



Kadale Consultants

**Honey Sub-Sector
Initial Report**

For COMPASS II

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This report has been prepared by John Pratt of DAI and Shelix Munthali of COMPASS as part of a consulting team led by Jason Agar of Kadale Consultants Ltd. Janet Lowore contributed materially to data collection, generation of graphic presentations and analysis during 2004.

The purpose of COMPASS II is to enhance household revenue from participation in community-based natural resource management (CBNRM) initiatives that generate income as well as provide incentives for sustainable resource use in Malawi. The COMPASS II project (2004—2008) seeks to further USAID Malawi's Strategic Objective 6: Sustainable Increases in Rural Incomes through three result modules:

1. Increase the decentralization of natural resource management in Malawi.
2. Enhance rural communities' capacity for managing natural resources in a sustainable manner.
3. Increase sales of natural resource-based products by rural households.

This report supports the achievement of the third of these objectives. The central theme of COMPASS II is to bring CBNRM into the commercial mainstream, so that products sustainably harvested from the natural resource base can find a ready market and provide a commercial return to communities and other stakeholders. Commercial viability will reinforce the stakeholder interests in preserving and protecting their natural resource base.

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Kadale Consultants Ltd.,
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Abbreviations

BERDO	Bwanje Environmental Rehabilitation and Development Organisation
CBNRM	Community-Based Natural Resources Management
CBO(s)	Community-Based Organization(s)
COMPASS	Community Partnerships for Sustainable Resource Management
DAI	Development Alternatives, Inc.
DNPW	Department of National Parks and Wildlife
ECI	Ebony Consulting International (Pty.) Ltd.
EDETA	Enterprise Development and Training Agency
GTZ	Gezellschaft fur Zusammenarbeit – German technical cooperation agency
MMCT	Mulanje Mountain Conservation Trust
MoMNRE	Ministry of Mines, Natural Resources and Environment
NGO(s)	Nongovernmental Organization(s)
NICE	National Initiative for Civic Education
NRBE(s)	Natural Resource Based Enterprise(s)
NRC	Natural Resources Committee
NRM	Natural Resource Management
NSO	National Statistical Office
SADC	Southern African Development Community
STTA	Short-term technical assistance
TA	Traditional Authority
USAID	United States Agency for International Development
WESM	Wildlife and Environmental Society of Malawi

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Executive Summary

This study was carried out between July 2004 and February 2005.

Malawi produces some 55–65 tonnes of honey each year and, although the beekeeping industry appears to be slowly expanding, its honey output meets only one third or less of domestic retail and industrial demand with negligible honey imports.

Retailers of honey are out of stock for several months each year but, surprisingly, shortages do not lead to seasonal retail price rises.

Total value of sales by the honey industry at around 400/kg is MK22-26 million/year (c. \$220,000).

Honey exports are insignificant. Since 1994 there have been three recorded shipments each of 10 tonnes or more to Mozambique, South Africa and Malaysia respectively. The Malaysian shipment took place in 2004.

Up to 3 tonnes of beeswax is available each year as a by-product but it is not truly commercialised as most is not even collected. There is a small trade for use in stitching/boot-making and a very small cottage industry in beeswax candle and floor polish making. Insect waxes, including beeswax are imported in shipments of several tonnes from time to time and their exact nature and uses need to be ascertained.

The honey bottling industry comprises 15 identified players, from independent beekeepers and Estates to Smallholder bodies. There are five bottlers in/near Mzuzu where competition for honey supply is high.

All honey retail jars sourced in Malawi are of PVC plastic from several manufacturers in Blantyre. The jars are not gas-proof and have become noted for leakage and poor presentation. Glass jars would be ideal technically but are costly to import. PET plastic, which is harder, gas-proof and has an attractive glossy finish, could be a suitable compromise if the jar and lid mould(s) were imported.

Bulk honey is used by the pharmaceutical industry for domestic and occasionally international sales.

The total number of active beekeepers nationwide is in the region of 2,500. On average they each produce about 24 kg of honey/year worth some MK 2,600 (\$24) in aggregate and spread over two seasons. The main flow is in mid-summer, i.e. December to January. Typically they are organized into Clubs of 5-15 members and while there is huge variation in hive ownership, the average beekeeper has four hives.

At least half of the output comes from traditional pot, log and bark-ring hives. A handful of larger-scale private beekeepers use the costly and intensively managed 5-storey Langstroth hive.

Adoption of modern top bar hives modelled on Kenyan hives, and in many cases donated by donors, is increasing but yields are low and these generally fail to provide a satisfactory return to investment. At some MK 2,000 each, they are around five times the 'cost' of traditional hives but mostly fail to give five times the yield with a productive life of about 6 years. They are made from local plantation timber planks and need water-proof roofing felt that has to be imported and is not readily available.

Honey harvesting, especially of top bar hives, is best done by three beekeepers working together. The clothing and equipment used for this purpose costs about MK 10,000 and needs to be replaced periodically.

With very few localized exceptions, all beekeepers suffer from theft and sometimes vandalism of their hives. In some regions hive losses are around 20%/year. This can drive less efficient beekeepers into financial losses and overall is a huge drain on the industry.

Beekeepers' access to public lands, especially forests under the management of Forestry Department and Department of Parks and Wildlife, needs to be organized and regulated, preferably under a tenurial arrangement, but this will need to be accompanied by provisions to mitigate the risks of hive theft.

Records of industry training since 2000 imply that 800 or more people have been trained in beekeeping but most are not yet equipped. It is not possible to determine whether these people have the necessary skills to harvest honey successfully and operate a successful business.

There is an enormous gulf in productivity between the best and worst beekeepers. This has less to do with hive type than with hive management. It is probably not due to shortages of bee pasture either, although bee pasture yield needs examination.

In each beekeeping club there are usually one or two leaders who may own 50 or more hives, for whom beekeeping is a full or part-time profession and whose yields/hive can be exemplary. In many cases they inherited their craft from their parents. This suggests that returns to the industry could be improved by promoting and supporting specialization by beekeepers who demonstrate good management and returns, rather than by treating hive distribution as a mass poverty alleviation effort.

Financial appraisal of the industry's overall performance identifies an inadequate return to most beekeepers' capital and effort. The fact that capital (i.e. top bar hives and bee suits) has often been donated is perhaps responsible for capital returns not being taken seriously. 'Beekeepers' who fail to manage their top bar hives properly after due instruction could be better off selling their hives (and suits) for their residual value to more efficient beekeeping neighbours.

The evidence presented in this report suggests that several past and existing donor-supported approaches to beekeeping promotion, being poverty-focussed, have targeted too a wide pool of inexperienced hands and failed to adequately match gifts of equipment with developing the right production and business skills. Many beekeeper 'training programmes', although technically sound, do not include a business/investment return training module.

The greatest potential gains to the industry will come from identifying and nurturing good beekeeping practices and then supporting the equipping of beekeepers who demonstrate the capacity to meet minimum levels of performance and especially returns on capital. This could involve establishment of a Certification scheme. It would be a selective process that rewarded success, not poverty.

The best beekeepers might wish to employ (unemployed) apprentices who can learn from them. This will enable the number of hives under skilled management to greatly expand. This miniature 'corporate' producer model is likely to prove to be the best approach to expansion of production and to industry profitability. It could also properly train the next generation of beekeepers.

After the high profile failure of the Beekeepers Association of Malawi, the industry has no umbrella or regional organization to represent its many interests, especially with Government on issues such as property security and forest access. Such a federation, besides being the interlocutor with Government, could promote both organic growth and the expansion of beekeeping in regions that are not fully exploited and take a lead in establishing Standards of production practice that would, over time, improve performance and profitability.

1 Introduction

This Sub-sector Report provides an analysis of the honey sub-sector and related bee product value chains in Malawi conducted between July 2004 and February 2005. This analysis forms part of a wider process for problem solving for stakeholders in this sub-sector¹ by providing a common understanding of the product value chains as the basis for the interested stakeholders to jointly prioritise and address issues that either offer opportunities or constrain the development of the sub-sector.

1.1 Outline of Sub-sector Analysis and Process

The value chain process is conducted in several phases of consultation and analysis. This is by its nature iterative as the precise outcomes of each phase are difficult to predict. The information to be gathered is essentially a blank canvas that is progressively filled in as more detail is obtained. Thus at the end of phase one (as reflected in this report), there is an outline of the key aspects of the value-chain and how they fit together. There is considerable detail on certain aspects that has come out of previous reports and fieldwork. However, the picture is not in any way complete.

Some areas of the picture come into sharp focus such as the priority problems identified by stakeholders, whilst others remain somewhat blurry. The objective is to solve problems, not to complete the detail for all of the picture.

It is important to bear in mind that key areas of information may prove impossible to get in the detail required or may become much less relevant as the picture emerges. There are likely to be more areas of information that were not identified at the outset, but which come out in the process as important to collect and in need of analysis. Moreover this will become particularly the case in relation to priority problems highlighted by stakeholders in the first stakeholders' workshop on February 17, 2005.

Whilst this is an analytical process, it is also primarily a problem solving process which requires the engagement of the stakeholders, their ownership and their active involvement in problem definition and solving. Therefore future analytical work must support and respond to the priorities of the stakeholders as identified at the stakeholder event.

1.2 Report Structure

This report is divided as follows:

Sections 2 - 4 describe the products under review, define their character and industry Standards (where available) and describe their output quantities and how they are traded internationally and, more particularly, nationally.

Sections 5 and 6 describe the stakeholders in the industry starting with beekeepers, i.e. primary producers and present a picture of the livelihoods of these producers. Support services offered by donor-funded entities are described here.

Section 7 and 8 describe the factors of production and some of the impediments to the industry, examine its financial viability and report on how the industry is financed.

Section 9 and describes non-donor support services available to the various actors.

Sections 10 and 11 analyse the functioning of the value chain and the industry's overall efficiency and explain how it is affected by Government policies and its context for the environment.

Section 12 suggests how the industry might initiate a dialogue to tackle the issues and Section 13 describes some of the risks to which the industry is vulnerable and which are largely outside its control.

