The beekeeping sub-sector has been an integral part of agriculture in Ethiopia. It has been contributing to the household income and poverty alleviation and national economy through export. Ethiopia is a country where apicultural research is being conducted in a coordinated manner under the national agricultural research system. Hence, a lot of information has been gathered on different aspects of the beekeeping. This is a review of various research results that are from published and unpublished papers over a long period of time and various reviews in the course of the apiculture. It has been revealed that the highest percentage of honeybee population is hived in traditional, transitional and modern hives, only the smallest proportion is remaining as wild. However, attempts by various investigators and development actors showed that both the production and quality can be improved in terms of transforming the beekeeping system, processing and marketing. This review paper also tried to address both natural and man-made bottle-necks that damage the sector not to reach the satisfactory level.

Keywords: Beekeeping, Honey, Production

INTRODUCTION

Ethiopia is known for its tremendous variation of agro-climatic conditions and biodiversity which favored the existence of diversified honeybee flora and huge number of honeybee colonies. The diversified agro climatic conditions of the country create environmental conditions conducive for the growth of over 7000 species of flowering plants of which most are bee plants. It has the largest bee population in Africa with over 10 million bee colonies, out of which about 5 to 7.5 million are estimated to be hived while the remaining exist in the wild (Gemechis, 2015).

Apiculture is a promising off-farm enterprise, which directly and indirectly contributes to smallholder’s income in particular and nation’s economy in general. It has significant role in generating and diversifying the income of subsistence Ethiopian smallholder farmers mainly the small land holders and landless (Fikru, 2015).

The annual honey production of Ethiopia is estimated to be 45,300 metric tons which makes the country to rank first honey producing country in Africa and ninth in the world. The total beeswax production estimates about 3,800 tons per year. Such an amount puts the country 4th in beeswax production worldwide. Moreover, Ethiopia has the potential to produce up to 500,000 tons of honey and 50,000 tons of beeswax per year (FAO, 2010).

Honey is produced in almost all parts of Ethiopia, with distinctive types of honey coming from different regions. Most of honey produced within the country (95.57% of total honey production) comes from traditional bee hives that generally deliver low yields (5-7kg/beehive) and low quality of honey (Mikhailet al., 2013).

Despite the long tradition of beekeeping in Ethiopia, having the highest bee density and being the leading honey producer as well as one of the largest beeswax exporting countries in Africa, the share of the sub-sector in the GDP has never been commensurate with the huge numbers of honeybee colonies and the country’s potentiality for beekeeping. Productivity has always been low, leading to low utilization of hive products domestically, and relatively low export earnings. Thus, the beekeepers in particular and the country in general are not benefiting from the sub Sector (Seid et al, 2015).

Beeckeeping subsector is dominantly for small scale farmers and is contributing significantly to the increment of off-farm income and towards poverty reduction in rural areas. Honey is considered as a cash crop and only about 10% of the honey produced is consumed by the beekeeping households. The remaining 90% is sold for income generation. Beeswax was in the list of Ethiopian
agricultural export commodities, though it only in 2008 that the country got EU accreditation to export its honey to EU market (Assefa, 2011).

The Beekeeping sub sector is also creating a job opportunity in both rural and urban areas. Recently, the Ethiopian government is intensively working in organizing jobless urban and landless rural youth and women to involve them in bee equipment production and beekeeping activities. A significant number of people are currently engaged in honey and beeswax collection,"tej" (honey wine making), honey and beeswax processing and marketing (Assefa, 2011).

Generally, since Ethiopia has comfortable agro climatic condition that favor for the existence of Honeybee flora and rank the countries first and ninth honey producing country in Africa and in the world respectively. However, the share of the sub sector in the country’s economy (GDP) does not match with the countries potentiality for bee keeping. The reason is that productivity has always low, leading to low utilization of hive products domestically and relatively low export earnings. Although, honey sub sector plays a crucial role unemployment reduction, maintaining food security, poverty reductions i.e. serve as a means of source of income for huge rural households in Ethiopia.

Objective

To review honey production and its role in Ethiopian economy

Methodology

This senior seminar is reviewed by referring different studies, published documents, guide books, international journals and proceedings.

