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ETHIOPIA: STRENGTHENING THE QUALITY COMPLIANCE CAPACITY OF THE HONEY VALUE CHAIN FOR GREATER MARKET ACCESS

Value chain study with focus on quality and compliance requirements, and related quality infrastructure capacities and services

MAY 2023





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ABBREVIATIONS

AAS	atomic absorption spectroscopy
CRM	certified reference material
EAB	Ethiopian Apiculture Board
EAS	Ethiopian Accreditation Service
EBA	Ethiopian Beekeeper Association
EC	European Commission
ECAE	Ethiopian Conformity Assessment Enterprise
EHBPEA	Ethiopian Honey and Beeswax Producers and Exporters Association
EMI	Ethiopia Metrology Institute
FAO	Food and Agriculture Organization of the United Nations
FOB	free on board
FT-IR	Fourier Transform Infrared
GIZ	German Agency for International Cooperation
GMAP	Global Market Access Programme
HACCP	Hazard Analysis Critical Control Point
HMF	hydroxymethylfurfural
HPLC	high performance liquid chromatography
ICIPE	International Centre of Insect Physiology and Ecology
ICP-MS	Inductively Coupled Plasma Mass Spectrometry
IES	Institute of Ethiopian Standards
ILAC	International Laboratory Accreditation Cooperation
ISO	International Organization for Standardization
ITC	International Trade Centre
MP-AES	Microwave Plasma Atomic Emission Spectrometry
MRL	maximum residue level
NQI	national quality infrastructure
SNV	Netherlands Development Organization
TRACES	Trade Control and Expert System
UNIDO	United Nations Industrial Development Organization



EXECUTIVE SUMMARY

The present value chain study for the honey sector in Ethiopia was prepared as part of the inception phase for the project “Strengthening the quality compliance capacity of the honey value chain for greater market access” which is one of the country projects in the framework of the Global Market Access Programme (GMAP) funded by the Norwegian Agency for Development Cooperation and implemented by the United Nations Industrial Development Organization (UNIDO). The study was conducted in May and June 2022 by a team of international and national experts, including desk research and on-site assessment of various value chain participants, sector associations, research institutes and quality infrastructure institutions and service providers.



OVERVIEW OF THE HONEY SECTOR IN ETHIOPIA

Ethiopia has huge production potential for both honey and beeswax. It is the largest producer in Africa and within the top ten producing countries globally, although it is estimated that current production is only 10 per cent of its potential. Within Ethiopia, Oromia has particularly high production potential and was the focus of this study. This potential is recognized and valued by the Government, and the sector has an important role in national development objectives as well as in the Jimma Declaration, an Oromia regional initiative to boost high-quality production.

Almost all production is with traditional log type hives and transitional top bar hives. Very few beekeepers use modern frame hives. Production, processing and storage equipment and utensils are often basic. Containers suitable for storing and transporting honey are generally lacking.

Due primarily to poor practices and inadequate basic equipment (protective bee suits and suitable storage containers), there are severe quality challenges, particularly at production, harvesting and storage at the bottom of the value chain.

Over 95 per cent of Ethiopian honey is consumed domestically (although smuggled volumes are reportedly high). Most (about 70 per cent) is used to make tej (honey wine), with a smaller proportion (about 17 per cent) consumed as domestic table honey. Only 1–2 per cent is exported through formal

channels although smuggling is a significant issue, with some interviewees estimating that 40–50 per cent of Ethiopia’s honey is smuggled to other countries in the region. Strong domestic demand keeps prices high all along the value chain, and quality challenges further restrict export opportunities. Weak traceability systems hamper efforts to improve quality.



GLOBAL MARKET ANALYSIS

Global demand for honey is increasing, with Europe providing a potentially valuable and sizeable market (40 per cent of the honey consumed in the European Union is imported). Prices for imported honey in the European Union, however, are low (on average less than \$2 per kilo), often below Ethiopian domestic prices. Organic certified honey can command a price premium (up to 15 per cent), but the certification process can be onerous, long (at least a year) and expensive.

Official honey exports in 2020 were \$373,000, having fallen from a high of \$3 million in 2013. Primary causes are quality problems (including intentional adulteration) which have undermined confidence in export markets, and the high domestic demand and consequently high prices.

Global demand for beeswax (a by-product of honey production) is high and increasing, particularly for high quality beeswax for the cosmetics industry. In 2020 Ethiopia exported \$1.9m of beeswax, almost half of it to the European Union.





QUALITY STANDARDS AND REQUIREMENTS AT THE MAIN EXPORT MARKETS

The European Union and other European markets, including Norway, Switzerland and the United Kingdom of Great Britain and Northern Ireland, have stringent quality requirements for imported honey. Exporting countries need to be approved “third countries” with established systems to ensure honey quality. Ethiopia is a registered third country and Ethiopian companies are allowed to export honey to the European Union (and other non- European Union countries). Honey imported into the European Union must comply with strict quality requirements and conform to import requirements on packaging, labelling, traceability and sample testing.



ANALYSIS OF THE HONEY VALUE CHAIN IN ETHIOPIA

There is considerable potential for increasing honey production in Ethiopia. Over 95 per cent of honey is produced in low-yielding traditional hives and it is generally regarded as complementary to other agricultural activities, although there is increasing professionalization of production with improved production techniques and the use of top-bar (transitional) and frame hives.

Honey producers fall into three broad groups: individual beekeepers and small beekeeping groups with more traditional systems as a side activity; members of apiculture cooperatives, sometimes supported by government or non-governmental organizations; and members of out-grower agreements with private processing enterprises. These producers usually have greater access to modern apiculture supplies.

Due to low capacity, a lack of inputs and equipment and honey markets (for tej and domestic consumption) that do not demand high quality, much of the honey produced has quality issues and would not be acceptable to international markets such as the European Union. Most of the quality problems occur at the beginning of the value chain (harvesting, transportation and storage), and most exporters have direct relationships with beekeepers to ensure adequate quality and traceability of their supplies.



ANALYSIS OF THE NATIONAL QUALITY INFRASTRUCTURE FOR THE HONEY VALUE CHAIN

The key quality infrastructure institutions and service providers for honey are the Institute of Ethiopian Standards (IES), the Ethiopian Metrology Institute (EMI), the Ethiopian Accreditation Service (EAS) and the Ethiopian Conformity Assessment Enterprise (ECAE). These institutions and service providers fall under the Ministry of Trade and Regional Integration.

The institutions have received significant government and donor support in recent years, with new premises and equipment. Skills gaps remain, however (staff have not received sufficient training to utilize the new equipment to carry out the necessary tests), and the cost of importing consumables, (in particular, certified reference material) can be prohibitive. Exporters currently rely on international companies for testing, and report that testing by Ethiopian institutions is less efficient and can be expensive.



BUSINESS SUPPORT ORGANIZATIONS AND SCHEMES

The honey sector is supported by extension services from the Ministry of Agriculture (with extension agents trained by the Holeta Bee Research Centre) and by two sector associations. There are too few extension agents for regular, in-depth support to beekeepers – each livestock extension officer can have over a thousand beekeepers within their catchment, and they have to provide support for all types of livestock. Extension officers’ technical knowledge of beekeeping is limited as they are generic livestock officers without in-depth training on (or experience of) beekeeping.

The two sector associations (Ethiopian Honey and Beeswax Producers and Exporters Association, and Ethiopia Apiculture Board) focus on sectoral issues but have very limited funding which limits their effectiveness.

Traceability is essential for exports to the European Union. At present there is no official traceability system for honey production, although some exporters use their own systems. The Government confirms that establishing an effective national traceability system should be a priority for the sector.



OTHER ASPECTS AFFECTING THE SECTOR

The project is well aligned to broader government objectives, and to specific programmes such as the Jimma Initiative to increase honey production in Oromia, and other donor-funded interventions. Developing the honey sector can also contribute to the Ethiopian environmental protection objectives, and can contribute to improved livelihoods for women, youth and other marginalized groups.

A strengths, weaknesses, opportunities and threats (SWOT) analysis identified the following issues:

Strengths. High potential in Oromia, with a strong beekeeping tradition and highly productive environment. Government commitment to developing the sector. Significant investment in the quality infrastructure system.

Weaknesses. Low quality honey due to producers' and traders' lack of knowledge, skills, systems and equipment. High domestic prices make Ethiopian honey uncompetitive internationally. Lack of access to foreign currency limits quality infrastructure institutions' access to foreign tests and inputs.

Opportunities. Beeswax has significant potential as demand is high and Ethiopia is an existing and well-regarded exporter. For honey exports, niche high value and low volume markets offer the best short to medium term prospects.

Threats. Continued issues around poor quality and adulteration threaten the international reputation of Ethiopian honey. Illegal trade undermines the impetus to increase formal trade. Conflict and instability can disrupt production and undermine investor confidence.



RECOMMENDATIONS FOR THE PROJECT IMPLEMENTATION

Within the framework of the project, four recommendations are made to focus priorities:

- » **Engage with buyers in the target markets:** Connecting with buyers will help Ethiopian companies to understand buyer requirements, build trust and establish a channel for sales.
- » **Focus interventions at the bottom of the value chain:** Ethiopia will not be able to significantly increase its honey exports unless it improves quality and increases production, which requires interventions at the bottom of the value chain to improve beekeeping practices.
- » **Broaden the scope from “honey” to “hive products”:** Beeswax is a high-value product under the Ethiopian traditional and transitional system of beekeeping, which is in high demand. Beeswax sales can help to make beekeeping and honey trading more profitable and build exporting experience.
- » **Address input gaps:** A lack of affordable, quality inputs, in particular protective equipment, storage and packaging materials, is an important contributor to quality deficiencies in the honey value chain.



▶ 1

INTRODUCTION



Development of the value chain and the improvement of quality and standards play an important role in eliminating technical barriers to trade. Developing countries in particular face challenges in overcoming these technical barriers owing to their lack of compliance with standards to meet market requirements. There is, therefore, a need in developing countries for capacity-building of all participants in the value chain, including processors, exporters, trade support organizations and quality institutions, in order to facilitate market access for their products.

Taking into account these challenges, the Global Market Access Programme (GMAP) specifically aims to enhance market access in prioritized value chains in selected countries. Within this programme, the project entitled “Strengthening the quality compliance capacity of the honey value chain for greater market access” was developed and concluded between UNIDO and the Ministry of Agriculture of Ethiopia in 2021. The objective of the project is to increase market access of Ethiopian honey products to foreign markets, in particular to the European Union and Norwegian markets. To achieve such access, the project will strengthen the capacity of quality infrastructure institutions and service providers to serve the development of the honey value chain, enhance the compliance capacity of honey small and medium-sized enterprises with foreign standards and regulations and promote a culture of quality among stakeholders in the honey sector, through the following specific planned interventions:

- » Enhance technical competence and sustainability of the national quality infrastructure system by targeting gaps and insufficiencies of national quality infrastructure (NQI) institutions and services supporting honey production and exportation, including the institutional and normative framework, as well as availability of conformity assessment services required to meet relevant honey-related criteria, quality assurance, and traceability requirements in export markets.
- » Enhance small and medium-sized enterprise compliance with standards and technical regulations by building compliance capacity of key value chain participants in the honey sector especially those engaging with honey processors belonging to the industrial and cooperative subsidiary value chain.
- » Strengthen culture of quality across the honey value chain, to improve reputation, add more value to honey production, and increase demand for Ethiopian honey by promoting the engagement of Ethiopian honey processors and their associated beekeepers, unions and cooperatives to a culture of quality.

The detailed honey value chain analysis in Ethiopia started in June 2022. Focusing on the honey supply chain in the Oromia region, the analysis aims to assess, in terms of market requirements, the capacity of various honey value chain participants, global markets, quality institutions and trade support organizations. This report also will serve to build synergies and to exchange experiences which would benefit a new project in the same sector to be implemented in another country under the Global Market Access Programme.





2

OVERVIEW OF THE HONEY SECTOR IN ETHIOPIA

Large areas of Ethiopia have exceptional climate and ideal vegetation cover for beekeeping. There are more than ten million honeybee colonies, and around two million people are engaged in the value chain. Ethiopia is the largest producer of honey in Africa and the tenth worldwide, and is the third largest producer of beeswax in the world.¹ With appropriate sectoral support, productivity and quality can increase and contribute to lifting households out of poverty, complement conservation activities and contribute to Ethiopian hard currency earnings.

2.1 PRODUCTION AND PROCESSING TECHNIQUES, PACKAGING AND LOGISTICS

2.1.1 HONEY PRODUCTION

The huge potential for honey production in Ethiopia has been widely acknowledged and derives from a combination of favourable factors including:

- » Wide variety of naturally occurring plants providing bee forage
- » Favourable climate with bimodal rains that permits honey harvesting twice (and sometimes three times) a year in much of the country
- » Large population (around 10 million colonies) of *Apis mellifera* honeybees. Two million of these are wild colonies, the largest population in Africa

In addition to *Apis mellifera* there are stingless bee species. Stingless bee honey is traditionally valued for its medicinal honey properties.

Honey and beeswax production are widespread and believed to represent an important safety net against poverty, a supplementary income for others, and a basis of many profitable enterprises.² Over 1 million rural households³ are engaged in production. Honey is hunted from wild colonies, or harvested from traditional, intermediate, and modern (frame) hives. It is a versatile occupation that can be carried out in many ways depending on market opportunities and investment capacities. Production potential is very high, varying with the different production system adopted, and changing from area to area according to rainfall and vegetation type.

Women play an important role in beekeeping although their position in the value chain is traditionally limited to retailing honey (at local markets), preparing and cleaning equipment used for harvesting and storage, and carrying equipment to harvesting sites. Honey harvesting from traditional hives is generally undertaken by men, but the introduction of modern hives has encouraged more women to engage in production and other activities in the value chain, often working independently of men.

2.1.1.1 Production levels

Honey production potential in Ethiopia is estimated at 500,000 tons and 50,000 tons per year for honey and beeswax respectively. Production through the decade 2007–2016 remained stable at an average of 46,505 tons of honey per year (FAOSTAT 2018). According to the Ministry of Agriculture of Ethiopia, the aggregated honey production in Ethiopia in the year 2018–2019 reached 58,588 thousand tons.

2.1.1.2 Main producing regions

Honey is produced in almost all parts of Ethiopia. The most important honey and beeswax producing regions are Oromia, Southern Nations Nationalities and Peoples Region, Amhara, Tigray, Benishangul-Gumuz and Gambela. These areas hold the highest proportion of honeybee populations in the country.

¹ [GBN Sector Brief Äthiopien HonigBienenwachs E Web.pdf](#).

² Getahun Tekle and Samuel Weldeyohanis, “Review on challenges and opportunities of honey marketing in Ethiopia”, *Journal of Marketing and Consumer Research*, vol. 23, (2016).

³ Kristina Gratzner, Kibebew Wakjira, Sascha Fielder and Robert Brodschneider, “Challenges and perspectives for beekeeping in Ethiopia: a review”, *Agronomy for Sustainable Development*, vol.1, No.46 (2021).

TABLE 1: HONEY PRODUCTION 2018/2019

Geographical area – region	All beehives		Average annual harvesting rate
	Number of hives	Aggregated annual honey production (kg)	
At country level – Ethiopia	7 057 188	58 588 153	2
Tigray	331 407	4 941 200	2
Afar and Somali	3 863	146 956	2
Amhara	1 208 124	10 629 137	2
Oromia	3 634 008	26 787 107	2
Benishangul – Gumuz	574 134	2 909 490	2
South Nations Nationalities and Peoples (SNNP)	1 227 546	11 171 645	2
Gambela	75 265	1 989 471	2
Harari	1 077	6 077	2
Dire Dawa	1 764	7 070	1

(Source: Ministry of Agriculture)

2.1.1.3 Honey types

The range of honey types reflects the diversity of the country's bioclimatic regions. The main types include:

- » White honey, from the northernmost region of Ethiopia, is produced by bees foraging on tebeb plants (*Becium grandiflorum* and *Hypoestes forskalii*). Similar honey is produced in the highlands of the southeast and southwest from *Schefflera* species. *Becium grandiflorum* and *Hypoestes forskalii* honey has a low moisture content, but *Schefflera abyssinica* white honey has a high moisture content as it is produced around high rainfall forest areas. These honeys have a distinctive texture and taste, and are said to have medicinal properties (which are yet to be scientifically tested). They are some of the most well-known and expensive honeys produced in Ethiopia.
- » Yellow honey describes a wide range of multi-flora honeys produced in almost all regions of Ethiopia. It is mostly produced from *Bidens* species and has a strong flavour and pleasant aroma.
- » Dark brown honey tends to be slightly bitter-tasting and is produced at intermediate altitudes (between 1,200 and 2,400 metres). It is mostly derived from coffee and *Vernonia* species and is typically considered to have good medicinal properties. It is often used for brewing the Ethiopian mead known as *tej*, but is less appreciated for table consumption.
- » Amber and red honeys are typically produced by bees foraging *Syzigium* and *Croton* species at mid-altitude. They have a wide colour range, strong pleasant aromas and flavours, and are mostly used as table honey (and for brewing *tej*).

Given the range of agroecological zones, honey is harvested somewhere in Ethiopia year-round. Mono-floral honey is derived from a (predominantly) single floral source of bee forage and is usually required to have more than 45–50 per cent pollen content from that named species. (This percentage varies from species to species.) Each mono-floral type has its own distinctive aroma, taste, flavour, physicochemical and medicinal properties which are linked to that flower. Demand for mono-floral honeys is high in Ethiopia, and demand for mono-floral honey is steadily increasing in the global honey market. There are several well-known mono-floral varieties globally, and Ethiopia provides a number of these.

TABLE 2 : ETHIOPIAN MONO-FLORAL HONEY AND POLLEN CONTENT

Botanical source	Percentage of pollen
Guizotia spp	62.3
<i>E. globulus</i>	56.3
<i>S. abyssinica</i>	100.0
Vernonia spp	83.4
<i>S. guineense</i>	80.7
Acacia spp	86.0
<i>C. machrostachys</i>	93.6
<i>E. arborea</i>	100.0

Source: Gemechis Legesse, "Identification and characterization of major mono-floral honeys in Ethiopia", Ethiopian Society of Animal Production (ESAP) Proceedings, pp. 121–128, 2013.

