



MIDDLE EAST AND
NORTH AFRICA



Food and Agriculture
Organization of the
United Nations

REGIONAL PROGRAM WORKING PAPER 37

DECEMBER 2021

Cluster-Based Development in Egypt

**A study of external shocks to the leather and medicinal
and aromatic plant sectors**

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A report for the Food and Agriculture Organization of the United Nations

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ABSTRACT

The Egyptian government has prioritized the idea of cluster-based development—that is, the geographic concentration of specialized firms, such as in this case, those producing similar or related products. The establishment of such clusters, however, presents significant challenges, bottlenecks, and obstacles. Based on primary field work, this paper focuses on two case studies of the impacts of shocks on business clusters. The first study involved the relocation of an established leather cluster from Cairo to a newly created industrial park, Robbiki Leather City, which was promoted by Egypt’s Ministry of Trade and Industry. Although the relocation partly solved the existing issues of water contamination, new challenges emerged relating to increased production and transportation costs, and unforeseen impacts on the community. The second study assessed the short-term impact of the COVID-19 pandemic on a business cluster producing medicinal and aromatic plants. Overall the MAPs sector was resilient to the outbreak and there are opportunities to offset any negative impacts of the pandemic by taking advantage of new markets for Egyptian MAPs stemming from supply disruptions in other countries; increased global demand for MAPs due to their pharmacological and health properties; and increased international demand for organically grown MAPs.

Findings indicate that it is essential for governments to develop policy responses to the challenges—and especially barriers—to the development of business clusters, while simultaneously supporting and creating incentives for the cooperation, entrepreneurship, and collective action needed for business clusters to thrive and grow. As anticipated, challenges and obstacles—whether overarching or in response to shocks—are unique to specific sectors, contexts, and times, and hence need to be dealt with as an ongoing facilitation process.

1. INTRODUCTION

Clusters—that is, the geographic concentration of specialized businesses, such as in this case, those producing similar or related products—have played an important role in the successful transformation of the rural economies of many countries (Sonobe and Otsuka 2006; Yoshiko 2011). Much of this success can be attributed to the capacity of clusters to build on the existing strengths of local communities, including social capital and abundant labor, to overcome limiting factors, such as weak financial markets and institutions (Ruan and Zhang, 2009; Long and Zhang, 2012). Under this model, the idea is for the government to provide improved infrastructure and favorable treatment in a limited area such that businesses can survive and thrive (Lin 2012). It is hoped that the growth dynamics generated within these clusters spill over to a wider area over time. Nevertheless, establishing a cluster or “industrial park” can present a great challenge compared with facilitating the growth of an existing cluster (Zhang 2019).

The Near East and North Africa (NENA) could benefit significantly from the cluster approach to revitalizing rural areas, especially in countries with a history of clustered agricultural and other economic activities (Abdelaziz et al. 2018). Realizing the transformative potential of the cluster-based development model, the Egyptian Government has made cluster-based industrialization a key pillar of the country’s sustainable development strategy to 2030. The timing for this model of industrial development seems favorable given the increasing competitiveness of Egypt’s economy based on macroeconomic reforms over recent years. Moreover, the country’s young labor force provides a comparative advantage for labor-intensive sectors.

Despite this recent attention, most business clusters in Egypt remain relatively small and have yet to experience the rapid growth in clusters recently seen in Asian countries. Research on various types of clusters in China, Ethiopia, Myanmar, and other countries, including Egypt, show that the biggest barrier to the expansion of a cluster is very often sector- and location-specific bottlenecks. Overcoming these bottlenecks can unleash cluster growth and create urgently needed jobs for people to escape poverty and to prosper. Abdelaziz et al. (2018), for example, suggest that the key constraining factors for medicinal and aromatic plant (MAPs) clusters in the Beni Suef and Fayoum governorates in Egypt are related to the high cost of quality testing and to difficulties in licensing businesses. Supporting affordable laboratory testing and easing the process of formalizing processing plants are policy solutions that have been communicated to the Egyptian Government and, if implemented, are likely to lead to rapid growth in the value of production and exports of MAPs. Such cluster-specific diagnostics can also help identify and unleash untapped and under-utilized potentials in clusters for other products.

In order to further investigate the constraints and opportunities for cluster-based rural transformation in NENA, the United Nations Food and Agriculture Organization (FAO) and the International Food Policy Research Institute (IFPRI) collaborated on the project, “Cluster-Based Development to Revitalize Rural Areas in the Near East and North Africa: International Evidence and Cluster-Specific Diagnostics for Egypt and Tunisia.” Two of the major outputs under this project are comprehensive analytical reports on case studies for selected clusters in Egypt and Tunisia. This working paper reports on the two case studies in Egypt, which focused on the relocation of the long-established leather cluster to a newly created industrial park, the Robbiki Leather City (RLC), and the short-term impact of the COVID-19 outbreak on two clusters of the MAPs’ sector.

This report is structured as follows. The next section discusses the theoretical framework underpinning the development of industry-specific business clusters. Section 3 presents the case

study on the relocation of Egypt's leather cluster to RLC. Section 4 presents the case study on the MAPs cluster. Section 5 presents conclusions.

2. THEORETICAL FRAMEWORK

The value of business clusters has been noted by many scholars, dating back to Marshall (1920). The standard definition refers to the spatial concentration of businesses within a common industry for the purpose of creating spillovers through shared technologies, inputs, and customers (Porter 1990). Clusters in developing countries share distinctive characteristics compared with those in developed countries: the businesses involved are small in size; they operate with low capital intensity; they exhibit a high degree of vertical disintegration and specialization at the different stages of production; they maintain strong buyer–seller networks across all stages of production; they use trade credit; and they share tools and information (Kranton 1996; Kali 1999; McMillan and Woodruff 1999a, 1999b; Banerjee and Munshi 2004; Ruan and Zhang 2009; Macchiavello and Morjaria 2015, 2019; and Dai et al. 2018). Cooperation among businesses within the cluster are governed by informal relationships rather than legally binding contracts. Entrepreneurs often belong to a common social network or community (defined by ethnicity or birthplace), which facilitates the enforcement of informal agreements based on community norms. Essentially, by taking advantage of existing strengths—such as abundant labor and strong, community-based and embedded trust—business clusters enable developing-country entrepreneurs to overcome many of the constraints facing more formalized institutions.

Most clusters are formed organically; development undergoes a phase of quantitative expansion, followed by a phase of qualitative improvement (Sonobe and Otsuka 2006). During this process, clusters run into a continuous variety of both demand- and supply-side challenges, or bottlenecks, the majority of which are beyond the control of the individual firms (Zhang and Hu 2014).

Cluster development is limited by the extent of the market. When diagnosing the growth potential of a cluster, a key indicator is the size of the market for the key product produced. Rising domestic incomes, or external demand, drives market expansion. For example, after the success of rural reforms in the 1980s in China, rural incomes doubled, generating huge demand for labor-intensive manufacturing goods (Xu and Zhang 2009). This was a key factor underlying China's rapid cluster-based industrialization. On the other hand, an unexpected demand shock can have a devastating effect on business clusters. The recent COVID-19 pandemic, for example, ground international travel to a halt. Consequently, in many developing countries, clusters that produce handicrafts for the international tourist market—such as leather goods—were severely affected.

