Business Opportunities in the Spice Value Chain: A Case Study On Turmeric

A project co-funded by the European Union

BIC ETHIOPIA
AFRICAN BUSINESS INCUBATOR COMMUNITIES

Study developed by:

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ADDIS CHAMBER

Acknowledgement

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Abbreviations

The following abbreviations are used in the report:

AACCSA : Addis Ababa Chamber of Commerce & Sectoral Associations.

BIC : Business Incubation Community/ies

IGA: Income generating activities

VC: Value Chain

VCA: Value chain Analysis

MoTT: Ministry of Industry and Trade

MoA: Ministry of Agriculture

ECTA: Ethiopian Coffee and Tea authority

EARI: Ethiopian Agricultural Research Institute

BIC ETHIOPIA
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01: Project background and introduction

BIC Ethiopia targets strengthening the incubation ecosystem for entrepreneurs and micro, small and medium-sized enterprises (MSMEs) active in agri-tech and agri-business in Ethiopia. Key challenges addressed are sustainability of business models for incubators, quality of business support services, availability of services outside Addis Ababa, access to finance for MSMEs and strengthening the relevant regulative framework supporting start-ups. There is a specific focus to expand services beyond Addis Ababa to also cover secondary cities and rural Ethiopia to support geographically inclusive growth.

The project aims to address these bottlenecks in the Ethiopian startup ecosystem by working with fifteen (15) selected existing and newly established incubators and by supporting them in developing sustainable and technically sound business models. The incubators are thus enabled to better support start-ups and MSMEs in agricultural technology and agribusiness to improve market access, generate higher incomes and create jobs.

The action is implemented by a consortium of five organisations, led by sequa gGmbH, a German non-profit specialist in private sector development in low-income markets, active internationally since 1991 and in Ethiopia since 2002. The Addis Chamber of Commerce and Sectoral Associations capitalises on its reach-out to 50,000 SME members and its experience to shape national policies in favour of the private sector. adelphi gGmBH and GrowthAfrica Foundation contribute their vast experience in curriculum development towards start-ups, entrepreneurs, the capacity building of incubation hubs and acceleration programmes, and access to finance strategies. icehawassa, a national grassroots innovation centre, and the Ethiopia-focused foundation Menschen für Menschen (MfM) establish, expand, and manage incubation centres in the southern and northern regions.

BIC Ethiopia also works with the Ethiopian Association of Startup Ecosystem (EASE) and the regional network BIC Africa. The former is currently being established by private, academic, and non-profit incubators to serve as a network and discussion forum for incubation centres in Ethiopia, while the latter is a regional network supporting business incubators in Africa to excel and spark a wide impact in society.

This publication was produced with the financial support of the European Union. Its contents are the sole responsibility of the BIC Ethiopia consortium and do not necessarily reflect the views of the European Union.

02: Executive Summary

The current study has collected information and makes in-depth analysis regarding on main aspects of the selected product (Turmeric) including production, marketing trends, export and import potential and available technologies to show the key opportunities and investment potentials in the turmeric value chain for private and youth business investors. The study used both quantitative and qualitative data collection methods. Review of published documents including annual reports, policies and strategies of the country, magazines, selected focused group discussions, and key informant interviews.

Ethiopia produces more than 50 spices from the 109 spices listed by the International Organization for Standardization (ISO). Among them, turmeric has an immense potential for economic development through creation and expansion of employment opportunities and distribution of income and foreign exchange earnings. SNNPR is the main producer of turmeric primarily in Kaffa Zone, Bench Maji Zone and Gedeo Zone. Specifically, among the various spices crops, turmeric has increased in demand within the local and international market. Turmeric holds significant promise and one of the exported commodities for Ethiopia. Turmeric holds significant economic importance in Ethiopia, particularly in the southwestern region where it is cultivated as a cash crop. The market for turmeric has grown by 10 percent annually over the past decade. The total production of turmeric was 22,400 tones in 2018, showing 50% increments (49,500 tons) by 2023 indicating that the demand of turmeric has increased from time to time.

However, challenges such as pest management, market access, and the need for better processing facilities remain critical issues that need to be addressed to fully realize the potential of turmeric production in Ethiopia. So as to exploit the opportunity of the current growing demand for spices in general and Turmeric in particular, meaningful development programs and approaches which bring the attention of all stakeholders is fundamental, so that the government can benefit from the economy.

03: Background

03.01: Introduction

Ethiopia has comparative advantages in the production of various exportable spices, which are useful for seasoning food, medicine and generating income for people at different economic levels and are important to the economy for earning hard currency, due to its rich genetic resources, diverse and suitable agro-ecosystem and abundant arable land and labour. Spices are considered as high value and low volume agricultural commodities primarily used for flavor, color, aroma and preservation of food and beverages. In addition to household consumption, spices are becoming an important ingredient in food and beverage processing, pharmaceutical, and cosmetic and textile industries. The bulk of spices are exported in whole dried form, while only 15-20 percent of spices are sold in processed/grounded form as mixtures of ground spices and as essential oils and oleoresins characterizing them as a high-value product per unit weight (Gachena et al., 2020). Next to Coffee, spices are economically and socially important since they are a source of income for smallholders; they can attract foreign currency and can provide many opportunities for employment.

Although Ethiopia has favorable conditions for spice production, the contribution of this sub- sector to the national economy is low, less than 1%. The major constraints that are affecting the production of spices in the country are various including the area devoted to spice production is very low compared to other cereal crops in the country, and the production and productivity of spices are also very low, which reflects the lack of attention given to the sub-sector in the country, the use of low yielding varieties as there are very limited availability of high yielding varieties in the context of adequate agricultural research on spices, weak role of private commercial investors in spice production, lack of appropriate pre-harvest and post-harvest treatments, weak market linkages among the stakeholders in the chain including farmers, traders, processors and macro-level regulatory and enforcement agencies, lack of extension services, lack of appropriate modern technology in farm management, drying, storage and very limited development of suitable strategic spices (Asfaw, 2020).

Although spices provide multiple uses, the emphasis given by research and extension activities is very unsatisfactory. Hence, a radical change should be undertaken in the system to exploit the

benefit from these marginalized crops. Therefore, there is a need to formulate policies focusing on research and development of this sub-sector.

Among 109 spices identified by the international organization for standardization (ISO), Ethiopia produces more than 50 spices, herbs, and aromatic plants, out of which 23 are trading as export items, particularly in the southwestern parts of the country (ECTA, 2021). Ginger, Turmeric, Korarima, red pepper, chili/hot peppers, black cumin, cardamom, and long pepper are the most widely grown spices in the country. In all the spices, Ethiopia is increasingly recognized for its potential in turmeric cultivation, particularly in the southwest region where it serves as a vital cash crop, supporting many livelihoods. Research indicates that there are varied turmeric varieties cultivated in Ethiopia, and studies have highlighted their functional and therapeutic benefits, which could further enhance their value in both local and export markets.

03.02: Rationale for examining the business opportunities in the turmeric value chain

Currently, there is a growing demand for organic spices in Europe, USA and Japan for food coloring, cosmetics, pharmaceuticals, essential oil derivatives and textile industries. Globalization, growing population and shifting consumer trends towards health and authentic experiences have sustained the growth of spice exports from surplus-producing countries (Sendrowicz & Dubelaar, 2020; Tesfa et al., 2017). Global consumption of spices is expanding steadily, with a growth rate of between 2% and 5% per annum (Asfaw, 2020).

The spices and seasonings market offers a tantalizing array of products, ranging from individual spices to complex blends, catering to diverse sectors such as food and beverage, culinary ventures, and food processing industries. The spice sub-sector in Ethiopia has an immense potential for economic development and poverty reduction through creation and expansion of employment opportunities and distribution of income and foreign exchange earnings. Despite the vast scale of utilization potentials, opportunities and foreign exchange earnings by exporting spices to foreign markets, contribution of spice trade, remained minimal and unexploited.

Turmeric, cinnamon, and pepper emerge as frontrunners in this flavorful landscape, while the herbs segment anticipates rapid expansion, driven by their health benefits and unique taste profiles. One of the spices turmeric (Curcuma Longa) is a common spice that is used as curry powder, ground spice, food coloring, a component in textile dyes, and a traditional treatment for

several illnesses. Turmeric is the most productive spice in the world, second only to ginger, with 65 qt/ha, whose product is 45 qt/ha, and this spice can be considered a strategic spice for boosting the productivity and output of spices in the globe. Its relevance has grown in global markets, with the majority of demand coming from households as a coloring agent in food items. Aside from food, it has also been employed in the pharmaceutical and dyeing industries. In terms of the importance of turmeric production, smallholder farmers have produced the plant in various agro-ecological zones, primarily as a source of revenue as well as food. However, as compared to other nations turmeric productivity in Ethiopia is very low. For instance, Ethiopia produced 24q/ha of turmeric on average, compared to 40 q/ha in India (Melese & Gurmis, 2024).

Opportunities for youth entrepreneurs in the turmeric value chain in Ethiopia are abundant and promising. As the national and global demand for turmeric and its derivatives continues to rise due to its medicinal and culinary uses, youth entrepreneurs can tap into this growing market by engaging in value-added activities such as drying, grinding, packaging and turmeric and turmeric products trading. This not only provides employment but also fosters entrepreneurial skills and economic empowerment among young people. Additionally, with Ethiopia's diverse agro- climatic conditions suitable for turmeric cultivation, youth can participate in farming and contribute to the supply chain, ensuring a consistent and high-quality product. Collaboration with research institutions and agricultural agencies can further enhance their knowledge and efficiency, leading to innovative processing techniques and higher yields. Ultimately, by investing in turmeric processing, Ethiopian youth entrepreneurs have the potential to drive economic growth, improve livelihoods, and establish a sustainable, locally-driven industry that capitalizes on both domestic and international markets.

The Government of Ethiopia is doing the maximum possible on the implementing measures to further privatize and liberalize the trade regime and, in turn, to create a safer and more attractive investment environment. So as to exploit the opportunity of the current growing demand of spices, Ethiopian development programs and approaches which bring all actors together to improve quality and strengthen linkages is necessary. The government can facilitate these development programs; however, private businesses have to be involved for implementing the new or improving the existing processing industries and market channels of spices.

Knowing this fact to exploit the opportunity of the current growing demand for spices in general and turmeric in particular, this business opportunity study was designed to be conducted on Turmeric. The study gives appropriate information and can serve as an input to investors/ entrepreneurs /for private businesses to be benefited from this untapped resource.

03.03: Objectives of the study

The general objective of the study is to provide an insight to the status quo of spices in general and turmeric in particular, forecast future trends at both domestic and global levels, and draws up recommendations tailored to the interests of the starter entrepreneurs. Moreover, avail clear information, which will serve as a guiding on scalability of the business and for preparing presentable and bankable business plans.

03.04: Scope of the study

The scope of the study is reviewing the status of the product, investigating the future potential/outlook and appraisal of the product for industrial processing and investment potentials. Accordingly, the opportunity study framework should be made up in the following manner:

1. Formulate Comprehensive overview of the sourcing and producing areas as well as the market (domestic and international)
2. Value chain analysis of the product in respect of five primary activities, notably inbound operation, operations, outbound logistics, marketing and sales, service, and four secondary activities; procurement and purchasing, human resource management technological development and company infrastructure,
3. Investigate the future potential/outlook and appraisal of the product for industrial, processing and investment potentials
4. Show scalability (possible value additions and processing) and business potential of the product,
5. Compile success stories of the entrepreneurs in the business of aquacultures and fisheries
6. Providing recommendations focusing on the business case aspect of the product to young entrepreneurs interested to invest initially on a small scale basis.

Based on the scope indicated above, specific tasks will be

a. Desktop study and review of secondary data on the subject matter.
b. Collect primary data through structured questionnaires and semi structured interviews with key informants.
c. Analyze both primary and secondary data to formulate a value chain frame work reflecting on all the five primary activities in a value chain.
d. Formulate a comprehensive overview of the Ethiopian market context.
e. Identify gaps and recommended business opportunities in each of the value chain.
f. Compile success stories of the entrepreneurs in relation to the product.
g. Formulate a draft report for AACCSA's review.
h. Finalize report incorporating suggestions and recommendations from AACCSA.
i. Submit editable softcopy of the report to AACCSA.

03.05: Methods of the study

03.05.01: Data collection

Standard and scientific methods for gathering data and analysis of the collected data were employed. The major data collection methods and tools include extensive document analysis (Published and unpublished previous and ongoing study documents), in-depth interview of resource persons and rapid assessments, focus group discussions, workshops, survey from various organizations considered under this study. To achieve the objectives stated and perform all the tasks specified, both secondary and primary data sources have been used.

Primary data collection

To collect primary data, a purposive multi-stage cluster sampling technique was employed. The data collection techniques were perused triangulation approach including questioner, interview, focus group discussions, key informant interview and observation as explained hereunder. This primary data was collected by using a small sample based study, rather than a large-scale survey, because of the short study period and limited geographical location.

Key informants Interview: Interviews conducted with firms and individuals from all functional concerned stakeholders of the sector, and/or individuals outside the sector. This might be done as convenient as possible for the interview using telephone as well as face-to-face interview. In addition to providing information about the movement of product and the distribution of benefits,

The interviews will inform on value chain actors' current capacity; how information is exchanged among participants; from where they learn about new production techniques, new markets and market trends; and the extent of trust that exists among actors. Interviews can help to identify where chain participants see opportunities for and constraints to upgrading. Missing or inadequate provision of services necessary to move the value chain to the next level of competitiveness can be identified locally, regionally or nationally.

Questionnaire: - Structured and standardized questionnaires have been prepared and distributed to respondents to collect data for the study.

Focus Group Discussion: In addition to individual interviews, focus group discussions was conducted to explore concepts, generate ideas, determine differences in opinion between stakeholder groups who are engaged in similar activities and triangulate with other data collection methods. The group discussion was a guided discussion type to captures the social interaction and spontaneous processes that inform decision making, which is often lost in structured interviews.

Field Visit or Observational study: The study team has also visited companies in and around Addis Ababa, which are engaged in business activities in the aforementioned commodity and its products.

Secondary Data collection

Relevant information was collected using secondary data from national and international organizations such Database, annual reports, magazines, newsletters, workshops, and proceedings in addition to desk review.

To this end, the secondary data sources were various organizations such as Central Statistics Agency, Ministry of Agriculture, Ministry of Finance and Economic Development, related academic institutions, Ethiopian Economic Association, Ethiopian Agricultural Research Institute, Ethiopian Revenue and Custom Authority, Ministry of Trade and Industry, International organization Data Base CD–Room and the relevant sources. The information gathered as statistical data used for the foundation of the sector diagnosis. Such documents are useful for providing a more in-depth understanding of what is currently going on in the turmeric value chain.

Desktop review on supply chain of turmeric by a rapid examination of readily available materials was conducted. The aim is to consider existing practices for the market and business environment of the industry in which it operates, as well as to identify sources for additional information collected through a systematic review of the available documents relevant to the subject under the study. Information such as statistics on exports/imports, consumption reports, global trade figures, etc., can be obtained through the Internet, phone calls and documents from trade, commerce and industry ministries, specialized industry journals, data bases and professional and trade association newsletters. Once the desktop research has been conducted, an initial secondary data analysis and current situation study was drafted for refinement during the primary research phase. Documents on current study were researched within a national and regional context to identify and prioritize opportunities for service oriented business organizations; to analyze key constraints including status of production, marketing and processing, the implementation of previous researches or value chain analysis and competitiveness issues faced by the spice sector and turmeric commodity.

Benchmarking study was conducted and success stories compiled within a country in the turmeric food system and thereby lessons have been taken. The study team recommended such lessons as intervention mechanisms or AACCSA advocacy.

03.01.01: Method of analysis

Quantitative analysis of the sector/commodity was used to provide a picture of the current situation in terms of the distribution of value-added, profitability, productivity, production capacity and benchmarking against competitors. Analyzing these factors highlights inefficiencies and areas for reducing cost.

After collection of relevant data from various actors using various data collection instruments, the data was managed in the following manner. The data collected through questionnaire was analyzed descriptively as a quantitative data. Moreover, appropriate data analysis software such as SPSS and STATA employed to analyze the collected data in combination with the methods employed.

Qualitative analysis:

Information collected through key informant interviews, rapid observation and focus group discussions was qualitatively analyzed. Qualitative content analysis and thematic analysis was used for interpreting the qualitative data collected from FGD, Interview and Key informants. The content analysis is used to evaluate patterns within a piece of content or across multiple pieces of content or sources of communication. Thematic analysis looks at patterns of meaning in a data set - for example, a set of interviews or focus group transcripts i.e. thematic analysis takes bodies of data and groups them according to similarities.

04: OVERVIEW OF THE SPICE INDUSTRY IN ETHIOPIA

Spice is the basic food item in the diet of Ethiopians and its utilization history is ancient. In Ethiopia, approximately 98% of all spices are cultivated by smallholder farmers living in rural areas of Ethiopia. Spices are predominantly intercropped with coffee, banana and maize and in some instances with sugarcane and teff. Smallholder spice producers are usually organized in small groups or cooperatives, which in turn are organized in cooperative unions that promote spices as part of their ‗crop portfolio'. The major spices produced by commercial farmers are ginger, turmeric, chilies and black pepper. The cultivation of spices by smallholder farmers is normally performed on small plots of land (< 0.5 ha) around homesteads and in natural forests (Deribe, 2021).

The spices subsector has an immense potential for financial advancement and poverty decrease through creation and development of employment openings and conveyance of wage and foreign trade earnings. Spices are the most profitable venture in all farming activities as they provide ample employment opportunities and slope to raise the income of the farming community. It is a country that ships many spices with the normal yield secured by the spice being around 222,700 hectares with a production of244, 000 tons per year, supplies over 50 spices, with an estimated 200,000 hectares potentially providing more spices (Wondimnew, 2024).

Ethiopia is known for producing a variety of spices many of which are indigenous, such as korarima (Aframomum corrorima), long red pepper, dark cumin, white cumin/ministers weed, coriander, fenugreek, turmeric, sage, cinnamon, and ginger. The country's unique climatic conditions and diverse agro-ecological zones provide an ideal environment for cultivating high-quality spices, which are increasingly gaining recognition in international markets (Asfaw, 2020; Shimelis, 2021).

