepeletier 1836) which are small, slender and yellow-banded. Their tongues are shorter (5.9 mm) than most other African honeybees, such as the *Apis mellifera intermissa* of Libya and Morocco, *Apis mellifera monticola* of the mountainous region of Eastern Africa and *Apis mellifera adansonii* of West Africa south of the Sahara. They exhibit marked variations in behavioural patterns, but generally possess a highly developed defensive instinct or aggressiveness. They migrate readily at the first sign of shortage of nectar and if disturbed, they may desert their nest, even leaving the brood behind. (Ruttner 1975).

Apis mellifera monticola is another species of bees distinct from *A.m. scutellata*. This species is found mainly in the mountainous regions of Eastern Africa, particularly on Mounts Kilimanjaro and Kenya. (Smith 1961). It has also been observed in Ethiopia at altitudes of 2300 -3100 meters in the cold forests. The bees are long and broad with tongues averaging 6.2 mm long. *A.m. monticola* is larger than *A.m. scutellata* but slightly smaller than

***A.m. intermissa.* The bees are good honey gatherers in their environment and have shown this ability under miombo conditions.**



Figure 16. Honey hunter in action.



Figure 17. A fire is used to calm the bees.



Figure 18. The honey and wax are harvested.

The consultant maintained three stocks of pure *monticola* at

Tabora in the mid 1960's under bee house conditions. They produced surplus honey in the first season. Later they were crossed with *scutellata* to produce hybrids.

Crosses between *A.m. monticola* and *A.m. scutellata* are a beautiful gold colour and quite docile. Second hybrids (F2) from a beekeeping point of view are a poor generation, aggressive and restless, and highly susceptible to EFB (European Foul Brood) (Ntenga 1968). *Apis mellifera monticola* can swarm even if there is room in a hive and at times they may panic during inspections, crawling over the frames and spreading all over the hive. But generally they are the best bees in Tanzania, as far as their behaviour is concerned.

***Apis mellifera littorea* is a third species known in Tanzania. They are smaller than *A.m. scutellata* but very similar in colouration. They are slightly slender with tongue lengths averaging 5.7 mm. The queen is very productive, probably because the worker bees have shorter lives and their coastal environment offers practically no periods of dearth, except during attacks by the**

pirate wasps, *Polaris latifrons*. When attacked, the bees abscond, leaving the brood and some stores behind. Their value for commercial honey production has not been assessed. Production statistics for the island of Zanzibar, its typical habitat, are not yet available.

The honeybees indigenous to Babati District are the same as those found elsewhere in Tanzania. They are productive and numerous and are adapted to the special conditions of the district. Minor variations may be caused by variations in climatic and vegetation conditions, and skills for handling them may be adapted to special environmental conditions. Modern management techniques are almost impossible, but it is possible to manage them in traditional ways, which should be examined seriously to see if they can be adapted or improved.

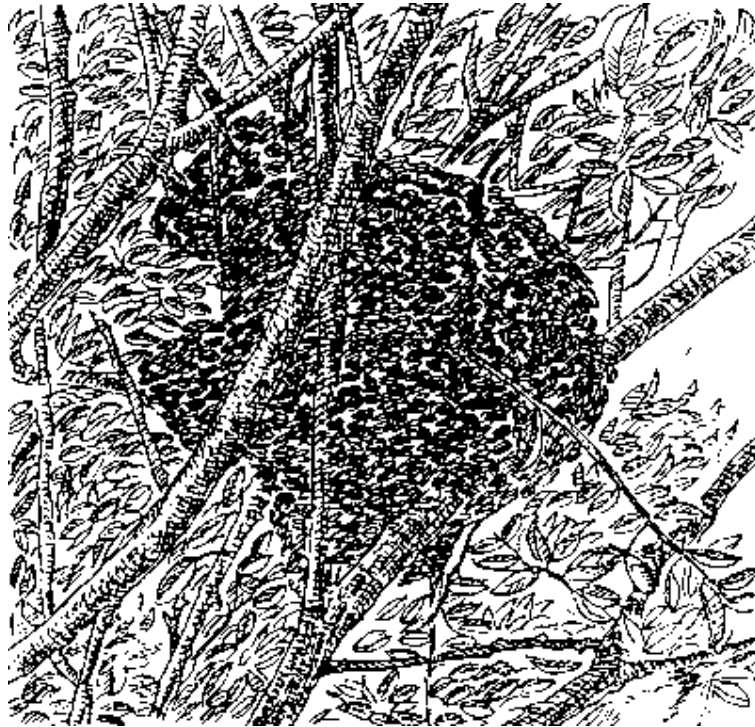


Figure 19. Swarming bees.

Modern apiarists are often inclined to simplify beekeeping by importing exotic species. The consultant witnessed the failure and total demise of imported Caucasian bee species at both

Arusha and Tabora in the 1960's, caused by the local strains of bees. One of the characteristics of the Tanzanian bees, which often is not documented, is that they rob other hives. The scutellata bees will rob weak colonies as soon as the nectar stops flowing from the flowers. When this occurred, and fighting ensued, the imported bees were killed by the acutellata bees. Imported bees cannot survive under Tanzanian conditions and it is unwise to contemplate any further importations.

Tanzania has apparently not been seriously affected by the bee diseases reported in other countries, particularly from the cold regions of the world. This may be because experts are absorbed into the administrative machinery, leaving inadequately trained workers in the field who cannot make the necessary observations. It may also be that traditional beekeepers do not detect diseases because they work with their bees only once or twice a year at night, and their hives do not permit any form of close inspection. It is, nevertheless, known from earlier observations (Smith, 1960), that the European Foul Brood Disease exists in Tanzania, and that it causes colonies to

dwindle during the build-up and dearth periods.

Importing bees carries the risk of importing other bee diseases, which would increase operating costs which traditional beekeepers cannot meet. This would have serious consequences for the bee industry. Babati District's bees are thus the best for the district. Concentrating on methods to control swarming, and on breeding from among the local species is the surest way to successful beekeeping in the district and Tanzania.

5.3 Bee forage

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The main vegetation types of the major ecological areas of Tanzania are represented prominently by the forests and deciduous woodlands, which form the most reliable beekeeping areas, where honey hunting and beekeeping have flourished for many centuries. The forests appear mainly in the lower zones of the mountains, particularly in the Kilimanjaro, Meru, Usambara and the highland areas, such as Ngorongoro, Oldeani and much

of the southern highland areas. Upland wooded grasslands, bushlands and thickets appear mainly in the central parts of the country with a high beekeeping potential. The coastal lowlands which combine cultivated areas and tropical forest can support a large population of productive bee stocks. This area is the least exploited in terms of beekeeping.

In areas where there are beekeepers or honey hunters, there is general appreciation that bees will flourish better in some places than others, with a knowledge of the main sources of surplus honey. In the woodlands of the west, for example, the beekeepers know the origin of the two honey flows.