Market infrastructure is also essential for cluster development. Most clusters incorporate marketplaces and logistics centers. Given their close proximity to their customers, individual producers within business clusters can significantly save on their purchasing, inventory, and marketing costs—for example, the Zhili children's garment cluster (Fleisher et al. 2010), or the Puyuan cashmere sweater cluster (Ruan and Zhang 2009), both in China.

On the supply side, clusters also face various challenges in the course of their development, such as lack of skilled workers, shortages of key production factors, or power outages. The transition from the first phase (quantitative expansion) to the second phase (qualitative improvement) presents multiple challenges. For example, if the supply of inputs is inferior, then it becomes impossible for businesses to produce high-quality end products. Lack of quality inspection and product certification are common obstacles in developing countries. And in cases where buyers can't necessarily discern differences in quality, firms may choose lower quality inputs

in order to reduce costs and increase their profit margins. Solving these and other issues that impede improvements in the quality of products produced within a cluster requires collective action.

Such challenges, or bottlenecks, whether on the demand or supply sides, tend to be cluster-specific and to vary over time. Once one bottleneck is addressed, others will emerge. It is therefore difficult to prescribe one-size-fits-all solutions. Incremental advances are required to gradually improve the way clusters operate. Local governments and business communities play important roles in facilitating collective action among stakeholders within clusters, and in providing the public goods necessary for clusters to overcome barriers.

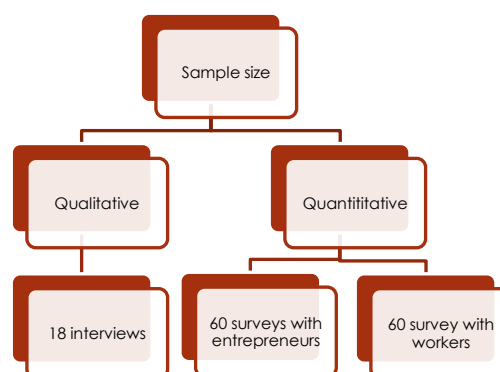
3. THE LEATHER SECTOR

This case study focused on the relocation of Egypt's long-established leather cluster in Old Cairo to the newly created industrial park, RLC, which is about 50 km away. The relocation was prompted by the fact that the existing leather cluster faced serious water-contamination problems, but space limitations and the small scale of the businesses (workshops) made it impossible to provide water treatment. A large body of literature focuses on the formation of clusters and industrial parks (Huang et al. 2008; Ruan and Zhang, 2009; Zhang 2019; Zeng 2010). Yet—with the exception of UNIDO (2017)—few studies have focused on the relocation of existing clusters to new places. The current study is the first that the authors are aware of to examine the relocation of a cluster in Africa.

3.1 Methodology

Both qualitative and quantitative methodologies were employed to obtain information on the impact of the relocation of the organic leather cluster to RLC (Figure 3.1). The qualitative component of the research involved interviews with key informants (using what is known as snowball sampling). The interview style is structured, with open-ended questions designed to elicit detailed, concrete information about the subjects' experiences (Whyte 1982). The quantitative component of the research involved two surveys, the first of business owners and the second of workers. The businesses were small, medium-sized, and large tanneries and chemical firms, determined according to their share of the total area of RLC. The sample of workers was drawn directly from the businesses included in the business owners' survey.

Figure 3.1: Breakdown of samples and sizes



Source: Authors.

3.1.1 The qualitative approach: Interviews with key informants

The qualitative research involved interviews with 11 government officials, 4 leather-industry experts, and 4 officials within international organizations to discuss major challenges facing the

leather sector. On average, each interview lasted approximately 40 minutes and included questions about the interviewees and their perceptions of major challenges related to cluster development, both in Egypt in general and in RLC in particular.

3.1.2 The quantitative approach: Surveys with business owners and workers

The quantitative research involved surveys of 60 business owners in the RLC cluster (Table 3.1). The main aim of the survey was to elicit information on whether the relocation worked and whether a cluster could be transplanted successfully. The questionnaire comprised 42 questions on a range of topics, including information on the owner, production, financing, trade credit, quality control, major bottlenecks, and the business environment (for more information, see Appendix Table 3.1).

Table 3.1: Details of business owners' survey sample

Type of firm (share of total area)	Number of surveys
Large firms of more than 5,000 cubic meters (30% of total area)	9
Medium firms of 3,000 to 5000 cubic meters (35% of total area)	14
Small firms of less than 1,000 cubic meters (35% of total area)	29
Input suppliers	7
Glue industry	1
Sample size/total number of surveys	60

Source: Authors.

The workers' survey included 59 individuals (originally 60, but one was eliminated because it was an input supplier). Of these, 28 workers were employed by large firms, 17 by medium-sized firms, and 14 by small businesses. The first part of the questionnaire covered general information about the worker: name (optional), gender, age, marital status, education level, and position held. Ten questions focused on the workers' opinions about the relocation. Following Tiberti and Costa (2019), the answers were coded from 1 to 5 (for more information, see Appendix Table 3.2).

3.2 Background and overview of the leather sector

3.2.1 Background

Egypt tanned about 200 million square feet of leather in 2018, according to data from the Industrial Development Authority (IDA). Meanwhile, according to a study conducted by the Chamber of Leather Industries, investments in the leather sector amount to about 5 billion Egyptian pounds (EGP). The leather industry employs 250,000 workers (UNIDO 2010). In 2016, the leather industry contributed to 0.4 percent of total value-added in the manufacturing sector (Haddad and Samy 2018). The tanning industry is the fifth largest industrial sector in Egypt and forms the backbone of the country's leather industry. Meanwhile, the quality of the Egyptian rawhides ranked seventh in the world according to MTI (2018), in part because the country has rawhides, a good supply of water from the Nile, an abundant labor force, and less stringent environmental regulations. Thus, Egypt has been classified as having a comparative advantage in the leather industry (UNCTAD 2020). Nevertheless, less than 5 percent of the tanneries in Egypt export their products into international markets, suggesting huge untapped potential. (See Appendix Figures 3.1 and 3.2 for more information.)

The tannery industry based in the Great Wall of Magra Al Ayoun dates back to Nasser al-Salah Elden al-Ayyub, who took over from 1169 to 1193 (Magra el Ayoun). The old tannery fields covered 64.5 acres with 1,066 tannery workshops, 205 shops, and 1,450 rooms housing workers. These 1,066 tannery workshops included small and informal workshops, many run by a single entrepreneur or firm. While it is difficult to quantify these workshops (since many operate as part of

the informal economy), findings from interviews with heads of tanneries reveal that approximately 60 percent of firms relocated and joined formal establishments. Small and informal workshops were the least likely to move. According to IDA, as of 2015, there were 108 registered firms in the Old Cairo area. About 5,000 workers received and processed animal skins in small factories (Hassan 2014). With the expansion of these tanneries in the heart of Cairo, the problem of sanitation and sewage became a critical issue, leading to calls for a relocation.

