Economic Growth and Climate Action

Feasibility Study and Value Chain Analysis

Agro-Industrialisation of Plant Resources and Environmental Infrastructure

Pharmaceutical and Cosmetic Sector Focus - Jordan

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I. Executive Summary

Danish Refugees Council (DRC) Jordan plans to design an ecosystem-based intervention to address ecological degradation, water insecurity, and unemployment in Jordan. The project, “Economic Growth through Climate Action”, aims to leverage an innovative public-private partnership to promote climate-regenerative green infrastructure. 3iS investigated the feasibility of establishing a mixed-species green belt ecosystem across the semi-arid region of Ma’an Governorate of Jordan. The overall study objective was to conduct research to inform the commercial viability of the proposed green belt, identify key stakeholders for project implementation, assess the value chain and unmet demand for medicinal plants as well as to provide recommendations which will be used to refine the project concept planned for Ma’an governorate of Jordan. The study administered semi-structured questionnaire guided interviews to managers and business owners within the pharmaceutical and cosmetic business sector, farmers, selected key stakeholders of the sector, and job seekers. Secondary information was gathered based on content analysis and findings from literature reviews of related studies.

General findings recorded that the pharmaceutical and cosmetic industry in Jordan is regulated by the Ministry of Health (MOH) and supervised by the Jordanian Food and Drug Association (JFDA). Regarding quality control, the government monitors drugs and food safety through the regulating rules, which are accessible via the Jordanian Drugs and Food administration, available at (http://www.jfda.jo). Stakeholders like a private company namely DELASS, public institutions like the Ministry of Agriculture and Ministry of Environment within the pharmaceutical and cosmetic industry indicated their willingness to collaborate as associates to the proposed project. Stakeholders suggested that Desi area Ma’an district has potential for green belt establishment, as some women associations support agriculture. Women dominate the workforce for small scale businesses (6 to 10 employees per firm) while men dominate the workforce in large scale businesses employing over 100 personnel per firm among the 15 companies interviewed. Fifty three percent of the interviewed firms reported that workers’ gender is not a factor that affects recruitment, while 40 % expressed their preference for female workers as they are more committed, besides the nature of work which is mostly packaging of the products. The majority, 67% of the interviewed companies, preferred young workers (16 to 30) years old, as they perceived more active and learn quickly. Out of the 15 pharmaceutical and cosmetic companies interviewed, the study recorded that 97 % of the workforce were Jordanians while the Egyptians and Syrians were only 2 and 1 % of the workforce, respectively. The low level of recruitment of foreigners in this sector was attributed to the rigorous process and the need for funding to secure work permits. Only 13 % of interviewed companies confirmed they have 1 to 4 job vacancies, mostly in administrative jobs with minimum educational qualification for hiring new technical employees as either diploma or high school graduates. However, it was reported that the academic qualification is not a condition for hiring workers but needed for the administrative and technical jobs.

Pharmaceutical and cosmetic value chain across Ma’an and Amman Governorates. Sourcing - While the sector exports its products, there is a significantly high level of importing raw materials. Out of the interviewed 15 companies, most companies (53%) reported purchasing portions of the raw materials from the international market, ranging between 10 and 90 %. Costs - utility costs constitute up to 2 % of pharmaceutical manufacturers’ expenditure depending on the demand and usage of production lines. This however varies especially for companies using alternative power systems to save on electricity bills. Manufacturers must add to every employee’s salary, a part of social security tax (14.3 %). Registration costs vary, but on average, they are broken down as follows: JOD200 for each drug sample, JOD400 for bioequivalence study (if needed), JOD200 for registration fees, JOD25 for drug sample analysis. Pricing - branded and generic drugs are governed by JFDA and controlled by a syndicate of pharmacists. A generic drugs’ price can only be up to 80 % of the price of the originator drug. The price of a drug in export markets is linked to its price in the country of origin. Government regulation limiting prices impacts pricing in the local market and consequently in the export markets. Exports - Exports form the core business of pharmaceutical and cosmetic manufacturers. Exported drugs are required to undergo the same registration process at the JFDA as the drugs sold in Jordan’s domestic market. In addition to this, the drugs meant for exports need to comply with local health authorities’ regulations of the destination countries.

On cultivation of medicinal plants and herbs, the interviewed 10 farmers reported that demand for their products during the six months that preceded the COVID-19 outbreak which started in March 2020 was good or even excellent—indicating that sage leaves, clover, barley, flowers, and thyme were the most selling products during that period. In Ma'an governorate, herbs production dominates on sale of products followed by fodder production. Key stakeholders and farmers concurred that, there is a huge potential to expand in herbs production such as: Chamomile - Matricaria chamomilla (Baboneig), Thyme -Thymus vulgaris (Zattar), Wormwood - Artemisia absinthium (sheeih) and Qaisum - artemisia gentileschi (Qasuiem) which are either cultivated or naturally grow in the Jordanian desert. Support for herbs production at household level can be integrated with the establishment of a greenbelt planted with wild plants (of both medicinal and forage/livestock feed value). In this case, the local community would be involved in establishing a green vegetation belt planted with a mixture of plant species harvested as raw materials for the pharmaceutical and cosmetic sector, as well as for the livestock feed supply which is linked to household income generation and climate impact mitigation and adaptation measures. Improved vegetation cover is a sound mitigation and adaptation strategy to climate variability. The Royal Society for Nature conservation can be an ideal stakeholder if this approach is adopted.

II. List of Acronyms

ASE	Amman Stock Exchange
APHC	Arab Center for Pharmaceuticals and Chemical Industries
API	Active Pharmaceutical Ingredients
APM	Arab Pharmaceutical Manufacturing Company
CAGR	Compound Annual Growth Rate
DADI	Dar Al Dawa Development and Investment Company
DoS	Jordanian Department of Statistics
DRC	Danish Refugee Council
EMA	European Medicines Agency
FDA	Food and Drug Administration
FOB	Free on Board
GAFTA	Greater Arab Free Trade Area
GCC	Gulf Cooperation Council
HIKMA	Hikma Pharmaceuticals
HPIC	Hayat Pharmaceutical Industries Company
IFC	International Finance Corporation
JAPM	Jordanian Association of Pharmaceutical Manufacturers
JCP	USAID's Jordan Competitiveness Program
JFDA	Jordanian Food and Drug Administration
JPHM	The Jordanian Pharmaceutical Manufacturing
META	Middle East, Turkey, and Africa
MOA	Ministry of Agriculture
MOE	Ministry of Environment
MOH	Ministry of Health
MPHA	Middle East Pharma and Chemical Industries and Medical Appliances Company
OTC	Over the Counter
PHIL	Philadelphia Pharmaceuticals
PIC/S	Pharmaceutical Inspection Co-operation Scheme
UPM	United Pharmaceutical Manufacturing
WTO	World Trade Organization

III. Introduction

Danish Refugees Council (DRC) Jordan plans to design an ecosystem-based intervention to address ecological degradation, water insecurity, and unemployment in Jordan. The project, "Economic Growth through Climate Action", aims to leverage an innovative public-private partnership to promote climate-regenerative green infrastructure. 3iS investigated the feasibility of establishing a mixed-species green belt ecosystem across the semi-arid region of Ma'an Governorate of Jordan. The ecosystem-based approach to adaptive livelihoods constitutes the capacity of communities of people to adapt to climate change impact, which is linked to the ecological health of natural ecosystems on which people draw natural resource capital for their socio-economic wellbeing. The proposed green belt will be re-afforested with mixed species and value-added plants as informed by this study, the plant species will include but not limited to; Aloe vera (Aloe barbadensis miller), jojoba (Simmondsia chinensis), prickly pear (Opuntia spp.) and other indigenous flora such Acacia raddiana, Phoenician juniper, Artemisia judaica, Artemisia herba-alba, Ducrosia anethifolia, and Achillea fragrantissima and other perennial trees and shrubs creating a natural barrier to the expansion of the desert across the selected project location. This pharmaceutical and cosmetic value chain analysis informs the proposed DRC Jordan project to apply an ecosystem-based approach to livelihood restoration intervention that can improve the ecological health of natural ecosystems on which people draw natural resource capital for their socio-economic wellbeing.

IV. Study Objectives

Overall Objective

The overall study objective was to conduct an exhaustive research to inform the commercial viability of the proposed green belt, identify key stakeholders for project implementation, assess the value chain and unmet demand for medicinal plants as well as to provide recommendations which will be used to refine the project concept and instigate private sector partnerships. The research study assessed the demand for plant-based products that can be harvested in Jordan. Also, the study identified pharmaceutical, cosmetics, nutrition supplements, and other companies that have a current demand for such products that can be competitively met through production in Jordan.

Specific Study Objectives

- Scope agricultural farms, cooperatives and SMEs in the target location that can participate in the post-harvest segment of the pharmaceutical and cosmetic value chain.
- Quantify the number as well as quality of jobs for each segment of the value chain including seedling production, planting, harvesting, grading, processing, manufacturing, packaging, and exporting.
- Explore the global supply chains for natural products used in the pharmaceutical, cosmetics, nutrition supplement and other sectors, to understand the supply, demand, pricing and labour needs.
- Identify the main stakeholders (public, private, communal/tribal, and civil society organization) in the targeted areas and the types of activities and partnerships needed to establish the green belt and supply chain.
- Identify women as change agents in selected sectors in the target location as well as women led initiatives that can be linked to the project.
- Identify and clarify each of the stakeholders' role and participation in regard to what type of support they can provide and what type of youth employment they can provide in terms of numbers, locations, gender, and skills.

V. Methodology

A comprehensive desk review was conducted to identify the regulatory frameworks for the establishment of the green belt, including land ownership, economic activity of government owned afforestation lands, health and safety standards that guide agroecology products (including medicinal plant components) processing and exporting.

Hence, consultative meetings were held with relevant key stakeholders including, the Ministry of Environment (MOE) and the Ministry of Agriculture (MOA), see Annex A showing specific organizations/ stakeholders interviewed. Secondary information was gathered based on content analysis and findings from exhaustive literature reviews of previous related studies on value chain assessments, the literature on native species of plants in Jordan, review of plant-based products used in the cosmetics, pharmaceutical, and nutrition supplements sectors. For primary data collection, the principal methodology used in the study is semi-structured questionnaire guided interviews of managers and business owners as employers within the pharmaceutical and cosmetic business sector, farmers, selected key stakeholders of the sector, and job seekers. Key informant interviews were conducted based on pre-tested questionnaires and process and ethical guidance notes. The interviews were done both in person and remotely through virtual online systems where applicable As presented on figure 1, the study respondents consisted of 15 pharmaceutical and cosmetic business owners/ managers, 12 medicinal herbs/animal feed farmers, 10 job seekers interested in the agribusiness and pharmaceutical sector, and 10 key informant interviews with selected key stakeholders. Out of the 15 interviewed pharmaceutical and cosmetics manufacturers, 12 and 3 were from Amman and Ma'an governorates respectively. The majority, 10 of the study respondents, were from the cosmetics sector, while 5 were drawn from the manufacturers of pharmaceuticals and food and nutritional supplements sectors. Out of 12 farmers interviewed, 60% were from Ma'an governorate, while Amman and Madaba governorates were represented by 30 and 10 % of the selected farmer's sample. Whereas 60 % of job seekers were from Amman governorate and 40 % were from Ma'an governorate. Annex B shows the three data collection tools/ questionnaires used to collect data from farmers, key stakeholders, and job seekers.

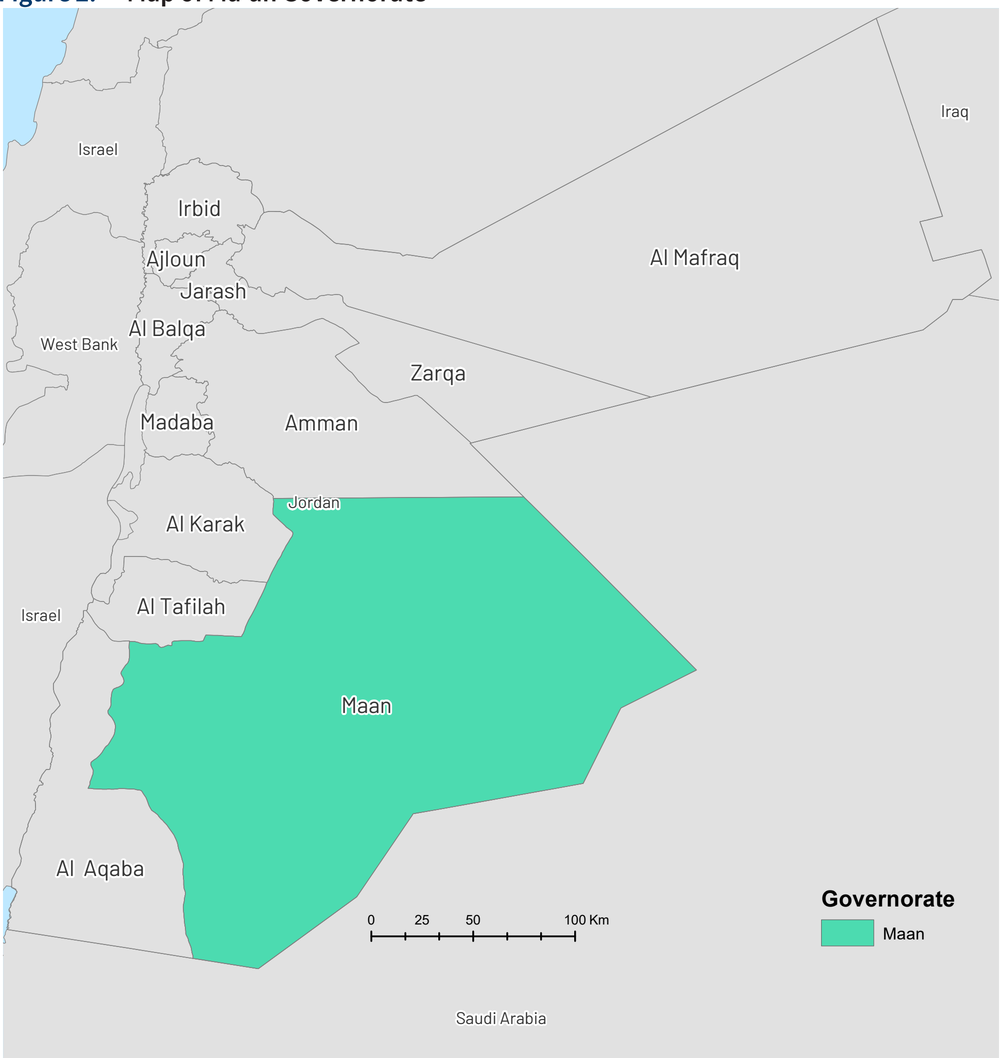
Figure 1. Study respondents

VI. Study area - proposed greenbelt project location

Ma'an Governorate Jordan

The majority of Jordan land (80%) is semi-arid and arid areas, only 4% of land is arable and less than 1% is forest and woodland[1]. For several years now, renewable groundwater resources have been extracted at an unsustainable rate in order to meet the increasing demand and Ma'an governorate is no exception Consequently, surface and groundwater quality in some areas is deteriorating. The topography of Ma'an governorate is mostly desert plateau. The primary causes of desertification have been the rapid development from a sparsely inhabited governorate into a modern agricultural and industrial society. Ma'an governorate's population boom has increased the demand for food and land[2]. Many towns and villages have extended their boundaries, and agricultural land has been increasingly transformed into residential areas[3].

Figure 2. Map of Ma'an Governorate



1 Al-Hadidi, L. M.,1996. Evaluation of desertification risk in Jordan using some climatic parameters. Unpublished MSc thesis, University of Jordan, Amman, Jordan.

2 The National Climate Change Policy of the Hashemite Kingdom of Jordan (2013-2020): Sector Strategic Guidance Framework. Prepared by the Ministry of Environment (2013).

3 National Environmental and Economic Development Study for Climate Change: Jordan National Report. Prepared by the Ministry of Environment (May 2010).

In addition to these human induced factors, climatic changes have led to increasingly periodic rainfall and droughts, all of which have exacerbated desertification. In terms of land mismanagement, farmers have resorted, for example, to poor agricultural practices like cultivating erosion prone hillsides and moving into marginal arid areas where crop yields usually drop sharply after just a few years[4]. Accordingly, the transition zone (western regions) has been exposed to a high risk of desertification and is expected to lose its productivity over time[5]. Other activities that have contributed to land degradation include plowing in order to register claims on land ownership, overgrazing of natural vegetation in the rangelands, and excessive woodcutting in forested areas.

According to 2019's population estimates, 175,200 people live in Ma'an governorate, which constitutes only about 1.7% of Jordan's population and a population density of just above 5 persons per km2. The human population, consisting of males and females, constitutes 52% and 48% respectively of the governorate's inhabitants. Regarding climate, Ma'an governorate falls in an arid climate zone. Rainfall is erratic both spatially and temporally and characterized by Saharan climate, whereas the western and northwestern parts get more rainfall. Barley (Hordeum vulgare), wheat (Triticum aestivum), and clover () trefoil are the most common annual crops. Most fruit trees are apple and olive. Due to its income generation and employment opportunities, livestock is one of the most important activities in Jordan's agriculture sector, and Ma'an governorate is one of the ideal areas for livestock production in the country.

Livestock feed formulations including protein-rich leguminous wild species, is common for both local use and sale of surplus within the livestock industry in Ma'an Governorate. For instance, the use of Acacia spp pods and leaves as feed mixture components. Also, Lucerne spp, clover (Medicago sativa L), and barley (Hordeum vulgare) are planted for both as a source of livestock feed in rural areas. There is an Industrial Park, which is the main cluster of Ma'an Development Area, which is considered a vital infrastructure for industrial investment. The area is well-equipped to provide all requirements to establish and operate light, medium and heavy industries. The area also includes a workshop to train technicians in preferred trade collaboration and support from the Vocational Training Corporation in Ma'an governorate[6]. As informed by key stakeholders and the subsequent desk/literature review, the following key economic sub-sectors were reportedly interlinked and perceived to have greater employment opportunities.

