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MINISTRY OF AGRICULTURE



National Apiculture Development Strategy



2024-2032

Addis Ababa, Ethiopia

**National
Apiculture
Development
Strategy**

Forward

Ethiopia with its diverse climate and rich natural resource has long been recognized as one of the most important honey producers in Africa and the world. Apiculture holds a unique place in the socio-economic fabric of our nation, not only as a source of livelihood for millions of rural households but also as a vital contributor to sustainable agriculture and environmental conservation. The honey and bees wax industry plays a pivotal role in food security, job creation and rural development. Ethiopian honey known for its exceptional quality is a valuable export commodity, strengthening our position in the global market. Moreover, the pollination service provided by bees is integral to the productivity of our agricultural systems, ensuring the continued success of key crops and maintaining biodiversity.

However, despite its potential Ethiopian apiculture sector faces challenges such as colony loss from unwise pesticide uses, land use changes, inadequate infrastructures, limited access to modern beekeeping technologies and financing, climate change and insufficient training for beekeepers. The need for a comprehensive, coordinated strategy to unlock the full potential of the sector is therefore, urgent and important endeavor. It is with this view and understanding that our ministry developed this National Apiculture Strategy in collaboration with our partners.

This apiculture strategy aims to address the current challenges and harness the potential of beekeeping industry through improved management practices, innovations in production, and enhance market access. It outlines clear objectives to support smallholder farmers, promote sustainable practices and position Ethiopia as a global leader in honey production. The strategy acknowledges and emphasizes on the multidimensional contribution of the apiculture sector for job creation, and food security efforts of the country. As part of this effort this new strategy focuses on integrating apiculture with agriculture and protected public lands including supporting the sector in the pastoral and agro-pastoral areas and mainstreaming apiculture into different sectors and programs, a major departure from our previous efforts.

Our Ministry once again confirms its commitment to work towards transforming Ethiopian apiculture into a vibrant, sustainable and inclusive industry, capable of contributing to national economic growth, environmental resilience, and the well-being of our people. The successful implementation of this strategy, however, requires the collaborative efforts from government, private sector, development partners and local communities, all united in the common goal of advancing Ethiopia's apiculture sector. It is my hope that through this strategic framework, we will secure a prosperous future for beekeepers, strengthen our agriculture economy and continue to offer the world the natural bounty of Ethiopia's honey.

Finally let me take this opportunity to thank all those involved in the process. Many individuals, institutions and development partners have made significant contribution in the realization of this strategic plan. Our special gratitude goes to the International Center of Insect Physiology and Ecology- ICIPE, for its technical and financial support throughout the preparation of the strategy document.



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I also acknowledge all contributors who invested their time in reviewing the strategy document and providing valuable professional inputs to improve the quality at various stages of its development.

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Lastly, I offer special appreciation to Mr. Azize Ayalew of the Ministry of Agriculture and Dr. Zewdu Wultaw of ICIPE for their outstanding leadership and coordination throughout the strategy development process.



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Executive Summary

Ethiopia has a high potential for beekeeping due to its diverse fauna, varied ecological and climatic conditions and biodiversity. Beekeeping plays a substantial role in pollination service to increase crop production and productivity, maintaining ecosystem, as well as generating and diversifying the income of smallholder farmers. Additionally, beekeeping can provide employment opportunities to youth and women and contribute to financial security. The country hosts around 7 million managed honeybee colonies, making it the number one in natural honey production in Africa and the tenth in the world. Ethiopia is also the fourth largest producer and exporter of beeswax to the world.

Ethiopia has the potential to produce up to 500,000 tons of honey, but the current production is only 129,301 tons of honey, which is far below the production potential. The country also exports only a small portion of its total production (<1%) to the international market. However, Ethiopian beekeeping faces a multifaceted set of challenges that hinder its development including mostly backyard based and traditional type of production system, low production and productivity of honeybee colonies, weak linkages among stakeholders, low attention of honeybee services, limited integration of beekeeping with public lands, limited expansion of beekeeping in vast pastoral and agro pastoral areas of the country, inadequate extension service delivery, high absconding, quality and value addition problems, limited bee product diversification, policy and organizational structure deficiencies, limited understanding of beekeeping as business, inadequate access to markets, and cross-cutting issues, and weak monitoring and evaluation. Addressing these systemic bottlenecks is crucial for enhancing the apiculture value chain, utilizing honeybee services, improving productivity, ensuring quality standards, strengthening market access, and fostering sustainable growth in the beekeeping industry.

The Ministry of Agriculture has identified beekeeping as a priority area for growth and development in Ethiopia. The ministry has developed national livestock breeding policy, Apiculture Resources Development and Protection Proclamation, Apiculture Development and Protection Regulation and a four year national development program Yelemat Tirufat initiative aims at boosting the production and productivity of honey and other bee products by two fold from the current production. Therefore, preparing an apiculture development strategy is mandatory to ensure desired changes and achieve intended goals and targets set by the government to be implemented in short-, medium- and long-term periods from 2024-2032.

The document identifies strategic issues and priority interventions in strengthening the linkage among stakeholders, improving productivity of honeybee colonies, utilizing honeybees for pollination services and maintaining ecosystem, utilizing public lands for beekeeping, implementing pastoral and agro-pastoral beekeeping, bee forage development and distribution to play a vital role in ensuring a healthy and balanced diet for impacting honeybees overall health and productivity, considering apiculture as sole business, supplying prolific queen bees for maintaining strong and productive colonies, honeybee health care, enhancing the efficiency of extension service delivery, strengthening research and extension linkages for continuous improvement and innovation, ensuring the quality and safety of bee products, value addition of bee products to enhance market value and product diversity, establishing a legal framework, ensuring compliance and standardization, access to capital, implementing climate-smart practices, promoting gender inclusiveness and job creation, and strengthening monitoring and evaluation mechanisms is crucial for assessing the impact of interventions and guiding future strategies for improvement.

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Acronyms /abbreviations

ACDI-VOCA	Agricultural Cooperative Development International-Volunteers in Overseas Cooperative Assistance
AEZ	Agro-ecological Zone
AGP	Agriculture Growth Program
AGP-AMD	Agricultural Growth Program – Agribusiness and Market Development
ASPIRE	Apiculture Scale-up Program for Income and Rural Employment
ATA	Agricultural Transformation Agency
ATI	Agricultural Transformation Institute
ATVTEs	Agricultural Technical and Vocational Education Training
BFP	Biodiversity and Forestry Program
BOAM	Business Organizations and their Access to Markets
CAGR	Compound annual growth rate
CGIAR	Consortium of International Agricultural Research Centers
CIG	Common Interested Group
COVID	Coronavirus disease
CRS	Catholic Relief Service
CSA	Central Statistical Authority
DAs	Development Agents
EAA	Ethiopia Agriculture Authority
EAAP	Ethiopian Agribusiness Acceleration Platform
EAB	Ethiopian Apiculture Bored
EADA	Ethiopia Apiculture Development Association
ECC	Ethiopian Customs Commission
EEC	European Economies commission
ESI	Ethiopian Standard Institute
EU	European Union
FAO	Food and Agricultural Organization
EPID	Extension and Project Implementation Department
FTC	Farmer Training Center
GDP	Gross Domestic Product
GIC	Green Innovation Center
GTZ/GIZ	German Corporation for International Cooperation
GBN	Global Business Network
GMP	Good Manufacturing Practices
HACCP	Hazard Analysis and Critical Control Points
HBRC	Holeta Bee Research Center
IFAD	International Fund for Agricultural Development
ISO	International Organization for Standardization
IVR	Interactive Voice Record
Kg	Kilogram
KTBH	Kenya Top Bar Hive
LT	Long Term
MFI	Microfinance Institute

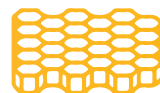
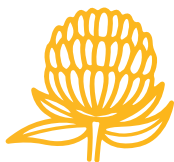
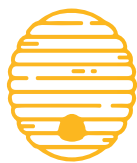
MOA	Ministry of Agriculture
MoYESH	More Young Entrepreneurs in Silk and Honey
MPP	Minimum Package Program
MSP	Multi-stakeholders plat form
MT	Medium term
NGO	Non-Governmental organization
PADEP	Participatory Agricultural Development and Empowerment Project
PTC	Pastoral Training Center
Q/ha	Quintal per Heater
RBRC	Regional Bureau of Research Center
RC	Research Center
SIDA	Swedish International Development Cooperation Agency
SIP	Systematic Intervention Program
SLM	Sustainable Land Management
SNV	Netherlands development organization
SIP	Systemic Intervention Program
ST	Short Term
SURED	Sustainable use of rehabilitated lands for economic development
SWOC	Strength, weakens, Opportunities, Challenges
TTBH	Tanzania Top Bar Hive
UAE	United Arab Emerita
UN	United Nation
UNDP	United Nations Development Program
USAID	United States Agency for International Development
USD	United States dollar
VC	Value Chain
WTO	Would Trade Organization

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01 | Introduction

Ethiopia has a high potential for beekeeping due to its diverse fauna, varied ecological and climatic conditions and varied biodiversity. The country hosts around 7 million managed honeybee colonies. Beekeeping plays a substantial role in generating and diversifying the income of Ethiopian smallholder farmers, pollination service and maintaining ecosystem. Additionally, beekeeping can provide employment opportunities to youth and women and contribute to poverty alleviation, food security and financial security, particularly in rural areas where job opportunities are limited. Backyard based and Traditional beekeeping practices are still widely used, with around 96% of hives being traditional types with no or poor management¹. However, there is a growing interest in transitional and frame hive beekeeping methods, which can lead to higher honey yields and better product quality².

Hive products have various functions, including industrial, medicinal, and nutritional value. However, Bees have multidimensional and invaluable natural missions such as agricultural crop pollination and ecosystem service. This process plays an indispensable role in improving agricultural crop productivity, environmental health and ecosystem maintenance. The global honeybee pollination value is significant, with honeybees playing a crucial role in pollinating crops and substantial contribution to the economy. Pollination by animals, mainly bees, enhances global crop output by an additional USD 235–577 billion annually³.

Out of the 53 major agricultural crops cultivated in Ethiopia, 33 of them (62.2%) are dependent on biological pollinators, and of the total biological pollinators, honeybees contribute 80% of pollination services. The economic value of pollination services in Ethiopia has been estimated at USD 814.6 million in the 2015/16 production season. However, an attention and recognition given to integrate honeybee pollination service as one

¹ Kristina Gratzner and Kibebew Wakjira. Challenges and perspectives for beekeeping in Ethiopia. A review

² 1

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Potts S.G., Imperatriz-Fonseca V., Ngo H.T., Aizen M.A., Biesmeijer J.C., Breeze T.D., Dicks L.V., Garibaldi L.A., Hill R., Settele J., et al. Safeguarding pollinators and their values to human well-being. *Nature*. 2016;540:220–229. doi: 10.1038/nature20588.

package for increased agricultural crop production and productivity in Ethiopia is almost none. It also needs integrating beekeeping with conserved public lands, irrigation farming of fruits, vegetables, legume crops, forage crops, commercial oil crops, commercial cotton farms and Agro-forestry systems. Honeybee services are needed for almost all agricultural activities and natural resource management activities in private and public lands. As the vast land of the country suitable for beekeeping is in pastoral and agro pastoral areas of the country, apiculture also needs to be expanded in the pastoral and agro-pastoral areas.

Ethiopia is one of the largest honey producers, ranking first place in Africa, and tenth worldwide⁴. The country is also the fourth largest producer of beeswax and the fourth beeswax exporter to the world.^{5,6} However, the country produces about 129,301 tons of honey (about 26% of its potential, 500,000 tons) and exports only a small portion of its total production, with less than 1% of honey and less than 3% of beeswax to the international market.⁷ The share is exceptionally low in the GDP of Ethiopia. This attributed to problems with backyard based and traditional type of production system, low production due to rapid land use change as more land is skewed to cereal farming, diminished pasture lands, unwise use of agro chemicals, poor integration of beekeeping with agricultural crops and conserved public lands, lack of seasonal colony management, poor marketing infrastructure, poor enacting of legal frameworks, low practice of commercial beekeeping, low quality infrastructure, limited research and development activities and high domestic market price. Additionally, nearly half of crude beeswax is lost during harvesting, and other honeybee products such as propolis, pollen, royal jelly, honeybee venom, services such as pollination, api-therapy and api-tourism are underutilized.

Consumers' interest in organically produced honey is continuously increasing worldwide. Finding reliable markers to ascertain the floral origin of honey is of prime importance in the honey industry. Defining the peculiarities and specialty of honey helps to add value to functional use and attract customers. High-quality and well-researched honey attracts a reasonable price in the world market, while lower-quality and uninvestigated honey does not bring a good price. The Chinese and Ethiopian honey in the world market cost about 2 and 4 USD/kg, respectively, whereas the well-defined and researched Australian honey costs 52.97 USD.^{8,9} If quality is maintained, researched, published, and promoted, the Ethiopian honey price could be twofold higher than the current price. With this estimation, if the current scenario remains constant, Ethiopia would be losing about eight million dollars per

⁴ Tekeba Negaand Yeshitila Eshetie, 2018; Review of Ethiopia's Global Position in Honey and Other Bee Products Production and Marketing: Analysis of Sectoral Opportunities and Limitations

⁵ Yeshitila Eshete and Tekeba, Nega2018: A Review on Crude Beeswax Mismanagement and Lose: Opportunities for Collection, Processing and Marketing in Ethiopia

⁶ Comvita, 2014: Insight Creative, Comvita Annual Report

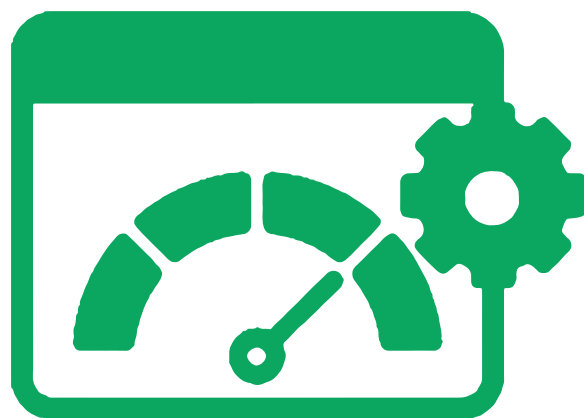
⁷ 8
⁸ 9
⁹ 10

year from 1,000 tons of honey exported . And as the level of export potential increases, the revenue will also increase. Even though it is not in mass export, it is promising that some specially marked honey of Ethiopian origin has a price of 12–20 USD per kg of honey, which is needed to replicate these experiences.

The Ministry of Agriculture has identified beekeeping as a priority area and acted for decades for job creation, growth and development in Ethiopia. The ministry has developed national livestock breeding policy, Apiculture Resources Development and Protection Proclamation (No.660/2009) and Apiculture Development and Protection Regulation (No. 372/2016), 10 and 5-Years Perspective plan, 10 in 10 national program and Yelemat Tirufat initiatives. Therefore, preparing an apiculture development strategy is mandatory to ensure desired changes and achieve intended goals and targets set by the government.

Accordingly, to exploit the sector's multidimensional potential for the socioeconomic development efforts of the country and realize the intended goals of the government in the apiculture subsector, more tailor made, intensive, strategic and consistent interventions in short and medium terms are highly required. Therefore, designing this development strategy is essential to guide the efforts in proper and effective way to meet the intended development objectives and use untapped potential for the development endeavors.

¹⁰ Abraham Belay, John W. Recha, Teshale Woldeamanuel & John F. Morton 2017: Smallholder farmers' adaptation to climate change and determinants of their adaptation decisions in the Central Rift Valley of Ethiopia



02 | Resource Base

2.1. Bee forage

Ethiopia has optimum environmental conditions for the existence of diversified natural resources, plants, and animals. The diversified agro climatic conditions of the country created suitable environmental conditions for the growth of 6000 to 7000 species of flowering plants most of them are bee plants¹¹. In the country, there is an abundance of bee plants ranging from herbaceous flora to large trees that grow on conserved public lands, wasteland, forest land, conserved institutional lands and cultivated fields. Though the abundance of for a was declining due to increased deforestation and skewed crop cultivation, now a days government is playing affirmative action to maintain afforestation through “Green Legacy” initiative. The abundance of bee flora and their continuous flowering is one of the major factors for the honey production potential of the country. The availability of floral resources to honey bees and the flowering period varies according to the climatic condition of the area which again affects the carrying capacity and honey flow period of the area. The carrying capacity is the number of bee colonies to be placed in a particular area which depends on the abundance, and nectar and pollen potential of the plants. The flowering calendar of bee plants is an important tool that informs the availability of certain bee forage for a particular area, to predict the time of honey flow period and their values to bees. Therefore, the timing of honeybee colony management operations corresponding to the flowering calendar of bee plants of the area with the carrying capacity of the area is critical in building up colony populations before the main nectar flow.

¹¹ Adi, A., Wakjira, K., Kelbessa, E., & Bezabeh, A. (2014). Honeybee forages of Ethiopia. Addis Ababa.