According to Greenway (1940) there are five important families of honey plants in the Miombo woodlands areas. The Caesalpiniaceae family comprises the leguminous trees found abundantly in the savanna areas: *Julbernardia globiflora*, *Julbernardia paniculata*, *Julbernardia unijugata* are the principal honey sources in those areas. They start flowering as early as March, with the honey flow commencing in April, reaching the

peak in the beginning of June. In some years the honey flow may fail due to damages to the flowers by a caterpillar, *Gabrucella sp*, of the Coleptera family. Honey from these sources is extra light amber in colour and of pleasant slightly strong flavour. The other genus is the *Brachystegia* with the following species.

***Brachystegia spiciformis*, *Brachystegia longifolia*, *Brachystegia bohoemu*, *Brachystegia stipulata*, *Brachystegia microphylla*, *Brachystegia bussei*.**

These trees may produce flowers between August and December, their ability to flower being dependent on good rainfall during the preceding rainy season.

Honey from *B. spiciformis* is nearly white, but because it flowers in conjunction with several other plant species, dark honey of strong flavour is usually obtained at the end of the honey flows. The Combretaceae family comprises predominantly: *Combretum colloum*, *Combretum apiculatum*, *Combretum molle*, *Combretum flagrans*, *Combretum*

***longispicatum, Combretum zeyheri, Combretum ternifolium, Terminalia sericea* and *Terminalia grandis* which flower at the same time as the *Brachystegia spp.*, producing light amber honey of mild flavour.**

The Mimosaceae family is of mainly: *Acacia joachimii. Acacia benthamii. Acacia rosvumae, Acacia albida, Acacia tripanollobiu, Acacia seyal Albizzia antunesiana* and *Albizzia paterisana*.

They flower variously from September to November, producing white honey with a pleasant flavour.

The Compositae family comprises numerous herbs and shrubs, especially in cultivated areas. They produce both pollen and nectar. Flowering may take place from February through to December depending on the geographical area. The following are a few of these plants: *Aspilia-wedelia spp., Bidens pilosa, Veronia aemulans, Veronia colorata, Tridax procubens*.

In some miombo areas there are still many plant families which contribute significantly to honey production and colony

development. Plants of the Papilionaceae, Rubiaceae, Tiliaceae, Anacardiaceae, Verbanaceae, Ancathaceae, and Sterculiaceae families may be found in certain localized areas in such abundance as to produce crop of honey and bees-wax.

The Euphorbiaceae family is notorious for comprising plant species which are responsible for bitter or unpalatable honey according to many traditional beekeepers. But since they flower alongside other plant species, from which bees collect nectar, the final product is mostly pleasant honey of good flavour and extra light amber in colour. The major species are: *Euphorbia candelabrium*, *Euphorbia tirucali*, *Hymenocordia acida*, *Clutia mollis*, *Ricinus communis*, *Pseudolachnostylis glauca*.

In the highland forests, flowering occurs from November through to February and then July and August. The major honey sources have been identified among several of the following species:

Phytolacaceae *Phytolacca dodecandra*

Rubiaceae *Cordia alliodora*

Boraginaceae *Cordia alliodora*

Euphorbiaceae *Croton microstachys*

Euphorbiaceae *Ricinus communis*

Hypericaceae *Hypericum sp.*

Proteaceae *Grevillea robusta*

Mimosaceae *Albizia spp.*

From the highland wooded grasslands, honey of very high quality between extra light amber and white may be produced from the following plants:

Compositae *Aspilia-wedelia spp.*

Bidens pilosa

Veronia aemulans

Veronia lasiopusa/colorata

Acanthaceae *Dyscoriste albiflora*

Hypoestes sp.

Mimosaceae *Acacia albida*

Acacia seyal

Acacia mollissima

Albizzia spp.

Sterculiaceae *Dombeya rotundifolia*

Plants of the Labiatae, Papilionaceae, Rubiaceae and Boraginaceae families are sources of nectar. Honey from these areas will granulate or crystalise with some fine texture.

Bushlands and thickets are areas which appear extensively as

the famous Itigi thicket in Manyoni district, as well as in areas of central and north eastern Tanzania. Honey flows occur between December and April. Important species from a beekeeping point of view:

Combretaceae *Combretum trothae*

Sterculiaceae *Dombeya schupangae*
Dombeya rotundifolia

Tiliaceae *Grewia spp.*
Triumphetta rhomboidea

Euphorbiaceae *Euphorbia spp.*

They are normally supported by plants of the Labiatae, Acanthaceae, Compositae, and Convolvulaceae families. Honey from these areas varies from extra light amber to white, depending on the locality of the source.

The coastal lowland areas abound with cultivated crops, supported by wild trees, shrubs and herbs. The honey flows take place between January and March, but may go on to April or even May, producing amber honey of very strong flavour, characterised by the presence of large quantities of pollen. Samples of honey have shown the presence of the following sources:

The coastal lowland areas abound with cultivated crops, supported by wild trees, shrubs and herbs. The honey flows take place between January and March, but may go on to April or even May, producing amber honey of very strong flavour, characterised by the presence of large quantities of pollen. Samples of honey have shown the presence of the following sources:

Acanthaceae *Blepharis sp.*

Asteracantha sp.

Hypoestes sp.

Justicia sp.

Compositae *Veronia aemulans*

Veronia colorate

Bidens - Aspilia-wedelia spp.

Malvaceae *Abutilon mauretanium*

Sterculiaceae *Dombeya cincinata*

Mimosaceae *Albizzia versicolor*

Tiliaceae *Grewia bicolor*

Agavaceae *Agave sisalana*

Cesalpinaceae *Brachystegia microphylla*

According to Crane and Walker (1983) farmlands can be important sources of honey, particularly from plants of Agavaceae, Rubiaceae, Proteaceae, Malvaceae, Leguminosae, Rutaceae, Compositae and Myrtaceae families, respectively represented by sisal, coffee, *Grevillea*, cotton, beans, oranges, sunflowers and eucalyptus plants.

Objectionable honeys are usually reported from areas where red palm oil plants (*Elaeis guineensis*) are extensively grown in Kigoma Region. They are also reported from Newala in Mtwara

region where ciera rubber plantations, *Manihot glazivii*, of the Euphorbiae family are found, as well as from Tengeru in Arusha region, where crops of castor oil, (*Ricinus communis*) are grown. In sisal areas, in Morogoro and Tanga Regions, similar reports have been received. Some plants of the Graminae families, such as sugar cane, produce nectar from extra floral nectaries, whose honey may be very unpalatable.

The vegetation map of Babati District (Figure 3.) shows a characteristic representation of what is discussed above, and it is clear from the honey plants named by the various traditional beekeepers that the district is rich in bee forage and can support a viable beekeeping industry.

5.4 The beehive

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The beehive in Babati District must conform to the beekeepers' traditional norms, and attempts to improve beekeeping in the district should be based on improvement of the traditional log

hive. Most of the beekeepers in the district use the type of log hive with a harvesting gate on one of its sides, provided by notching the edges of the two parts of the hive.