VII. Economic sectors with employment opportunities

- Agroforestry and Livestock Feed Industry
- Vocational and Business Skills development at industrial Parks
- Food and Nutritional Supplements
- Wholesale and Retail Trade (Cosmetics and Pharmaceutical)

4 The National Climate Change Policy of the Hashemite Kingdom of Jordan (2013-2020): Sector Strategic Guidance Framework. Prepared by the Ministry of Environment (2013).

5 Al-Hadidi, L. M.,1996. Evaluation of desertification risk in Jordan using some climatic parameters. Unpublished MSc thesis, University of Jordan, Amman, Jordan.

6 http://mda.jo/ProjectMain.aspx?project=2&lang=en

VIII. Study Findings

Overview of the pharmaceutical and cosmetic industry in Jordan

The pharmaceutical and cosmetic industry in Jordan is regulated by the Ministry of Health (MOH) and supervised by the Jordanian Food and Drug Association (JFDA). Regarding quality control, the government monitors drugs and food safety through the regulating rules, which are accessible via the Jordanian Drugs and Food administration, available at http://www.jfda.jo. According to the Jordanian Department of Statistics (DoS), the pharmaceutical and cosmetic sector is one of high value sector for exports, after phosphate and potash, accounting for 8% of all Jordanian exports by value[7]. According to the chamber of industry, cosmetics exports resembled only 0.015 percent of the sector's total exports in 2019, which added up to 1 billion US$. Industry sources estimate that 70 to 80 % of pharmaceutical products output is sold in export markets, and the remaining 20 to 30 % is sold domestically every year[8]. The healthcare system in Jordan has a strong reputation across the region, given its international quality standards, local experts, and world-class hospitals[9]. By 2018, the pharmaceutical sector comprised 23 companies, registered at the Jordanian Association of Pharmaceutical Manufacturers (JAPM), which manufacture mostly branded generics (formulated drugs that have lost patent protection). These manufacturers supply both public and private healthcare systems. Prices are fixed by the Jordanian Food and Drug Administration (JFDA), and hence companies compete on brand building. Jordanian manufacturers devote around 5% of their installed capacity to contract manufacturing for global pharmaceutical companies[10]. The industry caters to two main markets: Prescription and Over the Counter (OTC) medication. It is estimated that 70% of pharmaceutical drugs produced in Jordan are prescribed, while 30% are OTC drugs[11].

The pharmaceutical industry contributed to the development of the Jordanian economy as it provides jobs to 26,000 people and foreign currency from exporting over 75% of its products[12]. The sector reports an average value Compound Annual Growth Rate (CAGR) of 4.5% over 2013-2018, supported by consistent foreign demand from Saudi Arabia, Algeria, and Iraq. Demographic trends in the region, such as increasing life expectancy and literacy rates, are expected to lead to a greater awareness of health-related issues and a consequent increase in demand for pharmaceutical products. Jordanian pharmaceutical companies are expected to continue focusing on generic manufacturing and as such, industry sources expect a similar performance over 2019- 2023, with value CAGR of 4-6%[13].

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7 Skills for trade and economic diversification (STED): food processing and beverage sector sector Jordan / ILO Regional Office for Arab States - Beirut: ILO, 2015. https://www.ilo.org/wcmsp5/groups/public/---ed_emp/-ifp_skills/documents/publication/wcms_550993

8 Skills for trade and economic diversification (STED): food processing and beverage sector Jordan / ILO Regional Office for Arab States - Beirut: ILO, 2015. https://www.ilo.org/wcmsp5/groups/public/---ed_emp/-ifp_skills/documents/publication/wcms_550993.pdf

9 http://www.jordanecb.org/library/634448627045122500.pdf

10 Euromonitor International trade analysis, 2019

11 www.JAPM.com

12 Taifour, M., 2011. The relationship between the capital expenditure and financial operational performance in Jordanian pharmaceutical manufacturing corporations. MSc Thesis, Middle East University, Amman, Jordan.

13 Euromonitor International trade analysis, 2019

Growing Demand

The global pharmaceuticals market was worth $934.8 billion in 2017 and will reach $1170 billion in 2021, growing at 5.8%, according to a recent pharma market research report by The Business Research Company[14]. The increasing demographic trends in the MENA region, in terms of population numbers and the increasing life expectancy and literacy rates, are expected to lead to a greater awareness of health-related issues and a consequent increase in demand for pharmaceutical products. The pharmaceutical sector possesses several expansion opportunities in terms of innovation, whereas the Jordanian manufacturers currently focus more on formulating and producing drugs that are out of patent; however, more advantages can be gained through focusing on research and development especially if adequate funds to conduct clinical studies and to invest in new products and new patents are availed by the investors and the government. The global decline of new chemical entities for value added medicines is an opportunity for Jordanian companies in addressing certain health issues. Also, expansion on producing generic pharmaceuticals to increase the market share of Jordanian manufactures. The exploration of new markets always remains an effective strategy for expanding demand.

Use of natural products

Despite the current reduced interest in natural products by the pharmaceutical and cosmetic companies at the global level; however, natural products have provided considerable value to the pharmaceutical industry over the past half century. However, if natural product materials continue to be tested for desirable therapeutic activities, a significant progress in identifying new antibiotics, oncology therapeutics and other useful medicines will be made.[15] Compounds derived from natural products have made a big impact on the pharmaceutical industry. Of the 1,010 new chemical entities (NCEs) were approved between January 1981 and June 2006, 43 were unaltered natural products and a further 232 (23%) were second generation natural products derivatives[16].

Biosimilars to gain further ground

Production of biosimilars (medicines that are made from living microorganisms found in plant or animal cells) is expected to be spurred by the loss of patent protection for bestselling biologics. Industry reports indicate 66 innovator biologics are due to come off-patent in the market between 2020 and 2025 worldwide. Consequently, it is expected there will be an increasing number of biosimilar review applications to FDAs in the incoming years. This is especially attractive to the pharmaceutical sector, as the sector offers more lucrative opportunities, as this type of product is mostly destined to premium, high-value-added drugs.

14 https://blog.marketresearch.com/the-growing-pharmaceuticals-market-expert-forecasts-and-analysis

15 Baker, Dwight D., et al. “The value of natural products to future pharmaceutical discovery.” Natural product reports 24.6 (2007): 1225-1244.

16 https://www.ddw-online.com/drug-discovery/p92813-natural-product-pharmaceuticals-the-third-generation.html

Stakeholder Analysis

The engagement of key stakeholders and market actors is crucial to understand the employers' incentives, challenges, constraints, and opportunities. Moreover, this will ensure that the study is aligned to the ongoing economic activities in the public and private sectors and will help understand the relationship dynamics between the different entities in both the public and private sectors (see Annex A). Stakeholders like a private company DELASS, public institutions like the Ministry of Agriculture and Ministry of Environment within the pharmaceutical and cosmetic industry indicated their willingness to collaborate as associates to the proposed project. For instance, when asked if they are willing to absorb youths for vocational training, they all gave a preliminary positive response, and this is encouraging and needs to be followed up. However, that was not the case with companies involved in medicine manufacturing who indicated strict procedures and pre-requisite conditions need to be met by potential trainees before they are enrolled. Landholdings – As reported by the Directorate of the Ministry of Agriculture for Ma'an governorate, most of the land in Ma'an governorate is owned by the government while some private holdings exist. Investors can be granted land for investment even if they are from outside the governorate. Such investors are welcomed by the citizens. Previous projects were established by the Ministry of Environment and the Ministry of Agriculture to combat desertification and did not continue as required, mainly due to the problems of lack of funding. Those projects tended to establish green belts by using Atriplex plant (Atriplex hortensis (garden orache) as it tolerates salinity and water stress and proved to perform well against the desertification while it is suitable for grazing.

Value Chain Analysis

Pharmaceutical and cosmetic value chain across Ma'an and Amman Governorates
As reported from both key stakeholder informants and secondary information source[17], Hikma is the main manufacturer that owns an Active Pharmaceutical Ingredients (API) plant in Jordan specializing in oncology medicine. Active pharmaceutical ingredient is the term used to refer to the biologically active component of a drug product. It is worth noting that technical know-how in API manufacturing is available in Jordan. Figure 2 shows the pharmaceutical and cosmetic value chain map highlighting the main market actors and their institutional linkages. Sourcing - Jordanian companies prefer the import of APIs from India and China and excipients from Europe due to the low cost of procurement as per the raw material. Starting in 2019, all APIs are required to be registered in JFDA, otherwise manufacturers will be required to pay an additional 35% of API cost. The absence of local sourcing of APIs is due to the small size of the Jordanian market, which does not allow for economies of scale, hence importing APIs will always be cheaper. Registration - The drug registration process is identified as the most critical challenge and hindrance faced by pharmaceutical manufacturers, who claim that the process is very long and complex. According to manufacturers, the entire drug registration process takes no less than two years, given the process's stringent nature. However, this varies from one company to another and JFDA has made a tremendous effort to reduce the drug company registration time to a maximum of six months.

17 Jordan Ministry of Industry, Trade and Supply. 2019. Value chain analysis for the pharmaceutical sector in Jordan. Trade for employment project.

Production - Manufacturing infrastructure for pharmaceuticals and cosmetics are readily available in Ma'an and Amman Governorates and are inspected and accredited by JFDA. Every two years, all facilities are inspected by JFDA periodically. In 2017 the Jordan Investment Commission conducted a pre-feasibility study to establish a medicinal herbs processing plant in Ma'an governorate. The project proposes to establish an herbs and medicinal plants processing factory in Ma'an Development Area, while encouraging farmers in the governorate to cultivate herbs in order to purchase crops from them and from the rest of the governorates. . In addition, the pre-feasibility study covered the types of rare plants that are used in the area. Ma'an has the advantage of having large quantities of desired plants for aromatic and medicinal uses. The proposed plant factory extracts the aromatic and medicinal oils from these plants then markets them, after filling them in custom packages to fulfill Jordan's need of herbal extracts and the opportunity to export the products abroad due to the growing demand[18]. The project will fill medicinal herbs (chamomile (Matricaria chamomilla), fennel (Foeniculum vulgare), thyme (Thymus vulgaris), sage (Salvia officinalis), anise (Pimpinella anisum), ginger (Zingiber officinale) in cloth bags (tea bags), then package them in carton packaging. Based on information available from the manufacturers of tea bags, it was assumed that the weight per bag is (8.1 to 5.2) grams and each package consists of (100-110) bags.

Labour - Given the country's high unemployment rate, there is a wide availability of low-cost skilled workers across the study area who are high school and university graduates drawn from vulnerable Jordanians and Syrian refugees[19]. The pharmaceutical sector created around 26,000 direct and indirect jobs in 2016. The supply of pharmaceutical graduates exceeds domestic demand, on average 400 pharmaceutical students graduate annually. Generally, the graduates lack the required skills causing issues for the companies as a result these companies would normally second their personnel to institutions abroad to obtain the required training. In local pharmaceutical companies, pharmacists work in all departments, including research and development, quality control, regulatory affairs and sales and marketing.

Costs - utility costs constitute up to 2% of pharmaceutical manufacturers' expenditure depending on the demand and usage of production lines. This however varies especially for companies using alternative power systems to save on electricity bills. Manufacturers must add to every employee's salary, a part of social security tax (14.3%). Registration costs vary, but on average, they are broken down as follows: JOD200 for each drug sample, JOD400 for bioequivalence study (if needed), JOD200 for registration fees, JOD25 for drug sample analysis[20].

Pricing -branded and generic drugs are governed by JFDA and controlled by a syndicate of pharmacists. A generic drugs' price can only be up to 80% of the price of the originator drug. The price of a drug in export markets is linked to its price in the country of origin. Government regulation limiting prices impacts pricing in the local market and consequently in the export markets[21].

Distribution and Marketing [Local Market] - Distribution to the private sector is managed by importers/ manufacturers, using representative cars or delivery companies such as Aramex[22]. The outlets for the interviewed companies' production included small shop pharmacies, pharmaceuticals distributors hypermarkets, and drug warehouses that distribute to pharmacies and some women that run small home-based cosmetic businesses. This includes existing home-based backyard saloons that operate hair dressing and sale of cosmetic products for beauty therapy

18 Jordan Investment Commission, 2017. A pre-feasibility study for the establishment of medicinal herbs plant in Ma'an governorate. https://www.jic.gov.jo/wp-content/uploads/2018/10/medicinal-herbs-plant.pdf

19 Jordan Investment Commission, 2017. A pre-feasibility study for the establishment of medicinal herbs plant in Ma'an governorate. https://www.jic.gov.jo/wp-content/uploads/2018/10/medicinal-herbs-plant.pdf

20 Jordan Investment Commission, 2017. A pre-feasibility study for the establishment of medicinal herbs plant in Ma'an governorate. https://www.jic.gov.jo/wp-content/uploads/2018/10/medicinal-herbs-plant.pdf

21 Jordan Investment Commission, 2017. A pre-feasibility study for the establishment of medicinal herbs plant in Ma'an governorate. https://www.jic.gov.jo/wp-content/uploads/2018/10/medicinal-herbs-plant.pdf

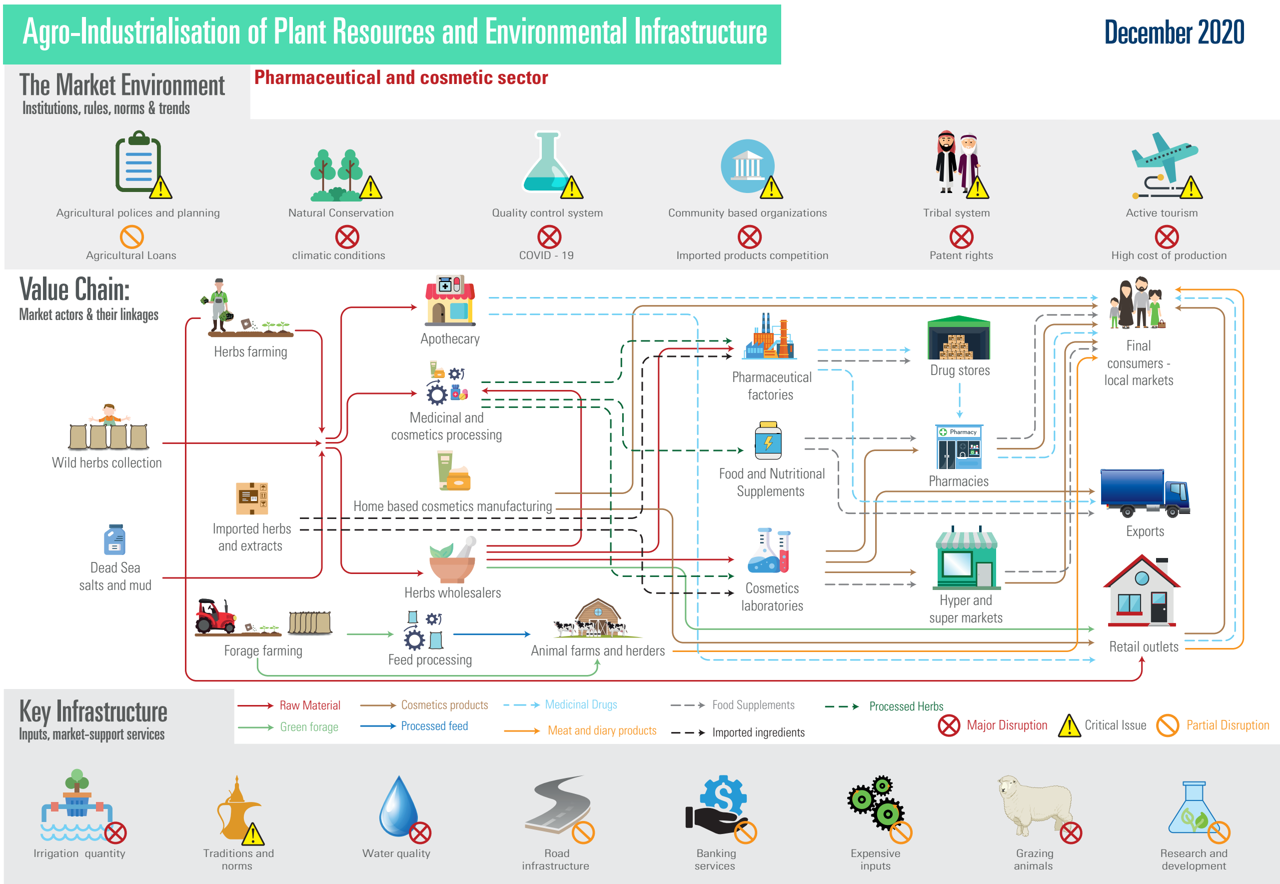
22 Euromonitor International trade analysis, 2019

Exports - Exports form the core business of pharmaceutical manufacturers. Exported drugs are required to undergo the same registration process at the JFDA as the drugs sold in Jordan's domestic market. In addition to this, the drugs meant for exports need to comply with local health authorities' regulations of the destination countries. Exports from Jordan face challenges in the North African region due to countries' protective mechanisms with developed pharmaceutical industries (i.e., Morocco, Tunisia), which results in limitations of importation drugs in these countries with preference for locally produced drugs.

Challenges in production - The JFDA conducts periodic inspections of production facilities to ensure they adhere to production standards. This can range from a few days to a month (depending on the number of production lines), which sometimes causes delays for manufacturers being able to complete their orders. Increasing utility costs such as electricity and water costs have turned into a bottleneck for manufacturers to address in the production stage, as they are directly linked with production costs, and hence the profit margin[23].