The spice industry contributes significantly to the livelihoods of many smallholder farmers, particularly in rural areas. Spices are often grown as cash crops, providing farmers with a source of income and improving food security. The increasing global demand for organic and specialty spices presents opportunities for Ethiopian farmers to expand their market reach.

Ethiopia has the potential to become a leading exporter of spices, particularly to markets in Europe, the Middle East, and North America. The government and various organizations are

working to enhance the quality of spice production and promote exports through better agricultural practices and processing techniques. The demand for spice products from domestic consumers and the international market is higher than those produced within the country.

Despite its potential, the spice industry faces several challenges hindering production and productivity in Ethiopia (Afeto et al., 2024; Asfaw, 2020; Deribe, 2021) , including:

- Unavailability of high-yielding varieties,
- Pests and diseases that can affect crop yields,
- Inadequate research support,
- Weak private sector role, weak stockholder linkage,
- Lack of extension services,
- Deforestation, traditional way of farming,
- Low attention to government,
- Displacement of spices by other crops, animal grazing,
- Lack of technology and Lack of proper pre and post-harvest handling practices
- Limited access to markets and information can hinder farmers' ability to sell their products at competitive prices.
- Lack of improved processing and value addition facilities to enhance the quality and shelf life of spices, which can increase their market value

Global spice production is anticipated to rise to 14.3 million metric tons by 2028 from 13.4 million metric tons in 2023, representing a yearly growth rate of 1%. Since 2019, global spice supply has seen a more robust annual increase of 1.6%.

Global spice consumption is projected to reach 11.3 million metric tons by 2028, up from 10.8 million metric tons in 2023. This marks a steady annual growth rate of 0.8%. Since 2019, global demand for spices has increased by 0.7% annually. India leads the world in spice consumption, with 4.7 million metric tons consumed in 2023. Trailing behind are Bangladesh, Indonesia, and Thailand, holding the second, third, and fourth spots, respectively. Notably, Swaziland's spice consumption surged by 8.5% annually, while Zimbabwe experienced a significant decline of 12.9% per year since 2019.

On the production perspective, Ethiopian spice output is expected to rise to nearly 440,000 metric tons by 2028 from about 396,000 metric tons in 2023, reflecting an average annual growth rate of 1.6%. Since 2019, the country's spice supply has increased by 2.3% each year. In 2023, Ethiopia also ranked eighth in global spice production, with Thailand surpassing it with the same output level of 396,000 metric tons. China, Nigeria, and Indonesia occupied the second, third, and fourth spots respectively in the global spice production rankings.

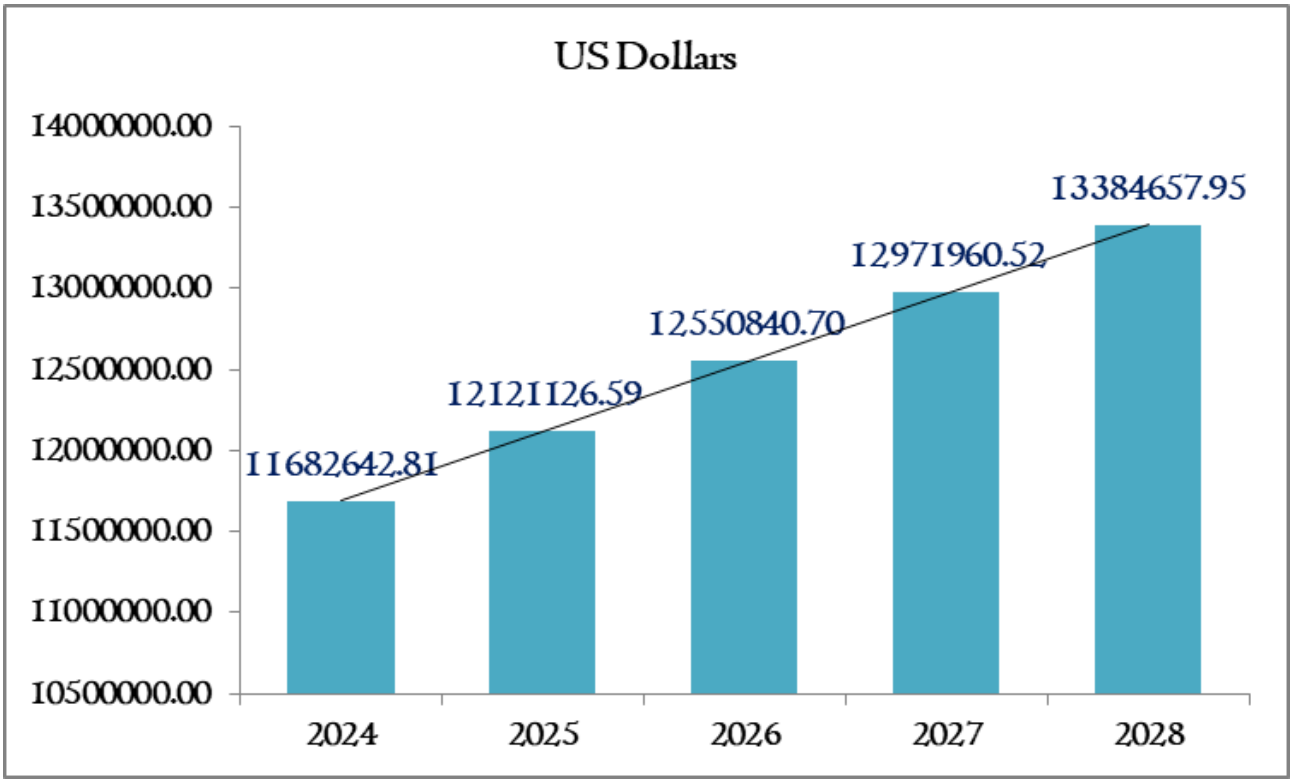


Figure 1: Forecast: Export of Seed Spice from Ethiopia
(Source: Ethiopia Spice Industry Outlook 2024 - 2028 – Report-Linker)

Ethiopia's spice consumption is projected to reach approximately 346,000 metric tons by 2028, up from around 296,000 metric tons in 2023. This marks an average annual growth rate of 2.5%. Since 2019, Ethiopian demand for spices has consistently increased by 2.2% each year. In 2023, Ethiopia ranked eighth globally in spice consumption, with Pakistan surpassing it at the same level of 296,000 metric tons. Bangladesh, Indonesia, and Thailand held the second, third, and fourth positions respectively in global spice consumption rankings.

Spice type	2018			2019			2020			2021			2022			2023		
	Coverage/000" ha	Production /000"ton	Productivity (Qu/ha)	Coverage/000" ha	Production (/000"ton)	Productivity (Qu/ha)	Coverage/000" ha	Production /000"ton	Productivity ()Qu/ha	Coverage/000" ha	Production /000"ton	Productivity (Qu/ha)	Coverage/000" ha	Production /000"ton	Productivity (Qu/ha)	Coverage/000" ha	Production /000"ton	Productivity (Qu/ha)
Black cumin	9	9.9	10.58	13	19.9	15	12.5	20.6	16.5	13.2	20.01	15.1	13.2	20.1	15	15.04	20	13.2
White cumin	3	2.5	8	4	4.5	9	4.5	4.36	9.5	4.3	3.86	8.97	4.3	3.9	9.1	5.9	4.9	8.1
Ginger dry	21.6	73.26	33.8	35	105.5	30	47.7	135.4	28.4	45.5	134.2	29.4	45.59	157.7	34.6	50.19	170.6	32
Korerima	49	25	5.1	50	32.5	6.5	51	35.7	7	52	31.2	6	102.5	43.3	6.1	118.5	47.78	6.2
Fenugreek	25	35	13.97	26.5	29.2	11	24.3	28.6	11.7	24.1	26.4	10.9	24.2	28.9	11.9	22.36	31.13	11.38
Coriander	0.3	5.	14.86	3.0	0.47	15	3.1	4.74	15.3	2.4	3.45	14.3	2.4	3.09	12.6	5.86	7.0	21
Turmeric dry	5.0	22.4	44.9	6.5	24.4	37	7.2	28.85	39.7	6.8	21.82	32	10.6	40.7	38.3	12.1	49.05	40.54
Rosemary													-	-	-	7.207	6.3	12.4

Table 1: Land coverage, production and productivity of Ethiopian spices (2018-2023)

04.01: Overview of the Turmeric Value Chain in Ethiopia

Figure 2: Turmeric seed and powder

Turmeric, also known as —Indian saffron,‖ has been in use dating back to 4000 BC(ECTA, 2021). The use of turmeric spans many purposes, as a dye9coloring materials in textile industry), condiment (food-coloring agent), and medicine, obtained from the underground rhizome of Curcuma longa (Family - Zingiberaceae) (Melese & Gurmis, 2022).

The botanical name of turmeric is Curcuma domestica Val. syn. Curcuma longa L. belongs to the family Zingiberaceae. The Latin name for turmeric is Curcuma longa, which has its origin in the Arabic name Kurkum. Ethiopia is one of the biggest producers and exporters of turmeric in Africa. The bulk of the Turmeric produced in Ethiopia is consumed domestically. Only a small portion is exported to Neighboring Countries (Sudan, Kenya, Djibouti, and Egypt), Asia, the Middle East, and the USA(ECTA, 2021).

Turmeric holds significant promise and one of the exported commodities for Ethiopia, as industry experts and exporters recognize it‘s potential. Ethiopia specifically cultivates the highly valued Alleppy variety of turmeric, known for its robust flavor, deep orange-yellow hue, and curcumin content of approximately 5 percent. The crop is typically grown in well-drained, fertile soils and requires a warm climate with adequate rainfall (Yewondwossen, 2024).

Southwest Ethiopia produce turmeric as a cash crop and many livelihoods are dependent on it. Ethiopia is the exporter and producer of turmeric in Africa. Tepi National Spices Research Center (TNSRC) has been done several research and developments since the introduction of the crop to Ethiopia in 1970s. The research was aiming of identifying best turmeric production and processing technologies and practices that could be served as the best alternative crop for export diversification(Girma & Mohammedsani, 2021). However, turmeric productivity, processing technologies and marketing has not satisfactorily contributing for economic development and address food and nutrition insecurity problems prevailing in the country. The emphasis given to production, processing and marketing, particularly in export of this important commodity is

minimal. In spite of the potential for production and growing demand for turmeric in the world market, the supply is constrained by different factors in the country. These constraints are mainly

observed at different supply chain levels (farmers, traders, processors and exporters) and stakeholders including the government policy. Opportunities for spice, particularly turmeric export are not fully exploited yet because of inefficient marketing, improper processing and sometimes-poor contract discipline. So as to exploit the opportunity of the current growing demand for spice and spice products, development programs and approaches which bring all stakeholders together is paramount to improve quality and strengthen linkages.

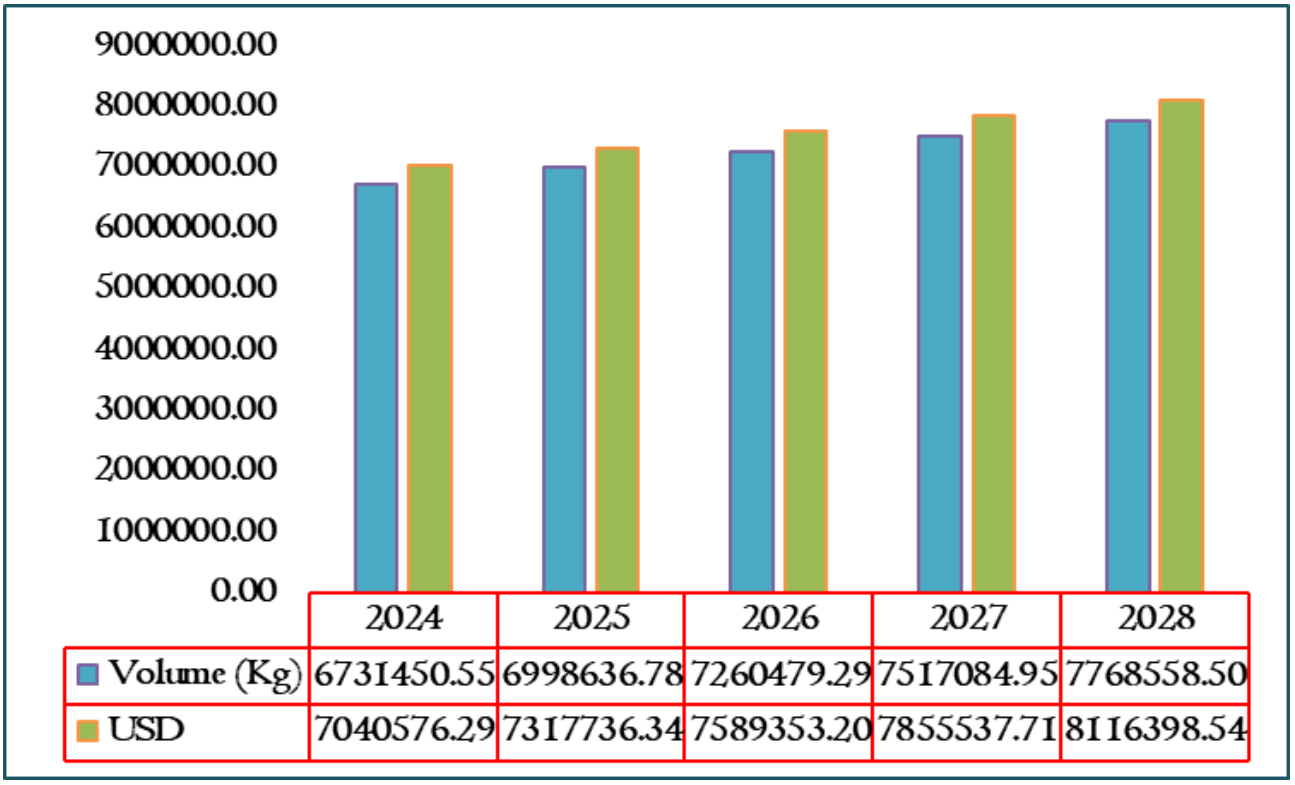
04.02: Importance of turmeric as a key spice crop

Economic development is one of the main objectives of every society in the world and economic growth is fundamental to economic development. There are many variables that contribute to economic growth (Cheffo & Goshu, 2020). Turmeric production in Ethiopia has gained significant attention due to its favorable climatic conditions and the increasing demand for this spice both locally and internationally, particularly in the southwestern regions such as Sheka, Bench Maji, and Kaffa. The southwestern regions are known for their fertile soils and suitable weather, which support the cultivation of high-quality turmeric. Turmeric is the most productive spice in the world, second only to ginger, with 65 qt/ha, which product is 45 qt/ha, and this spice can be considered a strategic spice for boosting the productivity and output of spices in the globe. Its relevance has grown in global markets, with the majority of demand coming from households as a coloring agent in food items. Aside from food, it has also been employed in the pharmaceutical and dyeing industries. In terms of the importance of turmeric production, smallholder farmers have produced the plant in various agro-ecological zones, primarily as a source of revenue as well as food. However, as compared to other nations turmeric productivity in Ethiopia is very low. For instance, Ethiopia produced 24 q/ha of turmeric on average, compared to 40q/ha in India.

Economic Importance:

Turmeric holds significant economic importance in Ethiopia, particularly in the southwestern region where it is cultivated as a cash crop. This crop contributes to the livelihoods of many farmers, providing them with a reliable source of household incomes and local economies. The demand for turmeric is raising both locally and internationally, providing opportunities for export. As an exported spice, turmeric not only caters to local culinary uses but also has potential for commercial production, enhancing economic returns especially for resource-limited farmers (Kifelew et al., 2018).

According to Volza's Ethiopia Export data (Volza's Big Data Technology), Ethiopia exported 166 shipments of turmeric from Feb 2023 to Jan 2024. These exports were made by 79 Ethiopian exporters to 100 buyers, marking a growth rate of 30% compared to the preceding twelve months. Within this period, in Jan 2024 alone, 11 Turmeric export shipments were made from Ethiopia. This marks a year-on-year growth of 83% compared to Jan 2023, and 11% sequential growth from Dec 2024, indicating that increasing demand of Turmeric and its economic benefits. Most of the Turmeric exports from Ethiopia go to the India, United Arab Emirates, and Egypt. India is the world biggest exporter and producers of turmeric, whereas, Ethiopia is the biggest exporters and producers of turmeric in Africa. India imported Turmeric worth USD 4,635,094 from Ethiopia with total quantity of 4,226,910. With Average price of per kg is USD 1.10everyyear. The market for turmeric has grown by 10 percent annually over the past decade, with worldwide export revenue exceeding $500 million (Kifelew et al., 2018).



	2024	2025	2026	2027	2028
Volume (Kg)	6731450.55	6998636.78	7260479.29	7517084.95	7768558.50
USD	7040576.29	7317736.34	7589353.20	7855537.71	8116398.54

Figure 3: Forecast: Export of Turmeric (Curcuma) from Ethiopia (2024-2028)
(Source: Ethiopia Spice Industry Outlook 2024 - 2028 – Report-Linker)

Tepi national spices research center (TNSRC) has commenced several research experiments and developments since the introduction of the crop with the objective of identifying best turmeric production and processing technologies and practices that could serve as the best alternatives

crop for export diversification and alleviation of poverty in the country, since turmeric introduced to Ethiopia in 1970's. Farmers typically grow turmeric as a cash crop, benefiting from its relatively low input costs and high market value. According to a study by Abate et al. (2020), the adoption of improved agronomic practices has the potential to enhance turmeric yields significantly, thereby improving the livelihoods of smallholder farmers in these regions.