The project to transfer tanneries from ancient Egypt dates back to 1995, when the Governor of Cairo issued Resolution No. 161 to transport tanneries and glue factories from Magra Al Ayoun to a site north of Badr City. Currently, 82 firms actively operate in RLC, with plans to expand that number to 151 firms. Although the social and professional life in old Cairo differs from that in the new location, the supply chain is largely the same. Traders collect hides and skins from homes and rural butchers, and then store and sell them to tanneries. Tanneries process the hides to produce pickle, wet blue, crust, and coat or finish leather, with each stage requiring progressively greater skills and levels of technology, including advanced chemical inputs.

The tanning industry depends on the availability of water. In the old location in Magra El Ayoun water was directly pumped from the nearby Nile river. At RLC, however, the water supply comes from the nearest city, 10 of Ramadan. On October 5, 2003, a special ministerial committee issued the decision to transfer the tanneries, but the project was delayed for nearly 12 years. With the support of the current political leadership, the relocation finally occurred in 2017, making RLC the first specialized city for Egypt's leather industry.

3.2.2 Current performance of the leather sector

Leather production in Egypt is located in several governorates. Data on total production, capital investment, numbers of firms, and average wages for workers, were obtained from IDA (Table 3.2). Information on production processes and differences between the old and new clusters was also derived through informant interviews in every cluster. Data for Cairo in 2010 and 2015 predate the relocation, which occurred between 2016 and 2019. By 2019, all of Cairo's tanneries had been relocated to RLC. The decline in the number of firms indicates that some small and informal workshops likely did not survive the relocation, and this is supported by the interview findings.

Aouissna tanned 1.6 million square feet of leather in 2019, more than twice that of Cairo and Alexandria combined. Despite there being only two firms in Aouissna (under the same owner), their combined production scale and capital investment were larger than RLC due to a collaboration with foreign investors from Spain and the facilitation of an exporting zone. From 2010 to 2019, total production volume and capital investment increased in all three locations.

Growth in the tannery industry in Cairo appears to have stalled from the year prior to the move (Table 3.2). Growth in production, investment, employment, and wages were all significantly higher in the 2010–2015 period than in the 2015–2019 period, during which the move occurred. This can partly be explained by the fact that many factories shut down during the move, which was also confirmed by interview respondents.

Table 3.2: Tanning leather by location, various years

Location	Details	2010	2015	2018	2019
Cairo	Number of firms	100	108	111	76
	Production value (EGP millions)	449	609	612	614
	Capital investment (EGP millions)	182	262	263	263
	Number of workers	2,606	2,922	2,954	2,965
	Average wage per worker (EGP thousands)	6,980	8,118	8,087	8,077
Alexandria	Number of firms	18	20	21	25
	Production value (EGP millions)	62	72	81	84
	Capital investment (EGP millions)	60	66	70	71
	Number of workers	951	1,011	1,036	1,044
	Average wage per worker (EGP thousands)	7,825	8,097	8,336	8,413
Aouissna	Number of firms	2	3	2	2
	Production value (millions)	860	1,460	1,580	1,620
	Capital investment (millions)	639	868	914	929
	Number of workers	450	1,050	1,650	1,850
	Average wage per worker (EGP thousands)	4,640	6,103	4,407	4,086

Source: IDA 2019.

Another possible explanation for the stagnant growth in the tannery industry since the time of the relocation is depressed global demand. Exports of tanned leather declined in 2008, during the global economic crises, and in 2011, during political instability in Egypt. Exports grew overall from 2007 to 2014 but declined consistently from 2014 (Figure 3.2). This occurred in spite of the devaluation of currency in November 2016, which should have enhanced the competitiveness of Egypt's leather products.

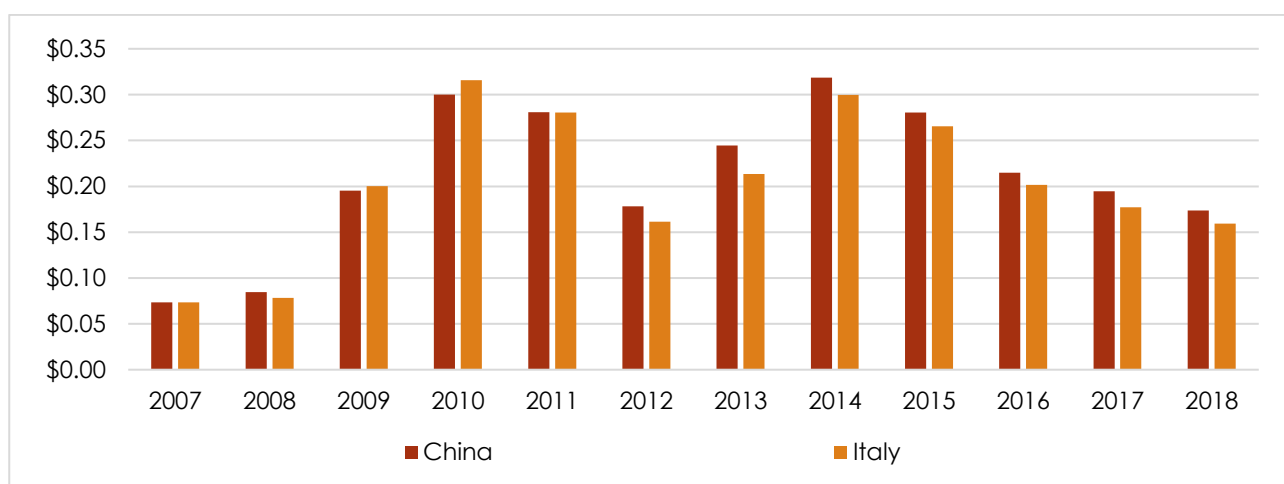
Figure 3.2: Total exports of tanned leather, 2007 to 2019 (US million dollars)

Source: UN Comtrade 2020.

One of the reasons for this decrease given during the interviews with the head of export council was that the global market was demanding fewer leather products based on changes in consumer preferences and a decline in the use of leather by fashion designers. A decline in global demand for leather was also identified in the monthly report issued by the Export Council for Leather and Leather Products, which revealed that leather exports fell by 21.9 percent between January and September of 2019 (Egypt Today 2019).

Egypt's major partners for trade in leather products are China and Italy (Figure 3.3). In the last several years, China has imported slightly more of Egypt's leather products than has Italy. Figures 3.2 and 3.3 present a similar trend, emphasizing the recent decline.

Figure 3.3: Egypt's major leather-export partners, value of exported leather, 2007 to 2018 (USD thousands)



Source: UN Comtrade 2020.

Egyptian leather exports far exceed the country's leather imports (Tables 3.3 and 3.4). The two largest export categories are tanned or crust hides (HS 4104) and prepared leather (4107). Exports of crust skins and tanned leather declined from 2014 and 2013, respectively, whereas exports of prepared leather have remained relatively stable. (Note that the descriptions of HS codes for the leather industry are provided in Appendix Table 3.3).