1.3 Methodology

This Value Chain sub-sector analysis has been the first trial of a methodology agreed upon by the partners in 2004. Full details of the process and methods are available upon request. Phase 2 will commence upon completion of the first stakeholders workshop.

In July 2004, in a pilot exercise, Janet Lowore was commissioned to investigate the Northern Honey sector over a period of two months and organised a regional workshop for stakeholders in Mzuzu on September 15, 2004 to share the findings and provoke discussion of emerging issues. A number of semi-structured interviews with consolidators and beekeeping groups were conducted, during an extensive travel programme in the North and covered a wide range of topics as laid out in this report.

Shelix Munthali carried out a scoping exercise among industrial stakeholders in Blantyre and elsewhere, several of whom were known to him from his previous career in the food processing industry. Malawi Bureau of Standards was also consulted.

Secondary data was obtained from various sources including Wildlife and Environment Society of Malawi, Mulanje Mountain Conservation Trust and Business Consult Africa. John Pratt carried out visits to Southern beekeeping groups in early 2005 to verify cost and yield data generated from other sources and used this information to prepare the financial analysis.

2 Products

Whilst the original focus of this study was on honey and bee products, it is clear from the analysis that other than honey, almost no other bee products are traded. The focus of this report is therefore on honey, with some information on beeswax. The market is just too undeveloped to consider royal jelly, bee venom, bee brood and propolis at this stage.

2.1 Honey

Honey is a versatile natural product with range of domestic, food processing and pharmaceutical uses. It has natural preservation properties due to its high sugar content and this gives it a good shelf life if handled correctly. Its natural flavouring properties make it superior for processed foods to sugar and it is regarded as a highly valued food commodity. Honey is also appreciated for its perceived and actual health properties.

2.2 Beeswax

The ratio of beeswax to honey production is about 1:20 by weight. This is not fully exploited in Malawi, both at village level and in the urban areas and most of the times the wax is just discarded. Potential uses of bees wax include: manufacture of candles, polish, cosmetics and as a lubricant.

2.3 Propolis

Propolis is a sticky sap/gum collected by bees from tree bark/buds, often used as a swarm attractant in new hives. Use of propolis is mainly limited to household level with negligible income generation. Contains antibiotic substances; hence may be used for treatment of certain ailments. In Uganda it is used by local communities for ear infections.

2.4 Bee Venom

This is not currently used, but has potential for use as treatment for various ailments and for treating bee allergies.

2.5 Royal Jelly

Produced by worker bees but not currently used. It has potential use in the cosmetic industry.

2.6 Bee Brood

This is the developmental stages of bees, which is a rich source of proteins/nutrition. However, if bee brood is 'over-harvested', or seriously damaged during honey harvesting the swarm may abscond, or through swarm reduction result in low honey production.

3 Standards

Malawi Bureau of Standards (MBS) began testing honey in late 2003. Honey is the only bee-product where a standard is defined. Inspection is usually arranged at the initiative of the vendor and this is relatively rare and primarily for export purposes. In practice the majority of branded and informally sold honey is not inspected

MBS is able to conduct micro-biological screening but suffers from problems in maintaining chemical analytical equipment. It remains in a position to provide Third Party Certification against foreign buyers' requests for Export Batch Quality Certification.

MBS is using the COMESA harmonized standard for Honey (COMESA/FDHS 002:2004). The COMESA treaty calls for harmonization of standards to facilitate quick transactions among member states by removing of technical barriers.

The COMESA standard is as follows:

Quality Factors

- Purity. Honey should not contain any additives; be it food or non-food additives.
- Honey shall not be heated at any stage of processing.
- Moisture content: $\leq 20\%$ (foreign importers usually demand a maximum of 18%)

Sugar Content:

(i) Fructose + glucose: $\geq 60\text{g}/100\text{g}$

Honey-dew honey or blends of honey dew with blossom (nectar)

honey: $\geq 45\text{g}/100\text{g}$

(ii) Sucrose: Lavender, Borage $\leq 15\text{g}/100\text{g}$

Alfalfa, Citrus Acacia, honey suckle, M. Banksia, Red Gum, Leather wood $\leq 10\text{g}/100\text{g}$

Others: $\leq 5\text{g}/100\text{g}$

Water Insoluble Solids

- Pressed Honey $\leq 0.5\text{g}/100\text{g}$
- Honey other than pressed honey $\leq 0.1\text{g}/100\text{g}$

Contaminants:

- Honey to be free of contaminants like heavy metals and pesticide residues. To comply with maximum residue limits as set by the codex Alimentarius Commission.

Hygiene:

- To observe rules of hygiene during packing: clean packing area, packers to wash hands and wear gloves, all utensils to be washed and well dried before being used, avoid leaking fingers, and jars to be clean and dust free.
- Packing room to have insect proof windows by fitting wire mesh

Labelling:

All the jars should be labelled accordingly. Information on labels to include name of product (in this case honey), name and address of packer, quantity of honey in the jar, country of origin, date of minimum durability preceded by the words 'Best Before', and batch number. For easy and convenient handling and transportation, the jars should either be shrink-wrapped or packed in cartons. Cartons should also be labelled and in addition to general information on the label cartons should also show number of units it contains as illustrated in the example below:

Livingstonia Honey

Packed by Livingstonia Honey Association
Mpopi Trading Centre
P.O. Box 33
Livingstonia, Malawi

20x350g
Batch LH07

Best Before 09/2006

HMF (Hydroxymethylfurfural) Value ≤ 80 mg/kg

In practice, the only quality factor commonly monitored at producer and consolidator level is moisture content to avoid producers who dilute the honey. Most beekeeping associations/clubs were trained in the use of refractometers, especially those formerly under the Malawi German Beekeeping Project. The same is true for consolidators. Hygiene, prevention of contamination and labelling are also generally being monitored. However for more sophisticated testing, the problem is access to the MBS facilities in Blantyre. SCFT honey is sold bearing the MBS-approved logo and SBDR regularly submits samples to MBS for testing.

Use of refractometers by honey buyers has diminished the risk of beekeepers adulterating honey with water. Some beekeepers in the Chakanaya Area, Chikwawa were notorious for this practice in 1995.

Some consolidators, pharmaceutical firms and the hotel industry also have their own (in-house) quality specifications which are given to potential suppliers to meet.

Apart from the MBS, CAMA, city assemblies and ministry of health also carry out regular inspections in food processing units as well as sales/distribution outlets to check conformity to standards. All these institutions are, however, thin on the ground and therefore relatively ineffective.

For the export market more rigorous standards than just moisture content will need to be met. The EU market is particularly concerned about pesticide residue limits, an area that seems to have received no attention so far.

4 Trade, Marketing Systems and Structure

This section reviews the trading and marketing system through which honey and other bee-products reaches the final consumer from the original point of production.

4.1 Honey

National honey production is in the region of 55 – 65 tonnes/year, based on reported production turnover and purchase records of stakeholders who have been interviewed as indicated in this report. For up to six months of the year there is no honey on the market (off season), especially in the cities of Lilongwe and Blantyre. Production probably needs to be increased at least two to three times to satisfy domestic demand.

There have been very limited honey imports and exports but neither exhibits a pattern. In reality, the scope for exports is currently very limited due to the limited volumes and probably restricted to niche products such as 'Macadamia Honey'. Imports are restricted to the occasional retail products to meet the shortfall in domestic production. The paucity of imported retail products also probably reflects that there is a relative regional under-supply and processors with surplus capacity are more attracted towards other markets such as South Africa, the Middle East and Europe.

Beekeepers sell honeycomb or strained honey through the following channels:

1. Direct to consumers within the neighbourhood, village or nearest trading centre/market place which is readily accessible.
2. To consolidators: These may be large-scale beekeepers or clubs/associations with bottling facilities and easy access to big markets in the urban areas.
3. To large scale consumers like hotels, pharmaceutical industries, and hospitals as bulk honey.

Consolidators provide both a bulking service and moving honey from remote points of production to the market in the urban areas. In some cases they can also provide further processing and pack their own products for retail sale:

1. Consolidators selling direct to consumers at farm gate, retail, or wholesale prices.
2. Consolidators selling to processors
3. Consolidators selling to export markets.
4. Processors selling to export markets but this trade is almost non-existent at the moment.

4.2 Beeswax

It has not been possible to determine bees wax output. Taking a ratio of 1:20 against honey, it is likely that some 3 tonnes of wax could be made available for sale but most of this is not being collected. Ironically there is evidence suggesting that 'insect' wax (including beeswax) is imported for industrial uses.

Small-scale bootmakers/repairers and some tailors treat stitching thread with beeswax, to improve 'glide' of the thread and to help its preservation. Bees wax may also be used in small scale leather preparation.

There are small producers of candles in Vwaza and Chelinda (some are linked to retailer African Habitat) and others associated with Village Hands. A family makes its own beeswax-based floor polish in Dwanga under the "Inta" label.

There is potential demand for exported beeswax; in fact the value of bees wax is much higher than that of honey, but the volumes of beeswax production are very small and might be difficult to consolidate for a realistic export shipment.

4.3 Imports of bee products

To supplement local production, processors have sometimes imported honey into the country. In the border districts of Chitipa and Karonga this may be quite common (although it involves small quantities); at industry level there are isolated cases, which may involve larger quantities. In 2001/2002 Tambala

Foods bought only 5 tonnes of honey from local producers (Namwera and Chikwawa). This was supplemented by 10 tonnes from dealers who were supplied from neighbouring Tanzania.

National Statistics Office data for 1998 - 2003 for imports of bee products are presented in Table 1. They do not indicate a year-to-year pattern.