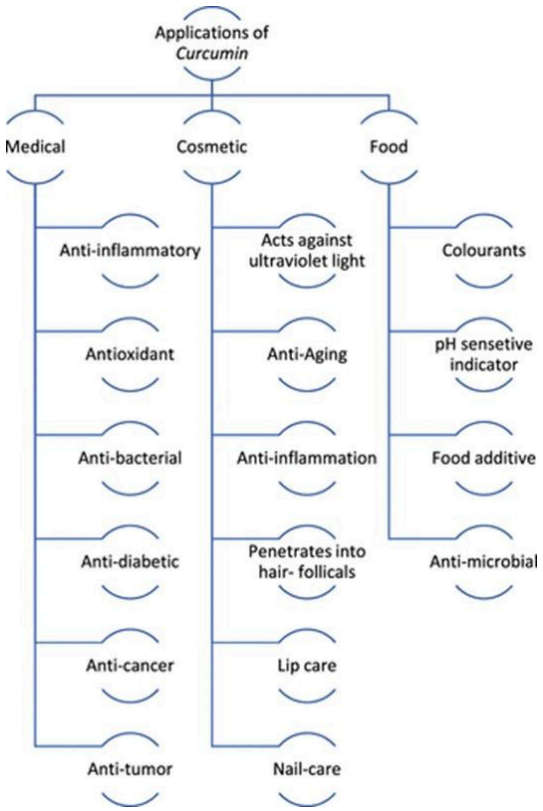
Health Benefits:

Turmeric has a characteristic flavor and yellow in color. Turmeric is a spice that has received much interest from both the medical/scientific worlds as well as from the culinary preparation world. In addition to its economic benefits, turmeric is recognized for its health-promoting properties, primarily due to the active compound curcumin, which has anti-inflammatory, antiseptic, antioxidant effects, in cosmetics (facial preparation and creams) and ayurvedic drug preparations (Kifelew et al., 2018). The medicinal properties of turmeric, the source of curcumin, have been known for thousands of years; however, the ability to determine the exact mechanism(s) of action and to determine the bioactive components has only recently been investigated. Curcumin (1, 7-bis (4-hydroxy-3-methoxyphenyl)-1, 6-heptadiene-3, 5-Dione), also called diferuloylmethane, is the

main natural polyphenol found in the rhizome of Curcuma longa (turmeric) and in others Curcuma spp.

Curcuma longa has been traditionally used in Asian countries as a medical herb due to its antioxidant, anti-inflammatory, anti-mutagenic, antimicrobial, and anticancer properties. Curcumin, a polyphenol, has been shown to target multiple signaling molecules while also demonstrating activity at the cellular level, which has helped to support its multiple health benefits (Hewlings & Kalman, 2017). It is used in traditional medicine for various ailments, including digestive issues, skin conditions, and joint pain. Experts emphasize that Ethiopian turmeric has a high concentration of curcumin, an antioxidant known for its health benefits, including cancer prevention, anti-viral properties and anti-inflammatory properties, may increase its demand from the pharmaceutical industry (Liu et al., 2022; Porro & Panaro, 2023).

In addition to the rhizome‘s richness in curcuminoid pigments (6%) and essential oils (5%), it also contains 69.43% carbohydrate, 6.30% protein, 3.50% mineral and other important nutrients on dry weight basis. The increasing demand for natural products as food additives makes turmeric an ideal produce for a food colorant (Kifelew et al., 2018).



The Ethiopian government and various NGOs are increasingly promoting turmeric cultivation as part of their agricultural development strategies, aiming to boost food security and rural incomes. However, challenges such as pest management, market access, and the need for better processing facilities remain critical issues that need to be addressed to fully realize the potential of turmeric production in Ethiopia (Tadesse et al., 2021).

Figure 4: Application of Curcumin in different industries (Source: (Manasa et al., 2023)

Market Opportunities:

There is a growing global market for organic turmeric, which Ethiopian farmers can tap into by adopting sustainable farming practices. Value addition through turmeric processing into powder, capsules, or extracts can enhance profitability. It plays a significant role in the local economy, contributing to export earnings alongside other spices like cumin and ginger. However, farmers face challenges exist regarding the yield and quality of turmeric production, which can influence its overall viability as a key crop such as pests, diseases, and market access, which can hinder production and profitability.

04.03: Production of Turmeric commodity

Southwest Ethiopia is rich in the diversity of spice having different functions. Still, many kinds of spices are collected from natural forests and others are cultivated in home gardens and alongside farmland. Kaffa zone is one of the spice biodiversity most affluent areas with suitable

agroecology and climate conditions for different types of spice production. The habit of spice product marketing is lower and resulted in a lower market-oriented production system in the study area. Also, this sub-sector is producing traditionally without agricultural technology support like production systems and improved verities (Afeto et al., 2024).

Turmeric is widely grown and mainly concentrated in the southwestern region of Ethiopia, specifically in Bench-Sheko and Sheka zones. However, recently major ginger producing areas including Wolayta zone shifts the land to turmeric production because of ginger bacterial wilt and good demand for turmeric (Kifelew et al., 2018). The SNNPR is accountable for 76% of Ethiopia's turmeric production.

Table 2: Turmeric production (2018-2023)

Year	Coverage/000" ha	Production /000"ton	Productivity (Qu/ha)
2018	5.0	22.4	44.9
2019	6.5	24.4	37
2020	7.2	28.85	39.7
2021	6.8	21.82	32
2022	10.6	40.7	38.3
2023	12.1	49.05	40.54

The total production of turmeric in the fiscal year of 2018 was 22,400 tones, and increased to 49,500 tons by 2023 (Table 2) indicating that the demand of turmeric has increased from time to time.

04.03.01: Challenges faced by turmeric farmers

Although the demand of turmeric locally and globally is increasing, in terms of productivity, it is not satisfactory and the yield of turmeric in Ethiopia is still low. Turmeric farmers in Ethiopia face several challenges for this low productivity of turmeric in Ethiopia, including backward cultivation practice and technique, absence of turmeric agricultural research specific to turmeric, irregular supply and variable quality of turmeric produced, weak business linkage, absence of

micro-level support organizations, raising the contribution of uninhibited agents in the exchange of turmeric in the market, fragile selling arrangement, absence of planned market data provision to the diverse performers in the turmeric (Melese & Gurmis, 2022). Additionally, there is poor use of mechanized technology and a lack of necessary agricultural inputs and advanced handling techniques, which leads to higher amounts of postharvest losses primarily due to fungal invasion.

One of the main issues identified is a quality problem associated with post-harvest processing. The traditional method of boiling and drying turmeric spices employed by farmers has proven to be a hindrance. It is an outdated technique that often results in overcooking or undercooking the turmeric, thereby compromising the product‘s quality and diminishing its value in the global market.

04.04: Post-harvest handling and processing

Turmeric with a botanical name Curcuma longa has two dominant types on the in the international market: 'Madras', and 'Alleppey'. Alleppey turmeric contains about 3.5% to 5.5% volatile oils, and 4.0% to 7.0% curcumin. In contrast, the Madras type contains only 2% of volatile oils and 2% of curcumin. In Ethiopia the dominant type of turmeric produced is Alleppey type one. This orange-yellow flesh Alleppey turmeric type is predominantly imported by the United States, where users prefer it as a spice and a food colorant.

In Ethiopia, turmeric harvesting begins in late December and ends in March. Turmeric comes as fingers, bulbs and splits. Fingers are the secondary branches from the mother rhizome, the bulb, and splits are the bulbs cut into halves or quarters before curing. The fingers are 2 to 8 cm long and 1 to 2 cm wide, and are easier to grind than the more fibrous bulbs and splits, and therefore command a higher price.

There are different type‘s turmeric Products available in the market ether as fresh turmeric, dried turmeric, polished turmeric, turmeric powder, turmeric oil and Curcumin.

04.4.1: Post-harvest handling: curing, drying and polishing

Turmeric is typically ready for harvest between 9 to 10 months after planting. The crop is ready for harvesting when the leaves turn yellow and start drying up. At the time of maturity, leaves are cut close to the ground, the land is ploughed and rhizomes are gathered by handpicking or the

clumps are carefully lifted with a spade. The picked rhizomes are collected and cleaned. The whole plant is removed from the ground, taking care not to cut or bruise the rhizomes.

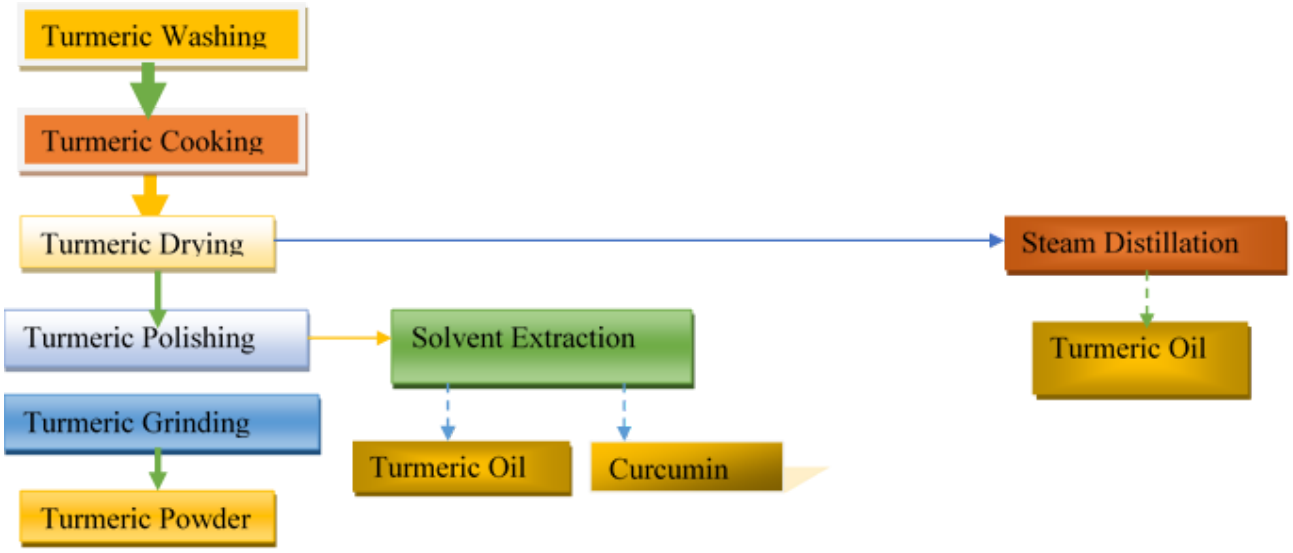


Figure 5: The general turmeric-processing flow diagram

- **Sweating**

The leaves are removed from the plant and the roots carefully washed to remove soil. Any leaf scales and long roots are trimmed off. The side (lateral) branches (which are known as the fingers) of the rhizomes are removed from the main central bulb (known as the mother). The mothers and fingers are heaped separately, covered in leaves and left to sweat for one day. The mothers‘ are the preferred material for planting the following year.

The washing process is to remove dirt‘s and turmeric root pods, which will maintain hygienic condition. The current washing technology has two effects, washing as well as rubbing, and provides effective removal of the surface contaminants (e.g., pesticide, insects, soil, dirt, etc.) without damaging the material quality. The washing machine is avilabel in the market with a capacity of 250 to 1000 kg/hr.

Figure 6: Turmeric washer

❖ Curing

Curing turmeric involves boiling fresh rhizomes in water for 45 to 60 minutes, typically using copper, galvanized iron, or earthen vessels. This process gelatinizes the starch and ensures uniform drying by diffusing the coloring material consistently throughout the rhizome and to remove the fresh earthy odour. It is recommended to carry out the curing processing within 2 to 3 days after harvesting the turmeric, if there is delay in processing, they should be stored under shade or covered with sawdust or coir dust. This cooking helps to remove raw odour, reduce drying time and yield uniform color.

In our country practice, curing operation conducted traditionally, the cleaned rhizomes are boiled in water just enough to immerse them and boil continued until froth comes out and white fumes appear giving out a typical odour. This boiling operation takes 30-45 minutes till the rhizomes turn soft using open barrel and wood. Using this method, the colour will deteriorate if the rhizomes are boiled too long. However, if not boiled for long enough, the rhizome will be brittle. The optimum stage is reached when the rhizomes are soft to touch or can be pierced by a blunt piece of wood. This outdated technique that often results in overcooking or undercooking of the turmeric, thereby compromising the product‘s quality (curcumin content) and diminishing its value in the global market. Beside the quality effect, this outdated method addresses health concerns such as sunstrokes that affect women involved in the boiling process as well as deforestation effect.

To overcome this consequence boiling in alkaline water by adding 0.05% to 1% sodium carbonate, or lime, may improve the colour during curing. In addition, making uniform size during cooking also improves the quality of the turmeric. Furthermore, currently there is slicing machine as an alternative to boiling. Using this machine may help to preserve the forests by excluding the boiling of turmeric and addresses health concerns such as sunstrokes that affect women involved in the boiling process. Slicing the rhizomes significantly reduces drying time from 21 days of traditional methods of boiling in to less than four days and yield turmeric with lower moisture content as well as better curcuminoid extractability by avoiding overcooking or undercooking turmeric, which can affect its curcumin content. It is easier to achieve lower final moisture content in small pieces of rhizome without spoiling the appearance of the product.

Currently there are emerging cooking technologies for turmeric like steam cooking technique. This technology developed to retain curcumin content up to highest possible level and reduce the cooking time. The cooking time for turmeric using steam is about 10 min.

❖ Drying

Cooked fingers or bulbs are dried to a moisture level of 5% to 10%. Sun drying may take 10 to 15 days, and the rhizomes should be spread in 5-7 cm thick layers to minimize direct sunlight that results in surface discoloration. This process may create not clean product and there is also chance of contamination.

In Ethiopia, processors just spread the boiled turmeric on the floor without any ventilation treatment. The drying time may take up to 21 days, because of this poor handling practice there is high probability of cross-contamination even there is high chance of aflatoxin development beside the other quality deterioration. It should be dried on clean surfaces to ensure that any extraneous

matter does not contaminate the product. In this traditional practice, moisture is tested by breaking dried fingers with a metallic sound confirmed that it is sufficiently dry. This is the most traditional method of drying indicator. Therefore, it is better to use very cheap handheld moisture testers.

Turmeric is one of the spices for which it is more advantageous to use mechanical driers because of the sensitivity to light. Those can be solar, drum driers, trays, or continuous parallel or cross-

flow hot air tunnels or rotary dryer. For example, turmeric rotary dryer with hot air supply has very less drying time with very little chance of contamination. The process is very hygienic with high productivity. Using this process, turmeric fingers can be polished, there by reduces time during polishing process. The machine is available with a capacity from one tone /batch to eight tone/ batch by cheap price.

Figure 7: Turmeric rotary drier

- **Polishing**

Dried turmeric having poor appearance, rough dull outer surface with scales and root bits, should be polished for improving its appearance by smoothing, polishing outer surface by manual (rubbing on hard surface) or mechanical rubbing (polishing drums rotated by hand or by electric power) to remove the surface scales, small rootlets and if any soil particles left during washing and drying. The process gives better colour. Sometimes turmeric powder suspended in water is sprinkled over the rhizomes at the final stage of polishing to give an attractive colour. The above methods are not advisable in terms of pollution, productivity and efficiency.

Figure 8: Polishing of Turmeric after drying

04.04.02: Turmeric milling and Extraction

Grinding is a simple process-involving cutting and crushing the rhizomes into small particles, then sifting through a series of several screens. The whole rhizome pieces may be exported and then ground in the country of destination. Alternatively, the dried rhizomes may be ground at the place of origin. Ethiopia exports the whole polished turmeric finger to India. Some of the mechanical mills, such as a hammer mill, generated heat during the grinding process, which can cause some of the volatile taste and aroma compounds to be lost. For higher quality ground turmeric, the grinding temperature should be kept as low as possible. In the case of turmeric, heat and oxygen during the process may contribute to curcumin degradation. Cryogenic milling under liquid nitrogen prevents oxidation and volatile loss, but it is expensive and not widespread in the industry, thus, exporting the whole turmeric is economic in the context of our country. In addition to this turmeric, powder may also be adulterated with foreign starch like maize, tapioca, cereal flour, or husks. This adulteration resulted with a low curcumin content and low market value.

The process of turmeric oil and curcumin extraction is a crucial step in the recovery of the bioactive compound from the plant matrix. During the extraction process, specific solvents are used in accordance with predetermined procedures, leaving behind insoluble compounds. Curcumin can be extracted using either conventional or advanced techniques. Since conventional extraction methods such as solvent extraction and Soxhlet extraction, require a considerable amount of time, organic solvents, cooling water, and energy, now a days novel extraction methods such as ultrasound-assisted extraction, microwave-assisted extraction, enzyme-assisted extraction, supercritical fluid extraction, and pressurized liquid extraction are wildly used in Europe and USA for the extraction of bioactive (curcumin) compounds from turmeric for the use of medicine and cosmetics industry.

04.05: Marketing and distribution

Ethiopia is a country endowed with many spices products. The sub-sector of spices is among one of the critical components of the agricultural sector in Ethiopia as it contributes to the enhancement of the Ethiopian economy and ensuring food security. In Ethiopia, the spices sub- sector had remained under-utilized and neglected and subsequently the level of production in the country is far below the global standard (Shimelis, 2021). By adding values to spice products and processing part of them, the nation exports spice to various parts of the world. Spice is, therefore, one area

that helps the country to gain foreign currency income. The producer (i.e) farmer who cultivates turmeric has three options to market their produce: through commission agents, through regulated market and through co-operative marketing society.

The bulk of the turmeric produced in Ethiopia is consumed domestically. Ethiopia is currently one of the largest consumers of spices in Africa, since over 90% of spice crops produced in the country are consumed domestically. Domestic consumption is growing fast because of increases in income, rapid population growth, and greater urbanization. Only a small portion is exported to China, Djibouti, Egypt, Europe, India, Kenya, Morocco, Saudi Arabia, Sudan, Tanzania, USA and Yemen (Shimelis, 2021).

04.05.01: Import-Export Trends of Turmeric in Ethiopia

Turmeric has very small amount of import in compared with the export one. The data obtained from Ministry of Industry indicates that in 2022 maximum import of 41.8 metric ton of turmeric with a market value of $62.99 thousand. Surprisingly 98% of the import volume (41.1) comes from India with a market value of $46.94 thousand. The unit purchase value was 1142 USD per metric ton whereas at the same year Ethiopia sells turmeric to India with a market value of 696.35 USD per metric ton; export 4,826 metric ton with $3,360.59 thousand (WITS, 2024).

Table 3: Ethiopian Turmeric Import-Export data from 2018-2022

Year	Import Trade Value 1000USD	Import Quantity (Tone)	Export Trade Value (1000USD)	Export Quantity (Tone)
2018	2.33	0.504	3,902.03	4482.81
2019	7.46	4.5	6,108.18	9112.71
2020	1.63	1.324	3,915.28	6741.44
2021	62.99	41.801	5,979.19	9087.55
2022	69.4	5.999	2,568.13	3773.34

The data showed that the export volume significantly reduced in 2022, 58.47% reduction in volume export as compared to 2021 export. Ato. Abdu Mohammed, the owner of Abdu Mohammed Import and export plc actively engaged in turmeric export, explained that for the last two years the raw turmeric supply to the market reduced by 2/3 because of the illegal market of turmeric to Kenya.