2.1.1.4 Production systems

Most of Ethiopia has two honey harvesting seasons:

- » February–June
 - » February and March for dark brown honey
 - » April, May and June for white honey (from *Schefflera abyssinica*)
 - » May and June for amber and red honey
- » October and November
 - » Yellow honey
 - » White honey (from *Becium grandiflorum*)

There are four methods of honey production:

- » **Traditional honey hunting** in natural forests. Honey hunters harvest honey from wild colonies they find in tree trunk hollows or rock crevices and others. Harvesting systems are usually destructive as colonies are mostly inaccessible unless trees are cut down or severely damaged. The colonies of bees are often destroyed in the process of taking the honey.
- » **Traditional backyard and forest beekeeping** with log and traditional hives. Beekeepers usually keep some hives in their home compounds, often on shelves under a shelter so they are protected from excessive sunshine and rain, and the rest are kept in the forest. Those in the forest are hung in trees, often quite high up to reduce wildlife and pest problems and deter theft. Some of these hives may be remote, often 20 or 30 km away from homes, in areas that the beekeeper finds productive and to which he has access.

» **Transitional beekeeping** using hives made from timber (top-bar hives) and locally available materials (home-built hives). These are the first, and probably the most useful, steps in modernizing production. These hives cost either nothing (they are often home built) or relatively little compared with the price of modern hives (frame hives). Both are easier to harvest (than log hives) so honey can be better, and colonies are not destroyed during harvesting.

» **Improved beekeeping** using frame hives. Apiaries of modern hives typically have more than 40 units, often in shelters to protect them from extreme sunshine and rainfall. These are expensive hives and suitable only for beekeepers that have relevant training, good skills, a commitment to managing their bees and the requisite equipment and consumables to run them. The logistics of harvesting and extracting are particularly difficult issues for beekeepers using modern hives (as discussed below).

2.1.1.5 Production in Oromia

The strongest honey-producing areas of Oromia are in the western and southern areas of the region, and these contribute to a large proportion of Ethiopia's beekeeping products. Jimma, Illubabor, Beddele, West Wellega, Bale, East Wellega, Kelem Wellega, Horo Gudru Wellega, South West Shewa and West Shewa zones are particularly abundant in apicultural resources. These are shown in red on the map below.⁴

⁴ Source: <https://reliefweb.int/map/ethiopia/ethiopia-administrative-map-october-2020>.

HIGHEST POTENTIAL HONEY-PRODUCING AREAS OF OROMIA



2.1.2 HARVESTING AND PROCESSING

2.1.2.1 Harvesting

Beekeepers with traditional hives (made from logs, planks, bamboo or clay pots) can only access honey from the ends (or, for clay hives, through the neck). Log hives are often hung high in trees in the forest. Trees are tall and must be climbed to reach, and then lower, the hives. These hives produce large quantities of beeswax.

Beekeepers harvest at night. They must cut out the comb nearest the entrance (even if it does not contain ripe honey) to reach the rest. Each comb is placed in a bucket after brushing bees from the comb. Beekeepers continue to cut out combs of honey until reaching the nest and, in many cases, will continue to cut out the combs to remove all the honey, mixing combs containing honey with those containing pollen and the brood. As beekeepers want to maximize their harvest, most of the combs are put in the same harvesting container. As the colony is pulled to pieces, bees become increasingly defensive, and beekeepers respond by using increasing amounts of smoke. (The colony of bees is sometimes destroyed.) It is stressful and hard work in the dark, and beekeepers perspire, bees are squashed, and honey quality is impaired.

Beekeeping with traditional beehives accounts for approximately 90 per cent of the hives currently used in Ethiopia.

Harvesting transitional hives is similar to harvesting traditional (log) hives but the process is easier, cleaner and less stressful. Beekeepers can open a hive from the top, so are not restricted to removing combs from the end of a hive to reach the honey. The bees are disturbed less, so less smoke is used. With the cover removed the beekeeper can lift out independent top bars without disturbing other bars and can therefore select which combs to harvest – avoiding those containing brood or excessive amounts of pollen or unripe honey. The combs are cut from the frames and put in the collecting container. Transitional hives can therefore provide good quality honey as well as wax and, with good practice, there is no risk to the viability and survival of the colony.

Harvesting from modern hives is a completely different process. A modern hive typically has two boxes one on top of the other, with an excluder between them. The excluder keeps the queen in the bottom box, but workers can move through it. The hive is opened from the top and, with good management, the upper part of the hive should contain only honey, in other words, no brood and little or no pollen. The combs are in frames that can be removed from and replaced in the hive, so the beekeeper can select which frames to take for extracting (putting them in an empty honey box). The boxes of selected frames are taken to an extractor (indoors) which spins the honey out without destroying the combs. The boxes of frames

(with intact but empty combs) are then taken back to the apiary and put back on the beehives. The extracted honey is drained into a storage container and may be left to settle so any fine pieces of wax can also be removed. These hives produce negligible volumes of beeswax but maximize production of honey by negating the need for the bees to rebuild comb.

TABLE 3
YIELDS OF HONEY AND BEESWAX, BY HIVE TYPE

Hive type	Typical yield of honey per year	Proportion (of honey) yield of beeswax
Traditional hives	7.9 kg	25%
Transitional hives	15–20 kg	25%
Modern frame hives	30 kg	2%

2.1.2.2 Transport and processing

Harvested crude honey from both traditional and transitional hives is usually collected in heavy-duty sacks or plastic containers. Such sacks are seldom food grade. The sacks are sealed (tied with twine) and then transported home or directly to buyers.

Beekeepers sell their crude honey to traders, cooperatives and processors (including tej brewers). Some of these buyers pay beekeepers in advance of harvesting, at reduced prices, and beekeepers take their honey straight to these purchasers once harvested.

Honey is seldom collected by purchasers, except by the commercial or private processors that have a sustained working relationship with individuals or groups. Beekeepers transport their product to market or to buyers. Smaller quantities are moved by men (carrying it on their shoulders or heads) and women (on their backs), and donkeys and horses are used to move larger volumes. Vehicles are also used, depending on cost and accessibility. The crude honey is sold for cash. Traders weigh the sacks of crude honey but seldom check for quality.

Traders keep sacks of crude honey in their own stores, which are often used for other items. These stores are seldom inspected and there are no extension or training services available to guide the improvement of these facilities, or to improve traders' practices and knowledge.

Traders are typically engaged in several activities based on honey as well as buying, storing and aggregating – including straining, bottling and selling from their kiosk. They may also bulk-up and sell to other buyers, trade in beeswax, and sell a limited range

of beekeeping inputs, such as veils and basic tools, to beekeepers.

Beekeepers also deliver and sell crude honey to cooperatives. The honey is seldom tested for moisture content, inspected for comb type and cleanliness, or smelled for smoke or sourness. It is weighed, and beekeepers are paid in cash.

The honey is then stored in the cooperative store, may be processed to separate wax and honey, and may be bottled – but most is probably sold to the parent union of that cooperative or sold to commercial processors. These stores are seldom inspected by public health authorities and there are no adequate or sustained extension or training services provided or even available to guide the improvement of these facilities, or to develop a cooperative’s practices and knowledge. Cooperatives are seldom specialized in honey, working with a range of agricultural produce that often includes coffee. Their knowledge of honey, and skills in handling it, are generally limited.

Unions work at a larger scale serving the interests of their member cooperatives. They are mandated to buy honey from a cooperative, if a cooperative wishes to sell to them, but seldom have the interest, expertise or facilities to handle and trade honey effectively.

Honey harvested from modern hives is usually processed by the beekeepers themselves, using extractors that are either borrowed free of charge from the district (known as “woreda”) agricultural offices or that they have purchased themselves. The honey is sold directly to cooperatives or to processors who specialize in handling this. (Modern beehives yield very little beeswax so trade in this is negligible.)

Larger-scale successful beekeepers with modern hives are likely to have close working relationships with their buyer, receiving inputs on credit, training and technical support, and they use buckets for storing the processed honey (unlike the prevalence of sacks used for storing crude honey). These buckets are provided by the processors. These beekeepers usually have access to or own a simple centrifugal extractor and extract in their homes. Processors collect the extracted honey from the larger producers and pay cash. Some of the progressive beekeepers serve as aggregators for the processor buying the crop.

2.1.3 EQUIPMENT AND CONTAINERS

2.1.2.3 Processing equipment

Almost all processing equipment is imported (from settling tanks and warmers to extractors and bottling units), but there is one facility producing stainless steel equipment for use in other sectors. The present supply pattern is adequate for current needs.

Some of the cooperatives visited during the inception planning mission had more advanced equipment.

Some was functioning, some was not, and some was inappropriate to local needs.

The established exporters do have good quality facilities and very good equipment.

2.1.2.4 Bulk honey containers

Containers suitable for storing and transporting honey are generally lacking in Ethiopia. The use of fertilizer-type plastic-lined polypropylene sacks for crude honey is adequate as a very basic measure – providing they are food grade, not reused (at least not without thorough cleaning, washing and drying), and are transported, stored and handled, and used in the field (filled with comb and honey) carefully to minimize contamination with debris when beekeepers are harvesting. They are not ideal containers for hygienic honey handling, but their ubiquity and cost preclude their replacement, at least for most of the crude honey trade.

Food grade buckets (wide topped, with lids, and a capacity of about 30 kg of honey) are the most useful and appropriately sized containers for harvesting, transporting and storage, but these are not manufactured in Ethiopia. Companies produce plastic containers of a similar design for paint and similar products, and reportedly would have the capacity to manufacture food grade buckets, but do not at present perceive there to be sufficient market demand for these products. Some private commercial processors have imported food grade buckets and provide them to their network of out-grower beekeepers. The lack of accessibility to adequate food grade containers is a major issue affecting honey handling, from harvesting through to processing, with considerable risks to hygiene and quality. There is a need for quality control oversight on the use of containers for bulk handling of honey.

Similarly, 200 litre plastic drums (which hold about 300 kg of honey) are produced in Ethiopia but are not to standard, typically lacking the internal epoxy coating that conforms to international legislation for holding food. Metal drums (200 litres or 300 kg) are usually preferred by importers in the United Kingdom, with the requirement for epoxy lining and an expectation that they are painted blue externally. Both plastic and metal drums are imported.

2.1.2.5 Extractors

Very few beekeepers have their own extractors and borrow from the government extension service offices. This is a significant logistical issue in terms of collecting and returning extractors, and there are also hygiene issues. Most beekeepers with modern hives do not seem to have buildings suitable for the task and use the extractors inside their own homes.

2.1.2.6 Beehives

Traditional hives cost little or nothing and serve their purpose. They are generally made from local materials.

Transitional hives (typically the top-bar hive) are generally low cost and serve their purpose as an improvement on traditional hives. There are many manufacturers producing these hives and although standardization is not always good, the hives are adequate. Lack of standardization is not an issue with this type of hive as parts are seldom transferred from one hive to another.

Modern hives are expensive and have many component parts. Their construction needs relatively high levels of skill and good quality assurance, but standards and quality control at the factories visited seemed poor. Apart from poor assembly, the most critical issue of standardizing internal dimensions (not external

dimensions) is a common problem, so frames are not always interchangeable. This becomes a challenge for beekeepers in the field, during harvesting, and when frames are returned to honey supers or brood boxes after extracting honey.

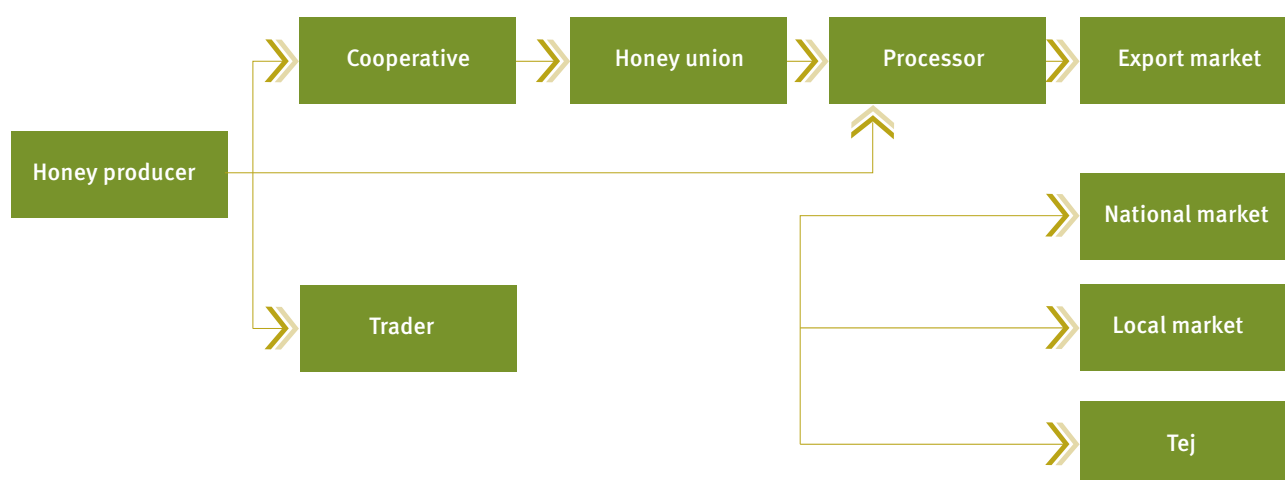
Beehives and their components should also vary according to the race of bee being managed. Different honeybee races are different sizes, requiring different bee spaces: between frames, between covers and walls, and with different cell-sizes embossed on the beeswax foundation.

2.1.2.7 Table honey containers

Most table honey for the domestic market is packed in plastic jars, with a small proportion packed in glass jars. Both are made in Ethiopia to various specifications, designs and sizes.

2.2 DOMESTIC MARKETS: DISTRIBUTION, DOWNSTREAM INDUSTRIES, CONSUMPTION

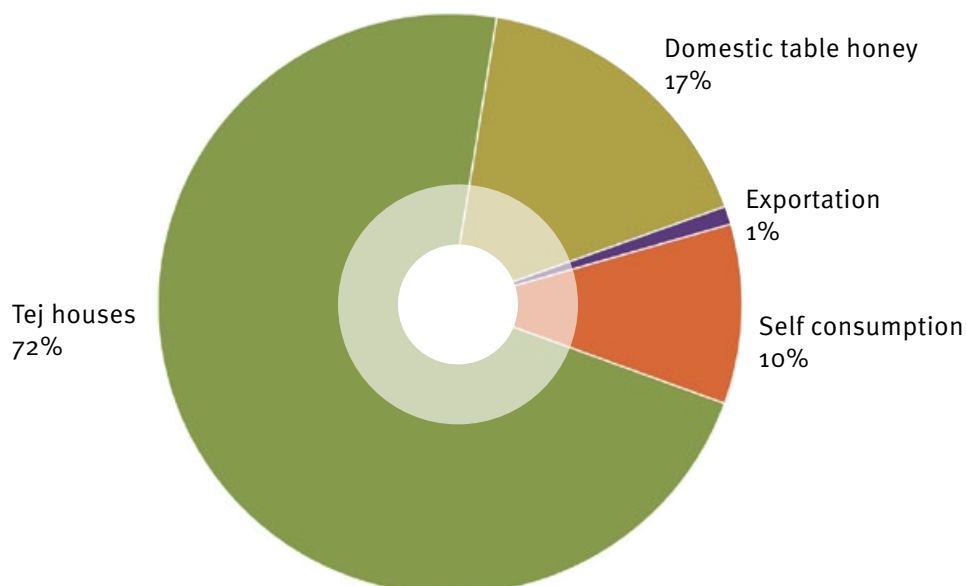
FIGURE 1: ETHIOPIAN HONEY VALUE CHAIN



2.2.1 OVERVIEW OF DOMESTIC CONSUMPTION

Honey marketing is characterized by a high level of informality in Ethiopia. According to official statistics, 99 per cent of Ethiopian honey production is consumed within the country (although there is reportedly a high level of informal trade and smuggling).⁵ There are three domestic markets: direct consumption by beekeepers and their families plus local informal sales; for brewing tej; and the national or domestic market for table honey and food processing.

FIGURE 2 : OUTLET DISTRIBUTION OF ETHIOPIAN HONEY PRODUCTION IN 2016



Brewing tej, a locally popular form of mead, uses about 72 per cent of the total production; and the rest, around 17 per cent of the total production, is sold on the domestic market as table honey.

2.2.1.1 Local consumption

An estimated 10 per cent of the production is consumed directly by beekeepers and their households, provided as gifts to friends and relatives, used in local ceremonies or sold locally. It therefore never reaches formal markets.

It is likely that all honey for this sector is produced from traditional and transitional hives. Processing methods, separating honey from the comb and beeswax, are basic. Beekeepers squeeze the honeycombs by hand to extract the honey or crush the combs and strain them through cloth or fine metal mesh.

The proportion sold goes directly to consumers in local markets or is bought by traders who then sell it locally at their kiosks. Sales to this market may be crude honey or strained honey. This sector of the market typically has a short supply chain. Local consumption of honey remains high.

2.2.1.2 Brewing tej and the national market

Honey for the national market (table honey) and for brewing tej utilizes over 90 per cent of Ethiopian production. Almost all honey for these markets is derived

from traditional and transitional hives. Beekeepers sell crude honey to traders who sell to larger traders along the supply chain to the ultimate processor (whether tej brewers, table honey producers or bulk handlers selling for other food processing uses). This sector is poorly regulated and has the longest supply chain. The supply chain for national consumption and for tej is also supplied by cooperatives and private processors.

The market for honey for brewing tej is growing as consumption of tej increases.⁶ National demand for table honey and demand for honey by local food industries (as an ingredient for cakes, biscuits and yoghurt) are also growing.

The national honey market lacks adequate structure for effective regulation. Quality and hygiene are seldom monitored by any external body and are frequently poor. Most honey has a long market chain with many participants, and producers are distant from consumers. The supply chain is therefore vulnerable to smuggling, adulteration and contamination; and honey deteriorates in the heat. In addition to lowering the general quality of honey in the market, these factors also squeeze out legal business actors by undercutting prices paid for quality, hygiene and accountability.

Prices favour producers and traders. Farm gate prices for crude honey in Oromia vary considerably but average between 180 and 200 birr per kilogram. Tej brewers typically buy crude honey for Br160 per kg and processors buying honey for processing and

⁶ ABJNA-7-5-248-253.pdf. Available at scihub.org.

bottling for the retail market (for table honey) in Addis Ababa typically pay around Br400 per kg (although prices as low as Br250–300 are also quoted).⁷ Retail table honey sells at Br400-680 per kg in the capital's

⁷ Lower figures provided by the Ministry of Trade and Regional Integration, Ethiopia.

supermarkets and shops. (At the time of finalizing the present report, \$1 was equivalent to about Br55.)