23 Jordan Ministry of Industry, Trade and Supply. 2019. Value chain analysis for the pharmaceutical sector in Jordan. Trade for employment project.

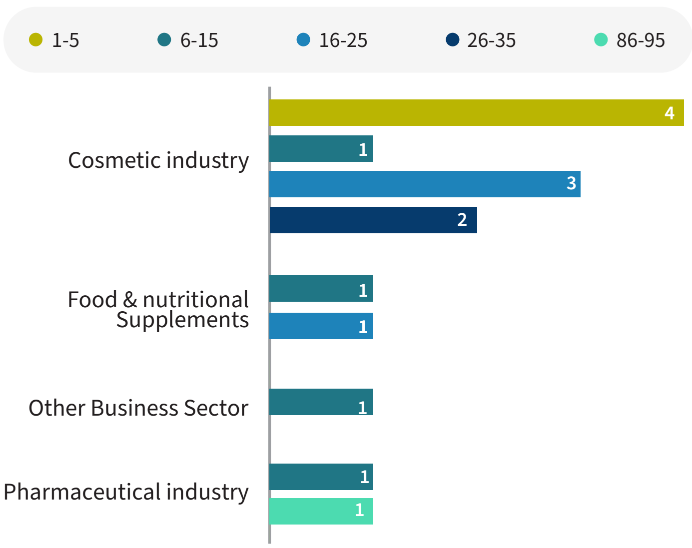
Figure 3. Pharmaceutical and Cosmetic Value Chain Map



The Competitive landscape of the value chain - Key primary chain actors and their functions

The pharmaceutical industry in Jordan started in 1962 and developed with confident steps to worth about USD 1.2 billion in 2018. The number of manufacturing companies reached 23 in 2018. This expansion in the countries' pharmaceutical industry was mainly due to foreign direct investments initiated from the Gulf countries. Twenty percent of the interviewed firms were established 2 to 5 years ago, 33% were established 6 to 14 years ago, and 47% were established 17 to 33 years ago (Figure 4).

Figure 4. Interviewed Business Age by Sector



About 73% (11 out of 15) of interviewed companies indicated the existence of local actors who are monopolizing the production of some commodities or raw materials and raising their price, as well the Dead Sea mud and salts which are monopolized by the Potash Company that controls the market by either having the capacity to import, export goods or setting prices.

There is an existing big company by the name DELASS, which is willing to be associated with the proposed project. DELASS company now produce45 products, including cosmetic health care products, immune stimulants, antioxidants, and cough syrup. Their products are produced merely from natural products using new formulas and new ideas. The company also produces some food supplements. The company introduced the cultivation of some herbs in a small area within the factory premises to produce high-quality raw materials. Recently the company acquired the Jordanian Food and Agriculture Administration approval for exporting medicinal herbs as raw material after drying using complex processing techniques. DELASS is highly involved with indigenous herbs and plants of Jordan as well as the surrounding countries for developing extracts from Thyme (Zaatar) Rosemary (Rosmarinus officinalis), Aloe vera, as well as supporting its internal research and development programs and intended to start a new program at the southern parts of Jordan to explore the use of natural flora. Currently, the grading of the raw material and the initial process is carried by the company due to the relatively small size of production, while intermediaries will be needed as the volume of raw materials increases. DELASS is willing to provide training to local farmers as the production of high-quality medicinal plants and cosmetics extraction require caliber expertise in this field.

International players

In 2018, multinational companies held a significant portion of local market share, estimated at around 70% in Jordan in value terms[24]. They are present in the market either directly or through licensed/contract manufacturing. Many multinational companies have also entered co-marketing arrangements with local companies. Most pharmaceutical imports are from European countries and are largely comprised of therapeutic products not covered by local production[25].

The Government of Jordan’s Role

The Jordanian government considers the sector as a key pillar to the economy. Jordan imposes a 0% tariff on the import of drugs as a result of World Trade Organization (WTO) regulation and existing trade agreements. This limits the protection of domestic companies. Also, the government may need to negotiate trade agreements with target countries for a 0% tariff on exports of drugs from Jordan. Tax Incentives - 15% price incentive is provided to local manufacturers in the tendering process compared to foreign manufacturers. Trade Agreements - Jordan holds multiple bilateral trade agreements with advanced economies such as the US[26] and the EU[27]; despite this, their pharmaceutical exports are largely focused on neighboring countries such as Saudi Arabia, Iraq and UAE, countries with which Jordan does not hold active trade agreements. Greater Arab Free Trade Area (GAFTA) - Jordan has actively sought greater integration into the regional economy as well. Greater Arab Free Trade Area is part of an effort to boost economic cooperation among the 22 Arab League member states. The agreement came into full effect in 2005 and has resulted in multiple exemptions from custom duties and charges.

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24 http://www.jordanecb.org/library/634448627045122500.pdf

25 http://www.jordanecb.org/library/634448627045122500.pdf

26 https://ustr.gov/trade-agreements/free-trade-agreements/jordan-fta

27 http://ec.europa.eu/trade/policy/countries-and-regions/countries/jordan/

Infrastructural development of the Pharmaceutical sector in Jordan

The International Finance Corporation (IFC) as of January 2018 to 2020, has invested over USD300 million collectively across 13 projects in Jordan, facilitating private sector investments valued over USD1 billion in Jordan's electrical energy/power distribution and generation sectors[28]. The investments have been to support the infrastructure (power and transportation) and manufacturing (pharmaceuticals and chemicals) sectors. Furthermore, in May 2017, IFC supported MS Pharma with an equity investment of USD45 million to expand into new export markets and produce affordable generic medicines and healthcare products across the Middle East, Turkey, and Africa (META) region[29]. USAID's Jordan Competitiveness Program (JCP) 2019 supported the JFDA in streamlining and automating Jordan's drug registration process. The aim is to reduce pharmaceutical products' time-to-market from over two years to just over one year, thus increasing companies' competitiveness exporting to regional markets.

Labour Needs

The pharmaceutical sector is essential in resolving the high unemployment rates in Jordan[30]. In 2016, the sector created around 26,000 direct and indirect jobs[31]. Pharmacists work in all departments in local pharmaceutical companies, including research and development, quality control, regulatory affairs, and sales and marketing. They generally manage inventory and the preparation and dispensing of medicines. One of the strengths enjoyed by the sector is the low cost of wages paid to unskilled workers who are recruited in the packaging and distribution departments (minimum estimated at JOD280 per month)[32]. According to industry sources, the education system in Jordan faces many challenges, and hence graduates lack the required skills in research and development as well as pharmaceutical and cosmetic product development. This causes issues for companies who, in some instances, must send their staff abroad to get the required training. Existing scientists also require training which means that positions are often filled by external instructors from abroad. According to industry sources, the lack of a competent workforce is one of the key bottlenecks in the pharmaceutical and cosmetic value chain. Most of the pharmaceutical degree holders work in pharmacies, with only a few working at the manufacturing sites.

In April 2016, the Government of Jordan embarked on a program to create opportunities and grant formal working rights in specific occupations to registered Syrian refugees in exchange for increased access to European export markets. Since that time, Jordan's Ministry of Labour has granted 50,909 work permits to Syrian refugees across the agriculture, manufacturing, wholesale and retail trade, and other sectors. However, out of the 15 pharmaceutical and cosmetic companies interviewed, the present study recorded that 97% of the workforce were Jordanians while the Egyptians and Syrians were only 2 and 1 % of the workforce, respectively. The low level of recruitment of foreigners in the pharmaceutical and cosmetic sector was attributed to the rigorous process and the need for funding to secure work permits. This is the case, despite Jordan's commitment to creating opportunities in the formal employment sector for Syrian refugees was, at least in part, a response to calls to reconceptualize the refugee crisis as an opportunity to develop a high value-added manufacturing sector[33]. Following Jordan's adoption of the refugee economic inclusion policy, international organizations and NGOs have begun to develop programs addressing the issue of work and livelihood opportunities for Syrian refugees.

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28 https://ustr.gov/trade-agreements/free-trade-agreements/jordan-fta

29 https://ustr.gov/trade-agreements/free-trade-agreements/jordan-fta

30 Ministry of Planning and International Corporation, http://inform.gov.jo/en-us/

31 Ministry of Planning and International Corporation, http://inform.gov.jo/en-us/

32 www.jordantimes.com.news

33 Ketam Malkawi, 'Integration of Syrian refugees in the workforce hinges on new investments,' The Jordan Times (Amman). December 2015.

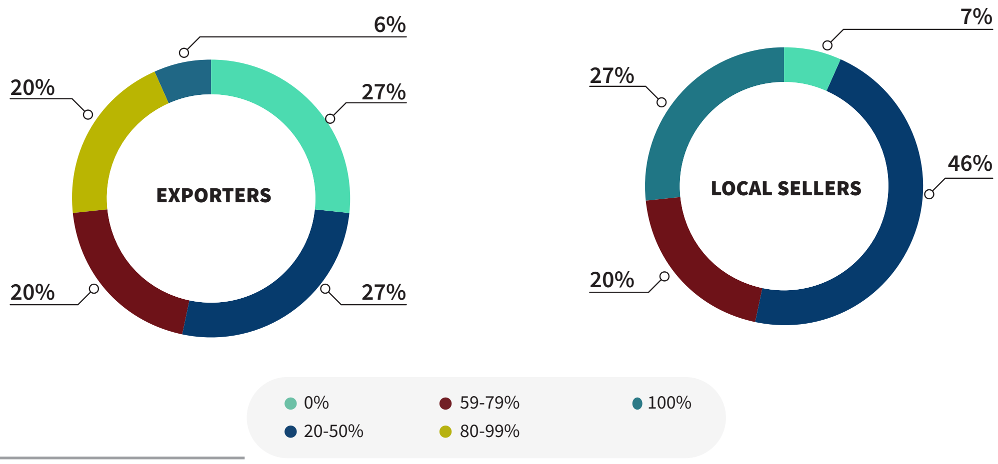
Export Process

Jordanian pharmaceutical companies have established a strong rapport with FDAs in Arab countries, providing those markets with quality OTC branded and generic drugs at competitive prices. Jordanian pharmaceutical companies are avid in supplying drugs with proper timing and efficient logistic management within the Gulf Cooperation Council (GCC), Levant, and North Africa area[34]. Industry sources indicate the key criteria influencing foreign buyers' decisions include:

- **Compliance with regulations of their local FDA** - Jordanian pharmaceutical companies have strengthened communications and understanding of local FDA requirements of the main markets they target, mainly in the Arab League (KSA, Iraq, Algeria, Sudan, UAE). Few manufacturers export to other regions such as Hikma Pharmaceuticals has been granted FDA approval to USA and MS Pharma exports to Europe. JFDA is in the process of joining the members of the Pharmaceutical Inspection Co-operation Scheme (PIC/S). Once JFDA's membership is approved, it will ease the export of pharmaceutical products to other member countries of PIC/S[35].
- **Quality** - The quality of Jordan's pharmaceutical products is well-recognized in GCC, Levant, and North African countries; high demand is especially evident for antibiotics and painkillers, followed by drugs for respiratory systems and vitamins and drugs to treat diabetes and cancer[36].
- **Availability** - Availability and fast delivery (2-4 weeks) are substantial requirements from buyers; small pharmaceutical companies mentioned having issues with cash flow to purchase enough APIs to further production of orders for the export market. Pricing - Pricing is key in export negotiations; the fact that the JFDA provides unified/fixed prices for most pharmaceutical products in the local market facilitates negotiations as these prices act as the benchmark when setting FOB prices for the export market[37].

The majority of the interviewed firms (73%), translating to 11 out 15 firms confirmed that they do export portions of their products, which ranged between 15 and 100%, while the bulk of the respondents (about 45 % of the exporters) indicated the export sales range between 25 and 50 % of their production (Figure 5). Regarding the local sales. Only 27% of the respondents indicated they only sell in the domestic market.

Figure 5. Distribution of businesses according to the percentages of exports versus local sales



34 Euromonitor International trade analysis, 2019

35 Jordan Ministry of Industry, Trade and Supply. 2019. Value chain analysis for the pharmaceutical sector in Jordan. Trade for employment project.

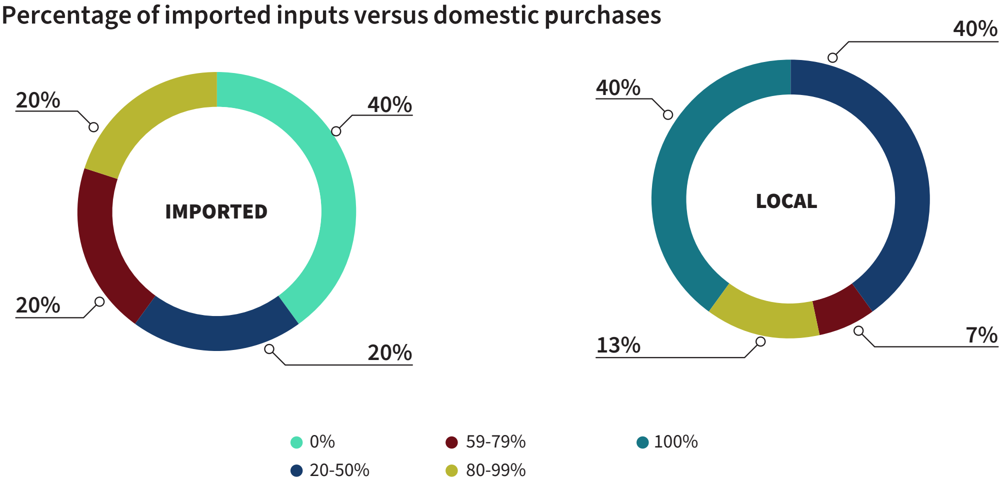
36 Jordan Ministry of Industry, Trade and Supply. 2019. Value chain analysis for the pharmaceutical sector in Jordan. Trade for employment project.

37 Jordan Ministry of Industry, Trade and Supply. 2019. Value chain analysis for the pharmaceutical sector in Jordan. Trade for employment project.

Jordan exports benefited from a dual trend, acting as a cost-efficient exporter and re-exporter of OTCs and generic brands to Saudi Arabia and UAE. On the one hand Jordan's exports benefited from its lower operational costs, based on lower cost labour and strategic geographic location between Western Europe and GCC countries (for re-exports). On the other hand, the country benefited from steady demand for generics from Algeria, Sudan, and Libya; however, recently, these countries started to implement protective mechanisms to support their local pharmaceutical industries and limit imports. Furthermore, Sudan's political turmoil and financial pressures resulted in sharp decline of the country's currency reserves, hence creating challenges in currency exchange and payment of exporters. Due to sanctions from the USA, Sudanese banks are prevented from dealing with correspondent banks in other countries.

Pharmaceutical export divisions could benefit greatly from trading/research trainings to explore new markets, especially in Sub-Saharan Africa, non-EU Eastern Europe, and the Caucasus[38]. Depending on the complexity of the target market, the size of the company, and product to be exported, some pharmaceutical companies might arrange export clearance and logistics with companies such as Aramex, DHL, and AL Naseer Company[39]. The government has shown efforts to reduce export costs by streamlining customs clearance processes, advancing the use of a single window, and improving infrastructure at Aqaba customs and port[40]. The price ceiling of generics has been set at 80% of the price of the originator brand in Jordan. Thus, prices of generics in Jordan are high compared to free-market prices for generics in other countries, but this serves as an incentive for achieving higher revenue in exports markets, as most countries consider the price in the country-of-origin price a reference[41].

Figure 6. **Percentage of imported inputs versus domestic purchases**



While the sector exports its products, there is a significantly high level of importing raw materials (Figure 6). Most companies (53%) reported purchasing portions of the raw materials from the international market in percentages ranging between 10 and 90. Whereas, about 40% of the companies indicated that their imports constitute about 70 to 90% of their raw materials needs. The raw materials sourced from the local market also ranged between 10 and 100%, while 60% of pharmaceutical companies mentioned they rely on this market for about 70 to 100 percent of their raw materials needs. The experience of drug companies in marketing their products might be to some extent irrelevant to the cosmetics sector, as while the drugs are considered essential stuff; the cosmetics are rather luxurious commodities and target the wealthy groups. This entails more promotion efforts to be exerted by the cosmetics producers.

38 Euromonitor International trade analysis, 2019

39 Euromonitor International trade analysis, 2019

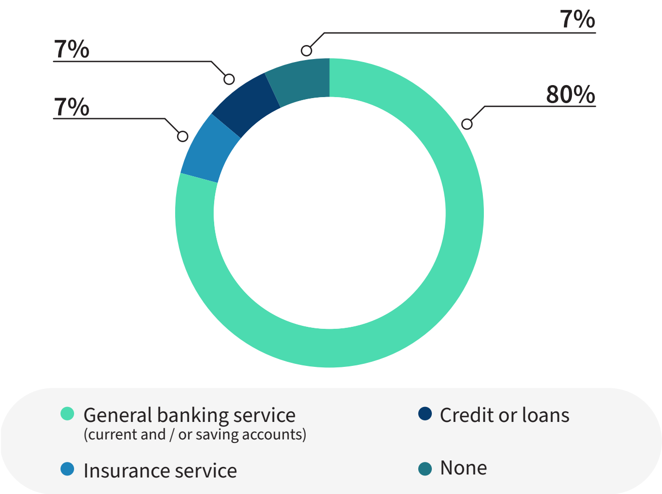
40 http://www.doingbusiness.org/en/reforms/overview/economy/jordan

41 https://pdfs.semanticscholar.org/d7cc/3b3fd906dfac2347deb764b5a6526a7c7805.pdf

Financial services utilized by firms

The majority of interviewed companies (86%), that is 13 out of 15 companies presume to have access to loan services while the remaining 14% indicated that being at the startup phase of business and the unstable economic conditions are behind their presumption that they would not receive loan services. There were reports of small businesses facing difficulties in accessing loans, especially if it is without interest, and the difficulty of having a guarantor. Regarding the purpose of the financial services that businesses utilize, only 7 % of the business respondents indicated that they do not use bank financial resources and reasoned that they do not desire to commit to banks as banks refrain from providing loans to aged customers. Six percent of the respondents utilize bank services for credit and loans only. The majority (80%) indicated that they use banking services (deposits, cheques, and saving accounts) as well as credit or loans (Figure 7).

