Investment opportunity in Mekelle, Regional State of Tigray, Ethiopia
Production of Essential Oils and extracts from Aromatic Gums

Executive Summary

Ethiopia, located in the African Gum Belt, is one of the few countries with large frankincense and myrrh resources. The country has a potential annual production of 70,661 tons from the 2.9 million ha of land total area covered of oleo-gum resin bearing species (see Tables 3 and 5). In terms of the market for gums and resins other than gum Arabic (aromatic gums), Ethiopia has 1 percent of the world market and 28 percent of Africa's export trade (Sisay and Samuel, 2011). It is Africa's leading exporter of natural gums and resins other than gum arabic. The sub sector plays a significant economic role both at the local and national level today in Ethiopia, and its contribution is growing every year. Trade volumes of gums and resins in Ethiopia have been increasing since the 1990s. Between 1997 and 2011, Ethiopia exported about 45,323 tones of natural gums and resins to the world market, with a value of 86,731,451 USD (Table 4). Since 2010, the major export destination countries in terms of volume are China (accounted 30.7%), India (13.7%), Viet Nam (13.5%), United Arab Emirates (11%), Tunisia (6.8%), Greece (5.4%), and Germany (4.5%).

Despite its huge potential, Ethiopia has not fully benefited from the subsector. It exports raw gum and resin materials without any further industrial processing. Essential oils that can be extracted from gum have wide applications - as odorants, flavorants and pharmaceutical ingredients in the manufacturing sector. The price for these essential oils is 5-10 times higher than the price of the dry extract resins on a weight basis [CBI Market Survey, 200]. However, no attempt has so far been made to process raw gum for extraction of essential oils in Ethiopia.

The industrial demand for essential oils and extracts in the country is met through imports. Exact data on the imports of essential oils extracted from natural gums is not available. Nonetheless, according to the Ethiopian Revenue and customs Authority (ERCA) data, the import volume of various types of essential oils and extracts has increased almost four fold within the last fifteen years (Table 6). Such huge increase is a result of expansion of the industrial sector that makes use of essential oil. For instance, in 2011 the country paid out nearly 30 million USD to import 1,596 tons of various types of essential oils and mixtures of odoriferous substances from countries such as Ireland, Swaziland, South Africa, Netherlands, Spain, United Kingdom, Italy and Germany in order of their importance.

This suggests the existence of huge demand for essential oils in the country. Introducing value-added processing of the resources would produce greater benefits and offers viable investment opportunities.

Introduction to Mekelle

Mekelle is the capital of the Tigray region, located at about 780 km from Addis Ababa. The city is one of the fastest growing urban areas in Ethiopia and in the recent years, the city has become an important investment destination.

Demography

According the 2007 census, the population of Mekelle was 215,546 of which 51.3 percent

were women. The 2013 population, assuming a 5.4 percent growth rate, is projected to reach around 300,000.

Table 1: Mekelle Population Growth Scenarios

	2007 Census	2008	2009	2010	2011	2012	2013	2014	2015
High growth (6.3%)	215,546	229,562	244,490	260,388	277,321	295,354	314,560	335,015	356,800
Medium growth	215,546	227,505	240,129	253,452	267,515	282,358	298,024	314,560	332,013
Low Growth (4.4%)	215,546	225,242	235,374	245,961	257,025	268,587	280,669	293,294	306,487

Source: Millennium Cities Initiative, The Earth Institute, Columbia University (2011) Draft of a comprehensive City Development Strategy based on the Millennium Development Goals (MDG) for Mekelle, Ethiopia.

Economy and Infrastructure

Mekelle is becoming an industrial hub of northern Ethiopia. A survey of the Central Statistical Agency of Ethiopia (2011) revealed that the number of large and medium scale manufacturing[1] firms in Ethiopia has increased by 74% during 2005/6 - 2009/10 but in Tigray it has nearly doubled (increased by 91%) during that period. The private sector in Mekelle is therefore growing faster than the national average. In 2009/10, nearly 10% of Ethiopia´s larger firms were based in the Tigray Region (199 firms), with the majority of them located in Mekelle. The business of these firms is the manufacture of food products and beverages, non-metallic mineral products, fabricated metal products, furniture, motor vehicles, trailers and semi-trailers, rubber and plastic products, and chemicals and chemical products.

