Funded by the European Union

Henna Value Chain Analysis

in Ghayl Ba Wazir District - Hadhramaut - Yemen

Implemented by the Small and Micro Enterprise Promotion Service (SMEPS)

With the United Nations Development Programme (UNDP) in Yemen

Funded by the European Union (EU)

2022

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وكالة تنمية المنشآت الصغيرة و الأصغر
Small&MicroEnterprise PromotionService

SIERY
Strengthening Institutional and Economic Resilience in Yemen
مشروع تعزيز المرونة المؤسسية والإقتصادية في اليمن

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Note:

During field visits to collect data, ODK technology - electronic data collection by smartphones - was used, without the use of the Internet. The servers of the SurveyCTO site were used to store data.

A photo showing the data collection process through the SurveyCTO application by the team with one of the players in the chain

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Saleem Ali
R&D Supervisor
SMEPS

Abbreviations

Symbol	Expression
EU	European Union
FGDs	Focus Group Discussions
kg	kilogram
km	kilometer
m	meter
PESTLE	Political, Economic, Social, Technological, Legal, and Environmental
SIERY	Strengthening Institutional and Economic Resilience in Yemen

Symbol	Expression
SMEPS	Small and Micro Enterprise Promotion Service
SWOT	Strengths, Weaknesses, Opportunities, and Threats
Ton	ton (1000 kg)
UNDP	United Nations Development Programme
USD	United States Dollar
YR[1]	Yemeni Riyal

Definitions of Key Terms

Term	Symbol	Definition
Value chain	**VC**	The value chain (VC) is a set of activities and procedures related to each other and necessary to convert the primary resources used (inputs) into products or services (outputs), which in turn go through different stages of production to give the product added value until the latter reaches the final consumer in the chain (Porter, 1985).
Value chain players	**VCA**	Value chain players, value chain actors, or value chain workers are all terms with the same meaning.
Supply Dealers	**---**	Supply dealers are suppliers of supplies and needs of chain producers.
Producers	**---**	The producers in this study are farmers.
Aggregate Retailers	**---**	Aggregate retailers are traders who buy products (henna) and sell them in retail quantities without any processing to convert them to other products.
Aggregate Wholesalers	**---**	Aggregate wholesalers are traders who buy products (henna) and sell them in undivided quantities and without any processing to convert them into consumable products.
Processing Retailers	**---**	Processing retailers are traders who buy products (henna) and sell them in retail quantities and process them to convert them to other products.
Wholesale & Retail Processors	**---**	Wholesale and retail processors are traders who buy products (henna) and sell them in both small and large quantities, processing them to transform them into consumable products.
Enablers	**---**	Enablers are the authorized entities with the power to make decisions and formulate laws and regulations for the sector.
Supporters	**---**	Supporters are entities that seek to support the sector.
Full-Time Employment	**FTE**	The number of jobs during the year where these jobs are 8 hours per day, 26 days per month, and 12 months per year, that is, a total of 312 working days during the year.
SWOT Analysis	**SWOT**	SWOT analysis is a cognitive process that examines the interrelationships between the internal and external environments of the sector or project, where SWOT analysis is based on a mixed (subjective-objective) evaluation of strengths, weaknesses, opportunities and threats (Ghazinoory, Abdi, & Azadegan-Mehr, 2011; Amato, Andreoli, & Rovai, 2021).
PESTLE Analysis	**PESTLE**	PESTLE analysis is a common research tool used to analyze and classify Political (P), Economic (E), Social (S), Technological (T), Legal (L), and Environmental (E) issues (Rastogi & Trivedi, 2016; Song, Sun, & Jin, 2017).

1 The dollar rate according to the study area was 1,100 YR in March 2022.

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Executive Summary

This report reflects the results of a value chain study and analysis of the henna value chain in Ghayl Ba Wazir District, Hadhramaut Governorate, Yemen, in 2022. The study was implemented by the Small and Micro Enterprise Promotion Service (SMEPS) with the United Nations Development Programme (UNDP) in Yemen in March 2022 and funded by the European Union (EU).

The study was conducted through collection of primary data from the target area through key informant interviews and focus group discussions; where several interviews and workshops were conducted with multiple stakeholders and value chain actors including input suppliers, producers, traders, consumers, companies, local authorities and other relevant authorities.

The study is divided into four main parts: -

- Background and Overview Section
- Study Methodology
- Findings
- Development Strategy

Key Findings:

The study outcomes show 7 stages of the henna value chain in Ghayl Ba Wazir District, and the following figure shows these stages starting from the supply inputs through to consumption.

By analyzing the internal and external environment of the henna sector through SWOT analysis, the results showed that players can be patient and bear the work of serving and treating the crop, possess qualified labor and have multiple sources of income as key strengths. Additionally, there are favorable opportunities for growth and development in this sector, as it has a good economic return for players and Ghayl Ba Wazir District's environment is suitable for cultivating, producing, and using the henna crop. The increasing demand for henna and encouraging laws for this sector are also beneficial. However, the analysis revealed some weaknesses, including a lack of capital, players' weakness in marketing and promotion, difficulty in communicating with foreign markets, and a lack of experience in the proper processing of the henna crop. Threats include price fluctuations, power outages, and rising costs of fertilizers and transportation.

The study also shows that the henna sector in Ghayl Ba Wazir District is small, and through analyzing marketing channels, there are seven different commercial channels that start from producers and end with consumers, with a simple exchange network between traders, processors, and exporters. Channels 3 and 2 were the best marketing channels for henna producers, with the highest marketing margin for producers and the highest flow of farmers and quantities in those channels. It is noteworthy that the presence of retail processors in the chain played an important role in increasing the marketing margin share for producers.

There is no strong exchange movement for the henna product among players in the henna sector, as henna is not the only product traded by henna merchants. These merchants usually deal with food or spice products, and henna is just one commodity among them. The production of henna is distributed through five marketing channels, starting from the

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producers and ending with the consumers. The channel with the highest production quantity and percentage of farmers selling in it was the first channel, where producers sell to wholesale processors. The flow of quantities in this channel was about 48.7% of the production quantity, with an average price of around YR 666 / kg [2]. 43.3% of the producers sell in this channel. The highest-priced channel was the direct channel from producers to consumers, with an average price of YR 1,056 / kg. However, this channel has the least amount of quantity flow due to the limited access of producers to markets and marketing capabilities.

Wholesale and retail processors buy dried henna leaves from producers and process them through sorting and grading. All impurities such as stones, metal pieces, or grass leaves are removed from the henna leaves and filtered and prepared for grinding, as leaving in these impurities affects the quality of the henna. These traders also provide grinding services to retailers and producers, and they all market the final product in different packaging and at prices ranging from YR 1,000 to YR 1,150 / kg in the local market.

Exporters obtain the highest price for selling final henna products, with an average selling price of YR 1,496 / kg. Henna quantities flow towards exporters from three sources and with different proportions from wholesale traders, retail traders, and producers.

The henna value chain in the Ghayl Ba Wazir District provides job opportunities for 6 workers, with around 27.5% of them being women, for each player in the chain. Also, more than half of the workforce for each player in the chain is within the family. Overall, each player in the chain provides 536.5 working days during the year and spends about YR 1,538,133 on working days.

The henna sector faces many challenges and obstacles, where the fluctuation of exchange rates and currency instability is the most significant problem facing most players in the chain. The reason is the lack of laws and a unified pricing system. There are other problems at each stage of the chain, such as the high cost of transportation and the lack of capital for input suppliers. The high cost of fertilizers, the low demand for producers, and the interruption of electricity and weak marketing among processors and exporters. As for consumers and the market, they face a problem of poor quality of henna products, in addition to the health risks for female henna artists, the shortage of staff, weak capabilities, and a lack of experience in agricultural practices among enablers and supporters.

It is noticeable that most of the problems, according to the Pestle analysis, were economic, followed by technological and institutional, which in turn lead to the deterioration of the sector and the shift towards cultivating other products. Most of the players in the sector agree that the state is the first responsible for improving and supporting the henna sector in Hadhramaut Governorate.

Finally, the study recommends a set of interventions that all aim to enhance henna production and improve marketing. It is important to work on developing henna production methods and promoting them through events, festivals, and linking the use of henna to local customs, traditions, and occasions. This will increase the demand for henna products and encourage producers and traders to expand their activities, increase production, and improve quality.

To increase production, support will be directed towards producers and traders by adopting proper agricultural methods, modern techniques, and automating agricultural operations. Programs and plans for fertilization, disease control, modern drying techniques, and post-harvest operations will be implemented. Traders will be provided with modern screening, sorting, and milling equipment to increase productivity, improve quality, and reduce costs. All of these

2 The dollar rate according to the study area is 1,100 Yemeni riyals in March 2022.

interventions will be accompanied by technical, managerial, and financial training to fully benefit from these interventions and increase awareness and impart a high culture of production and change negative behaviors.

It is also recommended to support henna-producing communities by framing them in cooperative associations and promoting their activities to serve the community of producers and traders, increase production, and reduce costs. The enablers will also be supported by providing them with the necessary technical and administrative support, and equipment to provide their services to the community and issue studies, recommendations, and laws that regulate and improve the sector's performance.

1 Background and Overview

This section includes a preface about the project, value chain analysis, the study introduction and its objective

1.1 Forward and Preface

In order to develop a number of vital economic sectors in Yemen, the United Nations Development Programme (UNDP), with funding from the European Union, worked on implementing the Strengthening Institutional and Economic Resilience (SIERY) project with a group of local partners. The project aims to strengthen institutional and economic resilience through a value chain approach. The project began implementation at the beginning of 2022 in the governorates of Hadhramaut, Aden, Sana'a, and Hodeida, in a number of different and important sectors in each governorate.

The United Nations Development Programme (UNDP) organized workshops in collaboration with a number of organizations and local implementing partners to involve local authorities, the private sector, associations, unions, and other stakeholders in all targeted directorates of the project in selecting priority economic sectors. The workshops discussed the nominated sectors from the communities and identified the priorities that the project will work on developing. From the outcomes of these workshops, the targeted sectors were selected.

The Small and Micro Enterprise Promotion Service (SMEPS)[3] role in the project is working to enhance the selected economic sectors in each target areas, according to the selection of the sectors by several actors in the target locations. The agency's main role is to first, conduct a detailed value chain study of the selected economic sector in the target area, and provide the needed technical and financial support to the chain actors based on the value addition and gaps. In particular, the agency's role include:

- Support smallholder producers in the selected value chains to overcome the constraints they face in increasing production, productivity, and income, thus improving their livelihoods. In addition, smallholder producers will be supported using the "poverty markets" approach, which will enable them to access markets and financial services by facilitating linkages and encouraging their roles in the market.
- Fill gaps within the selected value chains by strengthening linkages between producers, smallholder farmers, supply chain enablers, and markets, including SMEs and large business associations.

After selecting the targeted economic sectors for the project, the Research and Development team at SMEPS began implementing value chain studies for the identified sectors in each district to determine intervention priorities in these sectors and assist local authorities in developing plans that contribute to the development of the studied areas. The studies were carried out by teams consisting of SMEPS employees, sector experts and technicians. The teams used survey forms specific to the study for each stakeholder along the value chain. The survey process was conducted through individual meetings & focus group discussions with selected samples from all stages of the value chain.

3 The Small and Micro Enterprise Promotion Service, a Social Fund for Development subsidiary, was established in 2006. Its mission is to provide business development services through innovative and creative projects that help the growth of various economic sectors, following a business development approach, value chain analysis, and entrepreneurship. Under the current situation, SMEPS has been implementing emergency projects that aim to assist vital economic sectors to continue providing services to the community (agriculture, coffee, fish, honey, livestock, and health) using the same development approach.

1.2 Concepts in the Study

The recent global focus on cost reduction has led to the introduction of suitable methods to achieve this goal under competitive pressure and in the pursuit of excellence. In this context, value chain analysis has emerged as one of the methods for cost reduction due to its advantages in distinguishing between value-adding activities and those that do not add value. With this distinction, it has become possible to identify areas of improvement and places of excellence to enhance them (Omar, 2010). Understanding the value chain of goods & services is important for planning and implementing program interventions, which allows individuals to contribute to the comprehensive economic development of sectors & country strategies. It is useful to understand the relationship between producers, suppliers, transporters and traders.

1.2.1 Concepts in Value Chain

1.2.1.1 Value Chain Definition

In 1985[4], Porter introduced the concept of value chain (VC) as a set of interrelated activities and procedures necessary for transforming the primary resources used (inputs) into products or services (outputs), which pass through various production stages to add value until they reach the final consumer in the chain (Porter, 1985). The United Nations Industrial Development Organization (UNIDO) describes the value chain as a complete set of activities necessary to prepare a product that passes through various stages of production, from the initial inputs to the final destination in the market (The UNIDO Approach, 2009). Stabell & Fjeldstad (1998), go further to propose that value chain analysis should evolve into value components analysis. They defined the value chain as an approach to analyzing the competitive advantage at the enterprise level based on three value-creating technologies and logic, in addition to the value chain. They also added two other value formations: value shop and value network. All three of the above formations are based on the logic of value creation. The value chain relies on transforming inputs into products; the value shop revolves around customer problems and solutions; and the value network is based on connecting customers.

Therefore, the actors in the value chain who are responsible for transporting materials and/or information and/or services share an interest in the final product, because changes in the final market affect all players in the chain. Value chain can also be defined as the relationship established between different players in the chain with the aim of adding value and sharing the risks associated with each stage of the product flow, from the production stage to its final consumption. In general, the value chain includes input suppliers, producers, traders, distributors, processors, and final consumers. Partners within the value chain work together to identify their best goals, with a willingness to share risks and profits and efficiently utilize time, energy and resources (UNDP, 2016).

Al-Faloji (2016) summarizes that the value chain is a set of multiple activities that work to prepare a product or service from its early stages in the chain (the product) and through its other stages in the production chain until it reaches the final consumer. The value chain is an analytical tool that links all steps and activities together, including inputs, production,

4 Professor Michael Eugene Porter at Harvard Business School, University of Bishop William Louise.

processing, and distribution. Each step is analyzed with the previous and subsequent steps, and the value chain also works to enhance strengths, address potential weaknesses, avoid threats, and exploit possible opportunities, using the SWOT analysis tool. This contributes to ensuring the continuity and sustainability of businesses or projects while being able to adapt to current economic conditions.

Therefore, the value chain is considered a working methodology for analyzing strengths, weaknesses, and competitiveness at the organizational and production levels. The value chain should be classified into its strategic components to better understand the impact of each component on cost and value.

1.2.1.2 Value Chain Goals

There are several objectives for studying the value chain as stated by Gereffi (1999), Omar (2010) and Zaghloul (2003), which can be summarized as follows:

- Increase value and enhance competitiveness in the labor market for players and value chain establishments.
- Increase benefits for value chain players through the division and organization of integrated activities between value chain players in a sequential and functionally and logically interconnected manner, and providing products or services with a competitive advantage for the end consumer in the value chain.
- Develop a joint mechanism for work between value chain players, which in turn will help in decision-making, policy and strategy development, organizing production processes, and using information technology to provide products and services that meet consumer needs.
- Distinguish between value-adding activities (and enhance them) and non-value-adding activities to address them in the value chain.
- Use resources efficiently.

1.2.1.3 Importance of Value Chain Analysis

The importance of analyzing the value chain lies in identifying the best interventions to enable small producers and other players in the chain to overcome production and food shortages, as well as poverty. This helps improve their income level and continue to develop their businesses. The importance of analyzing the value chain can be summarized as follows, as stated by Ronald (1981) and Omar (2010):

- Generate opportunities and ideas for developing the player in the chain by diversifying products, improving their quality and reducing costs.
- Determine and identify the costs in the supply chain.
- Help reduce operational costs.
- Help in arranging performance.
- Identify opportunities for business development.
- Help identify performance indicators for management information systems within the organization.
- Help improve decision taking.

It is worth noting that poverty can be reduced through production by developing value chains. This works to increase the prices of producers and players in the chain, establish strong and inclusive organizations for producers (cooperatives), effectively reach the most vulnerable groups such as women, and lower prices for consumers by improving the efficiency of the chain.

1.2.1.4 Definition of Value Chain Mapping

Value chain mapping is a central element in value chain analysis. It is used to show the flow of transactions from raw material and input sources to production, processing, marketing and final sale. The maps can also illustrate costs and value added at each stage, critical constraints, and the relative influence of players along the value chain (UNDP, 2016).

Value chain maps provide an easy way to understand the processes and paths leading to production and sales by simplifying the complexities of the industry sector and its value chain. They are particularly useful for analyzing value chains and researching them to determine how they are performing, how they can be improved, or how they can be refined. The maps align sectors and participants and produce a common picture not only of what the industry or sector is doing but also of how it could look. They can also be developed collaboratively to enhance a shared perspective among all participants or some of them. This can be of utmost importance for the ability of concerned companies to innovate, or for them or the sector to develop or improve the value chain (Economic Development Board, 2015).

1.3 Background Information

1.3.1 Overview of SIERY Project

The Strengthening Institutional and Economic Resilience in Yemen (SIERY) project aims to improve productivity and resilience in promising value chains, create job opportunities, improve livelihoods, and enhance food security and household nutrition. The SIERY project - Strengthening Economic and Institutional Resilience in Yemen - aims to improve productivity and resilience in promising value chains, create job opportunities, and improve livelihoods and food security, and family nutrition. This follows the project's theory of change, which assumes that if value chains are improved, livelihoods will be improved through job creation, increased income, as well as production and productivity.

This follows the project's theory of change which assumes that if value chains are improved, livelihoods will improve through job creation, increased income, as well as production and productivity.

Therefore, targeted companies and associations will become more resilient and able to effectively deal with the fragile economic context and continue to provide vital commodities related to food security. In addition, communities will be more resilient and able to effectively deal with low levels of food security, decreased health services, low levels of nutrition, and increased poverty, and thus be strong drivers towards recovery and peace building efforts.

The project aims to implement the economic resilience project to strengthen vital value chains in the Yemeni economy, with the main objective of enhancing food security, improving access to health, and creating job opportunities.

The grant will help implement a value chain development approach to support the resilience of micro, small and medium-sized enterprises in selected value chains in the targeted areas, to assist communities, households, SMEs, and the vulnerable to access the basic building blocks for early recovery, sustainable livelihoods, and improved access to food and health. Therefore, the targeted companies and associations will be more flexible and will be able to deal effectively with the context of fragility and continue to provide vital commodities related to food security. In addition, societies will be more resilient and will be able to deal effectively with current food insecurity, health and nutrition, and poverty, and will be powerful drivers of recovery and peacebuilding efforts.

The project aims to implement the Economic Resilience Project to strengthen the vital value chains of the Yemeni economy, with the main objective of enhancing food security, access to health, and job creation.

The grant will help implement a value chain development approach to support the resilience of Micro, Small, and medium enterprises in selected value chains, and in the same target areas, to help provide communities, families, and vulnerable SMEs with the building blocks to move toward early recovery and sustainable livelihoods and enhance their access to food and health.

1.3.2 The objective of the Study

Based on the project document, the objective of the study will help in conducting initial value chain studies for the target sector to identify economic gaps, opportunities, and the main players in the chains to be supported.

This study will also assist in the selection of business intermediaries (supply chain enablers), SMEs, entrepreneurship companies, MFIs, markets, and market players such as input supply traders, microfinance institutions, business consultants, and small producers to be targeted in the project.

The study will be conducted by the Research and Development Unit at SMEPS. The studies will cover the targeted areas of intervention with the involvement of stakeholders involved in the chains, particularly chambers of commerce and local authorities.

1.3.3 Importance of Henna Commodity

The henna plant (*Lawsonia inermis* L.) is one of the most famous ancient plants used in cosmetics and hair dye products, with medical, cosmetic, cultural, and commercial benefits. It is grown for its leaves, but other parts of the henna plant, such as seeds, flowers, stem bark, and roots, have been used in traditional medicine for thousands of years. Henna paste on the skin provides a cooling effect that helps protect the skin from bacteria and fungi. Henna also helps hair growth and serves as an available source for strengthening hair roots. It was also used for body art and tattooing since ancient times for different cultures and occasions, and its importance also lies in its use as cosmetics and for the treatment of wounds and fungal infections (Sabra, 2015).

According to Noonari (2015), henna is an extremely important commodity. The results showed that henna cultivation can add a new dimension to the economy of countries, and also indicated that other studies confirm that cultivating henna is highly profitable, and farmers in these areas should be aware of this fact in order to develop and expand their activities.

In many countries where henna grows naturally, such as the Middle East and Asia, traditions involve using henna for special occasions such as victory in battle, childbirth, circumcision, birthdays, and even celebrating favorite animals. The most commonly used tradition of henna is in wedding celebrations for different cultures such as Muslims, Jews, Christians, Hindus, and Zoroastrians, including the henna night (Gallo, 2014).

In the context of globalization, henna art has become a popular culture in many societies around the world, not just in Asia, Africa, and the Middle East, where it has long been practiced in the past, but also in Western societies. There are many famous artists in the West who also use henna as an alternative to temporary tattoos (Chairunnisa, 2019).

Currently, henna is widely sold in containers available in stores as cosmetic products for hair and body dyeing. Given the popularity of henna around the world, especially in the Middle East, Europe, Australia, Canada, and the United States, all of these countries have their own production and different types of henna according to demand and traditions. Even though specialized markets and trained artisans sell and use henna, most of the market and uses in Europe are not fully regulated, particularly in body art, which is performed on the street or beach under completely unsanitary conditions (Gallo, 2014).

Henna is also known worldwide as a cosmetic agent with with anti-cancer, anti-inflammatory, analgesic, and antipyretic properties. Alcoholic extracts of henna leaves have shown mild anti-bacterial activity against *Micrococcus pyrogens var Aureus* and *Escherichia coli* (Chengaiah, 2010). Chengaiah goes on to state that there is a need to develop appropriate methods for using henna, and to document and describe the dye-producing plants for further development of the pharmaceutical industry and the formulation of high-quality natural plant dyes with therapeutic and safe uses.

1.4 Introduction

Yemen is located on the western side of Asia, specifically, in the southwest of the Arabian Peninsula, where it is geographically located between latitudes 12° 40° and 17° 26° north and longitudes 42° 30° and 31° 46° east, and its area is about 555,000 m^2 (Guoyu, 2011). Its population is approximately 30,411,000 people, according to the population projection for the year 2020 (The Ministry of Planning and International Cooperation, 2021). Although Yemen is in the northern parts of the tropical region, its climate varies from one region to another due to several factors such as geographical location, altitude above sea level, terrain type, and others. These factors play a role in the significant variation in rainfall, humidity, wind direction, and temperature from one region to another throughout the year (Arabic Encyclopedia, 2022).

In general, Yemen's economy relies on limited resources such as oil and gas (Ibp Usa, 2009). While Yemen is considered an agricultural country, it does not economically depend on agriculture, but mainly on oil, gas, ports and other sources. The agricultural sector in Yemen is one of the most important productive sectors, as its contribution to the GDP ranges between 15-20%. In addition, this sector produces food commodities and raw materials needed for many different industries, and a large segment of the population, amounting to about 74%, depends on the agricultural sector, which includes approximately 53% of the total workforce in Yemen (Arabic Encyclopedia, 2022). The major agricultural crops in Yemen include coffee, grapes, pomegranates, corn, wheat, mangoes, bananas, papayas, watermelons, oranges, lemons, pears, apples, peaches, dates, and henna (Encyclopædia Britannica, 2012).

In this study, we will focus on henna, which is considered a cash crop in Yemen. When we looked for statistics and data on henna, we found that there was no data on henna production, import, or export. Figure 1 briefly addresses the movement in productivity of cash crops in Yemen during the period from 2016 to 2020, of which henna is one. From Figure 1, it is observed that there was a decrease in the growth rate of cash crop production in Yemen from 2016 until 2018, followed by a significant increase in cash crop production in 2019, reaching about 35%, and then a very sharp decrease in the growth rate of cash crops production in 2020 to about -13%. This fluctuation in cash crop production in Yemen has several reasons, the most important of which is the migration of farmers from their lands and villages towards cities to pursue professions other than agriculture (Green Dream, 2022).

