

Original Research Article

Myrrh, Frankincense, and Grape Supply Chain Practices and Challenges

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Abstract: This study includes the supply chain management practices and challenges of the three EOTC worship requirement supplies i.e Myrrh, Frankincense, and grape. Myrrh is a gum resin extracted from some small, thorny tree species of the genus *Commiphora*. Frankincense also known as *olibanum* is an aromatic resin used in incense and perfumes, obtained from trees of the genus *Boswellia*. A grape is a berry or typically green, purple, or black growing in clusters on a grapevine, eaten as a fruit and used in making wine. Therefore, the purpose of this study was investigating the challenges and practices of the Myrrh, Frankincense, and Grape supply chain system. The study used methods of assessing the most relevant literatures written from the Web of Science, Scopus, and google scholar including Ethiopian reports to the world unions. The KJV version of the holy bible mentions frankincense more than 100 times, myrrh 18 times, and grapes 7-25 times. These resources are to be used prudently and according to Leviticus' instructions. The findings indicated that three elements of worship are taking place under various, negative circumstances. All three species are widely known around the world and in Ethiopia in particular, but little is being done about them because EOTC only spends 33,075,050,000birr annually. Even key users are not heavily involved in the import-export chain. Values: The chain's stakeholders are paying a high price and losing benefits as a result of this reasons. According to church teaching, it is also necessary to use isolated Frankincense, pure grape, and pure and tested myrrh. Standardization of the supply chain and frameworked structure should assured by stakeholder. As far as the government concerned, and the EOTC, which accounts for the largest portion of those three consumes, it recommend to learn from the past in order to ensure future demand and supply balances.

Keywords: *Boswellia, Frankincense, Grape, Myrrh, Olibanum, Supply chain*

1. Introduction

The goal of supply chain management is to provide the best possible customer benefits at the lowest possible cost. Previous researchers commonly mentioned challenges of supply chain management were; Location, inventory management, Transportation, infrastructures, supply chain inbound/outbound, etc. Analysis at the supply chain or life cycle scale is often focused on improving efficiency and reducing environmental impacts across the life cycle, utilizing methods and metrics such as eco-efficiency, life cycle GHG emissions, net energy analysis, water footprint, and others. A collaborative strategy is therefore intrinsically required for the sustainable commercialization of biofuel production, which involves simultaneously resolving several technological, economic, social, and environmental difficulties that arise across the supply The value chain begins with the definition of the market, following the WEEE life cycle. (Samantha, 2017)

Customer dependence, supplier dependence, supplier concentration (limited number of suppliers or, at the extreme, single sourcing), and global sourcing (greater uncertainty, less transparency, and visibility) are the key causes of supply chain vulnerability. Operational robustness of supply chains refers to the robustness of the dynamic processes within them, supposing unchanged structures (Monostori, 2018).

In a chaotic environment, effective supply chain management is essential for surviving and succeeding. The difficulty in selecting the appropriate business frameworks and standards from a variety of sources goes hand in hand with supply chain frameworks and standards (Rajah, 2018) According to (DAI, 2011) Myrrh is collected from a small 1.5 to 4.6m tall tree about 0.3m in diameter called the dindin tree. This tree looks like a short flat-topped hawthorn tree with gnarly branches and sparse leaves that grow in groups of three. The whitish-green flowers appear before the leaves in the spring and historically it had medicinal uses. While Frankincense is a tree with papery bark, sparse bunches of paired leaves, and flowers with white petals with red or yellow centers that grow without soil along the rocky shores of Somalia. The young trees furnish the most valuable gum milky white ooze that hardens to a tear-shaped droplet with a translucent golden hue Scrubby and desolate among the rocks and sands of the desert (S Andini, 2021).

The word frankincense is derived from the old French term “franc encens”, meaning “pure incense” or literally, “free lighting” (Chang-Chien, 2022) by mentioning Tucker, 1986 and added saying “pure and noble high-quality incense”. By the Javanese people in ancient times, frankincense was used for a cigarette mixture (klembak cigarettes). Furthermore, it was also used in traditional rituals (funerals) and many benefits of frankincense were associated with the mystical world. Indonesia was once one of the exporting countries of frankincense resin. The export volume of frankincense from North Tapanuli reached 1913 tons/equivalent to 601,000 guilders in 1939. Meanwhile, in 1978, the export volume of frankincense decreased to 323.6 tons equivalent to \$143,800. Then, frankincense production continued to decline until 1996, with as much as 66.8 tons, or equivalent to US\$ 186,001 that was exported from North Sumatra (S Andini, 2021).