Some processors dealing in high-end products favour, or are increasingly interested in, buying crude honey to minimize quality risks, adulteration, and hygiene challenges; and to add the beeswax income stream to their businesses.

2.3 EXPORT MARKET

2.3.1 HONEY SUPPLY

The export market is mostly supplied either by unions, that buy from cooperatives, or by processors, that buy from traders. These have long supply chains. Some, however, is supplied through the most direct supply chain in which private processors and exporters buy directly from producers, usually from groups with whom they have a long-term relationship, or from individual beekeepers that serve as local aggregators within their network of other beekeepers.

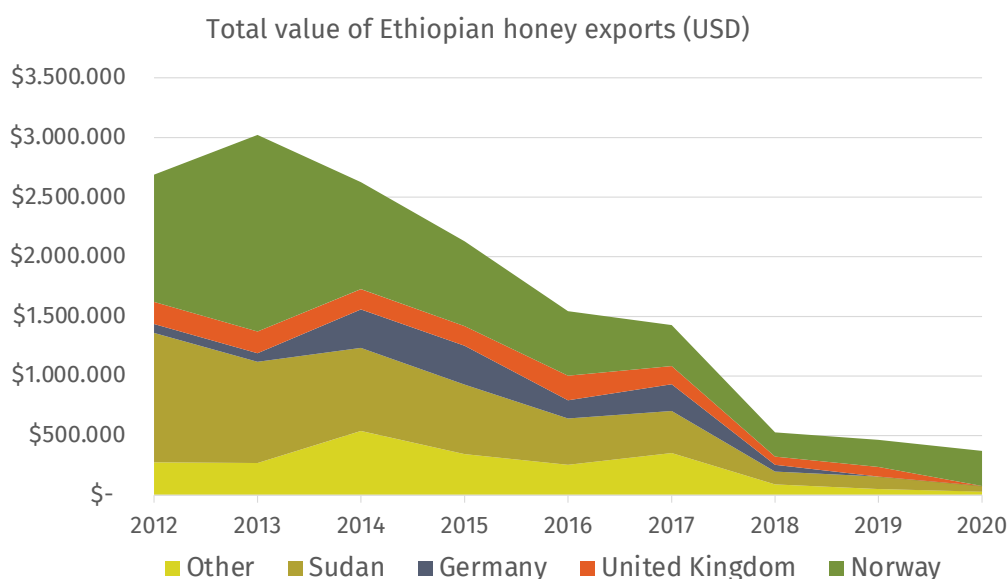
Direct sales by producers to processors, including those which are exporting, shortens the market chain but seldom impacts farm gate prices. Many of these processors operate supply chains that incur high costs, including providing buckets, providing training, helping beekeepers to access equipment, and supervising transport, for example, and recover this investment by minimizing quality-related

failings, building positive reputations and developing potential markets that command better prices. They may also supplement returns by processing and selling high-quality beeswax if they buy crude honey.

2.3.2 EXPORT AND EXPORT CHALLENGES

Less than 1 per cent of Ethiopian honey production is exported through official channels. Volumes of exported honey did not grow at the same rate as the rest of the Ethiopian economy during the last decade. On the contrary, volumes have receded considerably since 2013, when they reached their maximum to date with an export volume of 904 tons (ITC Trade Map) and an estimated value of \$3 million. The main export markets were Norway, Sudan, Germany, United Kingdom, Italy and France, with small volumes exported to other markets (including Qatar, United States, Israel, Yemen, Japan and China).

FIGURE 3: EXPORT MARKETS FOR ETHIOPIAN HONEY



Source: ITC Trade map

The monetary value of exports is shown in the table below, which illustrates the decline in hard currency earnings from honey, country by country, between 2017 and 2020 with the world total value of exports falling from \$1,428,000 to \$373,000 in those four years.

TABLE 4 : EXPORT MARKETS FOR ETHIOPIAN HONEY

Importers	2017	2018	2019	2020
World	\$1 428 000	\$526 000	\$466 000	\$373 000
Norway	\$346 000	\$202 000	\$228 000	\$295 000
Japan	\$66 000	\$11 000	\$11 000	\$7 000
United States of America	\$4 000	\$6 000	\$17 000	\$8 000
Saudi Arabia	\$13 000	\$-	\$1 000	\$-
Germany	\$222 000	\$56 000	\$-	\$-
Yemen	\$7 000	\$9 000	\$8 000	\$8 000
Sudan	\$354 000	\$109 000	\$104 000	\$48 000
United Arab Emirates	\$-	\$-	\$-	\$1 000
Sweden	\$-	\$-	\$-	\$-
Australia	\$-	\$4 000	\$-	\$-
Somalia	\$80 000	\$51 000	\$1 000	\$-
Canada	\$-	\$-	\$-	\$-
Djibouti	\$1 000	\$-	\$7 000	\$-
Belgium	\$-	\$1 000	\$-	\$-
France	\$158 000	\$-	\$-	\$-
Israel	\$22 000	\$5 000	\$8 000	\$5 000
Italy	\$-	\$2 000	\$-	\$-
Qatar	\$1 000	\$-	\$-	\$1 000
Spain	\$3 000	\$-	\$-	\$-
United Kingdom	\$152 000	\$69 000	\$81 000	\$-

Source: ITC Trade map

The data on exports have also been affected by large-scale, undocumented black-market sales to the Sudan, Uganda, Kenya, Somalia, Djibouti and Yemen. As this trade is undocumented, there is no official record of the volumes exported. Several interviewees felt, however, that it possible that as much as 40–50 per cent of Ethiopian honey production is smuggled to these countries. Sudan takes the largest volumes. Changes in Ethiopian legislation precipitated much of this shift from documented to undocumented sales.

Exports to the United Kingdom, Germany, Italy and France have collapsed to nil or very low volumes per year, and shipments to the most resilient European

market for Ethiopian honey, Norway, have stabilized at about 15 per cent (in terms of dollar value) of their 2013 high.

The reasons given for the lack of development and decline of the export volumes are quality failure and noncompliance with destination-country regulatory and customer requirements. Specifically, these include:

- » Failure to overcome important quality issues, including adulteration and shipping honey in improper containers. These have, for example, led to the rejection of batches of honey shipped

to Norway. These failings reflect the lack of basic knowledge and effective quality assurance through the value chain, and inappropriate sampling systems for testing. This has led to deteriorating business relations and damaged the reputation not only of that exporter but may also have had an impact on the wider reputation of Ethiopian honey.

- » Insufficient quality assurance and conformity assessment capabilities in Ethiopia have hampered the rapid dissemination of evidence required to prove compliance of exported honey with European Union norms. This has led to severe delays in shipping honey, affecting the reputation of the exporter's and the country's ability to do business.
- » Ethiopian honey exports are undifferentiated, and generally blended with honey from other sources by importers to be sold as "African honey". There is no international recognition of the qualities and characteristics of Ethiopian honey, to guide its use for blending, so there are no definitions or specifications for exporters to comply with.
- » The local market for honey is strong and prices are high, frequently above the international market rates (even before the cost of shipping). Conversely, the export process is complex, expensive and difficult to navigate. Combined, these factors reduce the incentive to tackle export markets.

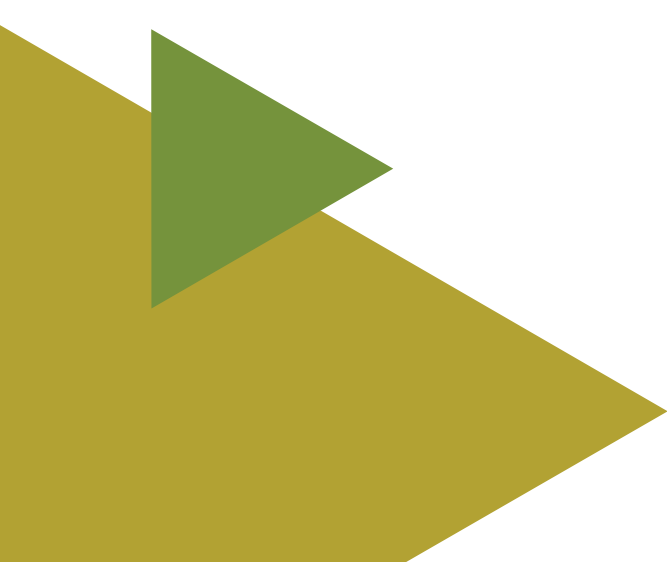
Despite export pricing constraints, there are probably two factors encouraging the continued drive for exports: the advantage of selling high volumes in a single transaction, albeit for a lower return per kg; and the Government's drive for hard currency earnings. The first point is probably the main driver for individual exporters. This will be coupled with the uniqueness, and therefore added value, of some Ethiopian honey floral types and the potential to target more specialized products to more lucrative markets. The second point is harder to understand. The Government provides export promotion benefits like trade fairs and support for the sector.

2.3.3 EXPORT PROCESS

The procedure for exporting honey from Ethiopia is complex, involving over six government bodies, three or four commercial companies, the National Bank and a certified laboratory. The exporter must:

- » Register with the Ministry of Trade and Regional Integration to undertake business
- » Obtain an export licence from the Ministry of Trade and Regional Integration
- » Establish a sales agreement or export contract with the overseas buyer, indicating quality requirements and payment modalities, such as advance payment or letter of credit, copied to the respective commercial banks
- » Register the contract with the Ministry of Trade and Regional Integration
- » Register as an exporter with the National Bank to receive an export code and bank permit
- » Receive the order from the buyer and register the export consignment with a customs declaration annex form from a commercial bank
- » Obtain a veterinary certificate from the Ministry of Agriculture
- » Apply for quality testing and certification by the Ethiopia Conformity Assessment Enterprise or Bless Agri Food Laboratory Services and compliance with tariff schemes from the Customs Authority
- » Test samples in accordance with the buyer's national legal standards and attach test results to the shipment
- » Send samples ahead of the shipment for client approval, while retaining duplicate samples for traceability
- » Apply for a phytosanitary certificate (which involves the Ministry of Health inspecting the stored consignment to check cleanliness)
- » Secure insurance on the export cargo
- » Make a customs declaration to the Customs Authority
- » Provide further information that may be related to the export of honey to receive a special permit from the Ethiopian Food and Drug Authority
- » Prepare a packing list
- » Agree on shipping logistics with the freight company
- » Complete customs checks on all paperwork, seal the container and despatch

The Government has, however, established a series of agroprocessing parks around the country. These are industrial areas that provide a range of services that include a single window for handling all these processes.



2.4 ECONOMIC AND SOCIAL SIGNIFICANCE

Beekeeping is an important economic activity and an important subsistence activity supplementing household (farm) income for an estimated 1.7 million rural households.⁸ It also makes a significant indirect contribution to agricultural output (and therefore exports, livelihoods and food security) through pollination services provided by bees.

2.5 NATIONAL DEVELOPMENT STRATEGIES, INITIATIVES OR PLANS

The Government of Ethiopia values the apiculture sector. It plays an important role in national development objectives. Responsibility for production in the sector falls under the Ministry of Agriculture, and processing falls under the Ministry of Industry. Exports fall under the Ministry of Trade and Regional Integration. Responsibility for quality is with the Ministry of Trade and Regional Integration through the Ethiopian Conformity Assessment Enterprise (ECAE). Management of the residue monitoring plan is the responsibility of the Ethiopian Honey and Beeswax Producers and Exporters Association (EHBPEA) and the Ministry of Agriculture provides the health certificate for exports (see above).

There are several strategies, initiatives and plans of relevance to the sector, as set out below.

The Agriculture Growth and Transformation Plan (Ministry of Finance and Economic Development, 2010), through the Apiculture Resources Development and Protection Proclamation (No. 660/2009) provides major policy directives for apiculture resources development and protection, regulations for apiculture resources development and protection, the establishment of a new apiculture research division working at national and regional levels, direct involvement with honey exporting enterprises in the current residue monitoring plan and the establishment of the Animal and Plant Health Regulatory Directorate.

Growth and Transformation Plan II of Ethiopia provided assessments of Growth and Transformation Plan I that were articulated through four overarching objectives addressing: GDP growth rates and attaining the Millennium Development Goals; expanding access and ensuring the qualities of education and health services and achieving the Millennium Development Goals in the social sectors; establishing conditions for sustainable nation building; and ensuring the sustainability of growth. These overarching objectives were translated into seven pillar strategies that cut across all socioeconomic sectors.

Growth and Transformation Plan II (2015–2020) was an important vehicle for reversing the downward trend of the economy. The Government committed itself to mobilizing a range of resources including modernizing the agricultural sector, expansion of industrial development, and a significant shift in export development. Development of the Ethiopian honey sector was seen as an important component of the agricultural sector with potential to contribute to the Sustainable Development Goals.

The Strategic Plan to develop a Globally Competitive Honey Industry in Ethiopia was developed by the Ministry of Trade and Regional Integration and operationalized by the Ethiopian Meat and Dairy Industry Development Institute. Implementation has been limited, however, by insufficient laboratory capacity constraining its support to the honey sector through its inability to tackle problem-solving research and third-party external quality assurance services.

Generally, the strategic direction of the last ten years has focused on productivity improvement and product differentiation. The productivity improvement has been based on two approaches:

- » Developing and managing apiary sites to ensure sufficient sustainable forage for bees to create opportunities for productive multiple harvesting
- » Hive selection and colony management for improved quality and increased quantity of honey

The Jimma Declaration is a specific Oromia regional initiative to address low-quality honey, poor modernization in the sector and low hive production. To reverse this, the government declared an initiative to increase the production and subsidize the sale of modern hives in identified high potential zones. It also boosted training of extension workers in modern beekeeping systems and their increased support to farmers receiving modern hives from the initiative. The Oromia regional government plans to produce 300,000 modern hives, which are to be distributed on the basis of five hives per family. The initiative does not include support for protective equipment or accessories and other equipment.

⁸ Getahun Tekle and Samuel Weldeyohannis, "Review on challenges and opportunities of honey marketing in Ethiopia", *Journal of Marketing and Consumer Research*, vol. 23, 2016.



3

GLOBAL MARKET ANALYSIS

3.1 ANALYSIS OF THE INTERNATIONAL MARKET

3.1.1 GLOBAL PRODUCTION

FAO statistics indicate annual production of honey worldwide was about 1.82 million tons in 2018. China is the world's biggest honey producer (447,000 tons per annum) followed by the European Union (280,000 tons per annum).

TABLE 5: GLOBAL HONEY PRODUCTION, 2018 (TONS)

Country	Production	% of global production
Total	1 815 703	100
China	446 879	25
Türkiye	107 920	6
Argentina	79 468	4
Iran (Islamic Republic of)	77 388	4
Ukraine	71 279	4
United States	69 857	4
Russian Federation	65 006	4
Mexico	64 253	4
India	62 197	3
Ethiopia	58 588	3
Canada	43 089	2
Brazil	42 268	2
Spain	36 394	2
United Republic of Tanzania	30 890	2
Romania	29 162	2
Rest of the world	531 065	29

Source: [FAOSTAT](#).

3.1.2 GLOBAL TRADE

Worldwide, imports reached 585,311 tons in 2020. Asia, South America and the European Union are the major exporting regions.⁹

In 2020, honey was the world's 676th most traded product, with a total trade of \$2.29 billion. Between 2019 and 2020 the exports of honey grew by 14.8 per cent, from \$2 billion to \$2.29 billion. Trade in honey represent 0.014 per cent of total world trade. The top exporters of honey in monetary terms (2020 figures) were New Zealand (\$328 million), China (\$229 million), Argentina (\$175 million), Germany (\$155 million), and Ukraine (\$140 million); and the top importers were the United States (\$419 million), Germany (\$293 million), Japan (\$176 million), the United Kingdom (\$136 million), and France (\$123 million).¹⁰

3.1.3 ANALYSIS OF THE EUROPEAN UNION MARKET

Currently, the European Union is one of the largest consumers of natural honey. In 2020, this consumption amounted to 426,000 tons.¹¹ Between 2010 and 2020, total European Union honey consumption increased by 2.1 per cent annually, reflecting consumer interest in natural, pure and healthy products.

⁹ See [market-presentation-honey-spring2021_en.pdf \(europa.eu\)](#).

¹⁰ <https://oec.world/en/profile/hs/honey>.

¹¹ https://ec.europa.eu/info/sites/default/files/food-farming-fisheries/animals_and_animal_products/documents/market-presentation-honey-spring2021_en.pdf.

TABLE 6
SIZE OF EUROPEAN UNION HONEY MARKET (TONS)

	2018	2019	2020
Production	240 000	231 000	280 000
Imports	167 463	167 097	177 650
Exports	26 756	27 433	31 287
Apparent consumption	380 707	370 664	426 363

Africa supplies 0.1 per cent of European Union imports. Only those countries with an approved residue monitoring plan can export to the European Union. In Africa, these are currently: Zambia, Ethiopia, Cameroon, United Republic of Tanzania, Uganda, Ghana, and Rwanda.