2.2. Honeybee races of Ethiopia

Ethiopia having a wide variety of bee flora, different climate and geographical condition, harbor important *Apis mellifera* sub species of honeybee. The subspecies of *Apis mellifera* honeybee species found in Ethiopia have been studied at different time by different researchers. However, the report of each researcher seems to be contradicting each other because of reporting different sub species. Therefore, further investigation has to be done to get a clear and well defined research data all over the country. Based on the findings by Amsalu Bezabeh et al. (2004), five sub-species of honey bees have been identified in Ethiopia: These are *A. mellifera jementica*, in the Northwest and Eastern part; *A. mellifera scutellata* from west, south and south west humid midlands; *A. mellifera bandassi*, in the central moist highlands; *A. mellifera monticolla* in the mountainous regions of Northern Ethiopia where there is cool and high altitude areas and *A. mellifera woy-gambella* in the south western semiarid to sub humid low lands of the country have been identified. Among the identified geographical sub-species of *Apis mellifera* species, *Apis mellifera Woyi-Gambella* distinctly differs from other African *Apis mellifera* sub-species and therefore endemic to Ethiopia.¹²

2.3. Honeybee colony population

The apiculture sector is one of the essential livestock sub-sectors, which contributes significant importance to the livelihoods of the people in Ethiopia.¹³ Ethiopian honeybee population is entirely composed of local honeybee races. Over ten million honeybee colonies in the country with approximately 6,986,100 of these kept in hives. Thus, 95.89%, 1.47%, and 2.63% of our colonies are managed in traditional, transitional, and frame hives, respectively.¹⁴ Though the country has a potential to produce far more metric tons of honey, current honey production is limited to 129, 301.8 tons/year.¹⁵

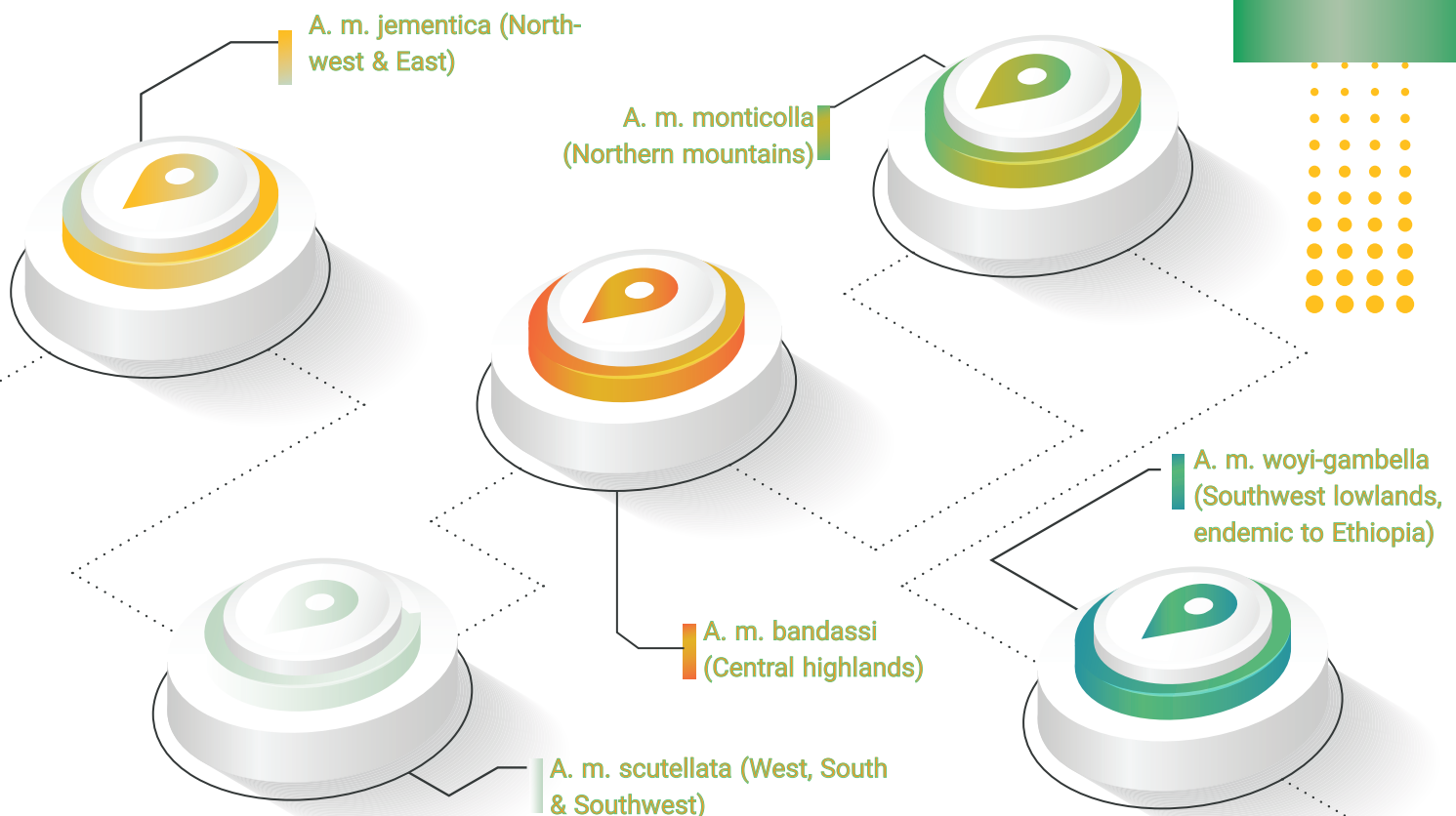
¹² Amsalu Bezabeh. 2008. *Apis mellifera Woyi-Gambella* (AB) honey bees endemic to Ethiopia (BfD J. 88)

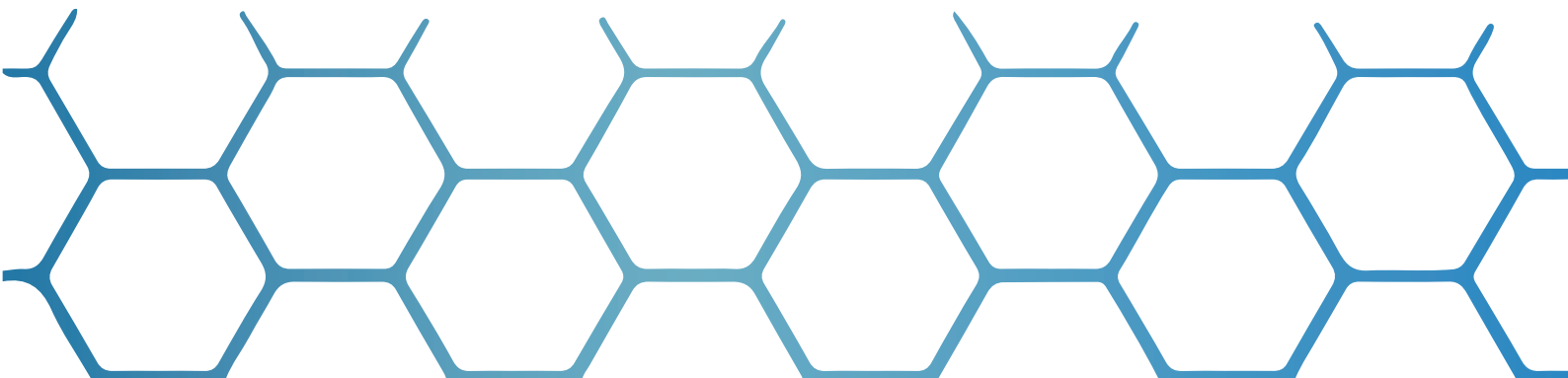
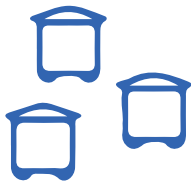
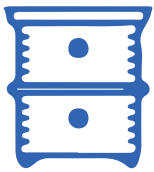
¹³ Mesfin Aklilu, Waleleng Warku, Wogayehu Tadele, Yimer Mulugeta, Hussene Usman, Amelework Alemu, Sintayehu Abdela, Alemnesh Hailmariam, Endalkachew Birhanu, 2008: Assessment of Job Satisfaction Level and Its Associated Factors among Health Workers in Addis Ababa Health Centers: A Cross-Sectional Study

¹⁴ CSA.2021. Ethiopian Statistics Service, Agricultural Sample Survey 2021/22 [2014.E.C.] Volume II: Report on Livestock & Livestock Characteristics. Addis Ababa, Ethiopia

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Ethiopia hosts five *Apis mellifera* subspecies:





03 | Importance of Apiculture

3.1. Pollination services

Pollination is a unique and indispensable service provided by pollinator animals, mainly bees, which plays a crucial role in plant reproduction, food production, environmental health, and biodiversity enhancement. Bees are particularly important as they account for about 65% of the pollination services provided by animals. Over 90% of flowering plants and 87% of farm crops depend fully or partially on animal pollinators. Additionally, about 75% of vegetables and fruit plants rely on pollination. This vital function of honeybees is not recognized and well understood in developing countries, including Ethiopia. Consequently, a number of farm crops benefit from the secret pollination services of bees and other animals, similar to trees in forests, shrubs, and herbs in fields. In contrast, bees in developed countries are often kept for rental pollination services rather than for their hive products such as honey, beeswax, pollen, propolis, and royal jelly.

Recognizing the role of bees in improving agricultural crop productivity and product quality is essential for enhancing farmers' benefits and ensuring food security. The role of bee pollination service is much higher than the individual role of genetically improved seed and other agronomic practices in terms of yield and quality. Field assessments have shown that adequate bee pollination services can increase productivity by up to 84%. Honeybees are responsible for 70-80% of insect pollination. Moreover, pollination services help enhance the planet's green coverage through improved plant reproduction, quality seed production and ensuring environmental health. Enhancing pollination is more effective than increased conventional agriculture inputs for improving crop yields. This is why scientists endorse the slogan "No Bees, No Life," and the UN declared World Bee Day (May 20) in 2016 to highlight the significant role of bees and the need to protect them from various hazards. Therefore, advocating for the importance of bee resources, developing the sector and ensuring effective use of our potential is crucial for social, economic and environmental health efforts.

The Table below shows actual production in 2022 in Ethiopia and production increment of different crops provided that there was effective bee pollination.

No	Type of crop	Unit in 1000s/ha	Pollination value in %	Pollination value in %	Yield If well pollinated
1	Faba Bean	1000s/ha	497.07	33.5% (40-100%)	663.59
2	Soybean white	1000s/ha	368.503	18%	434.83
3	Soybean red	1000s/ha	365.375	18%	431.14
4	Niger seed	1000s/ha	109.91	43-80%	175.68
5	Sun flower	1000s/ha	40.96	48%-100%	60.62
6	Flax seed	1000s/ha	60.62	22.5 to 38.5%	83.96
7	Sesame	1000s/ha	952.01	62%	1542.27
8	Oilseed rape/mustard	1000s/ha	12.32	43%	17.62
9	Soybean	1000s/ha	720.58	18%	850.28(40
	Cotton			19%	
	Alfalfa			112%	
	Onion			93%	
	Apple			44-50%	

3.2. Biodiversity Conservation

Apiculture and forest conservation and rehabilitation practices are deeply rooted in Ethiopian rural communities. Several studies have shown that forest management and beekeeping have a long history of interdependence, as beekeeping naturally aligns with agro-forestry for ecosystem functioning, biodiversity conservation and crop pollination. The clearing of potential bee forages has led to a decline in honeybee colonies and honey production, threatening the livelihoods of communities dependent on forest beekeeping. Recognizing the impact of deforestation on honey production, the government has designed various strategies to conserve the remaining forest resources. Green legacy initiative and Participatory Forest Management (PFM) is one such solution, addressing the problem of open access to forest resources and promoting sustainable forest management. PFM encourages farmers to engage in beekeeping activities in forests, allowing them to benefit from hive products as a reward, enhancing their household income and livelihoods and reducing their dependency on timber. This approach not only supports biodiversity conservation by maintaining forest ecosystems but also ensures the sustainable use of natural resources, contributing to the overall health and resilience of the environment.

3.3. Enhancing Food Security and Poverty alleviation

Food security is not only a matter of producing grains but also the financial power to pay for the purchase of grain. Thus, beekeepers can sale different bee products and buy sufficient food crops. Bee products provide for improved nutrition and consequently better health for families and others in local communities. Honey is a useful source of carbohydrate, and contains a rich diversity of minerals, vitamins, and bioactive compounds, providing rich nutrition to human diets¹⁶. Bee products such as honey, pollen, royal jelly and propolis have medicinal properties and are efficient and safe natural medicines that can be used to treat a variety of diseases and ailments. Therefore¹⁷, apiculture provides substantial benefits to address household food security and poverty alleviation. These characteristics make bee products attractive commodities for commercially oriented smallholder beekeepers.

3.4. Source of Income

Beekeeping in Ethiopia plays a crucial role in contributing to income generation for farmers. Beekeeping has contributed to income generation for farmers from honey sales alone generating between 0.1 to 0.3 billion USD in 2011. Nearly 95% of the honey produced is sold in markets, providing profits for collectors and traders. Beeswax is also collected and sold, benefiting producers, collectors, processors, and exporters. In areas with bee colony shortages, queen rearing and selling honeybee colonies has emerged as a new income source. The revenue from bee products enables beekeepers to purchase essentials like food grains and clothes, pay labor costs and taxes, and invest in other income-generating activities such as buying farm animals and building better houses. Beekeeping also fosters the development of related businesses, including the production of protective clothing, smokers, beehives, and value-added products like honey wines (Tej) and beeswax candles.

3.5. Foreign exchange earning

The Ethiopian Government has identified the beekeeping sector as offering growth potential targeting the export sector as a foreign exchange earning source. Bee product is the only livestock product exported to EU market from developing countries. Ethiopia began exporting honey to EU countries since 2008. Since then, it has exported honey and beeswax into different countries. Norway, Japan, United States, Saudi Arabia, Yemen, Germany, Sudan, UAE, Sweden, Australia, France, and United Kingdom are among the countries that have imported Ethiopian honey and beeswax¹⁸.

3.6. Job opportunity

Beekeeping creates job opportunities for landless youths and women for their livelihood, as it needs low capital investment. It is also true observed that millions of lead beekeepers produce substantial honey

¹⁶ FAO, 2009: Beekeeping and sustainable livelihoods.

¹⁷ SNV.2012. Scaling-up programme for income and rural employment programme document (2013- 2017) Phase I – 2013-2015 of Ethiopia

¹⁸ GBN Program 2000. Partnership Ready Ethiopia: Honey and Beeswax.

and bees wax, many people participate in honey collection, retailing and making and selling Tej in different parts of country to earn their livelihoods. It can also serve as job opportunities to craftsmen, local carpenters and organized youths in construction of beehives and making protective cloth.

Youth unemployment is a problem that is affecting most developing countries. Youth employment is presenting a particular pressing development challenge to Ethiopia since above 50 % of the population are young generation; the country faces growing youth landlessness in rural areas and insignificant rural job creation, potentially leading to an increase in migration to urban areas ^{19,20} leading to urban decay. Therefore, beekeeping has immense capability of employment generation and an interesting off farm practice for low-resource people that provide employment opportunities to rural youth in developing countries like Ethiopia. More than 2 million households in Ethiopia are involved in beekeeping. Besides this at different levels, a significant number of people are engaged in marketing of honeybee colony, honey and beeswax, selling local honey wines “Tej” and in producing and selling of bee hives and beekeeping equipment. This creates job and self-employment opportunities for a large number of citizens and young generation which are more likely to benefit from the industry at value chain stages. Due to critical unemployment problem in the country, different beekeeping development initiatives such as “Oromia Honey initiatives”, “YeLemat turufat” “MoYESH program”, “MAYA” and others have been trying to implement job creation through beekeeping to benefit youths and women's job seekers to generate income by government and CSOs although it is not adequate.

3.7. Social Value

Beekeeping and honey production are long-standing customs in Ethiopia that are ingrained in religious and cultural rituals. In the community, beekeeping is typically seen as sensible, respectable, and having good social values. Some Ethiopian societies view having many beehives and honeybee colonies as a source of prestige or status and use it as a key wealth ranking metric. Beekeeping fosters social cohesion and community bonding as people work together in beekeeping activities such as setting up hives, harvesting honey, and sharing knowledge and experiences related to beekeeping. In rural Ethiopia, honey holds great value as a product, utilized for various cultural, religious, and ceremonial activities and used in traditional medicine. It is given as a dowry in various cultures during engagement ceremonies. In Ethiopian Orthodox Christianity, honey is a symbol of purity and is used in various religious ceremonies. For many ethnic groups, using beeswax to make votive candles is a significant part of their cultural tradition. Furthermore, in many Ethiopian communities, honey is used as a symbol of conflict resolution in the process of reconciliation. That is the one who has accepted its guiltiness or considered guilty by the mediating team of elders, s/he come up with jar of honey in request of forgiveness from the other side.

¹⁹ World Bank, 200: The World Bank annual report (English).

²⁰ Paul Dorosh and Emily Schmidt, 2010: The rural-urban transformation in Ethiopia.

3.8. Api-Tourism

Api-tourism is a newly growing industry in the apiculture subsector with a notable economic importance. Bee lovers, experts, beekeepers, processors, and bee product importers are traveling to see and enjoy with bee races, beekeeping systems, apiaries, processing plants, and diversified products and to participate on sectorial events in different parts of the globe. Accordingly, it is easy to understand that api-tourism is an emerging important economic activity in the apiculture subsector which has to be considered in planning processes to exploit it properly.

Api-Tourism, also known as bee tourism, is a growing niche in the travel industry that combines the allure of exploring new places with the educational and experiential aspects of beekeeping. In Ethiopia, Api-Tourism has significant potential due to the country's rich biodiversity, traditional beekeeping practices, and the cultural importance of honey.