Frankincense oil, commonly known as the king of essential oil, is extracted by the hydro-distillation or steam distillation of aromatic oleo-gum resin produced by the trees of the *Boswellia* genus. There are around twenty species of *Boswellia* distributed across Africa, Arabia, and South Asia. The oleo-gum resin has been used in traditional medicine, cultural, and religious ceremonies since ancient times (Ojha, P.K.; Poudel, D.K., 2022).

Frankincense, also called *olibanum*, is used mainly for its lovely fragrance; Frankincense and myrrh are both resins dried tree sap that comes from trees of the genus *Boswellia* (frankincense) and *Commiphora* (myrrh), which are common to Somalia and Ethiopia. Both are in the botanical family *Burseraceae* commonly called the incense tree family (Flowers-Kimmerle, 2021).

Frankincense and myrrh were once regarded as lifelines to spiritual and physical health and considered more precious than gold (Mulugeta Lemenih, Demel Teketay, 2003). They are tropical genera, which are dominantly found around the Horn of Africa, and some in the Arabian Peninsula and India (Chang-Chien, 2022). Frankincense oil, commonly known as the king of essential oil, is extracted by the hydro-distillation or steam distillation of aromatic oleo-gum resin produced by the trees of the *Boswellia* genus. There are around twenty species of *Boswellia* distributed across Africa, Arabia, and South Asia. The oleo-gum resin has been used in traditional medicine, cultural, and religious ceremonies since ancient times (Ojha, P.K.; Poudel, D.K., 2022).

2. Literature Review

2.1 Purposes of Three Supplies

The priests of ancient Egypt and Rome used frankincense to create a mysterious atmosphere in the temple (Xiang-Long Meng, 2021). While it will also be useful for pharmaceutical purposes, coffee ceremonies, and holidays in each household (Mitin, Lubanja, adden adrus, Ian Emni, meker, Shutara, kufkuaf, berir & Saeri Saero), perfumes etc. The use of incense became common with the expansion of monasteries and churches, and with the adoption of Christianity as the state religion in the 4th century. Frankincense and myrrh are the two incense types burned in the rites of the Ethiopian Church. It is consumed in the church and is classified into pure white and regular. Some religious leaders claimed that pure white frankincense is valued for its fragrance and that it is imported from Jerusalem and Greece, hence known in the church as the ‘Jerusalem incense’ and ‘Greece incense’. Due to its high price and small quantity, its consumption is restricted to specific prominent/big churches

located in major cities (Nigus, 2022).

2.2 Species Origin and Revenue Stream

When considering the countries of origin by variety: most Thompson and Red Globe grapes come from Chile and Argentina, Kish Mish is delivered mostly from Turkey and Uzbekistan, and the Cardinal variety is from the South African Republic and Latin America. Branding by country of origin does not directly influence price (for example, consumers are not looking for grapes from a certain country). However, grapes from Chile and Argentina command a higher price due to their higher quality (more uniform, bigger bunches, longer shelf life, firmer grapes, and handler-friendly packaging). This higher price covers their increased costs of transportation, tariffs, etc. to travel for three weeks by boat. Italian grapes also have higher quality and therefore command a higher price (DAI, 2011). The practices of value chain mapping in India are well structured. They have integrated production and manufacturing centers.

Frankincense, Gummi Boswellia or Olibanum, is an oleo-gum resin whose biological source is as many as 24 plant species (out of 25) belonging to the genus *Boswellia* (family Burseraceae). Representatives of this genus are distributed across the huge geographic area between the tropical regions of Africa and the arid forests of Punjab and West Bengal in India (Maksimović, 2021).