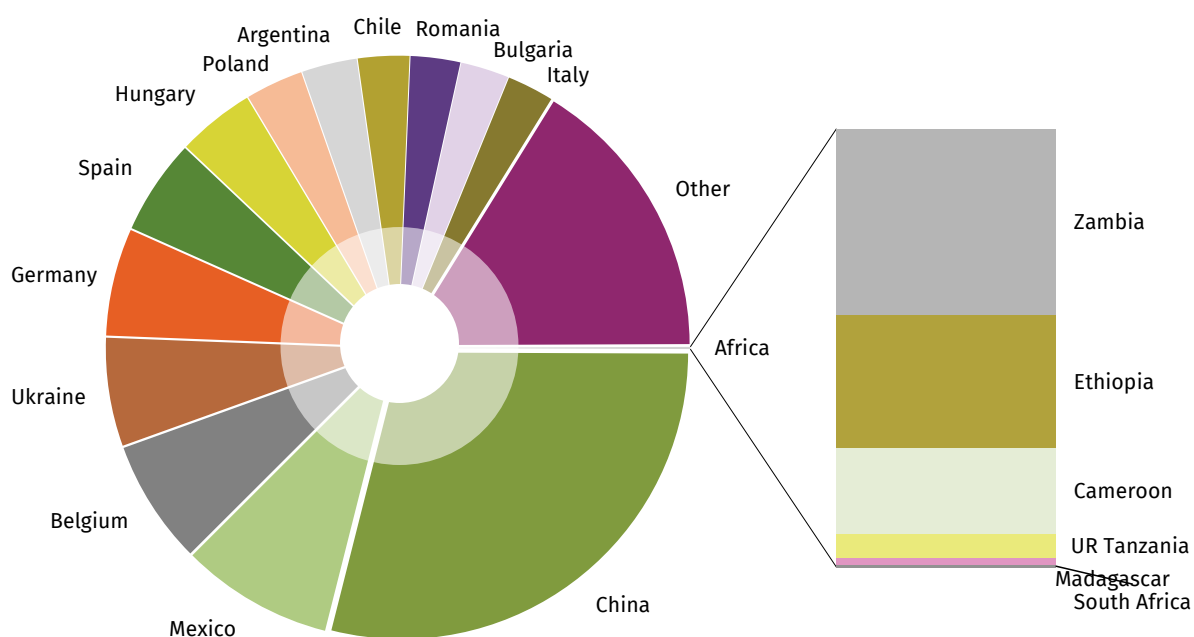
3.2 MARKET OPPORTUNITIES

3.2.1 KEY EXPORT MARKETS

Although the European Union is the world’s second biggest honey producer (after China), with annual total production amounting to around 280,000 tons, the European Union demand for honey is greater than the domestic supply. Its own production satisfies only 60 per cent of demand and the remaining 40 per cent is

imported, creating enormous opportunities for non-European Union producers. The main exporters of honey to the European Union in 2020 were Ukraine and China (between them supplying over 50 per cent of European Union imports), followed by Argentina (providing 13 per cent of European Union imports).

FIGURE 4: COMPETITORS IN THE EUROPEAN UNION MARKET



Export data show that Ethiopia provides only a very small percentage of total European Union imports of honey, and that this figure has been falling since the 2013 high. In 2020 Ethiopia exported a total of \$373,000 of honey worldwide.¹² None of these exports was to the European Union, although 79 per cent of Ethiopia's exports went to Norway, not part of the European Union but still a member of the European Economic Area common market. These figures are negligible when compared to the European Union imports of honey (\$595 million, 177,650 tons) for 2020. If the Ethiopian honey sector can comply with market demands and can produce honey at a competitive price in respective segments, the European Union market is considerable. As discussed above, this challenge is not being met because of quality-related and price-based issues.

3.2.2 MAIN EXPORTED PRODUCTS

The information presented above has not been differentiated by market segment. These market segments are usually described as bulk honey, certified bulk honey, mono-floral bulk honey and retail honey.

Bulk honey, which meets minimum legal requirements, can be industrial honey or table honey. It is undifferentiated, poly-floral, and mostly blended to standardize quality. It is usually shipped in 20-ton container loads of 300 kg drums. It commands low prices, and is sold to large importers, packers and retail chains. Most Ethiopian honey exported to date has been bulk honey, receiving the lowest prices in the international market.

Prices of conventional bulk honey are low. China plays an important role in setting prices internationally in this segment, with an average 2021 figure of \$1.3 per kg. The average import prices for Chinese honey have fluctuated considerably between 2011 and 2021. Prices for other suppliers to this segment are considerably higher, with Ukraine at \$1.65 per kg, and Argentina and Mexico around \$2.25 per kg.

Certified bulk honey is the same as bulk honey, but with a certificate of compliance with social or environmental standards such as European Union organic or Fairtrade. Ethiopia has very limited capacity to export certified bulk honey, but seven Ethiopian entrepreneurs now market this product.

Certified organic honey commands a premium price 5–15 per cent above conventional bulk honey prices. Organic certified produce is perceived as healthier and better. Prices in this segment are under increasing pressure as the supply of organic honey increases, particularly from countries like Brazil and Mexico.

The import price of organic honey from Brazil and Mexico is estimated at around \$2.55–3.078 per kg.

This price is lower than average export prices for Ethiopian honey.¹³

Mono-floral bulk honey, with evidence that it is mono-floral, has 45–50 per cent pollen from the specified flora, with respective typical taste profiles and appearance characteristics. Much of Ethiopian honey may be described as mono-floral honey, and considerable quantities of what is effectively mono-floral honey have been and are being exported, but it has (probably) not been defined as mono-floral with required pollen-based evidence.

FOB prices of mono-floral bulk honey range from \$4 to \$15 per kg, although prices seldom exceed \$10 per kg for most types of honey. Prices depend largely on availability and this, in turn, depends heavily on the availability of the respective bee forage. Ethiopia is well placed to develop this market with good opportunities to differentiate the *Becium* (tebeb) and *Schefflera* white honeys (with their distinctive colour, texture and taste), the yellow honey from *Bldens* species, and the *Syzigium* and *Croton* species amber and red honeys (with their strong pleasant aromas and flavours).

Retail honey (table honey) is offered to the market in consumer packaging (jars). It is sold under the brand of the packer or with a private label. As buyers of retail honey cannot test the honey in each jar, they rely on the quality management system of the supplier.¹⁴ No retail honey is exported to Europe from Ethiopia, and little appears to be exported to other countries.

Prices of retail honey packed in jars prior to export vary enormously. While most of the common honeys on supermarket shelves in Europe (for example) are priced between \$5 and \$10 per kg, exclusive mono-floral honey in specialty shops can command prices as high as \$200 per kg.

Beeswax is a by-product of honey production, but beekeepers generally focus on obtaining honey. Availability is therefore low, and high-quality, pesticide-free, low-residue beeswax is scarce. Weight for weight the value of beeswax is much higher than that of honey.

Around 30–40 per cent of globally traded beeswax is used in the cosmetics industry. International demand is not satisfied and is increasing. Prices for high-quality beeswax are therefore good – much higher than for lower quality beeswax which does not conform to standards and conformity tests for cosmetics and food use).

¹³ Although certified bulk honey fetches higher prices than conventional bulk honey, certification comes at a cost (including fees to the certification body for inspection and assessment, increased apiary management costs and other costs). These costs are lower per kg of honey produced when productivity per apiary or hive is high, that is, when more honey is produced from each certified apiary. Certification is therefore more attractive financially to larger operations.

¹⁴ For large European buyers this means rigorous certified food safety management (for example, the British Retail Consortium) and significant control over supply chains. They also require liability insurance in cases where products need to be removed from shelves. In addition, a legal representative in the European Union is appointed with responsibility for handling complaints.

¹² This does not include informal exports.

Investment can be high for equipment for melting and processing beeswax and separating beeswax from crude honey.

Beeswax is usually packed for export in cardboard boxes. Buyers prefer larger shipments (typically multiples of 20 tons) to maximize economies of scale, but with high demand, increasing prices and limited availability, buyers of beeswax are currently accepting lower quantities for shipment, perhaps as little as one to three tons. A large percentage of Europe's beeswax currently comes from producers in Spain, so their transport costs are therefore lower.

Ethiopia is a major supplier of beeswax to the global market. Current market prices are around \$13 per kg FOB Djibouti. Production of beeswax is less efficient than honey. Bees use 8–10 kg of honey to produce 1 kg of beeswax, which means that it is far less efficient for bees to produce beeswax than honey.

Modern hives are considerably less efficient for producing beeswax as extracting systems allow the honeycomb to be reused by the bees. Traditional and top-bar hives are far more effective producers of beeswax.

International markets for other hive-products, including pollen, propolis, royal jelly and venom, have not investigated in this study. There are, however, small initiatives piloting work with these products.

3.2.3 COST AND PROFIT MARGIN ANALYSIS

The international market remains strong despite prices remaining low over the past five years, with prices to the European Union market decreasing considerably due to strong competition between supplier countries. As covered in section 1 above, farm gate prices for honey in Ethiopia are high – between \$3 and \$5 per kg – which is well above the average unit value of honey imported into the European Union (see table 7 below), with the exception of that imported from New Zealand owing to the extremely high price of Manuka honey.

Given the high farm gate prices, profitable export is difficult.

TABLE 7

EUROPEAN UNION AVERAGE UNIT VALUE FOR IMPORTED HONEY (€/KG) BY ORIGIN

Source	2018	2019	2020	2021
Ukraine	1.83	1.68	1.53	1.89
China	1.51	1.40	1.38	1.36
Mexico	2.89	2.56	2.22	2.88
Argentina	2.35	2.28	2.20	2.74
Brazil	3.38	2.67	2.17	2.77
Cuba	2.40	2.11	1.83	2.08
Uruguay	2.25	1.99	1.78	2.69
Turkey	3.87	3.46	3.33	2.53
Chile	2.96	2.71	2.72	3.50
Moldova	2.47	2.69	2.26	3.24
United Kingdom	4.73	4.29	4.25	4.15
New Zealand	30.70	28.52	29.13	28.12
Serbia	3.74	3.51	5.28	6.91
Viet Nam	1.33	1.39	1.33	1.71
Russian Federation	1.92	2.21	2.11	2.12
Extra European Union	2.33	2.13	2.06	2.34
Extra European Union (excl. New Zealand)	2.26	2.06	1.99	2.32

Source: Honey market presentation by European Commission¹⁵

Given current prices, exporting Ethiopian honey will only be profitable if producers are able to access niche, higher value market segments.

¹⁵ https://agriculture.ec.europa.eu/system/files/2022-04/market-presentation-honey_en_o.pdf.



▶ 4

**QUALITY STANDARDS
AND REQUIREMENTS AT
MAIN EXPORT MARKETS
(EUROPEAN UNION,
NORWAY, UNITED
KINGDOM, SWITZERLAND)**

The European Union is the largest market in Europe, and even those countries that are not members of the European Union (Norway, Switzerland, United Kingdom) largely follow its requirements.

4.1 EUROPEAN UNION

4.1.1 MINIMUM BUYER REQUIREMENTS FOR ALL SEGMENTS

When exporting honey to Europe, suppliers must comply with legally binding requirements. As most honey is used as food, European Union legislation on food applies. All European food legislation is established according to the principles of traceability, risk analysis and precautionary measures. In addition, honey should comply to a minimum standard of quality; however, there is no overall specific set minimum quality. Buyers search for a certain type of honey, depending on the desired application.

A frequently heard criticism of honey sourced from Africa is its smoky flavour. This is something that is unacceptable to most buyers, as this is an undesired taste for most European consumers.

4.1.2 PRE-MARKET APPROVAL

European Union legislation¹⁶ prohibits honey imported from countries outside the list of [third countries drawn up by the Commission for that purpose](#). Countries on this list have established systems for testing honey quality and can effectively prevent honey exports which are not in compliance with European Union requirements. In order to be included in the third country list, a residue monitoring plan is required. The residue monitoring plan guarantees that the honey imported into the European Union does not contain any prohibited residues and veterinary drugs, such as chloramphenicol. Ethiopia is on the third country list and companies from Ethiopia are allowed by the European Union to export to the European Union.

4.1.3 APPROVED ESTABLISHMENTS

Products of animal origin for human consumption including honey can only be imported into the European Union if they come from approved processing establishments. The competent authority of the country where the company is located is responsible for checking compliance with public health requirements specified in Annex III to [Regulation \(EC\) No 853/2004](#) and listing the company in TRACES. The [published lists of establishments](#) are derived from the data in TRACES-NT.

4.1.4 HYGIENE

Honey suppliers are required to comply with the European Union legislation on hygiene of foodstuffs ([Regulation \(EC\) 852/2004](#)). The General Hygiene legislation requires a clean production environment and personnel trained in hygienic handling of honey. Implementation of procedures based on Hazard Analysis Critical Control Point ([HACCP](#)) principles, are also required. It is not obligatory, however, to obtain the actual certification of HACCP. European Union legislation also recommends sector support organizations to develop guides to good hygiene practices. These guides should be based on relevant codes of practice of the [Codex Alimentarius](#). In addition, each batch of honey must be accompanied by a health certificate signed and stamped by a veterinary officer authorized by the relevant authorities of the exporting country. A model health certificate can be found in Appendix VI to Annex VI of [Regulation \(EC\) 1664/2004](#).

4.1.5 TRACEABILITY

European Union legislation¹⁷ requires that in the case of food safety problems, products should be taken off the market and consumers should be informed. To facilitate this procedure, products must be identifiable and located quickly through a traceability system.

The General Food Law requires European Union food business operators, such as honey importers, to be able to identify each supplier of every batch of honey. To this end, importers require their suppliers to label every batch and keep samples for 2–3 years. In case of a safety problem, members of the Rapid Alert System for Food ([RASFF](#)) network must inform the European Commission, which notifies the public.

4.1.6 EUROPEAN UNION HONEY DIRECTIVE

[Directive \(EC\) 110/2001](#) sets out European Union requirements concerning honey quality standards and labelling. Requirements regarding honey composition are specifically described in Table 8.

¹⁶ EUR-Lex - 32022R2293 - EN - EUR-Lex (europa.eu).

¹⁷ [General Food Law \(europa.eu\)](#).

TABLE 8 HONEY COMPOSITION REQUIREMENTS

Composition criteria	Amount
1.1. Fructose and glucose content (sum of both)	
– blossom honey	not less than 60 g/100 g
– honeydew honey, blends of honeydew honey with blossom honey	not less than 45 g/100 g
1.2. Sucrose content	
– in general	not more than 5 g/100 g
– false acacia (<i>Robinia pseudoacacia</i>), alfalfa (<i>Medicago sativa</i>), Menzies Banksia (<i>Banksia menziesii</i>), French honeysuckle (<i>Hedysarum</i>), red gum (<i>Eucalyptus camadulensis</i>), leatherwood (<i>Eucryphia lucida</i> , <i>Eucryphia milliganii</i>), Citrus spp.	not more than 10 g/100 g
– lavender (<i>Lavandula</i> spp.), borage (<i>Borago officinalis</i>)	not more than 15 g/100 g
2. Moisture content	
– in general	not more than 20%
– heather (<i>Calluna</i>) and baker's honey in general	not more than 23%
– baker's honey from heather (<i>Calluna</i>)	not more than 25%
3. Water-insoluble content	
– in general	not more than 0.1 g/100 g
– pressed honey	not more than 0.5 g/100 g
4. Electrical conductivity	
– honey not listed below, and blends of these honeys	not more than 0.8 mS/cm
– honeydew and chestnut honey and blends of these except with those listed below	not more than 0.8 mS/cm
– exceptions: strawberry tree (<i>Arbutus unedo</i>), bell heather (<i>Erica</i>), eucalyptus, lime (<i>Tilia</i> spp.), ling heather (<i>Calluna vulgaris</i>), manuka or jelly bush (<i>Leptospermum</i>), tea tree (<i>Melaleuca</i> spp.)	
5. Free acid	
– in general	not more than 50 milli-equivalents acid per 1 000 grams
– baker's honey	not more than 80 milli-equivalents acid per 1 000 grams
6. Diastase activity and hydroxymethylfurfural content (HMF) determined after processing and blending	
6.1 Diastase activity (Schade scale)	
– in general, except baker's honey	not less than 8
– honeys with low natural enzyme content (e.g. citrus honeys) and an HMF content of not more than 15 mg/kg	not less than 3
6.2 HMF	
– in general, except baker's honey	not more than 40 mg/kg (subject to the provisions of (a), second indent)
– honeys of declared origin from regions with tropical climate and blends of these honeys	not more than 80 mg/kg

4.1.7 RESIDUES

[Regulation \(EC\) 470/2009](#), in conjunction with the annexes of [Regulation \(EC\) 2377/90](#), establishes maximum residue levels (MRLs) for the use of authorized veterinary drugs, such as antibiotics, applied to honey bees. The use of veterinary drugs containing pharmacological substances not listed in the annexes is prohibited.

TABLE 9: MAXIMUM RESIDUE LIMITS FOR VETERINARY DRUGS

Residues	MRLs
Amitraz (Tactic, Apivarol)	0.2 mg/kg
Chloramphenicol	Zero tolerance
Chloroform	Zero tolerance
Chlorpromazine	Zero tolerance
Colchicine	Zero tolerance
Coumaphos (Perizin)	0.1 mg/kg
Dapsone	Zero tolerance
Dimetridazole	Zero tolerance
Flumethrin (Bayvarol)	Not restricted
Metronidazole	Zero tolerance
Nitrofurans (including furazolidone)	Zero tolerance
Oxalic acid	Not restricted
Ronidazole	Zero tolerance

Although pesticide use is limited in many areas of Ethiopia, [Regulation \(EC\) 396/2005](#), which sets MRLs for pesticides, is very relevant. The MRLs set by this Regulation are frequently amended. Therefore, the European Commission publishes an up-to-date [Pesticides database](#) on its website, where the current MRLs for pesticides can be checked.

4.1.8 PACKAGING

Honey imported from developing countries into the European Union is transported in bulk, rather than in retail packaging. Packing for retail usually takes place inside European Union borders, before distribution to retail chains and elsewhere. European Union buyers strongly prefer steel drums over plastic drums because of handling and quality. Due to the weight of honey, plastic drums may collapse when stacked. In practice, this also means that storage of plastic drums requires more space. Moreover, equipment of importers is not always suitable for plastic which may break as it is less durable. Plastic is also more permeable which means honey is more easily contaminated by, for example, materials or liquids on the floor.

Buyers commonly require metal drums of 200 litres. The drums must be painted on the outside and lined on the inside. Depending on buyer preferences, beeswax, or plastic bags (such as polyethylene) can be used for lining. Buyers might agree to packaging honey in plastic containers if these are certified food-safe plastics.

4.1.9 LABELLING

Labels must include the following information:¹⁸

- » Name under which it is sold
- » Gross and net weight
- » Date of minimum durability – “best before”
- » Any special conditions for keeping or use
- » Name and address of the manufacturer, packager or importer established in the European Union
- » Place of origin or provenance
- » Lot marking on pre-packaged foodstuffs with the marking preceded by the letter “L”
- » Drum number (if exported in bulk)

As labelling regulations for consumers might differ by country, buyers prefer to pack and label honey themselves. This allows them to create their own product label that complies with local labelling rules, and is in the local language.

4.1.10 SOCIAL AND ENVIRONMENTAL SUSTAINABILITY

Corporate social responsibility is one of the ways for companies to differentiate themselves in the market. A corporate social responsibility policy usually consists of environmental and social aspects. For example, honey exporters can recycle waste and improve safety for employees at the processing plant. Environmental management systems may be based on the international standard [ISO 14000](#), but certification for this is commonly not required in the honey market. Similarly, OHSAS 18001 regarding occupational health and safety and [SA8000](#) regarding social conditions can provide a solid basis for improvement of social conditions, while certification is optional.