Table 3.3: Leather exports by product type, 2007 to 2018 (million US dollars)

Year	Tanned, crust hides (4104)	Leather, prepared (4107)	Leather, tanned (4112)	Leather, tanned no wool (4113)
2007	0.61	0.29	0	0
2008	1.4	8.18	0.08	0.08
2009	2.02	2.8	0.06	0.7
2010	2.12	7.41	0.02	0.24
2011	1.99	5.75	0.04	1.99
2012	1.53	10.37	0.03	28.13
2013	3.36	7.71	3.05	59.97
2014	6.32	17.86	1.44	42.93
2015	0.8	21.13	0	28.7
2016	0.08	18.87	0	21.88
2017	0.61	18.73	0	27.7
2018	0.1	23.43	0.11	26.18

Source: Provided to authors by Ministry of Trade and Industry, 2019.

Crust leather imports increased between 2006 and 2011, but thereafter declined due to the political crisis (Table 3.4). Imports grew during 2012–2015 but once again declined again after the 2016 currency devaluation. For the other types of imports, the trend was more volatile depending on the need for crust leather in the domestic market. These imports largely consist of the rawhides, which are sometimes imported from other countries because of the inferior quality of local hides or the need for additional hides to meet domestic demand.

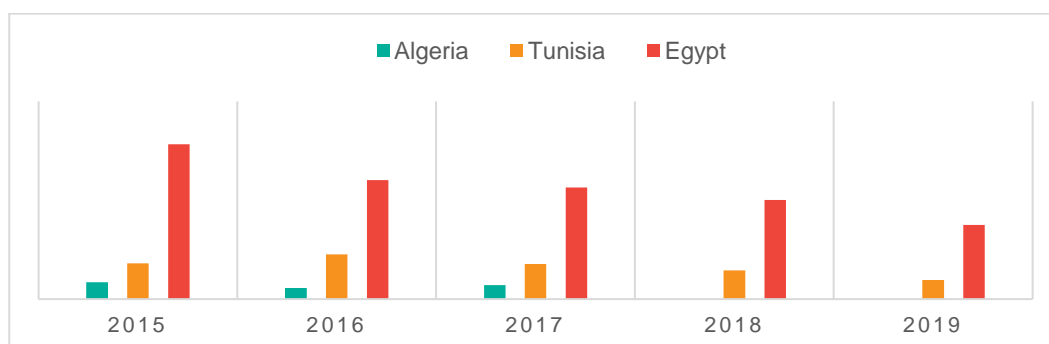
Table 3.4: Leather imports by product type, 2007 to 2018 (million US dollars)

Year	Tanned, crust hides (4104)	Leather, prepared (4107)	Leather, tanned (4112)	Leather, tanned no wool (4113)
2007	0.00	0.13	0.00	0.00
2008	0.03	0.86	0.33	0.83
2009	0.38	1.71	0.04	0.14
2010	0.00	1.53	0.76	0.29
2011	0.01	0.27	0.02	0.97
2012	0.22	1.02	0.07	1.39
2013	0.00	1.02	0.04	2.63
2014	0.26	2.55	0.00	1.53
2015	0.05	3.22	0.00	0.17
2016	0.00	1.78	0.00	0.12
2017	0.00	1.24	0.01	0.00
2018	0.00	1.46	0.26	0.00

Source: Provided to authors by Ministry of Trade and Industry, 2019.

Like Egypt, Algeria and Tunisia also experienced a decline in their leather exports in recent years, which supports the explanation of depressed global demand (Figure 3.4).

Figure 3.4: Comparison of leather exports by country, 2015 to 2019



Source: UN Comtrade 2020

3.2.3 Robbiki Leather City

While the relocation to RLC was designed to address some of the existing challenges/bottlenecks, such as issues with sanitation, pollution, and stagnant productive capacity, the Ministry of Trade also aimed to significantly increase the country's leather exports, from US\$200,000 to 3 Billion (MTI 2018). It was intended that RLC would provide superior infrastructure and services to support the businesses within the cluster; that the cluster would enhance the spread of technological knowledge, quality testing, and technology transfer; and that the cluster would facilitate collective action, particularly in terms of marketing activities.

The most important goal of the relocation was to facilitate the clustering of the different businesses by enhancing manufacturing linkages and trade within the city. The location was chosen to serve investors by minimizing transportation time and costs to and from local and international centers, while also being in close proximity to the large number of shoe factories in 10 of Ramadan city.

RLC was planned to be developed in three phases, in an area totaling 1,629 acres. There were no specific timelines for completion of the three phases, but phase one has been completed and phases two (as of 2019) and three (as of 2020) are both under construction. Phase one of the

project, at a cost of about EGP 1 billion, involved moving all tanneries larger than 160 acres with the aim of establishing 152 factories, 24 chemical firms, and 17 storage facilities in the cluster by 2020. The cluster also includes a treatment plant for industrial and sanitary waste water and a sanitary landfill on 282 acres, both incorporating the latest technologies and international environmental guidelines. RLC was also designed to be an eco-industrial zone on which 810 acres of trees will be planted and maintained using water recycling. The trees will be used in a separate project related to a cluster for furniture in Damietta city. In addition, RLC houses a 6,000 square meter technology center built in collaboration with the Italian Agency for Development Cooperation (ACI). The center assists small firms in processing the final stages of tanned leather in cases where they lack the necessary machinery.

Some public services were established as part of the first phase (banks, conference halls, a fire station, a police station, a communication center, and grocery stores), but some facilities are still lacking (exhibition and meeting halls, maintenance centers, marketing outlets, licensing offices, schools, and a hospital). The second phase, once again, at a cost of about EGP 1 billion, will develop a further 116 acres of land, while the third phase is intended to attract foreign investors and international brands in order to increase value-added within the industry (MTI 2018). The goal is to develop the Egyptian leather cluster as a hub for leather products. The government established the Cairo Investment and Urban and Industrial Development Company (CID) with EGP 200 million to manage the assets of the new city (CID 2019). CID's role is to manage the city and to attract foreign investment in order to achieve the goal of adding value to Egyptian leather products as opposed to just exporting leather in its primary form. This will involve the manufacture of shoes and other leather products both for domestic use and for export. It is hoped that this will open external markets for Egypt's leather products.

One key objective of RLC is to increase yearly leather production from 125 million square feet (semi-finished) to 350 million square feet (fully finished). The director of CID stated that RLC could create 25,000 new job opportunities by completing the project's second and third phases. An investment of EGP 5,766 billion is anticipated for construction and equipment. Other goals are to double yearly industrial exports from US\$170 million to 800 million, and to increase productivity from 60 square feet per worker per day to the global average of 250 square feet per worker per day.

The city also aims to improve working conditions and eliminate pollution resulting from tanning operations. The relocation is also beneficial for preserving Magra El Ayoun's area as an archaeological site and tourist attraction.

The new investment law enacted in 2016 encourages local and foreign investors to establish businesses in the new industrial zone. The 2018 policy review of the World Trade Organization for Egypt (WTO 2018) summarizes major incentives adopted by the Egyptian government. Ministerial Decree No. 469/2017 has been implemented to ban the export of raw materials in order to ensure that sufficient supplies remain available for domestic production. For example, Egypt banned the exportation of raw or tanned hides, and skins or leather in their wet state (WTO 2018). Specific policies adopted by the Robbiki leather clusters are detailed in Appendix Table 3.4.