Ethiopia is one of the leading honey and beeswax producers in Africa, with a long history of traditional beekeeping that is deeply integrated into the rural lifestyle. The practice is not only an agricultural activity but also a cultural one, with honey being used in various ceremonies and traditional medicines. The concept of Api-Tourism can be leveraged in Ethiopia to provide tourists with a unique experience that includes:

- Visiting local beekeepers: Tourists can learn about traditional and modern beekeeping techniques, hive construction, and honey harvesting methods.
- Honey tasting: Sampling different types of honey directly from the hives, experiencing the diverse flavors influenced by Ethiopia's varied flora.
- Cultural immersion: Participating in local ceremonies and festivals where honey plays a central role, offering a deeper understanding of Ethiopian culture.
- Conservation education: Understanding the role of bees in biodiversity and the importance of sustainable practices to protect the environment.

Organizations like Bees for Development Ethiopia have been working in the Amhara region, providing training to young people in beekeeping as a means of poverty alleviation and biodiversity preservation. They have also organized beekeepers' safaris, offering tourists the chance to explore Ethiopia's renowned sites like the rock-hewn churches of Lalibela while engaging with local beekeepers.

Moreover, Api-Tourism can contribute to the local economy by creating new job opportunities and markets for bee products. It can also promote environmental conservation as tourists become advocates for sustainable practices.

In general, Api-Tourism holds great promise for Ethiopia, offering a sustainable way to boost tourism while supporting local communities and conservation efforts. With proper development and marketing, Ethiopia could become a premier destination for Api-Tourism enthusiasts from around the world.

For instance, when Ethiopia hosts Apiexpo Africa in 2012, 16 members of German Beekeepers Association, including the editorial board of the association, have been participated on the event. After close of the event, the group traveled to the then SNNPR, Tigray and Bahir Dar to see the field situations of our bees and beekeeping system. They have been glad with what they have seen, and reflected what they have seen in their annual association's magazine. Following such promotion, 22 and 18 members of the association came to Ethiopia in 2014 and 2017, respectively, to visit Ethiopian bees and beekeeping system. This travel has been halted only because of the global COVID-19 outbreak. The first travelers, who have been touched by our potential and situations of our beekeepers, have established a small NGO, called Imker fur Imker, to assist female beekeepers in Ethiopia.

3.9. Api-Therapy

Api-therapy is a holistic approach that uses various bee products, including honey, pollen, propolis, beeswax, royal jelly, and bee venom, for their therapeutic properties. In Ethiopia, where beekeeping is an integral part of agriculture and culture, Api-Therapy could have a significant impact on health and wellness practices.

Different bee products can be utilized in Api-Therapy in Ethiopia:

- Honey: Known for its wound-healing properties, honey can be used as an antiseptic and for treating gastrointestinal disorders, pharyngitis, and coughs.
- Pollen: With its antioxidant properties, pollen can help in treating allergies and is also used in cosmetic products.
- Propolis: This bee product has applications in gastrointestinal disorders and oncological treatments due to its antimicrobial and anti-inflammatory properties.
- Beeswax: Beeswax is effectively used as a coating for slow drug release and also in various skin care products.
- Royal Jelly: It is used for enhancing reproductive health and treating neurodegenerative disorders.
- Bee Venom: Venom therapy is known for its effectiveness in treating conditions like Parkinson's disease, neuralgia, and certain types of cancer.

In Ethiopia, the most widely used hive products are honey and beeswax, which serve many functions, ranging from local beverage production to different medicinal uses. The traditional knowledge of using these products is vast, and with modern scientific backing, Api-Therapy could be further developed and standardized for wider application. The integration of Api-Therapy into Ethiopia's health-care system could provide an alternative and complementary method of treatment, especially in rural areas where modern medical facilities are limited. It could also promote the conservation of bees, which are vital for biodiversity and the environment.

By harnessing the medicinal value of bee products, Ethiopia can pave the way for innovative health solutions that are natural, sustainable, and deeply rooted in the country's rich beekeeping heritage.

Most of the bee products have anti-viral, anti-bacterial and anti-protozoan characteristics. Most surprisingly, there are hints that our forefathers were aware of these features of bee products and they have been using honey to treat wounds and manage surgeries in the battle fields. We all know that our generation too has a well-founded tradition in using honey and honey mixed with various spices, to overcome the number of infectious and other diseases at home.

As a matter of this bare fact, current scientific research results are in favor of these peculiar characteristics of bee products and further researches and assessments are underway in different developed part of the world to replace the drugs that have been adapted by the disease causing agents due to drug-resistance development. As a matter of this fact, clinics called Api-clinics that are using mere bee products are just functioning in different parts of the world.

Api-clinics are modern clinics flourishing in Europe, Japan and other developed countries treating patients using bees (bee venom) and bee products only. Many reports are coming out that patients who couldn't get cured in usual modern clinics are coming to the api-clinics and got solutions to their health problems. Nowadays, the api-therapists in Europe and other parts of the world have started to treat animals, beside to people, such as horses, dogs and cats which haven't been get solutions for their health problems in the regular zoological clinics.

Therefore, api-therapy is another emerging industry that has considerable social, economic and health importance which needs to be considered during planning for apiculture subsector development interventions.

3.10. Apiculture prospect in Ethiopia

Given the availability of vast land surfaces suitable for beekeeping and a favorable climate, Ethiopia holds tremendous prospects for apiculture. The country's diverse agro-climatic conditions and rich biodiversity provide an ideal environment for honeybee colonies, which are crucial for pollination and biodiversity conservation. Ethiopia is already one of the top honey and beeswax producers globally, with over 10 million bee colonies. The potential for further growth is significant, as modern beekeeping techniques and better management practices could substantially increase honey production, which currently stands at around 129,301 tons annually. Additionally, the integration of beekeeping with forest conservation efforts can enhance environmental sustainability and support rural livelihoods. By leveraging these natural advantages, Ethiopia can boost its apiculture sector, contributing to food security, economic development, and environmental health.



04 | Apiculture production system

Beekeeping systems can be classified based on several criteria, such as technology types, management practices, scale of operation, environmental context, etc. In Ethiopia, there are three different types of beekeeping systems based on the hive types used and management practices.

4.1. Traditional Beekeeping system

Traditional beekeeping practice (Traditional forest and Traditional backyard) is the major and oldest type, exercised for more than thousands of years in Ethiopia. Most honeybee colonies (95.89%) in the country have been kept with this type of hive. This preference for the traditional system is primarily due to its lower cost, the limited availability of materials for frame hive setups, and its ease of management and little technical skill required in making the hives. Most beekeepers in this system install their hives in different forests away from farmland and only wait for the harvesting season, a practice that is exclusive to men. There is backyard traditional beekeeping practiced both by male and female of different age groups with relatively better protection and feed supplement under some cases. Although the traditional system is the most practiced beekeeping in the country, it is the least reported yield in terms of honey production per colony per year (about 8.5 kg). However, the annual honey and beeswax production from the system is still the leading and estimated to be 129,380 tons.

4.2. Transitional Beekeeping system

It is a beekeeping system that falls between the traditional and frame hive beekeeping and is regarded as low-cost hive technology because it can be made with locally available material although often made using timber. In Ethiopia, transitional beekeeping began in 1976 with top-bar hives like Kenyan and Tanzanian top-bar hives. Currently, the Ethio-ribrab/Chefaka and Kenyan top-bar hives are mostly used because they are less costly to manage in terms of skills and easy to construct as opposed to frame hives. The top-bar hives produce more honey and a comparable amount of beeswax as the

traditional one. The MOA report for 2022 showed 14,670 tons of honey (18.2 kg per hive/year) and 1,350 tons of beeswax and its contribution to honey and beeswax production is by far lower than the traditional. Its low contribution to the production may be attributed to its slow adoption rate in the beekeeping system.

4.3. Modern Beekeeping system

The fact that modern beekeeping is environmentally friendly (pollination service through integrating with crop and animal production systems, and natural resource conservations), easy to manage, easy to practice migratory beekeeping to increase the production and honeybee services, produces more honey with better quality and enable bee product diversification that diversifies the farmers' income. Also creates conducive working conditions for women and different age groups to participate in beekeeping. The introduction of modern beekeeping using a moveable frame hives to Ethiopia dates back to 1978 as part of the Ethiopian Rural Extension Program²¹. The rate of adoption has remained exceptionally low. The low adoption of this type of beekeeping is attributed to the high cost of production. Moreover, a shortage of trained extension staff, inadequate extension services, poor extension linkage among stakeholders, modern bee management skills and how to use the hive and its accessories are the other factors that contributed to its low adoption rate. Furthermore, the MoA's annual report for 2022 shows its less contribution to the country's honey and beeswax volume, which is 7,335 tons of honey with a productivity of 26 kg/hive and 370 tons of beeswax. Thus, low technology adoption, low productivity and traditional ways of beekeeping practice need to be addressed in the strategy to improve the beekeeping system on which production and productivity will be increased.

4.4. Honey production trend

The three-year honey production trend of frame hives (2018/19-2020/21) and the 2-year honey production trend of transitional hives (2019-2020) have both showed a growing trend of 26.4% and 71%, respectively. Furthermore, the three years (2019-2021) colony data in a transitional hive showed a 13.2% increase (see Table 1 and 2). Honeybee colonies hived in the frame hives was increased by 57.5% in 2019. Different factors may contribute for the increasing and decreasing trend of production and colony number. The observed increase in honey production trend from different beehives may potentially be attributed to the favourable environment created. The

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MoARD (Ministry of agriculture & rural development). 2007. Livestock Development Master Plan Study. Phase I Report - Data collection and analysis. Vol. N - Apiculture pp. V. Addis Ababa, Ethiopia

decreasing trend could be caused by long drought condition, unwise use of pesticides and habitat degradation.

Table 1. Trends of honey production by hive types and production years

Types of hives	Honey yield in tons by production years				
	2016/17	2017/18	2018/19	2019/20	2020/21
All type of bee-hives	47,706.1	66,221.8	58,588.2	146,995.5	129,301
Traditional hive	42,927.9	63798.1	54,367.9	142,111	124,791
Transitional hive	2037	497.3	951.7	1,444.7	920
Frame hive	2,741.2	1,926.4	3,268.5	3,439.8	3,589

Table 2. Honeybee population by hive types and production years

Types of hives	Honeybee population in millions by production years				
	2016/17	2017/18	2018/19	2019/20	2020/21
All type of beehives	5.92	6.52	7.075	6.79	6.98
Traditional hive	5.71	6.33	6.79	6.52	6.69
Transitional hive	0.071	0.069	0.08	0.09	0.10
Frame hive	0.14	0.127	0.2	0.181	0.184

Source: CSA reports from 2016 -2021

4.5. Production and productivity increment projection target initial points

The current Production and productivity of beekeeping is expected to full fill the following increment projection target assumptions. Such as: Status of honeybee colonies, Current Honey Production and productivity and Current number of beekeepers. Production and productivity increment projection target assumptions will be achieved by increasing the number of honeybee colonies in improved hives from current 2,363,594 to 11,990,540 at the end of this strategy implementation timeline. The productivity of honey from traditional, transitional and frame will reach to 10.5, 25 and 40 kg per hive. About 30% swarming of bee colonies from wild and traditional honeybee colonies will give chance to increase the number of existing colonies. About 20 % of honeybee colonies will be

transferred to transitional and frame hives with the ratio of 35 % and 65% respectively. And also, about 12% will be get bee colony in artificial queen rearing.

To achieve the targets, assumptions such as increasing number of commercial beekeeping, practicing migratory beekeeping, implementing beekeeping at pastoral and agro pastoral areas and promoting urban beekeeping system will be implemented. In addition, conserved public lands will be promoted and used for beekeeping practice. With this, the number of individual beekeepers will increase from 2 million to 2.5 million and the average colony holding will increase from 6 to 8. The honey production will increase from 272 thousand tons to 500 thousand tons to its potential. To achieve this, honey will be harvested from 90% of bee colonies per year.

Traditional beehive will be modified and improved, bee forage development and queen rearing will be promoted in government institutions and private sectors. With above considerations, honeybee colonies in traditional hives will remain constant 9,992,120 due to transferring of swarm trapped colonies to frame hives and other factors. Honeybee colonies in transitional hives will increase from 989,314 to 4,196,689 and honeybee colonies in frame hives will increase from 1,374,280 to 7,793,851.

Honey production from all types of hives is estimated as follows.

- From Traditional hive bee colonies: 94.426 with 90 % of hive produce honey per year
- Transitional =102.8 with 98 % of hive produce honey per year
- Frame hives =305.5 with 98 % of hive produce honey per year due to proper management
- Total honeybee colonies 2,198,2664 and honey production will be 500 thousand tones.

4.6. Diversification of bee products

In Ethiopia, the common products collected from honeybees are restricted to honey and beeswax. Most of the products with high market value, including propolis, royal jelly, bee venom, bee pollen, colony selling and bee pollination services, are still unexploited. These products have significant benefits, health impacts, and contribute economically to the country. In general, the diversification of bee products in Ethiopia offers a promising avenue for enhancing food security, supporting sustainable environments, and contributing to the economy. With the right support and development, it can significantly impact the livelihoods of many Ethiopians.

Moreover, stingless bee honey, Tazma Mar, has a higher market value for having greater demand for its claimed better medicinal value. But stingless beekeepers have no/little extension service to improve their production system and product volume, except some research activities started in the

Holeta bee research center. This is also an area that needs attention for the desired changes Tasma Mar production.

Therefore, our development interventions must consider diversification of bee products, to ensure better exploitation of our resource potential and global market opportunities, for greater benefits of the actors in the subsector and the country at large.

4.7. Honeybee products marketing

4.7.1. Global honeybee products marketing

The global honey market was valued at USD 9.01 billion in 2022 and is expected to grow at compound annual growth rate (CAGR) of 5.3% from 2023 to 2030, reaching USD 13.57 billion (Market Analysis Report, 2024). The market is driven by shifting consumer preferences towards a healthy, nutritious, and natural alternative for sugar and increasing consumers' traction towards healthy spreads. Conventional honey dominated the honey market with a share of more than 80.0% in 2022, while the organic segment is projected to register at faster CAGR of 5.9% from 2023 to 2030 due the growing trend of eating plant-based sweeteners for natural honey sweeteners. The hypermarkets and supermarkets segment captured the largest revenue share of over 40.0% in 2022, while the online distribution channel is projected to register the highest CAGR of 6.6% from 2023 to 2030. Europe held the

Table 3. Percentage of exported honey from the total production of top 12 countries

Country	Honey Production (tons)	Exported volume (tons)	Exported percentage
China	485,960	145,886	30.02
Ukraine	71,279	61,166.9	85.81
Argentina	79,468	60,406.1	76.01
Brazil	55,800	47,185.9	84.56
Germany	21,970	30,919.9	140.74
Spain	36,400	28,441.9	78.14
Mexico	62,079.66	25,076.1	40.39
New Zealand	22,000	12,117.8	55.08
Turkey	96,344.20	10,045.5	10.43
USA	57,364	8,617.4	15.02
Saudi Arabia	5,000	3,684.46	73.69
Ethiopia	129,301	39.90	0.03

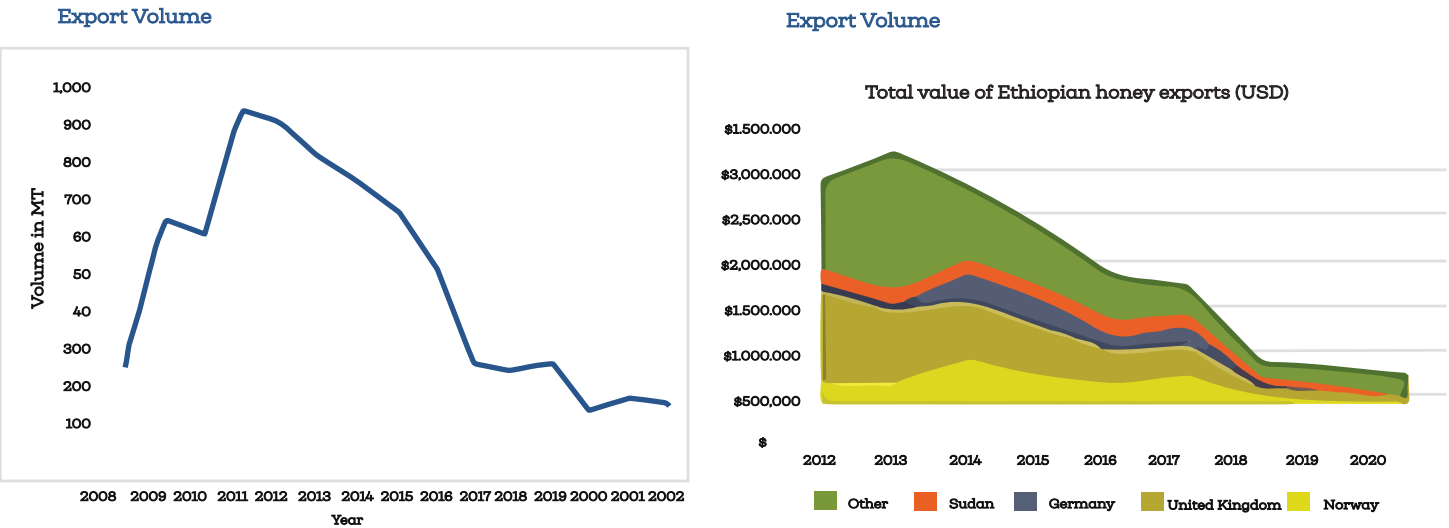
Source: WTO, 2021

largest revenue share of over 35.0% in 2022 and is expected to maintain it lead over the forecast period, while Asia pacific is expected to register the highest CAGR from 2023 to 2030 .