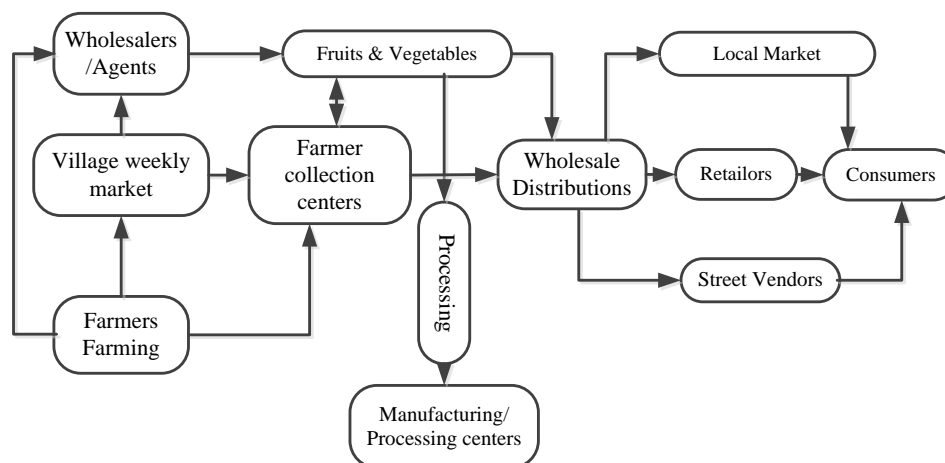


Figure 1 Value chain mapping for fruits and vegetables in India (Nirmal Ravi Kumar. K, 2021).

The *Boswellia* genus includes around 30 species and is usually found in the arid regions of tropical Africa, the Arabian Peninsula, and South Asia, where moisture is supplied by morning mist. Like *Boswellia serrata* Roxb. is found in India, *Boswellia sacra* in the Arabian Peninsula, *Boswellia papyrifera* (Caill. ex Delile) Hochst. and *Boswellia rivae* Engl. in Ethiopia, *Boswellia neglecta* S.Moore in Eritrea, and *Boswellia carterii* and *Boswellia frereana* Birdw. in North Africa and Somalia. However, frankincense is obtained mostly from *B. frereana*, *B. sacra*, *B. papyrifera*, and *B. serrata*, which grow in Somalia, Yemen, Oman, India, and Pakistan. Although many *Boswellia* species are known to produce frankincense, *B. serrata* (India), *B. sacra* (Oman), and *B. carterii* (Somalia) are the major sources of commercial frankincense (Chang-Chien, 2022).

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Table 1 Some species of Boswellia trees

No	Frankincense Species	Naming	Countries Abundant	Type of Tree
1	Resinous gum	Olibanum	India	Boswellia serrata
2	Moxor	olibanum	Somali, Oman, Yemen	Boswellia sacra
3	Yagcar	Luban lami	Somali	Boswellia frereana Birdw
4	Tigray type olibanum	gum-resin	Ethiopia	Boswellia papyrifera
5	Ogaden type	gum-resin	East & South Ethiopia	Borena and Ogaden type
6	Boswellia Socotrana		Socotra	Boswellia socotrana
7	Ambilobea madagascariensis	Razafim	Madagascar	Capuron, Thulin, Beier
8	Boswellia dalzielii	Hutch	Nigeria	Boswellia dalzielii
9	Garuga floribuna		China, Bhutan, Bangladesh	decne
10	Guillaumin		Sudan	Boswellia chariensis

Source: June 2022 World Flora Online Website, et al

Ethiopia is a tropical country with vast areas of land that are arid to semiarid and have marginal/almost no agricultural potential. The main sources of frankincense are tree/shrub species of the genus *Boswellia* which comprises 20 species, of which of the 6's are found in Ethiopia. Frankincense is collected from five of the six species, namely *B. (papyrifera, neglecta, revea, microphylla, and Ogadensis)*. Of these five, *B. papyrifera* contributes the largest share of the volume exported.

The production and marketing of frankincense is an age old traditional activity in Ethiopia and elsewhere that makes frankincense one of the world's oldest internationally traded commodities.

2.3. Supply Chain Management Practices of Myrrh, Frankincense & Grape

The incense trade is almost invisible, and little is known about how incense was produced, distributed, and consumed within ancient states and how incense was integrated into local and regional political economies. Figure 2 shows the volume of production and export for all gums and resins produced and exported from Ethiopia over the three periods considered.