The harvesting gate is definitely the most important property of the log hive. The main purpose of this opening is to enable the beekeeper to harvest his honey without disturbing the rest of the hive and the bee nest. The size of the opening, however, leaves much to be desired. The beekeeper measures the opening with his extended hand. The distance between the tip of the middle finger and that of the thumb is the length of the opening. Half this distance is the width.



Figure 20. A traditional beehive with a harvesting gate. Observe that the hive is sited so the beekeeper can work with his bees.

Unfortunately the opening was observed to be too small for the beekeepers to work freely. It needs a little enlargement to allow the beekeeper freer movement of his arm and a better view of

the contents of the hive. The cover to the opening should also be enlarged and provided with a more secure latch, which could be made from waste metal or rubber.

The next improvement should be in the size of the hives. The beekeepers should be encouraged to make them bigger. The maximum size would probably be 135 cm long by 45 cm diameter. It is not possible to standardize the traditional hives because the tree trunks from which they are made vary considerably in size. It should, however, be a long-term policy to do so, particularly when the beekeepers resort to sawn timber or other manufactured materials.

Beekeepers should be introduced to plank and transitional hives. Should a beekeeper wish to try them, he should be encouraged to do so, with specific instructions on their use. By no means should commercial frame hives be advocated. These require expert management, and should be confined to trial apiaries.

The hives should be baited as they now are, using materials like

the *soriangw* or *moigangw* (Gorowa), *thamfi* (Iraqw for propolis), honey or bees-wax. The hives must be located where flowering plants are abundant and water is available for most of the year. If these sources are far from the villages the beekeepers should be encouraged to start beekeeping camps in groups of five to a camp. Since beekeeping is a seasonal occupation, it is likely that this move will meet with their approval.

The beekeepers in many areas have also learnt that big hives are conducive to larger crops of honey. Even those who use log hives are now making them big enough to accommodate large bee colonies. This change of attitude is a welcome phenomenon, suggesting that, with time, the traditional beekeepers will accept new ideas related to improved bee hives. For this reason, the consultant previously designed the hive shown in Fig. 21. It is said to be a good hive for forest beekeeping.

The hive is a modification of those used by many tribes in the country. It permits beekeepers to collect honey from both ends,

because bees may place honey at both ends with the brood in the centre. If this happens, the beekeeper can collect honey from both ends, leaving the brood intact in the centre. If the brood is at one end, then he can collect honey from the other end. Since it is unnatural for the bees to separate brood by combs of honey, they will not place honey in the centre with brood at both ends.

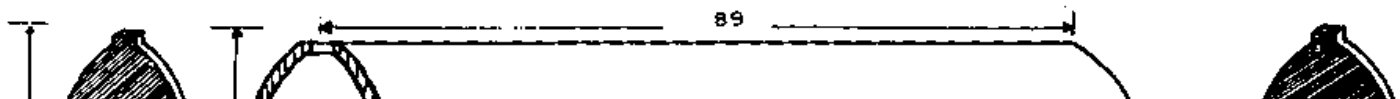
The plank hive shown is a new design, derived from the consultant's experience of plank hives. It also incorporates the idea of having an opening in the side. The Nguu in Handeni District, the Gogo in Dodoma and Mpwapwa Districts, and the Nyaturu in Singida District use log hives with openings in the sides for collecting honey. The consultant has successfully used plank hives with an entire side as an opening. The new design of plank hives should open a new stage towards the use of the traditional hive which is also shown.

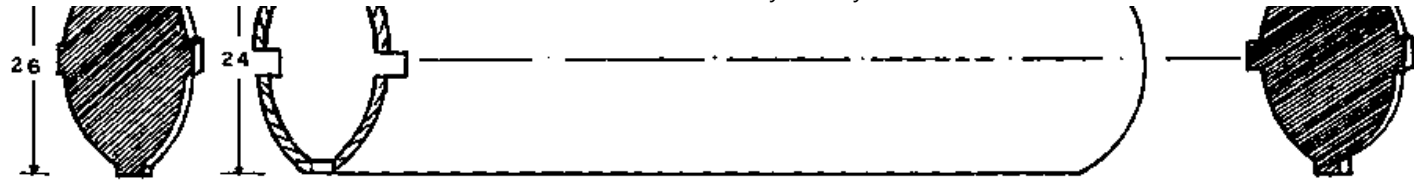
The standard size of the plank hive is 89 cm long, 48 cm long, 48 cm wide and 24 cm deep with a boo entrance 16 cm by 1.3

cm. The door in the centre is 43 cm by 24 cm, and hinged to the bottom board, if necessary, to open downwards. There are no frames or movable parts. The bees will attach their combs to the upper board and the combs can be cut out as in other traditional hives. It is not a perfect improvement of the traditional log hives described above, but allows pre-harvest inspections and is a viable alternative when hive-making materials are unavailable.

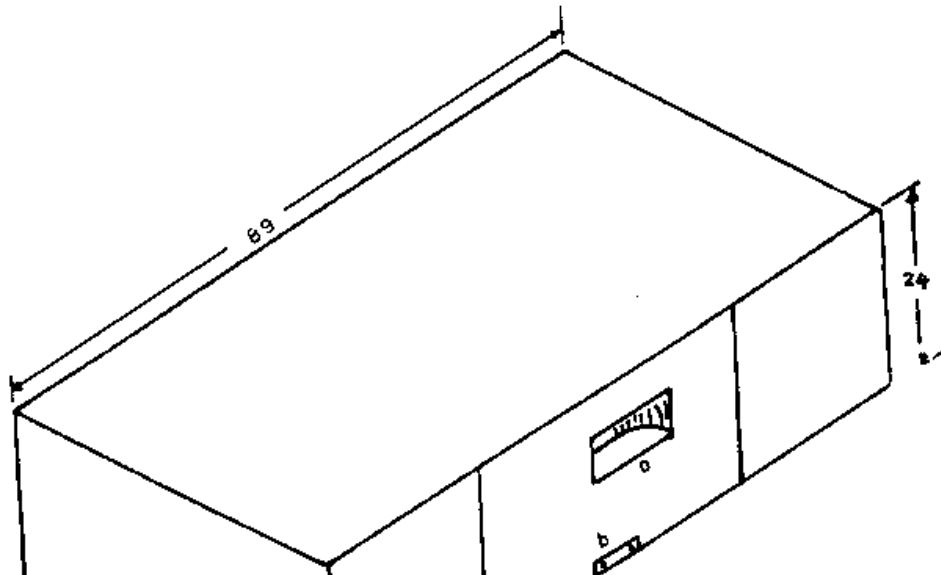
The transitional hive was designed and described by Ntenga (1972) as an intermediate step towards the use of frame hives. It has so far proved its worth under Tanzanian conditions and is widely used in government apiaries notable success.