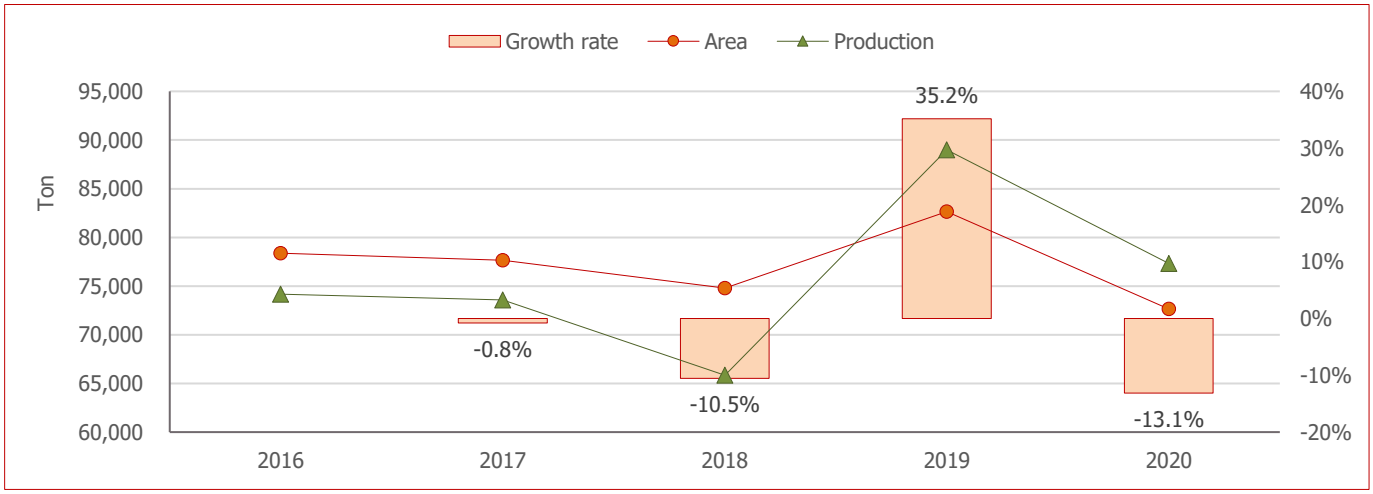

Figure no. 1: Productivity and cash crops in Yemen 2016 - 2020 (Ministry of Agriculture and Irregation, 2020)

1.4.1 Henna Sector in Ghayl Ba Wazir District

Ghayl Ba Wazir District is one of the districts of Hadhramaut Governorate. It is located on the northeastern side of Mukalla, the capital of Hadhramaut Governorate. Ghayl Ba Wazir District is about 43 km away from Mukalla, and has an area of about 2,418 km^2. Its population according to statistics collected in 2004 was about 25,741, and according to estimates for 2019, the population has grown to about 75,360 people (fscluster, 2020).

The climate of Ghayl Ba Wazir District is hot and dry in the summer, with mostly cloudy weather, while in the winter it is humid and dry, with mostly clear and warm skies. The temperature usually ranges from 20-34 degrees Celsius throughout the year. The hot season lasts for about three months, from April 28 to August 6, while the cold season lasts only two and a half months, from December 14 to February 28 (weather spark, 2021).

The Ghayl Ba Wazir District is known for its vast lands, with an average altitude of about 80-200 m above sea level. It has many flowing springs, around which palm trees, henna, and other trees grow. Tobacco, locally known as "Tambak," is one of the most grown crops in the district. Henna is also one of the most important crops in the district and is known for its high quality and popularity in Hadhramaut and Yemen in general. According to a study conducted in 2017, the henna plant is ranked eighth in importance to farmers in Hadhramaut (Alwan, 2017).

We did not find any official data or reliable sources regarding henna production, imports, or exports for Yemen or in Ghayl Ba Wazir District. This indicates that there is not much attention given to this important crop, which, if properly invested in, can contribute to reviving the agricultural sector in the region.

1.4.2 Production and Climatic Change

There are no studies on the climatic effects on the henna sector specifically, but there are climate effects on agricultural productivity in general in Yemen and around the world. Global climate models (GCMs) produce a wide range of results for Yemen, but the structures of climate models and emission scenarios reflect uncertainty about what will happen specifically. Based on a set of 21 GCM simulations, the Intergovernmental Panel on Climate Change (IPCC) expects in its fourth assessment report that there will be higher warming rates in East Africa and the Arabian Peninsula than the global average, and this heat is "very likely" to make rainstorms and heavy rainfall events more frequent throughout the region, but the uncertainty range related to future rainfall is large (Al-Jibly, 2016).

Yemen is particularly vulnerable to the impacts of climate change due to its heavy reliance on water resources. The per capita share of annual water resources is only 195 m^3, and Yemen already faces severe water scarcity. However, Yemen is a country that relies heavily on water, with the agricultural sector using more than 90% of the water, and there is strong unmet demand from domestic and industrial users. The country is prone to severe storms that produce flash floods interspersed with long periods of drought, and groundwater reserves will also be depleted in the foreseeable future, and climate change will at best delay the date by a few years (World Bank, 2010).

2 Study Methodology

The study was structured in a methodological, scientific manner and organized in several steps to ensure efficient and quality data.

2.1 General Approach to the Study

The study adopted the descriptive and analytical approaches of value chain analysis as the study went through the following five stages:

- **First** Stage: Stakeholders were involved, and the target sectors selected.
- In the **second** stage: Communication was established with the consultants, the team of workers selected, and the study needs of various forms and templates identified.
- In the **third** stage: The data was collected, verified, and processed.
- In the **fourth** stage: The data was reviewed and analyzed.
- The final **fifth** stage**:** The report was written and distributed to stakeholders.

Details of the implementation stages of the study are shown below in Table no. 1.

Table no. 1 The stages of the implementation of the value chain study

Stages	Actions	Outputs
Selection of target sector	• Participation of the stakeholders in the target area and identification of their priorities • Participation of target chain players in identifying chain players and the problems of the sector • Coordination with concerned entities to start studies and project	• Induction workshops by the donor team • Workshops by the SMEPS team • Sector problem analysis forms at the level of each player in the chain
Preparing study needs	• Desk review and revision of accessible reports and statistics • Define and map the players and value chains of sectors, and the initial analysis of stakeholders • Selection and evaluation of the work team (specialists + team leaders + data collectors + reviewers and verification of data + coordinators + translators + editors) • Preparing an electronic portfolio for the work team that includes (a simplified value chain guide + electronic survey guide + work procedures guide + templates and forms for the project and study and other necessary papers and documents) • Development of primary data collection tools (paper and electronic data collection forms (ODK-CTO) and value chain study report template) • Training the work team and distributing the samples and tasks	• Available reports and statistics • Training workshops • Lists of target value chain players • An electronic portfolio • Paper and electronic data collection form • Data collection sheets
Data collection and verification	• Field visits and communication with targeted people to collect data for target sectors of the value chain • Data review and verification • Data preprocessing	• Data collected in the SMEPS system • Visit sheets and communication with the targets • Reports of work team • Photos of communicating with the targets
Data review and analysis	• Review of the key technical and financial data of the study • Statistical data analysis • Mapping the target value chain players • SWOT analysis and analysis of sector-related problems • Analysis of the quantitative and financial flows of the product across the players of the chain • Propose recommendations for the development of targeted sectors	• Analysis results • Map of value chain players • Analysis of SWOT, quantitative, and financial flows • Recommendations
Report writing and publication	• Writing the initial version of the report • Re-drafting the report and designing graphs and figures • Writing the final version of the report and translating it into Arabic and English • Printing the report • Distribution and sharing of the report with stakeholders	• Draft report • The final report in Arabic and English • Wrap-up workshops

2.2 Study Scope

2.2.1 Implementation Date)

The study data were collected in March 2022.

2.2.2 Study Area

The study targeted Ghayl Ba Wazir District in Hadhramaut Governorate - the largest governorate of Yemen. Ghayl Ba Wazir District is located northeast of the city of Mukalla, the capital of Hadhramaut with the coordinates (14.77, 49.36) as shown in Figure no. 2.

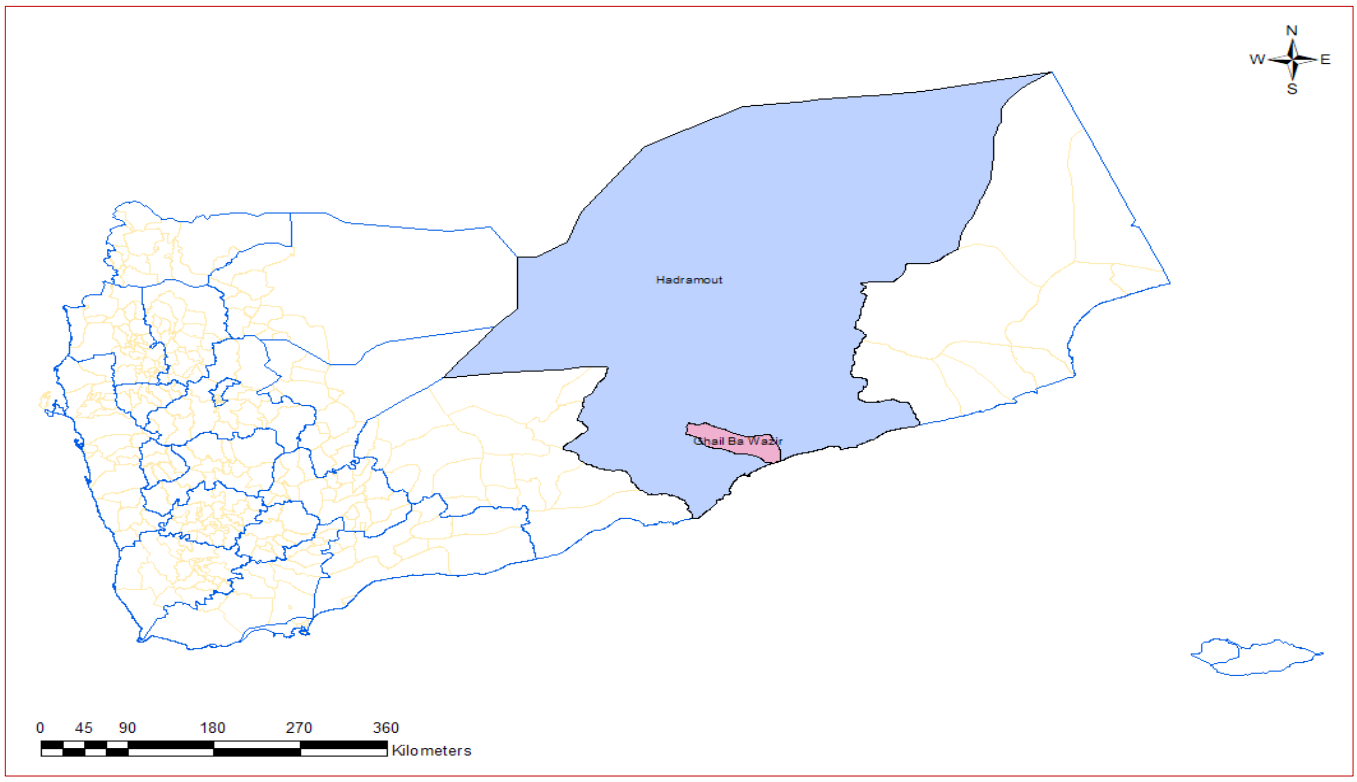

Figure no. 2: Map of the study area

2.2.3 Team Work

The work team consisted of 13 members, divided according to an organized work structure (refer to the work team page at the beginning of the study for more details). This structure ensured the order of work, the sequence of the data collection, and a study free from any errors and with accurate and logical content. The work team structure consists of the following:

- 1 officer in charge of implementing the study + data analyst
- 2 technical and administrative assistants
- 2 study consultants
- 1 data collection team leader
- 4 data collection team members
- 1 data reviewer + verification + data analysis
- 1 external report reviewer (UNDP)
- 1 English translator

In addition, another team of SMEPS staff worked on reviewing and reformulating the text, headings and data to develop a highly efficient and accurate study.

2.2.4 Sampling

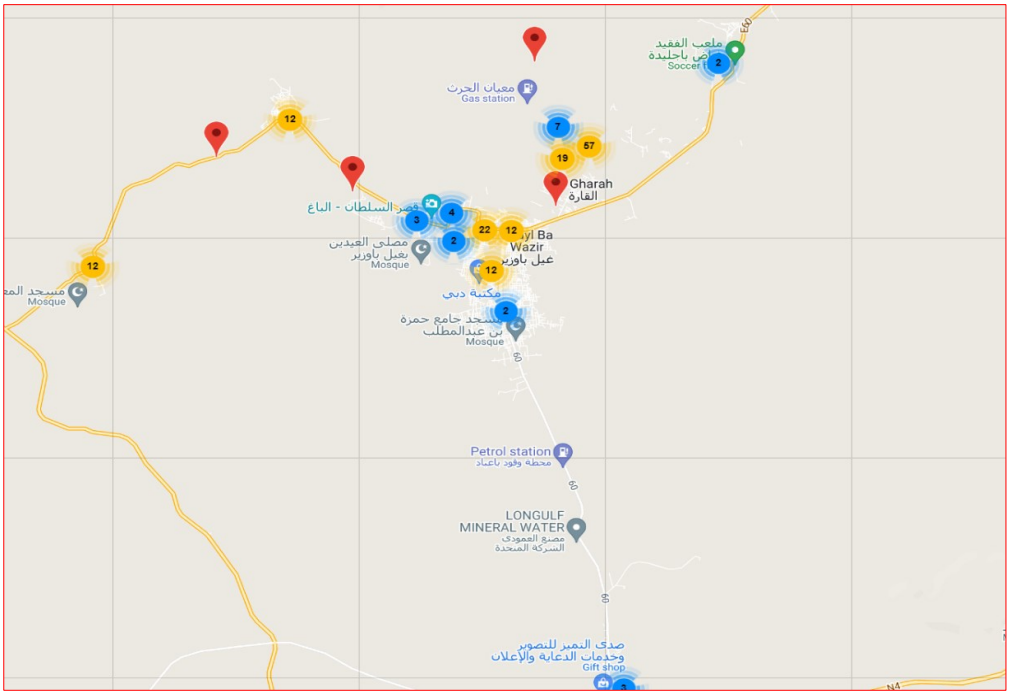

Figure no. 3: A map showing the sites of the study sampling

Figure no. 3 shows the sites and distribution of the study samples on a map. Table no. 2 shows the details of the sampling at the level of stages in the value chain.

With the launch of the value chain study activities in the target sector, a discussion workshop was held, during which a sample of actors or players in the value chain participated, where several individuals from each link or job in the chain were divided into groups at separate tables.

At the beginning of the workshop, the participants were introduced to the study and its significance, and how it could have a role in reviving the sector. The problems of the sector were discussed, and innovative solutions were proposed by attendees to help develop the sector. These discussions enhanced the community's response to the data collection team. In addition, each group had the opportunity within the workshops to talk and express within the limits of their role and position in the chain their concerns and the most significant challenges they face. The workshops also provided an opportunity for the actors in each chain stage to hear each other and cooperate. During the workshops, participants filled out a pre-prepared questionnaire. The participants recorded the most significant problems facing them, the causes and effects of these problems on the sector, proposed solutions to these problems, and the parties responsible for implementing these solutions.

Table no. 2 Size of sampling classified at the level of henna value chain stages in Ghayl Ba Wazir District (Primary Sources, 2022)

Type**	Description	Trader Suppliers	Producers	Traders / Processors / Exporters	Consumers / Market	Government and Supporters	Total
FGDs	Focus groups workshop (with chain players) (Number of persons per group)	0* (0)	1 (13)	1 (8)	1 (6)	1 (5)	4 (32)
KIIs & Q	Chain Players	7	140	19	54	10	230
Total Study Samples		**7**	**153**	**27**	**60**	**15**	**262**

** = **Type of data collection tool**: **FGD**= focal group. **KII**= Key interviews. **Q**=Questionnaire.

* **Note:** Because supply traders were preoccupied and unable to attend the opening workshops, other players were the focus in the workshops at the beginning of the study. However, supply trader data was taken later through interviews and questionnaires.

2.3 Data Collection and Verification

2.3.1 Data Collection

Before starting the study and collecting data from the field, secondary sources and references were gathered, and primary data collection forms were prepared for all players in the value chain. The study team was then prepared to collect primary data electronically using the SurveyCTO Collect program. The survey covered several levels of the targeted sector's value chain, where primary actors in the chain, such as producers, input suppliers, traders, distributors, and end consumers, were interviewed. The interviews also included supportive entities in the chain, such as associations, cooperatives, enablers or legislators in the chain, represented by local authorities. To carry out the study, teams were prepared with expertise related to the targeted sector, and specialists and consultants were contacted and tested to select the working team.

Before collecting any data from the field, an opening workshop was held for players in the value chain of the targeted sector, and they were divided into groups, with each group representing a specific function in the targeted value chain. The attendees were then introduced to the project and its objectives, and the most important problems in the sector at the level of each group (function) in the value chain were discussed. Primary data was collected for the problems of each function, along with proposed solutions to these problems. Data collection forms were then prepared in a way that was appropriate and compatible with the targeted sector and its players.

Photos showing the focus group discussions for each henna value chain player in Ghayl Ba Wazir District

During the preparation and implementation of the workshops, a report template and data collection forms were prepared on paper and converted into electronic form to facilitate data collection. The forms included all possible answers and options to facilitate the data collection process and increase the level of accuracy. Field visit models, achievement levels for field teams, and a model for reporting field tasks were also prepared. Additionally, three guides were prepared for the team, including a guide to the concepts of the value chain, a guide to ethical fieldwork, and a guide to the data collection process to facilitate the team's work.

After that, the work team (team leaders and field surveyors) were trained for five days. During the training period, the team was introduced to the project and its objectives, the importance of the information that will be collected, its accuracy and credibility, and how to download and activate the electronic form. The training also included aspects related to ethical and regulatory fieldwork, how to deal with the target groups, how to fill out forms, models, and daily and final

reports to complete the task. At the end of each training day, the work plan and fieldwork documents and attachments were distributed, and the target sample was distributed among the team.

Photos showing the training period of the field survey team

After preparing and equipping for all the study's needs, the field survey team set out to meet the players (stakeholders) in the targeted sector value chain. The field survey process continued for 10 working days, during which the players at all levels and stages of the chain were interviewed, and the data was sent directly to the agency's database, which was pre-equipped to receive data via SurveyCTO Collect servers. The data was immediately reviewed, verified, and any errors from the field were corrected.

According to the study plan, a clear methodology was developed for the data collection process from the field team. The sample distribution list was distributed to the team so that all stakeholders in the targeted value chain were targeted. The study included several aspects, including technical, financial, production location, work environment, and problems and obstacles faced by the players in the chain. Upon completing the data collection, the team leader checks the completeness of the forms with his team to ensure that all the form data has been completed before sending it to the data collection server.

The team leader also reviews the daily survey team reports, ensures the level of achievement, and follows up with the team through a social communication group (WhatsApp) to monitor all updates facing the team and solve their problems immediately, disseminating any observations among team members. Additionally, he receives any emergency instructions from the research and development team to disseminate to the team.

Photos showing the work team during data collection from the field

2.3.2 Data Verification

To verify the validity and accuracy of the data, a specialist was appointed to review the data as it was received. The specialist was trained on how to receive, review and follow up the data first-hand to avoid repetition of data and errors from field enumerators, and to enhance the quality of data to the highest possible degree.

Photos showing the meetings and training of the data processing and verification team

During the data collection process, an interactive dashboard was created that was linked to the study's database. The dashboard was used to monitor the progress of the field survey team and guide the team to focus on all levels of the value chain. It was also used to track the team's progress speed, the areas that were visited, and the number of forms submitted to the database for each player in the value chain, as shown in Figure no. 4.

Figure no. 4: An interactive dashboard to track the daily achievements of the data collection team

After completing the data collection process, the data was verified by the specialist who contacted a sample of the target group by phone to verify the accuracy and credibility of the data, ensuring that it matched what was collected from the field. Any missing data or illogical data were completed and corrected in coordination with the field team leaders and field surveyors.

2.4 Data Processing and Analysis

2.4.1 Data Processing and Cleaning)

To process the data, a specialist was trained for each study to review and process the data and verify it. The data processing specialist was trained on the workflow and the concept of the value chain, how to receive and verify data, and review it in real-time to avoid duplicating data, and negotiate obstacles or erroneous data from the field data collection team. The reviewer was connected to the interactive dashboard to monitor the flow of data received from the field and to determine the level of progress of the field survey team and guide the team to focus on all links in the value chain.

Photos showing the training of the specialist in data review, processing and verification

During the data collection process, the accuracy of the data was verified by a specialist in review and verification. Random samples of the surveys that had been received in the database were contacted by phone to verify important questions and to match the answers given in the survey. Data was processed upon arrival and any missing data was completed in coordination with the field team leaders and field surveyors.

After processing and verifying the data, a meeting was held with the study specialist to discuss the mechanism for data analysis, and how to coordinate the work between the monitoring and evaluation team, the review specialist, and the study specialist in order to write the text in a report format, and to ensure coherence between the information and to maintain consistency in the report. Data analysis was conducted using Google Sheets for technical and statistical analysis, and some mathematical and statistical methods were used for variables such as averages, ranges, highest and lowest values, percentages, and other statistical measures.

The study included several aspects in its analysis, including production costs, sales prices, profit margins, and product flow channels through the studied value chain. The cash flow between the players in the chain was analyzed, and a map of the players was drawn. The SWOT analysis model was used to review the most important problems and challenges, and how they can be addressed. The strengths and opportunities were highlighted, and recommendations were proposed to develop the sector and improve the performance of the value chain in the future.

Photos showing the meetings with the study specialist and agreement on the analysis mechanism and report writing

2.4.2 Data analysis

The quantitative and qualitative data were analyzed using systematic scientific methods to reach the financial and economic indicators related to the studied value chain. One of the most important indicators studied in this report is the value added by the players in the chain, how their shares are distributed in the value chain, what is the profit margin and marketing margin for the players in the value chain, and other necessary financial and economic indicators for this study. The data were classified into two parts: qualitative or descriptive indicators, and quantitative or numerical indicators:

2.4.2.1 Qualitative Data

Descriptive data analysis is one of the most intensive tasks in the analysis process, due to the standardization and encoding of the data, dividing it into several levels and classifying it into groups and then re-analyzing it. One of the most important descriptive analyses of the study is of the players, functions, and channels of the value chain, as well as SWOT and PESTLE analysis of obstacles and problems, and the analysis of developmental strategies for the targeted sector.

2.4.2.2 Quantitative Data

There are many indicators that have been relied on to measure the performance and analysis of the value chain, including financial and economic indicators that are necessary to evaluate the financial performance of the chain as mentioned in (McFadden & others, 2011). The data for these indicators were obtained from the data collection forms for this study. The most important of these indicators are outlined below.