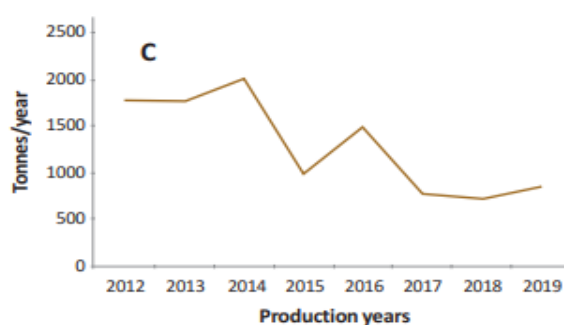


Figure 2 Production of frankincense per 8 years sample

The production and export volumes in this era showed a very sharp declining trend, associated with the decrease in the production area managed by the state and private actors, following the engagement of communities in dry forest management through PFM cooperatives. Most production areas of the two main actors were handed over to cooperatives, with the primary objective of enhancing the participation of local communities in the management of declining resources. The two major supply chains prevailed during this period. Exporters engaged in the production, processing, and marketing of frankincense. This was common in northern and northwestern Ethiopia. Farmers or pastoralists are collecting & selling to buyers and rural retailers at the cheapest price. Buyers would then sell on to wholesalers and or exporters. This was common in the south and in southeastern Ethiopia. Special features of this period include the following. Increased involvement of

development partners such as NGOs in supporting local efforts and national or regional governments to promote improved management and exploitation. A policy change that involved devolution of management and uses rights to local peoples.

2.4. Market Benefit of Myrrh, Frankincense and Grape

The estimated entire population size of Ethiopia is almost 123 million, which is being the 2nd populous country in Africa next to Nigeria. It is also rapidly increasing year to year. Hence there must be provided job opportunities and various economic source schemes. Unless it is oblivious to the government that will be very dangerous to sustain. Because more than 60% of the total population is adult population requires job opportunities, development, and change in their life.

On the other hand, almost more than 50% of the land is for traditional agriculture that is not well cultivated yet. Hence the total land area of Ethiopia is 1.1km², from this, there is 550000km² for agricultural use. That implies there is a very big opportunity when supporting the agricultural sector. With this quantity of land, the highest consumption goes to frankincense, myrrh, and grapes. Therefore all stakeholders and shareholders in this sector have to motivate and mobilize the young portion of Ethiopian citizens.

2.5. Production and Marketing Situation of Ethiopia

Ethiopia is known for its rich cultural heritage and mystical legends. Grape and wine were known in Ethiopia around the first century A.D. when they were imported through the Red Sea Port of Adulis (Ethiopian Embassy, 2017). The use of the raisin grape dates back to the introduction of Christianity and is used as “sacred” in the Ethiopian Orthodox Church. However, grapevine introduction into Ethiopia is not well documented Asfwa, (2013). Ethiopia has perhaps the widest range of endemic gums and resins in Africa and this represents an important commercial resource base for the country. Among the most commercially valued species are gum Arabic, Frankincense, also known as Olibanum, Myrrh and Opoponax and Gum karaya (development, 2020). The major source trees of NTFPs from the species of Acacia, Boswellia, Commiphora, etc were identified for further care and conservation as sources of gums, incense and myrrh.

The main benefit of buying gums and resins from Ethiopia has the widest range of endemic gums and resins-bearing species in Africa. Key species include the most sought-after Frankincense and Myrrh species used in fragrance, medical and aromatherapy products and long-established and experienced sectors in harvesting, grading, trading, and exporting. Recognition that the sector has strong potential for value additions. It offers also a range of lesser-known and less commercialized gums and resin. Even there is also a legend from elders that grape crop was cultivated in ancient Aksumit civilizations in this area. The church people are interested in producing table grapes which will be used for religious purposes as communion services to all local churches around Tigray to earn income for the church. Economic yield will begin to emerge in the fourth year of the establishment in most vineyard farms. Starting from the fourth year a grower can expect a return on the expense of his costs (Temesgen Kebede, Aseffa Redae, 2017). As to Mahibere Kidusan Television's weekly news of Tikmt 16 the monastery of Belbelit Eyesus in the North Shewa zone of Ethiopia are lately begun the cultivation of grapes for church services (Asrat, 2022).

Even though substantial quantities of gum and resins are harvested annually in Ethiopia it is neither adequate nor accurate. Because Market structures for selling Frankincense are not well structured. The collectors are not equipped to do effective collection due to a lack of basic skills and equipment. There is no established market chain of Frankincense i.e. simply producer to the consumer of local market transport channels. The production processes such as tapping, resin collections, processing, grading and marketing of the products are little documented. And only limited reliable quantitative assessments at country or regional levels have been made. However, none of the cooperatives have been functional due to a lack of continuous follow-up and support. Even though households depend on the collection of Frankincense, are particularly disadvantaged in the trade due to a lack of market information. There is no organized team or cooperatives with legally binding rules and

regulations.