MIZINGA BORA YA NYUKI TANZANIA (VIPIMO KATIKA 5m)





**MZINGA WA GOGO
(Log hive)**





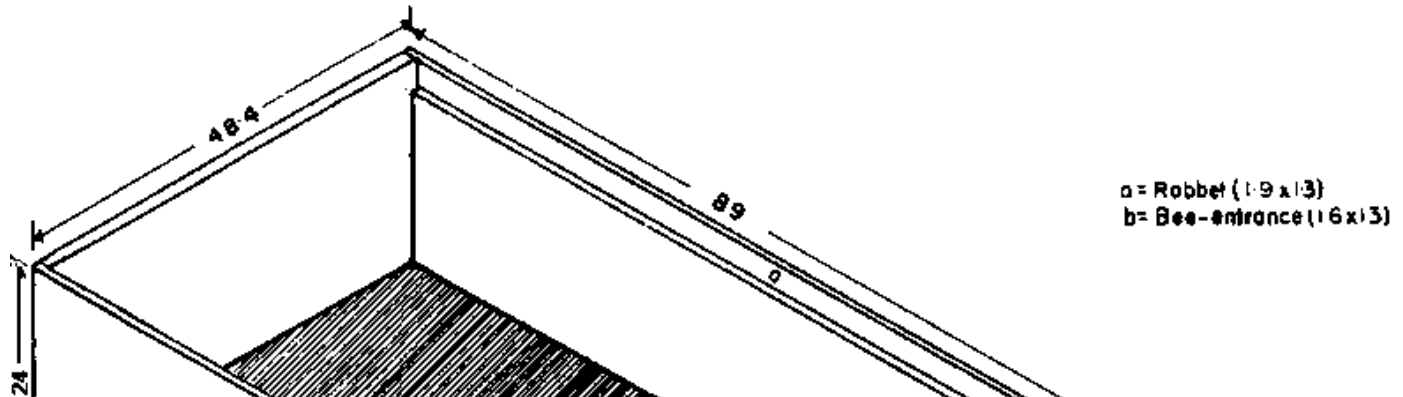
MZINGA WA MABANZI

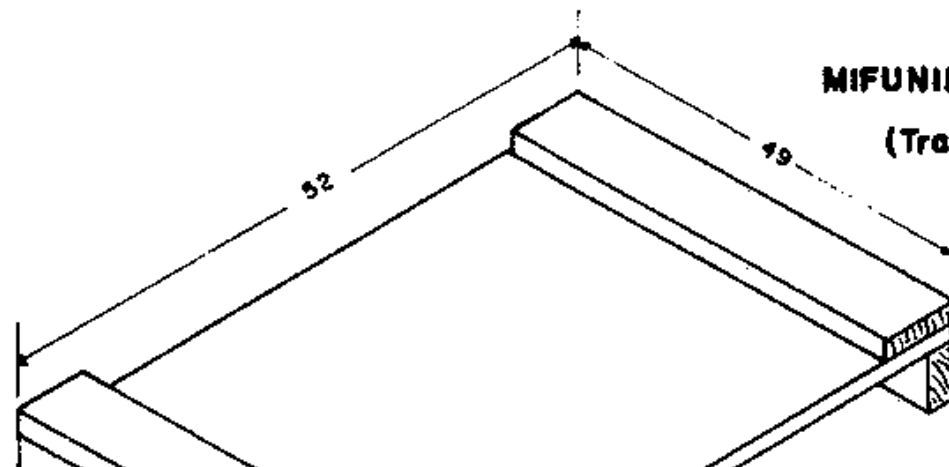
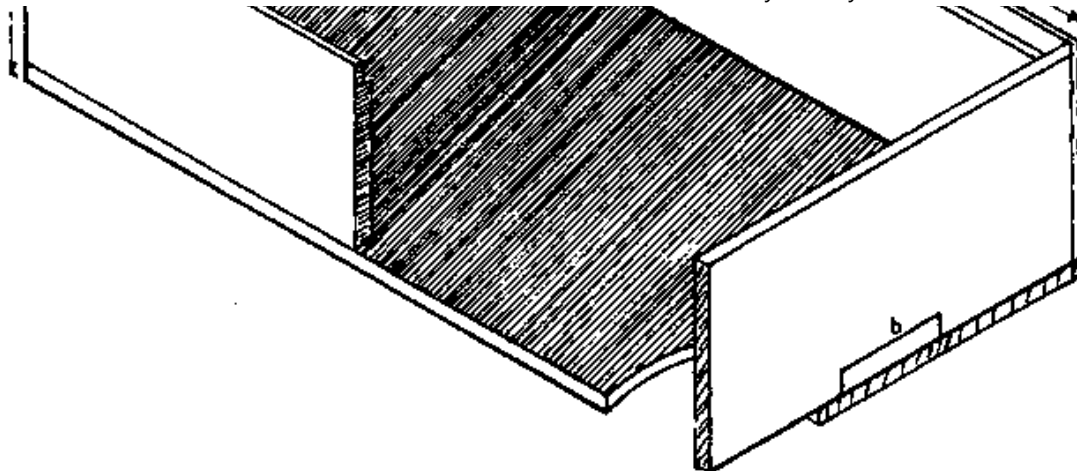
(Plank hive)

Figure 21. Log and plank hive.

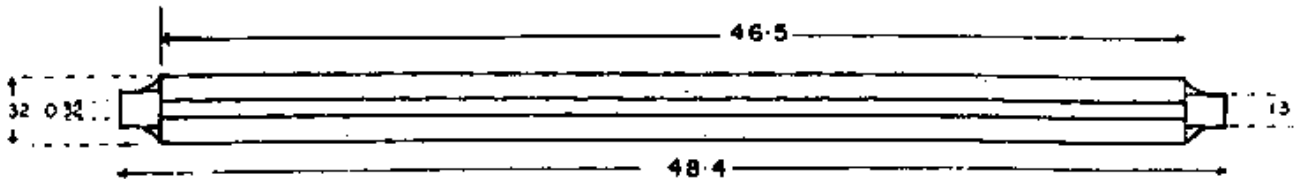
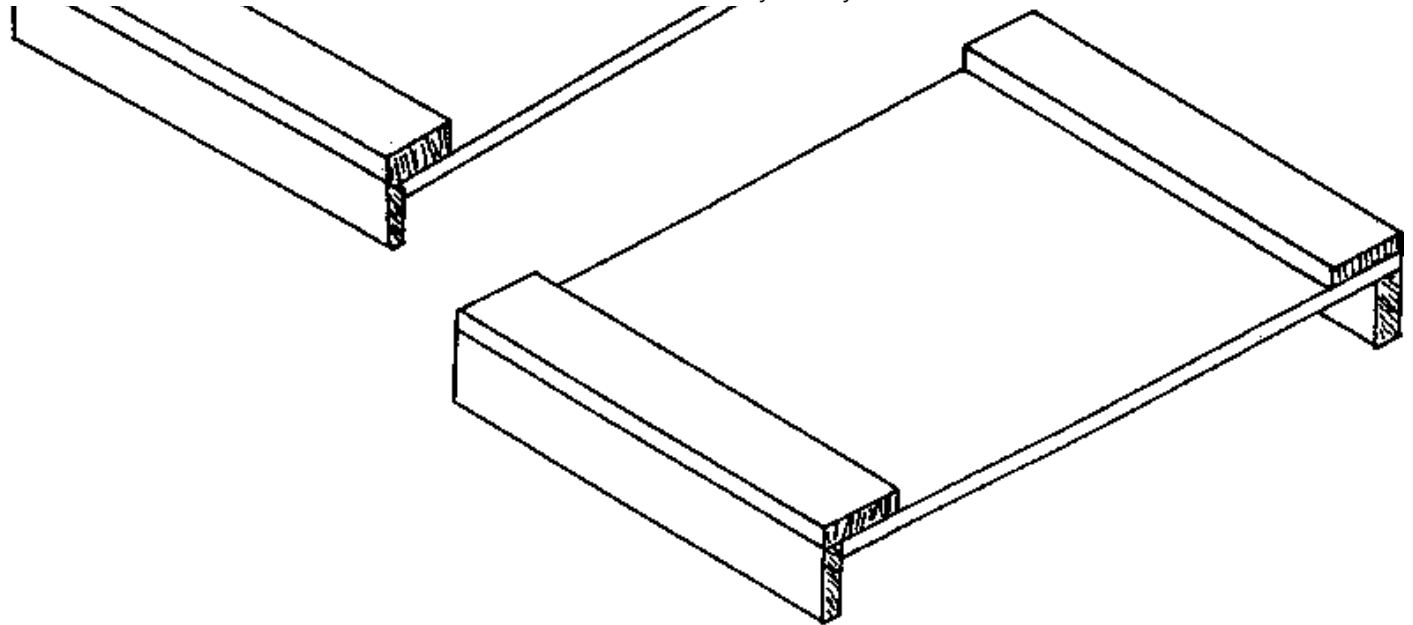
MZINGA WA KATI (Transitional hive box)