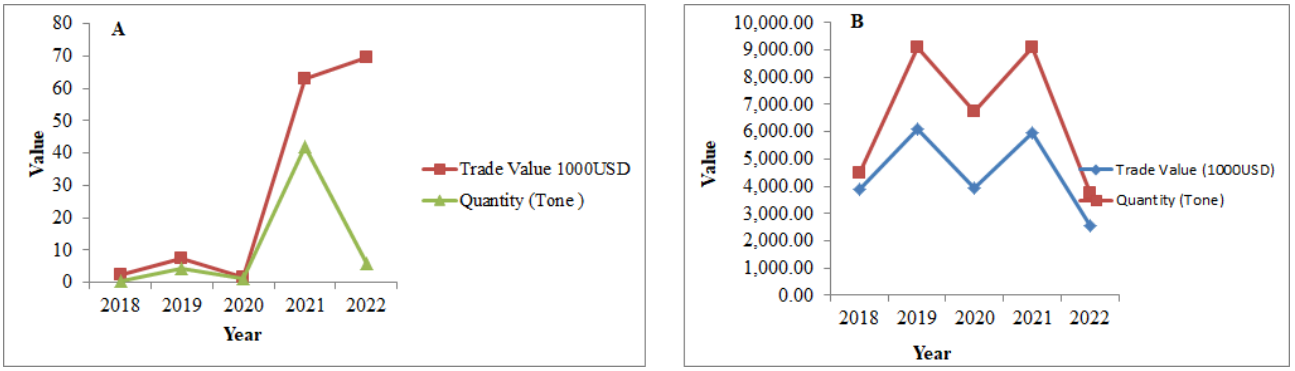


Figure 9: Ethiopian Turmeric Import-export trend (2018-2022):
Source: Ethiopia Ministry of Industry (2024)

04.05.02: Market Share and Export Destination

In 2018, Ethiopia's turmeric (Curcuma) exports totaled $3,902.03 thousand, with a quantity of 4,482.8 metric tons. The main export destinations were:

- **India**: $2,658.68 thousand (2,967.7 tons)
- **Bangladesh**: $308.76 thousand (306 tons)
- **Egypt**: $249.92 thousand (292 tons)
- **Iraq**: $162.29 thousand (224 tons)
- **Yemen**: $152.08 thousand (199.5 tons)

In contrast, in 2022, the total exports dropped to $2,568.13 thousand, with a quantity of 3,773.34 tons. The key export destinations were:

- **India**: $1,275.43 thousand (1,690 tons)
- **United** Arab Emirates: $416.82 thousand (684.5 tons)
- **Egypt**: $196.12 thousand (267.75 tons)
- **Iraq**: $163.60 thousand (280 tons)
- **Turkey**: $137.94 thousand (155 tons)

Country	2018	2019	2020	2021	2022	5 year average	5 year average %
India	2,658.68	3,737.83	2,252.81	3,360.59	1,275.43	2,657.07	61.04
Bangladesh	308.76	28.44	112.98	98.21	62.75	122.23	2.81

Country	2018	2019	2020	2021	2022	5 year average	5 year average %
Egypt, Arab Rep.	249.92	706.69	412.67	500.73	196.12	413.23	9.49
Iraq	162.29	326.92	165.53	262.77	163.60	216.22	4.97
Yemen	152.08	290.94	404.46	120.03	46.80	202.86	4.66
UnitedArab Emirates	76.88	390.31	265.66	775.34	416.82	385.00	8.84
Morocco	74.76	52.63	12.59	53.94	0.00	38.78	0.89
Jordan	58.40	42.57	41.27	19.28	19.37	36.18	0.83
Saudi Arabia	37.39	70.44	52.78	0.00	30.66	38.25	0.88
Malaysia	27.51	28.38	25.89	45.84	64.82	38.49	0.88
Vietnam	27.31	166.50	20.33	140.30	0.00	70.89	1.63
Turkey	22.99	40.98	101.85	134.38	137.94	87.63	2.01

Country	2018	2019	2020	2021	2022	5 year average	5 year average %
Pakistan	0.00	0.00	0.00	109.90	121.79	46.34	1.06

The data computed from world integrated trade solution (WITS, 2024) indicated that for the last five year, 2018 – 2022, the Ethiopia turmeric export destination country was India with a lion share of 61% followed by Egypt (9.5%), United Arab Emirate (8.85%), Iraq (5%), Yemen (4.66%), Bangladesh, Turkey, Vietnam, Pakistan etc.

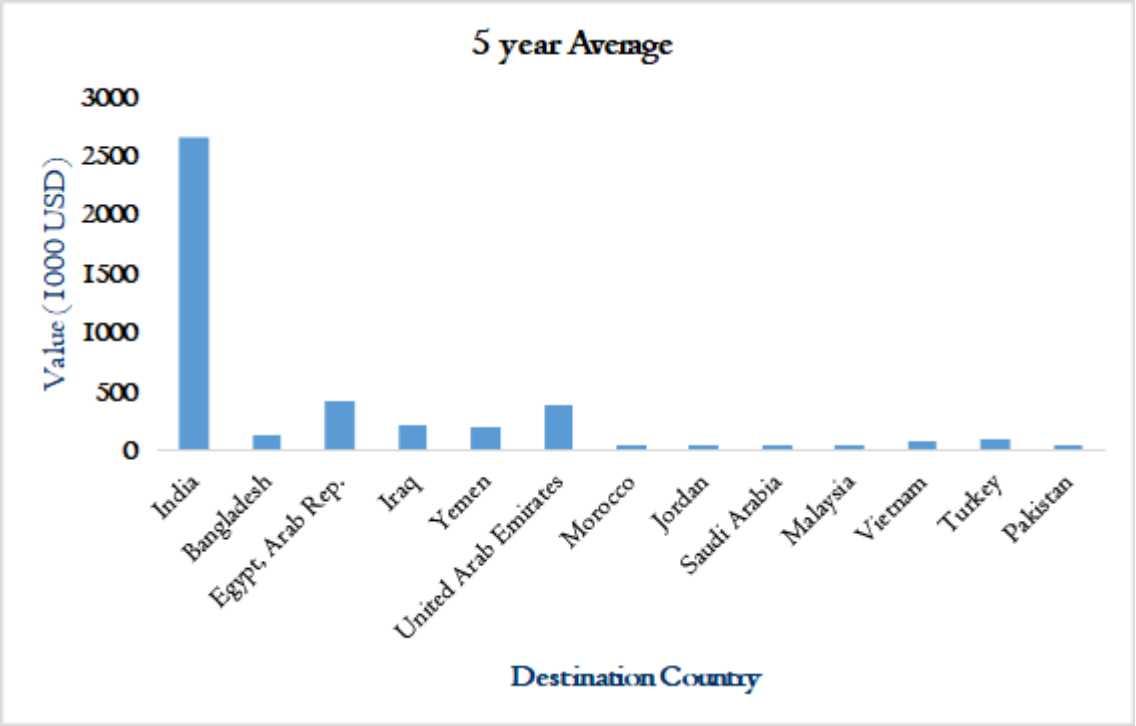


Figure 10: Export destination country of turmeric with Five years average trade value (1000USD) (2018-2022)

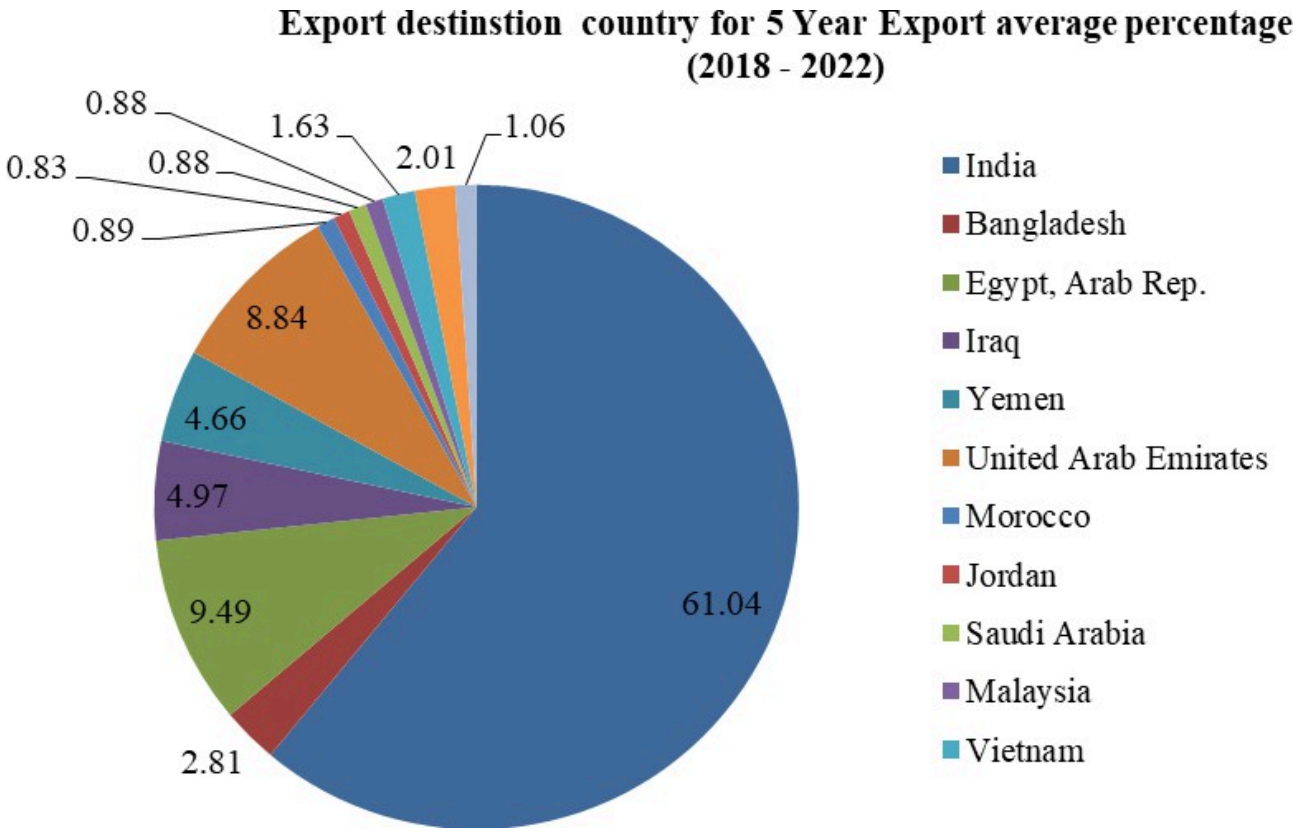


Figure 11: Export destination Country 5 Years Average percentage

The data from Organization for Economic Co-operation and Development indicates that in 2022 the top exporters of Turmeric (curcuma) were India ($226M), Burma ($19.6M), Fiji ($11.5M), Netherlands ($10.3M), and Indonesia ($9.75M) with a percentage contribution of 63.8%, 5.55% and 3.25%, 2.9% and 2.75% respectively. Whereas when we look at the top importer data the top importers of Turmeric (curcuma) were United States ($44.1M), Bangladesh ($28.7M), India ($26M), United Arab Emirates ($17.4M), and China ($15.8M) with 12.5%, 8.09%, 7.33%, 4.9%, and 4.47% respectively (OECD, 2024).

05: BUSINESS OPPORTUNITIES IN THE TURMERIC VALUE CHAIN

Turmeric VC exhibits various opportunities, which both exist and anticipated ones to allow commendable interventions by core value chain actors and other stakeholders as supporters. Generally, the opportunities are related: among others, to availability potential labour force, room for research and development, and extension service delivery, room for new technologies to improve turmeric processing, and existence of unmet global market demand for organic products. Development interventions to scale up turmeric production, marketing and use will also create valuable opportunity for derived infrastructure development with a backward-and- forward linking dynamics. The following sections discuss potential opportunities to be considered from producers, processors and exporters perspectives in line with the respective value chain activities they are in.

05.01: Opportunities for Smallholder Farmers

As primary actors in the value chain, smallholder turmeric farmers have got valuable opportunities to diversify their spice products parallel to turmeric production with the available manpower that is engaged on other stapple food crop cultivation. The current intercropping practice gives good opportunity for efficient use of arable land that can be availed for turmeric production.

Opportunities are wide open for additional VA practices at farm level including using high yielding varieties to scale up productivities, to accommodate more labor force (as employment opportunities) for local youth and women community members. With due emphasis to the sector from government and other stakeholders, farmers have better opportunity to expanding the currently practiced intercropping and further engagement in relatively larger farm plots.

The current practice of fragmented and individually practiced turmeric production in small plots could be expanded with collective approach that can bring better productivity – in terms of volume, quality and marketing power to support their livelihood.

05.01.01: Improving productivity and quality

There is a potential for improving the productivity of turmeric production in terms of per hectare yield pertaining to the scalable productivity gap observed between; for instance, estimated yield of 2.4 tons per hectare in Ethiopia compared to 4.0 tons per hectare in India1. Quality wise, producer farmers have better opportunity to comply with the necessary quality in terms of odour, flavour and colour, physical and chemical characteristics. Above all, Ethiopia‘s turmeric product is known for its highly organic nature that renders a great quality feature to be highly demanded in the world market.

The current turmeric VC practices also open opportunities for adding values to raw products, and bringing higher standard quality products to meet international market requirements and also chances for reaching new market segments and locations.

05.01.02: Access to finance and inputs

The current situation of smallholders‘ inefficient and low productive turmeric production creates an important room for financial services to be attracted to this sector given the necessary policy attention is in place by concerned government and non-government stakeholders. Having the potentials for and the currently existing global market participation to bring foreign currency to domestic markets, turmeric production has better opportunity to access financial resources from banks and microfinances operating in the country. Availability of different financial institutions both as public and private entities to leverage financial resource supports could be considered as an opportunity to be harnessed to develop the turmeric production and marketing. Existence of the development bank of Ethiopia – as a policy-oriented bank is another opportunity to be opted for scale up turmeric production/marketing.

In the case of access to inputs, with the growing demand for turmeric products both in domestic and international markets, turmeric production and marketing is said to have better opportunity for input supply businesses (to operate in areas of seed, fertilizer, chemical inputs and farm tools and machineries), creating better job opportunities for those who engage in such businesses, and also creating good avenue for research and development activities that strive to make better productivities and marketing.

05.01.03: Collective marketing strategies

Apart from the collective approaches to be adopted for turmeric production, small turmeric producers have also the opportunity to cooperate as marketing clusters to reap competitive advantages in terms of economy of scale – that could bring more advantages due to shared costs for storage, transportation, processing, etc. in addition, chances of under capacity utilization of the available and newly to be introduced advanced technologies, such as boiler, drier and grinder machineries will be solved. For local traders, collective marketing strategies would create good

opportunity for minimizing the artificial market price distortions that informal brokers or middle men are creating in the market that tend to affect formally registered traders negatively. With such collective strategies, traders will have better opportunity for negotiating on the prices that put them advantageous – getting the unmet demand in the market. Further, such collective approaches ease the opportunity to have strong networking and access to information with other market actors and have better marketing relationships, trustworthiness and sharing best practices.

05.02: Opportunities for Processors and Value-adders

Turmeric production/marketing is known by its intensive processing phases - in tandem to produce the most refined and standardized turmeric product to the final consumer. Across turmeric value chain, there are various value addition activities ranging from simple manual differentiation of non-turmeric materials and sorting to highly automated and machine-assisted purifications in laboratories (which are not practiced currently) - like Curcumin and oleoresin extractions. The various forms of value-added turmeric products included such as: Turmeric Oleoresin (a resin-like

viscous material obtained when a spice is extracted with a hydrocarbon solvent), Turmeric Drops, Curcumin Powder, Golden (Turmeric) Milk, and Turmeric Powder 2 (as ingredients in food recipes and turmeric tea, etc.). Therefore, such a wide range of value addition requirements in turmeric obviously call for engagement in processing business – as investment opportunity. Turmeric processing opportunity is also believed to bring extended needs for processing or milling/grinding of other spices like chillis and corianders.

05.02.01: Product Diversification

From diversification perspective, turmeric product have the potential to be used in the form of turmeric whole, turmeric powder or turmeric extracts. In either form, it is used as food ingredient or spice, natural medicinal use (having anti-viral and anti-cancer effects, ayurvedic drug preparations, antiseptic, and anti-inflammatory 3), coloring material, cosmetic products like hand – or machine-processed turmeric incense products/sticks and as flavoring agent. Other chances for turmeric by-products include construction bricks formation - as reported by some practitioners.

2 Source: https://pmfme.mofpi.gov.in/pmfme/newsletters/enewsaugust5.html
3 https://agritech.tnau.ac.in/banking/pdf/Tumeric.pdf ,
https://ethiocta.gov.et/wp-content/uploads/2022/09/ECTA-Major-Spices-Booklet-.pdf

05.02.02: Enhancing processing capabilities

Turmeric processing plants are operating under-capacity due to various factors among which are: variations in weather condition, raw turmeric input supply variations following cropping calendar, power supply, low level of farm productivity, etc. Hence, poor practices in turmeric processing – such as harvesting, sweating (removing the leaves and roots), boiling, drying, polishing, grinding, extracting, grading, and storing and the under-capacity utilization of processing of machineries imply existence of opportunities to bridge the prevailing gaps.

05.02.03: Securing reliable supply and quality raw materials

According to interviews with experts from the Ministry of Agriculture and the Ethiopian Agricultural Research Institute, several opportunities must be leveraged to ensure a sustained and reliable supply of raw turmeric. These include a favorable climate, the availability of arable land suitable for turmeric cultivation, and the presence of a skilled workforce to engage at all levels of the turmeric value chain. In this regard, opportunities also exist for value chain upgrading and bringing initiatives to incentivize turmeric suppliers to supply adequate raw or semi-processed products in a reliable continuity and quality standards. Such opportunity lines are also expected to bring derived need for new research and innovativeness agendas to increasing productivity as well as better chances for education, training, and awareness creation schemes.