3. Findings and Discussion

3.1. EOTC Demand and Supply Estimations

EOTC is one of the oldest Christian churches with about 50-60 million followers, of which 450,000 clergy serve in about 45,000 parish Churches and 2,000 monasteries distributed all over Ethiopia (Gobena, 2018) with little updating from current estimation. Meanwhile, this review was conducting an extra practical assessment incorporated for further investigation and scientific critique. The sources of such data were taken from deacons of limited followers small churches in very remote zones and pessimistic situations. While in the capital city and regional states there are very few cathedrals were considered as a sample for triangulation purposes and also intermediate churches for a mean calculation. Hence the range will give a very close estimated average of total parish consumption rates per annum.

Table 2 The estimated consumption of EOTC/annum for religious purposes only

No	Type of Parish Church	Consumption of Myrrh/year	Consumption Frankincense/y	Consumption Grape/year	Estimate Price
1	Big Cathedral, Gedam	50kg*1000	400kg*500	400kg*500	20,250,000,000
2	Normal Parish (Debir)	25kg*1000	250kg*500	250kg*500	12,375,000,000
3	Small Parish (Atibiya)	10kg*1000	50kg*500	50kg*500	450,050,000
	Total church(oneness of her)	85000	275000	275000	33,075,050,000

Disclaimer; All the calculations have been done by 45000parish church numbers. And the type of frankincense is 1strank (pure white color not mixed or any black), and the grape is also fruity (unripe) type is mostly preferred not an ordinary one. While the myrrh is also the original, not the nominal type will present to the worship purpose. So according to half of Hidar 2015E.C (November 25) date calculation result the annual expense of EOTC is thirty-three billion seventy-five million and fifty thousand birr required. This is a very big capital for the church administration and other service plans, if autonomously cultivated or shortened the supply chain. When assessing the consumption of each household expense/year is 900-1200ETB, since for simple calculation $121 \text{ million}/5=24.2 \text{ million households}$ (21.78-29.04billion)ETB/year will consume in the country. The estimate information basis dedication goes to (Nigus, 2022), et al.

Bearing wild fruit was symbolized as a curse of the sinfulness of human beings against the will of God. The Book of Isaiah 31, for instance, narrates about a song for a vineyard: “My Well-beloved hath a vineyard on a very fruitful hill. And He fenced it, and gathered out the stones thereof, and planted it with the choicest vine; and built a tower in the midst of it, and also made a wine press therein. And He looked for it to bring forth grapes, and it brought forth wild grapes” (Cheng, 2016). Ethiopian exegetic tradition on this section of the prophecy of Isaiah continues to state for the vineyard of the Lord of hosts is the house of Israel, and the men of Judah his pleasant plant: and he looked for judgment, but beholds oppression; for righteousness, but behold a cry (Gobena, 2018).”

The responsibility of offering the oil for the light and the fragrant incense and the continual grain offering and the anointing oil are 51 ascribed to Eleazar the son of Aaron the priest, and his successors.⁵⁴ The Ethiopian Orthodox tradition upholds the words of the St John Apostle and the Evangelist “and the smoke of the incense, with the prayers of the saints, ascended before God from the angel’s hand”⁵⁵ and due to this raising of incense is so important that almost all prayers and services are accompanied by rising of the incense. The incense is sourced from a tree/forest and as a source of this important offering the forest also received high regard and due protection.

One of the very important practices in the Ethiopian Orthodox Tewahedo Church, alike the other ancient and traditional churches, is the use of incense and myrrh in liturgical and sacramental prayers. This practice

anticipates its origin from the passages of the Bible describing the order of the Lord to bring burnt offerings and burn fragrant incense perpetually every morning and evening throughout generations.

Stakeholders in the supply chain and their contribution percentages are presented in Table 3 below. The price at the origin and the end user varies by 98.4% which is a very big difference. Because the chain is fluctuating depending on various stakeholders' interests without standardization. No governmental intervention or policy has been made to this sector.