Table 1 Imports of Honey and Bee Products 1998-2003

Imports		1998	1999	2000	2001	2002	2003
Product	Country of origin	Tonnes	Tonnes	Tonnes	Tonnes	Tonnes	Tonnes
Honey	Germany	0	0	0	0	0	0
	Zimbabwe	nominal	6.0	0	0	0	0.2
	RSA	0	0	1.2	0.2	0.7	nominal
	Tanzania	0	0.8	0.1	0	0	0
	China	0	0	0	0.4	0	0
	India	nominal	nominal	0.2	0.2	nominal	0.2
	Saudi Arabia	0	0	0	0.1	nominal	13.3
	Total	0	6.8	1.5	0.9	0.7	13.7
Beewax, insect waxes							
	RSA	0	14.2	10.5	24.0	0	4.0
	India	0	0	0	0	0	2.0
	UK	0	0	0	0.3	0	0
	Zimbabwe	0	0	0	0.3	0	0
	Total	0	14.2	0	24.6	0	6

Source: NSO

In the above period there were only two significant amounts of honey imports of 6 tonnes from Zimbabwe in 1999 and 13.3 tonnes from Saudi Arabia in 2003. Small amounts (less than 1 tonne/year) enter from South Africa and India. However, the unreliability of the statistics is indicated by their failure to capture the 10 tonnes imported from Tanzania by Tambala in 2001/2.

Insect wax (including beeswax) imports, especially from South Africa, are more significant but fluctuate. In 2003, 6 tonnes of insect waxes were imported; much larger imports are logged for four earlier years and nil imports for four other years.

4.4 Exports of bee products

National Statistics Office data for 1998 - 2003 for exports of bee products are presented in Table 2. They do not indicate a year-to-year pattern.

Table 2 Exports of Honey 1998-2003

Product	Country	1998 Tonnes	1999 Tonnes	2000 Tonnes	2001 Tonnes	2002 Tonnes	2003 Tonnes
Honey	Mozambique	10	0	0	0	0	0
	RSA	0	0	0	0	0	10
	Total	10	0	0	0	0	10

Source: NSO

A total of 10 tonnes of honey were exported in each of the years 1998 and 2003 to Mozambique and South Africa respectively.

It may be possible to look forward to a time when the domestic honey market will be satisfied. Exports are the choice of each individual firm and will depend on a range of factors, but given that it is more difficult to export and Malawi is at a significant transport disadvantage, and that the domestic market is clearly undersupplied, then it is likely that most production will continue to be targeted domestically other than niche products such as Macademia, organic or potentially fair trade honey. Examination of markets in the European Union (EU) could be warranted in due course, but is not likely to be a priority for the industry in the foreseeable future.

5 Stakeholders

This section reviews the range of participants in the honey sub-sector and their roles. Players in the value chain from primary producer to retail consumer are described below:

5.1 Small-scale beekeeping households

Basing figures principally on a compilation of production around Mzuzu and Nkata Bay and data provided by WESM and EPL for the South and far North respectively, the number of active beekeepers throughout Malawi is in the region 2,500 (i.e. they routinely extract honey from their hives). Most beekeepers belong to a Club whose membership may range from 5 – 15. This summation has avoided double-counting that could come from including all beekeepers in the North who are registered with one or more consolidators.

Perhaps more than 800 other people have been trained in beekeeping over the last 4 years, principally through NGO and/or donor-supported initiatives and also through initiatives of the Ministry of Trade and Private Sector Development, but probably they are not yet active. Possible reasons for this are suggested and analysed in this report.

The Malawi-German Beekeeping Development Project (MGBDP), designed in 1988, ran in three Phases from 1989 to 1997. MGBDP reported in 1996 that a total of 561 beekeepers (including 165 women) were in production in the Nyika Park border zones. It supported 63 Clubs, mostly in Rumphu District but few of these survive. The number of active beekeepers currently in Nyika Park and its border zone needs to be determined. In the North generally, especially Chitipa, there appears to have been an increase since that time.

Concentrations of beekeepers and beekeeping clubs are found in Misuku Hills/Chitipa (some 1,000 beekeepers in 70 clubs), numerous communities along the fringes of Nyika National Park (Phoka, Ntchenachena, Rumphu, Bolero, Thazima (20 clubs), etc); Vwaza, Mzimba, Livingstonia, Nkata Bay (Kapunduli Beekeepers Association): 41 Clubs/some 450 members; Small Beekeepers Development and Research Association: 50 participating Clubs/some 550 members), Chikangawa, Nkhotakota, Mzuzu, Kasungu/Chimaliro, Nchisi, Mchinji (11 clubs), Southern Ncheu/Dzanje Forest Reserve and Balaka Districts, Thambani/Mwanza/Neno, Machinga, Blantyre-West, Luchenza, Mulanje and Phalombe, (some 200 beekeepers) and Chikwawa. Other groups operate in forest areas including Viphya, Dzalanyama, Liwonde and Mangochi (3 new clubs). More information on these groups and those in the Lower Shire valley is required.

The limited data set collected implies that 50% of active beekeepers are found North of Nkhotakota and that some 30% of active beekeepers are found in Central region. The remaining 20% are in the South, where most industrial users of honey and final processors of honey are located.

There are a small number of larger scale private beekeepers owning more than 60 hives and two plantation estates that keep large numbers of hives.

In the small beekeeping sector, statistics provide by WESM and IFSP suggest that every bee-keeping club has its leader and laggards. The leader is often a virtually full-time beekeeper owning half or more of the hives of the entire club.

In the North, EPL has identified some 900 beekeepers who own some 3000 hives. Most of these are traditional hives. That equates to just over 3 hives/beekeeper. WESM honey purchasing records for 2004 cover a total of some 260 beekeepers who own 1,100, mostly traditional, hives, i.e. just over 4 hives/beekeeper. In these two very large samples, the average number of hives/beekeeper is about 4. Financial analysis at Section 7 determines that this number is far too low to justify the overheads of group/club collaboration that are associated with small-scale beekeeping.

5.2 Medium/large scale commercial beekeepers

Several of these beekeepers use the five-storey Langstroth hive:

1. One firm is based in Maselema, Blantyre operating under the brand "Bee Kind".
2. Kawalazi Estate Ltd, Nkata Bay marketing Macadamia Honey.
3. Chimpeni Estate, Zomba and some producers in Chiwogoro also use this hive.
4. Satemwa Tea Estate has about 60 hives.

5.3 Consolidators and processors/bottlers of honey and by-products

MGBDP facilitated the formation of the Beekeepers Association of Malawi (BAM) as a Trust in 1993 to help in the marketing function (in the northern region) but failed to accomplish its goals due to mismanagement and poor pricing policy. BAM purchased honey processing equipment with German financial support and installed it in Mzuzu. It could handle a throughput of over 40 tonnes/year. However, BAM continued to suffer from an inability to cover its operating expenses and ran into financial difficulties in 1997 due to mismanagement. It was dissolved in 1998.

Present consolidators are:

1. **Smallholder Coffee Farmers Trust (SCFT), Mzuzu**, uses honey sourced from its members and non-members. SCFT also buys small quantities of beeswax for "onward sale when an opportunity arises". BAM's honey processing plant (but not the purpose-built premises) was transferred to SCFT by the Border Zone Development Project (BZDP) in 1998 and continues in use. SCFT throughput is far higher than ever achieved by BAM but its 40 tonnes capacity is still under-utilised.
2. **SBDRA, Nkata Bay** procured honey from extensive travelling to beekeeping clubs in both Northern and Central Regions.
3. **Mr J.B. Mweso's business Chiwogoro Honey, Mzuzu.**
4. **Mr Siwandem, Chikangawa** sells honey mostly derived from Blue Gum pasture.
5. **Mr A. Chunga, Nyika Honey (brand), Mzuzu.**
6. **Mr A. Banda Kumavembwa Food Products, Mzuzu**, Uchi Brand honey.
7. **Village Hands Ltd, Mwanza** under supervision of Wildlife and Environment Society of Malawi, supported by grant funding from GTZ. It appears to be the sole large-scale buyer from beekeeping clubs around Mulanje and possibly Mwanza.
8. **Eco-Products Ltd (EPL), Chitipa (subsidiary of Corporate Governance Centre, Blantyre)** bottled its first batch of honey in December 2004. It is planning to expand and offer a range of services, including technical advice, to beekeepers.

City-based processors and bottlers for retail who do not consolidate, include Tambala Foods Ltd and Nali Ltd, both in Blantyre. Nali's current throughput is from beekeepers mostly in Chikwawa and Zomba who deliver raw honey.

5.4 Domestic importers and exporters

When domestic supplies have been inadequate, Tambala Food Products has purchased honey from dealers who source from Tanzania.

Okhai Ltd has investigated exports to the United Arab Emirates and Saudi Arabian honey markets but has not yet exported due to non-availability of product. Malawi's whole production would barely fill three containers.

5.5 Industrial/bulk users

These include the pharmaceutical firms Malawi Pharmacies Ltd and Pharmanova Ltd that use honey in their formulations and (non-government) hospitals of the Christian Health Association of Malawi use honey in wound treatment. The pharmaceutical firms are understood to use some 7 tonnes annually for cough syrups and other formulations. Their demand for honey is raised whenever a regional export order for one of these products arises.

5.6 Wholesalers/Retailers

A shop stock and price survey for honey was carried out in Blantyre in January 2005. Major outlets for honey include nationwide chains such as Peoples Trading Centre (PTC) supermarkets and Kwiksave mini-markets, McConnell/Metro, Shoprite supermarkets, Iponga Superettes, Kandodo supermarkets, 7 – 11 Group, Super Foods and Tutla. Individual grocery outlets include Bisnowaty in Lilongwe and the following in Blantyre: Savers Choice, Superior Halaal Meats, Atlas Trading Co, Hannover Supermarket, Elly's supermarket.

It was interesting to note that even in what is the peak output season, 5 out of 15 outlets surveyed did not have any honey in stock.

5.7 Consumers

A consumer survey has not been conducted. Beekeepers everywhere are anxious to ship their honey to urban markets, consume very little themselves and sell very little of their production within their communities. The consumer market comprises mostly urban middle and high income earners.