Honey certified as organic in line with European Union requirements can command higher prices, typically a 5–15 per cent premium above conventional bulk honey prices. Details of the European Union organic requirements are set out in Council Regulation (EC) No 834/2007¹⁹ and supporting regulations including Commission Regulation (EC) No 889/2008²⁰ and

¹⁸ [Food labelling - general European Union rules - Your Europe \(europa.eu\)](#).

¹⁹ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32007R0834>.

²⁰ [LexUriServ.do \(europa.eu\)](#).

Commission Regulation (EU) No 2021/2325.²¹ While organic honey commands a higher price, achieving organic certification can be an expensive and long process (minimum one year). Maintaining organic certification can cost enterprises several thousand dollars per year. Honey producers would therefore need to be sure of having sufficient export volumes with a high enough price differential for organic certification to be commercially advantageous.

4.2 NORWAY

Any food (including honey) imported into Norway must comply with Norwegian food regulations. Because of the European Economic Area agreement, Norwegian food legislation is harmonized with that of the European Union, and Norway is obliged to follow the European Union legislation in the food and veterinary areas.²²

According to Norwegian legislation, the business operator in Norway importing and receiving the honey is required to perform the necessary controls of the honey to ensure that it complies with Norwegian regulations.

4.3 SWITZERLAND

Honey imports to Switzerland follow similar requirements and procedures to the European Union.^{23,24,25} Unless transported by air (very unlikely given the cost), imports to Switzerland will transit through the European Union, and the required veterinary controls will take place at the first point of entry into the European Union.

4.4 UNITED KINGDOM

Despite officially leaving the European Union, procedures, rules and regulations for importing honey into the United Kingdom are broadly in line with those of the European Union, as set out in the United Kingdom Government's [Import of Honey, Royal Jelly and other Apiculture Products for Human Consumption](#) Information Note. European Union legislation that had applied directly or indirectly to the United Kingdom before 31 December 2020 has been retained in United Kingdom law as a form of domestic legislation, known

as “retained European Union legislation”.²⁶ Ethiopia therefore continues to be on the list of third countries with recognized residue control plans for honey.

The requirements detailed below apply for honey imported into Great Britain, as the rules for Northern Ireland are slightly different and at the time of writing are yet to be finalized post Brexit.

4.4.1 PRODUCTION STANDARDS

Honey imported into Great Britain must have been produced in accordance with the conditions laid down in:

- » Retained Regulation (EC) 178/2002 – the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety
- » Retained Regulation (EC) 852/2004 – the hygiene of foodstuffs
- » Retained Regulation (EC) 853/2004 – specific rules for food of animal origin
- » Retained Regulation (EU) 2017/625 – specific rules for the organization of official controls on products of animal origin intended for human consumption; and on official controls performed to ensure the verification of compliance with feed and food law, animal health and animal welfare rules
- » The Honey (England) Regulations 2015. These are aligned to the European Union Regulations

4.4.2 HEALTH CERTIFICATION

Imports into Great Britain must be accompanied by a [health certificate](#), based on the requirements included in Retained European Union Regulation 2019/628.

4.4.3 PRE-NOTIFICATION OF IMPORTS

Importers must notify the Animal Plant Health Agency of honey imports into Great Britain as products of animal origin using the [Import of products, animals, food and feed system](#) before the shipment reaches Great Britain.

²¹ [Publications Office \(europa.eu\)](#).

²² Obligations for importers of foods to Norway | The Norwegian Food Safety Authority ([mattilsynet.no](#)).

²³ [RS 817.022.108 - Ordonnance du DFI du 23 novembre 2005 sur les denrées alimentaires d'origine animale \(admin.ch\)](#).

²⁴ [Fédération Cantonale Neuchâteloise d'Apiculture, FCNA - Miel, pollen, gelée royale, étiquette, législation suisse](#).

²⁵ [Import \(query\) \(admin.ch\)](#).

²⁶ This is set out in sections 2 and 3 of the European Union (Withdrawal) Act 2018.





▶ 5

ANALYSIS OF THE HONEY VALUE CHAIN

5.1 LINKAGES AND MAIN PROCESS: BEEKEEPING, COLLECTING, PROCESSING, PACKAGING, LOGISTICS, RETAIL AND EXPORT

There is considerable potential to further increase Ethiopian honey production volumes. As at 2013, over 95 per cent of Ethiopian honey was produced in traditional hives, with an average yield of 6.5 kg a year.²⁷ With modern techniques, yields of up to 33 kg per year have been achieved in Ethiopia.²⁸

Although traditional beekeeping is generally regarded as complementary to other agricultural activities, there is a trend towards professionalization of production. As the private sector recognizes opportunities in the apiculture sector, several honey processors are engaging in honey production to ensure consistent supply and volumes and assure quality.

Honey producers can be categorized in three interconnected groups with movement between them:

- » **Individual beekeepers and small beekeeping groups** that produce honey with more traditional systems as a side activity, usually with low yields
- » **Affiliated members of apiculture cooperatives** that were formed to resolve common logistical

access modern beehives and other supplies through public or private support, for instance with help from non-governmental organizations.

Producers who are members of out-grower agreements with private processing enterprises. These producers usually have greater access to modern apiculture supplies.

The official target for honey production is set at 200 thousand tons per year.²⁹ Various strategies are being implemented to achieve this, based on improving production and harvesting techniques, improving input supply, increasing access to finance, and others. This strategy comes with the expectation that increasing honey production will have a direct, positive impact on income generation and poverty reduction. Nevertheless, as the domestic and global honey value chain is strongly driven by its end markets, it is important to consider market opportunities for Ethiopian honey to ensure its success.

5.2 NATIONAL SUBSIDIARY VALUE CHAINS

The institutional channels that correspond to honey commercialization in the domestic market are multiple, complex, and interconnected. Nevertheless, it is possible to identify four different types of subsidiary value chains, based on the main processors involved and the final markets to be reached:

5.2.1 TEJ SUBSIDIARY VALUE CHAIN

The tej subsidiary value chain is principally sustained by individual beekeepers and producer groups. Honey is supplied to tej breweries by village-level collectors either directly or through intermediary local processors and traders. It is unclear whether these collectors fall under the formal or the informal trade channels. If they are classified as informal traders, they are only loosely regulated and may not be required to meet any specified standards for collecting and trading crude honey. The final product, tej, is then sold to restaurants and tej houses.

5.2.2 INFORMAL HONEY SUBSIDIARY VALUE CHAIN

The informal honey subsidiary value chain functions

in a similar way to the tej subsidiary value chain, with village collectors gathering honey for local processors and traders, who blend the honey and place it on the local market as table honey in small cities and towns. The informal honey subsidiary value chain includes a wide range of circumstances, scales of operation and participants, from small-scale family businesses at household level to more structured enterprises operating in the margins of formality. It can deliver a wide variety of honey qualities and types.

5.2.3 COOPERATIVE SUBSIDIARY VALUE CHAIN

The cooperative subsidiary value chain relies on the association of producers to form primary cooperatives to improve their logistics and trading capacity. Producers typically deliver extracted honey to the cooperative, and the cooperative blends and packages it for the wholesale trade. Honey is then either transferred to an industrial processor and trader or to a cooperative union. In either case, the honey is generally blended a further time, re-packaged and sold to domestic retailers as table honey. The cooperative subsidiary value chain is generally hampered by a lack of collection, storage and packaging facilities, which frequently compromises the quality of honey processed through this channel.

²⁹ [LMP apiculture 2013.pdf \(cgiar.org\)](#).

²⁷ Ministry of Agriculture, Ethiopia, and International Livestock Research Institute, 2013.

²⁸ Addis Ababa University, 2015.

5.2.4 INDUSTRIAL SUBSIDIARY VALUE CHAIN

The industrial subsidiary value chain can be defined by its central participants: industrial processors, that are legally formed as private limited companies. Industrial honey processors generally source their

crude honey either from networks of contracted out-growers or from primary cooperatives or groups of producers and take charge of all subsequent processes before selling it, packed, to retailers. Most exported honey originates from this subsidiary value chain.

5.3 ANALYSIS OF CHALLENGES AND CONSTRAINTS IN VALUE CHAIN DEVELOPMENT STAGES

5.3.1 PRODUCTION QUALITY AND HONEY QUALITY IN EACH VALUE CHAIN

5.3.1.1 Tej subsidiary value chain

Honey quality requirements for tej brewing are very low. Because honey is mixed with water during the brewing process, the moisture content of the honey is not checked. There is, reportedly, considerable adulteration through the whole tej subsidiary value chain.

5.3.1.2 Informal honey subsidiary value chain

Honey quality in this subsidiary value chain is also generally poor with few checks and negligible attention to moisture content. The longer the value chain – that is, the greater the number of traders and transactions that the honey is subjected to – between producer and processor, the greater the likelihood of adulteration and the greater the risks of contamination and other types of spoilage.

5.3.1.3 Cooperative subsidiary value chain

Inadequate and inappropriate facilities and lack of training are critical issues in this subsidiary value chain. Cooperatives seldom focus on honey as their primary commodity. It is a secondary interest or business line to, typically, coffee. Without the specialization required, honey quality in the cooperative subsidiary value chain deteriorates rapidly.

Where cooperatives have the equipment to blend and package honey for wholesale, the facilities are frequently inadequate and are seldom inspected for public health and food handling standards. Only where there are committed and trained, knowledgeable individuals do these cooperatives adequately address quality.

5.3.1.4 Industrial subsidiary value chain

The management of quality can vary significantly in the industrial subsidiary value chain. Although it is the most formal commercialization channel, it is frequently involved in the adulteration of honey.

The most rigorously managed value chains are operated by private enterprises, usually exporting honey, which cut out the middleman traders and work directly with groups of producers, training, supervising and supporting them, equipping them and establishing standards that ensure honey quality is maintained. Typically, they also identify specific progressive beekeepers who support the producer groups and who also act as aggregators for the company. This system works very well providing the processor remains engaged with the producers.

5.3.2 TABLE HONEY IN ETHIOPIA

Locally processed and packed table honey is often subject to granulation and the problems associated with granulation. This relates to sugar content, resulting from mixing different floral types. When honey separates in the jar, forming two layers with coarse crystallization at the bottom and a liquid layer above, the product not only looks unappealing, affecting its marketability, but is also more likely to ferment. Although the honey, when bottled as a uniform product, may have had an acceptable moisture content, the crystallized bottom layer will now have a very low moisture content while the liquid phase will have a higher water content. The upper layer may then ferment. Furthermore, most local people associate coarse honey crystals with adulteration with table sugar.

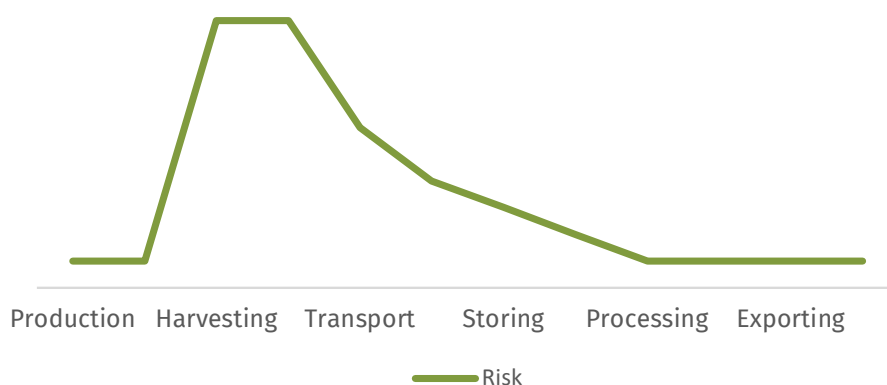
5.4 ANALYSIS OF CHALLENGES AND CONSTRAINTS IN QUALITY COMPLIANCE AT EACH STAGE

Honey is unique. It is one of the only foods consumed raw, unwashed, and untreated. From the moment honey is removed from the hive, its quality and hygiene can only go down; so honey must be of the highest

quality, right from harvesting. There are significant challenges, especially at the beginning of the value chain.

5.4.1 RISKS

FIGURE 5: QUALITY RISK LEVELS ALONG THE VALUE CHAIN



5.4.1.1 The quality risks

At the production level, when the honey is in the hive, the quality risks are negligible. The only significant issue is the use of pesticides in the locality. As soon as honey is handled and removed from the hive, the quality falls and hygiene issues rise.

During harvesting, the many risks include bacterial and microbial contamination; the introduction of foreign material; loss of purity; high moisture content due to mixing ripe and unripe combs of honey; inclusion of brood comb; and contamination with smoke.

During transportation and storage, honey is exposed to: bacterial and microbial contamination; rising moisture content; and increasing levels of HMF, especially if the containers are poorly sealed or damaged, and the risk of foreign odours permeating the honey.

The more honey is handled and moved, the greater the risks to quality and hygiene; and where there is a long supply chain there is greater likelihood of adulteration because accountability is reduced.

During processing, the risks are lower but honey is still exposed to bacterial and microbial contamination; foreign material; and spoilage by heating.

During exporting, the risks to quality are yet lower, the most significant being spoilage by heat.

5.4.1.2 Quality challenges for producers

Beekeepers have very many quality challenges. To minimize quality issues related to their bees foraging, beekeepers must place hives in areas where no pesticides are used. They must also place hives at sites where they are difficult to steal or rob. The likelihood of theft impacts quality, especially if beehives are remote in the forest. If beekeepers travel long distances to harvest hives and the honey is not fully ripe in some hives, the risk of leaving it to ripen

(with the beekeepers returning later) is considerable. Others may steal it. So, beekeepers favour taking the unripe honey as well.

To maintain good honey quality, beekeepers must have adequate inputs including protection, suitable tools, and appropriate containers. If they work bees without adequate protection they sting, which hurts, which causes stress, so beekeepers hurry their work. Perspiration is a common contaminant (albeit never testing for), and stressful conditions encourage beekeepers to use more smoke (which permeates the honey and impacts negatively on aroma and flavour and, therefore, value). Honey quality also falls if beekeepers collect unsealed honey (which is not mature and has a high moisture content) and may also collect combs that have brood.

Beekeepers need strong skills and good practices to harvest and extract honey and maintain its quality.

Poor quality or unclean containers lead to contamination and the introduction of foreign matter, and these containers must be stored hygienically in a cool place, away from strong smells.

Very many beekeepers are unaware of quality issues, but honey is a fairly robust product. For many, increased quality does not affect the price they receive per kg, and unless a beekeeper receives adequate training they may not recognize these quality issues. These weaknesses and challenges are compounded by the general lack of quality checks on most honey sold by beekeepers in the country – even the basics of sight, smell, and moisture content.

5.4.1.3 Quality challenges for traders and local processors

The challenges for beekeepers are many but for traders and processors the challenges are fewer.

Most traders and a few cooperatives do not have traceability systems. The notion of accountability is therefore low, problems cannot be traced back to producers, and lessons on quality management upstream cannot be learned.

Most traders and cooperatives lack quality awareness and are seldom trained in this. The basic quality checks (sight, smell, and moisture content) are not used and there is little training on this.

Storage is often poor. Containers are not kept in hygienic conditions, are seldom kept off the floor, and stores are not properly sealed against vermin, insects, and dust.

Processing at the earlier stages of the value chain is often undertaken in unsuitable conditions with, for example, inappropriate basic equipment and inadequate washing and drying conditions. Standards of hygiene are generally poor.

5.4.1.4 Quality challenges for cooperatives and unions

Cooperatives and unions appear to have similar issues to those found among traders and local processors, around traceability, storage facilities and quality checks. They often have inadequate or non-functioning processing facilities. They have limited quality awareness and exhibit little knowledge of testing needs and of their own responsibilities, have little capacity to test, and have little knowledge of the role of available quality infrastructure institutions.

In summary, there are risks all along the supply chain, but they reduce significantly the further the honey has moved from the hive.

5.4.2 QUALITY

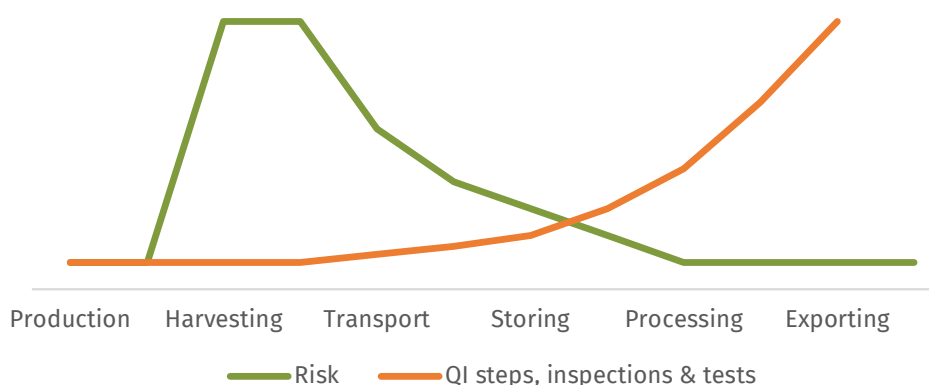
The graph illustrates the manner in which, during the stage when the risks fall (the green line), the quality infrastructure controls increase (the red line). Testing against standards, quality and hygiene mostly takes place at the processor level. Many of the usual tests, however, reflect production and harvesting factors including pesticide residues, moisture content, water insoluble content, proline content, sugar content (reflecting botanical origin) and electrical conductivity (which also reflects botanical origin). Two tests typically assess freshness, storage, and heating, these being diastase and invertase tests and HMF (which also looks at adulteration). Only one test, for acidity, determines the characteristics of honey.

The quality infrastructure system therefore is testing for many quality issues at the end of the value chain rather than at the beginning where most of the problems occur; in other words, the quality infrastructure system mostly picks up problems that have occurred at the production, harvesting and early trading and storage levels.

5.4.2.1 Challenges for exporters

At the end of the supply chain, exporters depend on buying honey that meets the standards of both the Ethiopian Government and the standards of the buying country. Rather than remaining at the end of a long value chain, with all its risks, most (as discussed above) shorten it by buying directly from producers. Many go right up the value chain to reach the first critical points, of production and harvesting, and establish best practices by providing training on husbandry, providing protective equipment, supplying suitable containers, training on and even initially supervising harvesting, establishing quality checks and undertaking basic tests on the honey. They focus on building a long-term relationship and mutual commitment with their network of beekeepers; and establish traceability systems.