Table 3 Approximate mean prices/kg received by various types of actors (Exchange rate date 25/11/2022, 53.4birr)

Stakeholders	Birrs From Dollar	Percentage
Gatherers	48.06	1.6
Collectors/Assemblers	58.74	1.96
Microenterprises	58.74	1.96
SOE/Transporting, processing, and trading enterprises	567	18.9
Private exporters	1000	33.33
Wholesalers	1500	50.00
Retailers/village pretty traders	2990.4	99.68
Retailers/mobile traders	2435.04	81.17
Retailers/urban pretty traders	2920.98	97.37
Consumers	3000	100

Channels of gum/other Olibanums are; Importers, Exporters and wholesalers, Local consumers, Small/large retailers, Border country traders, Regional wholesalers(assemblers), Terminal market, Border country wholesalers, Border town wholesalers, Coordinators, Cooperatives, Local market assemblers, Wage laborers (organized into groups)/squadrons and Personal & farming households.

Responding to rapid deforestation and the degradation of frankincense resources since the mid1990s, mainly in the north and northwestern Ethiopia, farmers' participation in frankincense value chains emerged as a new strategy (Eshete A, Kassa H, Livingstone J, 2021).

Table 4 Chemical contents of various species in different geographical locations

Countries	Chemical Components From Health Aspect
Chad(Dalzielii in hydro-di)	δ -3carene, α -pinene Eshete, (2021)
Mali(Dalzielii)	P-cymene, β -phellandrene
Nigeria(Gum-resin Caterii)	Isolongifolene, myrcene, α -pinene, α -terpinene, trans-sabinene hydrate Nigus, (2022)
Somalia(essential oil in rivae)	Esters, l-ocetate, alcohol, incensole, mixture...
Ethiopia(essential oil neglecta)	δ -3carene, δ -3carene & limonene, terpinen-4-ol

Frankincense has been traded and used as one of the most valuable materials since the beginning of written history. The frankincense trade flourished between the 3rd century BC and the 2nd century AD. Most of the frankincense in trade comes from Oman, Yemen, and Somalia (Maksimović, 2021). Since antiquity, frankincense has been traded as a precious commodity, but it has also been used for the treatment of chronic disease, inflammation, oral health, and microbial infection (Chang-Chien, 2022).

The genera *Acacia*, *Boswellia*, and *Commiphora* are known for their contributions to the world of some of the oldest and most acknowledged forest products such as gum Arabic, frankincense, and myrrh. These products are used today in some of the multi-billion dollar industries. The vegetation resources also provide several other products of commercial interest and have subsistence roles (Lemenih, 2011). High-potential gum Arabic and Frankincense Concentration areas within ASALs of Ethiopia are NW, W, S, and SE. Different types of gum Arabic and frankincense resources can be found due to the diversity of source species and variety. While medium

commercial potential Myrrh and myrrh-like resins are available in S & SE Different types of Commerce are going down (Lemenih, 2011).



Figure 3 Tigray-type Frankincense with various grades/B. papyrifera species, Black Borana incense/B. neglecta, respectively, and True myrrh from *C. myrrha* and Opoponax (Lemenih, 2011) and (Ahmed A., 2022)

Frankincense oleogum (*Boswellia sacra*), grade “Hougari, Figure 3” was purchased from the ‘Luban market’ which is located in the city of Salala, Dhofar region, Sultanate of Oman (Ahmed A., 2022). Olibanum, myrrh, and Opoponax are widely employed in traditional and modern industrial applications principally in perfumery, food industries, and pharmaceutical fields. Both myrrh and frankincense are highly valued for their aromatic fragrances and are common ingredients in incense, perfume and potpourris, soaps, detergents, creams, and lotions, and are often included in meditation blends, as it strengthens the psyche and aids in deepening the meditative state (FAO, 1995) (Lemenih, 2011). Gums and Resins Production and collection of gum and incense vary depending on the product type and location. Both gum Arabic and frankincense from the north are produced by tapping stems and branches (Plate 4). While in the south (frankincense, gum arabic, and myrrh) collection is carried out on naturally oozed tears, and there is no tapping involved. Production in the north is very organized and involves hired labor who works about 8 to 10 months (the entire dry season) in rounds of wounding, picking, and refreshing wounds. While collection in south Ethiopia is often carried out by herders and children mostly on a casual basis but occasionally and not systematically. In the north concessionaries or farmers' cooperatives produce while in the south mostly individual production is common (Lemenih, 2011).