2.4.2.2.1 Variable Costs (VC)

Variable costs or operating costs are the costs that change with the change in the number of production units. When the number of production units increases, the variable costs increase, and when the production costs decrease, the variable costs decrease. Variable costs include fertilizers, feed, fuel, pesticides, treatments, vaccinations, transportation, water, and production labor (i.e., temporary labor), etc. The **average variable costs** can be obtained according to the following equation:

$$\text{Average Variable Costs (AVC)} = \frac{Total\ Variable\ Costs\ (TVC)}{Yield\ (Y)}$$

• Where: **AVC** is the average variable costs **TVC** is the total variable cost **Y** is the number of units produced

2.4.2.2.2 Fixed Costs (FC)

Fixed costs are costs that do not vary with changes in the production volume, and they are the opposite of variable costs. These are costs that must be paid whether or not the production process is carried out. Fixed costs include fees, subscriptions, maintenance costs, rent, permanent labor costs, and others. The **average fixed costs** can be obtained according to the following equation:

$$\text{Average Fixed Costs (AFC)} = \frac{Total\ Fixed\ Costs\ (TFC)}{Y}$$

• Where: **AFC** is the average fixed costs **TFC** is the total fixed costs **Y** is the number of units produced

2.4.2.2.3 Total Costs (TC)

Total costs is the sum of fixed costs and variable costs, and **average total costs** can be obtained according to the following equation:

$$\text{Average Total Costs (ATC)} = AFC - AVC$$

• **ATC** is the average total costs **AFC** is the average fixed costs **AVC** is the average variable costs

2.4.2.2.4 Depreciation (Dp)

Depreciation is a gradual and continuous decrease in the value of fixed assets. The depreciation rate is estimated annually, and the depreciation expense is calculated by subtracting the estimated salvage value from the cost of the asset and dividing it by the asset's useful life in years. The **annual depreciation value** can be obtained according to the following equation (Abdul Larif):

$$\text{Depreciation (Dp)} = \frac{AFC - dd}{Time\ (T)}$$

• Where: **Dp** is the depreciation share **AFC** is the average fixed costs **dd** is the value of an asset after the depreciation period
• **T** is the depreciation period of an asset by years

2.4.2.2.5 Total Revenue (TR)

Total Revenue which includes the sale value and other project revenues, is the total number of units produced multiplied by the selling price or market price. **Total revenue** can be obtained according to the following equation:

$$\text{Total Revenue (TR)} = Price\ (P) * Yield\ (Y)$$

• Where: **TR** is the total revenue **P** is the sale/market price **Y** is the number of units produced

Average total revenue can be obtained according to the following equation:

$$\text{Average Total Revenue (ATR)} = \frac{TR}{Y}$$

• Where: **ATR** is the average total revenue **TR** is the total revenue (sales) **Y** is the number of units produced

2.4.2.2.6 Profit (Pf)

The profit indicator is one of the key financial indicators for measuring the efficiency of the performance of the economic units and projects (Al-Faloji, 2016). **Profit** can be obtained according to the following equation:

$$\text{Profit (Pf)} = \text{TR} - \text{TC}$$

• Where: **Pf** is the average net profit **TR** is the total revenue (sales) **TC** is the total costs

Gross profit can be calculated according to the following equation:

$$\text{Gross Profit} = \text{Net Sales} - \text{Cost of Sales}$$

2.4.2.2.7 Gross Margin (GM)

Gross margin is a short-term indicator and measure of the performance of the enterprise or project. One of the determinants of this indicator is that it is not related to the time value of money (Lampkin & Measures, 1994, 2001). Gross margin is the difference between the total revenue and total variable cost of the enterprise. It can be obtained by the following equation (Barnard & Nix, 1979):

$$\text{Gross Margin (GM)} = (Q * p) - TVC$$

Where: **GM** is the Gross Margin **Q** is the quantity of sold product **P** is the unit price for every unit sold **TVC** is the total variable or operating costs

2.4.2.2.8 Net Profit (NPf)

Average net profit is the average value of sales minus the average fixed and variable costs together. The **average net profit** can be obtained according to the following equation:

$$\text{Average Net Profit (ANPf)} = \text{Average sale value } (ASV) - (AFC + ACV)$$

Where: **ANPf** is the average net profit **ASV** is the average annual sales value **AFC** is the average fixed costs **AVC** is the average variable costs

2.4.2.2.9 Value Added (VA)

The value added is the value generated at each stage of production and marketing along the value chain and ends when the product reaches the final consumer. This indicator is used to measure the importance and competitiveness of the production project and its contribution to enhancing the country's GDP. That means the more the added value of the project, the more the project contributes to increasing the national domestic product (Al-Falouji, 2016). This indicator is one of the necessary planning indicators in distributing resources to the various projects to achieve social benefit (Al-Ezzi, 1989).

The value added can be measured for the product in the value chain as the difference between sales revenue and the cost of external purchases and services (direct production costs). The following equation illustrates the method for calculating value added (Karpik & Belkaoui, 1990):

$$\text{Value Added (VA)} = \text{Revenue } (R) - \text{Variable Costs } (VC)$$

• Where: **VA** is the value added at the level of each player **R** is the returns or revenues (outputs) **VC** is the operating cost (inputs)

The added value is estimated for the players, links, or levels of the chain between the producer and the consumer by calculating the price difference between the selling price and the purchase price (Al-Falouji, 2016):

$$\text{Value Added (VA)} = Sale\ Price\ (SP) - Purchase\ Price\ (PP)$$

• Where: **VA** is the value added at the level of each player **SP** is the selling price **PP** is the purchase price

The same equation above is used to estimate the marketing margin (MM) for each of the chain players.

2.4.2.2.10 Share of Value Added (SoVA)

This indicator is used to know the share or proportion of each player in the studied value chain, which as stated by (Kulmiye, 2010), is the ratio of value at each stage of product manufacturing and/or product distribution or at the level of wholesalers, retailers, and other players in the chain. This value can be obtained by dividing the value added at any player's level in the chain by the total value of all players in the chain. For example, the value added at the product level is the sale price minus the production cost, while the value added for other players in the chain is the difference between the sale price and the purchase price divided by the total value added for all players in the chain. The share of value added can be obtained through the following equation (Al-Falouji, 2016):

$$\text{Share of Value added (SoVA)} = \frac{Value\ Added\ at\ Market\ Level\ (VAi)}{Total\ Value\ Added\ (TVA)} * 100$$

• Where: **SoVA** is the share/ proportion of the value added **VAi** is the added value for each player in the value chain
• **TCA** is the sum of value added for all value chain players

There is another term called "Share of Value" similar to "Share of Value Added", and the SoV approach is used to compare the Gross Margins of players or entities in the value chain.

$$\text{Share of Value (SoV)} = \frac{GMi}{TGMvc} * 100$$

• Where: **SoV** is the share/ proportion of the value added **GMi** is the total profit margin per one player in the value chain
• **TGMvc** is the sum of the profit margin for all chain players

2.4.2.2.11 Marketing Margin (MM)

The marketing margin is an indicator of the value or cost paid for the processing and marketing services for the product at each stage of production (Al-Falouji, 2016), which is the difference between the selling price and the purchase price of the product. The value of the marketing margin can be found through the following equation (Hag, 2011):

$$\text{MM} = Sale\ Price\ (SP) - Purchase\ Price\ (PP)$$

• Where: **MM** is the marketing margin **SP** is the selling price **PP** is the purchase price

2.5 Report Writing, Translation and Publication

2.5.1 Report Writing

This study team built a detailed plan for what the report would include at the beginning of the study planning phase. Based on that, a report structure was developed, including chapter titles and section headings, as well as tables, charts, and appendices. This helped the team prepare the first draft of the report to present the main outputs and initial results to the team and receive feedback to develop the report. The team reviewed the first draft of the report, reformulated and rewrote it, and designed graphics, figures, and tables. They produced the final version of the report to be translated and shared with relevant parties, supporters, and the funding entity for the study (EU-UNDP).

2.5.2 Report Translation

The team prepared the report in its initial version in Arabic, and a specialized consultant was hired to review the final version of the report and hand it over to the consultant for translation into English. This took approximately two weeks to finish the translation, language review and professionally rephrasing for publication and sharing with stakeholders.

2.5.3 Report Publication

After completing the final report and printing it in both English and Arabic, it became possible to share the report with relevant stakeholders, whether they are players in the value chain or related donors and entities in the same sector, as well as official bodies.

Reviewing the results, presenting the outputs and recommendations will contribute to the development of an independent value chain sector. The report includes a detailed presentation of the gaps that can be addressed and the efficiencies that can be enhanced among stakeholders in the value chain. The report also includes proposals that may contribute to improving and raising the efficiency of the sector value chain and increasing local production and exports, while reducing operating costs. It will also significantly contribute to raising the country's economy and providing many job opportunities.

The report will also help relevant stakeholders and supporters to facilitate decision-making and design appropriate projects based on the needs of stakeholders in the chain, to support and enhance the development of the sector value chain in Yemen. The report can be downloaded in both Arabic and English through the agency's and UNDP's websites and promoted through social media platforms to provide an opportunity for all interested parties and individuals to access it.

Copy of the Arabic version

Copy of the English Version

Barcode to access the study via the web

3 Findings

Profits are being wasted and not invested correctly in the henna sector in Ghayl Ba

Wazir District - Hadhramaut

3.1 Dynamic Henna Value Chain System

There are four main components or headings through which the dynamics of the complex henna value chain system in the Ghayl Ba Wazir District will be identified and understood. These headings are as follows:

First: Defining the stages, players, and functions of the henna value chain.

Second: Describing the mechanism of the chain stages with SWOT analysis and PESTLE analysis, and defining the trading channels (buying and selling) between the players in the chain.

Third: Describing the process of quantitative cash flows between the players in the chain and analyzing the profitability (profit margin) of the henna value chain players.

Fourth: Analyzing the marketing channels and profit margin of each player at the level of each marketing channel.

3.1.1 Identify the Henna Value Chain

3.1.1.1 Stages of Henna Value Chain

The study team was able to divide, sort, and group all players in the henna value chain in Ghayl Ba Wazir District into seven stages. The stages start from inputs, then production, and end with the final consumption of henna products. In between, there are stages of trade, processing, and export. Figure 5 illustrates the stages of the henna value chain in Ghayl Ba Wazir District. Each stage will be detailed separately under the headings below.

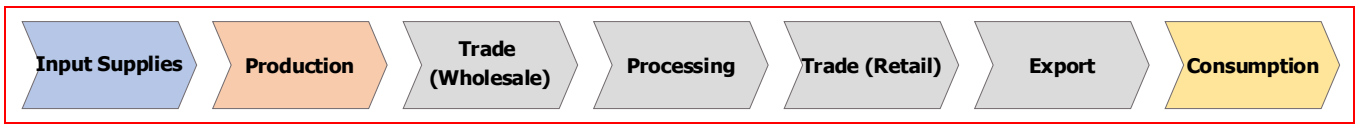

Figure no. 5: Henna value chain stages in Ghayl Ba Wazir District, Hadhramaut, Yemen (Primary Sources, 2022)

3.1.1.2 Players and Functions of the Henna Value Chain

In order to understand the mechanism and dynamics of the henna value chain in Ghayl Ba Wazir District, the players and functions were defined as shown in Figure no. 14, and players and functions can be distributed according to the henna value chain stages as follows:

- **Inputs supply stage:** There are four types of players at this stage, suppliers of production inputs, suppliers of packaging and labeling tools, suppliers of seedlings, and suppliers of oil derivatives. Each stage and its players and functions will be discussed in detail in the upcoming sections.
- **Production stage:** This includes the producers (henna farmers), where only about 14% are members of associations. About 87% of farmers are individuals who do not have business partners in their farms, and about 13% of henna farms in Ghayl Ba Wazir District are run in partnership.
- **Trade, processing and exporting stage:** This stage includes four types of players, wholesale traders, processing mills, retail traders, and exporters.

- **Consumption stage:** This stage includes two types of consumers, the first being local consumers, citizens and local henna artists, and the second being foreign consumers.

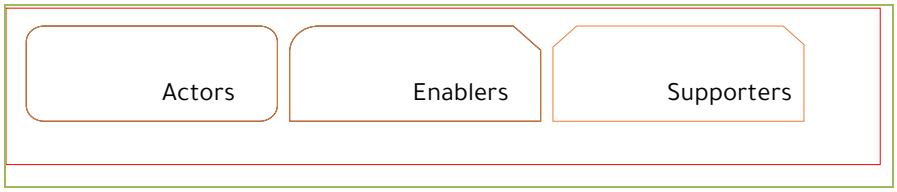

Figure no. 6**:** The forms of value chain players, enablers, and supporters.

The direct chain stages do not exhaust all the relevant players, however. There are other players that we can call **secondary players** in the chain - enablers and supporters. Figure no. **6**: shows the forms of both the primary and secondary players in the chain. The following headings will provide details of the stages, players and activities of the henna value chain in Ghayl Ba Wazir District.

3.1.2 A mechanism for the Work of Value Chain Stages and SWOT and PESTLE Analysis

3.1.2.1 Input Supplies

Henna farmers in Ghayl Ba Wazir District receive all the necessary inputs for henna cultivation from materials traders or input suppliers located in the same area. Input suppliers in the henna value chain play an important role in providing henna farmers with the basic necessities that enable them to continue henna farming and production. The roles and activities of input suppliers in the chain vary depending on the nature of their business. According to the study, some input suppliers provide fertilizers, pesticides, and farming tools, while others provide packaging materials, henna seedlings, and oil derivatives used to operate irrigation pumps for henna crop irrigation.

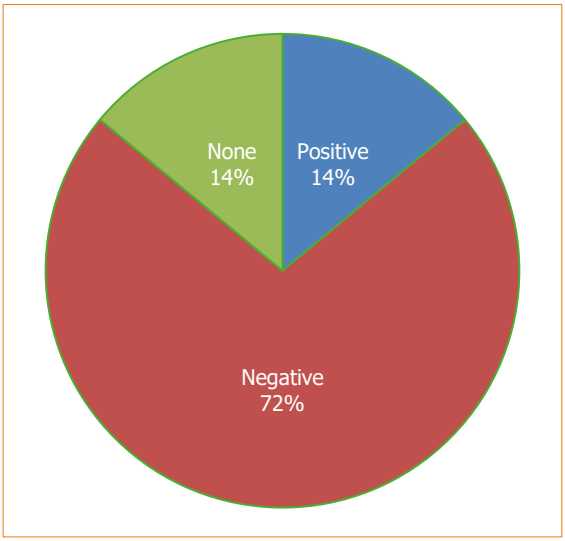

Figure no. 7: The views of inputs suppliers about the impact of importing products from abroad (Primary Sources, 2022)

Figure no. 7 shows input suppliers' views on the impact of imports. It is observed that most of the inputs for henna agriculture and production provided by input traders in Ghayl Ba Wazir District are imported. About 72% of input traders believe that the negative impact of imports on the henna sector is due to the fact that imported goods reduce production input prices and their quality is usually low.

However, about 14% of input suppliers believe that imports from abroad have a positive impact because they increase demand for the product and fill the gap in the market demand for henna. Meanwhile, there are input traders who see that importing henna production inputs from abroad has no effect and represent 14%.

The data in Figure no. 8 shows that the majority of input suppliers in Ghayl Ba Wazir District for henna cultivation do not face difficulties in purchasing inputs from abroad or transporting them to their locations, and they do not suffer from unavailability of products in the market or difficulty in accessing them from abroad. These processes are considered very easy to moderate, according to 86% of input suppliers. The reason for this is the availability of nearby sea ports and land borders such as the ports of Ash Shihr, Mukalla, Nishtun, Al-Mahra, Aden, and the Shihin crossing, which facilitate the arrival of these inputs from abroad. Meanwhile, 14% of input suppliers indicate that the procedures and transactions of purchasing, transporting the product to their stores, or the ease of accessing the product from abroad, are difficult. Upon analyzing the type of input suppliers who reported difficulty, it was found that they are dealers in chemical fertilizers, due to the current conditions and strict control on fertilizer imports.

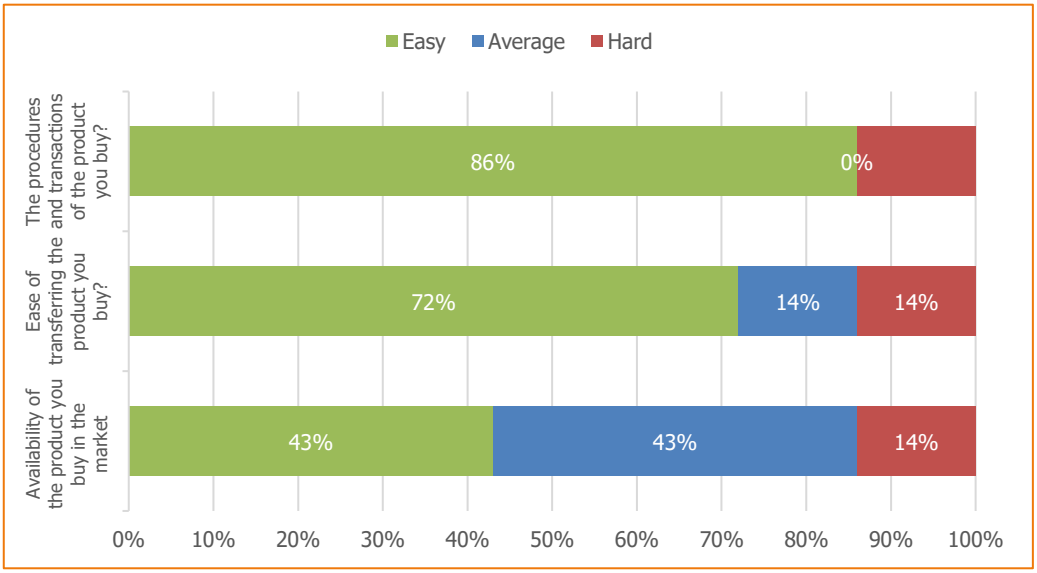

Figure no. 8: The views of input dealers about the procedures or providing products and how easy it is to provide (Primary Sources, 2022)

It is noteworthy that fertilizers are the most purchased products by farmers, as they contribute to their crops and increasing plant growth and yield. From the above, it can be concluded that inputs for henna cultivation are limited in variety and quantity, which may be due to the limited area of land dedicated to henna cultivation and competition with imported henna products.

It appears that the prevailing payment method between input suppliers and their customers is cash, as reported by about 71% of input suppliers, as shown in Figure no. 9, while 29% of traders are using credit with their customers based on mutual trust between the two parties.

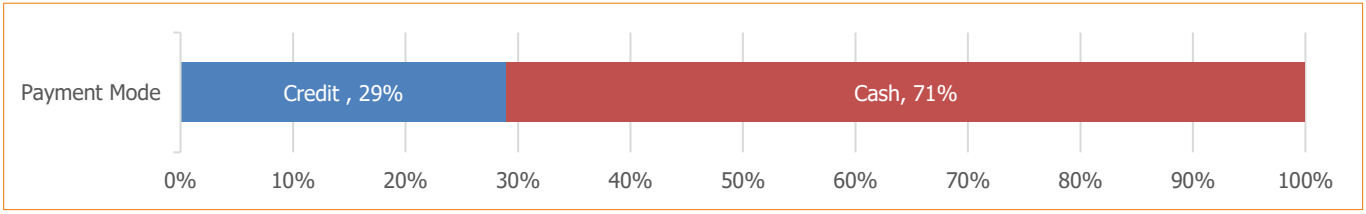

Figure no. 9: The payment method between input dealers and their customers (Primary Sources, 2022)

Regarding the level of satisfaction of input suppliers with the infrastructure in general in Ghayl Ba Wazir District, more than half (53%) of input suppliers are satisfied with the infrastructure in general. 29% of them are somewhat satisfied, while the remaining 18% are not satisfied with infrastructure services in general. Looking at the details of seven

infrastructure services as shown in Figure 10, the electricity and power service dissatisfied input suppliers the most at 86%. The reason given for this is the frequent and daily power outages.

The second service that input suppliers were dissatisfied with was the road services and ease of transportation, with a percentage of 29%. The reason for this is the lack of interest in roads and maintenance by the relevant authorities, which causes problems for transportation and continuous disruption.

Water facilities and water availability services, as well as sewage services, come third in the list of services that input suppliers are not satisfied with, with a percentage of 14%. The infrastructure for these services are seen as weak.

The majority of input suppliers indicated that they are somewhat satisfied with the health and medical care services, at 71%. Those who were dissatisfied cited incomplete health facilities and the weakness of the available medical staff. Meanwhile, the satisfaction of input suppliers with communication and internet services only reached 43%, due to the frequent interruptions in these services.

Finally, in terms of infrastructure services, input suppliers in the henna sector see that the best service in the region is education and the availability of schools, with a satisfaction rate of 86%. The satisfaction rate is somewhat lower, at 14%. They attribute their satisfaction to the availability of schools in the area and the availability of educational staff.

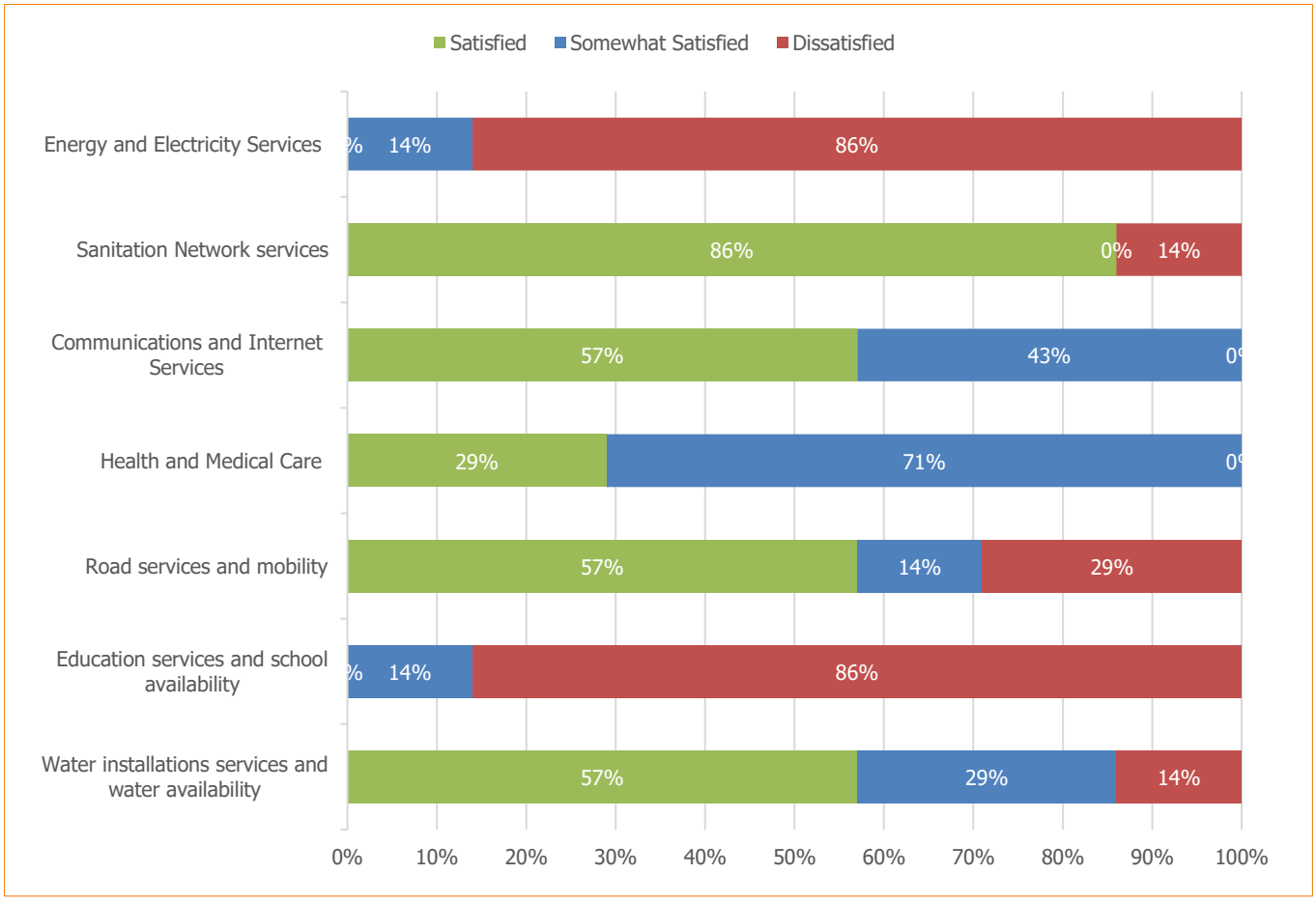

Figure no. 10: Inputs dealers' level of satisfaction with infrastructure in Ghayl Ba Wazir District

Figure no. 11 shows that the best month for work for the players in the henna value chain in Ghayl Ba Wazir District is January, while the worst month for work is the month before. During December, the activity of the players in the value chain is the weakest for the year. It is also noticeable that there is a fluctuation in the activity of the players between

January and December. Activity gradually decreasing after January through to April, then fluctuating up and down until December, and then the cycle starts again.

As for the highest and lowest selling values, the best month for selling among the players of the henna value chain in the Ghayl Ba Wazir District was April. In 2021, April coincided with the month of Ramadan according to the Hijri calendar. This month is characterized by its religious color, and the majority of Yemenis buy new clothes and decorations, including henna, which women and children adorn themselves with to welcome the coming month of Shawwal in celebration of Eid al-Fitr. Also, during the month of Shawwal, weddings increase, which are not without the use of henna in decoration, whether for the groom's or bride's house. All of this increases the demand for henna products, which justifies the highest selling price in April.

After April, the selling price of the players' products starts to decrease for a month, then has a secondary peak in July. July corresponds to the month of Dhu al-Hijjah, which is also a month in which the demand for Henna products increases for adornment. This increases the demand for the product, which raises the selling price to the second highest value after January.