Mekelle is connected by road and air to other major cities of Ethiopia, and to the ports of neighboring countries via road. It is connected to Addis Ababa and other renowned tourist destinations such as Axum by asphalt road. Mekelle is relatively closer to most seaports of neighboring countries than Addis Ababa and other major cities of Ethiopia. The road distance from the city to the port of Djibouti is about 837 Km which makes it closer than that of Addis Ababa, which is 910 km. Two new asphalt roads from Mekelle to Djibouti are under construction, which could further shorten the distance to 680 Km upon their completion by late 2013. The city's Alula Aba Nega International Airport currently serves domestic flights. There are 2-3 daily scheduled flights, 7 days a week to Addis Ababa. There is also a daily flight to Axum and Shire Enda Selassie.

Growing Number of Higher Learning Institutions and Skilled Personnel

In addition to Mekelle University, established in 2000, which has an intake capacity of 26,253, there is also the Mekelle Institute of Technology, and other public and private higher learning institutions which are producing skilled labor in many fields. In 2010/11, about 34,299 students were enrolled in institutions of higher learning.

[1]Manufacturing industries covered in the survey were all enterprises, which engaged ten persons and more and used power-driven machinery.

Market opportunity

Resource Base

Ethiopia is located in the gum belt of Africa (Fig. 1) and has over 60 gum and resin bearing species. The trade volume and value the country generates from exports of gums and gum resins sub-sector steadily increase over time.

Fig 1. Gum Belt of Africa

Source: John Corcoran and Karen Manheimer (2010)

Ethiopia is well endowed with various species of *Acacia*, *Boswellia* and *Commiphora* that are known to produce **gum arabic**, **frankincense**[2] and **myrrh**, respectively. The total area of oleo-gum resin bearing woodlands covers about 2.9 million hectare of land in the country. Studies estimate that the country's annual potential production of natural gum ranges from 76,661 metric tons (Mulugeta, 2011) to 300,000 metric tons (Girmay, 2000 as in W. Tadesse et al. 2007).

Table 2. Estimated potential and annual production of gum and incense in Ethiopia

Type of product	Estimated area (ha)	Estimated annual production (tones)
Gum olibanum	2,284,000	57,100
Gum arabic	399,700	4,996 (*A. senegal*52%, *A. seyal*48%)
Gum *Commiphora*	171,300	8,565 (myrrh 88%, opoponax 12%)
Total	**2,855,000**	**70,661**

Source: Mulugeta (2011)

Regional distribution

Gum- and resin-producing species cover substantial areas of Ethiopia. The country also has vast areas that can be considered potentially suitable for cultivating these tree crops – all the country's arid and semi-arid lands. Tigray Region has considerable gum and resin resource base that accounts for about 33 percent of the national potential (Table 3).

[2]In the literature, the terms frankincense, incense, gum olibanum, olibanum, resin and aromatic products are all used to refer to the products of *Boswellia* trees. Frankincense refers to the dried, gummy exudates obtained from various species of the family Burseraceae and the genus *Boswellia (*Mulugeta, 2011*)*.

Table 3. Estimated areas covered by natural gum and resin bearing species in Ethiopia, by Regional States

National Regional States	Genus	Estimated area (ha)
Tigray	***Boswellia, Sterculia, Commiphora&Acacia***	**940,000**
Amhara	*Boswellia, Sterculia, Commiphora&Acacia*	680,000
Oromia	*Boswellia, Acacia, Commiphora&Sterculia*	430,000
Gambella	*Sterculia, Acacia &Commiphora*	420,000
Somali	*Boswellia, Acacia &Sterculia*	150,000
Benshangul-Gumuz	*Boswellia, Acacia &Sterculia*	100,000
SNNP	*Boswellia, Acacia &Sterculia*	70,000
Afar	*Commiphora&Acacia*	65,000
Total		**2,855,000**

Source: Girmay (2000) adopted from W. Tadesse et al. (2007)