From anecdotal sources, there appears to be very limited flavour and perhaps brand preference. Consumers are more concerned about availability and will buy those brands they can find. There are the beginnings of product differentiation such as Mountain and Forest Honey, Macadamia honey and Nyika Honey, but given the limited supply, most processors are unable to differentiate the products at present and consumers are also unlikely to differentiate. There is some yellow crystalline honey available from Pirititi, which is preferred by some (mainly European) customers.

5.8 Apparel and equipment suppliers

These include Mr A. Banda and Mr A.Chunga, as well as various tailors and tinsmiths.

5.9 Packaging materials suppliers

These include Enterprise Containers Ltd, Packaging Industries and Polypack Ltd, which are headquartered in Blantyre, and printers of labels.

5.10 Other service providers/regulators

Malawi Bureau of Standards has been covered under Standards. The Department of Livestock (Animal Health/Animal Products) within the Ministry of Agriculture, is responsible for export inspections of the respective animal products from the beekeeping industry, notably to the EU.

5.11 Banks, Micro-finance and Savings and Loan institutions

Most beekeepers report that they have no access to formal sector credit, whether from banks of micro-finance institutions. There are no credit providers specifically targeting beekeepers or other community based clients.

5.12 Local technical and marketing advisory organisations/experts

These include Mr A. Banda, Mr A. Chunga, WESM, EDETA (D. Nyirenda) and Business Consult Africa.

5.13 Local and international registered charities, foundations and trusts

Organisations that are interested in beekeeping and honey production, especially for communities include: World Vision International, Concern Universal, Malawi Environmental Endowment Trust (MEET), Mulanje Mountain Conservation Trust (MMCT), OXFAM and Ptarmigan Trust UK (supporting EDETA). Bees Abroad, a UK Charity has provided direct funding to SBDRA of K1.7 million for technical assistance, buildings construction and equipment supply since September 2002. GTZ is supporting Village Hands.

6 Livelihood Profiles of Households

WESM has provided a livelihood profile for beekeepers from Chambe, Mulanje in June 2003 and, although the result of a localised survey, it may be illustrative of other beekeeping communities. Beekeeping methods described suggest this community had not received training in modern methods:

6.1 Subsistence farming & food security

Almost all of the participants were growing most of their own food on their own land. 8 out of 20 were able to feed themselves and their families for the whole year with their produce. The rest relied either on savings or doing *Ganyu* (contract work, usually paid in maize) for part of the year. Some also had other sources of income such as repairing tin buckets or selling chips at the market, but these always appeared to be 'top-ups' – cultivation was the primary activity. This also applies to beekeeping – in every case it was an added bonus, not the main source of income.

6.2 Stability

Only four out of 20 participants were born anywhere other than the village in which they are now living, and of these, only one moved to Chambe in order to find employment. Some had travelled away for work and then returned. All owned the land on which they lived.

All the participants were relatively wealthy in their villages. Many were closely related to the village Chief. None of the harvesters appeared desperate for money or food, most had livestock and savings of some sort. This is perhaps related to the reality that in order to keep bees a farmer has to be able to put in a small amount of capital to buy the hive – an option not available to the poorest members of the communities.

Also most hives were by the harvester's house for security reasons with 16 out of 20 participants kept their hives within 10 metres of their home. One man's honey had been stolen recently and as a result he had moved the hive even closer to his house.

6.3 Types of hives

'POT' & 'BARK' HIVES: Most participants had either 'pot' hives – made using a round earthenware pot with a coiled straw plug – or 'bark' hives – made by cutting a large segment of the bark of a tree and reconstructing it to form a hollow, cylindrical hive, with coiled straw plugs at each end.

HOLLOWED TREE HIVES: Only two participants were using hollowed tree hives.

TIMBER OR TOP-BAR HIVES: Only one participant already had a modern top-bar hive, although most were planning to get this type in future.

In their plans for expansion, most harvesters wanted the newer top-bar hives, which they had learnt of through WESM's project. Five wanted more traditional hives however (bark or hollowed tree) and perhaps significantly these tended to be the more experienced beekeepers who had learned from their fathers as children, rather than from friends as adults.

The number of harvests per year varied between 2 and 6. The average was 3.

7 Factors of Production, Yields and Costs

Following a process of conversion from using short-life traditional hives to 6 – 7 year life top-bar hives, initiated by MGBDP in the late 1980s, the beekeeping industry in Malawi is slowly transforming itself from a destructive low-input, low-output production system to one that is becoming managed, conservation-oriented and which, if relieved of vandalism and fire hazards, may eventually have a benign or even beneficial impact on the environment.

7.1 Bee pasture quality and seasonality

Production quantity depends on quality of the bee pasture that is the number and quality of pollen and nectar producing plants. Tobacco gives a bitter honey that is not liked. Coffee honey can be dark. Miombo, Savannah and Combretum (e.g. Mchinji) areas are generally good. The following are reported to be good honey potential areas:

1. Livingstonia - still use traditional hives of bark and logs
2. Mchinji
3. Kasungu
4. Dzalanyama Forest
5. Chombe (rubber plantation) and Mzenga okay if blend the honey (Nkhata Bay)
6. Mulange
7. Mwanza: Neno
8. Ntcheu – Mangawira, c 10km south from road block
9. Machinga Forest (Mangochi)
10. Mzimba – Pelekosi Forest Reserve and Chimaliro Forest Reserve
11. Nkhotakota Wildlife Reserve was a rich, acutely under utilised bee pasture.

In contrast, WESM reports Liwonde National Park and surrounding woodlands to contain *Euphorbia* flora whose nectar contains a toxin that makes respective honey unsafe for human consumption.

7.2 Access to bee pasture

The Department of Parks and Wildlife has established a fee-based licensing system for allowing beekeepers to site their hives in the Nyika National Park and Vwaza Marsh Wildlife Reserves.

Forestry Department is experimenting with granting access rights in the Mulanje and Chimaliro Forest Reserves to nearby beekeeping communities.

7.3 Security

All beehives, and top bar hives in particular, run the risk of being raided for honey by thieves, stolen or vandalised. This has an important bearing on realistic planning for production.

Beekeepers who placed some 40 donated hives in gum plantations at a former Young Pioneer Base at Amalika, Bvumbwe lost most of their hives to vandalism possibly attributable to jealousy. This, and honey theft, are recurrent problems of beekeepers in Michiru, Chileka and Lunzu, and even Estate producers. It is assumed that around Blantyre/Thyolo, some 20% of hives are lost each year.

Theft and vandalism are rare in communities along the Northern fringes of Mulanje Mountain but are recurrent problems for beekeepers throughout the Nkata Bay – Nyika region. The position for Chitipa has not yet been ascertained.

Many beekeepers resort to Magic to reduce risks of theft and vandalism. Nevertheless, for planning purposes, until law enforcement and punishments cause theft patterns to change, for most situations it should be assumed that 20% of set hives will be lost.

In several beekeeping communities visited, female beekeepers explained that they could not attend beehives far from home. They reported feeling unsafe and vulnerable to attack by men. This was

particularly stated for Nyika plateau where hives were sometimes set at up to 20km from the homestead and may involve overnight stays in the field.

7.4 Seasonality

Harvesting for bee products is mostly done twice a year, but in some cases where pasture is good then it can be harvested more than twice per year. The harvesting period is preceded by a period of flowering of the vegetation which then makes nectar and pollen available for bees to collect. This is determined by vegetation and prevailing climate in a particular area. For this reason, honey seasons vary from one area to another. In general, however, the major honey season in Malawi is during the period September to December with the biggest flow occurring in December – January; there is a smaller flow in the winter: May – July. This is the pattern for Blantyre.

In Nyika the flow is mainly (70%) in September – November and less (30%) in January – February. In Mwanza/Ncheu the flow is usually in November – January and April – June. In Mulanje slopes there are three seasons in February, May and August. Most of the mountain-top flow is in the winter.

The WESM records for honey passing through Village Hands in 2004 indicate that 60% (1 tonne) was collected in the first season and 40% in a second season.

7.5 Beekeeping equipment and materials

These include hives, swarm catcher boxes, swarm attractant/propolis, suspension wires and wire grease, anti-theft and anti-vandal charms, smokers, beesuits (sets of 3), beekeeper's leather gloves (sets of 3), smoke materials, comb knives, honeycomb collection buckets, sieves, honey storage buckets, honey transport buckets and drums, cleaning materials and clean water.

7.5.1 Beesuits

Top bar hive management requires three people to harvest one hive and for some of the maintenance tasks on each hive. Required suits may be purchased from suppliers at K2,500 – K3,500 each. They seem to cost more in the North. In Mulanje IFSP established a pattern of supplying cloth and veil materials free of charge, which are stitched by tailors at a charge of K600/suit. WESM HQ reports suits to cost K4,500 each. This study takes the median cost of suits as K2,500. They are a very significant capital expense and a price of K4,500 may be untenable.

7.5.2 Leather Gloves/Gum Boots

Gloves cost K700/pair according to WESM. Gum Boots cost K650/pair (BATA), but these are not costed in this study as beekeeping-only costs.

7.5.3 Smokers

A tinsmith in Mulanje makes smokers at K650 each but currently holds no stock. He sold 203 smokers over the two years 2003 – 04, of which 110 were purchased by IFSP and most of the remainder were bought by a Northern beekeeping trainer. Only 18 were sent to Central region.

SBDR reports smokers costing K1,500 each while A. Banda reports K900 each. This study uses a price of K650 in the financial analysis.

7.6 Hive designs, costs and availability of materials

Langstroth hive (honey yield potential 80 -100 kg/year) with few adopters in Malawi. The supreme hive for high output in rich pasture, especially where hives can be moved to coincide with successions of new blooms, e.g. coffee, blue gum, etc. Not suitable for pasture of low quality. Requires high standard of maintenance. Cost in excess of K5,000. An imported hive was reported by one source to have cost as much as K30,000.

Kenyan top-bar hive (5 – 7 year life; 80 cm length X 44.5 cm width; honey yield potential 35 - 50 kg/year). Cost K2,600 in Nkhata Bay.