LITERATURE REVIEW

Concept and Definition

Apiculture: Apis is Latin for bee, and apiculture is the science and practice of bee keeping. The words ‘apiculture’ and ‘beekeeping’ tend to be applied loosely and used synonymously: in some parts of the world, significant volumes of honey are today still obtained by plundering wild colonies of bees this ‘honey hunting’ cannot be properly described as ‘beekeeping’. Honey hunting still remains an important part of many rural livelihoods and falls within the remit of apiculture. In some parts of the world apiculture forms part of the work of hunter-gatherers, while elsewhere apiculture is practiced by highly industrialized agriculturalists in the world’s richest nations (Nicola, 2009).

Honey: According to Codex Alimentarius (2001) Honey is the natural sweet substance, produced by honeybees from the nectar of plants or from secretions of living parts of plants, or excretions of plant-sucking insects on the living parts of plants, which the bees collect, transform by combining with specific substances of their own, deposit, dehydrate, store and leave in honey combs to ripen and mature.

Beeswax: beeswax is the creamy colored substance used by bees to build the comb that forms the structure of their nest. Very pure beeswax is white, but the presence of pollen and other substances cause it to become yellow (Nicola, 2009).

Beekeeping in Ethiopia

There is no well-documented evidence that indicates when and where beekeeping practice started in Ethiopia. However, beekeeping had started in the country between 3500-3000 B.C. Among all countries of the world; probably no country has a longer tradition of beekeeping than Ethiopia (Giday and Kibrom, 2010). In Ethiopia except for some places in Afar and Somalia regions honeybees are fairly distributed in the country adapting varying degree of weather conditions. They all produce honey, the nutritious natural food good for both man and animals. Although the number of farmers engaged in honey production is not well known, but is estimated that around 1.8 million households are actively involved in honey production (MoA, 2012, cited as andualem, 2016). According to this researcher the moderate climate of Ethiopia makes one of the most successful countries in the tropics in box beehive utilization. Historically, Ethiopia has been an important honey and beeswax producing country dominated by local consumption. Thus, the Hieroglyphs of ancient Egypt refer to Abyssinia (ancient name of Ethiopia), as source of honey and beeswax and Abyssinia has been known for its beeswax export to Egypt for centuries when other items were not exported. However, in modern times Ethiopia lost its charm as honey exporter and produced largely to serve the demands of local markets and those in neighboring countries (Sreejith et al., 2011).

The report by (MoA, 2012, cited as andualem, 2016) stated that annual honey consumption nearly equals annual crude honey production, currently estimated at 54,000 tones. In the country, beekeeping is an integral part of the life style of the farming communities, and except for a few extreme areas, it is a common practice in every place where humankind has settled.

In Ethiopia there are three types of beekeeping practices: traditional forest beekeeping, traditional back yard beekeeping, transitional beekeeping and improved (modern) beekeeping; about 90 % of beekeeping that farmers practice in Ethiopia is traditional Amssalu et al. (2004).
In conclusion; Ethiopia have a long history with honey production and probably no country has a longer tradition of beekeeping than Ethiopia. These is why Hieroglyphs of ancient Egypt refer to Ethiopia, as source of honey and beeswax and Ethiopia has been known for its beeswax export to Egypt for centuries when other items were not exported.

**Role of beekeeping in Ethiopian economy**

In Ethiopia Beekeeping is a promising non-farm activity for the rural households. It contributes to the incomes of households and the economy of the nation. The direct contribution of beekeeping includes the value of the outputs produced such as honey, bee wax, queen and bee colonies, and other products such as pollen, royal jelly, bee venom, and propolis in cosmetics and medicine (Assefa, 2013).

Beekeeping also provides an employment opportunity in the sector. The exact number of people engaged in the honey sub-sector in Ethiopia is not well known. However, it is estimated that more than one million farm households are involved in beekeeping business using the traditional, intermediate and frame beehives. It could also be observed that a large number of people (intermediaries and traders) participate in honey collection and retailing and thousands of households are engaged in ምን-

Making in almost all urban areas, also hundreds of processors are emerging and exporters are also flourishing. Moreover, honey and beeswax also play a big role in the cultural and religious life of the people of Ethiopia (Gidey and Mekonen, 2010).