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The trend of foreign exchange earnings of Ethiopia shows (Figure 1) honey export volume shows sharp declining from 876.6 tons in 2013 to 47 tons in 2022 (ECC, 2022), thus the share of exported honey in the GDP is very low. The main reason for the decline in export could be illegal border marketing and smuggling, insufficient supply of quality product, high domestic price, limited credit service, lack of food graded honey storage material, adulteration of bee products, lack of traceability of products, lack of geographical indications for honey, lack of organic honey certification and lack of accredited honey laboratories. These constraints should be well addressed in the strategy in order to improve the export performance in the forthcoming plan without strict quality requirements.

Furthermore, it may be associated with increasing productivity and production and high supply of cheap honey to the world market from China and some other countries and no certified laboratory facilities. There is unhealthy competition between processors and exporters (this has significantly influenced the quality of export honey).



Source: Ethiopian Customs Commission report
Figure1. The trend of Ethiopian honey export volume and value.

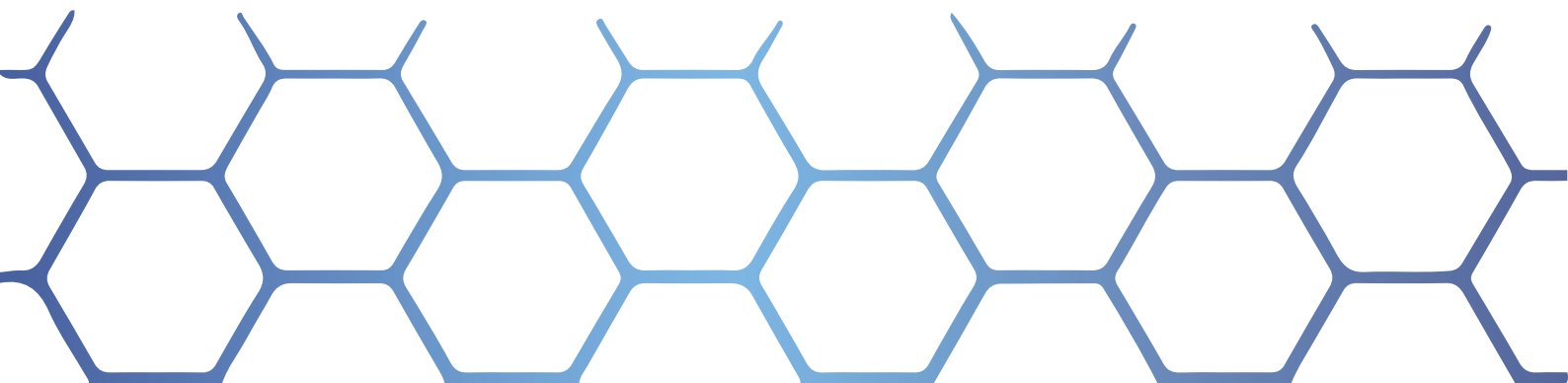
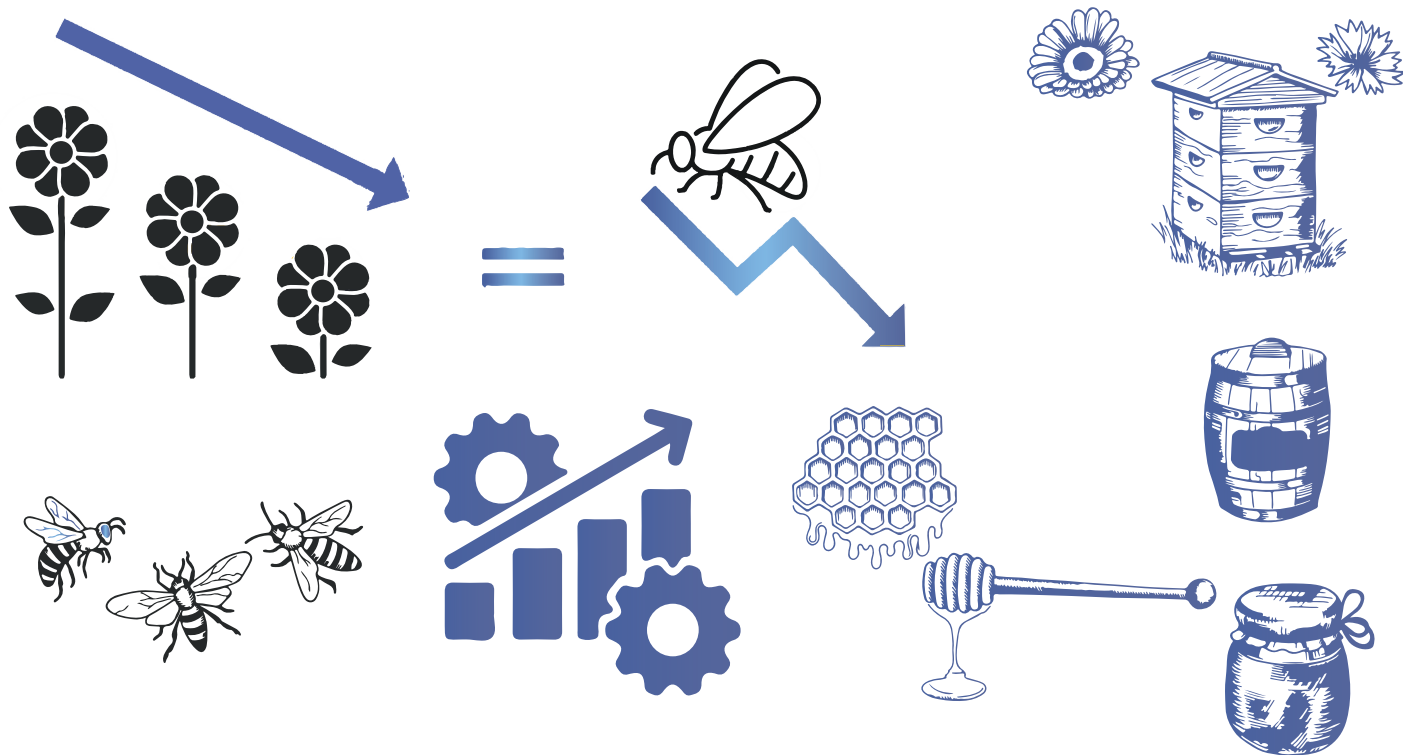
4.7.2. Domestic honeybee products marketing

It is believed that beekeepers consume 10% of the total honey production, with the remaining 90% being sold for income generation. Tej making is expected to use 50-80% of the entire honey production. The domestic honey market starts at the smallholder beekeepers level, who majorly sell crude honey to collectors in the nearest town/village markets, in which the producers are price takers. The collectors mainly pass the honey to the whole sellers in big cities and towns, though a significant amount of honey they collect also goes to local

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CIMDATA, 2024. Market Analysis Report.

tej brewers, processors and other consumers. The whole sellers are largely situated in cities and big towns and they distribute the honey they get from collectors to retailers, tej brewers, processors and consumers. In many cases the collectors lack proper collection, storage and transportation facilities and hence compromise the quality of the honey. They also have low business concept (market information gathering and analysis, branding, labeling, pricing, promoting, etc) to be competitive.

The whole domestic honey market lacks proper structure and legality. It is of lengthy chain of actors that widens gap for the access of producers to bigger and better paying markets, as well as opening a loop for quality reduction, including honey and beeswax adulteration. There is also no traceability system if honey adulteration or contamination occurred at some point. So, the beekeepers complain the business as not rewarding and even lacking the market for their products, while the consumers see the ever increasing price of honey as unfair. This unfair market leads to illegal marketing like smuggling, which in turn pushes the legal actors out of market.



05 | Situation Analysis

5.1. Past and current efforts in apiculture development

Since the inception of apiculture development by the former Ministry of Agriculture (MoA), a myriad of extension, development, and research initiatives have been implemented to transform the beekeeping landscape of the country. These endeavors aimed to introduce frame hives and associated accessories to potential beekeeping regions. The MoA facilitated the importation and dissemination of beekeeping equipment to foster the establishment of hive-producing workshops, provided essential training to experts and beekeepers, executed diverse beekeeping development projects, and oversee planning, monitoring, and evaluation activities.

Additionally, Agricultural Offices across former administrative regions and Woredas contributed to the transfer of apiculture extension services. Presently, regional states are actively engaged in extending upgraded beekeeping equipment to end-users, alongside delivering consistent technical assistance and training through experts and development agents. Concurrently, a handful of CSOs, aid organizations, and donor agencies have exerted efforts to bolster the sub-sector by providing training and beekeeping equipment.

However, despite comprehensive efforts from various quarters to enhance bee production and productivity, the outcomes have proved to be unsustainable and have yielded minimal change. This can be attributed to the recent lack of organization in providing extension services, which have not adequately addressed the needs of beekeepers on a large scale. Apiculture has received scant attention and effort from extension services as a pivotal income-generating activity and an integral component of the food production chain. Allocation of loans (credit facilities), provision of inputs, essential operational resources (such as development staff and budgets), and involvement of governmental organizations, civic society organizations, and donor-funded activities have been inadequate and lack a sustainable approach. Currently, the apiculture sub-sector is receiving considerable governmental focus due to its potential for creating employment opportunities for youth and women, generating foreign currency, maintaining ecosystem and offering pollination services to boost crop productivity. Beekeeping has been integrated into the government's development agenda and has garnered significant attention at both national and regional levels. However, there has been no noticeable improvement in the allocation of trained professionals to expand extension services for beekeepers.

In summary, endeavors to boost bee services, production and productivity have been impeded

by organizational deficiencies in extension services and insufficient support from various sectors, resulting in limited progress within the sub-sector.

5.2. Apiculture extension service

Beekeeping extension in the country began in 1978 as part of the broader activities of the Livestock Department within the Ministry of Agriculture, aligned with the objectives of the Minimum Package Program (MPP II) of the Extension and Project Implementation Department (EPID). Its primary aim was to enhance modern beekeeping practice by promoting the adoption of improved techniques and equipment. According to the report, seven beekeeping demonstration sites were established to trial-improved beehives and equipment, including honey extractors and casting molds. At each site, three sets of improved beehives and working equipment were deployed to showcase the benefits of modern beekeeping practices, including bee and bee product management. These demonstration sites were located in Yirba Muda (Guji), Gimbi (Welega), Jimma, Suba, and Holeta (Shewa). Additionally, the MPPII's improved beekeeping technologies were introduced to Finote Selam (Gojjam) and Bako (West Shewa). However, apart from Holeta, these programs were discontinued due to the lack of sustainable budget provision, manpower, and continuous follow-up at the other sites.

Despite limited extension staff numbers, considerable efforts were made to raise awareness and train farmers in adopting and implementing improved beekeeping technologies and techniques. Since the inception of beekeeping extension in 1978, approximately 976 extension staff and 53,000 farmers have undergone training in beekeeping techniques, production, and distribution of beekeeping equipment. Various types of beekeeping equipment were demonstrated and are currently in use, including different types of moveable frame beehives, honey extractors, casting molds, smokers, and protective clothing. Langstroth, Zander, Modified Zander, and PU (Polyurethane) moveable frame hives are commonly used in the country, with Zander being prevalent among beekeepers. Rural Technology Promotion Centers, private bee equipment producers, and recently emerged micro-enterprises are involved in the design and large-scale production of this hive type.

Despite the achievements made, the country's beekeeping potential thus far remains minimal and falls short of desired efforts. Several constraints contribute to the inefficient application of improved techniques and limited expansion of technology adoption. These include the instability of organizational structure, lack of continuity of approach, lack of functional link with research, low technical capacity limited knowledge and skills among farmers regarding moveable frame hive beekeeping, a

shortage of trained extension staff, inadequate training institutions and facilities, and inadequate extension services. Some of these constraints remain serious problems even at this time. The MoA delivers beekeeping extension through extension agents assigned at the Kebele level, with an average of 3 DAs assigned to each Kebele. Of these, one focuses on livestock, one on the crop, and one on natural resource management. Still, interviews showed that the burden of administrative tasks falls largely on the livestock DAs. The top-down delivery structure makes it difficult to separate administrative and bureaucratic tasks from the demand-driven technical work of providing quality extension services.

5.3. Apiculture Technology Packages

To bolster extension services and foster the growth of the honey and beeswax sub-sector, a comprehensive development extension package has been devised and disseminated nationally to the Regional Bureaus of Agricultural Development for implementation. The primary objectives of this package are manifold: it aims to enhance the quality and quantity of honey and beeswax production, it seeks to generate supplementary income for beekeeping communities, it endeavors to augment the supply of honey and beeswax to both domestic industries and foreign markets, thereby bolstering foreign exchange earnings and it aims to create employment opportunities through beekeeping and the trade of honey, beeswax, and value-added hive products.

This development package is structured around two key technological approaches: transitional and moveable frame hive beekeeping. Additionally, it emphasizes the improvement of traditional beehive management practices. Each technical package is tailored with diverse inputs, encompassing various elements such as hive types, honeybee colonies, bee health management, forage development for bees, beekeeping equipment, and hive infrastructure.

To provide a tangible framework, the overall cost required establishing an apiary comprising three colonies in both transitional and box hives has been meticulously calculated. Estimated costs for the transitional hive beekeeping package ranged from 312 to 770 birr, while for moveable frame hives, the range extends from 680 to 1135 birr. These cost estimates were coupled with projected outcomes, enabling stakeholders to gauge the potential impact of each package.

In the past, the organizational structure for apiculture development at the federal level was integrated with sericulture under the Honey and Silk Resource Development Directorate. This structure comprised 11 experts specializing in various aspects such as beekeeping, queen bee multiplication, forage, small technology expansion, extension communication, and stingless bee resource development.

However, with a new reform initiated in July 2022 by the Ministry of Agriculture, the structure underwent significant changes. The subsector was reorganized under the Livestock and Fishery Lead Executive as the Apiculture and Sericulture Resource Development Desk. In this revised structure, the number of

apiculture experts was reduced from 11 to 5, focusing on apiculture development, queen bee multiplication, and small technology expansion. Notably, the revised structure omitted expertise in bee forage and stingless bee development.

Regarding regional structures, most regional bureaus of agriculture lacked Bee Development Technicians at the Kebele level, resulting in insufficient technical support. Additionally, regional structures typically combined expertise in both bee and silk development into one professional task, often with just a single expert.

This past organizational setup fell short in providing an optimal environment for the progress of the apiculture subsector. To address these shortcomings and enhance functionality, the strategy should prioritize restructuring. This restructuring should aim to form cohesive teams at both national and regional levels, incorporating bee forage and stingless bee experts. It should also involve the appointment of bee technicians at the Kebele level and a sufficient number of dedicated Beekeeping Development Experts at the Woreda, Zonal, and Regional levels. This would replace the practice of combining responsibilities for bee and silk development into a single title, ensuring a more focused and effective approach to apiculture development.

Though we have numbers of wood workshops producing frame hives, they are not quality sensitive and standards are not in the minds of the producers. As our bees are measurement sensitive, such hives with poor qualities have been rejected by the bees and the bee colonies may evacuate in search of better nesting. Such actions of bees have discouraged the interest of beekeepers to use improved box hives. This is because; beside to the time issue and related opportunity costs, nowadays bee colonies are too expensive to replace the bee colonies lost. Other input producers too are not quality sensitive so that the inputs in our market, such as protective cloths, are not to the standards.

Moreover, the supply chain in apiculture system has its own problem. The improved input market is mainly in Addis Ababa. Apiculture potential areas are not well reached by the improved input traders/-suppliers in the subsector. Therefore, improved inputs are not available in local markets for individual beekeeper's purchase actions.

5.4. Finance/credit access

The other issue that hampered the expansion of using improved hives is the cost of the box hives. The price of box hives in Ethiopian market is not attractive for smallholder farmers that dominated the farming community in the country. Finance is another issue in the apiculture development efforts. Smallholder beekeepers (farmers) lack financial capacity to transform their beekeeping activity. As, almost, all our beekeepers are smallholder farmers or youth groups with very weak financial capacity, credit finance access for improved inputs purchase is so important that needs critical consideration. Therefore, apiculture subsector development efforts in Ethiopia should see ways for financial/credit access for the beekeepers, both smallholders and commercial, to purchase improved inputs and transform their

beekeeping activities.

5.5. Government attention

So far different beekeeping development projects have been practiced by government in the different regions of the country with varied magnitudes based on potentials and human resources. Beekeeping activities were also implemented by linking with natural resources rehabilitation and water shed management. Different stakeholders have also played crucial role in contributing for the sector based on government's priority. In recent years, the government has announced special development program, Yelemat tirufat: which is a four-year development program (2023-2026) that aims to boost productivity and production of dairy, eggs, chicken meat, and honey and other bee products. In this program, the government has planned to increase honey production by 149 thousand tons from the current 147 thousand tons to 296 thousand tons. Thereby, refined honey and beeswax supplied to the foreign market will be increased from 2.2 thousand tons of honey to 74 thousand tons and 0.2 thousand tons of beeswax to 5.5 thousand tons from the 2022 fiscal year .

Frame hives will be provided with a special focus on increasing and implementing improved methods. This will allow 125 beekeepers to have 500 to 1000 modern beehives every year, and at the end of the program, 475,000 modern beehives will be established. In addition, these growers set up a schedule of appropriate honeybee management throughout the year, planting 0.25 ha of multipurpose bee plants that will allow increasing the productivity and honey harvesting time. The productivity of beehive with full of bees will increase from 30 kg at the start to 40 kg per hive at the end of the program, and the harvesting time will be 3 times per year at the full capacity. Commercial beekeeping farms will allow for the production of 41.5 thousand tons more honey at the end of the program. The necessary resources for this success are including 475 thousand honeybee colonies, 500 certified beekeepers to provide the required honeybee colonies, and the seeds of the most desirable beekeeping plants.