Malawi standard top-bar hive (5 – 7 year life; 100 cm length X 44.5 cm width; in Mulanje sometimes length is extended up to 150 cm; honey yield potential more than Kenyan). Cost: K3,000 Chitipa; K2,500 and K3,100 – K3,150 (SBDRA) Nkata Bay; K2,000 Mzuzu.

Malawi standard top-bar hive self-build: cost of materials only is K1,100 – K1,200 of which wooden Gmelina planks cost K500 – K800. Labour for construction valued by communities at K300 - K450/hive; WESM separately stated (Blantyre HQ) that labour for construction costs some K350/hive. Total 'market value' of a hive: K1,400 – K1,650.

A successful mixed farmer who supports female beekeepers in Luchenza commissions manufacture of Gmelina hives in batches of 50. He pays some K1,200 for timber and K700 for assembly/hive to a local carpenter. This was said to give the hive a market value of about K2,000.

Malawi standard top-bar hive self-build in Lunzu, Blantyre was reported to have an overall material cost of K1,700/hive (One beekeeper: 4 hives) using pine or Gmelina wooden planks reported to cost K800 – K1,000/hive and a 'Rexine' plastic cover (productive life 4 – 7 years, if in shade) at K350.

Bamboo standard top-bar hive (By Bees Abroad)

Cost K1,200 including labour at K550 ; this is a recommended starter hive for under-capitalised beekeepers who wish to make a transition from traditional hives.

Palm leaf standard top-bar hive (By Bees Abroad: stronger than bamboo). Cost K1,600 (SBDRA) but leaves are not readily available.

EPL estimates that a traditional log or bark hive costs about K360, including 'cost' of materials and Forest Reserve siting fee. The different classes and costs of traditional hives need closer examination to enable a better financial appraisal.

Roofing felt

This bitumen-based covering is the ideal material for hive lids, being waterproof and very durable and preventing overheating. It is currently unavailable in Malawi. Beekeepers resort to doubled covers of thick polyethylene sheeting or a proprietary plastic-laminated cloth.

SCFT reported farmers having tried many, many alternatives to felt but nothing was really so suitable. Producer associations would need to place an order with a private merchant who could – with a large order – buy from outside Malawi.

7.7 Hive yield

7.7.1 Traditional Hives

WESM considers a traditional hive can yield 2 – 3 kg/crop. EPL reported yields of 3 – 5kg from traditional hives in Chitipa in December 2004. Honeycomb is removed when honey leakage is detected. This study takes 6.7 kg as the median annual yield from colonised traditional hives; this might slightly exaggerate actual average yields under normal conditions. Financial analysis of the traditional sector needs to be based on empirical data collection from statistically significant samples of different classes of hive.

7.7.2 Top Bar Hives

Numerous experts with many years' experience in the Malawi honey sector consider that a top bar hive (Kenyan or Malawian) has a yield potential of more than 20 kg/year, tapped over two or more harvests. The upper limit of most estimates is 35 kg/year. Many beekeepers, notably full-time beekeepers, do

achieve around 20kg/year on particular hives but there is compelling evidence for concluding that the overall yield from top bar hives in the industry as a whole falls far short of this.

In July 2004, Bettina Schoope, based on experience of the Mwingi, Kenya Beekeeping industry considered that in Malawi static top-bar hives could, at 50% colonisation, achieve a honey yield of some 10kg/colonised hive/year or 5kg/hive overall.

During a visit to two WESM & IFSP assisted communities in January 2005 one beekeeper who uses static top bar hives only (now 70 in use) reported a yield from 13 colonised hives of 6.9 kg/colonised hive in May, 2004; 5.8 kg/colonised hive in August, 2004 and the expectation of a bigger yield in February. Assuming the February yield might be 10 kg/colonised hive, this suggests that the colonised hives would achieve 22.7 kg for the year. He considered that at any time some 50% of hives could be expected to be colonised so the average potential annual honey yield/top bar hive set out in this (mountain forest) location is around 11 kg. He does not suffer from theft or vandalism.

This study takes 13.3 kg as the median annual yield from colonised top bar hives; this might slightly exaggerate actual average yields under normal conditions.

Mobile hives brought to pasture or crops in flower can provide much higher yields: one producer achieves an overall average yield of some 35 kg/hive/year from 80 Langstroth hives.

7.7.3 Hive Maintenance and Comb Harvesting

Traditional hive management has not yet been investigated by the study team; it is a much less intensive system than with top bar hives. Traditional hives and the swarms they contain are often destroyed (by fire) in the harvesting process. Hives are not periodically cleaned and inspected while a swarm is in residence. Stress/disturbance of the swarm is an issue that only arises at harvesting and is largely discounted as an occupational fact.

Top bar hive management requires inspection every two weeks. Good practice includes several cleaning tasks when colonies are inspected. Management involves minimising stress to the swarm and care that minimises the chances of swarm absconding.

This hive is cumbersome to handle. It weighs in the region of 25 kg (more in the extended Malawi Standard Hive) and lifting the lid is a two-person operation. Carrying to the field is arduous work and wire rigging of the hive needs two people or a winch/pulley system.

Comb harvesting should be organised on a minimum-stress regime: beekeepers need to work in groups of three: a comb stower, who brushes bees off comb, a comb cutter/lifter and a lid minder. The whole operation is conducted in the minimum of time, typically involving cutting of three mature combs, with minimum use of the smoker and minimum hive disturbance.

Top bar hives are usually made from timber 1 inch (2.5 cm) thick. The feasibility of reducing timber thickness, and so hive weight, should be investigated. One half of this thickness may be sufficient if saw milling is precise.

7.7.4 Diseases/ Predators

The main problem seems to be Bee diarrhoea epidemics which are caused by rainwater ingress into the hive. No other major disease has been reported.

Predators include honey badgers, rats, bee-eating mammals, predatory wasps, ants, wax moths and snakes. With the exception of wax moths and predatory wasps, predators can be avoided by careful rigging of the hive on strong wires and by regular mineral greasing of the wires.

7.7.5 Colony Vigour/Water

Beekeeping specialists can advise on how to reinvigorate a colony to improve productivity. This involves exchanging broods between hives/colonies. In other countries bee breeders sell Queens with high-yielding traits and it is feasible to import them.

A beehive always needs to be sited close to a perennial source of fresh water to enable the swarm to drink

7.8 Transport

One consolidator in the North charges K19/kg honey for collecting honey from designated collection points, irrespective of distance, deducting this amount from the respective payout. According to WESM the minimum economic road shipment of raw honey is 300 – 400kg, enough to fill the cargo space of a light pick-up. At a fuel cost of K10/km and capital cost of K10/km (K1,500,000/truck, including duty, spread over a 150,000 km life) and other expenses at K4/km, a 200 km round trip (without back-haul income) for 350 kg by such a pick-up costs about K4,800 or K14/kg for the 100 km actual single journey of the cargo. Collecting smaller quantities will obviously increase the unit cost, so be assured of the maximum payload is important for the economics of collection.

A consolidator provided a logistics profile for 311 kg of honey brought from collection point over a distance of some 190 km in three journeys at an aggregate matola and bus cost of K6,300. This is equivalent to just over K20/kg.

Plans of a Chitipa shipper include hire of a 10 tonne capacity truck to Blantyre at a cost of K120,000/trip, i.e. a minimum of K12/kg assuming a full load.

It seems reasonable to conclude that the real cost of shipping honey from beekeeper to consolidator or from consolidator to (an alternative) urban market is around K15/kg. Each kilogramme of honey, travelling twice, may thus incur an indicative logistics cost of around K30/kg. Longer trips will result in more expensive transportation costs.

7.9 Honey Processing

Most common method of extraction is Cold Dripping Method (CDM). This requires 3 people (harvesters), protective clothing (veil, overall, gloves, boots), smoker, matches, knife, and plastic buckets. CDM is easy and economical; no need for sophisticated equipment. However, CDM is not very efficient as regards honey recovery. A substantial amount of honey remains in the combs. CDM produces very clear (physically pure) honey, which is very good for marketing purposes.

Another honey extraction method, though less common, is the Pressing Method (PM) which has the advantage of having a higher honey recovery rate than CDM. PM extracted honey contains high proportion of nectar, hence more nutritious. However, nectar does not have a very good taste; the appearance of honey with high proportion of nectar is blurred, hence unattractive to the prospective buyer. High nectar content honey also crystallizes much quicker. PM is not commonly used because of the high cost of pressing machines. These are reported by A. Banda to cost some K15,000 each

a. CDM Process

Ripe combs are sliced and filtered over night through a mesh or net. Most times secondary filtering is necessary to ensure final product purity. Secondary filtration is done using a finer mesh than the one used in primary filtration.

b. Honey Settling

Extraction is followed by 2-3 days to allow the honey to settle. Some tiny particles will float on the honey and some foam is formed on the surface. The foam should be removed before bottling the honey.

c. Honey Storage

Processed honey to be stored in a cool dry place. High storage temperatures (>15°C) may lead to inactivation of some enzymes in the honey. High relative humidity (>75%) may lead to crystallization and fermentation.

d. Honey Crystallization

Causes of crystallization are:

1. Relative humidity
2. Type of sugars in the honey; high glucose facilitates crystallization, while high fructose and maltose inhibit crystallization.

Crystallized honey may be rejected on the market as it may be mistaken for bad or adulterated honey. Most customers prefer liquid honey. Crystallized honey has undesirable texture and may sometimes be difficult to use. Efforts should therefore be made to liquefy crystallized honey by stirring and /or warming (not heating) the honey.

7.10 Packaging

Ideal containers for packing honey are vacuum-sealed glass jars because they are airtight. Glass bottles are not manufactured in Malawi; they may only be imported from Zimbabwe and other countries and transport is costly.

Malawi honey is consequently packed in PVC plastic jars ranging from 250g to 550g sizes. Jar lids need screw seals to reduce leakage and too often leakage causes product weight loss and also is unsightly.