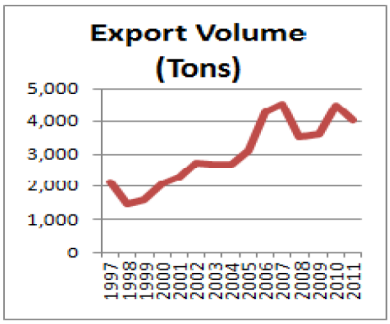
Export

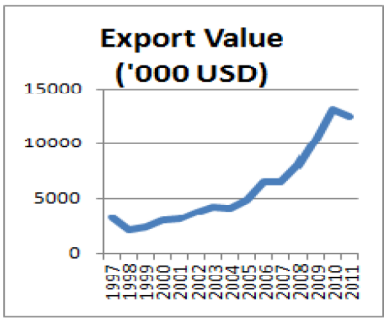
Ethiopia produces a variety of natural gums and resins, which can be classified as either ***aromatic*** or ***non-aromatic***. The former category comprises odoriferous gums and resins such as frankincense, myrrh and opoponax, and the latter consists of gum arabic and other odorless gums and resins. It is Africa's leading exporter of natural gums and resins other than gum arabic[3]. In terms of the market for gums and resins other than gum arabic, Ethiopia has 1 percent of the world market and 28 percent of Africa's export trade (Sisay and Samuel, 2011). Notably, the country is one of the world's leading producers of frankincense. In Ethiopia three types of frankincense are distinguished according to their origin: Tigray type, Ogaden type and Borana type. ***Tigray type olibanum*** is the most widely traded on both domestic and international markets, which accounts for 91% of the value and 93% of the quantity exported (ibid).

[3]Ethiopia also has a large resource base for the production of gum arabic, although current production levels fall far short of the potential (Mulugeta, 2011).

Table 4. Natural gums (gum olibanum, gum arabic, myrrh/opoponax) exported

Year	Export Volum	Export Value (USD)
1997	2,136	3,128,763
1998	1,456	2,066,105
1999	1,594	2,318,872
2000	2,079	2,947,767
2001	2,270	3,020,549
2002	2,733	3,698,981
2003	2,720	4,141,715
2004	2,698	4,024,075
2005	3,116	4,775,176
2006	4,303	6,389,798
2007	4,533	6,486,040
2008	3,550	7,942,418
2009	3,606	10,310,780
2010	4,478	13,051,120
2011	4,051	12,429,292





Source: Ethiopian Revenue and Custom Authority.

Trade volumes of gums and resins in Ethiopia have been increasing since the 1990s. Between 1997 and 2011, Ethiopia exported about 45,323 tones of natural gums and resins to the world market with a value of 86,731,451 USD. This is equivalent to averages of annual earnings of about 5.8 million USD from annual export of 3,022 tons. The export has increased both in volume and value by 6 and 12 percent, respectively for the period under consideration.

The country's major export destination is China. Out of the total natural gums exported in 2010 and 2011, China constituted 30.7%, India 13.7%, Viet Nam 13.5%, United Arab Emirates 11%, Tunisia 6.8%, Greece 5.4%, and Germany 4.5%.

Actual Production

Although The production and trade volumes of gums and resins in Ethiopia have been increasing since the 1990s the available data revealed that the actual production of the level remains much lower than its estimated potential.

Table 5. Comparison of actual and potential gum and resin production in Ethiopia, Based on figures for 2003/04

Regional state	Estimated actual production (in tons)	Share of total annual production (%)	Estimated potential production (in tons)	Share of actual production to potential (%)
Tigray	4,993	62	30,433	16
Amhara	2,396	30	16,545	14
Benishangul	316	4	2,500	13
Oromia	130	2	4,031	3
Somalia	185	2	4,106	5
Others	–	–	13,042	–
Total	8,020	100	70,661	14

Source: a MOARD for 2003/04 adopted from Mulugeta Lemenih (2011)

As shown in Table 5, the actual production of the country is 14 percent of its estimated potential. In terms of regional production, Tigray is the major contributor (62 percent) to the country production. A major reason the production volume falls far below its potential, among others, is the very low market prices for exports of raw products [Habtemariam et al. 2011]. It is, however, argued that the problem can be addressed if value-added processing such as production of essential oil and extracts could be added to the value chain. Sisay and Samuel (2011) have summarized how processing of essential oils would be more attractive business:

- The oils have a higher market value than raw gum resins (see below for detail);
- The subsector's high production costs and low profit margins can be minimized by avoiding the labour-intensive grading and sorting activities as producing essential oils does not require sorting and grading. All grades can be used for essential oil production; and
- Transport-related advantage can be achieved as essential oils are lightweight products compared with raw gums and resins.

Industrial demand & investment opportunity for essential oil

Extractions and processing of natural gums have wide applications in the manufacturing sector. Essential oils extracted from gum have wide applications in the manufacturing sector. As odorants, they are used in perfumes, lotions and other cosmetics, soaps, detergents, and other products ranging from animal feed to insecticides. They also used as flavorants in a wide variety of foods industries and as pharmaceutical ingredient in a large number of medicines. Due to their wide application, essential oils have high demand both in the local and international market.