05.3: Opportunities for exporters

As per a report on ECTA‘s Major-Spices-Booklet Ethiopia is said to be —one of the biggest producers and exporters of turmeric in Africa. The bulk of the Turmeric produced in Ethiopia is consumed domestically. Only a small portion is exported to Neighboring Countries (Sudan, Kenya, Djibouti, and Egypt), Asia, the Middle East, and the USAǁ. Web sourced data indicated that, from Feb 2023 to Jan 2024, about 79 Ethiopia Exporters have transacted with 100 Buyers worldwide (marking a growth rate of 30% compared to the preceding twelve months). However, there is also a feeling that there is globally unmet demand in Africa and in the wider global turmeric market destinations. According to Volza's Turmeric Import data, there are a total of 39,252 Turmeric Importers worldwide–which shows potentially a significant number of importers are yet to be connected given both qualitative and quantitative standards are met with competitive advantages upheld. Same global trade data source indicated that most of the Turmeric exports from Ethiopia go to the India, United Arab Emirates, and Egypt – while still

potential market destinations are open towards other leading importers like Bangladesh, Japan, Sri Lanka, United Kingdom, Malaysia, South Africa, Netherland and Saudi Arabia and United States of America. There are also revealed unbalanced numbers of more buyers as compared to suppliers in the world turmeric market (i.e 39,252 buyers versus 17,987 suppliers4). Global demand for turmeric curcumin marketing size projected to increase significantly from $ 80.8 million in 2022 to $126.8 million in 2028. [5]

05.03.01: Meeting international quality and safety standards

According to the discussion made with turmeric processors/exporters for this study, and newspaper post [6], Ethiopia's traditional method of boiling and drying turmeric spices employed by farmers has proven to be a hindrance to conform with global quality standards. The outdated technique that often results in overcooking or undercooking the turmeric compromise the product's quality and diminishing its value in the global marketll. Various quality parameters are set to be conformed with in international markets or competitiveness – both in organoleptic (referring to the general appearance such as fracture, flavor/taste, texture, the aroma of the medicinal plant and is the first step towards the authentication of turmeric and other medicinal plants) and macroscopic evaluation parameters (that involves different tools or methods related to botanical anatomy to measure the parts of the plant) [7].

Hence, Ethiopia's reportedly low level of quality standards imply existence of good opportunities for quality improvement with due emphasis to comply with international markets.

05.03.02: Developing brand recognition and market positioning

In congruence to the endeavors to be made to comply with international quality standards, striving for branding Ethiopia's turmeric product should gain equal attention by all actors. Promoting what Ethiopia's turmeric is and its unique identity – like having high level of Curcumin concentration and its highly organic features. So, opportunities are wide to make branding for Ethiopia's Turmeric making detailed assessments to get more buyers through

4 https://www.volza.com/p/turmeric/buyers/
5https://www.frontiersin.org/journals/sustainable-food-systems/articles/10.3389/fsufs.2024.1359040/pdf
6https://www.capitalethiopia.com/2024/01/08/obstacles-threaten-ethiopian-turmeric-export-growth-spice-industry-seeks-solutions/
7 For detailed standard quality parameters please refer to the following web resources:
-https://www.researchgate.net/publication/349745934_A_Comparative_Review_on_the_Standard_Quality_Parameters_of_Turmeric
-https://www.cbi.eu/market-information/natural-ingredients-health-products/turmeric/market-entry

widening its popularity, get recognition - both in local and international markets. Worthy of note, to effectuate the branding objective, due national policy recognition and strategic roadmap is expected to be prepared with the necessary resources mobilization and consistent communication.

05.04: Job opportunity for young entrepreneurs

Ethiopia presents significant opportunities for young entrepreneurs in the agribusiness. The country's agricultural sector is gaining competitiveness, and spices like turmeric are in demand due to their health benefits and culinary uses. By leveraging the growing interest in agribusiness and exploring partnerships with international organizations focused on entrepreneurship development, young entrepreneurs can position themselves effectively in the turmeric market.

Based on the different assessments made so far and the recommendations forwarded during discussion with various stakeholders in this study, as well as the objectives of the study as

identified in the TOR to engage youth entrepreneurs in the commodity under study (Turmeric production and marketing) by the chamber, a preliminary project/program entry plan is proposed. Accordingly, with the assumption that one youth group/association with one project administrative committee (composed of 6 members as administrators), 2 Machine Operators and 25 contractual labourers, a tentative total cost of ETB 5,397,392.00 (USD 49,062.00) is proposed. The following table shows the different costs – including machinery procurement, installation and other operational costs for one year.

Table 5: AACCSA Youth IGA Support in Turmeric Production and Marketing: Project Startup Cost Estimates

Project Name: AACCSA Youth IGA Support in Turmeric Production and Marketing
Youth Group Name: "Area Turmeric Production & Marketing Youth Association"
Year Of Establishment: 2025
Exchange Rate of Birr to USD (Average) [1 USD = 110 ETB] [1 ETB=0.0091 USD]

ITEM	Average Cost (Rate) of Cost Items (Birr)	UNIT	Number/ Qtty of Units	Total Amount (Birr)	Total Amount (USD)	Note
LABOR [Annual Lump Sum]				**ETB 2,280,000.00**	**USD 20,727.27**	
Project/Association Chairperson [1]	ETB 10,000.00	Month	12	ETB 120,000.00	USD 1,090.91	
Project Manager [1]	ETB 8,000.00	Month	12	ETB 96,000.00	USD 872.73	
M&E Officer [1]	ETB 6,000.00	Month	12	ETB 72,000.00	USD 654.55	
Finance Officer (Accountant) [1]	ETB 6,000.00	Month	12	ETB 72,000.00	USD 654.55	

ITEM	Average Cost (Rate) of Cost Items (Birr)	UNIT	Number/ Qtty of Units	Total Amount (Birr)	Total Amount (USD)	Note
Cashier [1]	ETB 5,000.00	Month	12	ETB 60,000.00	USD 545.45	
Machine Operators [2]	ETB 5,000.00	Month	12	ETB 60,000.00	USD 545.45	
Contract Workers	ETB 150,000.00	Month	12	ETB 1,800,000.00	USD 16,363.64	*
Subtotal Labor				**ETB 2,280,000.00**	**USD 20,727.27**	
FRINGE BENEFITS [Lump Sum] (5%)	ETB 9,500.00			**ETB 114,000.00**	**USD 1,036.36**	
Project/Association Chairperson [1]	ETB 500.00	Month	12	ETB 6,000.00	USD 54.55	
Project Manager [1]	ETB 400.00	Month	12	ETB 4,800.00	USD 43.64	
M&E Officer [1]	ETB 300.00	Month	12	ETB 3,600.00	USD 32.73	

ITEM	Average Cost (Rate) of Cost Items (Birr)	UNIT	Number/ Qtty of Units	Total Amount (Birr)	Total Amount (USD)	Note
Finance Officer (Accountant) [1]	ETB 300.00	Month	12	ETB 3,600.00	USD 32.73	
Cashier [1]	ETB 250.00	Month	12	ETB 3,000.00	USD 27.27	
Machine Operators [2]	ETB 250.00	Month	12	ETB 3,000.00	USD 27.27	
Contract Workers	ETB 7,500.00	Month	12	ETB 90,000.00	USD 818.18	
Subtotal Benefits				**ETB 114,000.00**	**USD 1,036.36**	
TRAVEL [4 Person/Year]				**ETB 12,000.00**	**USD 109.09**	
Transport Cost	ETB 2,000.00	Cost/Day/person	4	ETB 8,000.00	USD 72.73	

ITEM	Average Cost (Rate) of Cost Items (Birr)	UNIT	Number/ Qtty of Units	Total Amount (Birr)	Total Amount (USD)	Note
Per Diem - Meals & Incidental Expenses	ETB 500.00	Cost/Day/person	4	ETB 2,000.00	USD 18.18	
Lodging	ETB 500.00	Cost/Day/person	4	ETB 2,000.00	USD 18.18	
Subtotal Travel				**ETB 12,000.00**	**USD 109.09**	
MACHINE & EQUIPMENT [Annual Total - Startup Cost]				**ETB 3,266,058.00**	**USD 29,691.44**	
Cleaning and washing Machine (1 ton/hr)	ETB 135,000.00	Piece	1	ETB 135,000.00	USD 1,227.27	
Semi Automatic Stainless Steel Slicer (0.5 ton/hr)	ETB 101,000.00	Piece	1	ETB 101,000.00	USD 918.18	
Mobile Turmeric Steam Boiler/cooking	ETB 450,000.00	Piece	1	ETB 450,000.00	USD 4,090.91	

ITEM	Average Cost (Rate) of Cost Items (Birr)	UNIT	Number/ Qtty of Units	Total Amount (Birr)	Total Amount (USD)	Note
Machine (1500 Kg/Hr)						
Polishing Machine (1 ton/Hr)	ETB 932,000.00	Piece	1	ETB 932,000.00	USD 8,472.73	
Drying Machine (Semi-Automatic)	ETB 83,400.00	Piece	1	ETB 83,400.00	USD 758.18	
Grinding Machine	ETB 113,000.00	Piece	1	ETB 113,000.00	USD 1,027.27	
Sieving Machine (500 KG/Hr)	ETB 173,000.00	Piece	1	ETB 173,000.00	USD 1,572.73	
Installation Costs	ETB 94,320.00	Piece	1	ETB 94,320.00	USD 857.45	
Transportation/Shipping Cost	ETB 550,000.00			ETB 550,000.00	USD 5,000.00	
Taxation	ETB 735,338.00			ETB 735,338.00	USD 6,684.89	

ITEM	Average Cost (Rate) of Cost Items (Birr)	UNIT	Number/ Qtty of Units	Total Amount (Birr)	Total Amount (USD)	Note
Subtotal - Machine & Equipment				**ETB 3,266,058.00**	**USD 29,691.44**	
Supplies [Lump Sum]	ETB 30,000.00			**ETB 30,000.00**	**USD 272.73**	
CAPACITY BUILDING				**ETB 6,192,058.00**	**USD 56,291.44**	
Package (per person/day)	ETB 125,000.00	ETB/person/day	2	ETB 250,000.00	USD 2,272.73	** **
Office Rent	ETB 10,000.00	Month	12	ETB 120,000.00	USD 1,090.91	
Office Utilities and Supplies	ETB 7,000.00	Month	12	ETB 84,000.00	USD 763.64	
Accommodation Expenses	ETB 3,000.00	Month	12	ETB 36,000.00	USD 327.27	
Sub total				**ETB 6,192,058.00**	**USD 56,291.44**	

ITEM	Average Cost (Rate) of Cost Items (Birr)	UNIT	Number/ Qtty of Units	Total Amount (Birr)	Total Amount (USD)	Note
Contingency Allowance (10%)	ETB 619,205.80			**ETB 619,205.80**	**USD 5,629.14**	
Grand TOTAL COST				**ETB 6,811,263.80**	**USD 61,920.58**	

05.5: Remarks on Scalability and Bankability of Envisaged IGA Scalability

With all the necessary and commendable efforts and commitments in place, the proposed youth centered turmeric production; processing and marketing opportunities are deemed to be scalable towards increasing global and domestic market demands – periodically scaling up performances in terms of quantity and quality. The project will handle its segmented as well as diversified marketing with simultaneously increasing youth work force (and association members) as well as fulfillment of all the necessary financial and material resources.

Bankability:

Given the above project startup financial requirements and further viability and scalability aspects are closely monitored, the project is expected to continually generate enough cash flow to that would make it good candidate for obtaining financial credit sources. With the virtues of competitiveness in the sector, and the support by all stakeholders, the youth led turmeric businesses can attract more funds via financial service providers. Worth mentioning, the key success factors for the project's bankability will basically lie on considerations of overall cost-benefit situation. In this regard, apart from the expected competitive performances of the project itself, the supports from organizing entities - in terms of technical, material, financial (including provision of hard currency and fiscal supports), administrative and political supports should be given proper consideration to ensure the bankability or creditworthiness of this project.

05.06: Value Chain Assessment of Turmeric production & marketing

Due to its medicinal, cosmetics and nutritional values, turmeric is getting an important market value and providing employment opportunities for small farmers and other actors.

Turmeric Value Chain Functions:

As illustrated in the value chain map here under, in the course of turmeric value chain there are input supply, production, aggregation, processing, trading and exporting functions while delivering to the ultimate international markets and household uses.

Primary processing of turmeric products assumes both households/subsistence level and commercial purpose processing where at farmers levels (which could be taken as pre-primary processing) encompasses such activities as harvesting, cleaning, separation of rhizomes, boiling and drying at farm sites is carried out in traditional ways. The commercial processing is done by

a more organized agro-processing plants established by private processers assisted with automated and power using machineries that make polishing and sorting to some extent. The turmeric processing stopes at semi-processed phase – not processed to the upgraded turmeric powder and refined extract levels.

Turmeric Value Chain Actors:

The identified core value chain actors for the Turmeric product include farmers, traders, processors, retailers, processors, exporters and consumers who are involved in the overall value chain ladder. Turmeric farmers are producing individually with no collective actions for acquiring inputs, production, or marketing their products.

Small farmers: sell their turmeric products to small traders and on-farm collectors that sell to a limited number of processors around Adama, Bishoftu and Addis Ababa towns. As complained by research participants, there are some cross border traders who transact informally with traders from neighboring countries like Kenya. Generally, turmeric is cultivated predominantly for commercial purpose with little value addition activities limited to preliminary processing like boiling and drying at farm level.

Input Suppliers: Small farmers cultivate turmeric predominantly using own seeds preserved from previous harvests. No additional improved input supplies are practiced including additional labor hiring practices. Therefore, input suppliers are rarely observed in the turmeric VC.

Traders and Brokers: in the turmeric value chain small traders are engaged and play multitask function as product collectors, brokers–involved as price setters, connecting (or directly selling/reselling) to potential buyers and processors (as intermediaries/agents).

Processors and Exporters: Local turmeric processors in the country are engaged as processors and exporters of turmeric to the international market destination.

Turmeric Value Chain Supporters/Enablers: the primary task of supporting VC development in turmeric production and marketing in Ethiopia is shouldered by such government organization like the spices development and research directorate under Ministry of Industry, Ethiopian Coffee and Tea Authority, Ethiopian Spice Exporters Association, Ministry of Agriculture, Ministry of Trade and industry, Ethiopian custom office ……

Financial intermediary service by banks, insurances and other microfinances are present to give financial services to actors in the turmeric value chain. However, the extent to which these

services are channeled to support turmeric products in Ethiopia is said to be unsatisfactory, as explained by the processors/exporters.

The following figure illustrates the generic value chain map of turmeric product showing the various functions, actors and enablers/supporters:

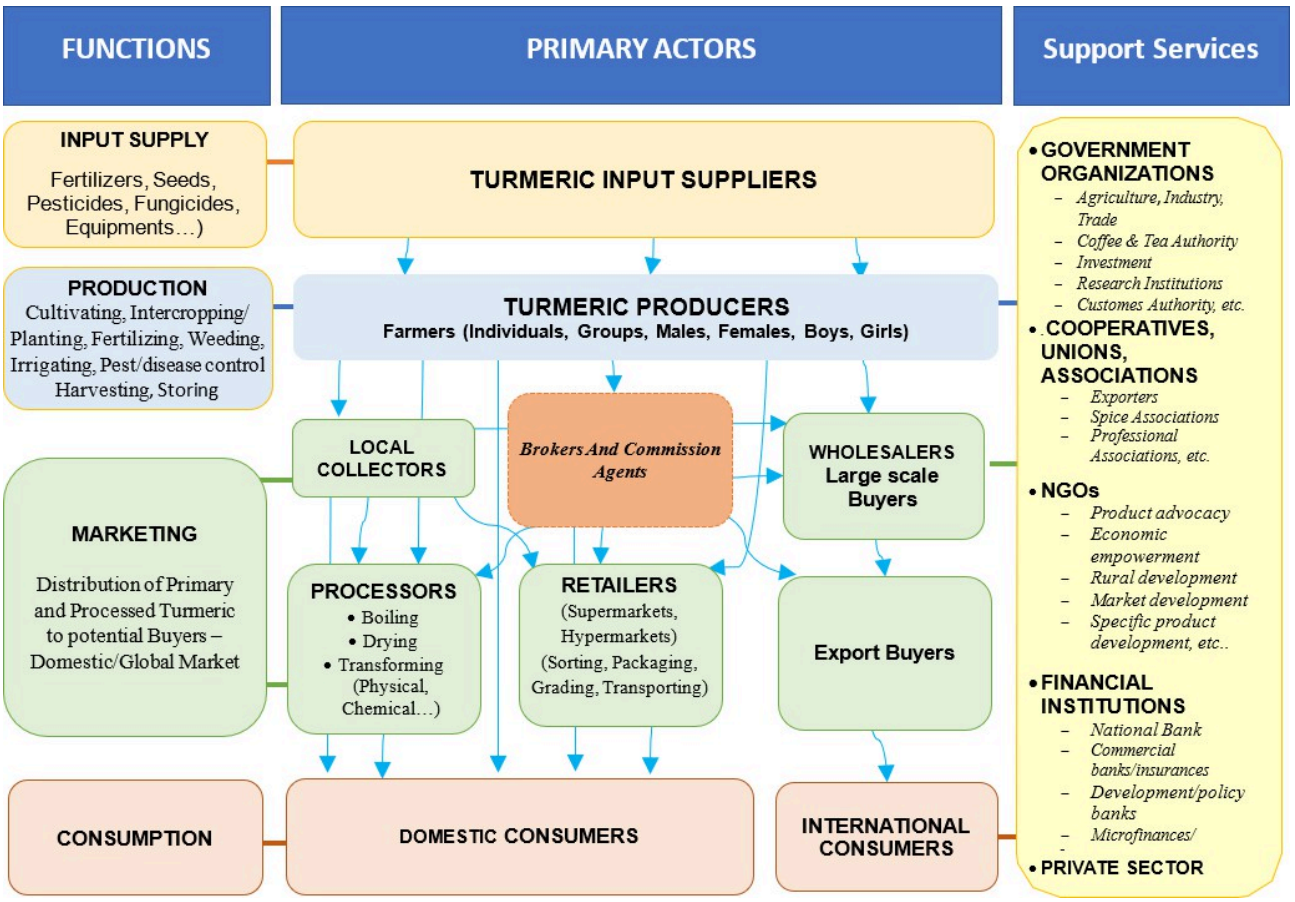


Figure 12: Generic Value Chain Map for Turmeric Product

Assessment of Marketing Channels:

Turmeric marketing channels portray five important directions/routs showing short to long route – as indicated in the following flow-chart.