Figure 7. **Financial services utilized by the interviewed businesses**



Thyme - Production

Land Preparation

The land is prepared for cultivation by removing the weeds, stones, and remnants of the previous crop, then plowing twice vertically.

Planting

On a dunum (0.1ha of land), there is need of 50of 50-60 g of seeds, or a dunum of open cultivation needs 2 000-2 600 seedlings, depending on the distance between the lines, and in the protected cultivation, a dunam needs 3 500 seedlings.

Transplanting

Thyme propagates by means of cuttings or seeds resulting from a previous season, and their storage period does not exceed 1 year to maintain their viability, as the seeds are planted in spring and summer and are transferred to the permanent land when the height of the seedlings reaches 12-15 cm.As for the cuttings, they are taken from a mature plant with a length of 12 cm and treated with the rooting hormone, and they are grown in a suitable environment and transferred to the permanent place after 20-25 days of transplantation. Planting date: Thyme seedlings are planted on permanent land from the beginning of spring until the end of autumn, while avoiding planting them during frost period in winter.

Seedlings

Thyme seedlings are planted at a distance of 0.5 m for intra-row spacing, and 0.7 m inter-row spacing, as the number of plants planted within the greenhouse reaches about 1 250 seedlings / one house and 2 500 seedlings per dunum.

Fertilization

Thyme is considered one of the easily stressed plants under poor soil fertility. In that regard, in addition to the fertilizers that need to be applied when preparing the soil for cultivation, the fermented organic fertilizer (animal manure) must be added every year after the last mulch at the beginning of winter, at a rate of 4 m3 of organic fertilizer per dunum. Chemical fertilizers are added as follows: 25 kg of ammonium sulfate or 10-15 kg urea per dunum after each munch application.

Harvesting

Thyme cultivated inside plastic houses is harvested 5-6 times per year compared to 2 harvests per year in the case of open cultivation. Thyme is considered a perennial plant, but it is preferable to renew it every five years, as productivity begins to decline after that period, after which the seedlings are grown again from the farm’s production.

Diseases and pests

Thyme can be attacked by pests that affect the quantity of the crop and reduce the production of essential oil. The most important pests are aphids, cutworms, and thrips. Fungal wilt disease caused by soil fungi is the most prevalent disease on thyme in Jordan.

Average productivity

Open cultivation is 2.5 tons / dunum per year. The ratio of dried thyme to green is 10% of the total weight of the green product.

Table 1. Production cost of the Thyme herb on 1 dunum per year, (1 dunum = 0.1ha)

Investment cost in JOD per Dunum					
Materials required	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Land rent per dunum / year	50	50	50	50	50
Cost of the planting materials (4000 plants @ 0.4 JD)	1600	0	0	0	0
Planting 5 working days @15 JD	75	0	0	0	0
The cost of green manure 1.5 Kg / plant @ 0.1 JD x 3 times per year	765	765	765	765	765
Fertilizers and other chemical costs	**Not used as it is intended to be organic product**				
Cost of Irrigation facilities 1600 meters of irrigation hose @0.0525 JD/m + 4000 nozzles @0.05 JD +100 m bigger hose from water source @1 JD /m + water pump @200 JD + Filter @150 JD + 150 JD instillation cost	884	maintenance cost @10% =88	88	88	88
Total investment	3374	903	903	903	903
Annual total cost in JOD					
Preparation of the land per dunum	70	0	0	0	0
Application of manure 3 times per year	90	90	90	90	90
Irrigation per year: (summer 300 JD/ month x 7 months, winter 150 JD x4 months	2700	2700	2700	2700	2700

Manual weeding and other intercultural operations 1 time per month @ 15 JD x 12 months	180	180	180	180	180
Harvesting labor (3 times per year @ 90 JD)	270	270	270	270	270
Total costs	**3310**	**3240**	**3240**	**3240**	**3240**
Total material and labour costs	**6684**	**4143**	**4143**	**4143**	**4143**
Harvesting - 1000 Kg on average per crop picking @ 2 JD / kg @ 3 times a year	6000	6600	6900	6900	6900
Net Revinew	**-684**	**2457**	**2757**	**2757**	**2757**
Cash flow	**-684**	**1773**	**4530**	**7287**	**10044**

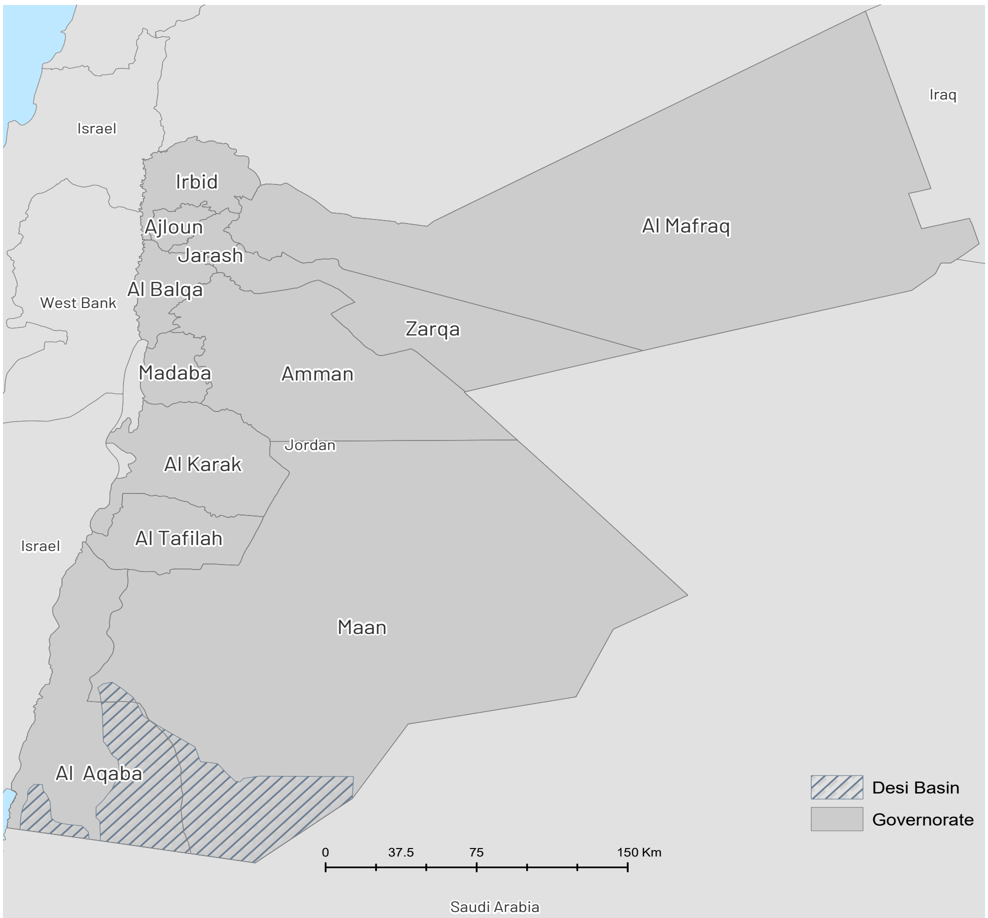
Aloe Vera - Production

Potential suitable producer groups (farms, processing plants, agricultural cooperatives, agribusinesses, etc.)

Aloe vera farmers are distributed across Al Ghor, Mafraq, Madaba, Karak, and Jerash. There are some forage farmers associations such as Alsad Alahmar and Al-Saideiah, which are producing alfalfa. These farmers utilize water springs (Wadi Musa, Aktayba – Alrajif – Telagah). Stakeholders suggested Desi area Ma'an district has potential for green belt establishment, as some women associations support agriculture. Alkh athaa in Ma'an governorate fights desertification, has nutritional value (Antioxidant) usually used for burning creams, does not require a lot of water, and can grow in the desert. Already Bedouins are growing it and exporting it to Saudi Arabia[42].

NAMA Strategic Intelligence Alliance implemented an ongoing project that provides cooperative associations with drip irrigation systems (pipelines, drippers and 2,000 liters water tanks) and training on farming and cultivation practices of Aloe vera crops, agroecological approach, environmental sustainability, and biodiversity. Moreover, the NAMA provides training on the home-based transformation of Aloe vera aimed at the production of cosmetic products. The Jordanian Agricultural Engineers Association can support through its programs dedicated for training new graduates on the best practices for herbs production. There is an existing project titled the Promotion of The Agribusiness Value Chain of Aloe Vera Project. This project is implemented by NAMA and supported by the Royal Society for Conservation of Nature. Such a project could be a referral project for the proposed Aloe vera cropping[43].

Figure 8. Map of Jordan



42 http://extwprlegs1.fao.org/docs/pdf/jor165358.pdf

43 https://amman.aics.gov.it/wp-content/uploads/2020/01/AICS-Aloe_FGPII.pdf

Existing producer groups of Aloe vera plants in Karak governorate

- Plantation of 31,550 Aloe vera plants in the Jordan Valley (Karak Governorate):
- 17,000 plants at "Ghor Madsous Cooperative" in Sammar.
- 7,000 plants at "RSCN-WJ" plot in Feifa.
- 4,500 plants at "Friends of Animal and Plants" association in Maamoura, Southern Ghor.
- 850 plants at "Women of Ghor Safi" association in Ghor Safi, Southern Ghor.
- 1,000 plants at "Aachabat" association, in Ghor Safi.
- 1,000 plants at the "Zuhair Jwehan" farm in Ghor Safi.
- 200 plants at the Municipality of Ghor Mazraa.

Soil requirement for the Aloe vera farming

Aloe vera can be farmed in a variety of soils ranging from sandy coastal soils to loamy soils of plains. The plant needs less care with the comparison to the other farming plant as well as less water requirement. It gives best results when grown under well drained loam to coarse sandy loam having pH ranges up to 8.5.

Land preparation

Aloe vera roots do not penetrate below 20-30 cm depending upon soil type, thus it needs thorough land plough. 1.5 ton of green manure is to be added to each dunum during the ploughing operations. Ridges and furrows are to be prepared for seedlings planting at 45 or 60 cm apart.

Planting or transplanting of Aloe vera

Seedlings can be planted can be done around the year except in winter months. The best result of Aloe vera yield is normally obtained with planting stand of about 990 plants per dunum but can adopt between 750 and 1250 plants per dunum. Planting space can range between 40 or 30 cm. The larger spacing of aloe vera tends to provide better growth of the plant in height and weight.

Irrigation

In summer or dry conditions, irrigation is to be within an interval of 2 weeks. In the rainy season, it does not require any irrigation and in the winter season, less irrigation should be given as the plant does not take up much water. First irrigation must be done immediately after seedlings get planted.

Drip irrigation and sprinkler irrigation are the best methods for Aloe vera farming as they reduce labour requirement and avoid over irrigation as the plant is sensitive to perpetual high soil moisture content.

Disease and pest control in Aloe vera production

Weeding is crucial for controlling Aloe Vera disease

Crop harvesting of Aloe vera farming

Aloe vera crop takes 18-24 months to fully mature. 3-4 leaves can be cut from each plant. Carry out picking in morning or in evening. The leaves are regenerated and thus crop can be harvested up to 5 years.

Table 2. Annual production cost analysis for Aloe vera production as informed by key stakeholders

	Investment cost in JOD per Dunum				
Materials required	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Land rent per dunum / year	50	50	50	50	50
Cost of the planting materials (1700 plants @ 0.4 JD)	680	0	0	0	0
Planting 3 working days @15 JD	45	0	0	0	0
The cost of green manure 1.5 Kg / plant @ 0.1 JD x 3 times per year	765	765	765	765	765
Fertilizers and other chemical costs	**Not used as it is intended to be organic product**				
Cost of Irrigation facilities 1600 meters of irrigation hose @0.0525 JD/m + 1700 nozzles @0.05 JD +100 m bigger hose from water source @1 JD /m + water pump @200 JD + Filter @150 JD + 120 JD instillation cost	740	maintenance cost @10% = 74	74	74	74
Total investment	2230	889	889	889	889
	Annual total cost in JOD				
Preparation of the land per dunum (ploughing only as drip irrigation is used - no furrows or ridges needed)	40	0	0	0	0
Application of manure 3 times per year	90	90	90	90	90
Irrigation per year: (summer 200 JD/ month x 7 months, winter 100 JD x4 months	1800	1800	1800	1800	1800
Manual weeding and other intercultural operations 3 times per month @ 15 JD x 12 months	540	540	540	540	540
Harvesting labor (3 times per year @ 45 JD)		135	135	135	135
in case of gel production (manual processing, 150 g is obtained from 1 meter leaves - sold @ 7 JD per Kg	-	-	-	-	-

Total costs	**2470**	**2565**	**2565**	**2565**	**2565**
Total material and labour costs	**4700**	**3454**	**3454**	**3454**	**3454**
Harvesting - plants of 80 - 100 cm leaves - 3 to 4 leaves from each @ 1 JD per leave 3 times a year		5950	6545	6800	6800
Net Revinew	**-4700**	**2496**	**3091**	**3346**	**3346**
Cash flow	**-4700**	**-2204**	**887**	**4233**	**7579**

Agribusiness linked to the pharmaceutical and cosmetic sector

The entire sample of the interviewed 10 farmers reported that demand for their products during the six months that preceded the COVID-19 outbreak which started in March 2020 was good or even excellent—indicating that sage leaves, clover, barley, flowers, and thyme were the most selling products during that period. (Figure 9). In Ma'an governorate, herbs production dominates on sale of products followed by fodder production.

Figure 9. Farmers current top selling products

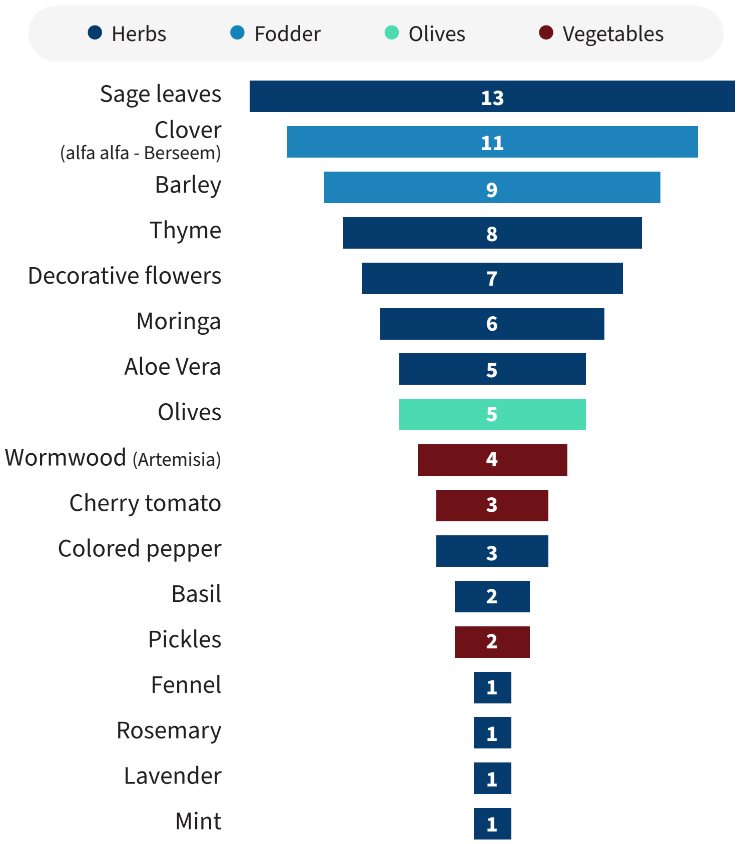
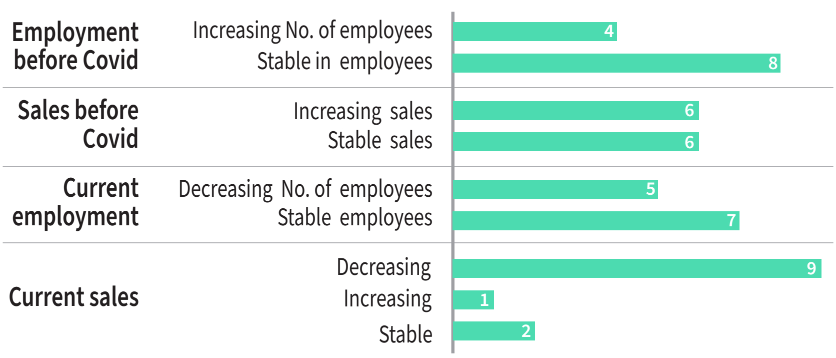


Figure 10. Business state with regard to employees and sales at both pre-COVID-19 and current situation



Regarding the state of agribusiness, 67% (7 out of 10) of the farmer respondents indicated that they are currently having an increasing number of employees compared to the pre-COVID-19 outbreak. 50% of farmers stated that their sales were increasing as compared to the pre- COVID-19 outbreak. The COVID 19 crises reduced farmers' product sales as 75% indicated while 16% presumed their sales were stable (Figure 10). Farmers reported that the most common factors behind this change were unfavorable economic conditions that prevailed during and after the lockdown imposed by the COVID-19 crises and consequences that followed in terms of demand reduction and the interruption of tourism activities.