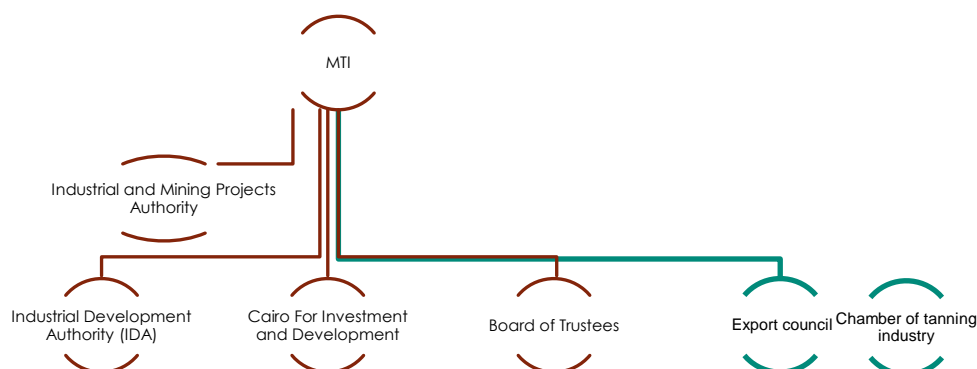
3.2.4 Institutional structure of the leather industry

The leather sector in Egypt falls under the umbrella of two nonprofit organizations, the Chamber of Tanning Industries and the Chamber of Leather Industry, with a total membership of about 3,000 businesses. The two chambers provide services to more than 750 shoe, leather good, apparel, and component manufacturers, and 200 tanneries (Abou El Kheir 2010). Meanwhile, the role of the Leather Export Council under the supervision of Ministry of Trade and Industry (MTI) is to foster the development of leather exports. Both the Chamber of Tanning Industries and the Export

Council were established by investors to promote collective action. In addition, the Footwear and Leather Industry Service Center (FLISC), Footwear Training Center, and Leather Technology Center provide design services, training, and technology assistance (for further details, see Appendix Table 3.5).

Although Robbiki is a city, many decisions about the cluster are centralized under MTI. (Figure 3.5). Under this ministry other bodies are responsible for the local management of the cluster, including the project authority (IMPA) and IDA, which are primarily responsible for providing firms with official documentation to commence operations. CID is the administrator and organizing body responsible for promoting the cluster’s development and assisting foreign investors. A board of trustees was recently established to discuss issues within the cluster and to coordinate activities with MTI.

Figure 3.5: Robbiki City Management structure



Source: Authors.

3.3 Value chain description

Based on the field work undertaken and secondary data from the Central Agency for Public Mobilization and Statistics (CAMPAS) in Egypt, the leather industry’s value chain is illustrated in Figure 3.6.

Figure 3.6: The leather industry value chain



Source: Authors.

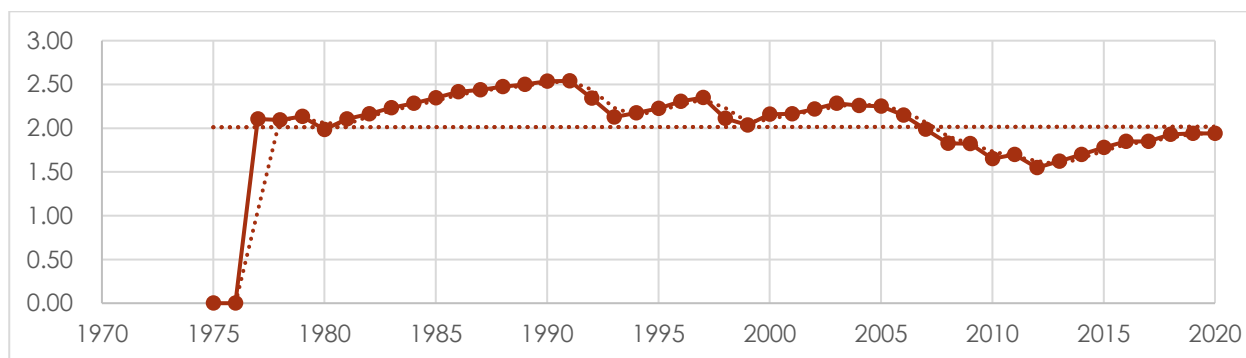
3.3.1 Livestock

The supply chain of the leather industry starts from the sale of livestock from farmers across Egypt. After the animals are slaughtered, rawhides are collected and transported to tanneries. The tanned leather is either intended for export or domestic supply for shoemaking or other products. As of 2019, livestock in Egypt totaled about 1.92 million head (USDA 2018) (Figure 3.7). Although livestock contributed about 35.2 percent of the total value of agricultural production during 2005–

2015, its use for leather—as the most important livestock byproduct—has not received sufficient attention (Morsi 2018).

The livestock sector is administered by the Ministry of Agriculture and Land Reclamation (MARL). Based on a 2019 United States Department of Agriculture report, Egypt prohibits the slaughter of cattle under 400 kilograms or younger than two years of age. Furthermore, the government has endeavored to control the cost of specific inputs, such as feed (USDA 2018). By diversifying the source of feed, it is intended that the livestock sector will reduce its reliance on imported feed. Regulations are intended to increase the national herd by 4.5 million head over two years (USDA 2018). To this end, MARL provides small and medium-sized farms with access to loans in order to increase their production capacity. Currently, the average livestock farms (28,000 head) operates at only 30 percent capacity.

Figure 3.7: Number of livestock in Egypt, mid-1970s to 2020 (thousands)



Source: USDA 2018.

3.3.2 Slaughterhouses

The second phase in the supply chain is slaughterhouses, which produce rawhides. The state regulation stipulates that animals can only be slaughtered in slaughterhouses. The rawhide collectors then preserve the hides and sell them to tanneries. The number of slaughterhouses in Egypt fell from 7,500 in 2016 to 5,673 in 2017 (CAPMAS 2020a; for more information, see Appendix Table 3.6). The slaughterhouses are mainly located in five governorates (Cairo, Giza, Kalyobia, Behera, and Garbia). They are well mechanized but still have high spoilage rates in raw skins. According to interviews with the heads of tanneries, damages to the skins is caused by injury to animals (such as cuts), diseases (especially fungal or bacterial skin diseases), skin parasites (such as mites or barges), and cuts and cracks caused by insufficiently skilled workers during the process of skinning.

3.3.3 Rawhide collectors

Rawhide collectors collect light hides (of goats and sheep) and heavy hides (of buffalo and cows) from slaughterhouses. Some big animals, such as cows, are imported from China, Vietnam, Indonesia, Turkey, India, European countries, and America. A rawhide seller is responsible for taking the hides and salting them to preserve them before selling them to tanneries. Most rawhide collectors (according to survey responses) are not officially licensed. They obtain rawhides either directly from slaughterhouses or indirectly through middlemen. A tannery normally works with three or four sellers of hides. Inside the tannery clusters, rawhide sellers generally form long-term relationships, which they rely on rather than official agreements. After the relocation to RLC, which is about 45km away from Magra el Ayoun, the issue of transportation became more of a challenge for rawhide collectors because Magra el Ayoun provided easier access. Rawhide collectors generally use their own individual trucks or cars as transportation.

3.3.4 Rawhide storage

RLC built 17 storage facilities for rawhides inside the cluster. Inventories are tailored to different types of hides (such as buffalo, sheep, cow, and camel hides). Tanneries can buy rawhides from collectors, from leather importers, or from the storage facilities inside the cluster.