(DESIGNED BY G. NTENGA)





MIFUNIKO YA MZINGA WA KATI
(Transitional hive covers)



MCHI WA SEGA(Comb-bar)
Figure 22.

This hive uses comb bars (top bars) instead of frames. The hive box which is 89 cm long, 44.18 cm wide and 22.86 cm deep permits 28 comb bars. The exact measurements of its various parts are given below:

<u>The Hive Box</u>	(Internal dimensions)	<u>The Comb Bar</u>
Length 88.90 cm		Length 45.18 cm
Width 44.18 cm		Width 3.18 cm
Depth 22.86 cm		Thickness 2.54 cm

Central Groove

(If the bar is not levelled or V-

shaped)

Length 44.18 cm

Width 0.32 cm

Comb Bar Lug

Length 2.54 cm

Width 3.18 cm

Thickness 1.27 cm

The Roof (2 pieces)

Length 52 cm

Width 49 cm

Depth (at ends) 5.08 cm

As with other movable comb hives, the dimensions of this hive must be perfectly accurate. A small error in its construction will defeat the whole purpose of the design.

The Tanzanian commercial frame hive is not detailed here, because its use requires special skills in bee management under Tanzanian conditions. It also requires extra investments to make the enterprise economically viable. It is, however, the best of all movable comb hives known in Tanzania.

The beekeepers should be aware that successful beekeeping doesn't depend on having many hives, but comes from the experience derived from handling smaller units, expanding when possible and maintaining the production level of the bee colonies. Figure. 22.

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5.5 Colony management and hazards

Bee colonies in traditional hives can be managed to some extent. Once the hives have been occupied, the beekeeper can identify weak and strong colonies by observing the flight of the bees. Small or weak colonies can be detected by erratic in-and-out flight movements. The opposite indicates strong colonies. Weak colonies cannot defend themselves efficiently against intruders or large hives effectively. Pests like ants, wax moth, wasp or rats, *garangw* (Iraqw), may be found in the hives. These can be removed to keep the hives clean for the colonies to develop. The hives may have been blown from their positions or pushed down by rats. They should be mended and replaced or relocated.

The traditional beekeepers should consolidate their habit of observing bees to judge the presence of ripe honey in their hives.

Some beekeepers shave their hair or remove some feathers from a chicken after the hives have been occupied by bees. When new hair or feathers have grown out, the honey is ready

for harvesting. Even the use of *watsi*, a small stick which some of the traditional beekeepers use to pierce the combs to check if there is honey in the hive, should not be condemned. Lifting hives to feel their weight should be encouraged if it can help reveal the presence of ripe honey.

But the above actions are best done during the day, when the bees are active. The use of protective clothing should therefore be recommended. Protective clothes give confidence to the beekeeper and facilitate efficient performance. Overalls and bee veils are sufficient protection against excessive stings.



Figure 23. A low-cost bee smoker made from an old tin.

The type of smoker used in Botswana could be promoted while an inexpensive smoker is being designed. Cooking oil tins are obtainable at low cost even in the villages. The perforations should be confined to the bottom third of the tin and should be

large enough to allow a lot of air to pass and to discard ashes from the smoker. The materials used by the traditional beekeepers, such as pieces of castor oil stems, the spongy flesh from sisal poles, cow dung and dororo a parasitic plant which grows on *Brachystegia spp* appearing like long greenish threads, can be used in this type of smoker. A wire handle fitted into the top of the tin should be hooked at the end so the smoker can be hung. But the use of this kind of smoker should be carefully monitored to determine its efficiency in handling established colonies.

Meanwhile, large engineering workshops and technical colleges should be recruited to make more efficient smokers from simple metal cans. It is nevertheless acknowledged that the bee smoker used by beekeepers in industrialised countries, which has been replicated in Tanzania, is most efficient and the traditional beekeeper would appreciate it if its cost could be reduced.

As previously mentioned, the honey badger is a serious threat

to beekeeping. The beekeepers in Babati District should be advised to hang their hives from hooked sticks or wires, or to take other measures such as piling thorns round the boles of the trees in which the hives are sited. Insect pests which include several species of ants, wasps and moths can be controlled by destroying their nests, relocating hives and keeping the hives and surroundings clean.

5.6 Honey containers

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The traditional beekeepers use simple containers made from inexpensive, local materials. The wooden trough or wide-brimmed calabash which they use for carrying honey comb during harvesting is satisfactory, but could be improved.

Covers for the troughs and calabashes should be used to keep out bees and dust. The beekeepers also use special calabashes for storing the honey after the combs have been broken down. These could be provided with suitable airtight stoppers which

could be made of wood. Using cow dung and ashes to seal the calabashes should be discouraged. It was also reported that after long use, the calabashes become worn through corrosion caused by honey. Determining the appropriate duration for their use and, if possible, the treatment required to prolong their use, are subjects for investigation.