FIGURE 6: QUALITY RISK AND CONTROL LEVELS ALONG THE VALUE CHAIN



Exporters struggle to access sufficient volumes of quality honey, so frequently work towards improving productivity per hive per beekeeper rather than increasing the number of hives and beekeepers. They typically encourage beekeepers to work with colleagues to increase productivity within a group.

Successful exporters access profitable markets, tending to focus on niche markets that require close

attention to quality. They value testing but many are not yet convinced that ECAE will be competitive with European laboratories on cost, speed and reputation with international clients.

They also value high-quality beeswax, not so much as a by-product but as a parallel and important income stream.

5.5 MAPPING OF THE DEMAND FOR QUALITY INFRASTRUCTURE SERVICES

Demand for quality infrastructure services comes from producers who need these services to either comply with basic requirements to access a particular market (for example, the European Union), or to add value to their product to access a market niche such as certified organic honey.

5.5.1 QUALITY INFRASTRUCTURE SERVICES – DEMAND FOR THE DOMESTIC MARKET

There is no requirement for quality for selling to the domestic market and there appears to be little interest in using quality infrastructure services among participants in these value chains, or among consumers. There are no market niches or buyers that ask for quality standards, and no value chain participants within Ethiopia appear to request quality infrastructure services for the domestic market.

5.5.2 QUALITY INFRASTRUCTURE SERVICES – DEMAND FOR THE INTERNATIONAL MARKET

The regional markets appear uninterested in quality assurance. Price and volume are the primary drivers for exports to Sudan, Kenya, Djibouti and similar markets.

Exporters to Europe are obliged to use quality infrastructure services. This includes testing their honey to ensure that it complies with Ethiopian requirements, as well as those of the European Union and their end buyers. (These steps are covered in detail in section 2.3.3 and section 4 above.) As Ethiopian laboratories are not yet fully certified to conduct all the necessary tests, some are carried out by laboratories abroad, often in Germany.

5.5.2.1 Residue monitoring plan

Under the formal export activities and the residue monitoring plan administered through the Ministry of Agriculture, the exporters prepare their plans for the year ahead. Governed by the relevant European Union Council Directive (96/23/EC), the sampling levels for honey monitoring are fixed for the levels and frequency of sampling. The number of samples collected is

determined according to the formula concerned, and the honey samples collected at different locations from the different members of EHBPEA to ensure that results are representative of the overall honey quality. The honey sampled from the EHBPEA members is not specific in enabling specific, individual members to sell to the European Union – honey from all EHBPEA members is eligible.

After testing, the samples are forwarded to an accredited laboratory for the analysis to take place. Currently, there are no accredited laboratories within Ethiopia able to carry out the required tests. Chemiphar Uganda, an accredited laboratory in Uganda, has been used in the past and currently a laboratory in Germany, namely Intertek, is used. The Ethiopian Government, with support from international partners, is developing the capacity of the local laboratories (in particular ECAE and Bless Agri-Food Laboratory Services) to ensure such tests can be carried out inside the country in the future.



▶ 6

ANALYSIS OF THE NATIONAL QUALITY INFRASTRUCTURE FOR THE HONEY VALUE CHAIN



The quality infrastructure system encompasses the totality of the institutional framework required to provide evidence that products and services meet the specific legal or further requirements demanded by legal authorities or the marketplace. It is not a rigid framework in the sense that each country is free to design its national quality infrastructure (NQI) according to its own criteria, legal framework, and regional context (UNIDO, 2018).

To be allowed to deliver the expected results, a quality infrastructure system must function as a whole, because there is a high level of interdependence between its constituent elements. Typically, such a system relies on the following elements:

1. A legal and normative framework, which sets all relevant regulations on national standards, accreditation, and metrology matters, and ensures that quality requirements at country level are compatible with applicable international trade rules;

2. Quality infrastructure institutions, which hold public authority in the fields of standards, metrology, and accreditation;
3. Service providers, which can be public or private operators, which propose calibration, testing, inspection, and certification solutions to business operators;
4. Quality-aware business operators, such as producers, domestic retailers, processors, and others.

A well-implemented quality infrastructure system is an important driver of economic and industrial development: with the application of internationally acknowledged standards, enterprises can compete on international markets and develop and access new value chains. Consumers also benefit from the implementation of a quality infrastructure system as they have access to safer products whose quality is publicly guaranteed.

6.1 OVERVIEW OF THE NQI FOR HONEY IN ETHIOPIA

Ethiopia took an important step towards the establishment of a fully-fledged NQI in 2011 with the creation of four new institutions, which took over and extended the mandate of the former Quality and Standards Authority of Ethiopia:

1. Institute of Ethiopian Standards (IES)
2. Ethiopian Conformity Assessment Enterprise (ECAE)

3. Ethiopian Metrology Institute (EMI)
4. Ethiopian Accreditation Service (EAS)

Together, these institutions are entitled to provide all the standards, quality assurance and metrology, and accreditation services required by business operators willing to export their products. Shortcomings still exist, however, for honey exports.³⁰

6.2 STANDARDS AND TECHNICAL REGULATIONS

The Institute of Ethiopian Standards (IES) is the national standards body of Ethiopia, established in 2011. It is a member of the International Organization for Standardization (ISO), the Codex Alimentarius Commission, and of the African Organization for Standardization.

IES provides the following services:

- » Development and sale of Ethiopian standards
- » Provision of training and technical support on standards implementation
- » Provision of standards information and raising public awareness of standards

The development of Ethiopian standards is done by sectorial Technical Committees gathering the main stakeholders of each sector.

Technical Committee 30 oversees standards on honey. It is composed of ten members:

- » Ministry of Agriculture (Chair)
- » Ethiopian Institute of Agricultural Research – Holeta Research Centre
- » Ethiopian Meat and Dairy Industry Development Institute
- » Food, Medicine and Healthcare Administration, and Control Authority of Ethiopia
- » Ethiopian Honey and Beeswax Producers and Exporters Association (EHBPEA)
- » Ethiopian Conformity Assessment Enterprise (ECAE)
- » Mekelle University
- » Ethiopian Beekeeper Association (EBA)
- » Bless Agri-Food Laboratory Services
- » Institute of Ethiopian Standards (IES) (Secretary)

³⁰ [PTB_Info_QI_Assessment_Report_Ethiopia.pdf](#)

6.2.1 RELEVANT STANDARDS

Three standards currently in place are of relevance for the honey and hive value chain:

- » Honey Specification (ES1202:2015)
- » Beeswax Specification (ES1203:2015)
- » Beehives Specification (ES1204:2015)

Compliance with these standards is voluntary. The beeswax specification is in the process of being updated as it is not currently in line with international

standards. The IES should also consider developing standards for:

- » **Protective equipment.** At present there is no national standard for protective equipment (bee suits, gloves). Locally manufactured protective equipment is more easily available and affordable than imported equipment, but quality issues impact its efficacy
- » **Packaging and storage materials.** There are no national standards for honey packaging and storage materials. Substandard materials are a major contributor to poor honey quality

6.3 METROLOGY

6.3.1 ETHIOPIA METROLOGY INSTITUTE

The Ethiopia Metrology Institute (EMI) is the national metrology body of Ethiopia and one of the organizations that originated from the Quality and Standards Authority of Ethiopia restructuring in 2011. It is responsible for the maintenance of Ethiopian National Measurement Standards and certified reference material. EMI is an associate of the International Bureau of Weights and Measures and a member of the General Conference on Weights and Measures.

EMI provides physical metrology services: calibration for length, weights, temperature, pressure, force, volume, electricity, density and radiation measuring instruments, to private and public laboratories. It is accredited by DAkkS³¹ for mass, temperature, pressure, volume, balance, electrical quantities. Private clients mainly originate from the leather, textile, and the agrofood industry.

EMI does not currently provide chemical metrology services, which are required for honey testing. EMI has, however, received significant investment from the Government. New premises are under construction which are not yet finished as the construction was stuck around June 2022. It is not known when construction will be finished. Moreover, equipment for chemical metrology has been purchased, although EMI were not able to provide details at present. This equipment is currently in storage, awaiting the completion of the new

building. EMI expects the equipment to be installed and commissioned in 2023.

Once the new equipment is in place, EMI will begin providing certified reference material for chemical metrology. Much of the certified reference material required for honey testing (pesticide residue analysis, heavy metal testing, and others), however, requires specialist expertise, and it is not yet certain when EMI will be able to begin providing this service to Ethiopian testing laboratories.

6.3.1.1 Issues

Staff capacity will be a key constraint. Almost all EMI staff have a background in physical metrology and will need significant training to provide chemical metrology services, including how to operate their new equipment. They also have no capacity to maintain their equipment. Capacity-building should take place once the new facilities and equipment have been commissioned so that staff can be trained on the job

6.3.2 DEPARTMENT OF LEGAL METROLOGY

Measurements of retailers, collectors and exporters are regulated by the Ministry of Trade and Regional Integration, Department of Legal Metrology, which regulates the appropriateness of measuring instruments for packed goods by inspecting or verifying their compliance with the stipulated requirements.

6.4 TESTING

Conformity assessment is at the core of any quality infrastructure system and is intended to demonstrate that a product complies with all legal and normative

requirements before being placed on a market. In the case of honey exported to the European Union, conformity assessment checks that all honey batches meet the requirements set by Council Directive 2001/110/EC and by the Regulations (EC) 396/2005 and 37/2010.

³¹ Deutsche Akkreditierungsstelle (DAkkS), the national accreditation body of Germany.

In Ethiopia, two laboratories currently provide conformity assessment services for honey: the publicly owned ECAE and the private Bless. Bless, however, does not have full international accreditation, and so their services are insufficient for exporting honey to the European Union. ECAE is in the process of gaining accreditation for all the conformity assessments required for exports to the European Union. The necessary international accreditation for its services were expected to be in place by the end of 2022.

6.4.1 ETHIOPIAN CONFORMITY ASSESSMENT ENTERPRISE (ECAE):

ECAE is a public enterprise owned by the Government of Ethiopia, under the authority of the Ministry of Trade and Regional Integration. It is the primary conformity assessment organization in Ethiopia, providing inspection, laboratory testing and certification services to the public and private sectors. ECAE has approximately 240 professional and support staff located at its headquarters and main laboratory facilities in Addis Ababa and its eight branch offices. It does not currently have an office in Oromia. Honey analysis is done by the ECAE agricultural products and Inputs testing laboratory.

ECAE has been supported by the World Bank Ethiopia National Quality Infrastructure Development Project, through which ECAE is receiving testing equipment and capacity-building. Equipment purchased for ECAE includes FT-IR equipment for residual analysis, atomic absorption and Microwave Plasma Atomic Emission Spectrometry (MP-AES). and Inductively Coupled Plasma Mass Spectrometry (ICP-MS) analysers for heavy metals testing.

6.4.1.1 Services

ECAE currently provides (or intends to provide over the coming six months) the following tests for the honey value chain:

- » Sugar content (fructose, glucose, sucrose)
- » Moisture content
- » Water insoluble content
- » Ash content
- » Electrical conductivity
- » pH
- » Free acid
- » Diastase activity
- » HMF content
- » Heavy metal analysis

- » Pesticide and veterinary drug residue analysis. ECAE has the necessary equipment for multi-residue analysis, but it has not yet been commissioned. Staff are currently receiving training and they were expected to begin testing in the third quarter of 2022.
- » Pollen analysis
- » Adulteration analysis. ECAE has procured an instrument to conduct carbon isotope analysis which was to have been installed and commissioned in the third quarter of 2022.

6.4.1.2 Accreditation

The table below summarizes the tests that are currently available, the tests that are not yet available but which the laboratory will begin over the coming months (the necessary machinery is in place or being installed), and which of the available tests are accredited by EAS.



TABLE 10: HONEY TESTS CURRENTLY (OR SOON TO BE) PROVIDED BY ECAE

No.	Parameter	Available (Yes/Not yet)	Accredited (Yes/No)
1.	Electrical conductivity	Yes	Yes
2.	HMF (Hydroxymethylfurfural)	Yes	Yes
3	Diastase	Not yet	-
4	Invertase	Not yet	-
5	Sugars	Yes	Yes
	Glucose		
	Fructose		
	Sucrose		
	Maltose		
6	Turanose		
6	Proline	Not yet	-
7	Specific rotation	Yes	Yes
8	Metals	Yes	Yes
9	Pesticide residue	Not yet	-
10	Veterinary drugs	Not yet	-
11	Adulteration, Isotope analysis	Not yet	-
12	Moisture	Yes	Yes
13	pH and acidity	Yes	Yes
14	Ash	Yes	Yes
15	Water-insoluble matter	Yes	Yes

6.4.1.3 Issues

ECAE is almost able to provide all the services required by the honey value chain. By the end of the third quarter of 2022 they expected to be able to offer all tests required for access to European Union markets, and expected these services to be fully accredited by the beginning of 2023.

Owing to their cost and the shortage of foreign currency, however, ECAE have issues in accessing certified reference material and consumables. Access should be resolved in the medium term, once EMI is able to provide all the certified reference material required for residue and heavy metal analysis, but this is likely to take several years.

ECAE also has a shortage of sample preparation equipment. Consequently, samples must be prepared manually, reducing efficiency and their capacity to test large volumes of samples.

ECAE staff will need additional training to effectively use and maintain the new equipment that they have received. A full list of the equipment, consumable and training needs of ECAE as reported to the inception team is included in Annex 3.

While ECAE is mostly funded by the Government, it is now also required to self-finance part of its budget by charging for its services. Demand for ECAE services from honey exporters, however, is not guaranteed – exporters report that it can be cheaper and faster to send samples to Europe for analysis. Developing a profitable and sustainable business model will therefore be critical for the long-term success of ECAE.

6.4.2 BLESS AGRI-FOOD LABORATORY SERVICES

[Bless Agri-Food Laboratory Service](#) is a privately owned company majority owned by an Ethiopian entrepreneur, with the French company Onyx SAS (Nutriset group) as the minority shareholder. Bless provides chemical and microbiological testing services, exclusively to the agricultural and food sector. In addition, it runs three regional offices in Adama, Tigray and Southern Nations Nationalities and Peoples Region, where inspection services and basic testing are carried out. The Bless laboratory is ISO 17025 certified and accredited by the South African National Accreditation System.

The Bless main facility is located on the outskirts of Addis Ababa. It is equipped with modern equipment, staffed with 37 specialized analysts and announces an average duration of four to five days to process samples that are sent in for testing. Bless has Gas Chromatography Mass Spectrometry for residue testing and Atomic Absorption Spectroscopy (AAS) for heavy metal testing. The prices of these services depend on the applicable fee policy.

Bless tests the following parameters for honey:

- » Moisture
- » Acidity
- » Sugars
- » Sucrose
- » Fructose : glucose ratio
- » Electrical conductivity
- » Ash
- » HMF
- » Essential elements
- » Water insoluble matter
- » Diastase activity

None of these tests are accredited, however, and so cannot be used for testing exports to the European Union. Their prices are also perceived by local producers to be high.

6.5 CERTIFICATION

Currently, ECAE is the only body accredited by the Ethiopian Accreditation Service (EAS) for the certification of ISO 9001:2015 Quality Management System, and its business scope is limited to food products, beverages, tobacco, and rubber and plastic products. Besides, as stated by ECAE, it has been accredited by the German accreditation body, DAkkS, for ISO 9001:2015 Quality Management System with 13 scopes, including agriculture, forestry and fishing; and food products, beverages and tobacco. This includes ISO 22000 Food Safety certification. ECAE accredited tests for honey are set out in section 6.4.1 above.

In Ethiopia, there is no mandatory management system certification, and the reliability of management system certificates provided by certification bodies is not controlled. Since honey is a food item, producers are expected to apply and comply with food safety management system standards, or product certification or Good Manufacturing Practice for honey.

The Ethiopian Food and Drug Authority accepts Good Manufacturing Practice certificates for pharmaceutical products but has yet to develop and apply suitable

6.4.3 HOLETA BEE RESEARCH CENTRE LABORATORY

The [Holeta Agricultural Research Centre](#) was established in 1966 under the Ethiopian Institute of Agricultural Research. Holeta has a dedicated Bee Research Centre (covered in more depth in section 7.2 below), which offers laboratory testing for honey. The laboratory tests honey for the following parameters: sugar profile, moisture content, HMF, ash and mineral content, acidity, conductivity, pollen analysis, diastase (although they have discontinued this test owing to a lack of reagents). Holeta laboratory facilities are basic, their equipment is not calibrated and their services are not accredited. They do not have the equipment to carry out residue monitoring or identify adulteration.

Most testing is for research purposes – data provided by Holeta from 2014 indicate that almost 95 per cent of the samples tested were for university theses and for other federal and regional research institutes. Only 4 per cent of tests were for honey processors, although their services are very inexpensive compared to those offered by the commercial sector.

To be able to better serve the value chain, Holeta would need to be re-equipped: they lack laboratory space, equipment, workshops, reagents and consumables. Staff would need training on conducting the tests: at present they are self-taught, learning procedures from the literature. Staff also need training on equipment handling and maintenance.

Good Manufacturing Practice for honey. ECAE is the only conformity assessment body accredited by EAS for quality management system certification. Others offering system certification in Ethiopia (ISOQAR, DQS, and Bureau Veritas) only have a local agent or representative, with the service provided by the certification body located outside the country.

6.5.1 ORGANIC CERTIFIERS

[Ecocert IMO](#), [CERES](#), and [Control Union](#) Certification operate in Ethiopia. There is some organic honey production in Ethiopia, but these companies mostly serve coffee producers. Obtaining organic certification can be a long process. Producers need to ensure that their operations, systems and procedures conform to the organic standard before applying for certification. The certification process itself normally takes up to a year.

Organic certification to European Union standards is typically a five-step process.³² The entity being certified

32 Full details of ECOCERT's certification process can be found here: [EOS Certification process.pdf | Powered by Box](#), and CERES' here: [Steps-to-Organic-Certification_Inf \(ceres-cert.de\)](#).

must meet all the requirements to receive organic certification. The steps include:

- 1. Application (and subsequent review of the application information by the certifying body):** The applicant must provide the certifying body with information about their business, production, operations and systems. The certifying body carries out an initial feasibility study based on these data to determine whether it will proceed to the next stage.
- 2. Formal contract and commitment with the certifying body:** The certifying body provides the applicant with a quotation for the certification process based on the expected work required, and both parties enter into a contract.
- 3. Initial evaluation (documentary assessment and onsite audit):** The applicant provides the certifying body with detailed information and supporting documentation about their business. The certifying body will conduct an on-site audit to inspect the production location and obtain samples for testing.
- 4. Final review and certification decision:** The certifying body will carry out a final review of the evaluation process to ensure that all stages are complete and properly carried out. Based on the conclusions of the evaluation process, including instances of non-compliance and the corrective action taken, the certifying body will decide whether or not to certify the applicant. If the result is negative, the applicant will need to begin the process anew.
- 5. Ongoing surveillance:** Once an applicant has received its organic certification it will be renewed annually subject to the applicant successfully passing a surveillance evaluation by the certifying body. The certifying body will prepare an annual audit plan based on level of risk identified.