Increasing the participation of private sector: - Honey and beeswax production spans a long value chain and the effective participation of the private sector (including organized youth and women and cooperatives) is critical. Apart from expanding honey and beeswax production, they make great contributions by providing product input and product marketing and value addition services. In the program, commercial beekeeping farms will produce 41.5 thousand tons of honey, multiply honeybee colonies, construct about 1.5 million modern beehives, and the production of beekeeping equipment. Government will facilitate the provision of loans to large-scale honey and beeswax producers for capacity building, purchase of beekeeping equipment and tools, honeybee colonies to enhance increased production of honey and beeswax, and construction of processing and packaging facility.

Product marketing and value addition: - Marketing and value addition activities are considered as the main implementation strategy to supply honey and beeswax with high quantity and quality to the market (especially for export). Therefore, honey and beeswax collection centers need to be established near to production areas, thereby, the centers will be able to provide honey processors with a product that

maintains the quality and the origin of the product by performing product tracking and quality inspection. Growers will develop a contract marketing system to supply their products to honey and beeswax processors. This facilitates the provision of pre-production financing and product marketing where processors provide production inputs to manufacturers organized in product assembly centers. In addition to this, in order to accelerate export trade, especially to meet the needs of the destination market, it will work to increase foreign exchange earnings by creating the capacity of infrastructure and human resources to carry out ongoing product quality assurance operations in the country. Facilitation of conditions for exporters of honey and wax (including facilitation of credit for export trade) will also be carried out.

5.6. Apiculture mostly limited to homestead areas; effort to integrate it with the farming system

The immense beekeepers in the country place their honeybee colonies in the homestead /backyard/. The traditional honeybee production system poses many challenges that reduce the production and productivity of the entire subsector as it is difficult to apply different seasonal management techniques. On the other hand there are diverse and seasonal agricultural activities that can sustain hundreds of thousand honeybee colonies. Therefore, apiculture subsector development efforts in Ethiopia should see ways for improving backyard beekeeping system and integrate beekeeping with crop farming via applying migratory beekeeping for both smallholders and commercial beekeepers to improve beekeeping production and productivity.

5.7. Public lands (Forests, parks and reserve areas) for apiculture

There are immense beekeepers whose beekeeping activity is limited to homestead beekeeping practices in Ethiopian. The options for integrating and utilizing public lands for apiculture is either limited or have no trend, strategy and legal frame work how to utilize it. Beekeeping on public land needs to be supported with appropriate policies, legal frame works and set standard beekeeping operating procedures on public lands (forests, parks, monasteries, institutional and reserves). There for, there should be appropriate information, legal frame work and enabling environment to utilize public lands and legal document to inform other public land managers about the benefits of beekeeping and processes for the administration and management of beekeeping on such lands.

5.8. Pollination and biodiversity conservation services of honeybees

Worldwide, about 90% of flowering plant species are fully or partly reliant on the transfer of pollen by insects and other animal and are essential part of ecosystems, providing food, habitats and other resources for a wide range of other species. Bees are the most important and specialized groups among the pollinating insects that provide important pollination services to crops around the globe. This is also the economic value of managed honeybees provided to ecosystem service. Proper Knowledge of the economic contribution of honeybees as pollinators to crops points out the potential for win-win situations, as it allows for raising both crop yields and promoting beekeeping. Now days, due to limited awareness about pollination service by beekeepers, there are limitations of using bees for the crop pollination, the ecosystem services for biodiversity conservation and integrations of beekeeping with such activities. Therefore, apiculture subsector development efforts in Ethiopia should see ways for integrating beekeeping with farmed crops pollination services for both smallholders and commercial farms to improve beekeeping and crop production and productivity.

5.9. Apiculture in the pastoral and agro-pastoral production systems

Beekeeping informative documents basing agricultural sample survey have not well informed about potentials and practices of beekeeping in the pastoral and agro-pastoral production systems. It has excluded wild colonies and beehives kept by pastoralist and agro pastoralist communities as well as forest dwellers. Whereas the contributions of beekeeping in drought prone areas (pastoral and agro-pastoral production systems) has contribution to the socioeconomic development and paramount importance in reducing vulnerability and improving livelihood of the farming communities in different regions of the country. Such regions have million hectares covered by forests which are rich in biodiversity owing to its diversified agro-ecological zones with altitude, rainfall, and temperature ranges. It contains woody, herbaceous vegetation, commercial irrigation farming and improved forage developments which are potential forage used by honeybees. Therefore; it needs implementing commercial beekeeping practices and expanding existing individual level beekeeping practices to utilize the pastoral and agro pastoral area potentials production and productivity of beekeeping.

5.10. Donor funded projects in apiculture

Unlike other livestock sectors, Ethiopian beekeeping sector has only a few records of donor engagement. However, some organizations/projects have been involved in the development of Ethiopian beekeeping sector since the beginning of apiculture development by Ministry of Agriculture (MoA), to change the beekeeping situation of the country through capacity building, introduction of frame beehives and its accessories, promoting market linkages, strengthening capacity of the private sector, establishing and strengthening supporting sector institutions, establishment of model apiary site, Supporting the sector through product promotion, financial credit service promotion, creating a new contract farming exten-

sion strategy and farmer business school and so on.

EEC, PADEP, FAO, UNDP, USAID, SIDA, IFAD, GTZ/GIZ, BOAM, ASPIRE, AGP, YESH, MoYESH, OXFAM GB, ASPIRE-SNV, SLM, World Vision, CRS, and ATA/EAAP are a few examples that have been assisting with apiculture development. However, most of these projects have the following drawback but not limited to:

- Less participatory project planning
- Poor integration with MoA
- Lack of clarity
- Focusing on capacity building and Market oriented intervention than other development activities.
- Sustainability issue

In addition to the NGOs, donor and aid organizations, Ethio-Libya Cooperation, Tea and Coffee plantation Enterprise, and State Farms have involved in commercial beekeeping development as parts of their enterprise. Apart from providing cash for their business, apiaries established in their site served as a demonstration to the surrounding beekeeping communities. In fact, all of them failed to continue with their commercial beekeeping program due to internal management problems within the companies.

Inputs	Technical	Institutional	Policy environment Framework conditions
Strength	• Existence of Skilled personnel in research and higher education institutions • Increased engagement of local beekeeping input suppliers • Increased women's and youth's engagement in Beekeeping activities	• Existence of higher education institutions (HIs) engaged in producing Apiculture professionals • Existence of Apiculture development supportive Civic Society Organizations • Existence of private institutions engaged in producing Apiculture inputs • Establishment of Apiculture Museum	• Existence of Apiculture development supportive government policies • Existence of Apiculture development proclamation
weakness	• Limited awareness of stakeholders about Apiculture government policies • Limited technical capacities of women's and youth's engaged in Beekeeping • No awareness for pollination services of bees	• Fragmented research trends at different regions, duplications of efforts and limited integrations among them • Absence of full data at national level • Less attention from stakeholders to utilize the existing opportunity • Limited coordination and functional capacity • Weak linkage among public, private and CSOs working in apiculture sub-sector • Lack of national bee research institution	• Less attention is given to familiarization and implementations • Limited policy and organizational structure • Weak extension service delivery • Inadequate monitoring and evaluation • Inadequate cross cutting issues

5.11. Technical, Institutional and Policy environment Strength, Weakness, Opportunity, and Challenge analysis

Table 5. SOWC Analysis

There are also resource potential strengths, weakness, opportunities and challenges. Having accumulated indigenous beekeepers knowledge, presence of good pilot improved beekeeping experiences and apiculture knowledge institutions are some of strengths of resource potentials. Whereas the weakness of the resource potential include almost all colonies are either in traditional hives or in wild, absence of commercial farming, poor integration of beekeeping with pollination services, miss exploitation of pastoral lands and conserved lands for beekeeping, and others. The resource potential opportunities include: over 10 million honeybee colonies, varied agro ecologies, honeybee ecotypes and human resources supportive policy environment and support from different civic society organizations. The challenges of resource potential include unwise use of agrochemicals, poor implementation of beekeeping legal frame works and weak extension service delivery .

5.12. Stakeholder analysis

Ethiopia's potential for apiculture production and its ability to reduce poverty have been acknowledged and included in the government's working agenda in recent years. The Ministry of Agriculture is the owner of the strategic plan and will play the primary role in guiding, monitoring and evaluating implementation of the strategy. Sector ministries and other institutions at national and regional level will help implement the strategy by providing guidance on specific sector policy concerns. Private and civil society organizations sector actors will contribute to helping to implement the strategy by increasing the capacity of actors along the value chain, supporting development projects and investing in activities to improve at specific points along the value chain. On the other hand, communities will play active participation role in implementing the strategy across the value chain. Roles and responsibilities of key stakeholders are presented in Table 6.

Roles and responsibilities of stakeholders

Table 6. Roles and responsibilities of stakeholders

SN	Stakeholder	Stakeholder roles and responsibilities	Stakeholder expectations/Interests	Institutional response
1	Local communities (beekeepers)	Adopt proven information and technologies and identify technology gaps	Appropriate and affordable technologies and information	Developing appropriate technology packages through a participatory developmental approach
		Increase production and productivity of Apiculture	Skill and knowledge	Facilitating the supply of input
		Provide beekeeper-to-beekeeper advice		
		Produce and process bee products for both local and export markets	Technical support	Provide training
		Maintain high quality standards for the bee products in order to be competitive in local and international markets	Technical support on product harvesting handling	Provide technical training
		Plant bee forage plants	Seed and seedling sources and technical support	Provide technical support
		Establish and manage Api-Agro-Forestry systems	Technical support of agroforestry	Provide training
		Production of subsistence and commercial bee products and value added products	Credit and input supply services	Render technical support
		Pay back credit on time	Market information	Provide market information on time Arrange credit facilities

2	Ministry of Agriculture	Formulate appropriate policies, regulations, directives and strategies		Decision making
		Sectoral-planning, budgeting, monitoring and evaluation		
		Promote Public-Private Partnership in beekeeping sector		
		Develop packages and scale up/out information and technologies		
		Facilitate national capacity building in beekeeping education, research, marketing and extension services		
		Encourage effective participation of stakeholders in beekeeping and beekeeping industries development		
		Financial support to provide appropriate technology for the farmers at large		
	Agricultural Transformation Institute	Coordination and collaboration in extension, training, research and marketing		Operate policies, regulations, directives and strategies
		Collection and dissemination of information		Identify the need of appropriate technology packages, training, and advisory services and develop and implement them accordingly.
		Provide funding and resources		Maintain strong linkage and partnerships among stakeholders
				Involve in formulation and implementation of technology scaling up and policy frameworks
				Funding and creating conducive working environments
				Close monitoring and evaluation
				Establishing technology multiplication and training center.

4	Minister of trade & regional Integration	Formulate and implement trade policies that facilitate the export and import	Initiating and formulating policies that aligns with national agricultural goals and trade regulations.	Develop trade Registration and Licensing Guideline
		Identify and promote new export markets	Provide export promotion, market intelligence, and trade facilitation	Increasing capacity in terms of value addition
		Identifying target markets, providing market information, and facilitating participation in trade fairs and exhibitions	Developing strategies that promote the competitiveness of domestic and international markets.	Identify new market opportunities and inform the business strategies of producers and exporters.
5	Federal and Regional Agricultural Research Institutes	Generate and adopt appropriate technologies and information	Develop appropriate and affordable technologies and information	Generate demand-driven technologies and information
		Demonstration of proven technologies	Coordinating and organize farmers to facilitate take up of technologies Scale up proven technologies	Effective utilization of resource
				Technical support for higher learning and other institutions
		Providing support in bee resources conservation and management		Co-ordinate support regional and federal research centers engaged in apicultural research
		Developing quality standards for different bee products		
6	Federal Government		Implementing policy regulations and directives as designed	Generating sound policy issues
				Adopt regulations and develop directives
		Developing institutional capacity to support beekeeping activities		Monitor the implementation of policies, regulations and directives
		Financing of investment in beekeeping sector		Providing feedbacks on existing policy gaps

7	Private sector/ Investor	Participate in manufacturing, importing and distributing beekeeping inputs	Improved beekeeping technologies and information pertinent to their interest	Provide technologies and information
		Investing in beekeeping sector	Quality standards and safety beekeeping inputs/outputs	Availing advisory and technical services
		Collecting, processing, packing and exporting bee products	Advisory and technical supports	Testing the quality and the standards of beekeeping inputs/outputs
		Organize and support out growers		Linking with other private sectors and stakeholders
		Conduct market research of bee products and services & involve in production of value-added bee products		Assist in organizing out growers
8	Federal and Regional Cooperative Promotion Agencies	Organize, coordinate, support and capacitate beekeepers	Technical support and trainings	Avail existing improved technologies on production, processing and handling
		Establish honey and other bee product collection centers	Proven technologies on production, processing and handling	Rendering training on pre and post -harvest handling, organic products, value addition and marketing
		Maintain the quality and maximize the profit of bee products and inputs	Advisory services on production and handling, value addition and marketing	Providing technical and advisory services
		Involve in bee product value addition and fair trade		
		Facilitate and avail credit and saving facilities and market		
		Facilitate marketing of beekeeping products		
9	Ethiopian Apiculture Development Association	Enhance forums for experience, information and technology exchange	Proven technologies, information and technical support	Support the forum in finance
		Fund raising and financial support	Advisory services	Providing technical and advisory services
		Facilitate honey related policy developments	Membership	Contributing for the strengthening of professional associations
		Promote Ethiopian honey and establish promising market linkages between different actors in the honey value chain	Financial support from members and other organizations	
10	Regional Women and Children Affairs Bureau	Encourage and increase the participation of females in beekeeping activities and honey value chain development, in general	The collaboration of other partners, like the Regional L&FRDB and CPA	

11	Regional Industry and Urban Development Bureau	Encourage private companies in the engagement of honey and other hive products	Voluntariness of the private companies to be engaged in honey processing and marketing	
12	CSOs	Funding	Effective utilization of fund	Facilitate their works
		Working in collaboration with the Bureau on development gaps	Project implementation and sustainability	Provide Governmental development directives
		Submitting plan of work and achievement report	Proven technology package	Strengthening linkage with different NGOs
		Monitoring and evaluation	Technical support	Link NGOS to Other NGOs
		Promoting research and development		
		Create linkage among stakeholders		
13	Universities/AT-VTEs	Technical capacity building on beekeeping technology package		
		Provide demand driven joint research, training and information exchange	Strong linkage and collaboration	Providing research areas, exposure visits and scientific forums
		Working in collaboration with the Bureau on development gaps		
		Develop training materials		
14	Finance & Economic Development Bureau	Produce require professionals		
		Allocate adequate finance and provide economic policies	Proper and effective utilization of budget	Use budget as per regulation and for set plans
		Coordinate and control budget	Attain set developmental goals	solicit funds
		Link to national and international funding agencies		Work effectively to meet set developmental and research targets
15	Regional Bureau of Agriculture	Provide tax incentives for Apiculture development and research		
		Implement policies on natural resources and proper use of agrochemicals	Sustainable natural resource conservation	Involve in policy development and implementation of natural resources conservation and proper use of agrochemicals
		ensure safe application of agrochemicals	Technology package for utilization of honeybees for pollination of crops	Develop and implement honeybee pollination technology packages
		Avail/allocate enclosure areas for apiculture development and research activities		Organize youths and land less farmers to carry out apiculture development in protected water shades

16	Zonal and woreda administrations	Coordinate stakeholders	Strong coordination with stakeholders	Establish team spirit
		Mobilize resources, human resources and communities	Joint work towards the goal	Develop joint action plans
		Under take monitoring and Evaluation	Attain the intended goals on time	Develop implementation strategy
		Provision of security	Creating job opportunity	Record tangible outputs
		Create conducive environment	Increased income of the beekeepers	
		Allocate adequate budget		
		Provide land for beekeepers		
17	Ethiopia Agriculture authority	Provide policy directives on veterinary and honeybee health related issues	Adopt and enforce the quality standard of inputs and chemicals	Adopt, develop, implement enforcing tools pertinent to the region
		Regulates quality and standards of inputs, vet drugs/chemicals	Ensure honeybee disease and pests are contained	Regulate and monitor any potential factors that are associated with honeybee diseases distribution
18	Conformity Assessment Authority	Monitor and regulate standards	Maintained set standards	Regulate and monitor set standards
19	Standard and Quality Assurance Authority	Set standard	Raise demand driven issues	Raise issue to be standardized
			Support development of standards	Implement standard
20	Environment & Land Administration Bureau	Provide policy frame, directives on the environment, inventory & protection of natural resources	implementation of the policies and directives	adopt, implement policies and directives
		Environmental management	Sustainable environmental protection	Protect and manage natural resources
21	Trade and Market Development Bureau	Licensing the business	Implementation of the policies and directives	Assists the customers in getting license
		Provide policies and directives	Brief report about the business	Support the implementation of policies and directive
		Provide technical supports		
		Collaboration work with stakeholders in quality control		
22	Industry and Urban Development Bureau	Provide technical advisory which supports the processors	Inputs and value addition of honeybee products	Encourage and assists the processors to be engaged in processing
		provide entrepreneurial skills	Branded and exportable honeybee products	provide technical and advisory services
		Provide policy and directives on industry		create a conducive environment for the business
		Provide tax incentives		