3.3.5 Tanneries

Leather products are frequently manufactured in labor-intensive (requiring less investment in equipment) or larger capital-intensive factories involving machines, components, and services. The first stage of tanning turns rawhides into what is termed “wet blue,” then into “crust leather.” The last stage finishes tanned leather according to customers’ specifications.

3.3.6 Complementary industries

In the second phase of RLC’s development, there are plans to establish complementary industries, such as gelatin and glue factories, which use the byproducts of the tanning process. This will help to complete the leather production value chain within Egypt.

3.3.7 Wholesalers of tanned leather

Small to medium-sized enterprises tend to sell leather in domestic markets through small retail shops that specialize in distributing tanned leather in old Cairo. These firms distribute tanned leather to shoemakers or manufacturers of other leather products. Transportation from RLC to downtown presents a significant challenge. Also, leather prices are unstable due to lack of coordination between the Chamber of Tanned Leather and Chamber of Industrial Leather Products.

3.3.8 Shoe factories and workshops

Tanned leather in Egypt is mostly sold for domestic shoe manufacturing or exported as processed leather. Although there is a rather large domestic market for shoes, competition from imported finished products made in China and other countries is very strong. Aside from shoe factories, there are workshops for bags and other leather products. While some of these are intended for local markets, other products are exported for sale in Arab, African, Asian, European, and American markets.

3.3.9 Exports of finished leather products

Leather exports constitute a large share of Egypt’s total exports. Although the quality of Egyptian tanned leather is well known in international markets, the final leather products are far from being internationally competitive. At the global level, the industry is tightly controlled by international marketing agents who have market knowledge and a wide network of sales channels. This allows the complex sector to be effectively navigated and managed. Egyptian manufacturers are also challenged in understanding global fashion trends for finished leather products. MTI has established export councils to develop linkages with businesses and promote the export of value-added leather goods.

3.4 Key bottlenecks

This section combines the results of both the qualitative and quantitative components of the study, while also considering the opportunities created by the move. Analysis of the survey responses indicated that the most commonly reported challenges were issues related to water, the quality of materials and products, and worker training. Some of these issues affect Egypt’s leather value chain as a whole, whereas others specifically relate to the relocation of the leather cluster to RLC.

3.4.1 Addressing overarching bottlenecks in the value chain

Some of the most important challenges identified by businesses—high production costs, transportation issues, and lack of facilities—relate specifically to the relocation to RLC, but more general, sectoral issues, such as the quality of rawhides, also persist (Table 3.5). Note that, because the RLC only contains tanneries and complementary industries located within its borders, the relocation had no direct impact on longstanding issues at other stages along the value chain. Note also that respondents were able to report multiple challenges/issues related to each question.

Table 3.5: Challenges identified through the business owners' survey

Type of challenge	Overarching challenges		Relocation-specific challenges	
	Number of firms reporting each issue	Ranking by level of importance	Number of firms reporting each issue	Ranking by level of importance
Higher costs	38	1	36	1
Lack of facilities	5	5	7	3
Transportation	17	2	10	2
Technology upgrades	4	6	4	6
Worker training/skills	1	7	8	4
Livestock quality	8	3	2	7
Marketing/branding	1	7	7	5
Administrative/bureaucratic issues	6	4	4	6
Sanitation	5	5	0	8
Other	5	5	4	6

Source: Authors, based on business survey.

Notes: Ranking was assigned based on the number of firms reporting each issue. In the case where an equal number of respondents identified an issue, those issues were given the same rank.

The quality of hides and leather is poor. Issues with the quality of hides were the third most-reported challenge of a total of nine (Table 3.5). Existing quality-control mechanisms do not appear to be working. And although 42 percent of respondents reported having formal contracts with their suppliers, the firms that had such contracts were not significantly less likely to experience disputes (Table 3.6). Moreover, only 1 of the 60 business owners reported having hired technicians to assess hide quality. This inability to properly assess quality at the time of purchase represents a considerable purchasing risk. Hide quality is most affected in the early stages of the value chain. By the time hides arrive at the tanneries, a significant share have already lost value due to improper handling. In interviews with rawhide sellers and producers of leather products, 80 percent reported rawhide quality as a major issue affecting exports. This issue of rawhide defects was reinforced through interviews with three rawhide collectors operating in RLC.

Table 3.6: Quality issues from the business owners' survey

Share of businesses reporting. . .	All	Domestic (small)	Medium exporters	Large exporters	Input suppliers
Quality issues with supplier	0.67	0.60	0.64	0.89	0.71
Having a formal quality assurance contract	0.42	0.47	0.07	0.78	0.43
Having hired a technician to assess quality	0.02	–	0.07	–	–

Source: Authors, based on business survey.

Note: The distribution of responses across the four types of firms was only statistically significant for formal quality-assurance contracts (p-value = 0.007).

- **Livestock breeding and disease at the farm level.** According to the head of export council in Egypt, “Some animal diseases reduce the quality of leather.” Other interviewers also emphasized the importance of livestock protection against all types of diseases, which cause skin infections, in turn affecting the quality of leather. However, as respondents pointed out, there is a lack of coordination between the MTI and the MARL, to enhance farmer awareness on the means to combat livestock skin diseases and manage animal health on farms. Treating symptoms promptly is necessary to prevent permanent damage to the skins. While drawing the connection between livestock farmers and the leather industry may seem unwarranted, in many countries infectious diseases of cattle can cause considerable financial losses to both the livestock and leather industries simultaneously (UNIDO 2010).
- **Poorly equipped slaughterhouses and informal slaughtering practices.** Another key factor affecting the quality of leather is the prevalence of informal slaughtering practices and difficulties in administering and controlling such practices, which ultimately compromise the quality of the hides. Modern slaughterhouses are concentrated in Cairo, away from the largest livestock production. Slaughterhouses are less well-equipped in other regions of the country where the hides are sourced, and a significant share of hides are produced under very poor environmental conditions.
- **Poor storage capacity of rawhide collectors, and price instability.** Leather collectors are an integral component in the early stages of the processing chain, responsible for both collection and initial processing methods. Per the survey/ interview findings, rawhide collectors in Egypt lack the capacity to properly preserve the hides. The high costs of production inputs and the lack of cold storage and transportation facilities during the summer season result in further loss in the value of leather. Rawhide prices differ significantly based on whether they are handled by formal and informal collectors. Low-price low-quality raw hides lead to low-quality finished leather.

The scarcity of skilled labor. Lack of skilled labor is apparent in RLC. The need for worker training was the third most-reported challenge (of nine) associated with the relocation (Table 3.5). This is reinforced by findings from the worker survey (Table 3.7). Interestingly, workers were significantly more likely to receive training if they worked in small enterprises. As one International Modernization Center (IMC) official emphasized, “Finding qualified workers in this sector remains a challenge.” He expressed a need for vocational training within the cluster to enable workers to operate new machinery, citing that it would be better for the technological center within RLC to organize such training rather than the individual firms.