6.6 INSPECTION

Three government ministries are responsible for regulatory inspection of food products:

- » The Ministry of Agriculture inspects the honey production process
- » The Ministry of Health through the Ethiopian Food and Drug Administration Authority inspects imported honey
- » The Ministry of Trade and Regional Integration inspects food items to ensure that processed food products comply with the relevant requirements before being delivered to market. This can take the form of inspecting food processing factories

from input to output of the products to ensure compliance of the product, as well as market inspection to protect customers from any expired or unstable, adulterated and counterfeit products.

- » The Ministry of Trade and Regional Integration accepts SGS and ECAE inspection results. So far, there is no inspection service provider which covers the entire honey value chain.

Interviews with value chain participants suggest that processors and exporters in Addis Ababa are inspected by the Ministry of Agriculture. However, producers (farmers, cooperatives and unions) and traders in Oromia did not report any inspection.

6.7 ACCREDITATION

The **Ethiopian Accreditation Service (EAS)** is the national accreditation body of Ethiopia. It is mandated as the sole body to accredit the competence of conformity assessment bodies to perform calibration, testing, certification, and inspection activities. It is certified under the ISO 17011 standard and is a full member of the International Laboratory Accreditation Cooperation (ILAC) and of the African Accreditation Cooperation, which gives it international authority for food and medicine testing accreditation under ISO 17025 and ISO 15189

standards.

EAS has the capacity to accredit conformity assessment bodies according to ISO/IEC 17025 (for testing laboratories), ISO/IEC 17020 (for inspection bodies), and ISO/IEC 17021 (for certification bodies).

Since 2017, EAS has been a full member of ILAC and a signatory to the ILAC Mutual Recognition Arrangement for testing (ISO/IEC 17025), Medical Testing (ISO 15189) and Inspection (ISO 17020). EAS adopted the International Accreditation Forum Code of Conduct in September 2016.

Developing the accreditation market is a major challenge for EAS. As the market for calibration and certification is very small, it is challenging for EAS to extend its ILAC Mutual Recognition Arrangement

scopes for calibration, PT providers, as well as certified reference material producers. EAS are certified internationally for food safety and ISO 22000 for the parameters already accredited.

6.8 PRIVATE STANDARDS AND INITIATIVES

There are no private standard developers in Ethiopia. However, third parties can submit a request to the Institute of Ethiopian Standards to develop a standard through the relevant Technical Committee. There are

no procedures for delegating the development of sector-specific standards to another organization, and no system to encourage the development of private standards.

6.9 GAPS IN QUALITY INFRASTRUCTURE SERVICES

There are gaps in the current quality infrastructure services that need to be addressed to facilitate honey exports.

- » **Accreditation:** At present, exporters are not able to access the accredited testing services they need to export to Europe from Ethiopian providers (such as residue and heavy metal testing). Consequently, exporters must send samples to international laboratories (such as [Intertek](#)), which is expensive. This gap will be addressed during 2023 when ECAE receives full accreditation for its services.
- » **Cost and timeliness:** Processors and exporters report that the cost of services provided by Ethiopian institutions (for example, ECAE and Bless) is high, and that turnaround times can be long. Exporters report that it is often cheaper and faster to send samples to European laboratories. This is contradicted by ECAE which reports that processors do not understand its pricing structure. ECAE will need to review its business and marketing strategy to ensure that its services are competitive and are seen to be so.
- » **Access to certified reference material and consumables.** There are no certified reference material providers at present in Ethiopia. EMI expects to begin supply in 2023, although it is likely to be several years before they can provide certified reference material for residue and heavy metal testing. Consequently, certified reference material and consumables (such as reagents) need to be imported. These are expensive and purchasing them can be difficult given the foreign currency constraints of Ethiopia. This impacts on the cost of services and the volume of tests that service providers can offer. Institutions should review options for reducing costs (for example, the possibility of establishing long-term relationships with international suppliers rather than tendering for supplies within Ethiopia).
- » **Standards:** National standards should be developed or reviewed for protective equipment, and for packaging and storage equipment. This will help to ensure that these inputs are available

and of the required quality. The beeswax standard should be reviewed to ensure that it is in line with international standards.³³

- » **Incentives:** Demand for quality infrastructure services is low, in large part because the quality culture within the honey value chain is limited, and because (with the exception of exporters and hive producers for the Jimma Initiative) there are few incentives for adopting quality practices and ensuring conformity to standards. Promoting quality throughout the value chain (by developing a certificate of quality, building consumer demand for quality products, and other initiatives) could help to incentivize value chain operators to improve their quality and increase their demand for quality infrastructure services.
- » **Location:** With the exception of Holeta Bee Research Laboratory, quality infrastructure service providers are based in Addis Ababa and far from honey producers in Oromia. Ideally, producers, cooperatives, unions, processors and traders based in Oromia and seeking to access international markets should be able to access testing services close by. Given the level of investment required, however, to develop high quality, accredited testing services, it would be more effective to focus efforts on existing high-performing service providers, particularly ECAE, to ensure that they have the capacity to deliver services effectively and efficiently and fully meet the needs of companies that are looking to export.

³³ ICIPE reports that a review of some standards is under way, with documents submitted to the mandated authorities.



7

BUSINESS SUPPORT INSTITUTIONS AND SCHEMES

7.1 AGRICULTURAL EXTENSION SERVICES

For most honey producers, extension services, overseen by the Ministry of Agriculture, are their primary source of information about and skills in honey production. The roles of the different levels of government include:

7.1.1 STATE MINISTRY OF AGRICULTURE

The Ministry sets the national agricultural policy and strategies, in particular for the extension system (curriculum development, working with agricultural colleges in terms of technical and vocational education and training, research). The State Ministry is not responsible for the delivery of extension services, but provides support to the regional bureaux of agriculture on technical issues and provides financial support for specific programmes.

7.1.2 OROMIA BUREAU OF AGRICULTURE

The Regional Bureau interprets the national policy and develops strategies to deliver the policy priorities that are aligned to the Region's capacities and needs. The Bureau organizes extension services within the Region, employs extension staff and provides them with training. The Bureau has a strong focus on beekeeping and honey production and is able to draw on expertise from the Holeta Bee Research Centre.

7.1.3 ZONAL AGRICULTURE OFFICE

Zonal agriculture offices coordinate extension services organized at the woreda (district) level, supervising their work. The zonal office employs product specialists, including a beekeeping specialist who is able to provide technical support to extension agents at the woreda level, although their own training on honey production is limited. The zonal office also oversees the distribution of hives under the Jimma Initiative.

7.1.4 WOREDA AGRICULTURE OFFICE

This office coordinates the extension services delivered at the kebele, or neighbourhood, level. The offices have technical officers covering livestock, crops and natural resource management. At the woreda level there is normally one beekeeping expert, usually with an animal science background but limited additional training on beekeeping and honey production.

7.1.5 KEBELE AGRICULTURE OFFICE

These offices have three extension agents covering livestock, crops and natural resource management.

The livestock extension worker is responsible for beekeeping training.

7.1.6 ISSUES

Extension agents play a critical role in building the capacity of farmers to improve their productivity, quality and livelihoods. For the honey sector, however, there are significant challenges in the current extension arrangements.

7.1.6.1 Lack of contact with beekeepers

Livestock officers have insufficient contact with beekeepers. Each kebele can have more than a thousand beekeepers, and they may be geographically dispersed. It is therefore impossible for extension agents to have regular contact with all beekeepers, especially as livestock officers have to cover all types of livestock (cattle, small ruminants, poultry, and others), not just bees. Their transport facilities are also often limited, reducing their capacity to reach beekeepers.

7.1.6.2 Limited technical knowledge on beekeeping and honey production

Livestock extension agents normally have a broad animal science background, with only limited specialist training on beekeeping and honey production. Extension agents interviewed reported receiving two days of beekeeping training three years ago.

These challenges limit the Government's ability to build the capacity and skills of honey producers. This is particularly important given the Government's drive to increase honey production through the distribution of modern hives (but without any additional training), which require very different management practices to the traditional hives with which most beekeepers are familiar.

7.1.6.3 Limited technical knowledge on beekeeping and honey production

A further constraint may be related to staff retention. Trained extension agents move on from their livestock-focused roles in kebeles, or move to other careers, so expertise is lost. Strategies to retain staff, as well as train them, are also required.

7.2 HOLETA BEE RESEARCH CENTRE

The Holeta Bee Research Centre is hosted under the Oromia Agriculture Research Institute of Oromia Regional State. It is the leading apicultural research centre in Ethiopia, with over 100 staff. Holeta carries out research on bee botany, bee biology, hive products (including quality and value addition), bee health, bee management and beekeeping equipment. It coordinates national apicultural research projects, including on honeybee diseases and pests. It seeks to develop and increase awareness in appropriate technology. Holeta has a laboratory, described in section 6.4.3 above, and is a member of the Honey Standards Committee.

Holeta offers beekeeping training for extension officers, beekeepers and development organizations. In the past they received an annual budget for training programmes. They are now required to train on demand, and to charge for their services. In the first two quarters of 2022 Holeta trained over 1,000 individuals across the country (although mostly in Oromia). In the past, Holeta has also provided training to processors. Despite the large number of individuals trained, the need for training is beyond Holeta's capacity.

7.3 SECTOR ASSOCIATIONS

7.3.1 ETHIOPIAN HONEY AND BEESWAX PRODUCERS AND EXPORTERS ASSOCIATION (EHBPEA)

EHBPEA is an association which provides support for development interventions in the apiculture sector, working with the Government to improve productivity, quality and marketing. It was founded in 2005 and has 61 members from across the sector, 10 of which export hive products. Their members export higher values of beeswax than honey as demand is very strong, particularly for organic beeswax. Destination markets include Norway, Germany, Holland, France and the United States of America.

EHBPEA is responsible for administering the residue monitoring plan for Ethiopia, collecting samples from across the country and sending them to a laboratory in Germany for testing. This process has been delayed, however, owing to a lack of foreign currency, which may put the third country status of Ethiopia at risk.

EHBPEA priorities for the sector include:

- » Promoting out-grower production models that would shorten supply chains and enable processors to invest in producers by providing training and inputs (which its members have struggled to implement due to a lack of finance)
- » Changing the current voluntary honey standard into a mandatory standard to address quality issues
- » Conducting research on Ethiopian honey characteristics. Members are concerned that some honey types naturally have diastase and

C4/C3 levels typically associated with adulterated honey which affects their ability to export and the reputation of Ethiopian honey.

- » Developing a framework to control illegal trade, which they estimate accounts for 25–40 per cent of national honey production.
- » Implementing a national honey quality label to promote quality awareness among consumers and incentivize higher quality within the value chain.

7.3.2 ETHIOPIAN APICULTURE BOARD (EAB)

EAB was formed in 2009 to bring together all value chain participants, including beekeepers' associations, cooperatives and unions, to promote the sector. EAB has 83 founding members and an executive board with representatives from each section of the value chain. EAB works with other associations to develop policies, lobby government, undertake market promotion, and improve production systems and the input supply chain. EAB is a member of Apimondia and a founder member of ApiTrade Africa.

Funding is a challenge for EAB. They depend on development partners for their funding as they do not charge membership fees and do not receive government support. EAB has good working relationships with the German Agency for International Cooperation (GIZ), the Netherlands Development Organization (SNV) and the United States Agency for International Development, providing apiculture advice and services (such as project design and delivery, market connections, and others).

7.4 MAIN NATIONAL, REGIONAL AND INTERNATIONAL TRADE FAIRS

Trade fairs provide companies with good opportunities to connect with buyers, potentially establishing longer term market relationships. Companies can also connect with others in the sector and learn about new developments in production and market trends, helping to improve their competitiveness.

International trade fairs can provide the greatest benefit for companies that are ready (meaning that they have the production and systems capacity in place to be able to capitalize on any new opportunities), but can be prohibitively expensive, especially as it can take a long time – up to several years – for an exhibiting company to build the recognition and trust of potential buyers and begin to generate significant volumes of business.

7.4.1 NATIONAL TRADE FAIRS

» The Government and some business associations, such as the Chambers of Commerce, organize agricultural shows and fairs at the Addis Ababa exhibition centre. These are typically scheduled around Christmas and other public holidays and are open to the public. All participants within the value chain, including cooperatives, unions, traders and processors, attend these exhibitions where they sell mostly direct to consumers and are able to receive good prices for their honey.

7.4.2 REGIONAL AND INTERNATIONAL TRADE FAIRS

These trade fairs provide producers with an opportunity to connect to buyers from around the world, share knowledge, connect with input providers and access training.

- » **ApiExpo Africa:** Organized by [ApiTrade Africa](#), this trade fair is hosted biennially in a different African country and was held in Ethiopia in 2020.
- » **ApiExpo and Apimondia Apicultural Congress:** The [Congress](#), and associated [Expo](#), is the largest beekeeping event in the world, bringing together beekeepers, scientists, honey traders, development workers, technicians and policy makers. The event, held every two years, changes location.
- » **BioFach:** [BIOFACH](#) is the leading trade fair for organic food, held annually in Nuremberg, Germany. It covers all food (not just honey), and all the organic food exhibited is certified in accordance with the European Union Organic Regulation or the accreditation directives of IFOAM.
- » **Gulfood:** [Gulfood](#) is held annually in Dubai, United Arab Emirates, covering all types of food. It is the main food-related trade fair for the Middle East.

7.5 TRACEABILITY

At present there are no official honey traceability systems in Ethiopia, although the Ministry of Agriculture is setting up a traceability system for cattle. Some individual exporters use their own systems (the UNIDO inception team were made aware of exporters using their own paper-based systems), as is required for exports to the European Union, but most of the sector has minimal traceability.

This is a major challenge as an effective traceability system is fundamental for improving quality by allowing any quality deficiencies to be easily identified and attributed. It is also a prerequisite for exporting to the European Union and the sector would benefit from a nationwide approach. The State Minister of Agriculture confirmed that establishing an effective national traceability system should be a priority for the sector.



The page features a large, abstract composition of overlapping yellow and olive-green triangles. In the lower-left corner, a close-up photograph of a honeycomb structure is shown, resting on a dark, textured wooden surface. The honeycomb is golden and glistening, with some cells appearing to be filled with honey. The overall aesthetic is clean and natural, with a focus on organic textures and warm colors.

8

OTHER ASPECTS

8.1 SWOT ANALYSIS OF THE APICULTURE SECTOR

<p>STRENGTHS</p> <p>High potential for hive products</p> <ul style="list-style-type: none"> » Oromia has a strong tradition of beekeeping, with many active beekeepers » The environment is highly productive, with the potential to produce large volumes of high-quality honey and beeswax » » Government support » The Government is committed to boosting honey production and exports, both at state and regional level » » Quality infrastructure capacity » Significant recent investment in the quality infrastructure system means it is now able to perform many of the necessary functions for exporters 	<p>WEAKNESSES</p> <p>Quality</p> <p>Quality of much of the honey produced is too low for the European export market</p> <ul style="list-style-type: none"> » Producers and traders lack the knowledge, skills, systems and equipment to improve their quality » Lack of traceability system makes it difficult to identify and address quality failings at source » » Price » High domestic prices make Ethiopian honey uncompetitive in the international market » » Foreign exchange » Lack of access to foreign exchange makes it difficult for quality infrastructure institutions to import materials and pay for tests
<p>OPPORTUNITIES</p> <p>Beeswax (and other hive products)</p> <ul style="list-style-type: none"> » Strong and growing international market demand and high prices, in particular for pesticide-free beeswax » Ethiopia is already a significant exporter with a good reputation » » Niche markets (organic?) » Potential demand for Ethiopian honey from low volume, high value, niche markets » Demand for organic honey coupled with low agrochemical use in Oromia 	<p>THREATS</p> <p>Quality and adulteration</p> <ul style="list-style-type: none"> » Continued poor quality and adulterated honey risks undermine the reputation of Ethiopian honey and buyer confidence » » Illegal trade » Informal cross-border trading risks undermine efforts to improve quality and traceability and comply with formal market requirements, thus increasing foreign currency earnings. » » Conflict and instability » Conflict and instability in project locations threaten to disrupt value chains and undermine investor and buyer confidence.

8.2 ENVIRONMENTAL IMPACTS

The honey value chain has minimal environmental impact. As bees are sensitive to pesticides and other contaminants, beekeeping promotes the adoption of chemical-free agricultural practices. Beekeeping also incentivizes the protection of natural ecosystems and is a traditional agroforestry practice in Oromia's protected areas.

Honeybees can, potentially, compete with other wild pollinator species but given the abundance and

diversity of flowering plants in Oromia, lack of risk factors (such as high levels of pesticide use) and the untapped potential for scaling up production, this is very unlikely to be an issue during the life of the project. Poor management practices, in particular by traditional honey hunters, can cause forest fires, but this was not reported as an issue in Oromia, and the promotion of beekeeping (rather than honey hunting) is likely to reduce this risk.

8.3 WOMEN AND YOUTH IN THE VALUE CHAIN

Women and youth are currently active throughout the value chain, although men predominate, particularly in beekeeping: traditional hives (still the most widely used) are heavy and often hung high in trees, and women are typically less involved in this very physically demanding activity.

Modern frame hives are a more accessible option for women, and youth may be more open to learning the new management approaches required than older beekeepers.

The Government's Jimma Initiative, which is distributing modern hives to beekeepers, therefore provides an opportunity for increasing women and youth engagement in the sector. The Government, however, is not currently targeting women and youth as priority beneficiaries.

There is also scope for making the Government extension services more inclusive to promote women's involvement (see 8.4.2 below). Very few extension staff are female, and extension agents do not have a gender-sensitive approach to service delivery.

8.4 NATIONAL AND INTERNATIONAL DEVELOPMENT PROJECTS

8.4.1 JIMMA INITIATIVE

The Jimma Initiative is a key programme of the Oromia Bureau of Agriculture. It aims to boost honey production in 13 of the 21 zones of Oromia, distributing 300,000 modern frame hives to beekeepers. To date over 70,000 hives have been distributed.