Beekeeping has high social and economic value in the country. The number of honeybee colonies and beehives owned serves as a major wealth ranking in some societies. Ethiopia is among the leading honey producers in Africa and has the natural resources to further increase its production. Most of the honey produced is consumed locally, and the export quantity compared to total production is very low. However, the level of honey is gradually increasing, though still very low, due to the expansion of modern beehives and private sector involvement in setting up industrial honey processing resulting in obtaining good quality honey that meets export requirements.

In 2013, FAO estimated that Africa accounted for roughly 9% of global honey production (155,789 t), representing a 10% increase since 2000, which has since increased to 13% by 2016, states non-profit organization ApiTrade Africa. Ethiopia (50,000 t), Tanzania (30,000 t), Angola (23,300 t) and Central African Republic (16,200 t) are amongst the world’s top 20 producing countries. Interestingly, Ethiopia is also the fourth largest beeswax producer in the world. Honey exports throughout the continent grew sharply by 613% from 2000 to 2013, which represented an increase to 3,195 t, worth €6.9 million. Whilst overall production is low in Egypt, most of it is exported (1,202 t in 2013), ahead of Ethiopia, which exported 904 ton in 2013, up from just a single tone in 2000 (http://spore.cta.int/en/trade/honey-exports-takeoff-in-africa.html, 2017).

In the Second Growth and Transformation Plan (GTP-II), the government of Ethiopia gives more emphasis on enhancing the nation's earning capacity through encouraging export. Even though there are several agricultural products which can be exported, most of them simply consumed locally in uneconomical manner due to lack of processing technology, packaging and transportation. Among these, Ethiopia is endowed with abundant honey and wax that can be exported (Abebe, 2016). Similar author reported that in the first GTP-I period, honey and wax processing and export contributed 26.77 million USD to the economy while in the second GTP period more than 75 million USD is targeted. Even though there are slight changes in the export performance of the sector year after year, the country is not benefiting from the sector as per its potential. The major challenges crippling the sector include: poor stakeholder linkage, distorted market, poor quality of the products, insufficient laboratory facilities, poor incentive and limited facilitation. According to several studies by different bodies, due to knowledge gap, the nation is not benefiting from this huge source. In order to solve the problems and be competent in the global market, encouraging more research work so as to benefit small holder farmers should be undertaken. The trend of honey exports from the country is shown in the Table1 (SNV, 2009).

**Table 1: Honey export value from Ethiopia in the year 2003-2009**

<table>
<thead>
<tr>
<th>Year</th>
<th>Quantity (tons)</th>
<th>Value</th>
<th>Unit price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>birr</td>
<td>USS/kg</td>
</tr>
<tr>
<td>2003/4</td>
<td>8</td>
<td>12,224.00</td>
<td>15.28</td>
</tr>
<tr>
<td>2004/5</td>
<td>15</td>
<td>459,150.00</td>
<td>51.01</td>
</tr>
<tr>
<td>2005/6</td>
<td>28</td>
<td>789,880.00</td>
<td>87.76</td>
</tr>
<tr>
<td>2006/7</td>
<td>406</td>
<td>1,179,240.00</td>
<td>29.04</td>
</tr>
<tr>
<td>2007/8</td>
<td>242</td>
<td>8,449,300.00</td>
<td>71.56</td>
</tr>
<tr>
<td>2008/9</td>
<td>210</td>
<td>7,363,662.53</td>
<td>35.10</td>
</tr>
</tbody>
</table>

**Source:** Global development solutions, LLC as cited by SNV, 2009

**Market Background of Ethiopian Honey**

Although honey consumers are almost everywhere on the planet, only four countries (China, Ukraine, USA, Turkey) dominate global production of honey and less than a dozen countries (China, Argentina, Mexico, Brazil) drive the global exports. In the case of Africa, Ethiopia is the largest producer of honey, followed by Tanzania and Zambia. On the side of buyers, the main importer countries are rich (USA, Germany, Japan, and UK). In this picture of global honey market, there is currently a significant concern over diseases (CCD-Colony Collapse Disorder)
and quality issues (honey flux mainly in the Asia region). In 2013, globally, a limited honey production, an increasing worldwide demand and extreme global climate conditions have taken place (Fikru, 2015).