After July, the price of henna products starts to decrease and then increases slightly until it reaches the lowest selling price in January. It is also noticeable that January, as mentioned above, is the best month for the activity of the players in the value chain.

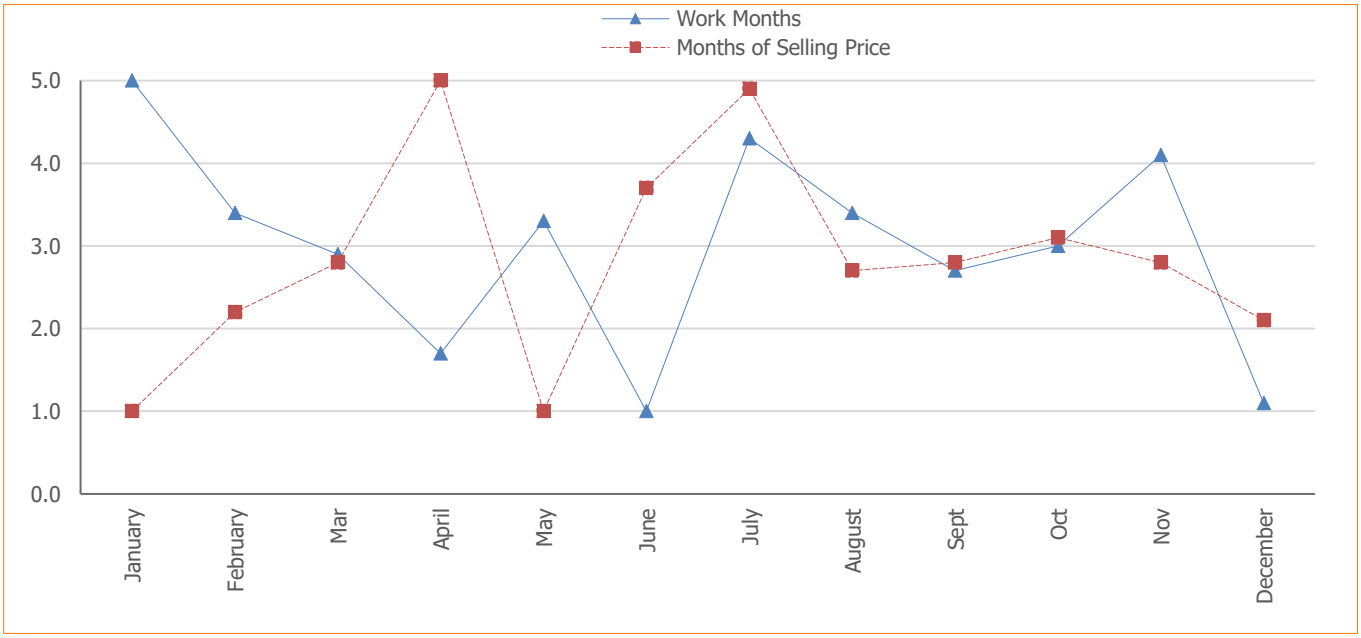

Figure no. 11: Months of work and sales for the players of the henna value chain in Ghayl Ba Wazir District (Primary Sources, 2022)

5=more/much better. **4**=more/better. **3**=Average. **2**=Less/Worse. **1**=less/much worse.

3.1.2.1.1 SWOT and PESTLE Analysis - Input supplies

In general, the SWOT and PESTLE analysis relied on ranking the points according to their frequency of mention among the players of the value chain, not according to their importance, as in the analysis of problems / challenges (see Appendix (2): SWOT and PESTLE Analysis Details). The findings and details at each stage level of the SWOT and PESTLE analysis are addressed under the following headings for henna value chain in Ghayl Ba Wazir District.

Strengths

The study showed that the strengths of the input stage sector are represented by social factors, such as having qualified labor with a frequency of 16% and patience and the ability to handle service and crop processing at a rate of 12%. The henna crop goes through many processing stages that require a great effort, and this advantage must be preserved as it represents a history and culture that is difficult to restore after its disappearance. Also, this stage has an economic strength with multiple sources of income at a rate of 12%, which reinforces the players' continuity in the input stage. Additionally, suppliers in this stage have knowledge of the markets at a rate of 12%.

Opportunities

Opportunities for this stage are a mix of economic opportunities, in that this sector has good economic returns with a frequency of 21%, and thus supporting this sector will stimulate input suppliers within the chain and increase their income. Also, there is an environmental opportunity represented by the suitable environment of Ghayl Ba Wazir District for henna at a rate of 17%, which makes investing in and supporting the henna sector in the district worthwhile. Socially, there is an opportunity for the availability of trained labor at a rate of 13%, whose skills can improve the quality of life and increase their incomes as individuals. Additionally, there is an opportunity for technical support at with a rate of 8%.

Weaknesses

Most of the weaknesses in this stage were economic, represented in the high cost of labor with a frequency rate of 21%, which affects the cost of the product later, so there is a need to reconsider how to invest in labor with appropriate costs. In addition, there is a lack of capital at a rate of 21%. There are also administrative and technical weaknesses, such as the weakness in marketing and promotion at a rate of 11%, and the inability to communicate with foreign markets at a rate of 11%. This is due to not knowing English or how to communicate with companies outside the country, which confines the product to the local community. Also, the regional community is not aware of the advantages of Ghayl Ba Wazir henna and its comparison with competing products in the market.

Threats

The input stage of the henna sector in Ghayl Ba Wazir faces multiple threats, represented by economic threats such as price fluctuations with a frequency rate of 20%, high transportation costs at a rate of 20%, high fertilizer costs at a rate of 16%, and the increase in hard currency exchange rate at a rate of 12%. These threats affect the return on investment in the henna industry.

3.1.2.2 Production

Based on the study's results, the agricultural land areas for henna producers in Ghayl Ba Wazir District are very small, with an average farm area of about 3,055 m^2 for henna cultivation. Henna producers (farmers) operate widely in Ghayl Ba Wazir District, where most farmers use primitive methods and old farming equipment, as follows:

- Leveling and preparing the land before cultivation
- Planting seeds or seedlings, with seedlings preferred to save time, costs and to accelerate the harvesting process
- The crop is irrigated every 8-12 days, sprayed with pesticides, organic and inorganic fertilizers added, and the crop cleared of weeds
- The crop is harvested and dried for a period of 1-5 days

The most significant statistics obtained from this study are as follows:

- About 83% of henna farmers use inorganic fertilizers, and 46% use organic fertilizer.
- About 16% of farmers use water as an input, while the remainder use water from springs, wells, or watercourses.
- About 6% of farmers use chemical pesticides to control insects and pests.
- Due to the high cost of local fertilizer, some producers (about 3%) use fish waste as organic fertilizer.
- The study also revealed that only 1% of farmers use harvesting tools, while the vast majority hire temporary labor who have harvesting tools during the harvesting season.

Photos of producers (farmers) of the henna value chain in Ghayl Ba Wazir District

3.1.2.2.1 Analysis of Production Costs

To implement a project for producers of the henna value chain (henna farmers) with an area of 3,055 m^2, the project will cost about YR 1,594,133. Only 1.3% of the total cost is for fixed costs, which equals YR 21,137. The remaining costs are operational, as shown in Table no. 3, assuming that the land is rented and irrigation water is purchased.

The fixed costs are for purchasing harvesting tools, such as grass sickles, hand sickles, and pickaxes, which are usually consumed over three years. Therefore, a depreciation rate of 33% is used, and the total annual depreciation costs (Dp) will be YR 6,975. The majority of the costs to establish a henna farm are operating costs, which account for almost 99% of the total costs, as shown in Table no. 3. The operating costs revolve around land rent, water, seedlings, labor, fertilizers, pesticides, and other needs for henna farming.

In summary, to establish a project for henna farmers in the Ghayl Ba Wazir District for an area of 3,055 m^2, the total cost (fixed and operating) is approximately YR 1,594,133. The average annual production costs, after calculating depreciation value and operating costs, are approximately YR 1,579,971, to produce about 2,700.6 kg annually. So, the production of one kilo of henna requires YR 698 Yemeni riyals before factoring in waste. After accounting for waste, the cost of production per kilogram is approximately YR 667.7. In the next section, the profitability and economic feasibility of implementing such projects will be studied.

Table no. 3 Average quantity and cost of henna producers' inputs for an area of 3,055 m^2 / per year in Yemeni Riyals (YR) (Primary Sources, 2022)

Description	Unit	Quantity	Amount	Total	Depreciation
Constructional costs/ fixed					
Harvesting tools	Number of	9	2,349	21,137	33%
Variable/operating costs					
Land rent	m^2	3,055	26	131,994	
Seedlings	Number of	4,606	46	210,725	
Plowing and preparing the land	h (hour)	3	9,137	27,410	
Irrigation (water)	liter	3,262,000	0.13	712,800	
Organic fertilizers	kg	2,082	20	41,907	
Inorganic fertilizers (chemical)	kg	146	1,107	161,865	
Wazif (tiny fish) waste as fertilizer	kg	262	268	70,254	
Pesticides	liter	13.32	1,610	21,451	
Drying tents	Number of	8	2,181	17,446	
Agricultural labor	Working days	1.22	4,400	5,368	
Labor for irrigation, fertilization, and pesticide spraying	Working days	21.96	4,400	96,624	
Labor and removing weeds	Working days	2.44	4,400	10,736	
4 times harvesting labor	Working days	9.76	4,400	42,944	
Packaging labor	Working days	5	4,400	21,472	
Total Construction / Fixed Costs (FC)	**21,137** (1.33% of total costs)				
Total Variable / Operational Costs (VC)	**1,572,996** (98.67% of total costs)				
Total Annual Depreciation Costs (Dp)		6,975			
Total Production Costs (variable + depreciation)		1,579,971			
Total Costs (TC)	**1,594,133** (USD 1,449)				

3.1.2.2.2 Profitability and Feasibility of the Production

From Table no. 4 Indicators for the production efficiency of producers of the henna value chain in Ghayl Ba Wazir District, estimated at 3,055 m^2/year it is clear that the total investment cost for an area of 3,055 m^2 is approximately YR 21,137 per year, and the average net cash flow is YR 223,371. By using these two numbers, the payback period can be calculated, where the average investment cost equals the average net cash flow, and the payback period was found to be 0.1 years. Based on this, it can be concluded that projects like this are economically feasible for henna farmers, but it should be noted that the investment costs are very low compared to the operating costs.

The average investment index in Yemen for 2022 is about 27% according to Trading Economics, (2022). From the analysis, it is evident that there is profitability and feasibility for productive projects for the producers (henna farmers), and according to the return on investment (ROI) index[5], the value of this index for such projects is about 956%, which is significantly higher than the average investment index for Yemen. the value of this index for such projects is about 956%, which is significantly higher than the average investment index for Yemen, 27%. This indicates that the project is profitable and feasible when implemented by henna farmers in an area averaging 3,055 m^2. However, it should be noted that the investment costs are very low compared to the operating costs, where the return-to-cost ratio is 12% in the first year. After that, the value of the seedlings will be added to the profits, as well as the costs of agriculture and plowing, which are estimated at about YR 243,503, which will increase the return-to-cost ratio to 26% after the first year, and the harvest may continue for 5 or more years.

Table no. 4 Indicators for the production efficiency of producers of the henna value chain in Ghayl Ba Wazir District, estimated at 3,055 m^2/year (Primary Sources, 2022)

	Production and economic efficiency indicators (calculation mechanism)	Symbol	Unit	Producers (Henna Farms)
1.	Production unit (Production Unit)	P/U	Text	Square Meter (m^2)*
2.	Production quantity/size per year (Production / Year)	Q-In	(1)	3,055 (0.31 ha)
3.	The period of work from the establishment until the first production	Per(0)	Month	6
4.	Period/life cycle of the product/service after the establishment	Per(n)	Day	90 (Four harvesters per year)
5.	Number of production/service cycles (after establishment) per year	---	No.	4
6.	Yield unit (Yield Unit)	Y(U)	Text	kg
7.	Production quantity - output per production unit - input per life cycle	Q-Out/In	Kg/0.31 ha	675.2
8.	Productivity for all production units - inside (after establishment) / year (Yield)	Q-Out	Kg/0.31 ha/Year	2,700.6
9.	Loss of productivity per year (Loss)	Loss	%	4.4
10.	Total investment cost (establishment + fixed)	TFC	YR/0.31ha	21,137
11.	The depreciation rate for each year (of assets) (% of item 10)	CFC	%	33
12.	Total variable / operation cost per year	TVC	YR/0.31 ha/Year	1,572,996
13.	Total marketing cost per year	TMC	YR/0.31 ha/Year	0
14.	Total capital (10 +12 +13)	TC	YR/0.31ha	1,594,133
15.	Total production costs per year (*1-11*) * 10+12+13)	PCT	YR/0.31 ha/Year	1,579,971
16.	Sale price per unit (Price /Unit-Sell)	SP	YR/Kg	585
17.	The purchase price or production cost per unit (Price / Unit-Buy)	PP	YR/Kg	698
18.	Returns / revenues (after establishment) per year (16* (*1-9*)*8)	R	YR/0.31 ha/Year	1,803,342
19.	Other returns / revenues (support/sale of assets/etc...) per year	OR	YR/0.31 ha/Year	0.00
20.	Total returns / revenues per year	TR	YR/0.31 ha/Year	1,803,342
21.	Profit or gross margin or cash flow for each year	Pf or GM	YR/0.31 ha/Year	223,371
22.	Net profit after deduction -5% (taxes, Zakat, and others)	NPf	YR/0.31 ha/Year	212,202
23.	Return to cost ratio (profit) or gross margin	GM	%	12

5 Average return on investment = (average net annual cash flows- initial investment) Initial Investment * 100 (Azmy, 2015)

24. Payback period (10/21)	PBP	Year	0.1

Italic number = a real number and counts as a number and not a number for the item * = Data received as an average area of agricultural land 3,055 m^2.

3.1.2.2.3 SWOT and PESTLE Analysis - Production

Strengths

The production phase of the henna crop has social strengths, such as famers having the patience and ability to handle the service and processing of the crop, with a frequency rate of 10%. Farmers consider henna cultivation a traditional profession, and this pride in their work is a social strength that contributes to the continuity of henna cultivation. Economically, they have good capital at a rate of 9%, and the product quality is good at a rate of 8%. They also have multiple sources of income at a rate of 8%.

Opportunities

This sector has economic opportunities that will contribute to increasing productivity and reducing production costs. These opportunities include increasing demand for Ghayl Ba Wazir henna with a frequency rate of 12%, making it possible to invest in this sector to meet the increasing demand. There is an environmental opportunity as the environment in Ghayl Ba Wazir District is suitable for henna cultivation at a rate of 9%. There is also water availability at a rate of 9%, and government support at a rate of 9%. Henna crop represents good economic returns at a rate of 7%. It is worth noting that henna is a perennial plant and socially more acceptable to cultivate compared with tobacco. Henna trees and the land on which they are grown are inherited within families, ensuring the continuity of the crop over generations.

Weaknesses

The henna sector in Ghayl Ba Wazir faces economic weaknesses such as a lack of capital with a repeatability rate of 14%, technical weakness in marketing at a rate of 12%, lack of experience in processing methods at a rate of 10%, and social difficulties in negotiating with customers at a rate of 8%. Most weaknesses are technical, such as lack of experience in agricultural practices, poor storage leading to weak henna dye color, stockpiling of goods, difficulty in controlling crop dryness, difficulty in sorting, and high levels of impurities, irregular irrigation, non-use of some agricultural inputs, inadequate product presentation, lack of value-added services, and lack of experience in machine maintenance. This affects the quality and value of the product in the market. Therefore, support in acquiring the proper skills in dealing with the crop will improve the quality and competitiveness of the product even on a regional level.

Threats

The threats facing the production phase of the henna sector are price volatility with a repeatability rate of 10%, fertilizer cost increases at a rate of 9%, decreased productivity at a rate of 8%, and inappropriate henna crop prices at a rate of 6%. There is also an economic threat from another competitive crop, tobacco, which provides better economic returns for farmers compared to henna. In addition, the entry of Indian henna plants and seedlings poses a threat to Ghayl Ba Wazir henna, as Indian henna leaves are larger and easier to sort compared to Ghayl henna.

3.1.2.3 Trade, Processing, and Export

Figure no. 12 illustrates the details of the trade, processing, and export stages that come between the production and consumption stages in the value chain of henna in Ghayl Ba Wazir District. This figure is part of the complete henna value chain map shown in Figure no. 15. According to the study, the trade, processing, and export stages are divided into four players, as follows:

- Processing Wholesalers
- Processing Retailers
- Aggregate Retailers
- Exporters

The following sections will explain the description and operating procedures of each player in these stages that exist between the producer and the consumer.

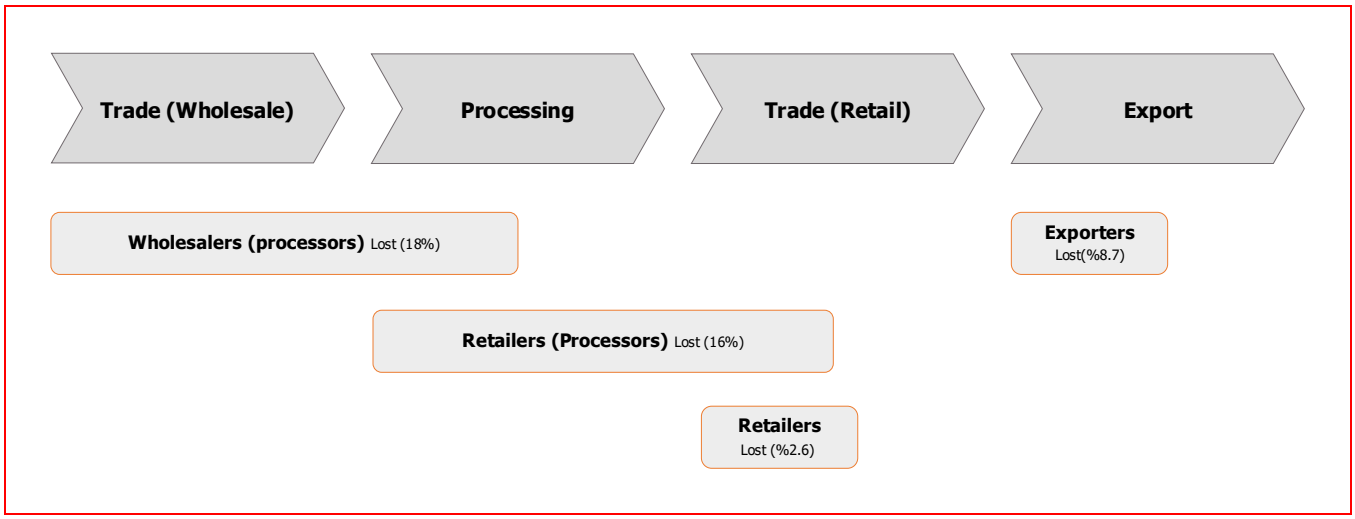

Figure no. 12: The stages of trade, processing, and export in detail and the functions of these stages in the henna value chain in Ghayl Ba Wazir District (Primary Sources, 2022)

Processing wholesalers

Processing wholesalers are henna traders in Ghayl Ba Wazir who buy henna from producers in large quantities that can reach up to 10,000 kg annually for each wholesale trader. The producers bring the henna leaves and branches to the traders once they are completely dry and ready for sorting and grinding. The traders sort the leaves in their own factories, which are equipped for sorting and grinding henna. They remove impurities, stones and foreign objects including weed branches and other foreign plant matter, as this affects the quality of henna powder if not removed. After that, the leaves are ground and sifted again after grinding to remove impurities and coarse grains to obtain high-quality and smooth henna powder. This is then packed in either large bags with a capacity of about 20 kg or small bags with a capacity of 1 kg according to customer demand.

Most henna traders are in Al-Qarah village have been working in the profession a long time. Some of them inherited the profession from their fathers. During the field survey, wholesale traders mentioned that they have been working in the henna trade for a long time, with an average of about 30 years for all traders. Also, 30% of these traders are also

farmers of henna crops, and they mentioned that they have ambitions to develop the henna crop and a desire to reach foreign markets and enhance local production, especially of the high quality dark red henna that Ghayl Ba Wazir is known for.

Wholesale processing traders in Ghayl Ba Wazir state that henna crop purchasing prices vary depending on the agricultural seasons. They are at their best levels (lowest purchase price) during the winter months and moderate temperatures from January to March, while the purchase prices are relatively high during June and July, as the quantities of henna coming from farmers decrease.

Photos showing processing retailers

Processing Retailers

The trade and processing of henna is not exclusive to males. During the field survey and data collection on the henna sector in Ghayl Ba Wazir District, the survey team found one of the active women traders in henna who owns a store and a mill for grinding, processing, and marketing henna. She mentioned that she takes pride in promoting Ghayl henna and aspires to support and encourage farmers and their sustainability. She also highlighted the distinguished quality and dark red color of Ghayl henna and its long-lasting color stability.

Similar to processing wholesalers, processing retailers buy henna leaves from producers in quantities ranging from 1,500 kg to 9,000 kg annually. Traders purchase dry henna leaves from producers and sort and sieve out foreign materials and weeds accumulated during the harvesting, gathering or drying process. Foreign material reduces the quality of henna powder when ground, so this motivates traders to focus on the sorting and purification process before grinding the leaves. Then, the powder is sifted again to obtain a fine high-quality product. The powder is packed in packages that meet the demands of customers and consumers from citizens or henna stalls in local markets.

Some 80% of processing retail traders explained that henna is not the only product they market. Some of them work on marketing other products, and others work in government jobs. These traders have been working in the henna trade for a long time, with an average of 25 years.

Photos showing henna processing by wholesalers and retailers

Aggregate Retailers

Women are also present in the promotion and trade of Ghayl henna, where researchers interviewed an active female businesswoman who is an aggregate henna retailer. Despite approaching 50 years of age, she decided to work in the henna trade three years ago due to the product's association with the customs and traditions in Ghayl Ba Wazir and Hadhramaut governorate in general. Retailers buy henna from producers and then use henna mill owners to prepare and package henna powder in its ready-to-market form. They package it in suitable containers with weights ranging from 0.1 kg to 1 kg according to consumer demand.

Exporters

The widespread popularity of Ghayl henna opened the way for Ghayl Ba Wazir traders to become exporters of this product that their region is famous for. They are pioneers in the field and pay great attention to selecting and drying henna leaves when purchasing them from farmers to produce high-quality henna powder. In recent years, the production of exporters has varied. For example, one exporter produced nearly 90,000 kg of henna in 2019, while output decreased by about half in 2021. Traders attribute this decrease in production to a decline in the area cultivated with henna as farmers move towards producing other crops such as tobacco. After purchasing henna leaves, exporters sort, clean, and sift them to remove impurities, then grind the leaves at special henna mills. The product is packaged usually under the name of the exporter and in various quantities according to customer demand, and marketed abroad.

Photos showing henna processing by wholesalers and retailers

3.1.2.3.1 SWOT and PESTLE Analysis - Trade, Processing and Export

Strengths

By analyzing the strengths of traders, processors, and exporters, the highest social strengths they possess are patience and the ability to handle and process the crop with a repetitive percentage of 10%. Technical, the product is easily sold at a rate of 9%, as it is popular in the local market and has its own markets (popular markets). Additionally, they export to some neighboring countries and are committed to deadlines at a rate of 6%. Economically, they have good capital at a rate of 6%.

Opportunities

The available opportunities for this sector at this stage are economic opportunities that support the continuity of cultivation and processing, represented by the region's fame in henna cultivation with a repetitive percentage of 43%, an increase in demand at a rate of 10%, and consumers' desire for Ghayli henna at a rate of 10%. It also represents good economic returns at a rate of 7%, and with these opportunities, the product can have a competitive position in the regional market.

Weaknesses

The weaknesses for this stage were diverse due to the multiple activities involved. The economic weaknesses were represented by a lack of capital with a repetitive percentage of 13%. Technical, they have a weakness in their ability to market at a rate of 12%. Transportation difficulty at a rate of 10%, weak promotion at 9%, and low productivity at a rate of 9%. This undermines the product's expansion and often appears to be economically unfeasible. Traders and exporters can expand their markets by possessing marketing and promotion skills, knowing the market needs, and providing them at the lowest cost.