The hives, manufactured according to the Ethiopian Standard, are also produced within the region. The Government trained 145 specialist woodworkers to make the hives and has supplied local timber through the Oromia Forest Agency.

The Initiative does not cover other complementary factors – protective equipment and other inputs, training, processing equipment, transitional hives and others, providing scope for complementary support by the UNIDO project.

8.4.2 ICIPE

The International Centre of Insect Physiology and Ecology (ICIPE) is currently implementing two honey value chain projects in Ethiopia. The Enhanced Integrated Framework Honey Trade project, financed by Norway, is a market development project based in Amhara Region.

The ICIPE More Young Entrepreneurs in Silk and Honey ([MOYESH](#)) programme (2019–2024), funded by Mastercard Foundation, aims to generate employment and income for 100,000 unemployed youth (60 per cent women) by providing them with appropriate knowledge and skills and enabling them to establish beekeeping enterprises. The project operates in Jimma, Bunno Beddele and Illubabor zones in Oromia.

There is scope for synergies with the ICIPE intervention. It is also providing training to beekeepers, training and certified reference material for ECAE, updating relevant standards, promoting locally manufactured

apicultural inputs and helping to connect processors to international markets. It will be important for the UNIDO project to build on the achievements and ongoing work of these projects.

8.4.3 GIZ

GIZ has supported the honey sector in Ethiopia for many years. At present its [Green Innovation Centres for the Agriculture and Food Sector](#) project (2014–2026) is working in Oromia and Amhara regions to support and improve selected value chains, including honey. It is not operating in the Zones that will be targeted by the present project, but may be able to share best practices and training materials with the UNIDO project and connections to exporters.

8.4.4 WORLD BANK

The World Bank Ethiopia [National Quality Infrastructure Development Project](#) (2017–2023) has been working to improve the delivery of quality assurance services to enterprises in selected sectors. It has provided considerable support to Ethiopian *NQI* institutions, helping to address many of their limitations. The UNIDO project can complement this work by supporting ongoing training and ensuring access to certified reference material and consumables.

8.4.5 DEVELOPMENT FUND OF NORWAY

The Development Fund of Norway project, building a honey value chain in Sheka zone, Ethiopia, 2018–2021. Financed by Norway, this project provided training and coaching and leased hives to 200 beekeepers through four beekeeping cooperatives of 50 beekeepers per cooperative. The project supported 150 tons of honey exports from the Southern Nations, Nationalities and Peoples Region to Germany.

8.4.6 SNV

The SNV Agricultural Services Programme for Innovation, Resilience and Extension project, commonly referred to as ASPIRE, targeted 30,000 smallholder farmers in cooperation with the Ministry of Agriculture, EAB and EHBPEA. The project ended in 2014.





9

RECOMMENDATIONS FOR THE PROJECT IMPLEMENTATION

Overall, the findings from the inception mission endorse the outputs and activities proposed in the project document, with additional recommendations for focusing the scope of priorities and activities:

- » Engage with buyers in the target markets
- » Broaden the scope from “honey” to “hive products”
- » Focus interventions at the bottom of the value chain
- » Address input gaps

9.1 ENGAGE WITH BUYERS IN THE TARGET MARKETS

At present, the project does not include a buyer engagement component. Given the current status of the value chain, however, the inception team recommend re-engaging with international honey buyers like Norwegian Honningcentralen (a Norwegian-based processor and distributor of honey which, through the Norwegian Development Fund, was part of an initial project), in order to promote quality within the sector and market linkages for exporters.

At current prices, Ethiopia will struggle to sell undifferentiated bulk honey and so will have to focus on niche markets. In order to make sales, exporters are therefore going to have to be able to identify and connect with potential buyers and meet their specific needs.

The project should begin by identifying current and

potential buyers, conducting a buyers’ perception survey to understand why buyers are interested in Ethiopian honey, and what opportunities exist for expanding this niche. The results of the survey will help to confirm whether it makes sense for Ethiopian producers to embark on organic certification which can be a long and costly process.

Making the value chain aware of the market opportunities that exist, and the quality requirements to access these markets, will provide a strong incentive for value chain participants to address quality gaps. Involving committed buyers in this awareness raising will further motivate the value chain and help them to understand buyers’ specific needs and requirements. Interacting with buyers will also help exporters to strengthen market connections, potentially leading to sales.

9.2 BROADEN THE SCOPE FROM “HONEY” TO “HIVE PRODUCTS”

The inception team strongly believes that the project should broaden its scope to include beeswax (and potentially propolis and pollen) as well as honey. For the two exporters that were met during the inception mission, beeswax is a cornerstone of their business strategy, providing a significant proportion of their

revenue and much of their profit. Most exporters buy raw honey which is a mix of honey and beeswax, and so are selling both products anyway. The profitability of beeswax exports enables the processors to run successful businesses, despite the tight profit margins for honey.

Ethiopia is internationally competitive in beeswax, and its product is well known and well regarded in international markets, with particular demand for pesticide-free and organic product. Beeswax therefore provides participants in the honey value chain with an opportunity for increasing exports and an incentive to improve quality in the hive value chain, which will benefit both beeswax and honey.³⁴

To ensure sufficient supplies of both honey and

beeswax, the project should engage with the State Ministry of Agriculture and the Oromia Bureau of Agriculture to ensure that the drive to modernize the beekeeping sector includes equal emphasis on both modern and transitional hives. At present, the Government is focused exclusively on increasing the distribution and adoption of modern hives. This should be broadened to include transitional hives, as these produce good quantities of beeswax, while modern hives do not.

9.3 FOCUS INTERVENTIONS AT THE BOTTOM OF THE VALUE CHAIN

Most quality problems originate at the bottom of the value chain, during harvesting, transportation from the production site and storage. This was confirmed by the observations of the inception team as well as by exporters, who commented that the lack of skilled and capable beekeepers to provide them with the raw materials that they need was their greatest obstacle to increasing exports.

In order to improve quality to encourage exports, the project should focus greatest attention on building the capacity of honey producers. This should include improving the quality of traditional and transitional production, and not only that from modern hives. Traditional and transitional hives provide the raw honey (together with beeswax) that processors purchase for export. These hives are also by far the most common forms of production (for example, in Jimma zone there

are 150,000 modern hives, 220,000 transitional hives and 1.5 million traditional hives).

The project plans to train master trainers to build the capacity of beekeepers. This is strongly endorsed by the inception team, but as well as focusing on cooperatives and unions, the project should prioritize training extension and outreach staff from processors and exporters. They have frequent interactions with producers within their supply chains as they depend on skilled beekeepers for their businesses, and they will continue to support farmers in the longer term, thereby ensuring the sustainability of the project's impact.

The master training component of the project should also include the government extension service as it is mandated to support beekeepers and most extension staff have only limited training on honey production.

9.4 ADDRESS INPUT GAPS

A lack of affordable, quality inputs, particularly protective equipment, storage and packaging materials, is an important contributor to quality deficiencies in the honey value chain.

Protective equipment (bee suits including veils and gloves) is both imported and produced domestically. Imported suits (from China, Europe, the United States and elsewhere in Africa) are generally of high to acceptable quality, but too expensive for most beekeepers. Bee suits produced in Ethiopia are more affordable, but reported to be of poor quality, particularly the gloves which are too thick to permit dextrous handling.

The project should consider supporting the IES to develop a standard for protective equipment that is aligned to local needs and domestically available materials to assure the quality of suits manufactured in Ethiopia.

The project should also consider promoting production in Oromia and Ethiopia more generally. As part of the Jimma Initiative, the Oromia Bureau of Agriculture has provided training and raw materials for carpenters

to produce hives to the Ethiopian standard. This concept could be expanded to include local garment manufacturers, supporting them to produce protective equipment.

Storing and packaging honey in food grade containers is essential for maintaining quality. Very few producers and traders use containers of an acceptable quality, which are currently not manufactured in Ethiopia. In some cases exporters provide their suppliers with food grade containers to use, but at present these have to be imported and are expensive.

The inception team understands that domestic plastic manufacturers have the capacity to produce containers of the required quality and specifications, but do not do so owing to insufficient demand. The project should work with the IES to develop a standard for honey containers. Together with the Ministry of Industry, the project could also engage with domestic manufacturers to promote production of food grade containers. The project should discuss with the Oromia Bureau of Agriculture whether it would be appropriate to include the supply of containers within the scope of the Jimma Initiative.

³⁴ During discussions with government representatives, they indicated that they were open to broadening the scope of the project to include beeswax.

▶ 10 ANNEXES

ANNEX 1. LIST OF INTERVIEWS, MEETINGS AND WORKSHOPS

ADDIS ABABA

- » Tarekegn Bululutra, Minister, and team at the Ministry of Trade and Regional Integration
- » Fikiru Regasa, State Minister for Agriculture, and team at the Ministry of Agriculture
- » Ethiopian Conformity Assessment Enterprise (ECAE) led by Abel Anberbir Shibeshi, Deputy Director General and Teshale Belihu, Director General
- » Oromia Bureau of Agriculture led by Oumer Hussien Oba, Minister for Agriculture, and ministry technical advisors
- » Forested Foods – a honey and beeswax processing company and exporter
- » Green Face – a honey and beeswax processing company and exporter
- » Ethiopian Honey and Beeswax Producers and Exporters Association
- » Ethiopian Apiculture Board
- » Aurelia Patrizia Calabro, Representative and Director of Regional Hub in Ethiopia, and Asegid Adane Mebratu, National Programme Officer, of UNIDO
- » Final feedback workshop, hosted by the Ministry of Trade and Regional Integration.

OROMIA

- » Ministry of Agriculture field office team in Jimma
- » Three traders and visits to their outlets, stores, processing facilities and processing equipment in Gera town
- » Extension team of the Ministry of Agriculture office in Gera
- » Katamujuga Union leaders and members
- » Beekeepers in Gera and Goma
- » Wareda livestock production and development office team in Goma
- » Members of Keta Mudugu Farmers' Coop Union in Goma
- » Workshop with stakeholders from government, cooperatives and unions in Ilubabor, Bedele and Jimma
- » Companies manufacturing beehives in the Jimma Small Industries Estate
- » Holeta Bee Research Centre

ANNEX 2. IES STANDARDS DEVELOPMENT PROCESS

The development of a new standard by IES is an eight-stage process:³⁵

- » Preliminary and proposal: any stakeholder can propose the development of a new standard, from government bodies to individual persons. The proposal must be evaluated by IES and Technical Committee members before being accepted or rejected
- » Preparation: a working draft is then prepared by IES or competent professionals
- » Committee and enquiry: the working draft is then reviewed by the Technical Committee or subcommittee and potential users are consulted for comments. This process allows the consolidation of a Final Draft Ethiopian Standard
- » Approval and publication: the Final Draft Ethiopian Standard is submitted to the Quality Council for approval and publication as an Ethiopian Standard
- » Review: at least every five years, to ensure the inclusion of necessary updates considering current technological and other developments

ANNEX 3. ECAE REPORTED NEEDS TO IMPROVE THEIR HONEY QUALITY TESTING SERVICES

NO.	PARAMETERS	REQUIRED INSTRUMENT	NO. OF PIECES OF EQUIPMENT AVAILABLE	CHALLENGES (SUPPORT REQUIRED)	REMARK
1.	Electrical conductivity	Electrical conductivity meter (EC meter)	1	<ul style="list-style-type: none"> » Conductivity CRM 300 to 2999 $\mu\text{S}/\text{cm}$ » Additional EC meter with all accessories » 150 ml beakers 	Service currently available
2.	HMF (Hydroxyl methyl furfural)	High performance liquid chromatography HPLC	2	<ul style="list-style-type: none"> » Hydroxymethyl furfural, (HMF) CRM » Analytical column: ZORBAX SB-C18 (3.0 x 250 mm 5 μm) » 100 and 50 ml grade A volumetric flasks 	Service currently available
3	Diastase	UV-Vis	2	<ul style="list-style-type: none"> » Phadebas® Honey Diastase Test, 5x100 tablets » Water bath with cooling circulating thermostat » Technical training on method development, validation to accreditation 	Not yet started

^w for more information, please refer to <https://www.ethiostandards.org/node/29>.

NO.	PARAMETERS	REQUIRED INSTRUMENT	NO. OF PIECES OF EQUIPMENT AVAILABLE	CHALLENGES (SUPPORT REQUIRED)	REMARK
4	Invertase	UV-Vis	2	<ul style="list-style-type: none"> » Potassium dihydrogen phosphate KH_2PO_4, anhydrous, $\geq 99\%$ » disodium hydrogen phosphate $\text{Na}_2\text{HPO}_4 \cdot 2\text{H}_2\text{O}$ » tris- (hydroxymethyl) aminomethane, $\geq 99\%$ » p-nitrophenyl-α-D-glucopyranoside » pH meter » pH buffers (4.0, 7.0, 9.2 CRM) » Water bath with cooling circulating thermostat » Technical Training on method development, validation to accreditation 	Not yet started
5	Sugars » Glucose » Fructose » Sucrose » Maltose » Turanose	High performance liquid chromatography with refractive Index Detector) HPLC with RI detector	2	<ul style="list-style-type: none"> » Fructose, glucose, sucrose, turanose and maltose CRM » HPLC grade methanol » HPLC grade acetonitrile » Carbohydrate column 	Service currently available
6	Proline	UV- Vis	2	<ul style="list-style-type: none"> » Proline CRM » Ninhydrin, ACS reagent » Ethylene glycol monomethyl ether, ACS reagent » Formic acid, ACS reagent » 2-Propanol, ACS reagent 	
7	Specific rotation	Polarimeter	2	<ul style="list-style-type: none"> » Sucrose – NIST Standard Reference Material 17f 	Service available
8	Metals	Inductively coupled plasma with mass spectrometer (ICP-MS) Micro plasma atomic emission spectroscopy (MP-AES) Atomic absorption with graphite furnace) AAS-GF	1 each	<ul style="list-style-type: none"> » Nitric Acid (double distilled ICP/ MS grade) » Microwave digester » MP-AES – easy fit torch » Nitrogen generator with compressor for MP-AES 4100 » 1000 mg/l Fe, Cu, Zn, Sn, Pb, Hg, As, Cd CRM » Ag gas in cylinder » Calibration solution » ICP-MS grade nitric acid » 100 ml grade A volumetric flasks » Helium gas (purity 99.999%) » Argon gas (purity ICP-MS grade) » Nitrous oxide (>99.5%) » Acetylene (purity > 99.9%) 	Service available

NO.	PARAMETERS	REQUIRED INSTRUMENT	NO. OF PIECES OF EQUIPMENT AVAILABLE	CHALLENGES (SUPPORT REQUIRED)	REMARK
9	Pesticide residue	LC/MS/MS GC/MS/MS GC/ECD		<ul style="list-style-type: none"> » HPLC column ultra aqueous C18 3µm 100 x 2.1 mm » QuEChERS extraction salt packet » QuEChERS dSPE » LC Multiresidue Pesticide Standard, with more than 204 compounds in suitable solvent and which can be used under QuEChERS sample preparation 100 µg/mL, 1ml/ampoule » GC Multiresidue Pesticide Standard with minimum of 16 compounds, 100 µg/mL each in toluene, 1 mL/ampoule » Carbamate/uron compounds, LC Multiresidue Pesticide Standard minimum 16 components, 100 µg/mL each in acetonitrile, 1 mL/ampul » Herbicide methyl esters, GC Multiresidue Pesticide Standard minimum of 10 components, 100 µg/mL each in toluene, 1 mL/ampul » Pyrethroid compounds, GC Multiresidue Pesticide Standard minimum 18 components 100 µg/mL each in toluene, 1 mL/ampul » Organonitrogen compounds, LC Multiresidue Pesticide Standard minimum 63 components, 100 µg/mL each in acetonitrile, 1 mL/ampul » Organochlorine pesticide mix Minimum 20 components Concentration shall be ≥ 2000µg/mL, 1 ml/ampoule » GC Multiresidue Pesticide Standard minimum of 40 components, w100 µg/mL each in toluene, 1 mL/ampul » Phenols Calibration Mix minimum of 14 components, 2000 µg/mL each in methylene chloride, 1 mL/ampul » Semivolatiles MegaMix, EPA method 625, minimum 54 components 1000 µg/mL each in methylene chloride, 1 mL/ampule » syringe filter 0.2 micro and 0.45 micro » nitrile blue glove (small, medium and large size) 	

NO.	PARAMETERS	REQUIRED INSTRUMENT	NO. OF PIECES OF EQUIPMENT AVAILABLE	CHALLENGES (SUPPORT REQUIRED)	REMARK
10	Veterinary drugs	Liquid chromatography with mass spectrometer (LC/MS/MS)	2 (1 LCMSMS malfunction)	<ul style="list-style-type: none"> » Synergy fusion RP 18e (50 X 2.6) mm 2.5µ » CRM of chloramphenicol, chloroform, chlorpromazine, colchicine, dapsone, dimetridazole, metronidazole, nitrofurantoin » syringe filter 0.2 micro and 0.45 micro » nitrile blue glove (small, medium and large size) » chemical respiratory masks » 10, 50, 100 ml grade A volumetric flasks » Technical training on method development, validation to accreditation 	
11	Adulteration, Isotope analysis	Elemental analysis coupled with Isotope ratio mass spectrometry (EA-IRMS)	Under installation	<ul style="list-style-type: none"> » Sucrose IAEA-CH6 ($\delta^{13}\text{C}$ value: -10.449‰) CRM » Acetonitrile GC or LC/MS/MS grade » Methanol GC or LC/MS/MS grade » Crystalline phosphoric acid ($>99\%$) and » sodium peroxodisulfate ($>99\%$) » Sodium tungstate dihydrate (puriss. p.a. $\geq 99\%$) » Technical training on method development, validation to accreditation 	
12	Moisture	Refractometer	1	<ul style="list-style-type: none"> » refractometer » refractometer reference calibration solution » Thermostated water bath with cooler 	
13	pH and acidity	pH meter	1	<ul style="list-style-type: none"> » pH buffer (4.0, 7.0 and 9.2) CRM 	Test available
14	Ash	Furnace	3	<ul style="list-style-type: none"> » Silca crucible that resists temperature up to 600°C 	Test available
15	Water insoluble matter	Oven	4	<ul style="list-style-type: none"> » Sintered glass crucible (porosity 2, 3 and 4) 	Test available





UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION



Global Market Access Programme (GMAP)

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