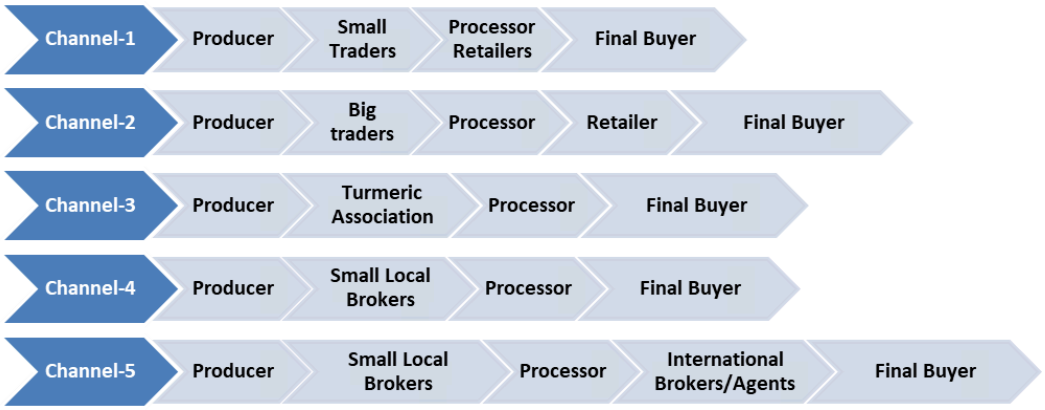


Figure 13: Turmeric Product Value Chain Marketing Channels

The most common and predominant marketing channel practiced is channel-4, whereas discussed with key informants, a significant market price decision role is played by ‗Brokers' in the value chain and negatively influencing market price stability.

06: Challenges and Constraints in the Turmeric Value Chain

06.01: Production-related challenges

Ethiopia's turmeric production faces several challenges that limit the industry's growth and competitiveness. These challenges are primarily related to access to improved agricultural inputs and practices, as well as effective pest and disease management.

06.02: Access to improved seeds and cultivation practices

According to interview made with an expert from Ministry of Agriculture, one of the major production-related challenges is the limited availability and adoption of improved turmeric varieties and cultivation practices. Smallholder farmers in Ethiopia predominantly use traditional turmeric cultivars, which often have lower yields and reduced tolerance to pests and diseases (Tesfaye et al., 2020). The lack of access to high-yielding, disease-resistant planting materials hinders the productivity and quality of turmeric production.

Moreover, the experts informed the adoption of recommended agronomic practices, such as proper land preparation, optimal planting density, timely weeding, and appropriate fertilizer application, is often low among smallholder farmers. This is due to various factors, including limited extension services, inadequate access to inputs, and financial constraints faced by small- scale producers (Gizachew et al., 2018).

Interview with processors indicated that smallholder turmeric producers in Ethiopia often rely on intercropping turmeric with other crops, such as maize or sorghum, due to the limited availability of

land. This practice can help diversify their income, but it may also result in suboptimal growing conditions and lower turmeric yields (Abebe et al., 2019). Large-scale farmers in Ethiopia also face challenges in securing sufficient land for dedicated turmeric production, as the crop is often not prioritized for large-scale farming compared to other more widely cultivated staple crops (Zerihun et al., 2021).

Furthermore, as it is evident from the interview held among the stakeholders, the current practice of turmeric production in Ethiopia is not primarily market-driven but rather influenced by the local farmers' cultural beliefs and traditions. Many smallholder farmers believe that growing turmeric is a blessing, and they continue to cultivate it based on these beliefs rather than focusing on market demands and profitability (Tesfaye et al., 2020). This can lead to a mismatch between

the production patterns and the actual market needs, further hindering the competitiveness of the Ethiopian turmeric industry.

The interview with the stakeholders from agricultural experts from Ministry of Agriculture, improper harvesting time is another challenge that can lead to significant losses in turmeric production. Harvesting the rhizomes at the wrong maturity stage can result in lower yields, reduced quality, and decreased market value (Gizachew et al., 2018). Smallholder farmers in Ethiopia often lack the knowledge and experience to determine the optimal harvesting time, leading to suboptimal post-harvest quality and economic losses.

06.02.01: Pest and disease management

The interview with the stakeholders from agricultural experts from Ministry of Agriculture turmeric cultivation in Ethiopia is also challenged by the prevalence of various pests and diseases, which can significantly impact crop yields and quality. The most common pests affecting turmeric include rhizome rot, leaf spot, and nematodes, while the primary diseases include bacterial wilt, viral diseases, and fungal infections (Zerihun et al., 2021). These biotic stresses can lead to substantial yield losses and quality degradation if not effectively managed.

Smallholder farmers often lack the knowledge, resources, and access to appropriate pest and disease management strategies, such as the use of resistant cultivars, targeted pesticide application, and integrated pest management (IPM) techniques (Abebe et al., 2019). The limited availability and high cost of effective plant protection products further exacerbate the challenge of managing these production constraints.

06.02.02: Post-harvest and processing challenges.

In addition to production-related challenges, the turmeric value chain in Ethiopia faces significant hurdles in the post-harvest and processing stages, which can undermine the quality and competitiveness of the final product.

06.02.03: Boiling, Drying and storage facilities

After the turmeric is harvested from the land, the next operations in the value chain are boiling and drying. These processes are typically carried out by smallholder farmers on their farmland using traditional methods. According to turmeric processors, the boiling process is a tedious and labor-intensive task, as farmers use a boiling pan and wooden fuel manually in the open air, often

during the night due to the lack of accessibility to other energy sources (Tesfaye et al., 2020). This traditional boiling practice results in poor quality boiled and cleaned turmeric due to non- uniform temperature distribution in the pan, which leads to variations in temperature from the bottom to the top of the pan (Tesfaye et al., 2020).

On the other hand, the existing drying process involves spreading the turmeric on the farmland, which subjects the produce to discoloration and fungal attacks, further affecting the productivity and quality of the turmeric production (Tesfaye et al., 2020). Proper post-harvest handling and processing are crucial for maintaining the quality and value of turmeric. However, smallholder farmers often lack access to adequate drying and storage facilities, leading to suboptimal product quality (Tesfaye et al., 2020). The turmeric processors indicated that the lack of proper drying techniques and storage infrastructure can result in moisture retention, discoloration, and microbial contamination, ultimately reducing the market value of the turmeric.

06.02.04: Processing technology and know-how

According to the owner of turmeric processing company, the processing of turmeric is also hampered by the limited availability and adoption of appropriate processing technologies and know-how. Smallholder farmers and small-scale processors often rely on traditional and labor-intensive methods for activities such as cleaning, polishing, grinding, and packaging, which can be inefficient and result in inconsistent product quality (Gizachew et al., 2018).

The lack of access to modern processing equipment, such as efficient drying systems, automated cleaning and grading machines, and high-capacity grinding mills, hinders the industry's ability to produce value-added turmeric products that meet international quality standards (Zerihun et al., 2021). Additionally, the limited technical knowledge and skills among processors, particularly in areas like product development, packaging, and food safety, pose challenges to the overall competitiveness of the Ethiopian turmeric industry.

The interviews conducted with the owners of turmeric processing and exporting businesses revealed that their financial capability to adopt value-adding technologies is quite limited. According to the processors, the high upfront costs of value-adding machines, such as specialized extraction equipment to isolate and concentrate the active compounds, such as curcumin, from the turmeric pose a significant barrier to upgrading their operations. This can include equipment like solvent extractors, evaporators, and crystallizers, which can help produce

high-value turmeric extracts for pharmaceutical, cosmetic, or food applications. Many of these processors have limited access to affordable financing options, such as loans or grants, that could help them acquire the necessary technology.

Furthermore, the processors highlighted the absence of strong financial support mechanisms from the government or development agencies that could incentivize and enable them to invest in

value-adding infrastructure. The lack of access to subsidies, tax credits, or low-interest financing schemes makes it challenging for these businesses to justify the capital expenditure required for modernizing their processing capabilities.

The financial constraints faced by the processors directly impact their ability to implement more efficient and effective turmeric processing methods. Without the necessary equipment and technology, they are forced to rely on traditional, labor-intensive, and often suboptimal processing techniques, which result in lower product quality and reduced market competitiveness.

To address this challenge, policymakers and development organizations should explore ways to strengthen the financial capacity of these turmeric processors, such as by providing access to affordable credit, establishing public-private partnerships, or introducing targeted incentive programs. Empowering these small and medium-sized enterprises to invest in value-adding technologies could significantly improve the overall quality and market positioning of Ethiopian turmeric, thereby enhancing the livelihoods of smallholder farmers and the overall competitiveness of the sector.4.3. Marketing and trade-related challenges

The turmeric value chain in Ethiopia also faces significant challenges in the marketing and trade aspects, which can limit the industry's access to both domestic and international markets.

06.03: Regulatory and policy issues

Based on the interview with processing companies‘ processors, the turmeric industry is subject to various regulatory and policy-related challenges that can hinder its growth and development. These include:

Inadequate quality standards and enforcement mechanisms: The lack of well-defined and consistently enforced quality standards for turmeric products, both for domestic and export

markets, makes it difficult for Ethiopian producers and processors to ensure the consistent quality of their offerings (Tesfaye et al., 2020).

Complex and bureaucratic trade procedures: The export of turmeric from Ethiopia is often hindered by complex and time-consuming trade procedures, including cumbersome documentation requirements, inefficient customs clearance, and limited trade facilitation measures (Zerihun et al., 2021).

Limited government support and coordination: The turmeric industry in Ethiopia often lacks comprehensive government support in the form of targeted policies, investment incentives, and coordinated efforts to address the various challenges faced by actors along the value chain (Abebe et al., 2019).

These regulatory and policy-related challenges contribute to the limited competitiveness of Ethiopian turmeric in both domestic and international markets, and hinder the industry's ability to capitalize on the growing global demand for this valuable spice.

07: Case Study

07.01: Sets General Trading PLC (Tsehay Feleke and Family Trading)

1. Background of Sets General Trading PLC (Tsehay Feleke and Family Trading)

Sets General Trading PLC, founded in 1994, to create a premier turmeric processing and export business in Ethiopia. The company began its journey with a processing facility and established connections with local turmeric farmers. Sets General Trading has experienced strengthening its supply chain while forging robust relationships with international buyers.

Located in Dukem, Sets General Trading operates turmeric processing plant tailored to the heart of Ethiopia's turmeric-growing region. The company sources turmeric rhizomes from several smallholder farmers while there are mediating middle men along the supply chain. It produces polished and dried turmeric products which are exported to markets mainly in Asia.

2. Input Supply of Sets General Trading PLC

Sets General Trading PLC is a prominent player in Ethiopia‘s turmeric processing and export sector, sourcing its primary raw material—turmeric—from smallholder farmers in the country‘s southwest regions, particularly around Mizan Aman and Tepi.

3. Sourcing from Smallholder Farmers

The backbone of Sets General Trading‘s supply chain lies in its network of smallholder farmers. These farmers are essential stakeholders, providing the turmeric that the company processes. By sourcing locally, Sets General Trading not only supports the livelihoods of these farmers but also fosters community development.

However, the supply of turmeric experiences inconsistent due to several factors. Seasonal fluctuations in production mean that there are times when the availability of raw materials is limited. During certain months, the harvest may yield lower quantities, impacting the company's ability to meet its processing targets. Additionally, the influence of illegal markets poses significant challenges. Many farmers may opt to sell their produce to informal buyers who offer higher prices (up to 25 % higher), leaving Sets General Trading vulnerable to supply shortages. This dynamic complicates the company‘s planning and might disrupt its operations.

4. Cost of Raw Materials

Sets General Trading acquires turmeric at a rate of birr 100 per kilogram at the factory gate. This pricing reflects the market conditions and the costs associated with sourcing better quality turmeric. While this price point is competitive, it underscores the challenges presented by the fluctuating market dynamics and the need for the company to maintain good relationships with its suppliers. Ensuring that farmers receive fair compensation is not only ethical but also vital for securing a reliable supply chain.

5. Processing Operations of Sets General Trading PLC

Sets General Trading PLC focuses on the crucial operations of polishing and drying. These processes are essential for transforming raw turmeric into better quality products that meet international standards.

a. Core Processing Operations

The primary operations at Sets General Trading involve two main processes: polishing and drying. Polishing is critical for enhancing the appearance and quality of turmeric, removing impurities and ensuring that the final product is visually appealing to consumers and buyers. Drying, on the other hand, is crucial for preserving the turmeric‘s flavor, aroma, and nutritional properties. Proper drying techniques prevent spoilage and extend the shelf life of the product, making it suitable for export.

The company utilizes equipment to carry out these operations. However, despite the technology, the processing stage does incur a significant amount of waste. The process loss ranges from 20% to 25%, which is a common challenge in agricultural processing. This loss can result from several factors, including the inherent moisture content of the raw turmeric, inefficiencies in the drying process, and residues left after polishing. Managing this loss is essential for maintaining profitability and optimizing resource use.

b. Capacity and Utilization

Sets General Trading has established a production capacity of 1,100 tons of turmeric per year. This figure reflects the company's ambition to utilize the growing demand for turmeric international markets. However, achieving this capacity is contingent upon several variables, including the availability of raw materials and operational efficiency.

Currently, the company operates at a capacity utilization rate of 68%. This percentage indicates that while the production potential is high, there are opportunities for improvement. Factors contributing to this utilization rate include fluctuations in raw material supply, seasonal variations in production, and operational challenges that may arise during the processing phase.

6. Marketing Strategies of Sets General Trading PLC

Sets General Trading PLC has established itself as a key player in the Ethiopian turmeric processing industry, particularly in the export market. With a focus on dried and polished turmeric, the company has successfully tapped into international demand, primarily catering to Indian processing companies. This strategic positioning has allowed Sets General Trading to thrive in a competitive landscape while maintaining a robust customer base.

a. Engaging the Export Market

The global demand for turmeric has been on the rise, driven by its recognized health benefits and culinary uses. Sets General Trading has adeptly positioned itself to capitalize on this growing market by engaging directly with export customers. The company‘s primary focus is on exporting dried and polished turmeric, which is a highly sought-after product in various international markets.

By targeting Indian processing companies, which are among the largest consumers of turmeric globally, Sets General Trading has aligned its offerings with the needs of a significant market segment. These customers require consistent and reliable supply.

b. Product Quality and Demand

The dried and polished turmeric produced by the company undergoes quality control measures to ensure that it meets the expectations of its international buyers. This focus on quality is critical, as it not only supports the company‘s reputation but also aligns with the stringent requirements of export markets.

The company enjoys a stable demand for its products, indicating that its marketing strategies have been effective. With no significant issues related to demand, Sets General Trading is well-positioned to expand its market reach. This consistent demand allows the company to plan effectively for production and logistics, ensuring that it can meet customer orders promptly and efficiently.

c. Building Strong Customer Relationships

A key component of Sets General Trading‘s marketing strategy is the cultivation of strong relationships with its customers. By understanding the specific needs and preferences of Indian processing companies, the company can tailor its offerings to better serve this market. This includes not only ensuring product quality but also providing reliable delivery schedules and responsive customer service.

Moreover, Sets General Trading actively seeks feedback from its customers, using this information to refine its processes and enhance its product offerings. This customer-centric approach fosters loyalty and encourages repeat business, which is vital for sustained growth in the competitive export market.

d. Future Marketing Strategies

As Sets General Trading looks to the future, it aims to diversify its marketing strategies to capture new opportunities in various regions. While the focus on Indian processing companies has been fruitful, there is potential to explore other international markets as well. By expanding its customer base, the company can mitigate risks associated with market fluctuations and enhance its revenue streams.

Additionally, the company has a long-term strategy to expand its operations in the turmeric value chain by incorporating additional processes such as milling and extraction. This plan aims to enhance the value of its turmeric products and meet the growing demand for turmeric-based derivatives. To achieve this, the company intends to invest in advanced technologies that will improve efficiency and ensure high-quality output in these new operations. By upgrading its facilities and machinery, the company seeks to position itself as a leader in the turmeric industry, offering a diverse range of products that cater to both local and international markets.

7. Challenges Faced by Sets General Trading PLC

Sets General Trading PLC, has established a strong position in the turmeric market, the company faces many challenges that impact its operations, product quality, and growth potential. This report explores the various challenges encountered by Sets General Trading, categorized into supply chain issues, processing and quality control setbacks, marketing obstacles, limitations on company growth, and inadequate support services.

a. Supply Chain Challenges

I. Poor Quality Input

One of the primary challenges facing Sets General Trading is the inconsistent quality of raw turmeric supplied by smallholder farmers. Factors contributing to poor quality include inadequate farming practices, lack of access to quality inputs, and environmental conditions. Many farmers lack the necessary knowledge and resources to produce high-quality turmeric, leading to variations that affect the overall product quality.

II. Costly Input due to Illegal Markets

The presence of illegal markets significantly impacts the cost of raw materials. Farmers often opt to sell their turmeric to informal buyers who offer higher prices, bypassing established supply chains. This not only inflates input costs for Sets General Trading but also complicates the procurement process, making it difficult for the company to secure a consistent supply of quality turmeric.

III. Supply Shortages and Intermittent Supply

Seasonality is another critical factor affecting the supply of turmeric. The production cycle varies throughout the year, leading to periods of both surplus and shortage. During off-seasons, the availability of high-quality turmeric diminishes, resulting in supply shortages that hinder Sets General Trading‘s ability to meet export demands. Additionally, the illegal market impairs supply issues, contributing to intermittent availability and further complicating planning and inventory management.

IV. Transportation Losses

Transportation of raw turmeric also poses significant challenges. Many farmers lack proper transportation facilities, leading to higher losses during transit. If turmeric is not transported under optimal conditions, it can absorb moisture, compromising its quality and increasing spoilage rates. The company faces additional costs and operational inefficiencies due to these losses, which can range from 10% to 15%.

B. Processing and Quality Control Challenges

I. Poor Quality of Processing Equipment

Sets General Trading‘s processing operations rely heavily on effective machinery for polishing and drying turmeric. However, the company faces challenges due to outdated and inefficient polishing machines. The inability to maintain high standards of quality during processing can lead to subpar products, which may not meet the expectations of international buyers.

II. Lack of Drying Facilities

Currently, Sets General Trading does not have dedicated drying facilities within its processing plant. This absence complicates the drying process and increases the likelihood of spoilage. Without proper drying technology, maintaining the quality of turmeric becomes challenging, leading to higher process losses and potential rejections from international markets.