5.7 Market development

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Based on the regular export returns from the Customs and Excise Departments between 1906 and 1985, a ten-year average production of honey in Tanzania was estimated to fluctuate between 4,000 and 8,000 tons per year. However, a lot of honey is consumed by the producers and some is sold to other consumers in the village. Honey that escapes the market in this way may be estimated at 2 000 tons. The methods employed in collecting honey and distributing it to consumers make it difficult to obtain accurate production statistics. Efforts to obtain information from the producers have not yet been

successful for several reasons:

- **Beekeeping is done in the forests in scattered locations.**
- **Many beekeepers are men with little formal education, who do not keep records of their harvests and are often suspicious of questionnaires, fearing levy or taxation.**
- **Not all honey reaches the market.**
- **Beekeeping is not yet attractive to young, educated persons because it is labour intensive and stinging is feared.**

Smith (1961) observed that the development of systematic honey marketing in some areas dates back to the 1950's, little having been done previously in the way of processing and packing it for the high-grade market.

After studying the problems of harvesting and preparation of

honey for the market, it became clear that if trade in high-grade honey was to be developed, it was necessary to win the cooperation of the beekeepers and teach them how to harvest and prepare it without spoiling it. As the beekeepers who operate near settled areas can easily sell low-grade honey to the wealthy honey beer brewers, it was considered appropriate to elicit the co-operation of beekeepers operating in remote areas of the forest.

In Tabora Region for example, transporting honey to the village areas where it could be sold was a major problem. Buying crude honey from the beekeepers was not considered because the honey contains brood combs and large quantities of pollen. Attention was therefore directed towards teaching beekeepers the following.

- Honey must be collected only immediately after the main honey flow, when the hives contain ripe honey.**
- Upon removal from the hive, the honey must be placed in an airtight container. The honey must be strained as**

soon as possible before crystalization starts.

- The honey must be checked for flavour, colour, density and cleanliness; any honey failing to meet standards must be rejected.

- Heat must be avoided and the honey stored as cool as possible.

After the necessary answers to the technical problems had been obtained, the operations were handed over to the beekeepers' co-operatives.

Similar efforts were made in Handeni District in the early 1960's, this time with a farmer's co-operative society. Honey presses were distributed to beekeepers in order to produce pressed honey which was filtered through coarse cloth. As the activities of the co-operative were diversified, concentration on honey soon lapsed and the venture was abandoned. Ten years later, in 1974, the government of the Federal Republic of

Germany dispatched Professor W. Drescher to carry out a feasibility study for a beekeeping project to be developed in Tanga Region, under the Tanga Integrated Rural Development Programme. Information was compiled on the number of hives in the region and the demand for honey in the major urban centres in the northern and eastern zone.

Following these observation, the following recommendations for improving beekeeping in Tanga Region were made.

- Better training of beekeepers in improvement of the quality of their honey.**
- Stimulation and training of interested people, especially in Ujamaa villages, to get involved in beekeeping.**
- Supplying more advanced beekeeping equipment to interested beekeepers.**
- Improvement of the market situation by collecting immediate payment for honey and wax.**

- Improvement of the products through adequate storage and processing facilities of honey.**
- Creation of contacts to inland and foreign markets.
(Drescher 1974)**

Implementation of the above recommendations included three demonstration centres and a filtering plant in Handeni, with a woodworking shop for the manufacture of beekeeping equipment.

The above experiences suggest that it is extremely important to win the cooperation of the producers if success in developing a honey market is to be achieved.

Harris (1932) made the following observations about bees-wax.

"... the work of improving the beekeeping industry and quality of bees-wax requires a knowledge of the most important bees-wax producing areas in the country:

(a) The area that lies to the west of Tabora - Mwanza railway line up to the Belgian Congo (Zaire) boundary. This area produces high quality bees-wax that commands a higher price than that from other areas, because it is uniform in colour and contains little dirt.

(b) The hinterland of Lindi and Kilwa. This area produces bees-wax which is not uniform in colour, ranging from pale yellow to deep chocolate.

(c) The rest of the country produces negligible quantities of bees-wax, but surprisingly, the areas of Kilimanjaro and Usambara mountains despite the fact that they are heavily stocked with bee hives, produce very little bees-wax.

(d) The areas around Rufiji and Iringa also produce some bees-wax.

It is not surprising that much government effort has been

directed towards those areas where the production of bees-wax has been substantiated. However, efforts have also been made in several other areas to bring the market value of bees-wax to the attention of beekeepers. But because of the strong traditions and myths about separating honey from bees-wax, success in putting this product onto the market has been limited.

Ntenga (1976) observed that methods employed for the protection of bees-wax, its recovery and marketing make it difficult to determine the amount produced in a given year. Nowhere in beekeeping literature can statistics be found on actual production of this product. Since the value of bees-wax is not yet known to all, export statistics must still be consulted to determine years of good or poor production.

In the areas of Meru, Kilimanjaro, Pare and Usambara, the normal practice of the beekeepers is to include the wax comb in their honey, which they sell to the flourishing beer market. The beer market requires wax in the honey to ensure its authenticity

and the fortification of the final brew. In the Sonjo areas of Monduli District it is prohibited to separate and render bees-wax because the bees are thought to migrate from the area for good if bees-wax is separated.

The subject of bees-wax is of special interest, and is taken up in Appendix II. Meanwhile it is well to bear in mind the Nyamwezi adage: "You spit wealth and swallow wealth."

This means that when you chew honey comb, the wax discarded after chewing is as valuable as the honey you swallow. The Nyamwezi people have known the value of bees-wax for more than a century.

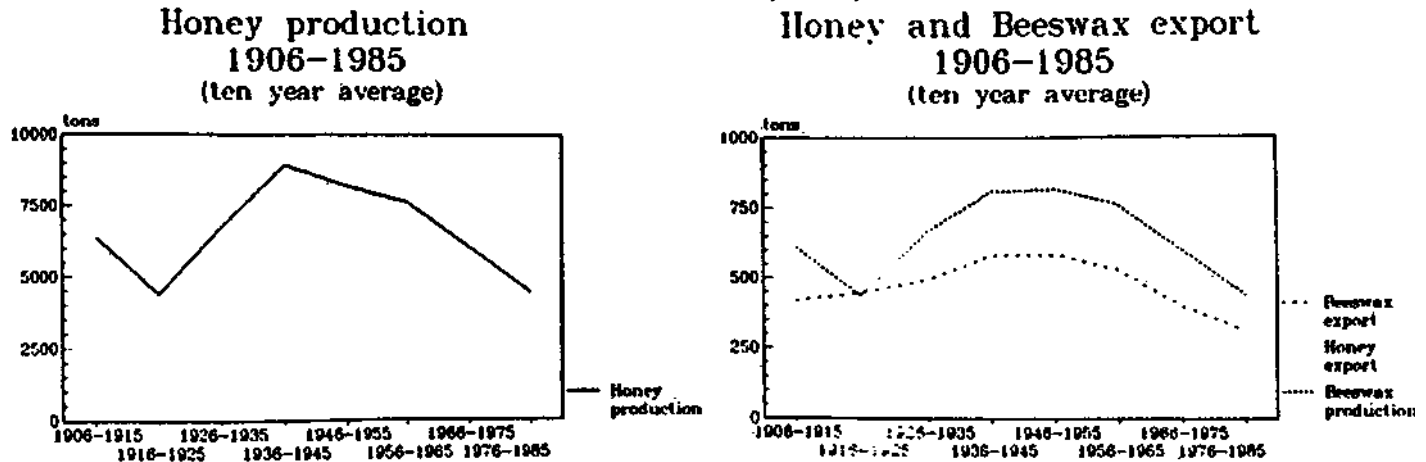


Figure 24. Production and export of honey and bees-wax, Tanzania 1906 - 1985.