23	MFI (Microfinance Institute)	Provide affordable credit for apiculture	Increases applications	Mobilize the smallholder beekeepers to apply for a loan
		Develop tailor-made product specific for apiculture product producers	Pay back loan on time	Mobilize beekeepers to practice saving
				Advice and encourage beekeepers to pay back their loans on time
				Provide training on book-keeping
24	Oromia Investment Commission	Provide policy and directives and information on investment	Increased application for investment in the area of apiculture subsector	Encourage smallholders to invest in the apiculture subsector
		Provide investment incentives	Efficient resource Utilization	Provide technical and advisory services to candidate investors
		Create good environment for investment		Create a conducive environment for investment
25	The Ethiopian Institute of Biodiversity	Establishing and managing of apiaries and bee reserves		

ETHIOPIA'S APICULTURE PRODUCTION SYSTEM

TRADITIONAL (95.89% OF HIVES)

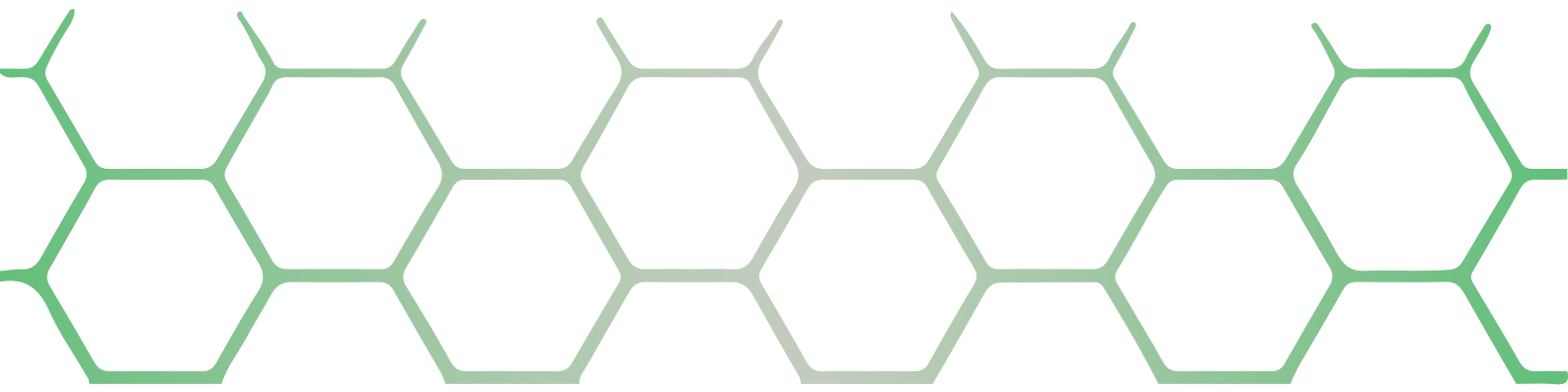
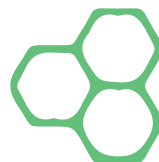
- OLDEST SYSTEM, LOW-COST, MINIMAL MANAGEMENT.
- YIELD: ~8.5 KG/HIVE/YEAR.
- ANNUAL PRODUCTION: ~129,380 TONS HONEY (MAJORITY OF ETHIOPIA'S OUTPUT).

TRANSITIONAL (1.47% OF HIVES)

- USES TOP-BAR HIVES (E.G., KENYAN/ETHIO-RIBRAB).
- YIELD: ~18.2 KG/HIVE/YEAR.
- ANNUAL PRODUCTION: 14,670 TONS HONEY, 1,350 TONS BEESWAX.

MODERN (2.63% OF HIVES – FRAME HIVES)

- HIGHER YIELD (26 KG/HIVE/YEAR), BETTER QUALITY.
- CHALLENGES: HIGH COST, LOW ADOPTION.



06 | Benchmarking

6.1. Rationale for Benchmarking

Ethiopia has the biggest honeybee population in Africa with annual production estimated at 500,000 tons honey and 50,000 tons beeswax. With this potential Ethiopia is the world's fourth largest bees wax producer and the tenth largest honey producer . The total honey production was 129,301 tons , accounting for approximately 26% of the country's honey production potential.

According to MOA's annual report for 2022, overall honey yield is in the range of 8.5 kg to 26.2 kg per hive per annum, which is much lower than the world average of 45 kg . This indicates underutilization of resources in comparison to the country's potential. Traditional beekeeping practice, poor management, genetically uncharacterized honeybee races and low adoption of improved beekeeping technologies are the primary causes of such low honey production and productivity.

The apiculture sector in Ethiopia has the potential to deliver multiple hive products, including, honey, beeswax, propolis, pollen, bee venom and royal jelly. However, the potential for other products, compare to other countries, such as propolis, royal jelly, pollen and bees' venom remains untapped .

Pollination and ecosystem service are the other most important socio-economic benefits of the apiculture subsector. Insect pollination is responsible for one-third of the world's entire human food supply. The honeybee is responsible for pollinating 62.2% of Ethiopia's crops and contributing a lot to the ecosystem service, even though it is not quantified for the country. In this respect, primarily, the honeybee has made a significant economic contribution to improving agricultural crop production quantity and quality, which is critical for ecological maintenance and improvement, human food, and nutrition security. However, in Ethiopia, honeybees are being affected by extensive agrochemical application and environmental degradation. Protecting pollinators and their habitats is intended to be incorporated into this national strategy.

²⁴ FAO, 2020: World Food and Agriculture - Statistical Yearbook 2020.

²⁵ ¹⁴

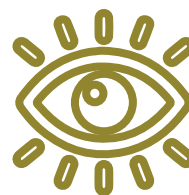
²⁶ ²⁴

²⁷ ⁵

²⁸ Zekiros, 2018: Status of Beekeeping in Ethiopia- A Review.

6.2. Global Production Trend of Honey and Beeswax

Despite the fact that apiculture is practiced in all countries throughout the world, production and productivity levels varied in quantity and quality. Honey and beeswax are the most important products in the world of apiculture. China has led the world in honey production and exports during the last ten years, followed by Turkey and Iran. India, Ethiopia, Tanzania, Mexico, Kenya, and Angola are also quit important honey producers in the developing world. For this strategic plan, honey and beeswax production and export experiences of Tanzania have been assessed. The last ten-year production track records of Tanzania show that the country's honey and beeswax production has been increasing in volume and quality, reaching 31,405 tons of honey and 1,894 tons of beeswax. The country's export share is also increasing by 2%, with 679 tons of honey and 348 tons of beeswax exported for a total value of 21.86 million USD to the national economy during the 2020 production year. The progress in the honey and production and export markets is achieved by high government commitment through developing and implementing an apiculture strategy with well craft production, marketing, extension and research guidelines. Taking this performance as a benchmark, the national apiculture development strategy attempts to address the major issues that make the country competent in the global market, increasing production volume and diversification of honeybee products, maximizing productivity, and transforming the dominant traditional production system to a modern beekeeping system through technology adoption.



07 | Strategic Models Apiculture sector dev't strategy

7.1. Scope of the strategy

The Ethiopian beekeeping strategy focuses on several core strategic areas, including capacity building, market development, research and innovation, and environmental sustainability. Geographically, the strategy targets all regions of Ethiopia, where beekeeping has significant potential for growth. The strategy is designed to be implemented over a ten-year period, from 2023 to 2032, allowing for the gradual scaling up of interventions and the achievement of long-term goals. This comprehensive approach aims to create a resilient and thriving apiculture sector that contributes to the economic development and environmental health of Ethiopia.

Additionally, the strategy incorporates the “10 in 10” national program (Yelmat Turufat), which emphasizes the role of hive manufacturers, the existence of associations, processors, and the inclusion of gender considerations for economic development. By integrating these elements, the strategy seeks to enhance the overall impact of beekeeping on the country's economy, food security and environment.

Furthermore, the strategy highlights the critical role of pollination and ecosystem services, product quality and diversification provided by bees, which are essential for maintaining biodiversity and increasing agricultural productivity and income. It also underscores the broad impact on job creation, particularly in rural areas, by fostering new opportunities in beekeeping and related industries.

7.2. Vision

Ethiopia envisions an innovative, transformed, globally competitive, and environmentally sustainable apiculture subsector, by 2032 that can meaningfully contribute to the country's livelihood and economic improvement efforts.

7.3. Mission

Foster sustainable and innovative apiculture technologies that enhance honeybee production, productivity, and product diversity, while supporting environmental conservation, boosting rural livelihoods, contributing to national food and nutrient security and economic growth, and introducing pollination services. This approach ensures productivity, product diversification, quality export promotion, environmental sustainability, honeybee race conservation, performance enhancement, and the development of a honeybee product value chain.

7.4. Core values

The apiculture development strategy has established a set of guiding principles and criteria for selecting projects and major activities for the implementation of the strategy in order to accomplish its mission and fulfill its obligations. As a result, the strategy will be guided by the following fundamental principles:

- **Innovation:** Encourage the adoption of new technologies and innovative practices to improve productivity and efficiency in beekeeping. Support research and development initiatives that drive advancements in the sector.
- **Collaboration:** Foster partnerships and cooperation among beekeepers, researchers, government agencies, and other stakeholders. Promote knowledge sharing and collective problem-solving to address common challenges and achieve shared goals.
- **Quality and Excellence:** Strive for the highest standards in bee product production. Implement best practices and quality control measures to ensure that products meet both local and international standards.
- **Inclusivity:** Ensure that all stakeholders, including marginalized and underrepresented groups, have equal opportunities to participate in and benefit from the apiculture sector. This involves creating accessible training programs and support systems that cater to diverse needs and backgrounds.
- **Participation and Capacity Development:** Foster active involvement of beekeepers and related communities in decision-making processes and capacity-building initiatives. Provide continuous education and training to enhance skills, knowledge, and competencies, empowering individuals to contribute effectively to the sector's growth.
- **Good Governance:** Promote transparency, accountability, and ethical practices within the apiculture sector. Establish clear policies and regulations that guide operations, ensuring fair practices and the responsible management of resources.
- **Stewardship:** Commit to environmentally sustainable practices that protect and enhance biodiversity. Implement strategies that ensure the long-term health of bee populations and ecosystems, balancing economic growth with ecological preservation.
- **Value for Money:** Ensures that every investment in beekeeping technologies and practices yields maximum benefits. This principle emphasizes cost-effectiveness, efficiency, and sustainability, ensuring that resources are utilized wisely to enhance honey production, support environmental conservation, and boost rural livelihoods. By prioritizing value for money, the strategy aims to achieve significant economic and social returns.

7.5. Rationale of apiculture strategy development

To transform the apiculture sector and realize its socioeconomic and environmental benefits, several major bottlenecks need to be addressed:

- **Awareness and Attitude:** There is limited awareness of the importance of bees and beekeeping, leading to a low attitude towards systematic interventions, engagement, and investment.
- **Knowledge and Skills:** A lack of knowledge and skills in improved (scientific) beekeeping, coupled with a shortage of well-trained manpower in beekeeping specializations, hampers sector growth.

- Institutional and Capacity Development: Limited institutional development for capacity building and demonstration restricts progress. Dalliance of implementing beekeeping Directives to practice beekeeping in Public and institutional lands. Absence of legal frameworks to practice honeybee Polli-nation services and biodiversity conservation.
- Access to Resources: Smallholder farmers face challenges in accessing credit finance and improved, quality beekeeping inputs and technologies. Apiculture practice is Homestead area limited. Low attention of Apiculture in the pastoral and agro-pastoral production systems
- Productivity and Diversification: Low productivity and limited diversification of honeybee products are significant issues.
- Management and Infrastructure: Poor pre- and post-harvest management of honeybee products, inadequate processing and quality infrastructure, and poor marketing infrastructure hinder sector efficiency.
- Technology Adoption: There is a low adoption rate of improved technologies for honey production.
- Extension and Management Systems: The apiculture-oriented extension system is weak, and there is an absence of a comprehensive bee management plan.
- Research and Linkages: Poor research activities and weak research-extension linkages further impede sector development.
- Small scale and fragmented system
- Multi sector engagement: collaboration among sectors
- Use of agrochemicals
- Addressing these bottlenecks is crucial for the transformation and sustainable development of Ethio-pia's apiculture sector.

7.6. Goal

- By 2032, Ethiopia as a leading producer of high-quality bee products on the global market, while ensuring the productivity, health and resilience of bee populations and ecosystems. This helps to establish a robust, innovative, and sustainable apiculture sector in Ethiopia that significantly enhances the livelihoods of beekeepers, food and nutrition security, contributes to the national econo-my, and supports environmental conservation.

7.7. Strategic issues, objectives and activities in apiculture development

- The government and nongovernmental organizations put a lot of effort into developing the apiculture subsector, but the effort did not increase beekeeper productivity or production. The primary causes of the sub-sectors low production and productivity include inadequate delivery of extension services, a lack of cluster connectivity between farmers, researchers, and extension, and a shortage of competent labor.
- The apiculture sector's remarkable potential often remains overlooked, despite its diverse advantages. Critical impediments are hindering its growth, acting as barriers within the market. These obstacles necessitate strategic interventions to enhance the sector's ability to uplift the livelihoods of local beekeepers. These challenges include low productivity and production in beekeeping, shortcomings in the extension service delivery system, limited cohesion among stakeholders in the apiculture subsector, inadequate legislative framework and enforcement, restricted market access, and a fragile network for monitoring and assessment. Addressing these issues is crucial for bolstering the sector's contribution to improving the beekeepers' quality of life in the country.

7.7.1. Strategic objectives in apiculture development

- Certainly, addressing the identified strategic issues in apiculture development requires a structured approach to achieve the specified objectives:
- Improve production and productivity
- Strengthen Research and innovation
- Improving extension system
- Improve the quality of inputs, bee product quality and safety
- Products and service diversification and value addition
- Market development
- Beekeeping business management
- Cross-cutting issues
- Creating enabling environment
- Monitoring, evaluation and learning

Table 7. Strategic objectives in Apiculture

Strategic issues	Strategic objective	Strategic intervention	Activity	Output
Low production and productivity	Improve production and productivity	Increase efficiency Using improved technologies	Promote and upscale frame hive beekeeping technologies	Up scaled and promoted frame hive beekeeping technologies
			Promote and upscale Top bar hive beekeeping technologies	Up scaled and promoted Top bar hive beekeeping technologies
			Promote and upscale modified traditional hive beekeeping technologies	Up scaled and promoted modified traditional hive beekeeping technologies
			Promote and upscale effective colony transferring technologies	Up scaled and promoted effective colony transferring technologies
			Promote and upscale double queen commercial frame hive beekeeping technologies	Up scaled and promoted effective double queen commercial frame hive beekeeping technologies
			Promote and upscale bee feeder technologies	Up scaled and promoted effective bee feeder technologies
			Promote and upscale bee waterer technologies	Up scaled and promoted effective bee waterer technologies
			Encourage the prolific queen rearing, multiplication and distribution	Established and strengthened Multiplication Centre and Satellite stations Training conducted in Queen Rearing and breeding
		Promote beekeeping in public lands	Develop and apply nuclei management package	Developed nuclei management package
			Promoting commercial beekeeping in conserved Public land	Commercial beekeeping promoted in Public lands
Bee strain Improvement		Digitalizing honeybee colony Productivity, production and management data	Digitalized honeybee colony Productivity, production and management data	
		Apply conventional honeybee breeding program	Applied conventional honeybee breeding program (selection, queen rearing, Queen fertilization, queen replacement)	
		Establish and strengthening honeybee colony multiplication centers	Established and strengthened honeybee colony multiplication centers	

		Avail the productive honeybee colonies	Availed the productive honeybee colonies
		Encourage private sectors engagement in honeybee breeding and multiplication	Private sectors engaged in honeybee breeding and multiplication
		Develop and Implement Bee strains Improvement Record keeping system	Developed and Implemented Bee strains Improvement Record keeping system
		Develop honeybee colony selection Knowledge and skill	Developed honeybee colony selection Knowledge and skills
		Apply utilization of the prolific queen multiplication and distribution	Applied utilization of the prolific queen multiplication and distribution
		Facilitate the engagement of unemployment in queen supply	Created private jobs in Queen multiplication and supply
		Knowledge and skill development	Developed Knowledge and skill in Bee strains Improvement through training and experience sharing
		Adapting Multiplying and distributing local (improved) honeybee forage species	Adapted, Multiplied and distributed local (improved) honeybee forage species
		Integration of beekeeping with forest conservation	Integration of beekeeping with forest conservation
		Conservation of bee forages and rehabilitation of natural resources in collaboration with concerned authorities	Bee forages conserved and natural resources rehabilitation increased
	Bee forage development and distribution	Promote beekeeping in pastoral and Agro pastoral areas	Promoted beekeeping in pastoral and Agro pastoral areas
		Promote commercial beekeeping integrated with commercial irrigation farms	Promoted commercial beekeeping integrated with commercial irrigation farms
		Promote commercial beekeeping integrated with commercial irrigation farms	Promoted commercial beekeeping integrated with commercial irrigation farms
		Promote beekeeping based on honeybee colony carrying capacity	Beekeeping promoted based on honeybee colony carrying capacity