Figure 14: Open air drying in the factory

III. Skill Gaps in Workforce

The effectiveness of processing operations is also hindered by a lack of skilled personnel. There is a shortage of trained workers who possess the necessary knowledge and expertise in turmeric processing techniques. This skills gap affects the efficiency of operations and quality control, resulting in high process losses that can reach up to 25%.

IV. Weak Quality Inspection and Control

Quality inspection and control measures at Sets General Trading are insufficient. The absence of a robust quality assurance framework makes it difficult to consistently meet the standards required for export markets. Weak quality control can result in products that do not comply with international regulations, damaging the company‘s reputation and marketability.

C. Marketing Challenges

I. Need for Diverse Customer Base

Sets General Trading primarily targets Indian processing companies, which poses inherent risks. Relying heavily on a single market makes the company vulnerable to fluctuations in demand. Expanding its customer base to include a variety of international markets is essential for mitigating this risk and ensuring stable revenue streams.

II. Lack of Product Standardization

Product standardization is crucial for maintaining quality and ensuring that products meet market expectations. However, Sets General Trading has not fully implemented standardization practices, which can lead to inconsistencies in product quality. This lack of uniformity can deter potential buyers and limit the company‘s ability to compete effectively in international markets.

III. Challenges in Traceability

In today‘s market, traceability is an essential aspect of food safety and quality assurance. Sets General Trading faces difficulties in establishing a reliable traceability system for its turmeric products. The inability to track the origin and quality of turmeric can hinder the company‘s efforts to penetrate more discerning markets, such as those in Europe.

IV. European Market Expansion Limitations

Expanding into the European market poses significant challenges for Sets General Trading. Stringent regulations and high-quality standards in Europe require companies to demonstrate robust quality control and traceability measures. The current limitations in processing capabilities and product standardization restrict Sets General Trading‘s ability to meet these requirements, making market entry difficult.

D. Company Growth Limitations

I. Limited Capacity Expansion

Sets General Trading's potential for growth is constrained by limited access to credit facilities. Without sufficient financial support, the company struggles to invest in necessary infrastructure upgrades, processing technologies, and workforce training. This situation hampers its ability to expand production capacity and respond to growing market demands.

E. Support Service Challenges

I. Weak Industry Associations

The lack of strong and focused industry associations further complicates the challenges faced by Sets General Trading. These associations can play a crucial role in advocating for the interests of turmeric processors, providing training, and facilitating access to resources. However, the current weakness of such associations limits the support available to companies in the sector as well.

II. limited national support

The turmeric processing sector is not prioritized in Ethiopia‘s national roadmap for agricultural development. As a result, Sets General Trading receives limited government support, which could otherwise help address some of the challenges it faces along the supply chain. Increased national focus and support could enhance the overall competitiveness of the turmeric industry and benefit companies like Sets General Trading.

8. Proposed Solutions to Overcome Identified Challenges

To address the challenges faced by Sets General Trading PLC in the turmeric processing industry, several strategic solutions have been proposed. First, supply chain improvements can be made by implementing training programs for farmers to educate them on sustainable practices and quality enhancement, which would improve the quality of inputs.

Another key strategy is to strengthen the supply chain. By fostering closer relationships with suppliers and ensuring a steady flow of high-quality raw materials, Sets General Trading can mitigate some of the risks associated with processing interruptions. Establishing direct purchasing agreements with farmers can minimize reliance on middlemen and reduce costs. Additionally, creating a seasonal supply plan that builds relationships with multiple suppliers will ensure consistent access to quality turmeric. This proactive approach not only supports production goals but also enhances the company's reputation as a reliable supplier in the

international market. Investing in transportation infrastructure is also essential to reduce losses during transit.

In terms of processing and quality control enhancements, the company should invest in modern polishing and drying machinery to improve product quality and processing efficiency. Installing dedicated drying facilities will further enhance the drying process. Providing skill development programs for employees will improve processing and quality control capabilities, while establishing a robust quality management system with regular inspections can help minimize process losses.

Marketing strategies should focus on market diversification by exploring new markets and customer bases through targeted marketing efforts and participation in trade shows. Implementing standards and certifications will ensure consistent product quality, while developing traceability systems will enhance transparency and sustainability throughout the supply chain. It is also important to research and comply with international market regulations, particularly for expanding into the European market.

Lastly, growth and support improvements can be achieved by seeking collaborations with financial institutions to gain better access to credit for expansion. Advocating for infrastructure development by working with government agencies will prioritize necessary improvements in the agricultural sector. Strengthening industry associations through collaboration among stakeholders will create a stronger voice for the turmeric sector. Engaging with national agencies will help secure support and promote initiatives that benefit the turmeric industry. These recommended solutions aim to enhance operational efficiency, improve product quality, diversify markets, and strengthen the overall capacity of Sets General Trading PLC to thrive in the competitive turmeric processing sector.

Table 6: Challenges and proposed solutions for the case company

Category	Challenges	Recommended Solutions
Supply Challenges	Poor quality input from farmers	• Implement training programs for farmers on sustainable practices and quality improvement. • Support the farmers financial capability to help them supply with harvesting, boiling and drying equipment • Owning land through contract farming
	Costly inputs due to illegal markets and middlemen	• Establish direct purchasing agreements with farmers to ensure fair pricing and reduce reliance on middlemen. • Implement regulation on illegal markets
	Intermittent supply due to seasonality and illegal market activity	• Develop a seasonal supply plan and build relationships with multiple farmers to ensure consistent supply. • Implement regulation on illegal markets
	Higher transportation losses due to improper facilities	• Invest in better transportation infrastructure and logistics solutions to minimize losses.
Processing and quality control	Poor quality of polishing machines	Upgrade processing equipment to modern, efficient machines to enhance product quality.
	Lack of dedicated drying facilities	Install dedicated drying equipment to improve drying efficiency and product quality.
	Skills gap in workforce	Provide training and skill development programs for employees in processing and

Table 6: Challenges and proposed solutions for the case company

Category	Challenges	Recommended Solutions
		quality control.
	High process loss (up to 25%)	• Optimize processing techniques and implement better quality control measures to reduce losses. • Invest in better transportation infrastructure and logistics solutions to minimize losses. • Upgrade processing equipment to modern, efficient machines to enhance product quality. • Install dedicated drying equipment to improve drying efficiency and product quality.
	Weak quality inspection and control	• Establish a robust quality management system with regular inspections and audits.
Marketing Challenges	Need for a diverse customer base	• Explore new markets and diversify customer outreach through marketing campaigns and trade shows. • Implement standardization processes and certifications to ensure uniform product quality.
	Lack of product standardization	Implement standardization processes and certifications to ensure uniform product quality.
	Difficulties in traceability and sustainability	Develop a traceability system to track products from farm to market, ensuring transparency and sustainability.
	Challenges in expanding into the European market	• Research and comply with European regulations, and seek partnerships with local distributors.

Table 6: Challenges and proposed solutions for the case company

Category	Challenges	Recommended Solutions
Company Growth Limitations	Limited capacity expansion due to lack of credit facilities	• Seek partnerships with financial institutions for better access to credit and funding for expansion. • Government support in prioritizing the sector is crucial for securing development efforts related to credit facilitation
	Poor quality infrastructure affecting standardization	Advocate for improved infrastructure development within the agricultural sector through government support.
Support Service Challenges	Weak industry associations	Strengthen industry associations by fostering collaboration among stakeholders for better representation.
	Limited national support for the turmeric sector	Engage with government agencies to prioritize support for the turmeric industry and promote national initiatives.

07.02: Abdu Mohammed Import and Export PLC

I. Background of Abdu Mohammed Import and Export PLC

Abdu Mohammed Import and Export PLC, established in 2018, aims to become a leading turmeric processing and export enterprise in Ethiopia with 30 million dollar investment and about 10 million dollar tax contribution. The company started with a processing facility and quickly built strong connections with local turmeric farmers. Over the years, Abdu Mohammed Import and Export has focused on enhancing its supply chain and developing solid partnerships with international buyers. The company operates its turmeric processing plant in Adamma. It sources turmeric rhizomes from smallholder farmers, navigating a supply chain that includes middlemen. The company produces polished and dried turmeric products, primarily exporting them to markets in Asia.

II. Input Supply of Abdu Mohammed Import and Export plc

Abdu Mohammed Import and Export PLC is a significant contributor to Ethiopia‘s turmeric processing and export industry. The company sources its primary raw material, turmeric, locally

from smallholder farmers in the southwestern regions, particularly around Mizan Aman and Tepi. It specializes in producing cleaned, polished, and dried turmeric products.

The company‘s supply chain relies heavily on a network of middlemen who connect it with these essential farmers. However, the supply of turmeric can be inconsistent due to various factors. Seasonal variations in production often lead to limited raw material availability, which affects the company's ability to meet processing targets. Additionally, illegal markets pose significant challenges, as many farmers may opt to sell their turmeric to informal buyers offering prices up to 25% higher. This situation puts Abdu Mohammed Import and Export at risk of supply shortages, complicating its planning and potentially disrupting operations, sometimes limits its capacity from three shift to one shift operation per day.

Currently, the company purchases turmeric at a rate of 70 birr per kilogram at the factory gate. This pricing reflects market conditions and the costs associated with sourcing higher quality turmeric. While competitive, it underscores the challenges presented by fluctuating market dynamics and highlights the necessity of maintaining strong relationships with suppliers.

III. Processing Operations and Technology

Abdu Mohammed Import and Export PLC specialize in the vital operations of polishing and drying turmeric. These processes are essential for transforming raw turmeric into high-quality products that meet international standards.

The Core Processing Operations at Abdu Mohammed Import and Export focus on two main processes: polishing and drying. Polishing is crucial for enhancing the appearance and quality of turmeric, as it removes impurities and ensures the final product is visually appealing to consumers and buyers. Drying, on the other hand, is essential for preserving the turmeric‘s flavor, aroma, and nutritional properties. Effective drying techniques prevent spoilage and extend the shelf life of the product, making it suitable for export.

The company employs specialized equipment to carry out these operations. However, even with the use of technology, the processing stage generates a significant amount of waste, with process losses ranging from 10% to 20%. According the owner of the company, this is resulted from several factors, including the natural moisture content of the raw turmeric, inefficiencies in the drying process, and residues left after polishing. Managing these losses is crucial for maintaining profitability and optimizing resource utilization.

The case company has established a production capacity 1,500 tons of turmeric per year, reflecting the company's ambition to capitalize on the growing international demand for turmeric. However, reaching this capacity depends on several factors, including the availability of raw materials and overall operational efficiency.

Currently, the company operates at a capacity utilization rate of 70%. This indicates that, while there is significant production potential, there are also opportunities for improvement. Contributing to this utilization rate are fluctuations in raw material supply, seasonal variations in production, and various operational challenges that may occur during the processing phase. Addressing these issues will be essential for optimizing capacity and maximizing output.

However, the company faces limitations in its production of polished and dried turmeric products due to its reliance on simple and conventional polishing machines. As a result, it does not engage in value-added processes such as slicing, grinding, milling, or extraction, which could significantly enhance the company's product offerings and profitability.

IV. Marketing Strategies of Abdu Mohammed Import and Export PLC

By focusing on dried and polished turmeric, the company has effectively tapped into international demand, primarily catering to Indian processing companies. This strategic positioning has enabled Abdu Mohammed Import and Export to thrive in a competitive landscape while maintaining a robust customer base.

a. Engaging the Export Market

The global demand for turmeric has been rising, driven by its recognized health benefits and culinary applications. Abdu Mohammed Import and Export has positioned itself to capitalize on this growing market by engaging directly with export customers. The company primarily focuses on exporting dried and polished turmeric, which is highly sought after in various international markets. By targeting Indian processing companies, among the largest consumers of turmeric globally, the company aligns its offerings with the needs of a significant market segment, which requires consistent and reliable supplies.

b. Product Quality and Demand

The dried and polished turmeric produced by the company undergoes quality control measures to ensure it meets the expectations of international buyers. This emphasis on quality is critical for supporting the company‘s reputation and complying with the stringent requirements of export markets. As a result, Abdu Mohammed Import and Export enjoys stable demand for its products, indicating that its marketing strategies have been effective. This consistent demand allows the company to plan effectively for production and logistics, ensuring prompt and efficient fulfillment of customer orders.

c. Building Strong Customer Relationships

A key aspect of Abdu Mohammed Import and Export‘s marketing strategy is the cultivation of strong relationships with customers. By understanding the specific needs and preferences of Indian processing companies, the company tailors its offerings to better serve this market. The company actively seeks customer feedback, using this information to refine its processes and enhance its product offerings. This customer-centric approach fosters loyalty and encourages repeat business, which is vital for sustained growth in the competitive export market.

d. Future Marketing Strategies

As Abdu Mohammed Import and Export looks ahead, it aims to diversify its marketing strategies to seize new opportunities in various regions. While its focus on Indian processing companies has been fruitful, there is potential to explore additional international markets. By expanding its

customer base, the company can mitigate risks associated with market fluctuations and enhance its revenue streams.

Furthermore, the company has a long-term strategy to expand its operations within the turmeric value chain by incorporating additional processes such as slicing, milling and extraction. This plan aims to increase the value of its turmeric products and meet the growing demand for turmeric-based derivatives. To achieve this, Abdu Mohammed Import and Export intends to invest in advanced technologies that will improve efficiency and ensure high-quality output in these new operations. By upgrading its facilities and machinery, the company seeks to position itself as a leader in the turmeric industry, offering a diverse range of products that cater to both local and international markets.

V. Challenges Faced by Abdu Mohammed Import and Export PLC

Abdu Mohammed Import and Export PLC has established a strong position in the turmeric market; however, it faces several challenges that impact its operations, product quality, and growth potential. Based on the case analysis, this report outlines the challenges encountered by the company, categorized into supply chain issues, processing and quality control setbacks, marketing obstacles, limitations on growth, and inadequate support services.

a. Supply Chain Challenges

One of the main challenges is the inconsistent quality of raw turmeric supplied by smallholder farmers. Inadequate farming practices, limited access to quality inputs, and challenging environmental conditions contribute to this issue.

Similar to case company one discussed above, illegal markets inflate the cost of raw materials, as farmers often choose to sell their turmeric to informal buyers offering higher prices. This bypass established supply chains and complicates procurement for the company.

Seasonal variations in production lead to periods of shortage. During off-seasons (dry seasons), high-quality turmeric becomes scarce, hindering the company‘s ability to meet export demands.

Transportation poses challenges as many farmers lack proper facilities, resulting in losses during transit. If not transported optimally, turmeric can absorb moisture, compromising quality and increasing spoilage, leading to additional costs for the company.

b. Processing and Quality Control Challenges

The adoption of outdated polishing machine and absence of dedicated drying facilities complicates the polishing and drying process and increases spoilage risks, ultimately affecting product quality. A shortage of trained personnel in turmeric processing techniques hampers operational efficiency and quality control, resulting in high process losses. Additionally, insufficient quality assurance measures make it difficult to consistently meet export standards, potentially damaging the company‘s reputation.

c. Marketing Challenges

Relying predominantly on Indian processing companies‘ poses risks due to potential demand fluctuations. Expanding the customer base to include various international markets is essential for stability. Moreover, without full implementation of standardization practices, inconsistencies in product quality can deter potential buyers and limit competitiveness. The inability to establish a reliable traceability system for turmeric products hinders efforts to access more discerning markets, such as Europe.

d. Company Growth Challenges and Support Service limitations

Limited access to credit facilities restricts the company‘s ability to invest in infrastructure upgrades, processing technologies, and workforce training, hampering production capacity growth. The lack of strong industry associations limits support for companies in the sector, including advocacy and access to training and resources. Additionally, the turmeric processing sector is not prioritized in Ethiopia‘s agricultural development roadmap, resulting in minimal government support to address supply chain challenges.

e. Proposed Solutions to Overcome Identified Challenges

To tackle these challenges, several strategic solutions have been proposed. First, improving the supply chain involves implementing training programs for farmers to enhance sustainable practices and quality. Strengthening relationships with suppliers, establishing direct purchasing agreements, and creating seasonal supply plans can ensure a consistent flow of high-quality turmeric. Investing in transportation infrastructure is also vital to reduce transit losses.

For processing and quality control, the company should invest in modern polishing and drying machinery, as well as dedicated drying facilities. Skill development programs for employees will enhance processing capabilities, while a robust quality management system can minimize losses.

Marketing strategies should focus on diversifying the customer base through targeted efforts and participation in trade shows. Implementing standards and certifications will ensure consistent product quality, and developing traceability systems will enhance transparency in the supply chain. Researching international regulations, especially for the European market, is crucial for expansion.

Finally, seeking collaborations with financial institutions can improve access to credit for growth. Advocating for infrastructure development with government agencies will prioritize essential improvements, while strengthening industry associations will create a unified voice for the turmeric sector. Engaging with national agencies will help secure broader support for the industry. These solutions aim to enhance operational efficiency, improve product quality, diversify markets, and strengthen the overall capacity of Sets General Trading PLC in the competitive turmeric processing sector.

07.03: Prospects for Small-Scale youth Entrepreneurs in the Turmeric Value Chain

This section explores the challenges and opportunities for small-scale entrepreneurs engaged in turmeric production, processing, and trading. The study involved in-depth interviews with experts

from the Food and Beverage Development and Research Center, the president of the Ethiopian Pulses and Oilseeds Exporters Association (EPOSEA), and retailers involved in minor value addition activities such as polishing and grinding. Insights were gathered from stakeholders primarily trading lower-grade products at Marcato and Shola trading areas and

sourcing inputs mainly from large processing companies including the case companies mentioned in this study.

According to the interviewee information, significant opportunities exist for small-scale entrepreneurs in the turmeric value chain. Local demand for turmeric is increasing, driven by greater awareness of its health benefits. Stakeholders confirmed sustained growth in demand, revealing a supply gap that small-scale entrepreneurs can fill through local production, processing, and trading. Additionally, there are opportunities for entrepreneurs to engage in value addition processes, such as washing, polishing, grinding, and packaging, which can enhance product quality and marketability. Building direct relationships with farmers can improve supply chain efficiency, enabling small-scale entrepreneurs to establish necessary backward linkages and ensure a steady supply of raw materials. Furthermore, entrepreneurs can explore local, national, and international markets, potentially increasing their customer base.