Threats

Traders in this stage face economic threats represented by fluctuating prices with a repetitive percentage of 15%, power outages at a rate of 13%, and currency exchange rate increases at a rate of 10%. Additionally, increased transportation costs at a rate of 9%, and the product's prices are not suitable at a rate of 5%, as the product faces competition from foreign products, especially in price, affecting its position in the market.

3.1.2.4 Consumption

The last stage of the value chain of the henna product is the stage of consumption. We find that the final consumer in this chain is not limited to women only, but also men use henna on some special occasions for the people of the Ghayl Ba Wazir district amid a festive atmosphere and folk dances as an ancient and famous tradition to this day, where they put quantities of henna after mixing it with water on their heads and faces while dancing to folk songs.

However, the field study showed that the main consumer of henna are women, especially for brides, as it is used in decoration, engraving designs on the body such as the hands and legs, and for hair dyeing in weddings, holidays, and social occasions. It is also used as a treatment for hair, skin, and some health problems. It is worth noting that henna artists must be highly skilled to master the art of henna application, and the study showed that henna artists on average had nine years of experience.

The Hadhrami henna is considered one of the finest types of henna, and henna artists prefer to use the following types of henna products: Al-Ghayli, Al-Seyouni, Al-Hadhrami, and Indian. It is worth noting that 47% of henna artists prefer Ghayli henna, while 38.8% of them prefer Seyouni henna, and 13.8% prefer Indian henna. The reasons given for preference were the stability of the red and green color, the texture, as well as the quality of grinding and the smoothness of the final art work.

Henna artists need several auxiliary tools for work, such as adhesives, color enhancers, scissors, funnels, and bags. It is easy for consumers to obtain channels for purchasing henna products and work tools, which contribute to the spread of sales channels. Henna powder can be obtained from various sources such as wholesalers, retail markets like spices and cosmetics stores, and canned products in commercial stores. It comes in the form of henna paste packed in cones or can be purchased raw and prepared into a paste by the henna artists themselves.

In addition, henna artists use social media (WhatsApp) to promote and showcase their work. The study showed shortcomings in supporting the henna sector and henna artists, especially in terms of not providing any capacity building or training courses for them. Therefore, we recommend supporting the henna sector as a product or the female workers in this sector as henna artists, as it has a financial return that benefits them and their families, and their participation in events contributes to increasing marketing and developing their experience.

3.1.2.4.1 SWOT and PESTLE Analysis - Consumption

Strengths

For markets and consumers, the economic strengths lie in the quality of Ghayli henna, with a repetition rate of 53%. Socially, strengths lie in the qualified staff, at a rate of 16%, and in the region's reputation for the skill of henna artists, at a rate of 16%, and accumulated experience, at a rate of 16%, which enhances the income of families in the Ghayl Ba Wazir region.

Opportunities

The economic opportunities for markets and consumers are represented in good economic returns, with a repetition rate of 23%, increased demand at a rate of 12%, state support at a rate of 10%, and activating some technical training courses, at a rate of 12%. The social environment is also suitable for henna, at a rate of 11%. Henna is the most important product in social and religious events in Hadhramaut in general. Furthermore, the henna sector represents a significant opportunity for employing young people, particularly women, in the field of henna art, which is a viewed as a suitable craft for women in the region and has an economic return for families.

Weaknesses

Economic weaknesses for final markets are the inability to obtain diversified support, with a repetition rate of 36%, the quality of the final product at a rate of 31%, resulting from not following the correct procedures in the previous stages, decreased productivity at a rate of 11%, and socially, the lack of trained labor at a rate of 6%.

Threats

The economic threats lie in power outages, with a repetition rate of 30%, price fluctuations, at a rate of 15%, the absence of supportive interventions in this stage, at a rate of 11%, and socially, the negative health effects during the henna imprinting process, at a rate of 11%. These artists sit still for long periods, and eye strain from staring repeatedly during the imprinting process is common among the workers in this industry.

3.1.2.5 Enablers / Legislative and Supporting Bodies

The enabling and legislative bodies supervise the henna sector in the Ghayl Ba Wazir District and coordinate work between research agencies and institutions working in the sector, as well as their relationship with foreign and local organizations supporting the sector. They also provide technical and advisory support, provide necessary supplies, and conduct studies to determine the seasons of cultivation and research modern technologies that contribute to increasing productivity and other opportunities available for the development of henna farming.

Supporters are considered the category that connects all categories of the value chain by providing many options contributing to raising and improving the capabilities of all players, and their absence from the chain, especially under these circumstances, causes losses to all players, especially producers, which may lead to the inability of producers to continue their activities. This cooperation between supporters and players in the chain, especially producers, can be divided into the following:

- **Advisory support** in the form of providing specialists to render guidance and technical support to the players in the chain.
- **Financial support** by providing necessary agricultural equipment and supplies, such as fertilizers, irrigation networks, plowing, etc., or through supporting agricultural facilities (sales and distribution markets) or supporting agricultural associations.
- **Technical and information support** by enabling producers and other players with the skills and knowledge to help them continue implementing their activities. The most significant of these activities is training farmers on modern agricultural techniques, which producers benefit from in maintaining their production tools and enabling them to deal with problems and solve them.
- **Legislative support** through the state's enactment of laws and regulations that ensure the continuation of this chain.

The following sections detail the enablers and supporters of the henna value chain in the Ghayl Ba Wazir District.

Agriculture and Irrigation Office - Enabler

The aim of the Ministry of Agriculture and Irrigation Offices is to develop and support henna agriculture by providing technical and advisory support, as well as providing the necessary materials to encourage and streamline investment and utilization, and to improve its production level in order to increase national income and support the national economy. The Agricultural and Irrigation Offices are responsible for the following tasks and specialties:

- Participating in the preparation of technical and specialized agricultural staff, assisting in developing plans, programs, and curricula for agricultural technical education, and supervising the agricultural training institutes and centers affiliated with the Ministry.

- Preparing and implementing plans related to agricultural guidance plans that ensure the development of farmers' skills, improve their performance, develop their means of production and knowledge, and provide services and facilities to raise their standard of living.
- Reclamation and settlement of agricultural lands and protection against floods and natural factors.
- Surveying and classifying agricultural lands, preparing topographic maps, and plans to preserve land fertility, raise land productivity, make better use of land, and protect land from erosion and desertification.
- Estimating the needs of the agricultural sector in terms of agriculture supplies and inputs and following up on their provision in coordination with the relevant authorities.
- Working on introducing and promoting the use of modern agricultural machinery and equipment to increase production and reduce costs.
- Organizing and encouraging investment in henna cultivation and providing the necessary facilities.

There are approximately 21 employees, including one woman responsible for rural women's development, working in the Agriculture and Irrigation Office in Ghayl Ba Wazir District. They receive an average monthly salary of USD 70 for male employees and USD 65 for female employees. The management office explained that they have ambitions to develop and improve the skills of rural women and producers, enhance agricultural production, and henna production, especially in light of the current circumstances, where henna agriculture is witnessing a significant decline, and producers are avoiding investing in henna agriculture and production.

Agricultural Research Authority - Enabler

The Agricultural Research Authority is under the Ministry of Agriculture and Irrigation, and its role is to conduct research and studies that serve the agricultural sector, including the sector of henna cultivation. The authority focuses on conducting studies, providing data and information related to identifying the seasons of henna cultivation, modern techniques that contribute to increasing productivity, and other opportunities available to develop and improve henna cultivation.

The authority has 17 permanent employees, three of whom are women, and they receive a monthly salary of USD 80 for males and only USD 60 for females. The authority also provides approximately 45 temporary job opportunities for both males and females when conducting studies, research, and field experiments. The temporary workers receive a daily wage of USD 2.50 for males and only USD 1.20 for females.

The authority has a good electronic management system, archiving records system, and a good electronic storage system that is easy to use. However, the continuous public electricity interruption hinders its work, making it difficult to operate the electricity generator due to the high prices of oil derivatives and the authority's low revenue.

During the data collection process, the fieldwork team met the director of the authority, who explained that the authority has future aspirations to develop its work, expand the scope of research, and increase the productivity of the authority's advisory bulletins and scientific research, which will enhance and improve the agricultural production situation in general, and the henna sector in particular.

Local Water and Sanitation Corporation - Enabler

The Local Water and Sanitation Corporation is a government institution established in 1971, providing multiple services to citizens in addition to water and sanitation services, such as improving and maintaining water and sanitation networks, digging wells, and technical support. The Corporation has a financial system, record-keeping system, and inventory system for all its work, and all these systems are rated excellent because they are electronic and easy to work with, and information can be easily accessed. The Corporation has about 189 employees, of whom 3% are females, and they have specialists and professionals in the field of water and sanitation. The employees are regularly trained by the Corporation every year to keep up with any developments in the field of water and sanitation. The Corporation also aims to improve and treat wastewater in the Ghayl Ba Wazir District and manage its water resources so that they can be properly utilized. This also contributes to increasing the efficiency and productivity of agricultural production and providing clean water to citizens.

Mills - Supporter

Henna has a special treatment during the milling process, where special mills are dedicated solely to henna and cannot be used to grind other materials such as grains or spices. This is because these materials leave different flavors on the mill, which affect the quality, color, and scent of the henna. Similarly, henna leaves traces of dye and powder on the mill, which affect other products if they are ground in the same mill. In addition to owning the mills, the owners are also henna traders who provide sorting and grinding services to other traders who do not have mills for a fee for every kilogram processed and ground.

The owners of the mills receive henna in spacious rooms or sheds to ensure its complete dryness and readiness for milling. Then, the henna leaves are spread on the ground over mats to ensure their dryness and readiness for milling. After that, the henna leaves are passed through metal sieves with predetermined holes for cleaning and sorting them from stones, pieces of metal, weeds, and foreign leaves, which affect the quality of the henna if ground with them. Then comes the milling process, and the mill owners make sure to grind the henna very finely to obtain a high quality. After the milling process, the sieving process is repeated, this time using a fine-mesh sieve to remove any impurities or parts that were not ground completely, leaving the henna ready for packaging, and then marketing.

Agriculture Cooperatives - Supporter

The agricultural sector in Ghayl Ba Wazir lacks agricultural cooperatives and associations. There is only one, the Ghayl Ba Wazir Multipurpose Agricultural Cooperative Association, established in 1968, and it has about 150 members. The association was established for various purposes, as mentioned by the administrative board members, including:

- Monitoring farmers' production and promoting agricultural products
- Seeking funding from organizations and supporters of the agricultural sector
- Providing technical guidance and consultation to producers

- Providing agricultural inputs and equipment to producers

The association has good administrative, financial, and storage systems, both paper-based and electronic. The association is managed by a council of 12 members, including one woman. The association aims to improve its performance and serve the community better, especially considering the significant decline in agricultural production and drought facing the region, which require urgent interventions to reduce their impact on production. The association's management adds that its funding is currently self-generated and seeks to obtain sources of funding for its activities to enhance its role in supporting the producers' community.

During the data collection process, it was found that only 13% of the producers interviewed are members of the association. 42% of them stated that they did not benefit from the association, while the rest mentioned that they benefited from their membership by receiving fertilizers, fuel and having production problems resolved.

Civil society organizations - Supporter

The Ghayl Ba Wazir District has not received any attention to enhance the production of the henna crop. Civil society organizations have not yet shed light on this sector, despite the challenges faced by producers and all actors in the sector. Through field surveys, it became clear that all those who were interviewed mentioned that they did not receive any intervention or support with any inputs to improve production or training on practices for developing and improving production. The sector has declined significantly over the past years and is still in decline.

The United Nations Development Programme (UNDP) and its local partner SMEPS may have an advantage in highlighting this important economic sector, helping producers and other actors in the sector to revive it through studying the sector's status, identifying the challenges facing players, and providing assistance to enhance production, increase quality and profit margins for producers and other actors in the sector.

During the preparation of this study, the project team at SMEPS visited the fields and producers to identify their needs, prioritize interventions, and draw broad lines for the aspects that require support at two levels. Firstly, financial support, represented in providing water distribution networks and agricultural inputs, and post-harvest inputs. And secondly, technical support represented by training farmers on proper production practices, and improving quality and quantity for the benefit of producers, traders, and consumers.

Local Authorities - Supporter

Local authorities, represented by official entities and community leaders, work to provide facilities and facilitate the work of civil society organizations and other supporters of the agricultural sector, including the henna sector. They also provide the necessary information, data, and lists to support farmers and develop the sector. Local authorities are considered official entities that represent the targeted communities and help raise and guide supporters in providing the necessary support to the community based on their actual needs.

The local authority in Ghayl Ba Wazir District struggles to solve problems related to the supply of gas and fuel, which affect the citizens' work and commercial movement in the district. Gas shortages also increase people's tendency to cut down trees, which is a problem in terms of destroying the vegetation cover. The management aims to provide everything that serves the citizens in the district and to motivate them to increase production and empower women. The director of the local authority mentions the need for further training and qualifications for the local administration staff in various financial and technical skills to enhance performance and benefit the community. The local administration has received technical and tangible support from some organizations, represented by technical training and photography tools, which had a positive impact on the local administration.

SWOT and PESTLE Analysis - Enablers and Supporting Bodies

Strengths

For the enabling and supporting bodies, strengths were represented socially by the presence of qualified personnel with a repeatability rate of 50%, conducting training courses at a rate of 21%, and forming teams to raise awareness among farmers at a rate of 14%. This helps to maintain the cultural value of the Ghayli henna crop and provide job opportunities at a rate of 7%.

Opportunities

Economically, opportunities for this sector are represented by state support with a repeatability rate of 29%, the availability of technical support at a rate of 14%, the existence of encouraging laws and regulations at a rate of 14%, and the availability of guidance and training entities at a rate of 14%. This can enhance support and investment in the Henna sector, and the support of some entities and organizations at a rate of 5%.

Weaknesses

Weaknesses varied for the enabling and supporting bodies. Economically, there are the scarcity of funding sources with a repeatability rate of 40%, and high operating costs at a rate of 13%. Technical weakness was represented by a lack of necessary guidance at a rate of 13%. Institutional weakness was represented by the accumulation of problems and complaints that are not resolved at a rate of 7%. This affects the relationship of the players in the henna sector with official bodies and leads to calls of frustration as these bodies should represent a nurturing entity for them. Additionally, the inability to communicate with companies and external markets at a rate of 7% is a weaknesses that could be addressed to promote henna more widely.

Threats

The biggest economic threat to the henna sector with a repeatability rate of 22% is the interruption of electricity, followed by price volatility at a rate of 17%, an increase in the exchange rate of hard currency at a rate of 11%, monopolization by traders at a rate of 6%, and the closure of border crossings at a rate of 6%. This institutional threat represents a stagnation in the movement of exports and dealing with donors for this sector.

Table no. 5 SWOT analysis of the stages of the henna value chain in Ghayl Ba Wazir District* (Primary Sources, 2022)

Chain Stages	Supply Inputs	Production	Trade, Processing and Export	Consumption	Enablers and Supporters
Strengths	• Possession of qualified labor (16%) • Patience and endurance in crop service and processing (12%) • Multiple sources of income (12%) • Knowledge of markets (12%)	• Patience and endurance of serving and processing the crop (10%) • Own good capital (9%) • Products quality (8%) • Multiple sources of income (8%)	• Patience and endurance of serving and processing the crop (10%) • Ease of selling the product (9%) • Punctuality (6%) • Possessing good capital (6%)	• Ghayli henna quality (53%) • Qualified personnel (16%) • The area's fame with henna imprinting (16%) • Accumulated experience (16%)	• Qualified personnel (50%) • Training courses (21%) • Forming teams to educate farmers (14%) • Ability to provide job opportunities (7%) • Existence of an appropriate work environment.
Opportunities	• Good economic return (21%) • The environment is suitable for henna (17%) • Availability of trained labor (13%) • Availability of technical support (8%)	• Increase demand (12%) • The environment is suitable for henna (9%) • State support (9%) • Existence of water springs and streams (7%) • Good economic return (7%)	• The area is famous for cultivating henna (43%) • Increase demand (10%) • Consumer desire for Ghayli henna (10%) • Environments suitable for henna (7%) • Good economic return (7%)	• Good economic return (23%) • Increase demand (12%) • Activate courses sometimes (12%) • The environment is suitable for henna (11%) • State support (10%)	• State support (29%) • Availability of technical support (14%) • Encouraging laws and legislation (14%) • Availability of guidance and training bodies (14%) • Support from some parties and organizations (5%)
Weaknesses	• High labor costs (21%) • Lack of capital (21%) • Weak promotion (11%) • Inability to communicate with external markets (11%) • Plenty of debt (11%)	• Lack of capital (14%) • Poor marketing (12%) • Lack of experience in processing methods (10%) • Difficulty negotiating with customers (8%) • High labor costs (7%)	• Lack of capital (13%) • Poor marketing (12%) • Difficult transporting (10%) • Weak promotion (9%) • Production decrease (9%)	• Lack of access to diverse support (36%) • Low product quality (31%) • Production decrease (11%) • Lack of trained workers (6%) • High labor costs (6%)	• Lack of sources of funding (40%) • High labor costs (13%) • The poor necessary guidance (13%) • Accumulation of unresolved problems, complaints (7%) • Inability to communicate with companies and external markets (7%)
Threats	• Price volatility (20%) • High transport costs (20%) • Fertilizer costs are high (16%) • High hard currency exchange rate (12%) • Power outage (8%)	• Price volatility (10%) • Fertilizer costs are high (9%) • Production decrease (8%) • Inappropriate product prices (6%) • High transport costs (5%)	• Price volatility (15%) • Power outage (13%) • High hard currency exchange rate (10%) • High transport costs (9%) • Inappropriate prices (5%)	• Power outage (30%) • Price volatility (15%) • Negative health effects during the imprinting process (11%) • No supporting interventions (15%) • Competition in the market (10%)	• Power outage (22%) • Price volatility (17%) • High hard currency exchange rate (11%) • Traders' monopoly (6%) • Closure of border crossings (6%)

* Details of the table are available in Appendix (2): SWOT and PESTLE Analysis Details

3.1.2.6 Multiple and Simple Channels in the Henna Sector

The henna sector in the Ghayl Ba Wazir District does not witness a strong movement of henna products between players in the henna value chain. Henna is not the only product traded by traders who are between producers and consumers. These traders are usually food or spice traders, where henna is one of several commodities they trade in their businesses.

The results in Figure no. 14 show that henna farmers in Ghayl Ba Wazir distribute their production through five marketing channels. Approximately 43.3% of farmers sell their production to wholesale processors, while 35.1% of farmers sell their production to retail processors. Only 11.9% of farmers sell their production to exporters, and a small percentage of farmers sell their production directly to aggregator retailers or consumers, with proportions of 7.5% and 2.2%, respectively.

When henna farmers sell their products directly to consumers, they go to markets near the production areas and market their products themselves to customers, whether they are citizens or henna salons. They also sell it at the farm gate, where farmers process and grind the henna in mills.

The data in Figure no. 14 also shows that wholesale processors perform some operations to process the raw product purchased from farmers, including sorting and cleaning henna leaves and grinding them to prepare the product for marketing. Fifty percent of wholesale processors direct their production to exporters, while the other 50% of their production is sold to retail processors.

In the henna value chain in Ghayl Ba Wazir, retail processors receive henna from two channels, as mentioned earlier, which are producers and wholesale processors. They perform some processing, such as sifting and packaging henna in small suitable containers for marketing. Some of them also sort and grind the product when purchasing it in its primary form. Retail processors distribute henna products in the local market only.

Retailers rely on mill owners to process the henna that they purchase from producers and then market it in two directions. The percentage of retailers who sell their products in the local market reached 60% while 40% market it to exporters.

As for exporters, they have the largest channels for supplying henna to them. Both wholesale processors and retail processors and producers sell a portion of their production to exporters, who in turn export the product abroad. It is also noteworthy that there is cooperation or trading of henna products between exporters themselves, where 25% of them sell to other exporters, which constitutes cooperation between henna exporters in Ghayl Ba Wazir.

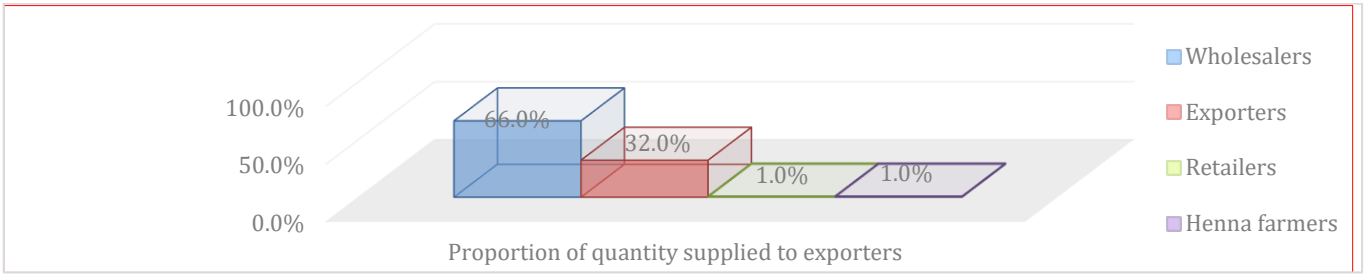

Figure no. 13: The sources of supply of henna for exporters, data from Figure no. 15 (Primary Sources, 2022)

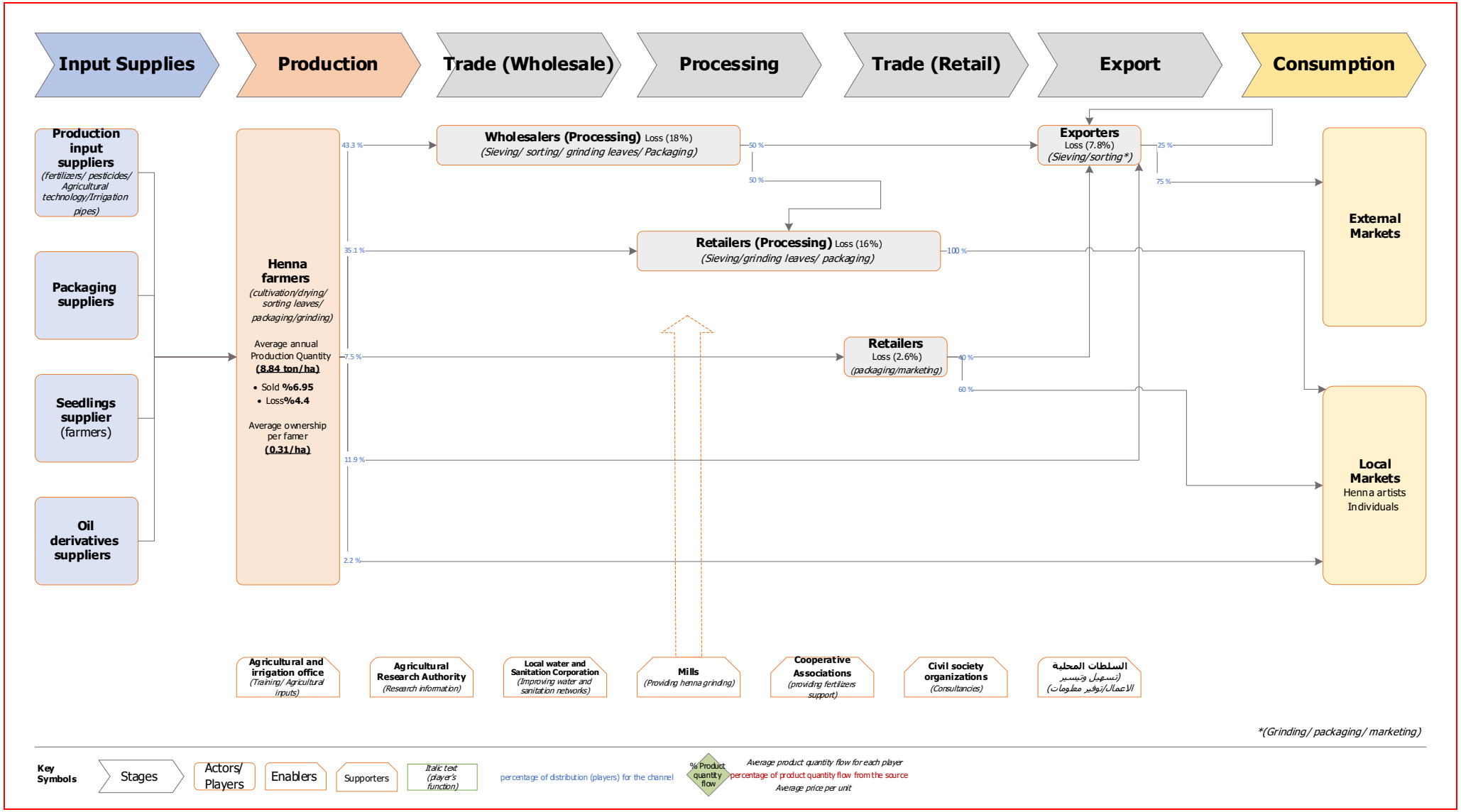

Figure no. 14: Map of the stages and functions of players in the henna value chain in Ghayl Ba Wazir District and the distribution of players between different channels (Primary Sources, 2022)

3.1.3 Quantitative, Cash, and Profitability Flows in the Henna Value Chain

There is a variation in the selling prices of henna in the marketing channels for producers, where the selling prices of Ghayali henna ranged from YR 666 / kg to YR 1,056 / kg, distributed over five marketing channels. In the first channel, wholesale traders buy processed henna from producers, which is the highest channel in terms of flow quantity, at approximately 48.7% of production quantities, and at a price of around YR 666 / kg for dried henna leaves.