Honey packed in plastic jars is prone to moisture absorption and subsequently, fermentation. PET (gas-proof) jars offer an alternative but although there are PET bottle dies in use in Malawi, there are no jar dies. These might be imported if there were enough interest from consolidators. One consolidator has explored the feasibility of importing flip-top plastic bottles and PET (gas-proof) jars from South Africa.

A local packaging company is understood to be able to set up a PET jar line but would need to be supplied with the required die/mould (priced by a honey consolidator: confidential).

250 g polyethylene jars cost in the region of K9 each from local manufacturers with 500 g jars costing K12–14 each.

Printed paper jar labels with water-soluble gum cost some K6-7 each from local printers. Self-adhesive high-gloss paper labels from South Africa cost some K12 each.

Locally made cardboard cartons cost about K5/jar at 10 jars/carton; Plastic shrink film can serve the same purpose, be cheaper and enable product inspection.

Honey packed in plastic jars with labels, regardless of style and size has a direct packaging materials cost of about K40/kg to which should be added processing charges.

7.11 Wax Processing

Raw materials for wax extraction are the combs from which honey has been extracted. There is a need to significantly increase honey output to achieve appreciable quantities of beeswax.

Process:

1. Boil combs in water to liquid state
2. Filter and squeeze molten substance through cloth
3. Leave overnight to settle
4. Wax forms on the water surface and is skimmed off

A beekeeper sells wax in Blantyre to shoemakers at about K200/kg and makes candles for sale at K10 each. WESM reports wax from Nyika being sold at K145/kg. Prices of beeswax candles from Vwaza and Nyika have not yet been ascertained.

8 Economics of the Value-Chain

This section looks at some of the economics of the value-chain.

8.1 Internalising costs to the environment

Ring-barking and/or cutting of hardwood forest trees for traditional hive making is a destructive practice. Trees are not replaced and natural regeneration is often frustrated by deliberately started bush fires. Like many other forms of woodland extraction, where no rent is paid by the exploiter, the cost of depletion is met not by the actual user but by (loss of use to) future generations.

8.2 Hive stocking rates

No information on optimum hive stocking densities has come to light. Bee pasture yield could usefully be investigated as a botanical postgraduate research thesis. Optimum hive stocking rates for different types of hive on various classes of bee pasture have not yet been investigated. It is likely there are natural limits which could be revealed by extent of hive colonisation and swarm vigour.

As the National Herbarium has had some involvement in supporting beekeeping in the Nyika Plateau, it might contribute to bee pasture investigations/ measurement.

8.3 Honey pricing - Producers

Prices (cash on delivery) paid to beekeepers for raw, cloth-filtered honey supplied in clean buckets (for return) at collection point/village range from K100 (all types) to K145/kg (for Mountain Honey only). This study takes K110/kg as the industry median price paid to beekeepers by consolidators. Some beekeepers, especially around Blantyre, do their own retail selling, enjoying much higher returns, but also additional costs. One beekeeper earns K550/kg (gross) from bottling his own honey and selling direct to consumers. This exceeds the highest recorded shop price of K529/kg.

Prices appear to have increased over recent years. Beekeepers in one Northern operation reported prices per Kg as follows:

2002	K65/kg
2003-04	K85/kg
2005	K100/kg

Some producers have reported selling honey in their communities by the spoonful. WESM reported a price in Chambe (2003) of K0.50 to K2.00/tablespoon of 15 ml or about 23 g. At the lower price, few sales were made and producers preferred to consume the honey themselves. The higher price is equivalent to about K90/kg, which was a good price for that time compared with the price of raw honey supplied to consolidators at collection points.

In Blantyre nearby producers sell whole cut honey comb to retail consumers at some K350/kg including a rectangular plastic container and lid which costs about K60. After allowing a K10/kg charge for transport, etc, the beekeeper appears to earn K280/kg honeycomb (net). This compares very well indeed with prices earned by beekeepers who sell raw honey to consolidators, but is a special case of capitalising on proximity of production to consumers.

8.4 Honey prices - Processors

The overall retail price range/kg in jars is from K336/kg (SBDRA) to K529/kg (Nyika Honey/WESM). Part of the price variation is the different pack sizes. The median retail price is in the region of K400/kg and this figure is applied in this study's financial analysis. To reach this point the honey will have cost some K30/kg to transport and packing materials will have accounted for some K40/kg. Deducting 20% retailer's margin (K80), the net proceeds available to the consolidator are about K250/kg to cover direct cost of raw honey, investment, management and processing costs and production losses/shrinkage.

In terms of retail products, the following information is provided:

1. Mzuzu Gourmet Honey from SFCT is the most widely distributed retail honey, fetching K130 – K135/300g and K190 – K280/550g.
2. Nyika Honey sold through WESM commands some K185/350g and in January 2005 fetched K200/550g through a commercial outlet.
3. Village Hands Mountain Honey fetches K165/350g.
4. “Malawi Gold” and “Natural Forest Honey” are sold by SBDRA in 550 g and 500 g jars, retailing at K185 - K280 and K175 respectively; its Natural Forest Honey was retailing at K220/550g in January 2005.
5. Tambala Honey – this is one of the most widely available honey brands due to the links between Tambala and PTC, both being owned by Press Corporation. Tambala is currently being dismantled and its brands and equipment being sold. There would seem to be a reasonable likelihood that it will re-emerge under different ownership, perhaps one of the existing players.

8.5 Beekeeping Club financial model

Assuming that throughout Malawi there are about 2,500 active (i.e. extract honey) beekeepers, most of whom belong to a Club (typical membership 5 – 15), and at an industry honey output of about 60 tonnes/year, on average each beekeeper produces 24 kg of honey/year, divided between two seasons. Beekeeping is a traditionally male activity but women are interested too.

A model for a typical beekeeping club has been developed and is set out in detail in Annex 1 Beekeeper Financial Profile Model.

A typical club has 12 members and a stock of 48 hives; half of the hives may be owned by just one or two leading members. At least half of the hives (24) are likely to be traditional hives and not more than 60% of all hives will be colonised.

The club’s annual output is 288 kg honey/year divided as to 192 kg from 24 top bar hives and 96 kg from 24 traditional hives. Yield from each colonised top bar hive is 13.3 kg/year and from each colonised traditional hive is 6.7 kg/year. These figures are consistent with, or slightly in excess of, the figures provided as observations of Schoope and others in the previous section.

To function effectively the Club will need to have timely access to three beekeeping suits, gloves, smoker, etc for regular hive maintenance and inspection purposes, honeycomb harvesting and occasional swarm management operations.

While suitable for serving the needs of a larger membership and more hives, it is impractical to assume that this ‘kit’ can be practically shared with another nearby Club.

Assuming a stock of 24 modern top bar hives (at most) at market value of K2,000 each (K48,000) and 24 traditional hives at K360 (K8,640) each, a smoker at K650 and three sets of bee suits and gloves at K3,200/set, plus some K2,000 of harvesting buckets and sieves, the total fixed investment of the Club is in the region of K69,000. Over 82% of the investment is in individually owned hives but nearly 18% (K12,200) is the shared ‘kit’ and this equates to a kit financial cost (because all kit materials have to be purchased) of just over K250/hive. More hives would help spread the cost of the kit investment/hive, but this cannot be done beyond a certain point.

The foregoing assets can be expected to remain functional, with only minor repairs, for a period of perhaps 6 years. The Club therefore needs to earn a net income of about K11,500 annually to cover the real capital cost of its equipment and, more particularly, to enable it to buy replacement equipment when it is worn out. To keep pace with inflation and allowing for some expansion would depend on even more income being set aside for investment, say K13,000 annually.

In many beekeeping communities this may be a novel concept: it should be noted that this industry has seen a considerable number of free or highly subsidised top bar hives given to clubs, effectively enabling entry. However, if the harvesters do not properly account for the replacement of hives and harvesting

kit, then they will not be able to continue generating an income stream when the equipment needs replacing.

At current collection point prices (say K110/kg, assuming that collection charges are met, by the consolidator), K11,500 is equivalent to about 105 kg of honey and implies that out of 24 kg (on average) of honey (worth K2,640) produced by each of the indicated 12 members, 100% of the proceeds of sale of the first 9 kg (nearly K1,000/year) need to be set aside to cover asset replacements/expansion. This means that nearly 40% of the gross proceeds of all production must be saved for spending on permanent assets. The effective net cash proceeds remaining available for 'distribution' as a return to the beekeeper's labour amount to just over K1,600/year or K140/calendar month.

By-products such as beeswax, have not been valued in this analysis because their trade from Malawi's beekeepers is as yet insignificant. It is hoped that further investigations will reveal opportunities for establishing a formal trade in beeswax.

Vandalism and theft have been left out of the calculations. There has been no attempt at accounting for the environmental cost of beehives made from indigenous bark and timber. Had these costs been factored into the calculations, the 'distribution' would have been minuscule.

The above analysis suggests that the current average performance of many beekeepers, and especially their return on capital is not a very attractive. The poor returns help to explain the relatively low level of production in Malawi.

It can be concluded that average performance of the beekeeping industry, and especially its return on capital, does not provide a basis for planning for its future. The performance of the industry's leaders implies that beekeepers need to be specialists in their trade and to each have many more hives and more productivity/hive than the average at present. It might be appropriate to promote a trade in beehives that are not performing in current ownership.

Comparison of the relative returns of top bar hives with traditional hives and their respective honey output has begun. The analysis that has been conducted infers a (honey) gross return on capital invested in hives at 72% for (low-management) traditional hives which is greatly superior to 39% return derived for (under-managed) top bar hives.²

Leading producers now need to be taken as benchmarks for future productivity planning and the means of replicating their success needs to be explored. The industry average return on capital invested in top bar hives simply is not good enough.

Beekeeper foundation training courses rarely cover the viability of beekeeping and need to start by instilling an understanding of the business of beekeeping. Like any other business it needs to provide a return on capital invested.

8.6 Consolidation and Retailing Financial Profile

Based on our initial analysis, bottled honey is sold by consolidators to retailers at about K320/kg equivalent. Direct costs of packaging materials, processing losses and transport and a honey input cost of K110/kg implies a total direct cost of preparing the retail product at some K180/kg.