Table 3.7: Workers' responses to whether they received training

Workers' survey responses	All	Domestic (small)	Medium exporters	Large exporters
Strongly disagree	0.34	–	0.41	0.46
Moderately disagree	0.10	0.07	0.06	0.14
Neutral	0.25	0.29	0.12	0.32
Moderately agree	0.27	0.57	0.35	0.07
Strongly agree	0.03	0.07	0.06	–

Source: Authors, based on workers' survey.

Note: The distribution of responses across firm types is statistically different (p-value = 0.010.)

Marketing and branding are still below international standards. Medium-sized and large exporters reported a preference for participating in trade fairs and seeking market information, whereas small businesses reported being most likely to contact their customers and input suppliers directly, or to rely on advertising (Table 3.8). Among medium-sized and large exporters, marketing and branding issues were the second and third most-reported issues associated with the relocation. “A key bottleneck for higher productivity, is the poor marketing skills and R&D to study international market tastes,” said an official from UNIDO Egypt. Subsidizing activities like attending international trade fairs can serve as an effective form of export promotion, and it is clear from their responses when asked about challenges that medium-sized and large firms are interested in improving their marketing and branding. This could have positive spillover benefits for small firms in RLC, as marketing costs can be prohibitively high for many small and medium-sized businesses. As a result, such businesses are more likely to be able to reach new export markets through larger exporting companies or subcontracts from bigger firms.

Table 3.8: Key marketing and branding strategies from the business owners' survey

Strategy	All	Domestic (small)	Medium exporters	Large exporters	Input suppliers
Advertising	0.43	0.37	0.38	0.40	0.86
Directly contacting customers	0.48	0.60	0.38	0.50	0.14
Fairs and market information news	0.07	0.00	0.23	0.10	0.00
Business centers	0.02	0.03	0.00	0.00	0.00

Source: Authors, based on business survey.

Notes: The distribution of responses across firm types is statistically different (p-value = 0.091).

3.4.2 Relocation-specific bottlenecks

The relocation, while generating new opportunities, also introduced new bottlenecks and challenges. The relocation had pronounced impacts on workers' quality of life and working conditions, and on production costs.

The impact of the relocation on workers. RLC was designed for the purpose of enhancing production efficiency. It was originally envisioned that RLC would form an integrated industrial city targeting the leather manufacturing industry and accommodating a range of small, medium-sized, and large businesses as a cluster. What RLC lacked, however, was the social and community environment of the old Magra Al Ayoun area. The new city was not designed with the needs of the workers in mind. Few workers have moved to the cluster and face long commutes, and there is a lack of available housing in the area. Many respondents regarded the lack of nearby facilities, such as schools and hospitals, as a key disadvantage of the new location. Of the workers responding to the survey, 74 percent indicated that their costs of living had increased since the move (Table 3.9). Importantly, workers in small firms were even more likely to report having experienced an increase

in their cost of living. Sixty six percent of workers reported issues with telecommunications at RLC (Table 3.9).

Table 3.9: Impact of the relocation on workers' quality of life

Workers' survey responses	All	Domestic (small) producers	Medium-sized exporters	Large exporters
<i>Living costs increased since the relocation</i>				
Strongly disagree	0.02	–	–	0.04
Moderately disagree	0.03	–	0.06	0.04
Neutral	0.20	–	0.24	0.29
Moderately agree	0.37	0.14	0.35	0.50
Strongly agree	0.37	0.86	0.35	0.14
<i>Telecommunications are an issue</i>				
Strongly disagree	0.02	–	0.06	–
Moderately disagree	0.10	0.14	0.24	–
Neutral	0.22	0.29	0.29	0.14
Moderately agree	0.19	0.43	0.18	0.07
Strongly agree	0.47	0.14	0.24	0.79

Source: Authors, based on workers' survey.

Note: The distribution of responses across firm types is statistically different level for both questions (p-value =0.005 for living costs and 0.001 for telecommunications).

The impact of higher production costs on competitiveness in international markets. The move to RLC significantly increased production costs, both in terms of labor and other inputs, which may have caused a loss in competitiveness in international markets. In addition, some government decisions adversely affected the sector. The decision, for example, to impose an export tariff on raw materials led to a decline in raw material exports in favor of higher value-added tanned leather. Furthermore, a decline in the international price of tanned leather lowered the profit margins of tanneries in RLC.

- **Rising costs of transportation and other worker-associated expenses.** The relocation meant a longer daily commute for many workers. Lack of existing public transportation forced some of the larger firms to provide buses to transport their workers, representing an additional cost. Differences were not significant among the different types of firms.
- **Rising costs of primary inputs, such as water and electricity.** The most commonly reported challenge by firms was higher costs of primary inputs, mainly water, but also electricity (Table 3.10). Sixty percent of the responding firms identified the costs of water or electricity as the biggest problem associated with the relocation, leading them to call for government support in the form of financial incentives to subsidize the higher costs (Table 3.5). Eighty-five percent of respondents in the worker survey agreed that the price of water and water availability was an obstacle (Table 3.10). This is especially relevant given that the industry is heavily dependent on water as an input. In addition, 58 percent of workers reported that electricity cuts or price increases had been an obstacle (Table 3.10). Differences in the distributions of perceptions of electricity and water challenges between workers in different firm's types were not statistically significant.

Table 3.10: Other impacts of the relocation on workers

Workers' survey responses	All	Domestic (small) producers	Medium-sized exporters	Large exporters
<i>Electricity is a challenge</i>				
Strongly disagree	0.10	0.14	0.24	–
Moderately disagree	0.10	0.07	0.12	0.11
Neutral	0.22	0.21	0.29	0.18
Moderately agree	0.31	0.43	0.24	0.29
Strongly agree	0.27	0.14	0.12	0.43
<i>Water is a challenge</i>				
Strongly disagree	–	–	–	–
Moderately disagree	0.02	–	0.06	–
Neutral	0.14	0.29	0.18	0.04
Moderately agree	0.29	0.29	0.29	0.29
Strongly agree	0.56	0.43	0.47	0.68
<i>Transport is a challenge</i>				
Strongly disagree	0.20	0.36	0.41	–
Moderately disagree	0.07	0.14	–	0.07
Neutral	0.19	0.14	0.06	0.29
Moderately agree	0.24	–	0.12	0.43
Strongly agree	0.31	0.36	0.41	0.21

Source: Authors, based on workers' survey.

Note: The distribution of responses across firm types is only statistically different for transportation issues (p-value =0.001).

Increasing ineffectiveness of business associations and the Chamber of Commerce in organizing collective action. Of the business owners asked about the major challenges they experienced since the relocation and how they could be solved, 45 percent reported that they needed help from the government (Table 3.11). A further 36 percent said these issues were an ongoing process. Clearly, however, many issues—such as quality at earlier stages along the value chain, high water prices, or the pool of skilled labor—cannot be solved by individual firms. Addressing these problems requires coordination and collective action. The provision of public goods and collective action is inadequate. Although most firms (65 percent) belonged to the Chamber of Tanning Industries, 80 percent of these firms reported that they received no benefits. Among the nine businesses that reported receiving benefits, the benefits cited were (1) help with the mediation of disputes, (2) marketing information, (3) financial support, and (4) the opportunity to talk with officials.