In the second marketing channel, producers sell henna to retail processors in quantities that amounted to about 31% of production quantities, with an average price similar to the first channel at YR 676 / kg of dried henna leaves. In the third channel, producers sell 4.6% of production quantities to non-processing retail traders at an average price of YR 688 / kg. These three channels are similar in terms of product price, and the majority of quantities produced by producers are distributed through them.

In the fourth marketing channel, producers sell henna at a price of YR 817 / kg, and the quantities of henna flow directly to exporters at a rate of 13.2% of production quantities. The high selling price in this channel is attributed to the demand by exporters for high-quality product and different specifications in terms of the quality of leaves and the absence of pollutants.

The highest price per kilogram of henna is obtained by producers when selling henna directly in markets near production areas, at an average of YR 1056 / kg. However, this channel only obtains a small percentage of production quantities, approximately 2.5%, and farmers also incur additional costs related to grinding, sorting, sifting, as well as transportation and marketing costs when selling in this channel.

Wholesale processors resell henna to exporters and retail traders after the grinding and sifting processes, with percentages of 81.2% and 18.8% of production quantities, respectively, at a price of approximately YR 1,155 / kg for exporters and about YR 924 / kg for retail traders.

Retail processors, who obtain their henna directly from farmers or from wholesale traders, market their entire production in the local market after grinding and packaging, at an average price of YR 1,006 / kg.

Non-processing retail traders sell most of their production, about 95.1%, to the local market, whether to individuals or to henna artists, at an average price of YR 1,130 / kg. The remaining quantities are sold to exporters at a very similar price of about YR 1,129 / kg. It is worth noting that these traders rely on mill owners to sort and grind henna so they can market it in a usable powder form.

Exporters, who are the last link before the product reaches the foreign market, are the most significant players in terms of obtaining the product, as they obtain henna from wholesale traders, retail traders, and producers. Some of them sell to each other at an average price of YR 1,254 / kg, while the selling price for export is about YR 1,496 / kg.

It would have been better if the study had included the profit margin for all players in the chain, but there was extreme caution from all traders in revealing their operating costs and profits. Instead, another analysis was conducted based on selling and purchasing prices, and the details can be found in the following section.

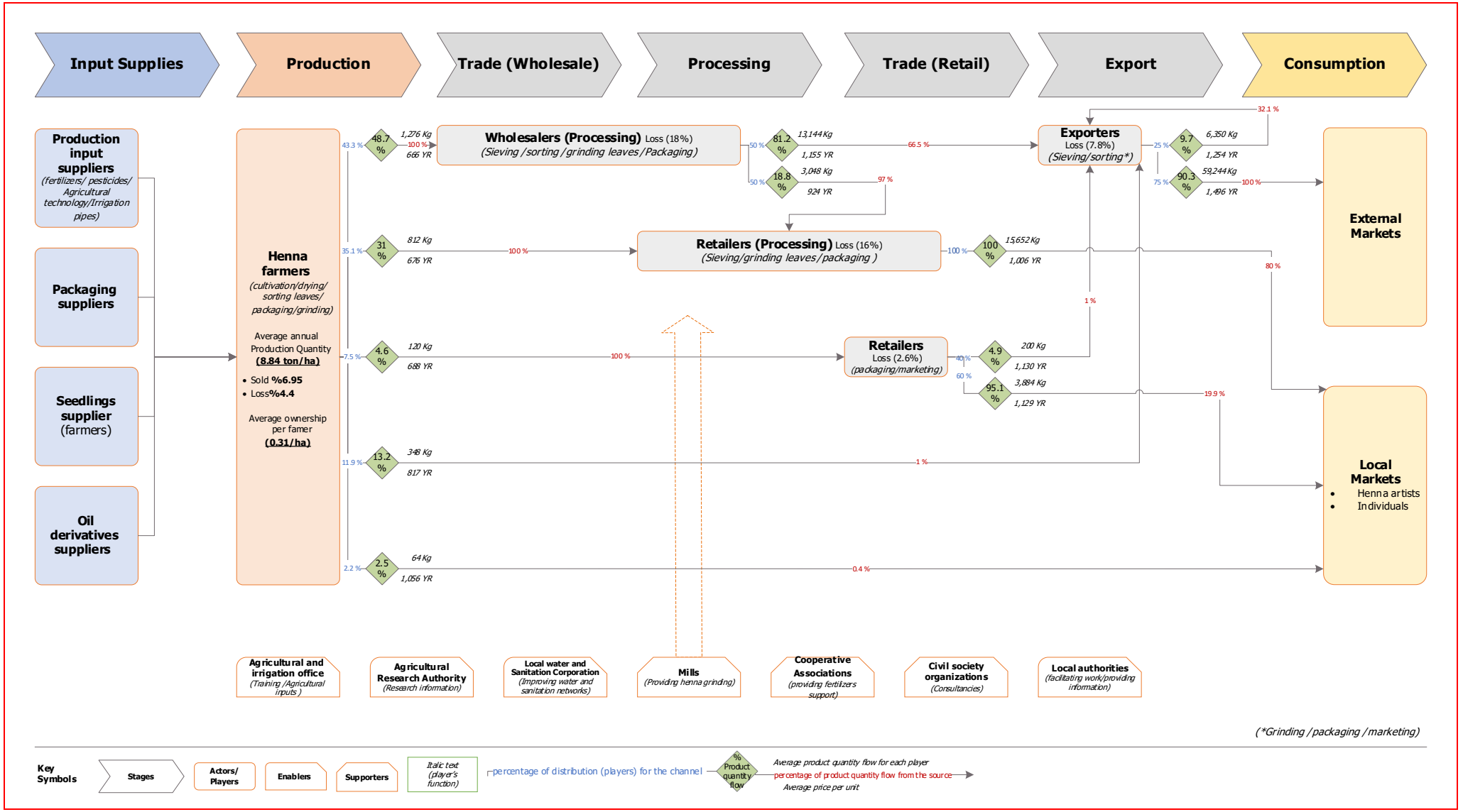

Figure no. 15: Map of quantitative and cash flow among henna value chain players in Ghayl Ba Wazir District - Hadhramaut - Yemen (Primary Sources, 2022)

3.1.4 Marketing Channels and Marketing Margin Analysis for Chain's Players

Figure no. 16 shows that there are 7 marketing channels for henna producers in the henna value chain in Ghayl Ba Wazir District. It appears that the best marketing channel for the producers is channel 7 because the producer in this channel receives the full marketing margin value for the product sold. The marketing margin is the difference between the price paid by the end consumer and the price received by the producers. Through marketing margins, it is possible to determine the share of the producers in the price paid by the end consumer in the chain, as well as the share of the traders between the producers and the consumers in the chain. The higher the share of the producers in the marketing margin, the higher the marketing efficiency in the chain. Marketing efficiency increases with fewer intermediaries between the producers and the consumers due to the lower value added to the product (Arafa & Hammam, 2015).

As previously mentioned, marketing channel 7 is the best marketing channel for henna producers in Ghayl Ba Wazir, where farmers directly market to the consumers in the chain. However, only about 2.2% of the producers use this channel, and the average quantity sold in this channel is only about 2.5% of henna production. Therefore, it is considered the best marketing channel in terms of marketing margin, but it has the least farmers and lowest flow of henna, as there are few consumers who buy henna directly from the farm and they are not regular buyers. The process is unpredictable and according to demand. Based on the above, this channel is considered one of the weakest marketing channels for henna farmers in the Ghayl Ba Wazir District in Hadhramaut.

The second-best marketing margin for producers is channel 2, where the share of the marketing margin for henna producers is approximately 67%, and the share of wholesale processors in the marketing margin is about 25%, while the lowest share of the marketing margin is for retail processors, at about 8%. Channel 2 is the most used channel by Ghayl Ba Wazir farmers, and has the highest quantity of henna production flowing through it at around 43.3% and 48.7%, respectively. This channel is also considered one of the best marketing channels for henna producers in the Ghayl Ba Wazir District.

The third-best channel in terms of marketing margin for producers is channel 3, where the marketing margin for producers is 67%. In this channel, there is only one type of trader, namely retail processors, and their share of the marketing margin in this channel is 33%. It is noteworthy that about 35.1% of farmers in the Ghayl Ba Wazir District use this channel, and the average flow of henna production is approximately 31% in this channel, equivalent to 812 kg. It is noteworthy that this channel is one of the best marketing channels for henna farmers in the Ghayl Ba Wazir District after channel 2.

Marketing channel 5 is considered the fourth-best channel in terms of the marketing margin share for the product, at around 61%, with the remaining share of the marketing margin in this channel going to non-processing retail traders, with their share being 39%. It appears that the number of farmers and their production flows in this channel is very low compared to channels 2 and 3, where they were about 7.5% and 4.6%, respectively.

Ranking fifth in terms of the best share of marketing margin for producers is channel number 6, at approximately 55%, with the remaining share of marketing margin going to exporters. Around 11.9% of farmers use this channel, and around 13.2% of their product flows through this channel. Therefore, channel 6 is considered good for producers to market their henna products after channels 2 and 3.

Channels 1 and 4 are considered the least attractive in terms of the marketing margin share for producers, reaching approximately 46% and 44%, respectively. However, channel 1 has the highest proportion of farmers and product flow, while channel 4 has one of the lowest proportion of farmers and product flow.

In summary, Figure no. 17 shows the ranking of marketing channels according to the share of producers in the marketing margin, from the highest to the lowest, in addition to the percentage of henna farmers' flow and production with each marketing channel. From Figure no. 17, we also note that channels 2 and 3 are the best in terms of the share of marketing margin going to producers, and these channels are among the most utilized by farmers and were among those with the highest product flow rates.

We also note that the presence of processing retail traders in the henna value chain in Ghayl Ba Wazir District increased the marketing margin share of producers, which is the largest among all channels. This indicates that processing retail traders have an impact and role in increasing the share of producers and moving the henna value chain in Ghayl Ba Wazir.

From the above, we find that there are many marketing channels for producers, and the marketing margin varies from one channel to another, where each channel has its positives and negatives. However, what matters now is that channels 2 and 3 are the best and most appropriate channels for investment in favor of producers. Therefore, organizing marketing channels between players in the henna value chain in Ghayl Ba Wazir District requires more coordination and arrangement in order to gather all players and organize them to increase the benefit for all players in the chain, especially producers.

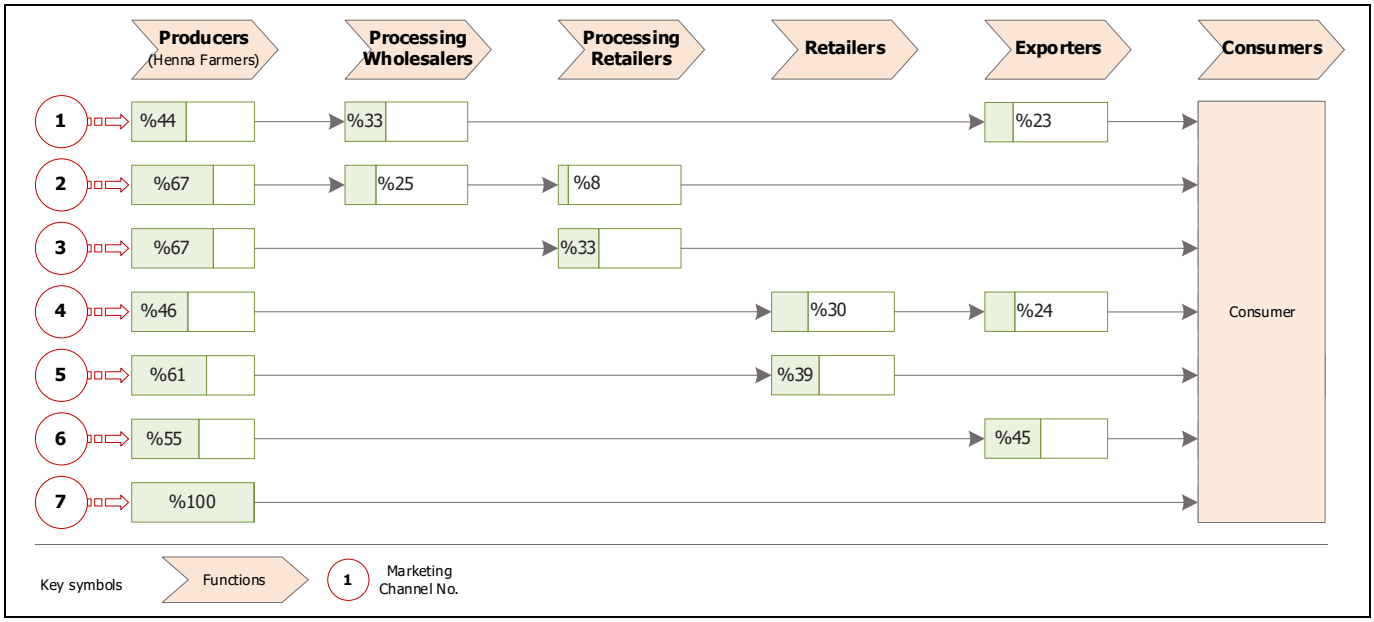

Figure no. 16: Marketing channels and share of marketing margin of value chain players in Ghayl Ba Wazir District (Primary Sources, 2022)

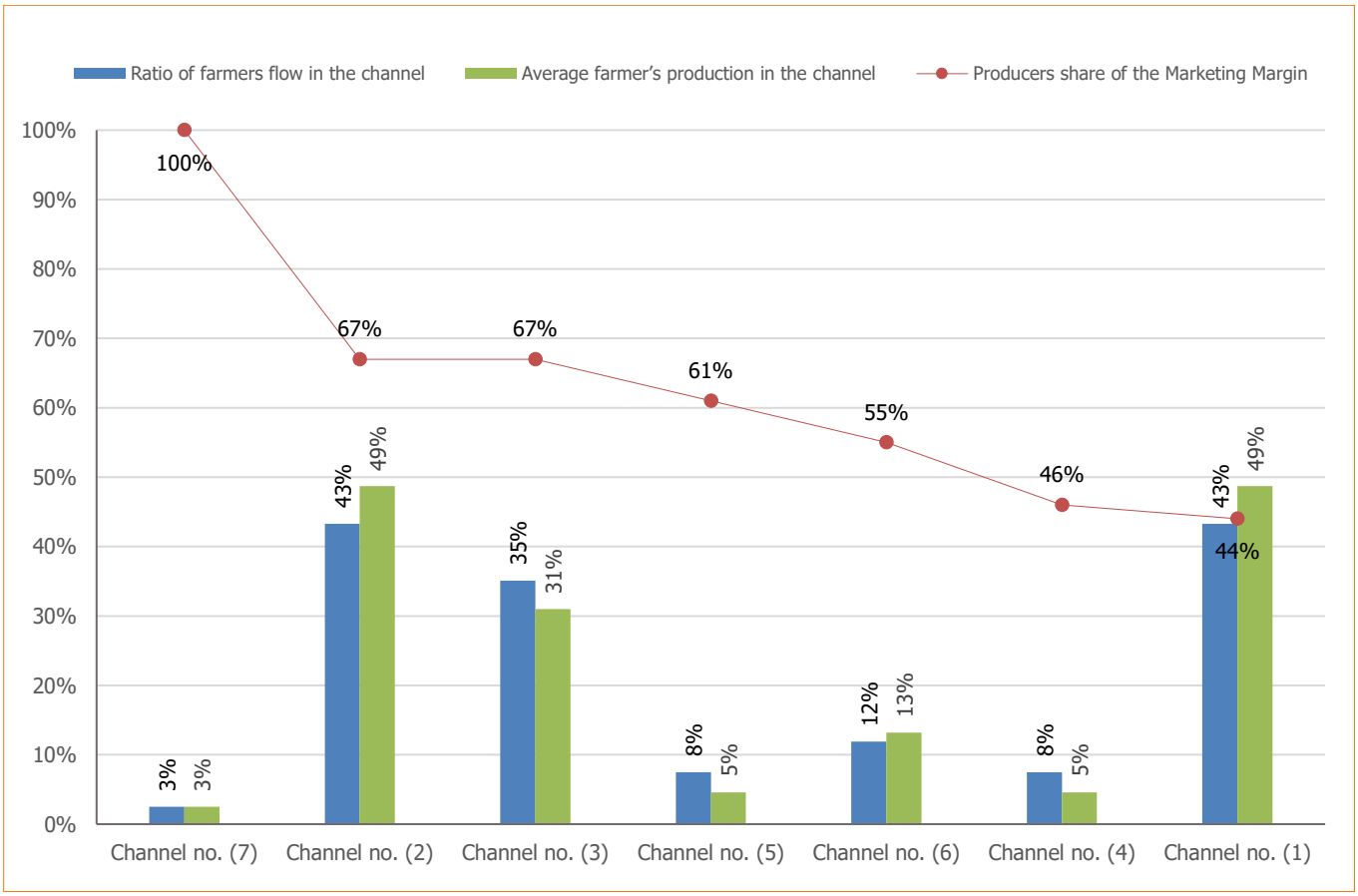

Figure no. 17: Comparison of marketing channels, flows, and number of henna value chain producers in Ghayl Ba Wazir District (Primary Sources, 2022)

3.2 Jobs Opportunities in the Henna Value Chain

Table no. 6 shows that male labor dominates completely in the stage of input suppliers in the henna value chain. The reason is that the work in this stage is hard and exhausting, such as using primitive tools for cutting henna twigs and transporting them between wet burlap sacks (to keep them moist until they are planted) from one place to another, as well as searching for fuel for the water pump and dealing with chemicals and other materials during trading. The absence of women in this stage seems logical because they do not have the technical specifications for such work, and the difficulty of moving from one merchant to another during purchasing in the markets due to prevailing customs and traditions in the district.

In general, the average permanent employment for any player in the chain is about 2 workers who work throughout the year for a monthly wage. The highest number of permanent workers was with wholesale processors and input suppliers, with 3.3 and 3.2 workers, respectively. The lowest permanent employment was with henna producers with zero permanent workers. This indicates that the henna production does not go through continuous operations and care throughout the year, but only in certain stages such as irrigation, fertilization, and other operations that are carried out on certain days during the year.

As for permanent female employment, the data shows that their average presence among male permanent workers is only about 25%, and their work is limited to sorting, sieving, and sometimes packaging. Women play an effective role in selling henna products by being able to visit women's homes and present the product to them, thereby saving time and effort for the consumer. These women sellers are called "dalalah". They may be part of the permanent or temporary workforce. Men also have a role in this stage, where they sell the product in local markets at villages or districts. It was noted that 100% of the workers were women at the henna painting stage, as this work is exclusively for women on occasions or weddings.

According to the data, the henna sector in Ghyel Ba Wazir provides temporary job opportunities for members of the community, where the average temporary employment for each player in the chain is about 4 workers who receive 20 days of work, and each worker gets about YR 3,362.9 per day.

More than half of the workforce in permanent or temporary employment comes from families, and this may be due to the ownership of the mill by rural families, which is located next to their homes. Here, family labor is preferred over other labor.

The henna sector in Ghayl Ba Wazir provides about 536.5 working days per player in the chain. According to the chain, there are seven different types of players, and it can be said that there are 3,755.5 working days for 41.3 workers at a cost of YR 10,766,931.7 annually, assuming that there is only one player of each type. Due to the lack of statistics for each player in Ghayl Ba Wazir, it is not possible to determine the number of job opportunities provided by the henna sector in the region.

Table no. 6 Job opportunities available in the henna value chain in Ghayl Ba Wazir District during the year (Primary Sources, 2022)

Value Chain Players	Average no. of permanent jobs	% of female permanent workers	% of household employment	Average no. of temporary jobs	% of Temporary female labor	% of household employment	No. of Provisional Days of Work	* Permanent labor cost/month (YR)	* Temporary Labor Cost/Day (YR)	Total labor cost/year (YR)	Total laborers	Total Working Days
Production Input Providers	3.2	0	33.3	5.4	0	18.5	29.5	71,500.0	3,300.0	3,270,960.0	8.6	965.6
Producers	0	0	0	10.1	8.7	55.8	4.0	49,610.0	4,400.0	177,760.0	10.1	40.4
Retailers	2.0	20.0	60.0	1.8	42.9	57.1	26.0	52,800.0	2,640.0	1,390,752.0	3.8	550.8
Processing Retailers	1.6	25.0	62.5	1.0	0	0	25.0	50,600.0	4,400.0	1,081,520.0	2.6	428.2
Processing Wholesalers	3.3	15.4	84.6	5.0	0	60.0	20.0	46,750.0	3,520.0	2,203,300.0	8.3	931.6
Exporters	1.4	14.3	71.4	4.0	66.7	75.0	25.5	81,400.0	2,640.0	1,636,800.0	5.4	454.8
Local Henna Artists	1.5	100.0	100.0	0.5	100.0	100.0	12.0	55,000.0	2,640.0	1,005,840.0	2.0	384.0
Average of one player	**1.9**	**25.0**	**58.8**	**4.0**	**30.3**	**52.3**	**20.3**	**58,237.1**	**3,362.9**	**1,538,133.1**	**5.8**	**536.5**

* The average shown in the table is for males and the average cost of employment for females is 89.5% that of males for permanent employment and 105% that of males for temporary employment

3.3 Analysis of Henna Value Chain Constraints/Problems

The henna sector is considered a cash crop that has economic value for the country and has multiple uses, whether in the medical or cosmetic industries, which should be given great attention by the relevant authorities. It is noticeable that the henna sector faces many challenges and constraints. The study below presents an overview of the problems facing henna cultivation from the perspective of henna farmers, wholesalers, retailers, and other players in the value chain, as well as proposed solutions and the responsible entities for implementing those solutions in terms of priority, as follows:

3.3.1 Inputs Stage

Traders of supply inputs in the henna sector face many challenges and obstacles that affect the growth and recovery of the sector.

Table no. 7 shows the three most important problems facing supply input traders, ranked by importance. The first problem is the volatility of exchange rates and currency instability, as the lack of a unified pricing system can lead to low profits. Fluctuations in prices, even for short periods, can push farmers to sell their production assets, such as land, at low prices, which can lead to falling into poverty. Input supply traders believe that the best proposed solution is to stabilize the currency and monitor exchange rates by the relevant authorities.

According to input supply traders, the second problem is the high cost of transportation resulting from the high price of fuels and oil derivatives, which is considered one of the main reasons for the high prices of goods. The variation in prices between stores is used by many traders as an excuse to explain the problem of price inflation in markets, which in turn leads to a decrease in supply. Input supply traders believe that it is necessary to provide oil derivatives at a reasonable price to help ease the burden on input supply traders.

The third problem affecting the supply inputs stage is the lack of capital and inability to bear operational expenses, which is considered a dangerous indicator that can lead to bankruptcy due a lack of income and weak production. The proposed solutions from stakeholders include providing financial support through civil society organizations.

3.3.2 Production Stage

The study revealed in

Table no. 7 that producers (farmers) face several problems, among which the most important are the high cost of fertilizers and the low demand. The cost of fertilizers is considered one of the biggest driving factors for price inflation in the markets, and producers cited the fluctuation of foreign exchange rates resulting from the high cost of production as the reason for this. Producers believe that the solution to overcoming this problem is to provide fertilizers at a reasonable price so that they can achieve a suitable profit margin.