			Avail the productive honeybee colonies	Availed the productive honeybee colonies
			Encourage private sectors engagement in honeybee breeding and multiplication	Private sectors engaged in honeybee breeding and multiplication
			Develop and Implement Bee strains Improvement Record keeping system	Developed and Implemented Bee strains Improvement Record keeping system
			Develop honeybee colony selection Knowledge and skill	Developed honeybee colony selection Knowledge and skills
			Apply utilization of the prolific queen multiplication and distribution	Applied utilization of the prolific queen multiplication and distribution
			Facilitate the engagement of unemployment in queen supply	Created private jobs in Queen multiplication and supply
			Knowledge and skill development	Developed Knowledge and skill in Bee strains Improvement through training and experience sharing
			Adapting Multiplying and distributing local (improved) honeybee forage species	Adapted, Multiplied and distributed local (improved) honeybee forage species
			Integration of beekeeping with forest conservation	Integration of beekeeping with forest conservation
			Conservation of bee forages and rehabilitation of natural resources in collaboration with concerned authorities	Bee forages conserved and natural resources rehabilitation increased
			Promote beekeeping in pastoral and Agro pastoral areas	Promoted beekeeping in pastoral and Agro pastoral areas
			Promote commercial beekeeping integrated with commercial irrigation farms	Promoted commercial beekeeping integrated with commercial irrigation farms
			Promote commercial beekeeping integrated with commercial irrigation farms	Promoted commercial beekeeping integrated with commercial irrigation farms
			Promote beekeeping based on honeybee colony carrying capacity	Beekeeping promoted based on honeybee colony carrying capacity
			Bee forage development and distribution	

		Developing classical breeding techniques & strategies	Breeding techniques & strategies developed
		Develop desirable strains through selection	Developed desirable strains
		Identify colony multiplication techniques fitting for local honeybees	Multiplication techniques fitting for local honeybees identified
		Identify local and adopted better performing feed types	Identified feed types
		Formulate season-based bee feeds	Formulated season-based bee feeds
		Assess factors affecting physicochemical properties of bee products	Factors affecting physicochemical properties of bee products identified
		Establish physicochemical properties of bee products	Established physicochemical properties of bee products
		Assess factors affecting honeybee product qualities and consumers' preferences	Factors affecting honeybee product qualities and consumers' preferences identified
		Analyze nutritional & medicinal profiles of honeys	Nutritional & medicinal profiles of honeys documented
		Identify, characterize, profile and promote major monofloral honeys of Ethiopia	Major monofloral honeys identified, characterized, profiled and promoted
		Species identification, distribution & characterization	Bee species identified, characterized & their distribution documented
		Develop and promote use of suitable hives and their siting methods	Suitable hives developed and promoted
		Develop suitable colony management regimes in different areas	Developed suitable management practices
		Develop standards for stingless bee products	Developed standards for products
		Identify important forage resources	Identified important forage resources
		Assess effects of species domestication	Effects of species domestication identified
		Physicochemical characterization and profiling bee products	
		Bee feed formulation	
		Stingless bee characterization and management	

		Identification of major pests & predators, & their economic importance	Major pests & predators identified
		Develop pests and predators management strategies	Developed pests and predators' management strategies
		Develop and coordinate training program-based on institution's need assessment	Coordinated training programs developed
		Establish national and international institutional linkages	Established national and international linkages
		Review and improve scheme of services	Improved scheme of services
		Plan and construct new infrastructure based on institution's current and future needs	Demand driven infrastructures built
	Strengthen institutional capacity building	Assess and establishment routine maintenance of infrastructures	Established routine maintenance of infrastructures
		Acquire state-of-art technologies, equipment and facilities	State-of-art technologies, equipment and facilities acquired
		Establish a culture of sharing research facilities	Established culture of resource sharing
		Formulate and implement research projects	Implement research projects
		Participate in reviewing policy document	Reviewed policy document
		Form regular stockholders' platforms	Key stockholders' platforms formed
		Develop user's manual and guidelines of technologies	Developed user's manual and guidelines
	Dissemination of research findings physical (information and technology)	Technology demonstrate	Released technologies demonstrated
		Participate on annual review workshops	Participated on annual review workshops
		Communicate research findings through different channels (scientific talks, lectures, seminars, digital, social and mass media, reports, policy briefs and publications)	Communicated research findings
		Motivate researchers to publish research findings	Published research findings

			Participate in national and international scientific conferences, trade fairs, Api-Expo and Agricultural shows	Participated in national and international scientific conferences, trade fairs, Api-Expo and Agricultural shows
			Disseminate research findings using ICT facilities	Disseminated research findings
			Facilitate honey village establishment and expansion.	Facilitated honey village establishment and expansion.
			Encourage and support farmer led extension delivery service	Established and implemented farmer led extension delivery service.
			Adequate technical support and follow up	Strengthened technical support & follow up
			Attention of apiculture extension delivery	Strengthened apiculture extension delivery.
			Identify and organize the best beekeeping practices	Identified and organized the best beekeeping practices
			Up-scaling the best practices of beekeeping	Up-scaled best practices on beekeeping
			Respond to demand driven extension service	Identified gaps & availed demand driven extension service
			Implement systems for collecting data	Implemented systems data collection
			Collaborate with higher institutions and TVEs to produce apiculture professionals	Produced higher beekeeping professionals
			Monitor all apiculture development interventions to follow the government extension system	Linkages and extension delivery strengthened
			Standardize extension guideline (manuals, model apiary, standard training)	-Developed beekeeping development training manuals. Developed guideline for the establishment of model apiary Established model apiary on FTC/PTC and model beekeepers based on agro-ecology and production systems. Developed guideline for standard beekeeping development training
			Provide capacity-buildings	
			Enhancing efficiency of extension service delivery	
			Improving extension service delivery	
			Inadequate extension service delivery	

		Knowledge and skill development	Training conducted
		Supply with all necessary working materials and transport service	Input provided to strengthen extension delivery
		Extension package development for all type of beekeepers, production system and agro-ecologies	Developed and implemented small, medium and large scale beekeeping development packages based on production system and agro-ecologies
		Encourage digital beekeeping extension service	Implemented digital technology for extension service
		Establish remote beekeeping extension system	Established IVR (interactive voice record) extension system
		Institutionalize private extension providers.	Farmers served by private extension providers.
	Regulate private extension advisory service providers	Develop a legal framework for private extension advisory service.	Developed legal framework
		Respond to demand driven extension service.	Identified gaps & availed demand driven extension service
		Provide Technical Support and Advisory Services	Farmer's knowledge and skills increased
		Provide practical training on new technologies.	Training conducted
	Conduct Suitable technology dissemination	Promote Suitable technology using Demonstration site	Technology demonstrated.
		Establish linkages between beekeepers and suppliers.	Established linkage between Beekeepers & Suppliers
		Collaborate with research institutions to generate and adapt beekeeping technologies.	Generated and adapted beekeeping technologies.

Quality and value addition problems	Improve product and service diversification and value addition	Value addition in Honey Processing and Packaging	Set up honey processing units	Operational records of processing units.
			Train beekeepers in honey filtration and packaging	Training attendance and skill assessment records
			Develop attractive and informative packaging	Sales and market data for packaged honey products
		Value addition in Beeswax Product Development	Train beekeepers in beeswax rendering and product making	Training attendance and skill assessment records
			Develop beeswax-based products (e.g., candles, cosmetics)	Product development documentation
			Market beeswax products through various channels	Beeswax sales and distribution data
		Value addition in Propolis and Royal Jelly Products	Research and develop propolis and royal jelly products	Propolis and royal jelly product development documentation
			Train beekeepers in harvesting and processing techniques	Training attendance and skill assessment records
			Promote health benefits of propolis and royal jelly	Campaign reach and engagement data
	Value addition in Pollen Collection and Marketing	Train beekeepers in pollen collection and processing	Training attendance and skill assessment records	
		Develop packaging for pollen products	Pollen product packaged	
		Conduct market analysis for pollen products	Market linked for Pollen products and documentation	
	Value addition in Apitherapy and Apitourism	Develop apitherapy programs and facilities	Program and facility records	
		Create apitourism packages and promote them	Tourism package sales data	
		Train local guides and therapists in apitherapy techniques	Training attendance and certification records	
		Conduct training on new hive products technologies	new hive products technologies training attendance records.	

			Distribute new hive products equipment (Royal jelly, pollen, propolis harvests)	Inventory records of equipment distribution Surveys of beekeepers knowledge and skills pre- and post-training new hive products
			Implement digital monitoring systems for hive health and productivity.	Usage statistics of digital monitoring systems.
			Conduct detailed research to analyze the chemical and microbial composition of Tej	Research papers published Chemical and microbial components identified Peer reviews and citations of the published research Feedback from the scientific community on the research findings
			Develop and Establish certification standards for Tej production to ensure quality and safety	Certification guidelines developed Number of Tej producers received certification Percentage of certified producers adhering to the standards Feedback from producers on the certification process Consumer satisfaction with certified Tej products
			Standardize the production processes of Tej to ensure consistency and quality	Standardized production protocols developed Training sessions conducted Producers adopting standardized processes Feedback from producers on the effectiveness of the training Consistency in the quality of Tej produced following standardization
			Enhancing tej development of standards	
			Bee Colony Multiplication	Records of nucleus colony creation.

		Train beekeepers in queen rearing and colony splitting techniques.	Training attendance and skill assessment records
		Establish breeding stations for high-quality queen bees.	Operational records of breeding stations
		Training and Capacity Building: Conduct training sessions for farmers and beekeepers on the importance of pollination services, best practices for managing bee colonies, and techniques to maximize pollination efficiency.	Number of beekeepers trained in pollination services
	Pollination service	Establishment of Pollination Networks: Create and support networks of beekeepers and farmers to facilitate the rental and management of bee colonies for pollination services, ensuring optimal coverage and efficiency.	Number of Functional Pollination Networks Established Increased Pollination Coverage Enhanced Farmer-Beekeeper Collaboration
		Habitat maintenance: maintain and preserve natural habitats, such as reforestation, wetland restoration.	Number of maintained and preserved natural habitats.
	Ecosystem service	Community Education and Engagement: Conduct workshops to raise awareness about the importance of ecosystem preservation and enhancement.	Community Participation Rates
		Distribute high-quality bee feed and supplements.	Distribution records of bee feed and supplements.
	Improving Inputs	Provide access to high-quality bee colonies and queens.	Records of colony and queen distribution.
		Supply modern beekeeping equipment and tools.	Inventory and distribution records of equipment and tools.
	Enhancing Bee Product Quality	Implement Good Beekeeping Practices (GBBP) training programs.	Training attendance and skill assessment records.
	Improve inputs, bee product quality, and safety		

Ensuring Product Safety	Establish quality control standards for bee products.	Surveys of standard adoption.
	Conduct regular inspections and audits of beekeeping operations.	Inspection and audit reports.
	Set up laboratories for testing bee product safety.	Laboratory operational records.
Branding	Develop and enforce regulations for pesticide use near apiaries.	Regulatory compliance reports.
	Develop a national branding strategy for bee products.	Branding strategy documentation.
	Design and distribute branding materials (e.g., labels, packaging).	Distribution records of branding materials.
Organic Certification	Promote branded products through marketing campaigns.	Marketing campaign analytics.
	Develop guidelines for organic beekeeping practices	Documentation of guidelines.
	Train beekeepers in organic certification requirements	Training attendance and skill assessment records
Protected Geographical Indication(PGI)	Facilitate the certification process for beekeepers	Certification records
	Identify and register locations for PGI status	Registration records
	Develop PGI standards and guidelines	Documentation of standards and guideline
Codex and EU Standards	Promote PGI -certified products	Sales and market data
	Align national standards with Codex and EU regulations	Documentation of aligned standards.
	Train beekeepers and processors in compliance requirements	Training attendance and compliance assessment records.
HACCP (Hazard Analysis and Critical Control Points)	Conduct regular audits to ensure compliance.	Audit reports
	Develop HACCP plans for bee product processing facilities.	HACCP plan documentation
	Train staff in HACCP principles and implementation.	Training attendance and skill assessment records

GMP (Good Manufacturing Practices)	Implement GMP guidelines in processing facilities.	Documentation of GMP implementation.
	Train staff in GMP requirements	Training attendance and skill assessment records
	Conduct regular GMP inspections	Inspection reports
Traceability and Enhancing Certification	Train beekeepers in safe handling and processing of bee products	Training attendance and certification records
	Implement traceability systems for bee products	Traceability system usage statistics
	Develop certification programs for organic and high-quality bee products	Certification records
Collaborating with Universities for Research in relation to bee product quality, and safety	Conduct awareness campaigns on the importance of certified products	Campaign reach and engagement data
	Joint Research Projects	Total Number of Projects
	Academic Publications	Total Number of Studies
Ensure Quality and Safety of Honey	Research Funding Grants	Total Number of Publications
	Extraction and Filtration	Total Funding Amount
	Moisture Control	Regular quality checks and lab tests.
Maintain Integrity and Quality of	Storage Management	Use of refractometers to measure moisture content.
	Cleaning	Periodic inspections and temperature monitoring.
	Proper Storage	Visual inspection and lab analysis.
Establishing and Strengthening Bee Products Laboratory	Equip the laboratory with modern analytical tools for testing bee products	Regular storage condition checks.
		Number and type of equipment procured and installed.
		Calibration certificates for all equipment
		Number of personnel trained and training sessions conducted

		Establish Standc Operating Procedures (SOPs) for assurance testing and	Establish Standard Operating Procedures (SOPs) for testing and quality assurance	Number of SOPs developed and validated Success rate of validation tests (percentage of accurate test results). Frequency of audits or internal checks of SOP adherence
		Collaborating with Universities for Research in relation to Improve product and service	Joint Research Projects	Total Number of Projects
			Academic Publications	Total Number of Studies
			Research Funding Grants	Total Number of Publications
				Total Funding Amount
			Updating the existing legal frameworks	-Reviewed the existing legal framework
			Develop new pressed legal frameworks	-New pressed legal framework developed
			Support and engage sectorial associations, cooperatives, and unions	-Established platform to engage sectorial associations, cooperatives, and unions
			Working with colleges and universities to produce apiculture professionals	Strengthened linkage with colleges and universities to produce apiculture professionals
			Strong engagement with other key stakeholders to contribute their shares in subsector development	Multi-stake holders plat form (MSP) established and strengthened
	Develop and review legal frameworks	Legal framework	Conservation of honeybee genetic diversity in collaboration with biodiversity institute	Genetic resource mapped and developed bee conservation guideline
			Familiarize and enforce the existing legal framework implementation	Familiarized and enforced the existing legal frame work implementation
			Develop protocol and implementation guideline to promote beekeeping in protected areas, forests and parks	Developed protocol and implementation guideline based on the existing legal frame work to promote beekeeping in protected areas, forests and parks
			Develop guideline and Promote Api tourism	Developed guideline and promoted Api- tourism
			Develop system to promote pollination service	System Developed to promote pollination service
Policy and organizational structure				

		Step-by-step Implementation Honey Value Chain Traceability	Prepare guideline on traceability system	Prepared guideline
			Facilitate infrastructure to establish traceability system	Improved institutional capacity to establish traceability system
			Develop appropriate digital database to establish traceability	Improved institutional capacity to establish traceability system
		Market Infrastructure Development	Develop honey collection, storage and distribution centres	Improved institutional capacity to establish market infrastructure
			Facilitate bee products packing and transportation facilities	Improved use of food grade packing and transportation facilities
			Develop honeybee colony marketing infrastructure and facilities	Improved institutional capacity to improve honeybee colony marketing
			Establish beekeeping inputs marketing system	Improved institutional capacity to improve honeybee inputs marketing
Underdeveloped honeybee colony and bee products market system		Arrange Marketing Services	Improve skills on product development	Number of skilled participants on product development
			Brand development of honeybee products	Number of honeybee products with developed brand
			Comply with export market requirement	Improved understanding of export requirement
			Improve bee products export performance	Increased diversified bee products for export
			Bee product promotion	Improved demand for honeybee products
		Improve Access to Market	Improve access to buyers of honeybee colony and bee products	Improved demand for honeybee colony and bee products
			Improve access to marketing information of honeybee colony and bee products	Improved institutional capacity to provide market information
			Build reliable market linkage of honeybee colony and bee products	Established market linkage mechanism
Cross cutt				

Lack of integration among apiculture actors Limited consideration of Apiculture for decent and dignified job /employment	Strengthen gender and people with disability inclusiveness on job creation Sensitizing bee and bee products benefits Promoting beekeeping practices on public land areas Reduce and improve climate impact on beekeeping	sustainability and Ensure inclusiveness on social environmental climate change resilience	Enhance women and youth involvement in beekeeping Promote disabled people participation in beekeeping practice Promote bee products medicinal value Promote use of bee products for better nutrition and health Using closure and protected areas for beekeeping Using water shed development for youth and women on beekeeping practice	Enhanced women and youth participation in beekeeping practice Disabled people participated in beekeeping Awareness and training created use of bee products for better nutrition and health promoted closure and protected areas used Watershed areas used
In -accuracy of data on apiculture resource	Assess apiculture resources, create a database and map areas	Resource Inventory	Conduct a comprehensive assessment of existing resources Create a database of local bee species and technologies Identify and map potential areas for expansion Conduct a comprehensive assessment of existing resources	Climate smart beekeeping practice promoted Well developed and organized data provided at national level Database system created Potential areas identified and mapped Well developed and organized data provided at national level
Lack of Capacity building(Human and	Establish partnerships with universities and HLIs	Relevant and Well-Trained Institution	Enhance Specialized curriculum development at university level Avail apiculture technicians at the grass root level	Curriculum development on apiculture expanded Apiculture technicians availed