² On average a top bar hive yields twice the output of a traditional hive but (on the limited information so far collected) the top bar financial cost is over five times that of the traditional hive

This leaves around K140/kg consolidator 'gross margin' to cover the numerous other expenses of the consolidator including capital costs of buildings, plant and equipment, management expenses, and operating expenses including full-time and seasonal labour and energy costs, plus profit.

The minimum economic scale at which a consolidator needs to operate has yet to be determined by analysis. The industry profile suggests this is in the region of 3 - 9 tonnes/year for 'sole traders', where the current analysis implies that the gross margin available to cover their other expenses and profit is between K420,000 (US\$3,900) and K1,260,000 (US\$11,700).

Higher honey retail prices from better quality and/or (PET) presentation could also contribute to better returns for consolidators/processors. However, irrespective of such improvements, even a basic analysis of supply and demand would suggest that the retail price of honey is (much) too low. Most processors/retailers report that they run out of stock within a few months of the two flows. In some cases the gap between selling out and new stock from beekeepers is three months with customers effectively being lost during this period because there is no product to buy anywhere.

The logic of this situation is that retail prices should increase. This will slow down the rate of sales in the early months after the new stock becomes available, but mean that there is product available right through to the next flow from the producers. Effectively, this will ensure that those customers who are prepared to pay more will be able to buy honey at any time in the period. Honey appears to be bought by Asian, expatriate and middle-class Malawian families who are not likely to be very price sensitive. The advantage for the processors and retailers is that all the honey will be sold at a higher unit price, thereby increasing their profits. As honey is not perishable in this time period (approximately 6 months) then the only extra cost is the extra cost of holding more stock for longer. As long as the increased price at least covers the extra working capital, then it is worth firms pursuing this strategy.

If only one processor follows this strategy, they will experience slower sales in the first two to three months but will capture all the sales in the second three months as theirs will be the only product available. Even in the first three months, they will capture sales as availability seems to be more important than price and many retail outlets are often out of stock even in the peak availability period (5 out of 15 outlets in our small survey in January). This firm will disproportionately capture the extra profits in the industry.

If several processors follow this strategy, then the outcome will be similar with slower sales in the first three months but continued sales in the second three months. In this scenario, several processors will be able to make increased profits.

One of the keys to success for consolidators and processors is to be able to source honey. If honey can be sourced, then it is clear that it can all be sold prior to the new flow (see above). Securing honey is based on several factors:

1. Knowing where producers with honey available are located.
2. Having a relationship with the producers in particular areas and consistently being willing to buy their honey – this may be a contractual or non-contractual relationship.
3. Timing of collections – being soon after honey has been harvested
4. Price paid and whether cash or credit.

Knowing the producers and building relationships with them is important as is timely collection and payment. However, as more consolidators and processors start to search for honey, which is beginning to happen in Malawi, then pricing will increasingly be a factor. Paying a premium will enable certain consolidators to secure supply from which they can make profits. Without honey, the consolidator/processor cannot make any profit.

Interesting, paying a price premium to producers and thereby increasing the returns from honey harvesting will also encourage more supply to come forward as it becomes increasingly worthwhile to invest in hives and to collect. As has been analysed earlier, the returns to beekeepers are really too low to make it a viable business in many cases, unless the initial capital is provided in the form of hives and suits, something that cannot continue indefinitely. Increasing the price to secure honey, and paid for out

of higher margins due to increasing the price of wholesale and retail honey would allow for better payments to the producers, securing a greater share of their honey and increasing the supply of honey as more producers invest in more hives and collection.

8.7 Financing

In practice most producers do not have access to the formal credit system of formal banks or even Micro-Finance Institutions. The former are not interested in the 'informal' sector and the latter rarely reach beyond the urban, peri-urban and trading centres. There are sources of informal credit in many communities – the Katapila – but these would tend to be used for more emergency short-term loans, not longer-term investments due to the interest rates (sometimes 50% per week). Producers are therefore restricted to resourcing investments from their own resources, from immediate family or from retained profits in the businesses. Some are able to access free or subsidised equipment from NGOs/GoM, but these are very limited in number. In some cases the consolidators/processors can help as occurs in other countries, notably private organisations like Honey Care in Kenya. This is just beginning to emerge in Malawi.

SCFT operated a revolving fund funded by EU with K.400,000 given to each of five farmer-run coffee producers sub-associations (K2 million in total) and deposited into their Savings and Credit Unions. For beekeeping activities, the farmers do not borrow in cash rather the administrators pay sub-contracted hive manufacturers to give the farmers hives. Farmers in this way borrow and pay back with interest rated at around 25%/year. If loans are repaid, then the original MK 400,000 becomes available again so more farmers can borrow. SCFT however considers that K400,000 per sub-association is woefully inadequate, especially since it is principally a coffee production support facility, not primarily or exclusively for beekeeping.

Ignoring costs of administration, bee suits and smokers, at "K2500 per hive", each K. 400,000 fund is sufficient for only 160 hives or 10 hives each for 16 farmers. And, just a part of the fund is used for this. Alongside the scheme, many farmers have also bought and paid for beehives from their own funds not credit.

Given the poor returns on investment, beekeepers are probably correct not to be investing in modern hives and suits with their own money. However, if the returns were improved then there could be scope for beekeepers to re-invest. The most likely pattern is that a few beekeepers in any community will see the opportunity and will be willing to retain profits for investment in more hives, particularly those who are more efficient at harvesting. This reflects the more entrepreneurial nature of some people in the community and explains why we see that some individuals have considerably more hives than others. What is missing at the moment is for better returns for beekeeping through better prices for producers to enable more self-financing growth.

WESM and MMCT are exploring the feasibility of mobilising a K500,000 fund from GEF resources. It may operate as a conditional grant scheme where a beekeeper will, in return for being given a top bar hive, after one year give another farmer a bee hive. The foregoing analysis implies that, unless the beekeeper is fortunate enough to get immediate colonisation and a honey yield of well over 15 kg from the hive in the first year, it may take much more than one year for one hive to generate revenue that can pay for a new hive that currently costs in the region of K1,700.

9 Support Services

This section considers the support services available to the industry, particularly the producers.

9.1 Quality Control.

MBS and DNPW staff are technically competent to undertake honey quality control (QC) but, from the beekeeper's and consolidator's perspectives there are not enough personnel and they are invariably too far away from where services are required with limited mobility due to funding constraints. It should be noted that this is a fragmented industry where the transaction cost of providing QC in the regions will be high in relation to the quantity of product to be inspected.

The cheapest and most realistic way of assuring good quality is for consolidators to institute rigorous sampling and testing of their own at point of purchase (of raw honey) and then to submit samples of large batches for assay by MBS. There are two consolidators who currently do this: SCFT honey is sold bearing the MBS-approved logo and SBDR regularly submits samples to MBS for testing.

Most spontaneous industry self-help has been found in the North, where professional advice is given either as part of the service of a honey buyer/consolidator or by an expert directly in return for fees.

9.2 Technical support services by consolidators/processors:

Training and general extension services in beekeeping are provided by SCFT to its member farmers and other suppliers and by EPL to old and newly formed associations in Chitipa. Smaller consolidators/sole traders around Mzuzu also provide similar services. For effective delivery of these 'embedded' services the beekeepers need to be better organized than they are at the moment, by, among other things forming groups, clubs and associations.

Provision of beekeeping equipment like hives, smokers, refractometers, and protective clothing is sometimes financed through revolving funds, e.g. EU funds managed by SCFT. Protective clothes suppliers and beehive manufacturers in the Northern region are relatively few.

It should be noted that several of the consolidators, including SCFT, collect honey from communities without directly charging for this transport service. Transport in this case is regarded as an operating expense of the consolidator.

Suppliers to Tambala Food Products Ltd (TFP) who have no containers, are lent plastic buckets at no cost by TFP for carrying honey to the company.

Agricultural extension workers are well spread throughout the country, but lack technical know-how on beekeeping. Given the necessary training, these extension workers could become effective in delivering services to beekeepers, as they already deal with the same communities in agriculture related activities.

While there are various initiatives of donors to support the beekeeping industry most recent donor effort for providing technical support has been directed through WESM and IFSP in Mulanje.

10 Market Functioning and Industry Efficiency: Key Issues

Based on the foregoing analysis of the honey sub-sector, the key issues, constraints and opportunities arising from the analysis so far are:

At the Production/Harvesting Stage:

1. Reducing vandalism/theft/production losses
2. Increasing utilisation of bee-suits and associated equipment
3. Increasing colonisation rates and quality of hive management
4. Raising the level of production
5. Improving the quality of honey
6. Increased collection and marketing of beeswax and other bi-products
7. Improving returns to producers
8. Better organisation of the producers into clubs/associations
9. Increased access to support services and equipment
10. Increased access to finance for investment in equipment
11. Determining the role of GoM/NGOs/Donors in ways that develop the functioning of the market
12. Determining and improving access rights
13. Reducing environmental damage from traditional hive making

At the Consolidating/Processing Stage:

1. Obtaining economic quantities/transportation costs
2. Organising and contracting producers
3. Obtaining sufficient supply to match demand
4. Improving quality and availability of packaging/labelling
5. Provision of support to producers (technical, financial and purchasing)
6. Reducing processing costs and increasing profitability
7. Compliance with relevant standards/quality/certification
8. Opportunities for importing – bulk honey for processing/packing

At the Marketing/Retailing Stage:

1. Getting the right retail prices
2. Getting the right supplier pricing/payment terms
3. Improving availability of product/reducing stock outs
4. Improving packaging/presentation/branding
5. Opportunities for product differentiation (Forest/Mountain, Nyika/Mulanje etc.)
6. Opportunities for exporting – bulk and retail
7. Opportunities for importing – retail packs

The above represents the initial list of issues to be discussed at the stakeholder event on 17th February 2005. Additional issues may be added, clarified or dropped according to feedback from the industry and its stakeholders. Prioritised issues will then be investigated further for feedback and a more comprehensive analysis may be provided.