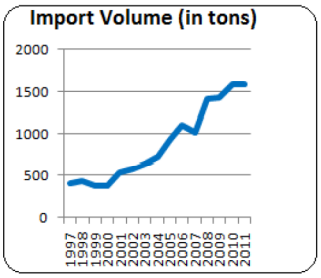
Ethiopia exports the raw natural gums, although the price for essential oils from resin is 5-10 times higher than the price of the dry extract on a weight basis [CBI Market Survey, 200]. Similarly, Sisay and Samuel (2011) argue that

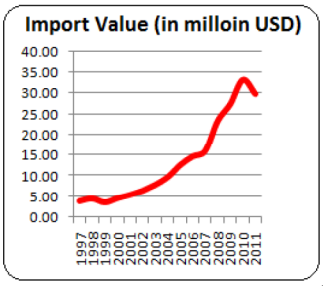
> ''Essential oils have a higher market value than raw gum resins. One kilogram of frankincense collected from *B. papyrifera* costs about 2–3 USD on the international market. However, this same amount can yield the equivalent of 0.7–1% w/w essential oil (i.e. 70–100 gm/kg), which can be sold for up to 10 times as much.'' Source: Sisay and Samuel (2011): p 75.

No attempt has so far been made to process raw gum for extraction of essential oils. The industrial demand for the products in the country is met through imports. Table 6 depicts essential oils (extracted from different plants) that are imported by Ethiopia during the period 1997 – 2011.

Table 6. Import of Essential Oils

Year	Volume (Tones)	Value (USD)
1997	400.11	3,865,349.88
1998	423.99	4,461,726.80
1999	368.72	3,520,854.72
2000	375.83	4,535,625.86
2001	534.3	5,359,948.05
2002	577.65	6,358,126.20
2003	632.44	7,773,675.72
2004	728.53	9,615,956.76
2005	929.47	12,543,293.13
2006	1,106.77	14,667,401.40
2007	1,026.39	16,023,486.18
2008	1,420.47	23,396,986.47
2009	1,428.53	27,482,015.22
2010	1,590.56	33,345,309.42
2011	1,596.48	29,894,818.56
Average	**876.02**	**13,522,971.62**





Source: *Ethiopian Revenue and customs Authority.*

As shown in Table 6, annual demand for essential oil and mixtures of odoriferous substances has increased almost four fold within the last fifteen years. Such huge increase is a result of expansion of the industrial sector that makes use of essential oil. For instance, the country spent nearly 30 million USD in year 2011 to import the oil and mixtures of odoriferous substances from countries such as Ireland, Swaziland, South Africa, Netherlands, Spain, United Kingdom, Italy and Germany. This suggests the existence of huge demand for the product and the opportunity for investing the production of essential oils.

Why build an extraction facility in Mekelle?

- **Availability of raw materials (natural gums)**

Tigray Region is endowed with gum-yielding species of gum and cover about 940,000 ha land. This accounts for 33 percent of the country's potential (Table 3). Tigray is the major producer of the frankincense in the country and contributes more than 90% of the total export volume of gums and resins (Habtemariam etal., 2011). Mekelle is the closest city to the gum-yielding resource base (about 250 km) which gives a comparative advantage to establish the essential oil processing plant.

Tigray type frankincense is the purest in terms of botanical origin. [Sisay and Samuel, 2011].

- **Proximity to major ports and good transport**

Mekelle is strategically located at the cross road of Middle East and European markets. It is the nearest Ethiopian city to Djibouti port which is only 680 km from Mekelle. In the future when the relationship between Ethiopia and Eritrea improves, Mekelle will be the nearest city to reach Massawa port at only 420 km. Mekelle is to be connected with the major economic centers of the country and Djibouti port by the national railway network, the construction of which has already started and is expected to be completed late 2013. This would further improve the connection and reduce transportation costs. A dry port has been established in Mekelle to simplify customs clearance for importation of the raw materials and export of products.

- **Labour efficiency**

Due to the long history of gum processing business in the Region, sorting and grading of gums are advanced in Tigray compared to other parts of the country. The granules are sorted, graded and shipped properly, leading to purity of quality grades.

Mekelle industrial zone

Mekelle municipal industrial was established in 2000 and furnished with basic utilities.The zone is delineated for manufacturing sector and is leased to investors at a low fixed lease price, i.e. Birr 1.25/m^2/ year. Leases are granted for up to 70 years.

Its total area was recently expanded from the original 40 hectares to 247 hectares. An area of approximately 100 ha is immediately available for new investment projects.

At present some 230 manufacturing plants are located in the industrial zone, of which 60 [TBC] projects have started production while the rest are under construction. Their activities range from heavy engineering to agro-processing, plastic and metalwork, sanitary products, pharmaceutical factories, and packaging materials (producing carton boxes).