The climatic conditions prominently impact the herbs and wild plants production. Most of the interviewed farmers mentioned that their productivity and sales decrease during the winter season and start to replenish by the beginning of the spring season; and that the summer season is better for planting Aloe vera, thyme, and sage. Aloe vera is very susceptible to frost during December and January, which significantly reduces its green shoot mass. This reduction in the plant size would postpone the next harvest and gel extraction for 18 months.

Farmers confirmed that they utilize greenhouses to protect their crops from the harsh climatic conditions during the summer season; however, they indicated it is rather difficult to manage the winter weather conditions. Although the frost problem that faces Aloe vera can be solved by establishing greenhouses or shelters, the minimum planting spacing requirement (60 cm between plants and 80 cm between rows) would impose a high cost to establish such protective structures. Moreover, the strong winds usually experienced during the winter season especially at the mountainous areas of Ma'an governorate, will induce the Aloe vera farmers to renew at least 20 – 30 % of the greenhouses each year.

Interview with NAMA Strategic Intelligence Alliance indicated that a solution for Aloe vera's winter frost might require moving production to alternative locations with suitable climatic conditions needed to diversify the risk. However, this will also increase the cost of managing different locations in terms of supervision, harvesting, transportation, and storage. It is important to consider such issues to attain an economically viable project. Some farmers rely on reducing the irrigation intervals during the summer season, but this increases the production costs.

Only 8% of the interviewed farmers confirmed that they import the needed inputs from the international market. While those who depend on the local market to secure their inputs like Alfalfa (Medicago sativa L) seeds, ornamental plant seeds, pesticides, fertilizers, growth stimulants, plastic houses, irrigation equipment, and spare parts for the farm are the main needed inputs. About 30% (3 out of 10) of the respondents confirmed they are facing disruptions in the supply of raw materials due to the COVID-19 outbreak, due to airplane flights suspension as well as the local lockdown which reduced the supplies from Amman. Farmers adopted adaptive measures to reduce some of these challenges. The coping strategies include collaborating with other merchants to secure the supplies as well as scaling down their farming activity during the lockdown.

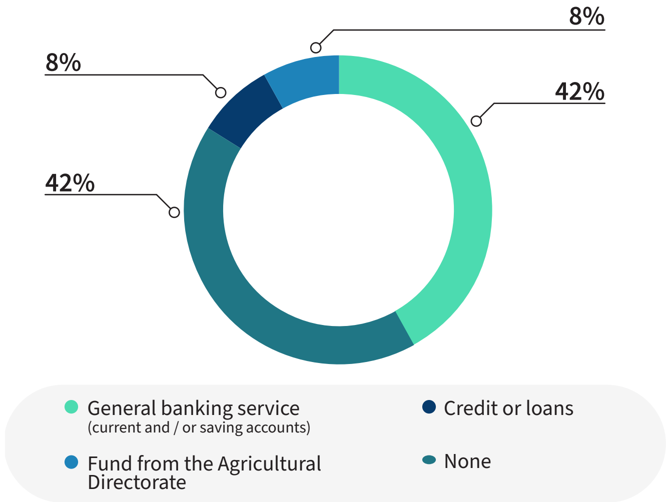
The marketing outlets that farmers utilize are diversified, including distributors, small shops, supermarkets, hypermarkets, fairs, nurseries, online selling, sales to women running home-based businesses. 50% of farmers confirmed facing some challenges related to the distribution, including difficulties in acquiring pass permits during the lockdown which resulted in reducing the number of retailers accessing the farms. In addition, some of the respondents highlighted a lack of awareness amongst the local community regarding the marketing of medicinal, agricultural products, and their products.

The links between the herb producers and the processors or the drug and cosmetics manufacturers can be based on contract farming, however; the interview with Delass Co. emphasized that contract farming although is considered appropriate for the business, but their previous experience was not fully encouraging as some of their partners breached the contracts by selling to other competitors. Another drawback of contract farming is that the company may become less transparent , in some cases, to purchase quantities beyond its contractual agreements and funded produce. Contact farming can support the company when the value chains mature as more links to the international market are established. In contrast, contractual farming induces farmers to exert closer attention to the cultural practices and limits the utilization of unauthorized pesticides or other agro-chemicals. If the farmers are involved in the production of natural plant products without such agreement probably, they will end up thronging their products or selling at very low prices without attaining any significant economic returns.

Financial services used by farmers

42% of farmers reported no use of formal financial services and attributed that either to their good financial status because they consider the loans not useful while a considerable portion refrain from being involved in the banking system due to religious reasons. However, the general banking services are still commonly used among the rest of the farmers interviewed where credit or loans services and opening current and saving accounts were mentioned to be utilized by 16% and 42% of the interviewed farmers sample, respectively (Figure 11). 8% of farmers confirmed that they receive funds from the Petra Agriculture Directorate to help establish their agricultural activities. 58% of the farmers sample indicated they will have access to bank loans when they need such service. Whereas farmers who think they will not acquire a loan if needed attributed this either to the lack of knowledge of the necessary procedures to obtain loans or that the requirements are complicated for obtaining loans - farmers inability to repay loans in the current economic conditions; while some highlighted that the interest charged on loans is considered high.

Figure 11. Financial services by the interviewed farmers



Farmers' perception on improving the pharmaceutical and cosmetic sector

Most interviewed farmers (75%) consider that the cosmetics and medicinal plants sector is promising for the youth and a good source of job opportunities in fieldwork as they consider the agricultural sector as profitable. However, the remaining 25% of interviewed farmers consider that not all the Jordanian youths do like the fieldwork which requires perseverance, patience, and effort. Farmers consider the cultivation of Aloe vera as only promising if its value chain is completely strengthened through finding an external market, while according to the interview held with the Jordanian chamber of industry representative, the Aloe vera global market is worth about USD11 billion, on an annual basis.

The respondents emphasized that the support needed to provide to medicinal and cosmetic extracts to maintain their production and the associated income generated by the value chain actors mainly revolve around:

- Financial and government support in terms of providing services and support to farmers in this sector
- Reviewing the government policies to ease the constraints facing the small producers as the Food and Drug Administration confine quality certificates issuance to firms located within an industrial zone.
- Increase links with the local markets
- The levies imposed on the recruitment of foreign (Egyptian workers) that need to be paid even if the worker returns on vacation to his country, and this imposes additional costs.
- Some of the respondents indicated their need for equipment for Aloe vera gel extraction.

Farming challenges

- Farmers are facing challenges that are both related and not related to the COVID 19 pandemic (Figures 12 and 13). General challenges are listed below.
- The high cost of irrigation equipment and networks
- Marketing of products and international competition
- Community and consumer limited knowledge of the quality of reclaimed irrigation water, which is considered unhealthy and polluted water. The declining, household purchasing power of customers
- High taxes imposed by the government

Figure 12. Challenges farmers facing that are not related to COVID-19

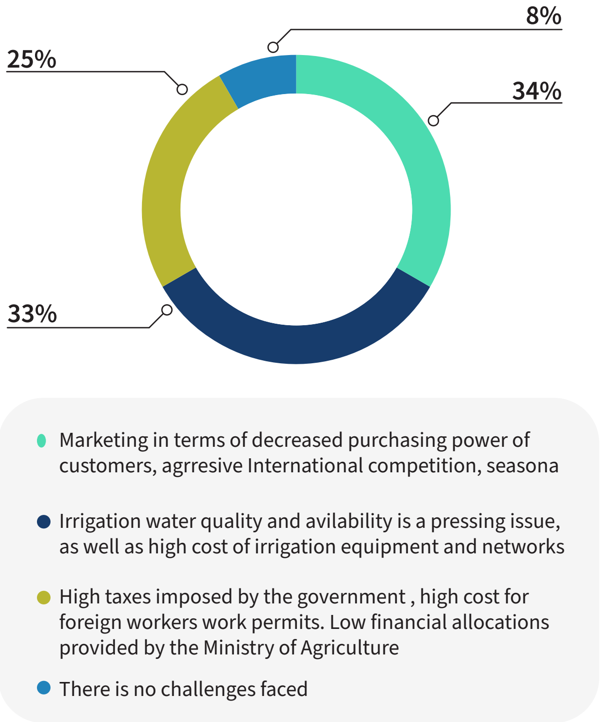
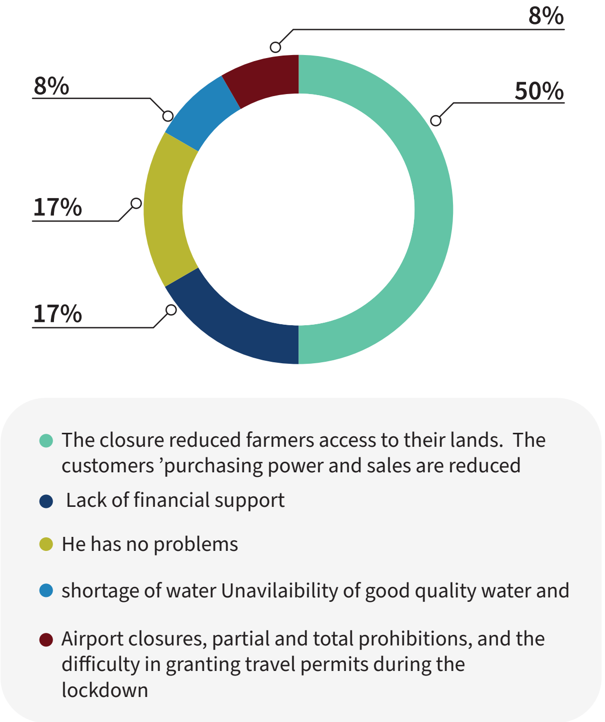


Figure 13. Challenges farmers facing that are related to COVID-19



Pharmaceutical and cosmetics business sector – labour force and employment

The study attempted to quantify the number as well as the quality of jobs for each segment of the value chain, including seedling production, planting, harvesting, grading, processing, manufacturing, packaging, and exporting. Women dominate the workforce for small scale businesses (6 to 10 employees per firm) while men dominate the workforce in large scale businesses employing over 100 personnel per firm among the 15 companies interviewed (Figure 14). 53% of the interviewed firms indicated workers' gender is not a factor that affects recruitment, while 40% expressed their preference for female workers as they are more committed, besides the nature of work which is mostly packaging of the products. The majority, 67% of the interviewed companies, preferred young workers (25 to 30) years old, as they perceive that the maturity of this age group and their ability to perform what is required is a great asset to the sector (Figure 15). Whereas 20% of companies indicated their preference of younger workers (16 to 24 years old) as they are more active and learn quickly.

Figure 14. Number of men and women workers recruited by businesses

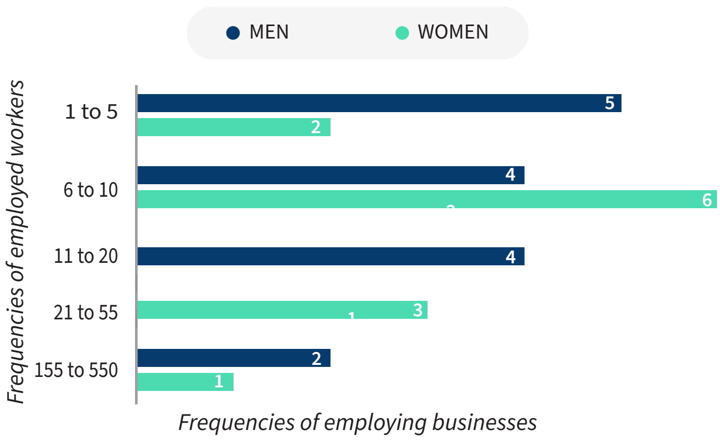
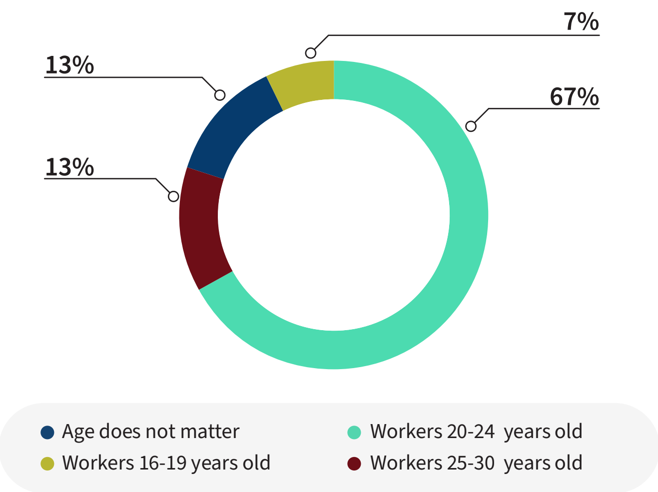


Figure 15. Most preferred age range of workers



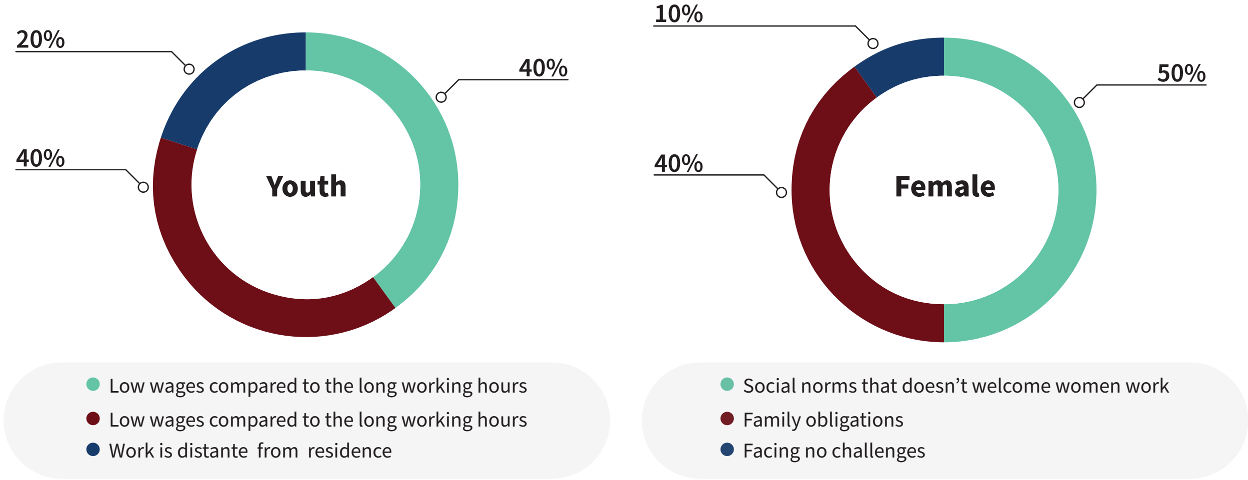
Only 13% of interviewed companies confirmed they have 1 to 4 job vacancies, mostly in administrative jobs. 53% of the sample indicated that the minimum educational qualification for hiring new employees is either diploma or high school graduates and indicated that the academic qualification is not a condition for hiring workers but needed for the administrative jobs.

Regarding the employment benefits that the interviewed businesses provide to their workforce, the main common benefits provided are social security, salary, bonuses to the salary, paid vacation, paid sick leave, and health as well as health insurance. Some of the firms also provide transportation support and lunch meals.

Job seekers across the pharmaceutical and cosmetics sector

Out of the 15 companies visited for interviews, contacts for the last formal job seeker were requested from each company. Out of the 15 names put forward, only 10 job seekers became available as study respondents. The majority of the interviewed job seekers, about 90% (9 out of 10) were between 20 and 25 years old, while 80% were females. The major challenges that face the interviewed job seekers were family disapproval especially for daughters to be recruited in remote work sites (farms and manufacturing sites) especially that the offered salaries were reported to be low and the working hours were considered long. Over 80% of the respondents indicated that they look for a job through friends, families, acquaintances, and social media. About 60 % of job seekers, as study respondents, prefer to work in sales or white-collar jobs. Funding and marketing constraints were the mere challenges to start a private business, as indicated by the respondents. The 10 interviewed job seekers are generally highly educated as the whole sample has attained at least tertiary education. The challenges that youth face in finding jobs in Jordan within the pharmaceutical and cosmetics businesses were low wage payment and the requested long years of experience, as reported by 90% of the jobseekers interviewed (Figure 16). While the challenges that women face in finding jobs in Jordan's pharmaceutical and cosmetic businesses or in participating in the labour market were mainly based on family obligations, which was reported by 60% of job seekers citing traditions and social norms among the major challenges that the women face.