Low demand was the second most important problem for producers, which in turn will lead to a decrease in prices. The main reason for this was the halt of henna exports due to the economic conditions in the country, which affected the product by piling up at farmers' farms and not covering production costs for most of them. Some farmers are turning to

tobacco cultivation due to its good financial returns. One of the solutions proposed by farmers is to create other markets to receive their products, and this can be implemented through the authorities, agricultural offices, and associations.

The third problem is price fluctuations due to the lack of a unified price in the markets and the absence of a law to price the product, which has decreased farmers' profits. Producers believe that the solution to this problem is economic stability and the stabilization of foreign exchange rates and exporting the product to foreign markets.

3.3.3 Trade, Processing, and Export

The study results in

Table no. 7 indicated that traders, processors, and exporters face the problem of power outages, which affected their business. Complete government power outages caused machines to stop working, resulting in a high decrease in production and financial losses for traders. The reason for this is the current situation in the country. Traders, processors, and exporters believe that the solution to the power outage problem lies with the government, and that maintaining power, even for limited hours per day, will help them operate machines to process and market henna products to end consumers.

The second problem for traders, processors, and exporters is weak marketing, which leads to a lack of customers and revenue decline. This is due to weak promotion of henna products, resulting in the accumulation of henna crops and their spoilage or sale at low prices. To solve this problem, traders, processors, and exporters suggest creating domestic and international markets and promoting henna products better.

The third problem hindering the work and activity of traders, processors, and exporters in the henna sector is the difficulty of transportation due to high prices of oil derivatives. This makes it challenging to transport products to markets and end consumers, in addition to the accumulation of goods in warehouses. The appropriate solution to this problem is for the government to provide oil derivatives at an appropriate price.

3.3.4 Consumption Stage

Consumers face multiple problems as one of the players in the henna industry. The first problem that marketers and end consumers face is the fluctuation of exchange rates and currency instability. The reason for this is the absence of unified pricing. Marketers and end consumers believe that currency stability and exchange rate monitoring by the relevant authorities is the most appropriate solution for this problem.

The poor quality of henna products and the absence of quality control standards and specifications are the second biggest challenge for marketers and end consumers. The product does not always provide the desired result due to varying reasons, most involving the high level of impurities in the product. Therefore, end consumers tend to look for alternative products. Marketers and end consumers believe that in order to encourage purchasing, high-quality henna must be provided, which can be achieved through farmers and processors attending to quality.

The health hazards for henna artists, including back pain and visual fatigue from continuous staring, represent the third challenge in the henna industry chain. The process of applying henna can be very long, and support can be provided to artists by providing adequate lighting and comfortable seating, in addition to training and qualifications by civil society organizations.

3.3.5 Enablers and Supporters

The absence of guidance, training, and experience in agricultural practices in the region is one of the biggest challenges facing enablers and supporters. The reason for this is the lack of specialized guides, resulting in low agricultural production, poor product quality, and difficulty in marketing. To solve this problem, it is necessary to activate the role of agricultural guidance and hold training courses in this field by cooperative associations and the Faculty of Agriculture.

The lack of resources for supporting institutions is the second most important challenge facing the henna sector. Most of the study participants at this stage indicated that the weakness of the executive bodies in the region and their limited resources pose a major challenge in their ability to carry out and sustain their work, in addition to the weakness of their work and outputs. Therefore, it is preferable to allocate a suitable budget to support these bodies.

The shortage of staff and the inability to provide work on a large scale is the third challenge for enablers and supporters. To support the henna sector, enablers and supporters see the necessity of contracting with specialists to support farmers in this sector.

Table no. 7 Analysis of the three most important obstacles/problems in the stages of the henna value chain in the Ghayl Ba Wazir District ranked from the most important to the least important (Primary Sources, 2022)

Stages in Chain	Ranking Based on Importance	Description Obstacle / Problem	Classification* (PESTLE)**	Main Cause of Obstacle / Problem	Most Important Obstacle / Problem	Proposed Solution to the Intervention (according to stakeholders)	In Charge of Implementing Solution
Inputs Supply	1	Exchange rate volatility and instability of the currency	Financial (Economic)	Lack of pricing rules and laws	Reduced production and therefore loss and lack of profit	Stability of the currency and control of exchange rates by the competent authorities	Gov
	2	High transport costs	Financial (Economic)	Rising fuel prices	Reduce transportation due to fuel	Providing fertilizers at an affordable price	Gov
	3	Low capital	Financial (Economic)	Low income	Low production	Provision of financial support	Civil Society Organizations
Production	1	High operating costs	Financial (Economic)	High foreign currency and low supply over demand	Increasing the cost of production and lack of profits	Providing fertilizers at an affordable price	Gov
	2	Low demand	Financial (Economic)	No export abroad	Product stacking with farmers	Creating new markets that receive products	Intervention by the authorities, agricultural offices, and associations
	3	Exchange rate volatility and instability of the currency	Financial (Economic)	Lack of pricing rules and laws	Reduced production and therefore loss and low profit	Stability of currency	Gov
Trade / Processing / Exports	1	Power outage	Technical (Technological)	Power outage	Machines cease to work	Finding a solution to the electricity problem	Gov
	2	Marketing	Administrative/Organizational (Technological)	Low promotion	Unsold crops	Providing local and external markets	Gov
	3	Lack of transportation.	Technical (Technological)	High oil derivatives price	Unsold crops	Providing oil derivatives at an affordable price	Gov
Consumption / Market	1	Exchange rate volatility and instability of the currency	Financial (Economic)	Lack of pricing rules and laws	Reduced production and therefore loss and low profit	Stability of currency	Gov
	2	Poor product	Technical (Technological)	Poor quality and lack of standards and specifications	Do not give the desired result	Providing very high-quality henna	Farms
	3	Health effects to the workers in henna mehndi (fatigue of sight as a result of repeated staring - back pain)	Technical (Social)	Because of the long work session	Back and joint pain and visual impairment	Supporting oil derivatives (strong light source - providing comfortable seats) + training and qualification	Civil Society Organizations
Enablers and Supporters	1	Lack of extension and training and lack of experience in agricultural practice	Technical (Techno-)	Lack of mentors with appropriate specialties	Lack of agricultural productivity	Activating the role of agricultural guidance and training courses	Cooperative associations + Faculty of Agriculture
	2	Weak potentials available	Financial (Technological)	Weak general budget	Poor work and outputs	Work on developing an appropriate budget	Gov
	3	Lack of personnel	Administrative/Organizational Social	Lack of contracting	No services are provided at a larger scale	Recruitment and contracting	Gov

* = **General rating**: **1**. Technical **2**. Financial **3**. Administrative/Organizational ** = **PESTLE Classification**: **1**. Political **2**.Economic **3**.Social **4**.Technological **5**.Legal **6**.Environmental

4 Development Strategy

Some possible solutions and strategies that will contribute to the development of the henna sector in Ghayl Ba Wazir District

4.1 Development Strategy

There are possible solutions and strategies that will contribute to the development of the henna sector in the Ghayl Ba Wazir District. The previous sections of the study reflect the most important problems in the sector at all levels of players in the henna sector in the Ghayl Ba Wazir District. Knowing their dimensions and causes, strategies will be built to intervene in and develop the sector by adding value to the product and changing the behavior of the sector's actors.

Demand is the main factor in the value chain of any product, and in the henna sector, intervention strategies will be built to develop the sector starting from the market or the consumer, whether local or international. Increasing demand will automatically result in an improvement in production and prices. Also, imparting to consumers and producers the culture of obtaining a good product or a product with certain specifications will reflect on the mechanism, quality of production, and agriculture. Based on that, development strategies for the henna sector will be listed, starting with input traders, then producers, exporters, and wholesale traders in the local market, retail traders, and finally the consumer or end markets, as well as enablers and supporters.

The order of the presentation is only to clarify the strategy to the reader and does not necessarily mean that the intervention strategy will be implemented in the order of the presentation. It is better to implement all strategy items in parallel with all players in the chain to achieve the desired results, improve performance for all players, develop production, and improve prices.

4.1.1 Inputs Stage

Very few modern agricultural inputs are used in the cultivation of henna. All agricultural operations, such as irrigation, weed removal, and harvesting, are carried out with traditional tools and methods. Therefore, changing the behavior of producers to the use of modern tools, equipment, and materials that increase productivity and improve quality will open a new market for input traders and the many materials that must be provided. Support can be provided to these traders by introducing them to the types of modern inputs that they can work to provide, as well as networking with major traders who import these inputs and drawing up fertilization and control plans. On the one hand, it is necessary to strengthen the relationship of these traders with agricultural conglomerates and cooperatives to ensure that their services reach all producers while at the same time obtaining their dues from producers, especially for credit sales and building a close relationship between traders and producers.

Input traders also need training in administrative, financial, and technical fields to acquire sufficient skills that enable them to manage their enterprises more skillfully, obtain the largest possible financial returns, and reduce costs. The provision of concessional and soft financing loans to support and expand the activity of these traders is important, as most of them consider the lack of capital to be the most impactful on their business activity.

4.1.2 Production Stage

Producers will work on improving their performance by raising the quality and quantity of production in response to the increase in quality standards desired by consumers and exporters, and to increase demand in the local market or open new markets as mentioned in the development strategy for the consumption and export stage. To assist them in improving production quality and quantity, targeted interventions will be drawn up to improve production through the use of modern agricultural techniques, training farmers on proper practices and the use of equipment and machines that reduce production costs and increase labor productivity.

Farmers producing henna in Ghayl Ba Wazir will also be trained and qualified on proper harvesting and post-harvest practices, and how to maintain the product without it being exposed to damage, providing them with tools to protect and process the crop after harvest. All of these interventions will help reduce production costs, increase production quantity per unit area, and improve the income of producers from the sale of the crop.

Financial training is also important to increase the skills of farmers in cost accounting and knowing the available profit margin, which will motivate them to know the best ways to obtain more income from henna production and compare it with other competing crops that consume larger amounts of water and have higher costs for control and post-harvest processing.

We cannot neglect the importance of framing producers in institutional structures, particularly in agricultural cooperatives, whose leadership is from the producers themselves, and who can support their activities from technical, administrative, and financial perspectives. Cooperative activity should be based on two main axes: the first is to provide support to producers by providing suitable inputs of high quality and agricultural equipment that can provide services to producers for rent or at minimal costs, in addition to providing technical support and training, and linking the association with a group of agricultural experts and organizing workshops to discuss production challenges and innovate solutions.

The second axis of cooperative activity should enhance the marketing capabilities of producers, reduce transport and drying costs, and the cooperative can collect the producers' production and transport large quantities for marketing, which will reduce production costs. Additionally, the cooperative can have capabilities for communication and promotion with a large number of traders and exporters, which may open up new markets for producers and provide fair compensation for their henna product.

4.1.3 Trade, Processing and Export Stage

International exhibitions and events will provide an opportunity for henna exporters to promote their product in Arab countries where the culture of henna art and hair dyeing is prevalent. Supporting exporters to reach these markets will open new avenues for international marketing, which will have a positive impact on domestic trade and production.

Marketing and communication skills are lacking among henna traders and exporters in Ghayl Ba Wazir due to their limited access to new markets. This requires specialized training for traders and exporters through workshops and short intensive training sessions that explain marketing strategies and the importance of participating in local and international promotional events and festivals to expand their reach to new markets and increase their customer base.

Wholesale and retail henna processors and traders also need to participate in promotional events and festivals to promote their products. They also need to develop their processing and packaging skills, build their own brand identity and promote it in all governorates through local events. It is also important to organize these traders and exporters into institutional clusters such as associations or unions for ease of coordination among them and to promote henna products locally and internationally.

Improving henna product processing tools and techniques to achieve two goals - improving quality and reducing cost - is also important. Using modern sorting and sieving tools to reduce impurities that may mix with henna powder during grinding and automating other processes such as sieving and packaging can reduce costs and improve quality, which will increase customer demand for henna.

4.1.4 Consumption Stage

The market development strategy will work on two fronts. Firstly, it will increase consumer knowledge, especially about the high-quality specifications required for henna, and how to distinguish them. This will create a good impression among consumers and also reduce the use of color enhancers when using high-quality henna. Secondly, it will promote the culture of using henna in religious and popular occasions in urban and rural areas, and it is also important to promote this culture in other countries where the culture of henna art and dyeing with henna exists, such as Saudi Arabia, Oman, Egypt, and Morocco. Accessing these markets will have a significant impact on increasing demand and improving trade and production revenues.

Increasing consumer knowledge, especially about product specifications, will be achieved through training workshops for consumers, exhibitions, and events that introduce consumers to henna specifications and the health benefits of using henna for hair or skin dyeing.

In addition, targeting communities during wedding and religious and popular occasions will have an impact on increasing the culture of using henna on the body and hair of women through events, competitions, exhibitions to promote henna products and display henna art, and support the spread of culture among the emerging generation of women to expand and increase demand for henna products.

4.1.5 Enablers and Supporters

To enhance the activity of enablers and supporters in the henna sector, it is essential to provide technical and financial support to enablers through training and qualification in administrative, technical, and financial aspects in the same production areas. This training should cover the most important agricultural principles and theories and henna processing methods so that they can be communicated to producers throughout the district. This is important for the continuity of agricultural awareness and guidance in the area.

Financial support includes providing monitoring and transportation tools and studies such as climate monitoring stations and census studies, which form the basis for development policies and knowledge of the impact of direct and indirect interventions on production and the sector. Enablers will also contribute to supporting the role of agricultural associations and ensuring that they perform their roles systematically according to studied regulations and laws issued by enablers.

Enablers are the link between supporters and sector players, where supporters need a lot of logistical support to implement their activities, whether cooperative associations or civil society organizations that want to support the henna sector. They must provide a set of well-studied intervention packages along the value chain that promote changing the behavior of actors in the sector for the better and improve the product quality and type.

The sector also needs small and medium financing institutions to enhance working capital in henna production, whether farmers or producers, by providing low-interest or interest-free loans to encourage production, introduce modern production inputs, and increase henna sector activity.

Table no. 8 Strategy for developing the stages of the henna value chain in Ghayl Ba Wazir District

Stages of VC	Type	Development Needs	Appropriate Interventions	Expected Impact
Inputs Logistics	Technical	1. Technical, administrative, and accounting training to raise performance and marketing skills 2. Networking with specialized and experienced engineers 3. Enhancing the role of traders to include modern agricultural inputs	1. Training and capacity building in the field of environmentally friendly and effective fertilizers and pesticides 2. Capacity building in preparing fertilization and preventive plans and programs 3. Increasing the activity of financing institutions and expanding their relations with other institutions to provide soft loans to merchants 4. Networking between agricultural input dealers and cooperatives	• Supply chain traders embrace new knowledge and skills • Introducing modern techniques and knowledge • Facilitating producers' access to modern production inputs
	Financial	1. Providing white or low-interest soft loans to promote and increase commercial activity		
	Administrative / Organizational	1. Enhancing the activity of cooperative societies		
Production	Technical	1. Introducing modern technologies 2. Reducing waste	1. Training in the field of modern technologies. 2. Support with agricultural production inputs such as modern irrigation networks. 3. Support with fertilizers and training on correct methods of using them 4. Finding a unified market policy in all collection centers 5. Providing soft loans at simple interest rates 6. Activate and establish blocs and a cooperative framework such as associations to organize the work of producers	• Reduce production costs • Farmers adopt the correct behavior in the use of pesticides and fertilizers • Reducing pre-harvest and post-harvest crop losses • Increasing net farm income • Increase job opportunities
	Financial	1. Providing loans 2. Financial support from sponsors		
	Administrative / Organizational	1. Organizational building and raising the technical, financial, and administrative capabilities of agricultural associations		
Trade / Processing / Exports	Technical	1. Attention to quality and added value 2. Improving hygienic practices in the preparation and processing of henna products 3. Raising efficiency by international standards and standards	1. Training on the level of international product standards and specifications 2. Providing financial and counseling support to therapists 3. Providing soft loans at simple interest rates 4. Holding local and international promotional and marketing events	• Educate the therapists about transporting the product and maintaining its quality • Enhancing the capacity of stakeholders from the private and public sectors to diversify production and raise henna exports • Use of modern production tools and equipment • Increased demand for local henna products
	Financial	1. Providing soft loans 2. Support and interest from the relevant authorities in the henna crop		
	Administrative / Organizational	1. Creating training and qualification plans and programs for workers in the technology of manufacturing henna products 2. Supporting marketing tools and methods for traders and exporters		
Consumption / Market	Technical	1. Educating consumers about the health importance of henna 2. Effective marketing and promotional campaigns 3. Organizing regular training on the methods of engraving and the use of henna	1. Educating consumers about the importance of using henna in the field of health and adornment 2. Providing consumers with the skills to identify the types and quality of henna	• Increased demand for a henna product • Opening marketing outlets in the foreign market and participating in international exhibitions for henna and its products • The use of technology and social networks in the marketing of the product
	Financial	1. Obtaining henna products at reasonable prices and high quality		
	Administrative / Organizational			
Enablers and supportive	Technical	1. Activating the control and inspection service for healthy practices for product circulation 2. Strengthening the relationship with the actors in the sector	1. Traceability training and qualification according to ISO & CODEX 2. Collecting data at all stages of production for the chain, from the producer to the consumer 3. Establishing a database specialized in the sector 4. Holding workshops and events among the players in the sector	• Increase the control and inspection service of the product • Increasing the impact and results of the intervention and work of organizations and civil society institutions. • Reducing price hikes and fluctuations • Availability of reliable information and data on the state of the sector in the region
	Financial	1. Technical, financial, and administrative training, provision of management systems, monitoring and control stations, and implementation of development programs and studies		
	Administrative / Organizational	1. Traceability 2. Update the database		

* = **Impact Term: 1**. Short term **2**. Average. **3**. Long-term.

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Appendices

Appendix (2): Adaptive Reuse Matrix

Table no. 9 SWOT - PESTLE adaptive reuse matrix in value chain (Ioannis, et al., 2021)

Sustainability Indicators	Strengths	Opportunities	Weaknesses	Threats
(Po) Political	(Po1) Blocking Neglect Policy	(Po2) Urban Re-Development Strategies / Incentives	(Po3) Political Support Level	(Po4) Political Inertia
(Ec) Economical	(1Ec) Economic Growth Boost	(2Ec) Capitalization of Cultural Value	(3Ec) Inability to Estimate Economic Viability	(4Ec) Investment Returns
(SC) Socio-Cultural	(SC1) Cultural Values Preservation	(SC2) Quality of Life Improvement	(SC3) Facadism	(SC4) Gentrification
(TT) Technological-Technical	(TT1) Technological Innovation	(TT2) Cooperation in a wide range of scientific fields	(TT3) Asset Condition	(TT4) Technical Difficulties
(Le) Legal	(Le1) Current Legislative Context	(Le2) Land Use Plan and Zoning	(Le3) Current Building Standards	(Le4) Ownership Status
(En) Environmental	(En1) Reduced Environmental Footprint	(En2) Eco-Building	(En3) Achieving Net-Zero Energy Goals	(En4) Indoor Environmental Quality

Appendix (2): SWOT and PESTLE Analysis Details

Table no. 10 Details of SWOT (**Strengths**) and PESTLE analysis for henna value chain players (Primary Sources, 2022)

Chain Players Stage of	*Description*	*Classification* (1/2/3)*	*PESTLE** (1/2/3/4/5/6)*	*Freq*	*Rate*	*Ranking*
Supply Inputs	Having qualified labor	Administrative/Organizational	Social	4	16%	1
	Patience and endurance in serving and processing the crop	Administrative/Organizational	Social	3	12%	2
	Multiple sources of income	Financial	Economic	3	12%	3
	Knowledge of the markets	Administrative/Organizational	Economic	3	12%	4
	Wide fame	Technical	Economic	2	8%	5
	Knowing the needs of customers	Administrative/Organizational	Economic	2	8%	6
	Persuasion and negotiation skills	Administrative/Organizational	Social	2	8%	7
	The presence of new inputs	Financial	Economic	2	8%	8
	Owning large stores	Financial	Economic	1	4%	9
	Master a foreign language	Administrative/Organizational	Social	1	4%	10
	Providing employment opportunities	Administrative/Organizational	Social	1	4%	11
	Providing spare parts	Financial	Technological	1	4%	12
Production	Patience and endurance in serving and processing the crop	Administrative/Organizational	Social	58	10%	1
	Having good capital	Financial	Economic	50	9%	2
	Item quality	Technical	Economic	45	8%	3
	Multiple sources of income	Financial	Economic	44	8%	4
	Availability of trained labor at an affordable price	Administrative/Organizational	Social	41	7%	5
	Easy sale of henna	Administrative/Organizational	Technical	38	7%	6
	Hiring qualified personnel	Administrative/Organizational	Social	30	5%	7
	Knowledge of the markets	Administrative/Organizational	Economic	30	5%	8
	Accumulated experience in the methods of serving the crop	Technical	Social	28	5%	9
	A strong relationship with players	Administrative/Organizational	Social	20	4%	10
	Have good production inputs	Financial	Economic	20	4%	11
	Ability to export outside the country	Administrative/Organizational	Economic	17	3%	12
	Provision of plants	Financial	Economic	16	3%	13
	Communication with online social networking	Technical	Technological	15	3%	14
	Not to sell on credit	Financial	Economic	13	2%	15
	Forming teams to market the product	Administrative/Organizational	Social	11	2%	16
	Existence of an appropriate environment.	Administrative/Organizational	Social	11	2%	17
	Ability to market internally and externally	Administrative/Organizational	Economic	9	2%	18
	Low impurities	Financial	Technical	9	2%	19
	Persuasion and negotiation skills	Administrative/Organizational	Social	9	2%	20
	Easy transportation of the product	Administrative/Organizational	Technical	9	2%	21
	Proud to be a henna farmer	Administrative/Organizational	Social	8	1%	22
	Knowing the needs of customers	Administrative/Organizational	Economic	6	1%	23
	Punctuality	Administrative/Organizational	Social	5	1%	24
	Forming teams to sensitize farmers	Administrative/Organizational	Social	4	1%	25
	Competitive price	Financial	Economic	3	1%	26
	Owning large stores	Financial	Economic	2	0%	27
	Provision of multiple items	Financial	Economic	2	0%	28
	Holding training sessions	Administrative/Organizational	Technical	2	0%	29
Trade / Processing / Exports	Patience and endurance in serving and processing the crop	Administrative/Organizational	Social	8	10%	1
	Easy to sell product	Administrative/Organizational	Technical	7	9%	2
	Punctuality	Administrative/Organizational	Social	5	6%	3
	Having good capital	Financial	Economic	5	6%	4
	Persuasion and negotiation skills	Administrative/Organizational	Social	5	6%	5
	Not to sell on credit	Financial	Economic	4	5%	6
	A strong relationship with players	Administrative/Organizational	Social	4	5%	7
	Multiple sources of income	Financial	Economic	4	5%	8

Chain Players Stage of	Description	Classification* (1/2/3)	PESTLE** (1/2/3/4/5/6)	Freq	Rate	Ranking
	Knowledge of the markets	Administrative/Organizational	Economic	4	5%	9
	Availability of trained labor at an affordable price	Administrative/Organizational	Social	4	5%	10
	Provision of multiple items	Financial	Economic	4	5%	11
	Easy packing	Administrative/Organizational	Technical	3	4%	12
	Understanding customer needs	Administrative/Organizational	Economic	3	4%	13
	Export to outside the country (abroad)	Financial	Economic	2	3%	14
	Owning large stores	Financial	Economic	2	3%	15
	Owning large stores	Financial	Economic	2	3%	16
	Great confidence in the crop	Technical	Economic	2	3%	17
	Low impurities	Financial	Technical	2	3%	18
	Promotion	Administrative/Organizational	Economic	1	1%	19
	Communication with online social networking	Technical	Technological	1	1%	20
	Providing employment opportunities	Administrative/Organizational	Social	1	1%	21
	Accumulated experience in the ways of serving the crop	Technical	Social	1	1%	22
	Training sessions	Administrative/Organizational	Technical	1	1%	23
	Competitive price	Financial	Economic	1	1%	24
	The presence of new inputs	Financial	Economic	1	1%	25
Consumption / Market	Quality Ghayli henna	Technical	Economic	6	32%	1
	Product quality	Technical	Economic	4	21%	2
	Hiring qualified personnel	Administrative/Organizational	Social	3	16%	3
	The area is famous for henna mehndi	Technical	Social	3	16%	4
	Accumulated experience	Administrative/Organizational	Social	3	16%	5
Enablers and supporters	Qualified personnel	Administrative/Organizational	Social	7	50%	1
	Holding training sessions	Administrative/Organizational	Technical	3	21%	2
	Forming teams to sensitize farmers	Administrative/Organizational	Social	2	14%	3
	Ability to provide job opportunities	Administrative/Organizational	Social	1	7%	4
	Existence of an appropriate work environment	Administrative/Organizational	Social	1	7%	5