11 Landscape Potential

The greatest potential beneficial impact on **the environment** of taking advantage of added value opportunities in the beekeeping sector relates to providing beekeepers with the opportunity to dominate custodianship of the natural forests, especially designated Forest Reserves which may or may not be effectively conserved by the Forestry Department. The beekeepers will have an economic interest in forest preservation and will act accordingly.

Another potential beneficial impact on **the environment** of taking advantage of added value opportunities in the beekeeping sector relates to building hives from economically sawn renewable timber resources and especially fast-growing plantation timbers such as pine and Gmelina, instead of wild, slow-growing miombo hardwoods. However the economics of the use of these plantation-supplied hives requires further investigation and building of respective financial models for various likely productivity scenarios.

Deliberate burning of forest grass by graziers and hunters and “dead” woodcutters needs to be brought under control and be punished. Habitual grass burning prevents beehives being set and needs to be controlled.

Government policies as articulated in the Malawi Poverty Reduction Strategy Paper (MPRSP) have empowerment of the poor as their cornerstone, so that they are able to find basic needs for living. Beekeeping is identified as one of several avenues to poverty alleviation, but its financial viability is not explored. Before promoting beekeeping further to ‘reduce poverty’, working examples of both success and replication need to be demonstrated. The existing beekeeping industry as a whole does not provide the right model for moving forward but there are examples of success at various places within it that need to be properly examined for their use as potential models.

Poor and vulnerable groups including women and children, will not be able to fully avail the value adding opportunities of this industry – as beekeepers – until theft and vandalism, and assault of females in the field, is brought under control and a more serious view on the economics of beekeeping and how to improve it is taken.

The potential impacts on **HIV/AIDS** of taking advantage of added value opportunities in the sector relate mostly to enhanced household income and the (as yet unproven) perception of returns to labour being relatively high compared with other rural-based income generating activities.

Further work on the social profile of beekeepers and related issues is still required.

12 Mechanisms for Dialogue and Change

The beekeeping industry lacks a formal structure for discussing and influencing the formulation and implementation of Government policy.

Since the failure of BAM, no industry-wide Association has been proposed or formed. BAM was essentially a creation of MGBDP for Northern beekeepers and their (BAM) consolidation plant only. The bad experience with the mismanagement at BAM still affects attitudes to regional or umbrella bodies for beekeepers. At present, the largest grouping of beekeepers is probably SCFT and its suppliers/coffee producers' associations. WESM and Village Hands also present a large producer-consolidator network but this is not formalised into a regional body for dialogue and represents a relatively small segment of national production.

Nevertheless the industry should consider how it can engage in a constructive dialogue with Government and Governmental bodies/agencies such as the Forestry Department and Department of Parks and Wildlife in particular as well as with the Malawi Bureau of Standards. As well as the beekeepers (producers) there may be scope for an industry body of processors to work together on certain issues through dialogue between themselves and with GoM.

Beekeeping activities and product processing are covered by several Government ministries/departments with varying levels of coordination and incomplete definition of roles. These include:

- Police
- Forestry Department
- Department of Parks and Wildlife
- Ministry of Industry, Science and Technology
- Ministry of Trade and Private Sector Development
- Ministry of Agriculture and especially the Department of Livestock
- Ministry of Transport and Public Works

There are several outstanding issues to be addressed at Central Government level:

1. Police intervention to reduce incidence of hive thefts and vandalism is not yet evident.
2. Beekeepers vie with unlicensed vested timber and charcoal trade interests for access to forest pasture where Forest Guards are sometimes absent or unable to influence matters
3. Improvement of rural infrastructure by improving feeder roads through the National Roads Authority and ensuring local assemblies take over the planning, construction and maintenance of infrastructure would assist the industry.

13 Risks

Surprisingly there is no evidence that the industry is vulnerable to competition from imports. This may reflect the relative undersupply in the region and the limited attractiveness of the Malawi market in terms of volume and value of sales. This could change, but at present the domestic consolidators and processors have a window of opportunity to build their brands and supply chain. Given that there is so much undersupply, the industry should move quickly to close the gap and encourage more supply to come forward.

Disease has not been found to be an issue in Malawi up to now, although some other honey producing countries suffer seriously from disease outbreaks. This could change if production is intensified or there is continued poor husbandry on such a wide scale. The impact could be catastrophic and it is unclear what plans are in place to deal with any serious disease outbreak.

As discussed under Mechanisms for Dialogue and Change, care of bee pasture owned by the State is essentially the responsibility of designated public sector Departments, notably Forestry Department and Department of Parks and Wildlife. Their ability to prevent deliberate seasonal grass fires and/or unauthorised depletion of forests by firewood cutters, timber cutters and charcoal interests is currently low. Meanwhile beekeepers and other authorised non-timber forest product exploiters are not endowed with property/tenure rights that enable them legally to take action against these intruders. This situation is a disincentive to expansion of beekeeping in public lands.

Property is not respected with hive theft and vandalism as persistent high risks to beekeepers individually and collectively. There is no basis for assuming that official law enforcement by the Police, and punishment of offenders, will rectify the situation in the near term. This situation is a disincentive to expansion of beekeeping and might be rectified by communities establishing 'neighbourhood watch'/vigilante systems of their own. As the product becomes more valuable, so the incentive to steal, and also to protect become greater.

In all other respects this is a low risk industry which has an unsatisfied market and where consolidators are beginning to compete for supply.

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Annex 1 Beekeeper Financial Profile Model

Description	Unit Cost MK	Quantity	Total Cost MK	Comments
Capital costs for Beekeepers				
Malawi Standard Top Bar Hive (Mulanje)				
Gmelina Timber Plank 7 ft X 8 in X 1 in	95	7	665	Note low cost of timber
Doubled plastic roofing "felt"/metre:	65	4	260	
Nails mixed: 1 in; 2 in; 4 in & felt 'clouts'	80	1	80	
3 mm galvanised steel wire/metre:	30	6	180	
Assembly labour (MK300 - 450; MK700 max.)	450	1	450	Many beekeepers build hives themselves
Wire grease/year	20	6	120	
Exterior paint and owner labelling	not costed	1	-	Not used
sub-total			1,755	This is the lowest regional cost reported
Malawi Standard Top Bar Hive (Lunzu)				
Pine or Gmelina Timber Plank 7 ft X 8 in X 1 in	130	7	910	
"Rexine" plastic-coated roofing "felt"/metre:	85	4	340	
Nails mixed: 1 in; 2 in; 4 in & felt 'clouts'	80	1	80	
3 mm galvanised steel wire/metre:	30	6	180	
Assembly labour (MK300 - 450; MK700 max.)	450	1	450	Many beekeepers build hives themselves
Wire grease/year	20	6	120	
Exterior paint and owner labelling	200	1	200	
sub-total			2,280	
Malawi Standard Top Bar Hive (Nkata Bay)			2,800	
Malawi Standard Top Bar Hive (Chitipa)			3,000	
Malawi Standard Top Bar Hive (Mzuzu)			2,000	
Traditional bark or log hive			360	

Club Shared Equipment/Kit

No. of Members in the Club		12		
Club jointly owned kit to replace after life of years:		6		
Beesuit with Mask	2,500	3	7,500	Prices reported ranged from MK2,500 to MK4,500
Welding Gloves	700	3	2,100	
Puffer Smoker	650	1	650	
PVC Bucket with lid 20L	265	6	1,590	Needed for honey separation and for honey storage
Sieve	120	3	360	
sub-total			12,200	
Kit cost/hive as below:			254	Maximum number of hives that can be serviced by one set of bee-suits not yet determined; depends on placement
Top-bar hives	2,000	24	48,000	
Annual Honey yield at 60% colonization (Kg/col hive)		13.3	192 kg	Calculation ignores losses due to theft and vandalism
Sales value of Total Honey yield at price/kg:	110		21,067	
Sales value as % of capital invested in hive + kit	2,254	24	39 %	At 100% colonization would be: 65% of capital invested Return is barely enough to justify interest-bearing borrowing
Traditional hives	360	24	8,640	
Annual Honey yield at 60% colonization (Kg/col hive)		6.7	96 kg	Calculation ignores losses due to theft and vandalism
Sales value of Total Honey yield at price/kg:	110		10,613	
Sales value as % of capital invested in hive + kit	614	24	72 %	At 100% colonization would be: 120% of capital invested
Total Honey yield of Club at 60% colonization			288 kg	At 180 kg in main flow, this would need 6 storage buckets
Sales value of Total Honey yield at price/kg:	110		31,680	
Honey sales of each member (average)		12	2,640	Some beekeepers have to pay collection charges
No. and cost of Hives sub-total		48	56,640	
Total Club Capital invested			68,840	
Annual savings needed to replace after life of years:		6	11,473	
Capital invested by each Club Member:		12	5,737	
Member's annual savings to replace after life of years:		6	956	
Member's annual honey sales to cover savings (Kg):	110		9	
Member's annual residual return to own labour			15 Honey kg:	
Annual net income including capital replacement	110		1,684 Value MK	
Monthly net income including capital replacement		12	140 MK/month	

Annex 2 Consolidation and Retailing Financial Profile

Description	Unit Cost	Quantity	Total Cost MK	Notes & Comments
Honey Processing and retailing/raw honey input kg				
Cost of honey at collection			110	Some beekeepers have to pay collection charges
Transport to consolidator/processor			15	
Processing losses		5%	6	
Bottling:plastic jars + lids cost	13	0.5 kg	26	
Labels cost	6	0.5 kg	12	
Transport to retailer			15	
Cost of honey for retail, excluding consolidator's capital, management and direct operating expenses			184	
Median retail price/kg			400	
Deduct retailer margin at		20%	80	
Possible selling price/kg of consolidator			320	
Indicated cover/kg for consolidator's capital, management and direct operating expenses and profit:			137	Minimum economic scale of consolidator unit not yet determined
Above, if throughput is tonnes/year:		15	2,047,500	
In US\$ at ROE:		108	18,958	