Concerning the global production and market of beeswax, major producers are few (i.e. India, Argentina, and Turkey) including Ethiopia. But these major producers are not the top exporters. The top exporters include China, Malaysia, USA, Germany, France, Netherlands, Canada, Ethiopia and Spain. Most of the top beeswax exporters are also top importers showing that these countries (Germany, France and USA-the top three) dominate the global beeswax market. In 2012-13, global beeswax production has been around 60,000 tons per year having relatively stable prices. But due to the bee diseases, and extreme climate conditions, global demand for beeswax has been increasing. The EU imports around 6,000 tons per year and approximately 50% of this is sourced from developing countries. From the continent of Africa, similar to the case in honey, Ethiopia is the largest producer of beeswax. Even at the global level, Ethiopia is among the top four beeswax producers and this is considerably attributed to the predominantly traditional system of production, which has relatively higher beeswax product per hive (Yetimwerk, 2015).

Based on the evident global honey and beeswax market conditions, the demand for these products is deemed unsatisfied. This is tangibly demonstrated in the bulk supply requests made to Ethiopian honey and beeswax exporters by buyer agents from foreign markets: mainly from Middle East (Yemen, Saudi Arabia, Emirates), Far East (China, Japan) and Europe (Norway, Germany). The inability of the largest Ethiopian exporter companies to cater for this sizeable demand illustrates the apparent market opportunity and the room for new players in the Ethiopian honey and beeswax processing industry. Based on the existing reality, the envisaged business will be operating in an industry where there are significant market opportunities; facing sufficient, if not overwhelmingly, demand for its table honey and beeswax products (ERCA, 2015).

### Table 2: Supply and Demand trend of honey from Ethiopia to the export market (in tons)

<table>
<thead>
<tr>
<th>Year</th>
<th>Supply, volume in tones</th>
<th>Demand, volume in tones</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2002</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>2003</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>2004</td>
<td>19</td>
<td>7</td>
</tr>
<tr>
<td>2005</td>
<td>23</td>
<td>8</td>
</tr>
<tr>
<td>2006</td>
<td>151</td>
<td>1</td>
</tr>
<tr>
<td>2007</td>
<td>387</td>
<td>2</td>
</tr>
<tr>
<td>2008</td>
<td>196</td>
<td>7</td>
</tr>
<tr>
<td>2009</td>
<td>274</td>
<td>1</td>
</tr>
<tr>
<td>2010</td>
<td>615</td>
<td>76</td>
</tr>
<tr>
<td>2011</td>
<td>729</td>
<td>3</td>
</tr>
</tbody>
</table>

### Table 3: Projected demand for processed honey (in tons)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Domestic</th>
<th>Export</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>2,608</td>
<td>858</td>
<td>1,750</td>
</tr>
<tr>
<td>2014</td>
<td>3,604</td>
<td>892</td>
<td>2,712</td>
</tr>
<tr>
<td>2015</td>
<td>5,132</td>
<td>928</td>
<td>4,204</td>
</tr>
<tr>
<td>2016</td>
<td>7,481</td>
<td>965</td>
<td>6,516</td>
</tr>
<tr>
<td>2017</td>
<td>11,103</td>
<td>1,003</td>
<td>10,100</td>
</tr>
<tr>
<td>2018</td>
<td>16,698</td>
<td>1,043</td>
<td>15,655</td>
</tr>
<tr>
<td>2019</td>
<td>25,320</td>
<td>1085</td>
<td>24,265</td>
</tr>
<tr>
<td>2020</td>
<td>38,738</td>
<td>1,128</td>
<td>37,610</td>
</tr>
<tr>
<td>2021</td>
<td>59,468</td>
<td>1,173</td>
<td>58,295</td>
</tr>
<tr>
<td>2022</td>
<td>91,577</td>
<td>1,220</td>
<td>90,375</td>
</tr>
</tbody>
</table>

Source: Ethiopian revenue and customs authority

### Empirical Evidences

According to Nebiyu Yamane (2011) research conducted in Gamo Gofa zone of the Southern Nations, Nationalities sample from total of 156 households, The main purpose of keeping honey bees was for both income and household consumption. According to the author 48% of the households produce the honey only for income generation purpose and 27% of the households produces the honey only for consumption purpose and totally 75% of households use both for income generation and consumption purpose.