* = **Classification**: **1**. Technical **2**. Financial **3**. Administrative/Organizational

** = **PESTLE**: **1**. Political **2**. Economic **3**. Social **4**. Technological **5**. Legal **6**. Environmental

Table no. 11 SWOT (**Opportunities**) and PESTLE analysis for henna value chain players (Primary Sources, 2022)

Chain Players Stage of	*Description*	*Classification* (1/2/3)*	*PESTLE** (1/2/3/4/5/6)*	*Freq*	*Rate*	*Ranking*
Supply Inputs	Good economic rectum	Financial	Economic	5	21%	1
	The environment is suitable for henna	Financial	Environmental	4	17%	2
	Availability of trained and affordable workers	Administrative/Organizational	Social	3	13%	3
	Providing tech support	Administrative/Organizational	Technological	2	8%	4
	Providing cheap sources of electricity	Financial	Economic	2	8%	5
	Production inputs are available at reasonable prices	Financial	Economic	2	8%	6
	Qualifying and training workers	Administrative/Organizational	Technological	2	8%	7
	Introducing modern equipment to the market	Financial	Economic	1	4%	8
	Consumer desire	Financial	Economic	1	4%	9
	Demand is high	Financial	Economic	1	4%	10
	Reviving local market	Financial	Economic	1	4%	11
Production	Demand is high	Financial	Economic	77	12%	1
	The environment is suitable for henna	Financial	Environmental	57	9%	2
	State support	Administrative/Organizational	Economic	57	9%	3
	Water springs and steams	Financial	Environmental	48	7%	4
	Good economic rectum	Financial	Economic	44	7%	5
	Availability of trained and affordable workers	Administrative/Organizational	Social	41	6%	6
	Perennial henna plant	Financial	Environmental	40	6%	7
	Inheritance of henna land and trees	Administrative/Organizational	Social	35	5%	8
	Providing alternative and cheap sources of electricity	Financial	Economic	24	4%	9
	Production inputs are available at reasonable prices	Financial	Economic	24	4%	10
	Providing tech support	Technical	Technological	23	4%	11
	The area is well-known for henna cultivation	Financial	Economic	21	3%	12
	Availability of extension and training bodies	Administrative/Organizational	Technological	17	3%	13
	Granting soft loans to farmers	Financial	Economic	17	3%	14
	Consumer's desire for Ghayli henna	Financial	Economic	16	2%	15
	Availability of employers	Administrative/Organizational	Social	12	2%	16
	Supporting by some entities and organizations	Administrative/Organizational	Economic	11	2%	17
	Reviving local market	Financial	Economic	11	2%	18
	Youth employment opportunities	Administrative/Organizational	Social	11	2%	19
	Support for electricity and irrigation	Administrative/Organizational	Economic	9	1%	20
	Henna long shelf life	Financial	Economic	6	1%	21
	Boost to Local Economy	Financial	Economic	6	1%	22
	Introducing modern equipment	Financial	Economic	5	1%	23
	Opportunities for the expansion of business networks	Administrative/Organizational	Economic	5	1%	24
	Opportunities for growth and development in the henna market	Administrative/Organizational	Economic	5	1%	25
	Providing a social environment that encourages investment	Administrative/Organizational	Social	4	1%	26
	Lack of drying period	Technical	Technological	3	0%	27
	Worker's qualification and training	Administrative/Organizational	Technological	3	0%	28
	Providing bio-fertilizer	Financial	Economic	3	0%	29
	Diversity of products	Financial	Economic	2	0%	30
	Continuity of henna production throughout the year	Financial	Environmental	2	0%	31
	Low taxes on the product	Financial	Economic	2	0%	32
	Income is continuous, not seasonal.	Financial	Economic	1	0%	33
	Halal cultivation opposite of tobacco	Administrative/Organizational	Social	1	0%	34
Trade / Process / Exports	The area is well-known for henna cultivation	Financial	Economic	69	43%	1
	Increase demand	Financial	Economic	16	10%	2
	Consumer's desire for Ghayli henna	Financial	Economic	16	10%	3

Chain Players Stage of	Description	Classification* (1/2/3)	PESTLE** (1/2/3/4/5/6)	Freq	Rate	Ranking
	A suitable environment for henna	Financial	Environmental	12	7%	4
	Good economic rectum	Financial	Economic	12	7%	5
	Ease of growing henna	Technical	Technological	9	6%	6
	Providing alternative and cheap sources of electricity	Financial	Economic	5	3%	7
	State support	Administrative/Organizational	Economic	5	3%	8
	Availability of production inputs at reasonable prices	Financial	Economic	4	2%	9
	Perennial henna plant	Financial	Environmental	3	2%	10
	Reviving local market	Financial	Economic	2	1%	11
	Diversity of products	Financial	Economic	2	1%	12
	Easy transportation of the product	Technical	Technological	2	1%	13
	Supporting by some entities and organizations	Administrative/Organizational	Economic	1	1%	14
	Availability of the right item	Financial	Economic	1	1%	15
	Providing communication media	Financial	Technological	1	1%	16
	Opportunities for the expansion of business networks	Administrative/Organizational	Economic	1	1%	17
Consumption / Market	Good economic rectum	Financial	Economic	38	23%	1
	Demand is high	Financial	Economic	20	12%	2
	Activate courses sometimes	Administrative/Organizational	Technological	20	12%	3
	The environment is suitable for henna	Financial	Environmental	19	11%	4
	State support	Administrative/Organizational	Economic	16	10%	5
	Production inputs are available at reasonable prices	Financial	Economic	15	9%	6
	Easy sale of henna	Technical	Technological	10	6%	7
	Youth Employment opportunities	Administrative/Organizational	Social	6	4%	8
	Providing tech support	Administrative/Organizational	Technological	5	3%	9
	Perennial henna plant	Financial	Environmental	5	3%	10
	Availability of trained and affordable workers	Administrative/Organizational	Social	4	2%	11
	Providing alternative and cheap sources of electricity	Financial	Economic	4	2%	12
	Beneficiaries user-friendly	Technical	Technological	2	1%	13
	Supporting by some entities and organizations	Administrative/Organizational	Economic	1	1%	14
	Reviving local market	Financial	Economic	1	1%	15
	Availability of the right item	Financial	Economic	1	1%	16
	Establishing the shelf-life of the product	Financial	Economic	1	1%	17
Enablers and Supporters	State support	Administrative/Organizational	Economic	6	29%	1
	Providing tech support	Administrative/Organizational	Technological	3	14%	2
	Encouraging laws and legislation	Administrative/Organizational	Legal	3	14%	3
	Availability of extension and training bodies	Administrative/Organizational	Technological	3	14%	4
	Support from some parties and organizations	Administrative/Organizational	Economic	1	5%	5
	Local authority members are serious about their work	Administrative/Organizational	Political	1	5%	6
	Boost to local economy	Financial	Economic	1	5%	7
	Providing alternative and cheap sources of electricity	Financial	Economic	1	5%	8
	Neighborhoods' headmen's role in assisting the local authority	Administrative/Organizational	Political	1	5%	9
	The area is well-known for henna cultivation	Financial	Economic	1	5%	10

* = **Classification**: **1**.Technical **2**. Financial **3**. Administrative/Organizational

** = **PESTLE**: **1**. Political **2**. Economic **3**. Social **4**. Technological **5**. Legal **6**. Environmental

Table no. 12 SWOT (**Weaknesses**) and PESTLE analysis for the henna value chain players (Primary Sources, 2022)

Chain Players Per each Stage	*Description*	*Classification* (1/2/3)*	*PESTLE** (1/2/3/4/5/6)*	*Freq*	*Rate*	*Ranking*
Supply Inputs	High labor costs	Financial	Economic	4	21%	1
	Low capital	Financial	Economic	4	21%	2
	Weak promotion	Administrative/Organizational	Technological	2	11%	3
	Inability to communicate with external markets	Administrative/Organizational	Technological	2	11%	4
	More debts	Financial	Economic	2	11%	5
	Marketing	Administrative/Organizational	Technological	1	5%	6
	Lack of safe warehouses (stores)	Financial	Economic	1	5%	7
	Not buying spare parts due to the availability of solar energy	Financial	Technological	1	5%	8
	Lack of data control (lack of experience)	Administrative/Organizational	Technological	1	5%	9
	Lack of experience in machine maintenance	Technical	Technological	1	5%	10
Production	Low capital	Financial	Economic	89	14%	1
	Poor marketing	Administrative/Organizational	Technological	78	12%	2
	Lack of experience in processing methods	Technical	Technological	67	10%	3
	Difficulty negotiating with customers	Administrative/Organizational	Social	52	8%	4
	High labor cost	Financial	Economic	48	7%	5
	Lack of transportation.	Technical	Technological	45	7%	6
	Inability to obtain multiple funding	Administrative/Organizational	Economic	43	7%	7
	Lower profits	Financial	Economic	43	7%	8
	Lack of experience in agricultural practices	Technical	Technological	26	4%	9
	Weak promotion	Administrative/Organizational	Technological	20	3%	10
	Bad storage	Technical	Economic	17	3%	11
	Inability to communicate with foreign companies and markets	Administrative/Organizational	Technological	14	2%	12
	Increase impurities in the product	Technical	Economic	13	2%	13
	Poor color of henna dye	Technical	Economic	13	2%	14
	Henna cultivation is very stressful	Technical	Social	12	2%	15
	Insufficient fertilization of henna plant	Technical	Technological	12	2%	16
	Great burdens and responsibilities	Administrative/Organizational	Social	8	1%	17
	Having competitors	Administrative/Organizational	Social	7	1%	18
	Poor agriculture policy	Administrative/Organizational	Political	6	1%	19
	Lack of labor	Administrative/Organizational	Social	6	1%	20
	Apathy for the product	Administrative/Organizational	Social	4	1%	21
	Weak employers	Administrative/Organizational	Social	4	1%	22
	Irregular irrigation	Technical	Technological	4	1%	23
	Poor communication with engineers	Administrative/Organizational	Social	3	0%	24
	Unsold goods	Financial	Technological	3	0%	25
	No control over the problem of crop drought	Technical	Technological	3	0%	26
	Selling within certain limits without thinking about expansion	Administrative/Organizational	Economic	2	0%	27
	Difficult sorting process	Technical	Technological	2	0%	28
	Non-use of certain agricultural inputs	Technical	Technological	2	0%	29
	Lack of advertising & publicity	Administrative/Organizational	Technological	2	0%	30
	Low salaries	Financial	Economic	2	0%	31
	Inability to keep up with rising rents	Financial	Economic	1	0%	32
	Not displaying the product properly	Technical	Technological	1	0%	33
	Confusion and randomness	Administrative/Organizational	Social	1	0%	34
	Lack of diesel	Financial	Economic	1	0%	35
	Product color change due to storage	Financial	Technological	1	0%	36

Chain Players Per each Stage	Description	Classification* (1/2/3)	PESTLE** (1/2/3/4/5/6)	Freq	Rate	Ranking
	High operating costs	Financial	Economic	1	0%	37
	Lack of value-added services	Technical	Technological	1	0%	38
	Lack of experience in machine maintenance	Technical	Technological	1	0%	39
	There is no designated drying facility	Financial	Economic	1	0%	40
Trade / Processing / Exports	Low capital	Financial	Economic	9	13%	1
	Marketing	Administrative/Organizational	Technological	8	12%	2
	Lack of transportation	Technical	Technological	7	10%	3
	Weak promotion	Administrative/Organizational	Technological	6	9%	4
	Reduced productivity	Financial	Economic	6	9%	5
	High operating costs	Financial	Economic	4	6%	6
	Inability to get diverse support	Administrative/Organizational	Economic	3	4%	7
	Farmers' lack of interest in the crop	Technical	Social	3	4%	8
	Great burdens and responsibilities	Administrative/Organizational	Social	2	3%	9
	Difficulty negotiating with customers	Administrative/Organizational	Social	2	3%	10
	Underperformance	Administrative/Organizational	Technological	2	3%	11
	Lack of safe warehouses	Financial	Economic	2	3%	12
	Useless crop	Financial	Economic	2	3%	13
	Low crop quality	Financial	Technological	2	3%	14
	Inability to communicate with foreign companies and markets	Administrative/Organizational	Technological	2	3%	15
	Inability to keep up with rising rents	Financial	Economic	1	1%	16
	Henna discoloration	Financial	Technological	1	1%	17
	High labor costs	Financial	Economic	1	1%	18
	Weakness and poor local grinding sometimes	Technical	Technological	1	1%	19
	Failure to comply with occupational safety tools	Administrative/Organizational	Social	1	1%	20
	Lack of modern grinding machine	Financial	Technological	1	1%	21
	Few modern devices	Financial	Technological	1	1%	22
	Lack of experience in agricultural practices and processing	Technical	Technological	1	1%	23
Consumption / Market	Inability to get diverse support	Financial	Economic	13	36%	1
	Poor product	Technical	Economic	11	31%	2
	Reduced productivity	Financial	Economic	4	11%	3
	Lack of trained workers	Administrative/Organizational	Social	2	6%	4
	High labor costs	Financial	Economic	2	6%	5
	Inability to compete	Administrative/Organizational	Economic	2	6%	6
	Low Producers quality	Financial	Technological	1	3%	7
	Alteration of product specifications	Financial	Technological	1	3%	8
Enablers and Supporters	Lack of funding sources	Financial	Economic	6	40%	1
	High labor cost	Financial	Economic	2	13%	2
	Poor necessary extension	Technical	Technological	2	13%	3
	Accumulation of problems, complaints, and unresolved	Administrative/Organizational	Social	1	7%	4
	Inability to communicate with foreign companies and markets	Administrative/Organizational	Economic	1	7%	5
	Low salaries	Financial	Economic	1	7%	6
	Lack of furniture	Financial	Technological	1	7%	7
	Lack of personnel	Administrative/Organizational	Social	1	7%	8

* = **Classification**: **1**.Technical **2**.Financial **3**.Administrative/Organizational

** = **PESTLE**: **1**. Political **2**. Economic **3**. Social **4**. Technological **5**. Legal **6**. Environmental

Table no. 13 SWOT (**Weaknesses**) and PESTLE analysis for the henna value chain players (Primary Sources, 2022)

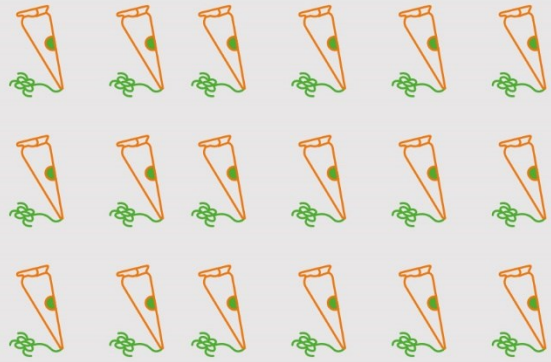
Chain Players Stage of	*Description*	*Classification* (1/2/3)*	*PESTLE** (1/2/3/4/5/6)*	*Freq*	*Rate*	*Ranking*
Supply Inputs	Prices volatility	Financial	Economic	5	20%	1
	High transport costs	Financial	Economic	5	20%	2
	High fertilizers costs	Financial	Economic	4	16%	3
	High hard currency exchange rate	Financial	Economic	3	12%	4
	Power outage	Financial	Economic	2	8%	5
	Defer payment from the agreed-upon date	Financial	Economic	2	8%	6
	High inputs cost	Financial	Economic	2	8%	7
	Low support	Administrative/Organizational	Economic	2	8%	8
	Laws and legislation hindering the work	Administrative/Organizational	Legal	2	8%	9
	Road cuts	Administrative/Organizational	Political	1	4%	10
	High freight costs	Financial	Economic	1	4%	11
	High spare parts costs	Financial	Technological	1	4%	12
	High power costs	Financial	Economic	1	4%	13
	Product damage due to disasters	Technical	Environmental	1	4%	14
Production	Prices volatility	Financial	Economic	91	10%	1
	High fertilizer costs	Financial	Economic	77	9%	2
	Reduced productivity	Financial	Economic	74	8%	3
	Inappropriate product prices	Financial	Economic	57	6%	4
	High transport costs	Financial	Economic	46	5%	5
	High hard currency exchange rate	Financial	Economic	45	5%	6
	Lack of guidance and training	Administrative/Organizational	Technological	33	4%	7
	High production inputs costs	Financial	Economic	33	4%	8
	Competitive crops	Financial	Economic	32	4%	9
	Pests and insects	Technical	Environmental	30	3%	10
	High power costs	Financial	Economic	28	3%	11
	Laws and legislation hindering the work	Administrative/Organizational	Legal	25	3%	12
	Low-quality henna crops	Technical	Technological	25	3%	13
	power outage	Financial	Economic	24	3%	14
	Control of players over the market	Administrative/Organizational	Economic	23	3%	15
	Traders' monopoly	Administrative/Organizational	Economic	22	2%	16
	Scarcity of fertilizers	Financial	Economic	17	2%	17
	Restriction of the agricultural area due to urban expansion	Administrative/Organizational	Environmental	17	2%	18
	High living costs	Financial	Economic	15	2%	19
	Low demand	Financial	Economic	15	2%	20
	Weak plants	Technical	Technological	14	2%	21
	Low supporting interventions	Administrative/Organizational	Economic	14	2%	22
	Lack of production inputs	Technical	Technological	13	1%	23
	Lack of pricing criteria	Administrative/Organizational	Legal	13	1%	24
	High humidity	Technical	Environmental	10	1%	25
	Draught	Technical	Environmental	8	1%	26
	Low land fertility	Technical	Environmental	6	1%	27
	Lack of trained workers	Administrative/Organizational	Social	6	1%	28
	Lack of and poor spare parts	Technical	Technological	6	1%	29
	Lack of fuels	Financial	Economic	6	1%	30
	Cheating and manipulation	Administrative/Organizational	Legal	6	1%	31
	Competition in the market	Administrative/Organizational	Social	6	1%	32
	Sale on credit	Financial	Social	5	1%	33
	High freight costs	Financial	Economic	5	1%	34
	Product damage due to disasters	Technical	Environmental	5	1%	35
	Poor infrastructure	Administrative/Organizational	Political	5	1%	36
	Difficulty in getting pesticides	Financial	Technological	4	0%	37
	Lack of alternative energy	Financial	Technological	4	0%	38
	Lack of agricultural equipment	Financial	Technological	3	0%	39

Chain Players Stage of	Description	Classification* (1/2/3)	PESTLE** (1/2/3/4/5/6)	Freq	Rate	Ranking
	Lack of control	Administrative/Organizational	Legal	3	0%	40
	High taxes	Financial	Legal	2	0%	41
	Closure of border crossings	Administrative/Organizational	Political	2	0%	42
	Inability to export to external markets	Administrative/Organizational	Political	2	0%	43
	Bankruptcy	Financial	Economic	1	0%	44
	Emigration	Administrative/Organizational	Social	1	0%	45
	Far selling markets	Administrative/Organizational	Economic	1	0%	46
	Stacked unsold local products	Financial	Economic	1	0%	47
	Low supporting interventions	Administrative/Organizational	Economic	1	0%	48
	Insufficient processing areas	Technical	Technological	1	0%	49
	Wrong suppliers practices	Administrative/Organizational	Social	1	0%	50
	Stray camels and goats	Technical	Environmental	1	0%	51
Trade / Processing / Exports	Prices volatility	Financial	Economic	12	15%	1
	Power outage	Financial	Economic	10	13%	2
	High hard currency exchange rate	Financial	Economic	8	10%	3
	High transport costs	Financial	Economic	7	9%	4
	Inappropriate prices	Financial	Economic	4	5%	5
	High production inputs costs	Financial	Economic	3	4%	6
	Lack of and poor spare parts	Technical	Technological	3	4%	7
	Manipulation with the market	Administrative/Organizational	Economic	2	3%	8
	Competition in the market	Administrative/Organizational	Economic	2	3%	9
	High living costs	Financial	Economic	2	3%	10
	Product damage due to disasters	Technical	Environmental	2	3%	11
	Quality of external products	Technical	Economic	2	3%	12
	Difficult to get funding	Administrative/Organizational	Economic	2	3%	13
	Lack of trained workers	Administrative/Organizational	Social	2	3%	14
	Having competitors	Administrative/Organizational	Social	2	3%	15
	Closure of border crossings	Administrative/Organizational	Political	1	1%	16
	Consumers moved to get another product	Administrative/Organizational	Social	1	1%	17
	Road cuts	Administrative/Organizational	Political	1	1%	18
	Far selling markets	Administrative/Organizational	Economic	1	1%	19
	Impact of a season change on production quantity	Technical	Environmental	1	1%	20
	High power costs	Financial	Economic	1	1%	21
	Increase in the price of some commodities	Financial	Economic	1	1%	22
	Lack of production inputs	Financial	Technological	1	1%	23
	Lack of alternative energy	Financial	Technological	1	1%	24
	Low supporting interventions	Administrative/Organizational	Economic	1	1%	25
	Low demand	Financial	Economic	1	1%	26
	Lack of awareness of the importance of henna	Administrative/Organizational	Social	1	1%	27
	Laws and legislation hindering the work	Administrative/Organizational	Political	1	1%	28
	Lack of pricing criteria	Administrative/Organizational	Legal	1	1%	29
	Lack of suppliers	Administrative/Organizational	Social	1	1%	30
Consumption / Market	Power outage	Financial	Economic	41	30%	1
	Price volatility	Financial	Economic	20	15%	2
	Negative health effects during the mehndi process	Financial	Social	15	11%	3
	No supporting interventions	Administrative/Organizational	Economic	15	11%	4
	Competition in the market	Administrative/Organizational	Economic	10	7%	5
	High hard currency exchange rate	Financial	Economic	9	7%	6
	Poor financial return	Financial	Economic	7	5%	7
	High living costs	Financial	Economic	6	4%	8
	Increase of some input commodities	Financial	Economic	4	3%	9
	Poor potentials	Financial	Economic	2	1%	10
	High taxes	Financial	Economic	1	1%	11
	Sale on credit	Administrative/Organizational	Economic	1	1%	12

Chain Players Stage of	*Description*	*Classification** (1/2/3)	*PESTLE*** (1/2/3/4/5/6)	*Freq*	*Rate*	*Ranking*
	Instability of political situation	Administrative/Organizational	Political	1	1%	13
	Road cuts	Administrative/Organizational	Political	1	1%	14
	High transport costs	Financial	Economic	1	1%	15
	Low demand	Financial	Economic	1	1%	16
	Competitive crops	Financial	Economic	1	1%	17
	Alternative products	Financial	Economic	1	1%	18
Enablers and supporters	Power outage	Financial	Economic	4	22%	1
	Price volatility	Financial	Economic	3	17%	2
	High hard currency exchange rate	Financial	Economic	2	11%	3
	Traders' monopoly	Financial	Economic	1	6%	4
	Closure of border crossings	Administrative/Organizational	Political	1	6%	5
	Cheating and manipulation	Technical	Technological	1	6%	6
	Instability of political situation	Administrative/Organizational	Political	1	6%	7
	The emergence of new rules and regulations	Administrative/Organizational	Legal	1	6%	8
	Lack of extension and training	Administrative/Organizational	Technological	1	6%	9
	Lack of control	Administrative/Organizational	Legal	1	6%	10
	Lack of fuels	Financial	Economic	1	6%	11
	More complaints	Administrative/Organizational	Social	1	6%	12

*** = Classification**: **1**. Technical. **2**. Financial **3**. Administrative/Organizational

**** = PESTLE**: **1**. Political **2**. Economic **3**. Social **4**. Technological **5**. Legal **6**. Environmental



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