The development of an organised market for honey should be viewed as a long-term programme in Babati District. Through extension the beekeepers should be taught how to separate honey from wax and the existing local market should be made aware of clear honey. The beekeepers should be taught how to clean bees-wax using the method described in Appendix IV.

Honey can initially be separated from wax by the settling

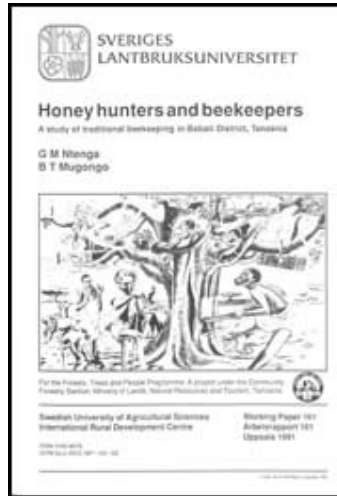
method using domestic utensils. The broken combs can also be placed in a container with a perforated bottom, allowing the honey to drip into another container. The wax which remains behind should be squeezed in a coarse cloth or rush bag to remove the remaining honey.

There is a big demand for honey both in the villages and urban centres. Any honey which is surplus to the needs in the village can be easily sold to urban centres through auctions which take place regularly at designated places in the village areas. The beekeepers at Mrumba and Liloda in Hanang District use these auctions effectively.

It appears that the beekeepers who sell honey to the Barabaigs or other villagers feel they are doing wrong; hence the clandestine nature of their business. This attitude should be fought vigorously through an education campaign.

After the quantities of honey and bees-wax have been ascertained, special buying posts and collection centres can be developed with a view to setting up a centre for filtering and

packing in wholesale and retail containers.



Honey Hunters and Beekeepers: A Study of Traditional Beekeeping in Babati District, Tanzania

Author(s): *G M Ntenga, B T Mugongo*

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6. GENERAL RECOMMENDATIONS

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6.1 Objectives

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It is important that the objectives of the development project be spelled out clearly and that every extension officer know exactly

what is required of him or her.

Generally, the objectives for developing beekeeping in Babati District are:

- Creating or furthering awareness of the importance of beekeeping among the rural population and government,**
- Improving traditional beekeeping with a view to introducing modern techniques,**
- Producing honey and bees-wax for domestic consumption and export,**
- Popularizing tree planting in rural and urban areas to improve the environment, protect the soil, provide nectar and pollen for the honey bees, and possibly to establish an apiagroforestry industry.**

6.2 Means

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The following measures are proposed as ways of attaining these objectives:

- Increase extension staff and organize their work effectively.**
- Set up demonstration centres to be stocked with improved traditional hives.**
- Organise beekeepers' brigades in the villages for communal instruction and improved beekeeping.**
- Visit beekeepers' brigades regularly for instructions, discussions and demonstrations.**
- Organise lectures and demonstrations in schools and Folk Development College.**
- Observe flora, climate and actions of the beekeepers and determine their value and influence on beekeeping.**

- Distribute beekeeping equipment.**
- Organise the processing and marketing of bee products.**

In considering methods of developing the beekeeping industry in Babati District, it is well to keep in mind Mukwaira's (1976) observation that traditional beekeeping has existed for centuries among African beekeepers. They are used to their own methods of obtaining honey and these are part of their culture. Changing cultural habits is always a long-term effort.

The development of beekeeping in Babati District should therefore be promoted by extension service efforts described in the following sections.

6.3 Extension staff

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Each of the existing beekeeping officers should be deployed to cover one division in Babati District. The District Beekeeping Officer should personally be in charge of activities in Babati Division, so that he can be available for assisting the brigades which have been organised at Kiongozi, Mamire, Mutuka and Sigino.

The other three assistants should be posted in Gorowa, Mbugwe and Bashnet Division. The assistants, who are virtually untrained, should work closely with the experienced Divisional Forest Officers. The Divisional Forest Officers should be encouraged to co-operate with and support the assistants.

A short, intensive training seminar on extension methods should be organised for both the forest and beekeeping officers, to acquaint them with the rudiments of practical beekeeping. If possible the beekeeping officers should be provided with bicycles so they can reach the beekeepers easily. It is important that the beekeepers see and talk to these officials to give them confidence in their work. Most of them have not consulted a

beekeeping expert and are not sure whether or not they are keeping bees legally. In order to boost their activities, arrangements should be made with the Tabora Training Institute to send students to the district on a study tour of the divisions, during which the students and the beekeeper will learn from each other. Efforts should be made to get trained beekeeping officers to take charge of the divisions.

6.4 Demonstrations

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It is recommended that each beekeeping officer should maintain, initially, a demonstration apiary using improved hives based on traditional designs such as plank hives. The apiary should consist of not more than 25 bee colonies built up progressively. The demonstration apiary should not be stocked with several designs of hives, and if it is desired to demonstrate other designs, separate apiaries should be started for each. The management of these apiaries should be demonstrated clearly and practically.

The crops from the apiaries should be sold and local beekeepers should be informed about the revenue generated from these sales. The beekeeping officer should use traditional equipment and containers as long as their use is practical. In short, demonstration apiaries should be designed to improve the skills of the extension officers, show the value of improved techniques and earn revenue for the government.

6.5 Beekeeping brigades

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The recruitment of beekeepers into brigades is recommended as the method of approach in all villages. The response of the beekeepers is always overwhelming at the beginning. More than five beekeepers can form a brigade to start with, with the aim of retaining five in the end. If the group becomes unwieldy due to the beekeepers' enthusiasm, it should be split into smaller units. The brigades should help the beekeeping officer organize his regular visits in each village.

This approach has already been initiated by the FTP-project at Kiongozi, Manure/Mutuka and Sigino and the participating beekeepers appreciate it. Although it is certainly too early to introduce them to the commercial improved hives or transitional hive, should eventually be introduced after convincing discussions with the groups. Bees can easily be transferred into transitional hives.

After the beekeepers' brigades have been established, they can be advised to form Divisional beekeepers associations which would eventually take over some of the FTP-project functions at divisional level.

6.6 Training and education

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The facilities at Tanga Folk Development College, Mbulu, which provides training to farmers as well as beekeepers, should be explored, so that when funds are available, selected beekeepers from the village brigades can be sent there for appropriate

training.

Arrangements should be made for lectures and demonstrations to be given in schools to introduce the pupils to beekeeping. A primary school at Luxumanda already has a beekeeping project, indicating that some schools are interested.