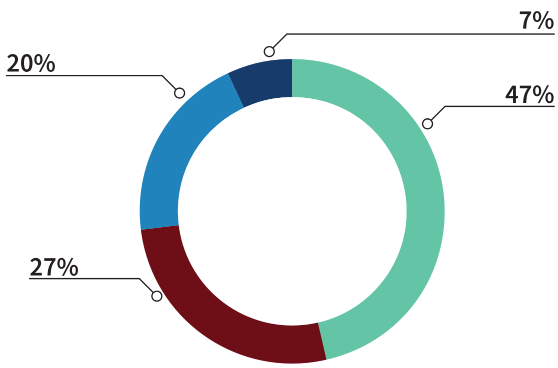
Figure 16. Challenges in finding jobs in Jordan within the pharmaceutical and cosmetics businesses



COVID 19 impact on development within the pharmaceutical and cosmetics sector

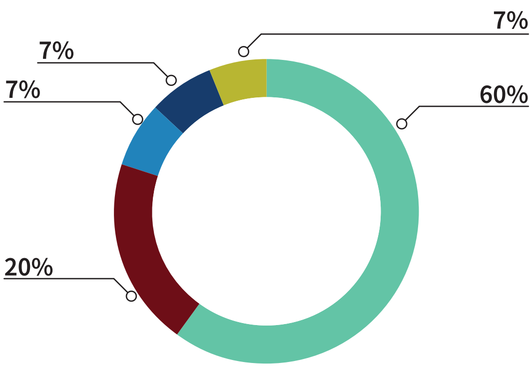
An assessment by the Jordan Ministry of Planning and International Corporation reported on the short-term and long-term impact of COVID-19 outbreak on each segment of the "Middle East Cosmetics Market" along with government measures to support the sector. It also showcases the current market landscape with the onset of the COVID-19 pandemic and the impact of the pandemic on the leading companies, expected demand schedule and supply chain in the industry, and other various major factors. This secondary information informs the present study in highlighting some of the impact of COVID19 on the sector[44]. Almost 80% (12 out of 15) of the responding companies reported that sales of products before the COVID-19 outbreak in March 2020 was good, and some even commented it was excellent. However, the current demand is considered much less, and according to one of the firms, sales decreased by 70% compared to the pre-COVID 19 pandemics. The pharmaceutical and cosmetics business sector is facing challenges that are both related and not related to the COVID 19 pandemic (Figures 17 and 18)

Figure 17. Challenges pharmaceutical & cosmetic sector facing that are not related to COVID-19



- Marketing constraints in various facets including lack of of appropriate marketing methods, and the inaccesability to the international markets beside the incrreasing international competition
- Government support in termes of policies, funding reduced taxes and non existance of institutions that facilitates the export and import marketing processes
- No challenges
- lack of skilled hands and

Figure 18. Challenges pharmaceutical & cosmetic sector facing that are related to COVID-19



- Airport, boarders and market closures and high freight rates, weak import and export capacity that led to reduced sales
- The closures, devastated the tourism sector as well as bazaars also led to sales reduction
- Defense laws that entitle the employee often to the detriment of the employer
- Demand for detergents and sanitizers increased but started to decrease by Sptember 2020
- The export has stopped, the local market has stopped, and now they are only operating so that the company does not separate, revenues have decreased

44 Ministry of Planning and International Corporation, http://inform.gov.jo/en-us/

IX. SWOT Analysis

The following section highlights the strengths and weaknesses of local manufacturers in Jordan and the opportunities and threats present in the pharmaceutical and cosmetics industry.

Strengths and Weaknesses

Table 3. Strengths of local players in the pharmaceutical and cosmetic sector

Strength	Impact on sector
Strong specialization in generics	Companies specialize in antibiotics and cardio-vascular drugs. On average 280 generics were introduced in 2017 by local manufacturers.
Quality control in manufacturing facilities	Companies not only comply with current Good Manufacturing Practices but also implement quality and risk management tools to ensure quality control towards zero defects in their manufacturing facilities. This enables them to meet international production standards towards exports.
High production potential current capacity exceeding USD 2 Billion	Manufactures have a total installed capacity estimated to be almost double the utilized capacity, suggesting large room for growth in the sector.
As to contribute to the economy	The entire pharmaceutical sector (considering different areas including production, clinical studies, exports, etc.) accounted for 3% of the Country's GDP in 2018, making it a strategic contributor to the economy.
Regulations and standards	The sector is regulated by the Ministry of Health and JFDA. Local regulations and standards governing the performance of the sector is compatible with that of other international regulatory bodies such as USFDA, EMA. This enables the ease of exports for Jordanian manufactures.
Trade agreements	Jordan's free trade agreements with countries and regions such as the US, EU, GCC and other Arab countries makes it an open market trade internationally and facilitates export of pharmaceuticals for Jordanian manufactures.
Preferential treatment for local players	Preferential treatment is given to local manufacturers in public tenders, 15% pricing advantage is available for local manufactures in public tenders.

Table 4. Weaknesses of local players in the pharmaceutical and cosmetic sector

Weakness	Impact on sector
Strong competition	Competition in the domestic market due to both local companies' products and imported drugs and in exports markets as Jordan is primarily producing generics.
Price pressures	Government regulations cap prices, which limits manufacturer profit margins. Thus, volume share is more important for companies than product value.
Increasing costs	Increase in labour costs and utility costs impacts the production cost in the sector and negatively impacts Jordan's competitiveness in the export markets. In addition to energy costs, compliance and regulatory costs are a huge burden on manufacturers.
Lack of differentiation-reliance on generics	Manufacturers rely only on generic drugs, resulting in a lack of differentiation which in turn impacts the sustainability of the sector.
Preparation of registration file	The lengthy registration process is a key obstacle to manufacturers. Certain procedures and processes can be obstacles and hindrances to local players. The growing number of regulations further adds to this challenge. Companies commonly receive deficiency letters upon submission of files to the JFDA which adds to the long registration process. Investment by companies in training to Research and Development (R&D) and regulatory personnel is minimal.
Talent acquisition in specialized areas	Shortage of highly trained human capital, specifically in IP and R7D, hinders differentiation among local companies.
Packaging and storage regulation	Differences in packaging requirements (labeling, color, language, type of container, etc.) for various export markets impose additional costs on manufacturers and increase operational challenges. Storage regulations in Jordan requiring cold chain management and adhering good distribution practices will add to the costs in the domestic market.
Marketing	As governments in the traditional export market continue to protect respective local pharmaceutical industries, export from Jordan will face more challenges. Competition in the domestic market due to both local companies' products and imported drugs and in export markets as Jordan is primarily producing generics. Most companies fall short of marketing professionals with techniques and technologies in marketing pharmaceutical and rely on general business marketing methods.
Transportation	Challenges in shipping due to avoidance of regular routes via road through Syria to Turkey to eastern European Countries, avoiding Syria route cause additional transportation cost.

Table 5. Opportunities in the pharmaceutical and cosmetic sector

Opportunity	Impact on sector
Invest in innovation	For manufacturers to be able to differentiate themselves and stay competitive as well as penetrate new markets, innovation in new patents is key
Value-added medicine	Global decline in the pipeline of new chemical entities for value-added medicines is an opportunity for Jordanian manufacturers to work on addressing key health issues such as Asthma in export markets such as the EU. Manufacturers can focus on the development of antineoplastic, anti-cancer drugs, and injectables.
Win market share over imported brands	A significant share of imported pharmaceuticals are generics, which means Jordanian companies have the potential to expand their market share and reduce reliance on imports.
Explore new export markets	Moving away from traditional export markets and exploring new markets has become inevitable as regional governments are limiting imports from Jordan to protect their respective local industries.

Table 6. Threats in the pharmaceutical and cosmetic sectors

Threat	Impact on sector
Rigorous regulatory environment	The lengthy registration process is a key obstacle to manufacturers. Certain procedures and processes under regulations can be obstacles and a hindrance to local players. The growing number of regulations further adds to this challenge.
Shipping and logistics	Challenges in shipping via road through Syria to Turkey and Eastern European countries force exports via Aqaba's port. This adds to both shipping costs and transport costs involved from Amman to the port of Aqaba, impacting the competitiveness of manufacturers by affecting the lead time.
Taxes	Change in corporate tax rates from flat 14% to different tax slabs with a gradual increase from10% for 2019 to 20% in 2024 is expected to impact cash reserves much needed for R&D.
Limitations to exports to traditional markets	As governments in traditional export markets continue to protect respective pharmaceutical industries, exports from Jordan will face more challenges.

X. Conclusion

Ma'an Governorate is very vast, varies in environment and topography, we need to be more specific on which geographical areas we are targeting for the green belt. The Desi area has potential for green belt establishment, there are some women associations that support agriculture. Alkh athaa in Ma'an fights desertification, has nutritional value (Antioxidant) usually used for burning creams, does not require a lot of water, can grow in the desert, and has exclusivity being a Jordanian genetic resource. Already Bedouins are growing it and exporting to Saudi Arabia. Buffer zones are also potential green belt zones which can be established around rangeland reserves that exist in Ma'an Governorate: aim to manage and conserve vegetation cover of the sites by minimizing wood collection and grazing, managing watersheds and improving livestock quality and animal husbandry. In Ma'an governorate there is Manshia 3 km2, Aishia 10 km2, Fujeij 10 km2, Ras Al-Naqab 12 km2, Hashemya 15 km2, Husainyeh 15 km2, and Mudawara 20 km2.

Key stakeholders and farmers as study respondents concurred that, there is a huge potential to expand in herbs production such as: Chamomile (Matricaria chamomilla) (Baboneig), Thyme -Thymus vulgaris (Zaatar), Wormwood (Artemisia absinthium) (sheeih) and Qaisum (artemisia gentileschi) (Qasuiem) which are either cultivated or naturally grow in the Jordanian desert. Support for herbs production at household level can be integrated with the establishment of a greenbelt planted with wild plants (of both medicinal and forage/livestock feed value). In this case, the local community would be involved in establishing a green vegetation belt planted with a mixture of plant species harvested as raw materials for the pharmaceutical and cosmetic sector, which is linked to household income generation and climate impact mitigation and adaptation measures. Improved vegetation cover is a sound mitigation and adaptation strategy to climate variability.

XI. Recommendations

- The support to the Jordanian pharmaceutical and cosmetic industry can be achieved after establishing the green belt and setting the appropriate control measures that integrate animal grazing and wild medicinal plants production and herbs production of the desired flora. The Royal Society for Nature conservation can be a leading stakeholder if this approach is adopted.
- To maintain environmental balance and support sustainable development, the land at risk of desertification needs to be mapped together with the Ministry of Environment and the Ministry of Agriculture, then collectively plan for adopting/initiating a green belt land system with selected local adaptive plant species (herbs and fodder/forage species) that can support ecological restoration, buffer communities from climate and environmental extremes such as drought and flood, while also providing a stable basis for local livelihoods and economic health. The project can stimulate the entrepreneurship and innovation ecosystem to generate sustainable green jobs.
- The project's social protection needs to be gained through making the established cooperative(s) in the targeted community area the project sponsors. This is to ensure local acceptance and local protection of the proposed green belt.
- Farmers for medicinal plants and fodder trees can be linked to willing private companies like DELASS for partnerships within the pharmaceutical and cosmetic value chain.
- DRC Jordan may need to plan for further studies on vegetation mapping exercise within the project proposal. This will involve Remote Sensing for Land use and Land cover mapping to propose a demarcated zone for the establishment of the green belt. The vegetation mapping can adopt a two-step approach: (1) remote sensing for mapping vegetation cover changes; and (2) Followed by the method of fieldwork which will use ground-truthing to verify land use and land cover categories, identify plant species, and record selected vegetation attributes (abundance and structure) to locate hotspot areas of selected plant species. This will ensure monitoring outcomes from vegetation management for livelihood restoration as per the proposal's call, which seeks to link Economic growth and Climate action.

XII. Annexes

Annex A – Key Stakeholders' Matrix – Interviewed

#	Institution	Sector	Description/Role	Focal Point/ Contact
1	**The Jordanian Association of Pharmaceutical Manufacturers (JAPM)**	Private Sector Representative	• A non-profit business association representing the Jordanian pharmaceutical industry, a high added value, key exporting industry sector in Jordan, with a voluntary base membership. • Thirteen pharmaceutical manufacturing companies as full members; 95% of the overall pharmaceuticals production in Jordan. • Four contract research centers as affiliate members. • Although membership is voluntary, JAPM has a member base of 13 pharmaceutical companies. The Jordanian pharmaceutical industry which is primarily an export driven industry is at the forefront of providing quality, safe and effective pharmaceuticals at affordable prices for millions of citizens in Jordan and throughout the world. • The mission of JAPM is to support, develop and upgrade the Jordanian pharmaceutical industry to world-class standards through technology transfer, industry integration and the implementation of current Good Manufacturing Practice (GMP). • As the official trade association for the pharmaceutical industry, JAPM is regularly involved in the development of pharmaceutical legislation and guidelines and maintain constant.	**Ms. Dana Al-Tarifi - Project Coordinator** +9626541 3114 +96279526 5361 dana@japm.com

#	Institution	Sector	Description/Role	Focal Point/ Contact
2	**NAMA Strategic Intelligence Solutions**	Private strategic socio-economic developer and implementer of projects and studies	• Nama is an Implementation partner - Promotion of The Agribusiness Value Chain of Aloe Vera Project • Nama project Started in 2013 under the John Paul II Foundation's coordination with the financial support of the Italian Agency for Development Cooperation. Nama aims to support small agricultural producers and women associations fostering a quality-oriented production and reorganizing the collective work of associations, focusing on environmental sustainability in compliance with international market standards. Small Aloe vera farmers were among Nama targets. Nama manages the project as well as the relationships among its various stakeholders.	**HE Dr. Fares Braizat – Chairman** **Jeries Ziadat - CEO** +96264006020
3	**Jordan Chamber of Industry –** **The Jordanian Chemical Industries and Cosmetics Sector**	Private Sector Representative	• The central strategic objective of the Jordan Chamber of Industry is to increase the competitiveness of the Jordanian industry sector on four working levels; these levels include: • The level of Industrial sector as a whole, • The level of specialized Industrial sectors, • The level of national economic and legislative environment. • The regional and international level.	**Eng. Ahmed Al Biss - Sector Representative** +962795525147 gm@alqawafel.com

#	Institution	Sector	Description/Role	Focal Point/ Contact
4	**Directorate of Agriculture – Petra**	Government	• To access information on agriculture and rangeland development and management, regulation, and protection of reserve areas. To get literature review and project activity validation. MOA has implemented projects in cooperation with donor agencies, such as the Sustainable Rangeland Management Project, the Desertification Initiative and the National Program for Rangeland Rehabilitation and Development; seedlings production, re-forestation program through its Forestry Department (FD). Soil conservation, land reclamation and water harvesting (through its Agricultural Extension Directorate, Biodiversity Unit and the Seed Centre). The FD has the national mandate to protect forests and has a law enforcement role to do so.	**Eng. Shazza Al Nawfleh – Head of Information Department** +962772181511
5	**Directorate of Agriculture – Ma'an**			**Mr. Ahmed Al-Khattab – Director. private agro-business investor.** +962796257080
6	**Global Green Growth Institute (GGGI)**	Intergovernmental organization	• GGGI's objective in Jordan is to support the government in its implementation of the National Green Growth Plan, Strengthening national, sub-national and local green growth planning, financing and institutional frameworks. • GGGI supports the climate change unit and green economy unit in the Ministry of Environment with policy formulation and project design for climate change projects.	**Mr. Marshall Brown - Senior Officer, Jordan Program** marshall.brown@ gggi.org
7	**Jordanian Agricultural Engineers Association**	Public - Association	• The Jordanian Agricultural Engineers association was established in 1966 with 14 branches across the kingdom with 23 thousand members. • The association is a member of the Supremum Jordanian Agricultural Council headed by the prime minister.	**Eng. Ahmed Amro** **Eng. Rami Alshareef** +962795144888

#	Institution	Sector	Description/Role	Focal Point/ Contact
8	**DELASS Natural Products**	Private - Industry	• a Jordanian pharmaceutical manufacturing company is realized and distinguished as the first company in the Middle East specialized in the development and production of plant and herbal medical products from standardized medicinal plant extracts, offering more than 50 natural and herbal innovative products with business operations in more than 20 countries worldwide.	**Mr. Ahmed Alterafi** +96265828644 +962795672984 altarifi@jpm.com.jo **Mrs. Nadia Abu Niema – Head of Quality control and extraction section** **Dr. Hesham Taha – General Director** +96265812906 delass@jpm.com.jo
9	**Ministry of Environment**	Government	• MOE is overall responsible for planning, promoting, and coordinating agriculture and environmental activities throughout the country. From MOE, the project will seek regulatory frameworks for the establishment of the green belt, including land ownership, economic activity of government owned afforestation lands	**Eng. Bilal Qutaishat** +962776123488 bqtishat@yahoo.com

Annex B – Key Stakeholders' Matrix – Not Interviewed

Institution	Description/Role	Focal Point/Contact
شركة نبع الاعشاب الطبيعية **The spring of natural herbs Co.**	Cosmetics from natural herbs Natural honey Natural vinegar production that is used for dissolving fats and cholesterol; In addition to oil extraction from various herbs and natural plants through advanced technology	+962788554233 +962795566016
United International Pharmaceutical Company(Femme Care)	Cosmetics and medicinal soap and creams.	+96265151599 +962799626666
Juman Laboratory for pharmaceuticals and cosmetics	A wide collection of cosmetics	+96264872662 info@jumanfactory.com
Cosmetic Technology Inc. الفنيه لصناعه مستحضرات التجميل	Baby products, creams, toothpaste, shaving paste	+962795665050 Zuhair Awad zuhairawad@yahoo.com
Jordanian Egyptian Co. for Medical Devices & Natural Cosmetics	Dead Sea products	+064020891 lab@jecdeadsea.com Dr. Rawan Manasra
Ozone Cosmetics	Ozone Cosmetics combines the best aspects of science and nature to create cosmetic products that deliver results. We utilize natural and organic ingredients in our products to create cosmetic products that not only beautify but also nourish the skin and hair using creative combinations of nature's rich resources.	+9626523 5004
The Jordanian pharmaceuticals manufacturing Company		+962796914136 +96264290741 Islam Sayayseh
Al Hikma pharmaceutical Company	Manufacture and market a broad range of branded and non-branded generic medicines	96265802900 Dr. Bushra

Institution	Description/Role	Focal Point/Contact
Pharma International Co.	Active in generic pharmaceutical industry starting by research & development and extended to large-scale commercial manufacturing operations, quality testing, distribution and marketing in the MENA region & Europe.	96277764404 064792222 EXT. 160 tamer.haddad@axantia.com Tamer Haddad
United Pharmaceutical Manufacturing Co. Ltd.	Manufacture of generic drugs including syrups, suppositories, tablets, capsules, suspensions, gel, cream, ointment and tablets; manufacture of shampoos.	96264162901 abdallah.mustafa@mspharma.com Abdallah Mustafa.
Amman Pharmaceutical Industries Co	Pioneer the production of niche branded generics in the therapeutic areas of Ophthalmology, ENT (Ear, Nose & Throat	RND@ammanpharma.com Dr. Sharifa
Dar Al-Dawa Development & Investment Co	MENA-wide leader in pharmaceutical and consumer health products	96265727132 hiba.najjar@dadgroup.com Dr. Hiba Najar
Philadelphia Pharmaceutical Co.	Specialized in development, manufacturing and marketing of human pharmaceutical products, cosmetics and medical devices	96264029181 962795463368 Rima.shnoudeh@philapharma.com Rima Shnoudeh
National Agricultural Research Center **Local University/Experts**	To support the project by providing existing information based on research studies on the suitability of crops and plant species as per climatic zone and uses in the mentioned industries. To verify and validate the feasibility of establishing selected plant species within the identified green-belt zone	96264725071 director@narc.gov.jo
Ministry of Labour (MOL) and its counterparts	Liaise with MOL to ensure that the study findings are aligned with policy and legal frameworks of Jordan. This will take into consideration the local frameworks in each of the targeted governorates by engaging local MOL directorates.	96265802666 info@mol.gov.jo

Institution	Description/Role	Focal Point/Contact
Ministry of Digital Economy and Entrepreneurship (MODEE) and its counterparts	Liaise with MODEE to learn about the local opportunities related to entrepreneurship and innovative solutions. Moreover, request latest reports related to economic studies that are relevant to this exercise.	96265805700, 96265805600, 96265861059 moict@moict.gov.jo
Ministry of Sport and Youth (MOSY)		96265604701 web@moy.gov.jo
Ministry of Health (MOH)		96265200230 diwan@moh.gov.jo
Ministry of Industry and Trade (MOIT)		96265629030 info@mit.gov.jo
chamber of commerce	Official businesses in various sectors need to be registered in the Chamber that is directly affiliated with their type of business. The local chambers will be the entry point to facilitate connections with the private sector.	96265902040 info@jocc.org.jo
Trade Unions and Business Associations	Unions and associations will play a significant role in providing information to understand sector-specific economic opportunities and challenges in both local and international trade.	
Vocational Training Centers	Learn about the local technical capacities of the training centres in Jordan	
Employment and Recruitment Agencies	Learn about recruitment trends and practices amongst employers, and how accessible are such platforms to the different population groups in society.	
Microfinance Institutions and Banks	Learn about the products and services available for home-based businesses, SME and youth entrepreneurs.	
Start-up Accelerators and Incubators	Explore the start-up ecosystem and the available pathways for young entrepreneurs in Jordan to start their business.	