Additionally, honey production reduces income inequality among smallholder households. Mohammed (2012) empirical result on Tigray region shows that Apis mellifera race identification and its association with productivity in the region /Tigray/ is the first of its kind. As a result a new Bee Breeding center establishment is going on at Mekelle University. This result was communicated at Purchasing colonies from highland to use in lowland. The price of one colony is about 63USD which means by multiplying good colonies a farmer beekeeper can save 63 USD per colony added to his apiary.

Beekeeping also plays a crucial role in unemployment reduction and environmental management. Tezera (2013) research conducted in Tigray region from 139 households reveal that Bee keeping has been serving as source of additional incomes and also diversification of income for significant number of bee keepers in the area, considering the agro-climatic conditions and the type of honey bee forage and cereal. Today as ells where in the country the human population is increasing the cultivated land area owned per house hold farmer is shrinking from time to time i.e. 0.5-0.65 hecter (excluding a lot of an employed youth) and it is highly degraded (decreasing its fertility) which leads to low production which needs improved agricultural in puts, but with sky rocketing price. All these prevailing conditions seeking for alternative income generating activity which are sustainable, environmentally friendly that lends its hand for natural resource...
conservation and requires small land area are becoming indispensable and important. In this regard honey production and marketing is preferable over other growing annual crops. Because honey production and marketing requires only a small plots of land, no or minimal competing for other resource (land) positively correlated with improvement of local environment have high gross margin as compared to other crops. In addition to these bee keeping production and marketing is not vulnerable to rain fall but has its product high value and non-perishable. Moreover, honey production and marketing is business which participate women and land less youths in the study area.

Beekeeping also plays a significant role in the country’s food production through honeybee pollination services of major cultivated crops. The role it plays in enhancing food security, poverty reduction and food production through pollination of crops has become substantial in the recent years. About one third of all plants or plant products eaten by humans depend directly or indirectly on bees for their pollination. The yield of plants pollinated by honeybees can be increased in quality and quantity. Honeybees can increase the yield of Citrus sinensis by 30%, watermelon by 100% and tomatoes by 25% and onion yields had been increased by 94% due to honeybee’s pollination (EHBPEA, 2010).

A study conducted by SNV (2005) showed that Oromia region produces about 41% of total honey produced by the country, followed by SNNPR and Amhara regions with a respective share of 22% and 21%. The Tigray region contributes close to 5% and all rest regions contribute 11%.

Additionally, the research conducted in SNNP by Yetimwerk (2015) also concluded that honey production increases producer (farmers) surplus. There is an increasing trend of honey production and colony numbers both from the local and frame bee hive. This is definitely the result of the ongoing effort of natural resource conservation which contribute for increasing availability of potential bee forages and the market demand for both honey and bee colony. There is attractive market price for honey and bee colony.

Generally honey have substantial role in the economy of Ethiopia. The most important role of honey productions are; it serve as a way of poverty reduction, reducing income inequality, source of income for rural households, way of mitigating environmental pollution and ever increasing the productivity of crops which paves the way for food security and overall development of the entire economy.

CONCLUSION

Ethiopia is known for its tremendous variation of agro-climatic conditions and biodiversity which favored the existence of diversified honeybee flora and huge number of honeybee colonies. The diversified agro climatic conditions of the country create environmental conditions conducive for the growth of over 7000 species of flowering plants of which most are bee plants.

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Beekeeping also plays a crucial role in unemployment reduction and environmental management. Because honey production and marketing requires only a small plots of land, no or minimal competing for other resource (land) positively correlated with improvement of local environment have high gross margin as compared to other crops. In addition to these beekeeping production and marketing is not vulnerable to rain fall but has its product high value and non-perishable. Moreover, honey production and marketing is business which participate women and land less youths.

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