6.7 Project apiaries

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A number of commercial hives have been purchased by the FTP-project, which should be installed in apiaries located in the Kiru Valley and at the foot of Ufiome (Qaraa) Mountain. Small apiaries of 25 stocks are preferable to larger ones, and should be developed step by step; one apiary should function well before another is started.

The existing supply of commercial hives (150) is sufficient for the next three to five years. If plank and transitional hives are to be used, they should be installed in separate apiaries and the

production from each should be recorded.

In addition to the above work, the FTP-project should assume the responsibility for distributing suitable equipment, such as bee hives, smokers and protective clothing, before transferring this task to any other organisation. The beekeepers' associations, once formed, would be the logical choice for assuming this responsibility.

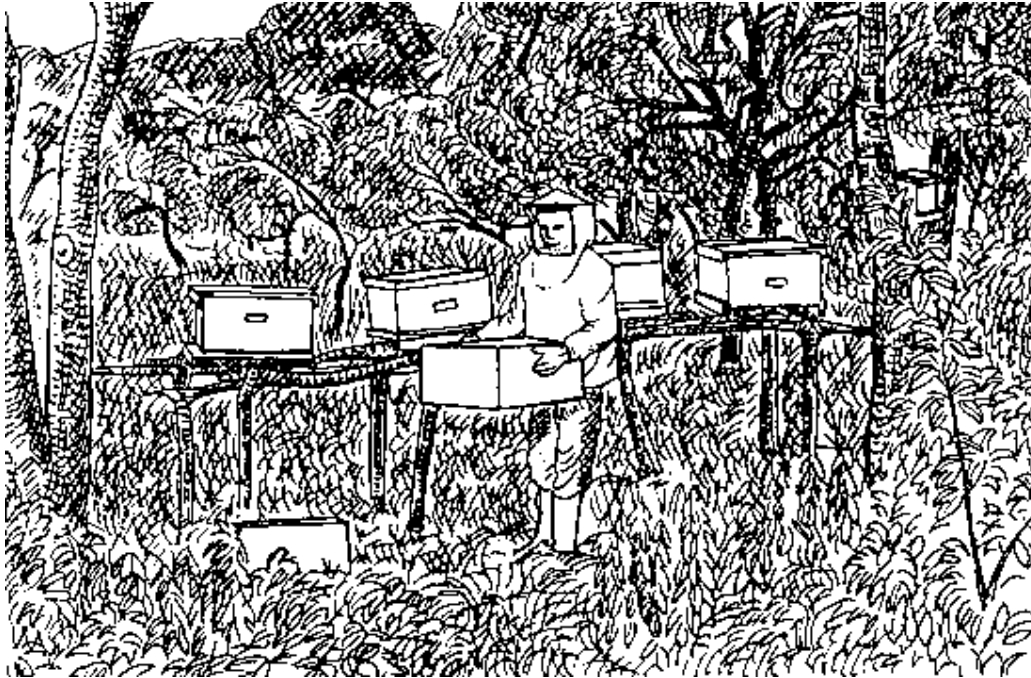


Figure 25. Commercial hives at the FTP demonstration and trial apiary.

It is appropriate at this stage to examine the bee house method of beekeeping as practised by the Nyaturu in Hanang District. The advantages of bee houses cited by beekeepers at Mrumba

are:

- **Theft of bee houses and honey is prevented;**
- **Bees do not abscond or migrate easily;**
- **Inspection of hives is facilitated;**
- **Bee enemies such as the honey badger can be controlled and other pests eliminated;**
- **Water can easily be provided for the bees in gourds or clay pots.**
- **It is possible to harvest twice a year.**

The consultant is familiar with both concrete wall and mud-and-wattle bee houses in Tabora area. He even designed a bee cage, with chain link wire netting instead of walls. There is no question about the protection afforded by these structures to

bee colonies, and the relative comfort with which the beekeeper is able to work with his bees. But production from bee colonies in bee houses has never exceeded that from outdoor apiaries, and under the present economic conditions it is difficult to justify the construction of houses or huts for bees. The investment for even one bee house is too high for an ordinary beekeeper, and management of a large number of bee colonies is at the moment nearly impossible.

Hopefully, there will be an improvement in the financial capacity of beekeepers to cover such costs as the beekeeping enterprise develops. Therefore, however, bee houses or huts should be set up on a trial basis, especially with the hives which may be prone to destruction by the elements. Bee houses are ideal for queen rearing, and could be used when this practice has become more widely accepted.

Finally, the scope for further studies in this field is unlimited, considering that beekeeping has to undergo changes stage by stage. This study provides the necessary base material for the

first stage towards the development of the beekeeping industry in Babati District.



Figure 26. Beehives kept inside the house.

6.8 Summary of recommendations

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The development of traditional beekeeping in Babati District should best be approached through four focal points - one for each division - with a main centre at Babati. It is believed that the integration of beekeeping activities with those of the FTP project should make available a considerable number of extension workers for both forestry and beekeeping. A plan of operation comprising short and long-term objectives and methods is suggested below.

Short-term:

- Deploy each of the existing beekeeping extension officers to each division to join the divisional forestry extension team.**
- Request from the government additional staff to take part in**

the beekeeping project.

- Make a detailed census of beekeepers and hives (with help of Tabora BTI students) and up-date it regularly.**
- Make the governments' and FTP's interest in beekeeping known to the beekeepers.**
- Set up beekeeping demonstration centres, one in each division.**
- Start experiments designed to solve the present problems in traditional beekeeping and devising simple improvements.**
- Organise beekeepers into beekeeping brigades.**
- Introduce improved methods for traditional beekeeping in demonstration apiaries and training sessions.**
- Teach beekeepers how to separate honey from wax and how to render bees-wax for the market.**

- **Organise sales of simple tools, equipment and containers.**
- **Encourage beekeepers to plant trees which can provide bee forage.**

Long term:

- **Provide training to members of beekeeping brigades.**
- **Organise experiments with plank hives and transitional hives (see Fig. 27, 28 and 29).**
- **Establish buying post or a mobile unit for the purchase of bees-wax and honey.**
- **Organise packing and sale of honey.**
- **Evaluate results.**



Figure 27. An experimental transitional hive made from sticks.



Figure 28. The frame is plastered with mud and cow-dung.

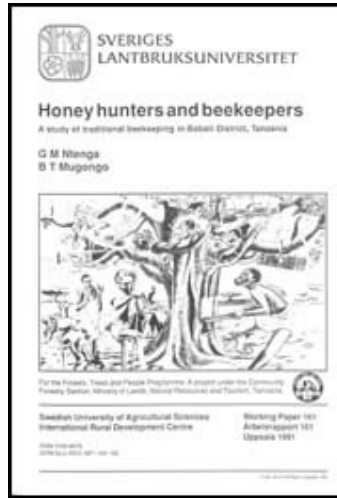


Figure 29. The beekeeper shows the top-bar with a comb. A zero-cost improved beehive like this can also work.





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