Institution	Description/Role	Focal Point/Contact
The Royal Society for the Conservation of Nature (RSCN)	An independent national organization devoted to the conservation of Jordan's natural resources. RSCN was established in 1966 with His Majesty the late King Hussein as the Honorary President. RSCN has been given the responsibility by the government to care for and protect the Kingdom's biodiversity. As such, it is one of the few national organizations in the Middle East to be granted such a public mandate. RSCN has gained a wide global fame for its pioneering work in integrating nature conservation programmes with socio-economic development.	96264616523 962797000086 tourism@rscn.org.jo
Sawsan Atallah Oran	Professor, research fields: plant biosystematics, medicinal plants, ethnobotany, pollution, palynology, plant anatomy, tissue culture, conservation and biodiversity. Author of The Status of Medicinal Plants in Jordan Scientific article	oransaw@ju.edu.jo; oransaw@yahoo.com.

Annex C: Data collection tools - Stakeholder In-Depth Interview Guide

This in-depth interview will be one-on-one with men and women that include Jordanian and international private sector entities, Ministry of Agriculture, Ministry of Environment, National Agricultural Research Center, Sector Representative (chamber of industry, chamber of commerce), unions, associations, syndicates, agribusiness, workers, etc.

Introduction

My name is …., and I am conducting this interview on behalf of the Danish Refugee Council (DRC). DRC is conducting a study to better understand the key-informant interviews to better understand the overall viability of the green belt green belt and recommendations on the key elements of the pharmaceutical and cosmetic value chain to optimize job creation, environmental impact and profit.

DRC is investigating the feasibility of establishing a mixed-species green belt system across the semi-arid region of Jordan, starting in the governorate of Ma'an. The proposed green belt will be planted with mixed species and high value-added plants, including Aloe vera, jojoba, prickly pear and other indigenous florae such as Acacia Raddiana, Phoenician Juniper, Artemisia Judaica, Artemisia Herba-alba, Ducrosia Anethifolia and Achillea Fragrantissima and other perennial trees, shrubs and plants creating a natural barrier to the expansion of the Jordanian desert.The questions will be mainly related to investigating the main players in the system and the relationships between them - including players within the private sector, public sector, and associations with an emphasis on women stakeholders and women led initiatives.

Your answers will be used only for research purposes. The answers that you provide will not be linked to your name and personal information. Your personal information will remain confidential.

The interview will take from 30 to 45 minutes. We highly encourage you to participate in this study. You have the right to not answer any of the questions or stop the interview at any time.

Would you like to participate in the interview?

Type of respondent: Authorities, local councils, agricultural engineers, experts, civil society actors…

التاريخ	Date
اسم مجري المقابلة	Name of interviewer
وظيفة الشخص	Key informant position / role
اسم الشخص	Name of interviewee (only if agrees)
الجنس	Gender and age of interviewee
مكان اجراء المقابلة	Area/Location of Operation
رقم الهاتف (اذا تسمح، وذلك في حال احتجنا الى لمزيد من المعلومات	Phone No. (only if agrees – for further clarification if needed)

Value chain سلسلة القيمة

1. What percentage of the population in this area is involved in producing and trading these products (pharmaceuticals, cosmetic, herbs/medicinal plants, nutritional supplements)? What percentage are women?

2. Who are the main actors in the pharmaceutical and cosmetic value chain, from production to consumption?

Market Environment/Context

1. What laws, formal rules or regulations have a big influence (positive or negative) on the way in which this pharmaceutical and cosmetic value chain works? Who are the main bodies involved in setting rules/regulations?

2. Are there any informal customs, habits, and practices that shape the relationships between market actors? (e.g., customs about whom to sell to or buy from) How are women affected by these informal customs and practices?

3. Are there any forms of regulations or justice in place that can formally address disputes within the pharmaceutical and cosmetic value chain?

4. At which stage in the pharmaceutical and cosmetic value chain are quality systems in place and who is responsible? Are there any quality standards in place for these products (pharmaceuticals, cosmetic, herbs/medicinal plants, nutritional supplements)?

5. How has this value chain been affected by the different controlling actors/local authorities?

Support Services

1. What are the services provided by other businesses that support the functioning of this market chain of the pharmaceutical and cosmetic value chain? (e.g., Suppliers, transport services, storage facilities, weather/market information, communications, financial services)

2. Are there any important services or infrastructures provided by government /local authorities that support or make this pharmaceutical and cosmetic market chain viable (e.g., credit facilities, power, and water, other)?

3. What are the challenges regarding roads and transport services? How do market actors cope with these challenges?

Prospects

1. If greater demand for these products (pharmaceutical and cosmetic products), could be guaranteed, to what extent would market actors be able to increase their production / supplies to meet the demand?

2. Which factors would be most likely to limit their capacity to increase volumes of business? Consider both men and women.

Socioeconomic Policies and Regulatory systems

1. Briefly describe of the local regulatory framework for the following aspects

- - land ownership for the management of natural plants with medicinal and nutritional value at community level,
- - pharmaceutical and cosmetic business registration,
- -quality and health regulation for the production of medicinal products for human consumption,
- - exporting pharmaceutical and cosmetic products internationally.

2. If know any, can you identify and name the active local actors within the pharmaceutical and cosmetic industry

- - medicinal plants/herb producers' groups,
- - private sector players (farms, processing plants, agricultural cooperatives, agribusinesses, etc.),

3. Briefly explain the suitability of crops (especially Aloe vera, jujube) as per the climatic zones of the study area and the use of plant materials in the pharmaceutical and cosmetic industry.
4. What are your recommendations or comments for the planned establishment of a green belt (see introduction) in Ma'an Governorate to strengthen the supply chain of plant material for the local pharmaceutical and cosmetic industry?

A.O.B

1. Is there any aspect of the pharmaceutical and cosmetic industry, which you want to share information with us other than the issues we discussed. If yes, please share information.

Annex D: Data collection tools - Market actors in the business sector of the pharmaceutical and cosmetic industry Questionnaire

Date	
Interviewer Name	
Interviewee Name	
Governorate	
District	
Name of Business	
Phone Number	

My name is …., and I am conducting this interview on behalf of the Danish Refugee Council (DRC). DRC is conducting a study to better understand the labor market dynamics and explore the challenges that pharmaceutical and cosmetic businesses are currently facing. The questions will be mainly related to your business sector, and your answers will be used only for research purposes. The answers that you provide will not be linked to your name and personal information. Your personal information will remain confidential.

The interview will take from 45 to 60 minutes. We highly encourage you to participate in this study. You have the right to not answer any of the questions or stop the interview at any time

Section A: General Business Information		
A1	Business Sector	Pharmaceutical industry Cosmetic industry Herb Processing and Agribusiness
A1.1	If others. Type of business	Goods Service
A2	Business Type	· 1. Manufacturing Retail· …. TBD
A3	What is your role in the business?	· Owner · Manager · Employee · Other, specify
A4	When was the business established?	Year
A4.1	How old is the business? (active years in the market)	

A5	How many full-time employees do you currently have?	Segregate: Men, Women, Jordanians, Syrians, Egyptians, Other Nationalities, Disabled, Age (18-30)
A6	How many part-time employees do you currently have?	Segregate: Men, Women, Jordanians, Syrians, Egyptians, Other Nationalities, Disabled, Age (18-30)
A6	What is the minimum educational qualification someone must have to be hired in your business?	· None · Secondary School · High School · Bachelor's degree · Diploma · Vocational training · Other, specify
A7	Are there currently any job positions in your business?	Yes/No
A7.1	If Yes, how many unique job positions are available currently? Hint: Unique job position can include multiple vacancies	
A7.2	The job title for: Job position 1 Job position 2 Job position 3 ….	
A7.3	Number of vacancies for each job position: Job position 1 Job position 2 Job position 3 ….	
A7.4	Type of job for: Job position 1 Job position 2 Job position 3 Hint: Jobs are considered remote jobs regardless of COVID-19 situation	· Fulltime · Part-time Fulltime (remotely) Part-time (remotely)

A7.5	The minimum education required to qualify for: Job position 1 Job position 2 Job position 3	· None · Secondary School · High School · Bachelor's degree · Diploma · Vocational training · Other, specify
A7.6	The minimum experience required to qualify for: Job position 1 Job position 2 Job position 3	Experience None Less than one-year relevant work experience 1-2 years relevant work experience 2+ years relevant work experience
A7.7	Brief job description for: Job position 1 Job position 2 Job position 3 ….	
A7.8	What is the salary for? Job position 1 Job position 2 Job position 3	
Section B: Employment Preferences and Recruitment Practices		
B1	How do you normally search for qualified workers?	· Advertisements · Referrals from friends and families · Referrals for education/vocational training institutions · Recruitment agencies · Referral from current employees · On job training programs · Online Platforms · Social Media · Others Specify
B2	What is the most preferred age range for your workers?	· Workers 16-19 · Workers 20 - 24 · Workers 25 -30 · Workers 30 and above
B2.1	Reason for choosing this age range	

B3	Do you prefer to hire female or male workers?	· Female · Male · Does not matter
B3.1	Reasons for choosing male/female	
B4	What nationality do you prefer to hire?	· Jordanian · Syrian · Egyptian · Others, specify
B4.1	Reasons for choosing this nationality	
B4.2	If the answer is Syrian, Egyptian or other nationalities. Do you face any challenges related to issuing work permits?	Yes/No
B4.3	Please specify the challenges related to issuing Work permits	
B5	What type of soft skills do you prefer your employees to have?	
B6	What type of technical skills do you prefer your employees to have?	
B7	Do you face any challenges in finding employees with the technical skills required for your business	Yes/No
B7.1	Describe the technical skills that are challenging to find? And why do you think there is a shortage?	
B8	Do you offer internship programs/apprenticeships/on-job training programs?	Yes/No
B8.1	If B8 answered [yes], are they paid?	Yes/No
B8.2	If B8 answered [yes], how many secure full-time employment?	
B9	What is the number of workers you had in the month before the COVID 19 lockdown began on March 17th, 2020?	
B10	What is the number of workers you have currently?	
B10.1	If the number of workers changed, why did it change?	

B11	How much do your admin workers normally earn? Select unit (per month)	Less than 220 JOD 221 - 400 401 - 600 601 - 800 801 - 1000 1001 - 1200 1201+
B11. 0	How much do your field workers normally earn?	Less than 220 JOD 221 - 400 401 - 600 601 - 800 801 - 1000 1001 - 1200 1201+
B11.1	Has this changed after the COVID-19 outbreak? (after March 2020)	Yes/No
B11.2	If yes, how much do your workers earn after the COVID-19 outbreak (after March 2020)? Select unit (per month, per week, per day or per hour)	JOD
B11.3	If yes, please explain the reasons.	
B12	What are the employment policies and benefits your business follow?	· Social Security · Health Insurance · Transportation · Lunch meals · Bonuses · Childcare · Paid vacation/sick leave · Housing provided · Others, please specify
The sections below focus on the value chain component, which will be updated and tailored to each selected value chain		
Section C: Demand		
C1	How would you describe the demand for your service or good in the last six months before the COVID-19 outbreak (Before March 2020)?	

C2	How would you describe the demand for your service or good currently?	
C3	Where did you use to sell your products/service before the COVID-19 outbreak (before March 2020)? (Export sales percentage and local market sales percentage)	· Export percentage…… · Local market percentage…...
C4	Where do you sell your product/service? (Export sales percentage and local market sales percentage)	· Export percentage…… · Local market percentage…...
C4.1	If percentages are different between the two time periods, please explain the reasons.	
C5	How would you describe the state of your business before COVID-19 outbreak (before March 2020)?	· Increasing in terms of sales · Increasing in terms of employees · Stable in terms of sales · Stable in terms of employees · Decreasing in terms of sales · Decreasing = in terms of employees
C6	How would you describe the state of your business Currently?	· Increasing in terms of sales · Increasing in terms of employees · Stable in terms of sales · Stable in terms of employees · Decreasing in terms of sales · Decreasing in terms of employees
C6.1	If there is a difference between the current and previous state, please explain why.	
Section D: Supply		
D1	Where did you purchase your raw materials from before the COVID-19 outbreak (before March 2020)? (not applicable for service-based businesses)	· Percentage of import from the international market…... · Percentage of the local market…. · Not applicable
D2	Where do you currently purchase your raw materials from? (not applicable for service-based businesses)	· Percentage of import from the international market…... · Percentage of the local market…. Not applicable
D2.1	If percentages are different between the two time periods, please explain the reasons.	

Section E: Distribution - Goods		
E1	Do you sell your goods/services directly to consumers or through other market outlets such as traders, wholesalers, retailers, or commission agents?	• Percentage Directly …. • Percentage Other market outlets……
E2	If some or all of your sales go through other market outlets, please specify the types of market outlets.	
Section F: Access to Finance		
F1	What financial services does your business utilize?	· Credit or loans · General banking service (deposits, checks and saving accounts) · Insurance · Investment Banking · None · Other, please specify
F1.1	If the answer is none, please explain the reason	
F2	If your business needed a loan, do you think you have access for loan services?	Yes/No
F3	If no, please explain the reasons	
F4	What are your perspectives regarding financial services in Jordan? Do you think that small businesses can access financial services?	
Section G: Competition		
G1	Are there any specific types of actors who control the market for this product (i.e., by having the sole capacity to import or export goods, to set prices, etc.)? What type of power do they have on this market?	
G2	Do you face any competition from the international market, this includes imported goods and services that enter the local market?	Yes/No
G2.1	Please explain challenges related to international competitors	
Section H: Opportunities and Challenges		

H1	Do you think that your business sector in Jordan was promising for youth (18 -24) to find job opportunities? (Before March 2019). If yes/no, give an explanation	
H2	What support will the value chain need to maintain the needed supply of XXX, and income of people depending on it? Probe improved access to finance, higher skilled labor, increased market linkages, changes to regulations governing business environment etc.	
H3	What are the main challenges your business is currently facing that are not related to the COVID-19 events? [Probe high competition (domestic), high competition (international), lack of access to capital, restrictive business environment, lack of high-quality labor, expensive labor, market price fluctuations, difficulty finding buyers, limited availability of quality inputs and/or machine maintenance services, high costs of quality inputs and/or maintenance services, lack of key infrastructure etc.]	
H4	What are the challenges your business is facing that are COVID-19 related? (This question should cover opportunities as well)	
H5	Is your business actively adopting/incorporating new technology?	Yes/No
H5.1	If yes, what type of technology?	