		Capacitate and build institutions with skilled manpower	Provide practical training for relevant conserved bodies	All relevant conserved bodies well trained
Enabling environment	Well equipped Institutions	Capacitate and build institutions with essential infrastructure	Employ and retain qualified manpower	Skilled manpower on apiculture sector provided
			Connect experienced beekeepers with newcomers	Beginners experienced in beekeeping
			Provide training with specialized and modern queen rearing techniques	Training conducted
			Establish honeybee breeding and multiplication centers	Honeybee breeding and multiplication centers established
Policy and organizational structure	Review and develop legal frameworks	Evaluate and revise existing legal frame works	Establish and strengthening laboratories for bee product quality sustainability	Laboratories Established and Well strengthen
			Equipped the existing queen rearing centers with required facilities	Queen rearing centers equipped with necessary facilities
			Familiarize and enforce the existing legal framework implementation	existing legal framework familiarized and implemented
			Legal frame work analysis, stakeholder meetings	Existing legal frame work analyzed
	Regulatory Body	Develop new legal frame work and regulations	Draft and develop new regulations for land access and product standards	New regulations drafted and developed
			Develop protocol and implementation guideline to promote beekeeping in protected areas, forests and parks	Guidelines developed
			Develop guideline and Promote Api tourism	Guidelines developed
			Create an agency for apiculture regulation set up best fit organizational structure which enable to apiculture and policy drafting	
		Design and establish national quality assurance monitoring and inspection system	Develop guidelines for certification of bee products	Guidelines developed
			Implement regular inspections and audits	Guidelines developed

Linkage of relevant stakeholders	Actors Develop Platform	Strengthen engagement of key stakeholders	Create a multi-stakeholder platform for collaboration	Stakeholder platform created
			Organize regular meetings and forums	Regular meeting organized
			Develop communication channels	Communication channels developed
	Incentives and Means of Facilitating Implementation	Develop recognition and incentive structures	Design incentive programs for best practices adoption	incentive programs designed
			Balancing salary payment equivalent to other livestock professionals	Motivated and sensitized professionals
			Provide grants or subsidies for beekeeping equipment	Subsidies for beekeeping equipment provided
			Establish recognition programs for outstanding beekeepers	Recognition program established
Inadequate access to finance	Access to Credit Facilities	Develop partnership with financial institutions	Collaborate with banks and microfinance institutions	Collaboration created
		Develop tailored loan for beekeepers	Educate beekeepers on financial management	Beekeepers educated with financial management
		Develop guarantee fund mechanisms	Organize financial literacy workshops	

7.7.2. Strategic implementation plan

Table 8. Strategic implementation plan (Short term: 2024-2025, mediumterm: 2026-2028, long term: 2029-2032)

Strategic issues	Strategic intervention	Activity	Output	Performance indicator	Implementing organization	Duration
Weak linkage among public, private and NGOs working in apiculture sub sector	Strengthening the linkage among public, private & NGOs working in apiculture sub sector	Developing the key stakeholders data	One key stakeholders data developed	Number of data	MoA	ST
		Developing agreed frame work	One agreed framework developed	Number of frame work	MoA	ST
		Establish appropriate multi-stakeholders plat form (MSP)	One multi stakeholder's platform data established.	Number of MSP	MoA	ST
		Mobilizing resource to sustain the platform	Required amount of Resource mobilized	Amount of resource	MoA	ST
		Consultancy meeting, sensitization work shop	At least two Consultancy meeting and sensitization work shop conducted	Number of meeting & workshop	MoA	ST
Low production and productivity	Creation of awareness and commitment of key stakeholders	Joint planning and sharing responsibility	One Joint planned and responsibility shared	Number of plan prepared & shared	MoA	ST
		Joint monitoring and evaluation	Two joint monitoring and evaluation conducted	Number of monitoring & evaluation conducted	MoA	ST
		Revision of Honeybee breeding policy and develop breeding program	One Honeybee breeding policy Revised and developed one breeding program on five honey bee recess.	Number of policy & breeding program	MoA	ST LT
	Productive honeybee colonies	Establish and strengthening honeybee breeding and multiplication centers	- One & four honeybee breeding & multiplication centers with sixteen satellite station established respectively - Four multiplication centers with sixteen satellite station strengthened	Number of honeybee breeding center, multiplication center & satellite station	MoA	MT LT
		Create enabling environment to bee research centers	At list ten proven technologies & Required amount of inputs provided	Number of technologies & amount of inputs	MoA	ST MT LT
	Productive honeybee colonies	Avail the productive honeybee colonies	55,719 productive honeybee colonies distributed	Number of productive colonies	MoA	ST MT LT

	Encourage private sectors engagement in honeybee breeding and multiplication.	-At least 10 different sensitization workshops/meeting -210 trainees	-Number of sensitization workshops/meeting -Number of trainees	MoA/RBRC	MT LT
	Develop and support Recording system	One database Developed	Number of data	MoA/ ATI	MT
	Promote technologies on breeding and multiplication	At list one on breeding and four on multiplication technologies Promoted	Number of technologies	MoA/ research centers	MT
	Knowledge and skill development	350 beekeeping expertise & technicians trained	Number of trainees	MoA	ST MT LT
	Promote and upscale beekeeping technologies	Ten beekeeping technologies on 200 Model FTC/PTC Promoted and up scaled	Number of FTC/PTC & technologies	MoA/ research centers	ST MT LT
	Encourage establishment of commercial bee farms	200 commercial bee farms established	Number of commercial bee farms	MoA/Federal Investment Agency/Regions	ST MT LT
	Develop and promote resource mapping	One resource mapping Developed and promoted	Number of resource mapping	MoA/ research centers	MT
	Support and promote product diversification including stingless bee's honey	Three honeybee products & one stingless bee's honey products supported and promoted	Number of products	MoA/ research centers	MT LT
	Promote migratory beekeeping	One developed guideline with 4 sensitization workshops	Number of guideline and sensitization workshops	MoA	MT
	Revise and implement beekeeping packages	One beekeeping packages Revised and implemented	Number of beekeeping packages	MoA	MT
	Knowledge and skill development	300,000 beekeepers, expertise, technicians and privet sectors trained	Number of trainees	MoA/Regions/ EADA/ NGOs	ST MT LT
	Multiply and distribute improved bee forages	At least 15 different types of improved bee forages Multiplied and distributed	Number of improved bee forages	MoA/Regions /NGOs/Research centers	ST MT LT

	Conservation of bee forages and rehabilitation of natural resources in collaboration with concerned authorities	4 Created linkage and 300 apiary established in area closed	Number of linkage and apiary	MoA/Regions/NGOs	ST MT LT
	Promote dearth period bee feed supplementation	One Developed and distributed dearth period feeding guide line and awareness created to all regional, zonal and district experts	Number of guideline and experts aware	MoA/ research centers	ST MT
	Develop legal framework for feed importation and feed development	One legal framework developed	Number of legal framework	MoA	MT
	Promote honeybee colony carry capacity of an apiary	One honeybee colony carry capacity guideline developed & awareness created to all regional, zonal and district experts.	Number of guideline & experts aware	MoA	MT
	Encourage the prolific queen multiplication and distribution	Four multiplication centers with sixteen satellite station established and strengthened	Number of multiplication center & satellite station	MoA	ST
	Create enabling environment for the supply of prolific queen	At list five proven technologies & Required amount of input Provided	Number of technologies & amount of inputs mobilized	MoA	ST MT LT
	Develop nuclei management package	One nuclei management package Developed	Number of package	MoA	ST
	Facilitate the engagement of unemployment in queen supply	500 unemployment CIG established	Number of CIG	MoA/NGOs	MT
	Knowledge and skill development	100,000 beekeepers, expertise, technicians and privet sectors trained on Queen Rearing & breeding	Number of trainees	MoA/Regions/ EADA/ NGOs	ST MT LT
	Strengthening quarantine	Eight quarantine Strengthened	Number of quarantine	MoA	MT
	Honeybee health care	Improved honeybee health care	Lump sum	MoA	ST

		Develop and facilitate collaboration among crop growers & protection, horticulture and beekeepers to safeguard bees from poisoning	One legal frame work Developed and implemented	Number of legal frame work	MoA	ST
		Establish database management	One data base Developed	Number of database	MoA	MT
		Regulate the movement of honeybee colonies and products	One legal frame work developed	Number of legal frame work	MoA	ST
		Develop and strengthen bee health laboratory with facilities and human resource	Five bee health laboratory Developed and one bee health laboratory strengthened	Number of bee health laboratory	MoA/RC	MT LT
		Facilitate monitoring of honeybee diseases and pests	Honeybee diseases and pests monitored, Facilitated and strengthened through created linkage	Number of monitoring and linkage created	MoA/RC	MT
		Standardized extension guideline (manuals, model apiary, standard training)	One beekeeping development training manuals Developed. One model apiary on FTC/PTC and model beekeepers based on agro-ecology and production systems guideline Developed. One standard beekeeping development training guideline Developed	Number of manual & guideline developed	MoA	ST
Inadequate extension service delivery	Enhancing efficiency of extension service delivery	Extension package development for all type of beekeepers, production system and agro-ecologies	One small, medium and large scale beekeeping development packages Developed and implemented	Number of package	MoA	ST

	Adequate technical support and follow up	Strengthened Technical support & follow up	Number of follow up and technical support	MoA	ST MT LT
	Facilitate honey village establishment and expansion	5000 honey village established	Number of honey village	MoA	ST MT LT
	Establish remote beekeeping extension system	One IVR (interactive voice record) Established	Number of IVR	MoA	MT
	Encourage and support farmer led extension delivery service	5000 farmer led extension delivery service established and implemented	Number of farmer led extension delivery service	MoA	ST
	Establishment of common interest group (CIG)	10000 common interest group Established	Number of CIG	MoA	ST MT LT
	Monitor all apiculture development interventions to follow the government extension system	Linkage strengthened through extension delivery	Number of linkage & monitoring	MoA	ST
	Respond to demand driven extension service	at least 5 major extension service gaps Identified	Number of gaps	MoA	ST
	Attention of apiculture extension delivery	Apiculture extension delivery Strengthened	Lump sum	MoA	ST
	Knowledge and skill development	60,925 (58770 beekeepers, 2155 technicians & experts) beekeepers, expertise, and technicians trained	Number of trainees	MoA	ST
	Collaborate with higher institutions and TVETs to produce apiculture professionals	140 higher beekeeping professionals Produced	Number of professionals	MoA	ST MT
	Supply with all necessary working materials and transport service	Input provided to strengthen extension delivery	Lamp sum	MoA	ST MT
	Incentivize technical personnel for the night work and hardship to halt attrition	Incentivized technical personnel to strengthen extension delivery	Lamp sum	MoA	ST MT
	Balancing salary payment with equivalent livestock professionals	Appropriate payment for professionals motivated and sensitized	Lamp sum	MoA	ST MT

	Strengthen research extension linkages	Problem identification on beekeeping practice	At least 5 major gaps identified	Number of gaps	MoA	ST MT
		Identify and organize the best beekeeping practices	At least three best beekeeping practices Identified and organized	Number of best practices	MoA	ST
		Up-scaling the best practices of beekeeping	Best practices up scaled to 300,000 beekeepers	Number of beekeepers	MoA	ST
		Knowledge and skill development for professionals, beekeepers, individual collectors, processors and exporters on quality product management and handling	1000 professionals, 35000 beekeepers, 2000 individual collectors, 100 processors and exporters trained on quality product management and handling	Number of trainees	MoA	ST
	Pre-and post harvest management and handling	Support to initiate and strengthening of cooperatives and unions	20 cooperatives and unions initiated and strengthened	Number of cooperatives and unions	MoA/ECC	MT
	Quality and value addition problems	Establish collection, honey processing and marketing centers in potential areas	50 honey collection, 25 honey processing and 50 marketing centers in potential areas established	Number of honey collection, honey processing and marketing centers	MoA/NGOs	ST MT LT
		Prepare guidelines and manuals on pre-and post-harvest good management practice and handling	One pre and post-harvest good management practice and handling guidelines and one manuals Prepared	Number of guidelines and manuals	MoA	ST
		Strengthening regulatory activities (handling, packaging, storage, transportation, marketing)	At list five honey processing centers Strengthened	Number of honey processing centers	MoA	ST
	Quality and safety of bee	Establish/strengthen internationally accredited laboratory for bee products analysis	At list one internationally accredited laboratory established and three internationally accredited laboratory strengthened	Number of laboratory	MoA	MT LT

	Value addition of bee products at cottage industry level	100 cottage industry Promoted value addition on bee products	Number of cottage industry	MoA	ST MT
	Develop manuals on value addition	One value addition manuals Developed	Number of manual	MoA	MT
	Knowledge and skill development	15000 beekeepers, 500 expertise & technicians and 60 private sectors trained on value addition of bee products	Number of trainees	MoA	MT
	Promotion of value addition technologies	At least 6 Value addition technologies Promoted	Number of technologies	MoA	ST MT
	Support beekeepers to access market information through digitalization and other approaches	One market information data base system developed	Number of data base	MoA	MT
	Support or promote export certifications (HACCP, fair-trade, ISO, GMP)	At least ten honey processing centers export certification Supported or promoted	Number of honey processing centers	MoA	ST MT LT
	Encourage the establishment of certification agencies	One certification agency Established	Number of agency	MoA	ST
	Promote quality products to attract markets	One Production and processing guideline developed	Number of guideline	MoA	ST
	Facilitate market linkage	linked market activities	Number of linkage	MoA	ST
	Promote mono-flora and organic honey for premium price	At least seven promotion event conducted Premium price for mono-flora and organic honey promoted	Number of promotion event	MOA/EADA	ST MT LT
	Promote and support profiling of varieties of honey	Five mono-flora & one poly-flora honeybee varieties of honey profiling supported and promoted	Number of profiling	MoA/RC/ EADA	ST MT

Policy and organizational structure	Updating the existing legal frameworks	One proclamation & one regulation of existing legal framework reviewed	Number of legal framework	MoA	ST
	Develop new pressed legal frameworks	One new pressed legal framework developed	Number of legal framework	MoA	ST
	Support and engage sectorial associations, cooperatives, and unions	One data of cooperatives, unions and association developed	Number of data	MoA	ST
		Different input for cooperatives, unions and association supported	Amount of inputs	MOA/NGO	ST MT
		Cooperatives, unions and association members trained on quality assurance & safety, pre & post harvesting methods technology.	Number of trainees	MOA	ST
	Working with colleges and universities to produce apiculture professionals	linkage with colleges and universities to apiculture professionals Strengthened	Number of colleges and universities	MoA	ST
	Strong engagement with other key stakeholders to contribute their shares in subsector development	300 key stakeholders data developed	Number of data	MoA	ST
	Legal framework	At least one binding framework developed	Number of binding frame work	MOA	ST
		Required amount of resource mobilized	amount of resource	MOA/NGO	ST
		One Multi-stake holders plat form (MSP) established and strengthened	Number of plat form	MOA	ST
	Conservation of honeybee genetic diversity in collaboration with biodiversity institute	One Genetic resource mapping and bee conservation guideline developed	Number of mapping & guideline	MoA/ biodiversity institute /RC	MT
	Familiarize and enforce the existing legal framework implementation	One legal frame work Familiarized and implemented	Number of legal framework	MoA	ST

	Develop guideline and support to promote Api-tourism	One Api-tourism guideline Developed and promoted	Number of guideline	MoA	ST
			Amount of input	MOA/NGO	ST/MT
			Number of trainees	MOA	ST
			Amount of resource	MOA/NGO	ST/MT
	Develop system to promote pollination service	One pollination service System Developed	Number of system	MoA	ST
		One national quality assurance monitoring and inspection system designed and established	Number of system	MoA	MT
		Created linkage to develop legal framework for feed importation and feed development	Number of linkage	MoA/EAA	MT
			Number of legal framework	MOA/EAA	MT
	Facilitate linkage among beekeepers and private sectors with financial institution	One memorandum of understanding developed	Number of MoU	MoA	ST
		Credit and funds to beekeepers, private sectors and research institutions facilitated	Amount of Credit and funds	MoA	ST MT
		200,000 beekeepers and 200 private sectors trained on business plan development	Numbers of trainees	MoA	ST MT
		Five projects mainstreamed Beekeeping	Numbers of projects	MoA	ST MT
Access to capital	Support associations	10 associations financially supported	Numbers of associations	MoA/	ST MT
		Two team established under apiculture and Sericulture desk	Number of teams	MoA	MT

		Assigning apiculture professionals at grassroots level with attractive salary	Assigned beekeeping technician with attractive salary at grass root level	Number of technicians	MOA/Regions	ST
Cross cutting issues	Climate smart, gender inclusiveness and job creation	Enhance women and youth involvement in beekeeping	20,000 CIG established	Number of CIG	MOA/NGO	ST
		Use of bee products for better nutrition, health, and food security	Created awareness and training	Number of trainees	MOA	ST
		Promote climate smart beekeeping practice	Climate smart beekeeping practice promoted	Number of promotion	MOA	ST/MT
Monitoring and evaluation	Monitoring and evaluation		Training and awareness created	Number of trainees	MOA	ST
		Developing and strengthening database	One Data base developed	Number of Data base	MoA/ATI	ST
		Regular monitoring of the output	At least four regular monitoring conducted	Number of monitoring	MoA	ST
		Providing feedback	Four Feedback provided	Number feedback	MoA	ST
		Evaluation of the impact due to the implementation of strategy	One evaluation conducted	Number of evaluation	Key stakeholders	MT

8. Monitoring and Evaluation

Monitoring and evaluation are critical for understanding the extent to which the apiculture development strategy is achieving as well as to learn from this and make data driven decisions. Monitoring and evaluation will serve three primary functions within the context of this strategy:

- To strengthen accountability for apiculture development works,
- To stimulate learning and improved performance across the partnership with stakeholders, and
- To facilitate organizational decision-making by the top management of MoA and national stakeholders. Progress made and achievements of outputs shall be monitored and evaluated periodically using participatory approach
- To determine the impact of the strategic implementation for sectoral development

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