Frankincense is one of the complementary activities next to livestock herding undertaken by pastoralists to supplement their income. Income generated from the sale of Frankincense helps in meeting households, purchasing food, and supporting livestock-keeping activities. Two different NGOs (Farm Africa Hammer and Benatsemay, and AFD-Hammer) formulated the incense production and marketing cooperatives with ultimate support, and initiatives and given different trainings concerning tapping and handling of incense products (Asmera Adicha*1, Asmelash Tesfaye2, Shimelis Tesema2 and Demis Segaw1, 2017).

Grape (*Vitis vinifera*) belonging to the Vitaceae family is one of the world’s most important economic fruit crops. The major grape-producing countries include China occupying the top position at 12.85% followed by Italy at 11.57% and the USA at 9.24%, Spain at 9.07 % and France at 8.69 % together accounting for about 51.42% of total world production (FAO, 2012) as well as South Africa, Tanzania. According to FAO (2010), approximately 71% of the world's grapes production is used for wine, 27% as fresh fruits, and 2% as raisins (dried fruit) (Mary Kulwijila1*, Jeremia Makindara2, 2018).

3.2. Production Process of The Worship Ingredients

The milky exudate that drips out of the incision is whitish in the beginning and gradually hardens in contact with air, changing its color as well. It is collected throughout the year and marketed, fresh or dried, in the form of fragrant, small, ovoid pieces similar to drops, reddish-brown, greenish-yellow, dull yellow, or yellow-orange. Pieces of oleo-gum resin are sometimes agglomerated into chunks up to 5cm long and up to 2cm thick. The fracture is smooth, waxy, and translucent. It burns readily and emits an agreeable characteristic balsamic resinous odor (Maksimović, 2021). For pre-marketing authorization and product licensing purposes, Canadian Natural Health Products Directorate (NHPD) has published three monographs that define the conditions for oromucosal,

oral, and topical use of frankincense and/or its preparations. According to the NHPD, oral administration of dried *Boswellia* oleo-gum resin is permitted as an astringent, and diuretic, to relieve nervous tension; in TCM, improve the life energy (qi) flow, alleviate urinary disorders, and eliminate damp wind. The allowed indications for topical use in TCM are the treatment of carbuncles, improvement of tissue regeneration, treatment of injuries, alleviation of problems with the gums, teeth, oral cavity, and throat, as well as the alleviation of pain, promotion of sore healing, and reduction of swelling (Maksimović, 2021).

Grape is one of the most important, demandable, and remunerative fruit crops. It has the earliest recorded history (Alemu, 7). It is one of the most widely grown fruit trees in the world, exploited for the production of fresh/table or juice, resin but the major use of grapes is in the wine industry. Grape is gaining popularity for its high nutritive value, excellent taste, multipurpose use, and better economic returns.

These firms have been compelled by the constantly shifting market to review their supply chain operations to effectively integrate sustainability through diverse practices including lean, green, circular, and industry 4.0, among others (Yadav, 2020). Making standardization of the chain networks, and inclusive frameworks must aligned to the crucial elements of it will be the best solution to the problem.

4. Conclusion and Recommendation

More than 20 countries in the world are producing various species of frankincense. Among those countries, Ethiopia is one and the major sources of various (more than 11) species. The number of EOTC churches in Ethiopia is around 45000 which is a potential consumer. The theological reasoning and traditional practices of EOTC helped the survival of ancient remnants of forest biodiversity in churchyards and monastery compounds as islands of rich and indigenous biodiversity in a sea of deforested landscapes. The user background & potential consumer are contradicting religious aims and righteousness plans. So the user must hand over the chain and cultivation of products and elements of the processing stream to increase the revenue as an institution. The chain needs to be standardized and up to date supply chain frameworks to the stake holder i.e EOTC. Or it will be decreasing the shortage of required quality and quantity of items in all three types. The total capital held by the three things is estimated at 60 billion ETB/yr excluding the vine component. So to the government, there is a high level of potential demand for the myrrh, frankincense, and grape market. So if the agricultural or any key stakeholder gives attention to this sector means eliminating unnecessary importing currency loss & bringing an amazing income.

Conflict of interest

The authors declare that there is no conflict of interest.

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