Support provided by Mekelle City Administration and Tigray Investment Office

The Regional Government and City Administration will assist investors interested in investing in the sector by providing land at very reasonable lease price in the industrial zone.

The Regional and City Investment offices offer the following support:

- Handling investor inquires by appointing a single client executive to provide accurate information and data.
- Organize and facilitate site visit for an investor.
- Provide investors with up to date check list of all clearances and approvals required by different authorities for the project.
- Work with investors to get the necessary permits and licenses and to make the right contacts with service providers at both national and city level.
- Ensure fast access to land in the industrial zone.
- Assistance in applying for investment incentives.
- Post-investment 'aftercare' in resolving issues and supporting requests.
- Periodic surveys of investors, followed by public-private dialogue to discuss factors affecting business operation and competitiveness.
- Serve as an advocate for business concerns by engaging with relevant officials, legislators and other necessary to seek to resolve constraints.

Investment incentives

Custom duty exemption:

- 100% exemption from the payment of customs duty on imported capital goods, construction materials and spare parts worth up to 15% of the total value of the capital goods to be imported

Income tax exemptions:

- 2 up to 7 years for manufacturing or agro-industrial and agricultural
- 2 years for expansion or upgrading of existing manufacturing or agro-industrial and agricultural investments
- Loss carry forward for half of the tax holiday period

Export incentives

- With the exception of few products (e.g. Semi-processed hides and skins-150%), no

export tax is levied on export products of Ethiopia;

- Duty Draw-back Scheme: Duty paid at the port of entry and locally, on raw materials used in the production of commodities is refunded, 100 percent, upon exportation of the commodity processed.
- Voucher Scheme: A voucher book is a printed document to be used for recording balance of duty payable on raw materials imported for use in the production of goods for external market. The beneficiaries of the voucher scheme are also exporters.
- Bonded Manufacturing Warehouse: Producers wholly engaged in exporting their products who are not eligible to use the Voucher Scheme and who have license that enables them to operate such Warehouse.

Non Fiscal Incentives

- Investors who invest in areas of agriculture, manufacturing and agro-industry will be eligible to obtain loan up to 70 percent of their investment capital from the Development Bank of Ethiopia (DBE) if their investment is sound to be feasible

Further information available

CBI Market Survey, (2008) Natural ingredients for foods, cosmetics and pharmaceuticals: The EU market for natural gums, resins and waxes. www.cbi.eu

John Corcoran and Karen Manheimer (2010). GUM ACACIA: FROM THE TREES OF NORTH AFRICA TO THE SUPERMARKET SHELF. Paper presented at the IFEAT International Conference in Marrakech, 26-30 Sept. 2010 '*North African and Mediterranean Essential Oils and Aromas: 2010 Tales and Realities of our Industry – a new decade of challenges and opportunities*' Pages 217-226 in the printed Conference Proceedings.

Girmay Fitwi and Mulugeta Lemenih, 2011. Production, handling and quality control: *In* ***Opportunities and challenges for sustainable production and marketing of gums and resins in Ethiopia.*** Lemenih, M. and Kassa, H. (eds) 2011. CIFOR, Bogor, Indonesia. ISBN 978-602-8693-57-8. PP 47-67.

Habtemariam Kassa, Berihun Tefera and Girmay Fitwi (2011) **Preliminary value chain analysis of gum and resin marketing in Ethiopia**: Issues for policy and research. CIFOR *briefs,* No. 4, March 2011 www.cifor.cgiar.org.

Mulugeta Lemenih (2011) Resource base of gums and resins and challenges of productivity: In ***Opportunities and challenges for sustainable production and marketing of gums and resins in Ethiopia*** Lemenih, M. and Kassa, H. (eds) 2011. CIFOR, Bogor, Indonesia. ISBN 978-602-8693-57-8. PP 13-45.

Sisay Feleke and Samuel Melaku (2011) Value-added processing and marketing of gums and resins: in ***Opportunities and challenges for sustainable production and marketing of gums and resins in Ethiopia*** Lemenih, M. and Kassa, H. (eds) 2011. CIFOR, Bogor, Indonesia. ISBN 978-602-8693-57-8. PP 69-85.

W. Tadesse, G. Desalegn and R. Alia (2007) Natural gum and resin bearing species of Ethiopia and their potential applications. Invest Agrar: Sist Recur For 2007 16(3), 211-221 ISSN: 1131-7965

Prepared: 2013