Annex E: Data collection tools – Market actors in medicinal plants and agribusiness questionnaire

Section C: Questionnaire for Farmers - – Herb/ medicinal plant Processing and Agribusiness	Questionnaire for Farmers - – Herb/medicinal plant Processing and Agribusiness		
C1	What type of herbs or medicinal plants do you produce? Multiple Selection	1. Aloe vera, 2. jojoba, 3. prickly pear 4. medicinal herbs (e.g., chamomile, fennel, thyme, sage, anise, ginger) 5. other indigenous flora such as Acacia raddiana, Phoenician juniper, Artemisia judaica, Artemisia herba-alba, Ducrosia anethifolia and Achillea fragrantissima	
C2	How would you describe the demand for your good in the last six months before the COVID-19 outbreak (Before March 2020)? Text		كيف تصف الطلب على سلعتك في الأشهر الستة الماضية قبل تفشي COVID-١٩ (قبل مارس ٢٠٢٠)؟
C2.1	What were your top three selling products before the COVID-19 outbreak? Rank (text)	1…. 2…. 3….	ما هي المنتجات الثلاثة الأكثر مبيعًا قبل تفشي COVID-١٩؟

C3	How would you describe the demand for your products currently? Text			كيف تصف الطلب على منتجاتك حاليًا؟
C3.1	What is your top three selling products currently? Rank (text)	1.... 2.... 3....		ما هي أكثر ثلاث منتجات مبيعًا حاليًا؟
C4	Where did use to sell your products before the COVID-19 outbreak (before March 2020) (Export sales percentage and local market sales percentage) Integer	· Export percentage....... · Local market percentage......	نسبة الصادرات..... نسبة مبيعات السوق المحلي.....	أين كنت تبيع منتجاتك قبل تفشي COVID-١٩ (قبل مارس ٢٠٢٠) (نسبة مبيعات الصادرات ونسبة مبيعات السوق المحلي(
C4.1	Which products had the highest export sales before COVID-19 outbreak (Before March 2020)? Rank (text)	1.... 2.... 3....		ما هي المنتجات التي سجلت أعلى مبيعات تصدير قبل تفشي فيروس كورونا (قبل مارس ٢٠٢٠)؟
C4.2	Which products had the highest domestic sales before COVID-19 outbreak (Before March 2020)? Rank (text)	1.... 2.... 3....		ام هي المنتجات التي حققت أعلى مبيعات محلية قبل تفشي فيروس كورونا (قبل مارس 2020)؟
C5	Where do you sell your product currently? (Export sales percentage and local market sales percentage) Integer	· Export percentage....... · Local market percentage......	نسبة الصادرات..... نسبة مبيعات السوق المحلي.....	أين تبيع منتجاتك حاليا؟(نسبة مبيعات الصادرات ونسبة مبيعات السوق المحلي)
C5.1	Which products have the highest export sales currently? Rank (text)	1.... 2.... 3....	1......	ما هي المنتجات التي تسجل أعلى مبيعات تصدير حاليا؟

C5.2	Which product has the highest domestic sales currently? Rank (text)	1…. 2…. 3….	2.... 3....	ما هي المنتجات التي حققت أعلى مبيعات محلية حاليا؟
C6	If percentages and products are different between the two time periods, please explain the reasons. Text			إذا اختلفت النسب المئوية والمنتجات بين الفترتين الزمنيتين ، فيرجى توضيح الأسباب.
C7	How would you describe the state of your business before the COVID-19 outbreak (before March 2020)? Multiple Selection	· Increasing in terms of sales · Increasing in terms of employees · Stable in terms of sales · Stable in terms of employees · Decreasing in terms of sales · Decreasing in terms of employees	· زيادة في المبيعات · زيادة في عدد الموظفين · مستقر من حيث المبيعات · مستقرة من حيث الموظفين · انخفاض المبيعات · انخفاض عدد العاملين	كيف تصف حالة عملك قبل تفشي COVID-١٩ (قبل مارس ٢٠٢٠)؟

C8	How would you describe the state of your business Currently? Multiple Selection	· Increasing in terms of sales · Increasing in terms of employees · Stable in terms of sales · Stable in terms of employees · Decreasing in terms of sales · Decreasing in terms of employees	· زيادة في المبيعات · زيادة في عدد الموظفين · مستقر من حيث المبيعات · مستقرة من حيث الموظفين · انخفاض المبيعات · انخفاض عدد العاملين	كيف تصف حالة عملك حاليا؟
C8.1	If there is a difference between the current and previous state, please explain why. Text			إذا كان هناك اختلاف بين الحالة الحالية والسابقة , يرجى توضيح السبب.
C9	Have you recently introduced a new product to the market?	Yes/No		
C9.1	What new products did you introduce to the market? Text			
C10	How is your production affected by seasonality? Text			
C10.1	How did you address challenges related to seasonality? Text			
Section D: Supply of Inputs and Raw Material				

D1	Where did you purchase your raw materials from before the COVID-19 outbreak (before March 2020)? Integer	· Percentage of import from the international market…… · Percentage of the local market….	· نسبة الاستيراد من الأسواق الدولية … …· نسبة السوق المحلي….	من أين كنت تشتري المواد الخام أو الأولية الخاصة بتصنيع منتجاتك قبل تفشي COVID19- (قبل مارس ٢٠٢٠)؟
D2	Where do you currently purchase your raw materials from? Integer	· Percentage of import from international market…… · Percentage of the local market…. Not applicable	· نسبة الاستيراد من الأسواق الدولية … …· نسبة السوق المحلي….	من أين تشتري المواد الخام أو الأولية الخاصة بتصنيع منتجاتك حاليا؟
D2.1	If percentages are different between the two time periods, please explain the reasons. Text			إذا اختلفت النسب المئوية بين الفترتين الزمنيتين , فيرجى توضيح الأسباب.

D3	Who are your domestic suppliers? Multiple selection and for each selection there are an open-ended question asking about each product	Farmers Products sourced from farmers....Local Traders Products sourced from local traders....Others, please specify Products sourced from other suppliers....	المزارعين المنتجات التي يتم الحصول عليها من المزارعين.... التجار المحليون المنتجات التي يتم الحصول عليها من التجار المحليين.... آخرون ، يرجى التحديد المنتجات التي يتم الحصول عليها من موردين آخرين..	من هم الموردين المحليين لديك؟
D4	Did your business face any disruptions in the supply of raw materials due to the recent events of COVID-19?	Yes/No		هل واجه عملك أي انقطاع في توريد المواد الخام أو الأولية بسبب أحداث COVID-١٩ الأخيرة؟
D4.1	If yes, what are these challenges? Text			إذا كانت الإجابة نعم , فما هي هذه التحديات؟
D4.2	What coping strategies did you adopt to overcome these challenges? Text			ما هي استراتيجيات التي اعتمدتها للتغلب على هذه التحديات؟

Section E: Distribution – Herbs and Medicinal Plants Processing				
E1	Do you sell your products directly to consumers or through other market outlets such as traders, retailers, or commission agents? Integer	· Percentage Directly .... · Percentage Other market outlets......	· النسبة مباشرة .... · النسبة المئوية لمنافذ السوق الأخرى	هل تبيع منتجاتك مباشرة أو من خلال منافذ السوق الأخرى؟
E2	If some or all of your sales go through other market outlets, please specify the types of market outlets. Multiple selection	Distributors Small shops Hypermarkets Supermarkets Others... please specify	▪ الموزعين ▪المحلات التجارية الصغيرة ▪ مجمعات تجارية (Hypermarkets or malls) ▪ سوبر ماركت ▪ أخرى ... يرجى التحديد	إذا كان بعض أوجميع منتجاتك تباع من خلال منافذ سوق أخرى , فيرجى تحديد أنواع منافذ السوق
E3	Did you face any challenges related to distribution before the COVID-19 outbreak (not related to the COVID-19 events)?	Yes/No	نعم / لا	هل واجهت أي تحديات تتعلق بالتوزيع قبل تفشي COVID-19 (لا علاقة لها بأحداث COVID-19)؟

E3.1	If yes, please explain the challenges Text		إذا كانت الإجابة بنعم ، يرجى توضيح التحديات
E4	Are you currently facing any challenges related to distribution?	Yes/No	هل تواجه حاليًا أي تحديات تتعلق بالتوزيع؟
E4.1	If yes, please explain the challenges Text		إذا كانت الإجابة بنعم ، يرجى توضيح التحديات
Section G: Competition			
G1	Are there any specific types of actors who control the market for this product (i.e., by having the sole capacity to import or export goods, to set prices, etc.)? What type of power do they have on this market? Text		هل هناك أي أنواع محددة من الجهات الفاعلة في السوق تتحكم بقطاع التصنيع الغذائي على سبيل المثال) من خلال امتلاك القدرة الوحيدة على جذب عدد كبير من السياح ، إلخ)؟ ما نوع القوة التي يمتلكونها؟
G2	How many businesses that are similar to yours are there in your area currently? Text		كم عدد المنشآت أو الشركات التي تشبه طبيعة عملك موجودة في منطقتك حاليًا؟

G3	Do you know any similar businesses who had to close (temporarily or permanently) after the spread of COVID-19? Text	Yes/No		هل تعرف أي شركات مماثلة لعملك اضطرت للإغلاق)مؤقتًا أو دائمًا(بعد انتشار COVID؟19-
G3.1	If yes, how many? Integer	Temporarily.... Permanently....	مؤقتا.... دائما...	إذا كانت الإجابة بنعم ، فكم عددها؟
G3.2	If yes, please explain the reasons Text			إذا كانت الإجابة بنعم ، يرجى توضيح الأسباب
G4	Do you face any competition from the international market, this includes imported goods and services that enter the local market?	Yes/No		هل تواجه أي منافسة من الأسواق الدولية هذا يشمل السلع والخدمات المستوردة التي تدخل السوق المحلي؟
G4.1	Please explain challenges related to international competitors Text			يرجى شرح التحديات المتعلقة بالمنافسين الدوليين

Annex F: Data collection tools – Job seekers in-depth interview guide

This in-depth interview will be one-on-one with men and women from the Syrian and Jordanian communities, to better understand the challenges of the supply side of the labor market.

Introduction

My name is …., and I am conducting this interview on behalf of the Danish Refugee Council (DRC). DRC is conducting a study to better understand the challenges that youth face in finding income-generating opportunities related to the pharmaceutical and cosmetic businesses in Jordan and other issues related to accessing the labor market. The questions will be mainly related to youth in your community, and your answers will be used only for research purposes. The answers that you provide will not be linked to your name and personal information. Your personal information will remain confidential.

The interview will take from 30 to 45 minutes. We highly encourage you to participate in this study. You have the right to not answer any of the questions or stop the interview at any time.

Would you like to participate in the interview?

General Questions:

2. Name
3. Age, Sex, Nationality
4. Education Level:
    - None
    - Secondary School
    - High School
    - Bachelor's degree
    - Diploma
    - Vocational training
    - Other, specify
5. Marital Status:
6. The number of household members:
7. Are you currently working?

A. If yes, what type of work?

- No economic activity (including retired)
- Full-time formal wage-employment with legal documentation

- Part-time formal wage-employment with legal documentation
- Full-time informal wage-employment without legal documentation
- Part-time informal wage-employment without legal documentation (including seasonal, temporary, daily work)
- Formal (registered) self-employment/business
- Informal (unregistered) self-employment/business
- Internship, apprenticeship, or on-the-job training

B. What is your job setting?

- Office job
- Field job
- Public sector
- Private sector

C. If yes, what is your job?

D. If not working, are you looking for a job?

8. Where do youth in your community usually search for jobs?

Advertisements; through friends and families; through education/vocational training institutions; through recruitment agencies; Online Platforms; Social Media; Others Specify

Section One: Job Seekers Preferences

In this section, we will ask you about the most common jobs youth in your community work in.

1. What type of professions or jobs do youth within your community prefer to work within the pharmaceutical and cosmetic businesses?

Probe for:

- Men
- Women
- Syrian
- Jordanian

2. Do youth in your community mind working in jobs that require labor? If yes, why?

Probe for:

- Men
- Women
- Syrian
- Jordanian

3. What type of environment do you prefer or other youth in your community to work in? (office, garage, mixed work environment, location, urban, rural, workshop, factory)

4. What are the average working hours per day do you or youth in your community prefer to work?

5. What is the minimum monthly salary that you or youth in your community would be willing to accept?

6. Do you prefer working with a company or having your own business? And why?What benefits would you and youth in your community prefer to have in your job?

7. (health insurance, social security, childcare support, transportation, lunch meals, etc.)

8. What is the maximum distance from home are you willing to travel to work? Please provide your answer in minutes and specify the mode of transport?

Section Two: Jobs Available

1. What jobs are currently available in your community? Which sectors are employing the most within the pharmaceutical and cosmetic businesses?

- Probe for the following:
- Jordanian
- Syrian
- Women
- Men

2. Are you aware of the skills set you need to have to be able to work in these sectors? If yes, can you please provide examples of the skills required?

Section Three: Opportunities and Challenges (not related to COVID-19)

1. What are the challenges that youth face in finding jobs in Jordan within the pharmaceutical and cosmetic businesses (specifically in your community)?

Probe: wage, working hours, distance from home, years of experience required, education level required, language skills, work environment, fieldwork

2. What are the challenges that women face in finding jobs in Jordan's pharmaceutical and cosmetic businesses or in participating in the labor market?

Probe: Leaving kids at home, cultural barriers, mixed working environment, family pressure and norms

Question 3,4 and 5 to be asked only for Syrians

3. What are the challenges that Syrians face in finding jobs in Jordan's pharmaceutical and cosmetic businesses or participating in the labor market?

Probing: wage, work permits, etc.

4. Are you aware of the sectors/jobs open for Syrians and the legal requirements for work?

5. What are the requirements needed to issue work permits?

Question 6 to be asked only for Jordanians

6. What are the challenges that Syrians face in finding jobs in Jordan or participating in the labor market of pharmaceutical and cosmetic businesses? And are they different from the challenges that Jordanians face?

7. Does your family set any rules for your job setting and work environment?

Probe: mixed working environment, cultural barriers, working hours, distance from home, years of experience required, education level required, language skills, work environment, fieldwork

Section Four: Self-employment

1. Have you ever thought of starting your own pharmaceutical and cosmetic businesses or freelance job? If yes, what type of business? And if no, why not?

Hint: business can include home-based job/business

2. What challenges do youth face if they want to start their own pharmaceutical and cosmetic business?

Probe: competition from big corporations, marketing, funding

3. Have you ever started, or do you currently have your own pharmaceutical and cosmetic businesses or freelance job? If yes, please describe your experience?

Hint: business can include home-based job/business

3.1 If yes, how much did you generate or are you generating monthly?

3.2 if yes, what are/were the challenges? What are/were the benefits?

3.3 How did you overcome those challenges?

Section Five: Access to finance

1. What financial services have used before or currently are using? If none, why?

Probe: Bank account, mobile wallets, credit cards

2. Have you ever applied for a loan or fund? If no, why? If yes, why did you access these financial services? What was the purpose?

Probe: loans, personal loans, grants from NGOs

3. If you want to take out a loan where would you go?
4. If you had the chance to take out a loan to start a new pharmaceutical and cosmetic business, would you do it? If not, why not?
5. What are your views on financial services in Jordan? What challenges or barriers do individuals face in accessing financial services to start their own pharmaceutical and cosmetic businesses?

Probe:

Jordanian

Syrian

Annex G: Scientific, English, and Arabic names of the plants mentioned in the report

English Name	Scientific Name	Arabic Name	
Aloe vera	*Aloe barbadensis miller*	*Alsabbar ,*	الصبار
Anise	*Pimpinella anisum*	Ya	ينسون
Atriplex / Saltbush / Orache	*Atriplex halimus* · *Atriplex nummularia* · *Atriplex cinerea* · *Atriplex semibaccata* *Atriplex hortensis*	Orache, Raghal	الرغل أوراش
Barley	*Hordeum vulgare*	Shaeir	شعير
Basil	*Ocimum basilicum*	Rayhan	ريحان
Chamomile	*Matricaria chamomilla*	Baboneij	بابونج
Cherry tomato	*Solanum lycopersicum var. cerasiforme*	Tamatim Karziat	طماطم كرزية
Clover / Alfalfa / lucerne	*Medicago sativa L*	Albirasim	البرسيم
colored pepper / Bell pepper	*Capsicum annuum*	Filful Mulawan	فلفل ملون
Decorative flowers	See Selected wild plant species with exotic flowers from Jordan Sawsan A. S. Oran https://academicjournals.org/journal/IJBC/article-full-text-pdf/5F0170153233	Zuhur Zyna	زهور زينة

Desert Wormwood / White Wormwood	*Artemisia herba-alba*	Shih	الشيح
Judean Wormwood	*Artemisia judaica,*	Shih Judy Shih Balady	الشيح الجودي الشيح البلدي
Fennel	*Foeniculum vulgare*	Shamra Shamar Basbas Basbasa	شَمَرة شَمار بَسْباس بَسْباسة
Forssk	*Achillea fragrantissima*	Qayswm Jabaly Bueaytaran Eilk Alghazal Khylyat Shadhia	قَيْصوم جَبَلي بُعَيْثَران عِلْك الغَزال خيلْيَة شَذِيَّة
Ginger	*Zingiber officinale*	Zingabil	زنجبيل
Jojoba	*Simmondsia chinensis*	Aljujuba	الجوجوبا
Lavender	*Lavandula angustifolia*	Khazamaa Lafndur	خزامى لافندر
Mint	*Mentha longifolia*	Naenae	نعناع
Moringa	*Moringa oleifera*	Almurinja	المورينجا
Moshgak	*Ducrosia anethifolia* boiss	Moshgak Roshgak	مشقاك روشقاك
Olives	*Olea europaea*	Zaytun	زيتون
Phoenician juniper	*Juniperus phoenicea*	Alearear Alearear Alfiniqiu	العرعر العرعر الفينيقي

prickly pear cochineal	*Dactylopius opuntiae*	Altyn Alshwkyu Altyn Alshwkyu Alqarmazii	التين الشوكي التين الشوكي القرمزي
Rosemary	*Rosmarinus officinalis*	Haslban 'Iklil Aljabal Rosemary	حسلبان إكْلِيل الْـجَبَل روزماري
sage / sage leaves	*Salvia officinalis*	Almurimia Awraq Almurimia	مَرْيَمِيَّة أوراق المَرْيَمِيَّة
Thyme	*Thymus vulgaris*	Zattar	زعتر
Twisted Acacia	*Acacia raddiana,*	Alsunut Al-lawlabi	السنط اللولبي
Wheat	*Triticum aestivum*	Gammah	قمح

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