Despite these opportunities, several challenges may impede growth. Weak backward linkages limit access to high-quality raw materials, affecting production capacity, with many entrepreneurs struggling to establish reliable connections with farmers. The lack of institutional support for clustering initiatives restricts collaboration among farmers and processors. Establishing farmer cooperatives could enhance bargaining power and access to resources, while processor clusters can improve logistics and reduce costs. Operational inefficiencies arise from the absence of designated processing facilities, and limited collaboration among small-scale processors restricts the sharing of best practices and resources. Additionally, entrepreneurs often struggle to meet regulatory quality standards, which deter new market entrants and complicate product certification processes. Financial barriers, such as limited access to finance due to a lack of collateral, restrict investment in necessary infrastructure, while high-interest rates and unfavorable loan terms further discourage growth.

To address these challenges, several recommendations are proposed. Strengthening linkages between small-scale entrepreneurs and farmers through cooperative models can enhance access to quality raw materials. Advocacy for government and institutional support to provide processing facilities and quality assurance training is essential. Developing tailored financial products, such as microloans and grants, can facilitate investments in production and processing activities. Implementing training programs focused on best practices in production, processing,

and quality compliance can significantly enhance the skills of small-scale entrepreneurs. Promoting the development of standardized processing practices and facilitating access to quality certifications can help tap into export markets and enhance product visibility.

These measures can significantly bolster the capabilities of small-scale entrepreneurs in the turmeric value chain, promoting growth and sustainability in the sector while effectively addressing the existing challenges.

Table 7: challenges and proposed solutions for small-scale entrepreneurs along turmeric Value chain

Value Chain Function	Subcategory	Challenges	Recommendations
Input Supply	Access to Inputs	Limited access to extension services for ongoing support and education that is specific to turmeric farming practice.	Collaborations with agricultural office and extension service provider for inputs can ensure consistent quality and supply of inputs.
	Clustering	Lack of support for clustering initiatives limits opportunities for collaboration among farmers.	Farmer cooperatives can enhance bargaining power and access to resources. Cluster farming can improve logistics and reduce costs through shared resources.
Production	Agricultural Practices	Production capacity limitations due to lack of access to machinery and technology.	Adoption of modern farming techniques can enhance yield and quality.
		Seasonal fluctuations and climate change can affect production consistency.	Use of sustainable practices can appeal to health-conscious consumers.

Table 7: challenges and proposed solutions for small-scale entrepreneurs along turmeric Value chain

Value Chain Function	Subcategory	Challenges	Recommendations
	Clustering	Insufficient support for the establishment of processing clusters limits operational efficiency.	Processor clusters can enhance efficiency and reduce costs through shared facilities and resources.
		Lack of trust and cooperation among processors can hinder clustering efforts.	Collaboration among processors can lead to improved quality control and innovation.
Processing	Value Addition	Absence of processing facilities leads to inefficiencies in operations.	Engaging in value addition activities such as washing, polishing, grinding, and packaging enhances product quality.
	Standardization	Quality compliance issues restrict market access and require knowledge about regulations.	Development of standardized processing practices can help tap into export markets.
	Certification	Lack of knowledge about compliance requirements can deter new entrants.	Obtaining quality certifications can open premium markets.

Table 7: challenges and proposed solutions for small-scale entrepreneurs along turmeric Value chain

Value Chain Function	Subcategory	Challenges	Recommendations
	Clustering	Limited collaboration among small-scale processors can restrict the sharing of best practices and resources.	Establishing processing clusters can improve access to shared facilities and reduce operational costs.
Trading	Market Diversification	High competition from established players makes it difficult for small-scale entrepreneurs to secure shelf space.	Opportunities to explore local, national, and international markets for turmeric product.
	Brand Development	Navigating the regulatory landscape can be complex and time-consuming.	Development of branded products can enhance visibility and consumer loyalty.
Support	Government Support	Limited financial access due to lack of collateral restricts loan opportunities.	Advocacy for policies that provide processing facilities and technical assistance can enhance capabilities.

Table 7: challenges and proposed solutions for small-scale entrepreneurs along turmeric Value chain

Value Chain Function	Subcategory	Challenges	Recommendations
	Training Programs	High-interest rates and unfavorable loan terms can discourage investment in growth.	Access to training programs can improve skills in production, processing, and marketing.
	Financial Products support	Insufficient market information limits strategic decision-making.	Development of tailored financial loans can facilitate investment in processing equipment.

07.04: Success Stories from Turmeric Case studies

From the aforementioned case studies to assess turmeric value chain activities, the following important success factors or best practices could be drawn as inputs for operationalization of the envisaged youth centered turmeric business development.

Smooth Local Supply Chain: Establishing smooth connections with local turmeric small farmers and strengthening supply chain while forging robust relationships with international buyers. In addition, ensuring and maintaining good relationships with input/raw material

suppliers offering fair compensation during times of market price fluctuations and adversities as an ethical measure to securing a reliable supply chain.

Specialized Value Chain Involvement: Though diversified participation of actors across multiple value chain functions is possible at advanced stages, focusing and starting with the crucial and profitable operations is a wise option.

Minimizing wastages and Losses: As essential for transforming raw turmeric into better quality products that meet international standards, waste/product loss management should be given due attention.

Marketing Strategies: Ability to primarily catering to global (Indian) processing companies through strategic positioning while maintaining a robust customer base. This includes aligning turmeric products with the needs of significant market segments that require consistent and reliable supply.

Product Quality Standards: Undertaking quality control measures to ensure buyers'/customers' expectations are adequately met – in conformity with stringent requirements of export markets and upholding better reputations.

Business Planning: Effective planning for production and logistics supply to ensure and meet customer orders; promptly and efficiently, is vital.

Customer Relationships: Cultivation of strong relationships with customers - by understanding the specific needs and preferences of customers, making use of constructive feedback etc. by ensuring product quality and provisioning of reliable delivery system also contributes to business success.

Participating Market Intermediaries: Use of a network of middlemen who connect turmeric processors with farmers as transaction

Turmeric Value Chain Functions Associated Challenges and Opportunities:

To summarize, from the case studies, the following matrix could be constructed to portray the nexus between value chain activities/functions – associated challenges – and, prevailing or potential opportunities to meet the general and specific objectives of this study.

Table 8: Summary Matrix for Turmeric Value Chain Functions, Associated Challenges and Opportunities

Turmeric Value Chain Activities/Functions	Value Chain Function Associated Challenges	Opportunities and Potentials to Address Challenges & Develop Value Chain
Input Supply	- Inadequate or no Supply of improved seeds - Poor Quality of Inputs Supply - Traditional cultivation/agronomic practices (Knowhow gap) - Shortage of cultivable land allotted for turmeric specific cultivation (i.e., reliance on intercropping with other crops)	- Government's incentives for subsidized input supply in required quantity, quality, and time, provision of capacity building programs in the form of extension service in line with regular sectoral development programs – to support youth employability and self. - Existence of young

Table 8: Summary Matrix for Turmeric Value Chain Functions, Associated Challenges and Opportunities

Turmeric Value Chain Activities/Functions	Value Chain Function Associated Challenges	Opportunities and Potentials to Address Challenges & Develop Value Chain
		and energetic community members to be engaged in the turmeric value chain activities – both individually and in groups
Production	- Prevalence of various pests and diseases – affecting productivity and marketability - Seasonal variations in production lead to periods of shortage. - Postharvest losses and wastages	- Presence of suitable agro-ecologies for production - Global advancements in turmeric cultivation techniques that can be adopted to domestic practices - Government's efforts towards favoring export-oriented production system - Increasing demand for organic products for nutritional, cosmetic, and other industrial uses- both in local & global markets - Potential opportunity for a smallholder driven investment model due to presence of smallholder farmer cultivation experiences.
Processing	- High cost of Inputs (due to Illegal Markets) - Intermittent supply due to seasonality and illegal market activity - Poor Quality of Processing Equipment (e.g., existence of outdated polishing machines) - Absence or limited adoption of modern processing facilities/ technologies for drying, boiling, grading,	- Establish direct purchasing agreements with farmers to ensure fair pricing and reduce reliance on middlemen. - Implement regulation on illegal markets - Develop a seasonal supply plan and build relationships with multiple farmers to ensure consistent supply. - Implement regulation on illegal markets - Global

Table 8: Summary Matrix for Turmeric Value Chain Functions, Associated Challenges and Opportunities

Turmeric Value Chain Activities/Functions	Value Chain Function Associated Challenges	Opportunities and Potentials to Address Challenges & Develop Value Chain
	storage etc. - Skill gaps in turmeric processing (shortage of trained personnel for processing, quality inspection and control while processing - leading to suboptimal product quality) - Shortages in financial resources to purchase and use value-adding technologies (such as specialized solvent extractors, evaporators, and crystallizers).	technological advancements in turmeric value chain development avail good opportunity for Ethiopia's endeavors to grow the sector - Existence of technical and vocational schools to manufacture appropriate local technologies and provide the necessary technical supports - Existence of financial institutions to support the financial needs for acquiring turmeric processors - Existence of agricultural extension services in/around turmeric producing/processing localities to provide training on turmeric processing
Marketing/Trading (Domestic and Global Markets)	- Lack of Product Standardization - European Market Expansion Limitations - Existence of a predominantly subsistence (not commercial) mode of production - Heavy reliance on limited product buyers (especially, Indian processing companies) – that poses market demand	- Existence of diverse consumer base and size that favors chance of higher unmet demand – hence opportunities for market diversification and target marketing - Evolving experience in use of electronic or online communication or e-commerce platforms to facilitate market promotions and brand building. - Trending nutritional and health related recognitions on benefits

In a more structured way, and based on the identified challenges from case studies and other supporting literatures, an illustrative summary of strategic intervention roadmap (in its preliminary form) to tackle the challenges and meet targeted objectives in the project implementation time frame is presented in Annex-1.

07.05: Conclusions and recommendations for case studies

Both Sets General Trading PLC and Abdu Mohammed Import and Export PLC are pivotal players in Ethiopia's turmeric processing and export industry, each facing unique challenges and opportunities.

Sets General Trading, founded in 1994, has established a solid supply chain by sourcing turmeric from smallholder farmers and targeting international markets, particularly in Asia. There is no demand constraint in both cases. However, it grapples with issues such as inconsistent quality, illegal market competition, and operational inefficiencies that impact its production capacity.

Similarly, Abdu Mohammed Import and Export, established in 2018, aims for rapid growth by forging strong connections with local farmers and focusing on quality control. Despite its ambitions, the company faces challenges related to supply shortages, outdated processing equipment, and a limited customer base, which might hinder its competitiveness in international markets.

To overcome these obstacles, both companies could benefit from strategic initiatives such as farmer training programs, investment in modern processing technologies, and diversification of their customer bases. Strengthening supplier relationships and improving infrastructure will also be crucial for enhancing operational efficiency and product quality. By addressing these challenges proactively, both Sets General Trading and Abdu Mohammed Import and Export can position themselves for sustainable growth and success in the competitive turmeric processing sector

08: Conclusion and Recommendations

08.01: Conclusion and future outlook for the turmeric business in Ethiopia

- The study has sufficiently explored the potentials and possible opportunities in scaling up the productivities and marketing outlets for turmeric products both in domestic and international markets. Opportunities are open for developing small farmers through productivity enhancing measures, access to financial resources, and cluster marketing strategies – which themselves have derived opportunities towards holistic product and marketing development.
- There are also opportunities for processors and value chain actors to help upgrade turmeric value chains to the level of standard that the international market demands given the present underdeveloped practices and the high unmet demand prevailing from potential buyers. By implication, the study unclosed that Ethiopian turmeric has a clear export opportunity with all associated and extended opportunities for economic growth, job opportunity that can accommodate and employ the growing number of youths.
- Moreover, the operations of turmeric processors are currently constrained by inadequate processing capabilities. Activities that add value, such as grinding, extracting, grading, branding, and standardization, are not being utilized. This presents a substantial opportunity for processors and exporters.
- From value chain perspective, this study revealed the VC dynamics in turmeric production and marketing is not adequately developed surrounded by many challenges and constraints. Value additions across value chain functions are not well developed to comply with international quality standards. There are efficiency concerns across the value chain ladder – production, processing and marketing.

08.02: Recommendations

- Business development strategies should be given due attention by all stakeholders in general, and the government in particular – revitalizing the high level of international market demand. These include such measures as product promotion and branding campaigns – that simultaneously, paves the road towards partnering with potential buyers both domestically and internationally.
- An enabling environment should be devised for Turmeric production and marketing. These include; among others:
    - Leveraging access to financial resources through special lending packages with no- or low collateral loan requirements or use of revolving funds
    - Integrated provisioning of technical and vocational trainings to collective production and marketing ventures – in collaboration with Technical and Vocational Training Schools, Agricultural development organizations, etc.
    - New initiatives in scaling up value additions across the value chain should be recognized by sector responsible government organizations to bring the highest-level product quality standard – with reference to best practices achieved elsewhere.

- A cluster approach for the production, processing and marketing functions should be devised to gain from collective actions to be more competitive in the world market. For this, the government should take the lead to organize such clusters with the necessary administrative and financial support – including possibilities of collaborations with the private actors in the form of public-private-partnership or donor‘s supports.

- To handle turmeric production and marketing related challenges due to pests, diseases and other post-harvest related problems; the following focused interventions are recommended:
  - Establish & operationalize an integrated pest management system - either in the form of biological control, habitat manipulation, modification of cultural practices, and use of resistant varieties, etc. in an environment-friendly approach that also gives attention to maintaining the overall ecosystem and not jeopardizing the human health concerns.
  - As per the underpinning know-how and resource related gaps in pest control, capacity building and credit provisioning schemes through such initiatives as turmeric production and marketing extension package‘ should be devised in collaborative approach. Government‘s startup-supports; specially in the first phases of the strategic entry roadmap, in the form of adequate and timely supply of the necessary inputs and subsidizing pest management practices will be vital.

- To ensure a better competitiveness, the envisioned youth focused turmeric production and marketing intervention should give special attention to promote Ethiopia‘s organic features emphasizing its uniqueness and originality by adopting either a product, ingredient or culture-oriented branding strategies to develop customer recognitions from a diverse customer spectrum (market segments). ‗The Ethiopian Turmeric‘ kind of brand positioning and promotion campaigns and events, national/regional seminars and technology showcases need to be organized periodically both in domestic and international trade fairs – with the Ethiopian government and other affiliated stakeholders.
- Given all the gaps underpinning turmeric production and marketing, research and extension services are vital to see better performance envisaged.

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09.01: ANNEX-1: A Phased Strategic Intervention Roadmap for Turmeric Production and Marketing Development (Preliminary)

Phase-I: Improving the supply-chain

- Design & Implement training programs for sustained productivity
- Establish strong relationships with suppliers to facilitate direct purchases
- Establish a working seasonal supply plan to ensure consistent supply flow
- Facilitating access to financial resources

Phase-II: Capital investment: Machineries, Equipment & Infrastructure

- transport infrastructure – connect to farm-gates and end/intermediate users
- modern polishing, drying and drying machineries and facilitation

Phase-III: Establish Sustainable Marketing Strategies

- *Diversifying the customer base through targeted efforts (Inbound and personalized strategy Perspective) and participation in trade shows (Outbound Perspective)*
  - *Due concerns to channel selection, market promotions etc.*
- *Establish or conform to acceptable quality standards and certification systems /regulations*
- *Establish a system of continuous business development, researching & policy updates*
- *Pursue advocacy activities (voicing sector development recognition & policy support, strengthen industry associations; branding activities, ….)*
- *Towards operational efficiency, improved product quality, market diversity and competitiveness.*

Phase-IV: Project implementation, phaseout and ensuring sustainability

- *Establish a system for continued capacity development programs for value chain actors, as appropriate*
- *Periodic monitoring and evaluation strategies – encompassing key performance indicators (KPI) and analytical results for effective performance tracking*
- *Implement project-exit and handover*

10: Contact details

BIC Ethiopia
Impress Hotel & Office Building (3rd floor)
(Near Bole Medhanialem Church)
Addis Ababa

Email: info@bic-ethiopia.eu
Mobile: +251 978 220 194
Website: www.bic-ethiopia.eu

Consortium members:

sequa
Alexanderstr. 10, 53111 Bonn
Germany

Contact person(s):
Oliver Petzoldt, Project Team Leader
Email: oliver.petzoldt@sequa.de
Mobile: +251 (0) 978 220 194

Sabine Schacknat, Project Director
Email: sabine.schacknat@sequa.de
Phone: +49 (0) 228 982 38 – ext. 35

Website: www.www.sequa.de

Addis Ababa Chamber of Commerce
Mexico Square, P.O. Box 2458
Addis Ababa, Ethiopia

Contact person(s):
Dr. Meseret Molla, Secretary General
Email: mesenana_03@yahoo.com
Mobile: +251 (0) 911 206 957

Daniel Dendir, Project Manager
Email: danibechene@yahoo.com
Mobile: +251 (0) 911 795 680

Website: www.addischamber.com

Menschen fûr Menschen
P.O. Box 2568
Adds Ababa, Ethiopia

Contact person(s):
Yilma Taye, Country Director
E: Yilma.Taye@menschenfuermenschen.org
Mobile: +251 (0) 978 220 194

Dr. Sebastian Brandis, CEO
E: sebastian.brandis@menschenfuermenschen.org
Phone: +49 (0) 228 98238 – 35

Website: www.menschenfuermenschen.org

Icehawassa
A8, Hawasssa
Ethiopia

Contact person(s):
Fikir Belete, Project Manager
Email: fikir.belete@icehawassa.org
Phone: +251 (0) 923 577 911

Markos Lemma, Co-founder & CEO
Email: markos.lemma@iceaddis.com
Phone: +251 (0) 912 615 214

Website: www.icehawassa.org

adelphi
Alt-Moabit 91, 10559 Berlin
Germany

Contact person(s):
Mirko Zuerker, Manager
Email: zuerker@adelphi.de
Phone: +49 (30) 89 000 68 - 143

Lina Gutierrez, Analyst
Email: gutierrez@adelphi.de
Phone: +49 (0) 228 98238 – 35

Website: www.adelphi.de

GrowthAftrica
Impress Hotel & Offices Building (3rd floor)
Addis Ababa, Ethiopia

Contact person(s):
Merselu Worku, Growth Catalyst
Email: byo@growthafrica.com
Mobile: +251 911 728 209

Ian Lorenzen, Exec. Director & Partner
Email: ilo@growthafrica.com
Phone: +254 731 51 39 51

Website: www.growthafrica.com