Table 3.11: Business owners' perceptions of the role of government (%)

Share of firms reporting. . .	All	Domestic (small) producers	Medium-sized exporters	Large exporters	Input suppliers
Having requested government support for general challenges	0.45	0.53	0.00	0.50	0.86
Being a member of the Chamber of Commerce	0.65	0.57	0.85	1.00	0.14
Having received benefits from their Chamber of Commerce membership	0.15	0.10	0.07	0.44	0.14

Source: Authors, based on business survey.

Notes: Results are statistically significant for requesting government support (p-value 0.0001) and being a member of the Chamber of Commerce (p-value 0.0001), but not for receiving benefits.

3.4.3 New opportunities arising from the relocation to RLC

Despite creating new challenges, the relocation to RLC also presented new opportunities. First, the issue of water pollution has been addressed. In addition, on average, workers' incomes have increased, and workers are satisfied with the new working conditions. Finally, RLC offers significant opportunities in the areas of technology upgrades and assistance, technology training for workers, and support for branding and marketing. Evidence also indicates that cooperation among firms has improved.

A more sustainable and environmentally friendly working environment. All the interviewed stakeholders within the cluster acknowledge that the relocation has addressed the pollution problem at the old location. First and foremost, moving away from the Nile means that waste water is no longer dumped in the river. Lack of infrastructure for treating solid and liquid waste in Magra Al Ayoun meant that the tanneries had a negative impact on the environment. The government constructed three water-treatment plants to deal with waste water in the RLC (CID 2019), which has resolved the pollution and sanitary issues associated with tanning processes. The government also hired a few private companies to provide cleaning services. MTI plans to expand the volume of water capable of being treated in order to facilitate the second and third phases of the project. Among the business owners interviewed, five cited sanitation as their biggest operating challenge in their original location, yet no firms reported that sanitation was a key issue after the relocation (Table 3.5).

Higher income levels and better working conditions. The survey of workers included questions as to whether respondents had (1) experienced an increase in income after the relocation, and (2) whether they were satisfied with their current working conditions (Table 3.12). Sixty-four percent of workers reported that their incomes had improved since joining RLC. The share was much higher (90 percent) among large firms. There is also evidence that working conditions in the tanneries have improved since the relocation; 73 percent of workers said that they were satisfied with their working conditions, and two-thirds of those respondents reported being strongly satisfied. For example, workers used to be informally organized in small houses in close quarters and there was sewage, but in the new location, the working space is more easily accessible for day-to-day business activities, significantly larger, and cleaner.

Table 3.12: New opportunities for workers, from the workers' survey

Workers' survey responses	All	Domestic (small) producers	Medium-sized exporters	Large exporters
<i>Income increased since the relocation</i>				
Strongly disagree	0.08	0.14	0.18	–
Moderately disagree	0.05	0.14	0.06	–
Neutral	0.22	0.36	0.29	0.11
Moderately agree	0.22	0.29	0.29	0.14
Strongly agree	0.42	0.07	0.18	0.75
<i>Satisfied with working conditions</i>				
Strongly disagree	0.03	0.07	0.06	–
Moderately disagree	0.08	0.21	0.12	–
Neutral	0.15	0.21	0.18	0.11
Moderately agree	0.24	0.29	0.24	0.21
Strongly agree	0.49	0.21	0.41	0.68

Source: Authors, based on workers' survey.

Note: The distribution of responses across firm types is statistically different for the question on living costs (p-value 0.0001).

Greater buying power. Of firms surveyed, 84 percent reported having bought new machinery since the relocation. The geographic concentration of these firms with similar activities created opportunities for collective action to upgrade technologies, skill levels, and marketing. UNIDO (2017) describes promising clusters as ones that are profitable, encourage innovation, and whose value chain members are located in close proximity to one another. This could be especially beneficial for small and medium-sized enterprises, which may not be able to afford such advancements on their own. Therefore, the presence of a leather technology center or shared facilities would allow such enterprises to benefit from being located in the cluster. Due to extreme limitations of space, even if tanneries wanted to modernize and become more efficient in terms of production and environment management, they were unable to do so at the old location, which had become a serious constraint for industry growth. Limited by the space of each workshop, workers must carry a huge number of raw hides to proceed with the different production steps. The move addressed the problem by providing more room for larger-scale production and machinery use. All the steps required for tanning are now located in same area, saving workers' time in moving hides from place to place. The factory layout facilitates mechanization and increasing the scale of production. More importantly, firms in the new location can meet the standards demanded by export partners, which are mandatory for exports.

Greater cooperation among firms. The degree of cooperation among firms within RLC suggests increased potential for collective action (Table 3.13). For example, sharing contracts, collateral, or credit, and information on production processes or marketing, are all ways that firms can work more efficiently together.

Table 3.13: Coordination of the cluster, business owners' survey

Share of firms reporting. . .	All	Domestic (small) producers	Medium-sized exporters	Large exporters	Input suppliers
Shares contracts with other firms	0.68	0.43	1.00	1.00	0.71
Refers work to other firms	0.48	0.50	0.85	0.30	–
Receives referrals for work from other firms	0.40	0.20	0.77	0.80	–
Level of trust since the relocation					
Decreased	0.38	0.30	0.46	0.20	0.86
Increased	0.32	0.47	0.31	0.10	–
Unchanged	0.30	0.23	0.23	0.70	0.14
Solutions for quality disputes with suppliers					
Litigation	0.05	0.03	–	0.20	–
Resolved privately	0.28	0.33	0.38	0.10	0.14
Returned	0.05	0.03	0.15	–	–
Other	0.62	0.60	0.46	0.70	0.86
Solutions for late payments from customers					
Litigation	0.22	0.17	0.15	0.40	0.29
Resolved privately	0.43	0.33	0.54	0.50	0.57
Compensation	0.03	–	0.15	–	–
Other	0.32	0.50	0.15	0.10	0.14
Channels for solving financial difficulties					
Banks	0.13	0.10	–	0.40	0.14
Borrow from relatives or friends	0.43	0.50	0.46	0.20	0.43
Extend business	0.02	–	–	–	0.14
Other	0.42	0.40	0.54	0.40	0.29
Have ever taken a bank loan	0.13	0.03	0.07	0.56	0.14
Would be interested in a bank loan	0.22	0.17	0.14	0.56	0.14

Source: Authors, based on business survey.

Notes: The distribution of responses across firm types is statistically different for all questions, except for quality disputes with suppliers.

Greater cooperation in outsourcing production. When firms were asked about sharing contracts or outsourcing work, they revealed that a high degree of collaboration already exists within RLC (Table 3.13). Forty-eight percent of firms in the sample reported that they referred contracts to other firms when they could not complete the work themselves, and 40 percent had received such referrals from other firms. Sixty-five percent of firms reported engaging in at least one of these activities. Meanwhile, 68 percent of firms responded that they would co-share contracts with other firms if they were too large to handle on their own. Medium-sized and large tanneries were significantly more likely than small firms to engage in referrals or co-share contracts. This suggests that small firms could benefit from greater coordination because they are more likely to accept subcontracts from larger firms. Firms were also asked about changes in the levels of trust since the move. Small firms were more likely than others to report that trust had increased, with 47 percent saying it had improved and 23 percent saying it was unchanged. Meanwhile, medium-sized and large firms were most likely to report that trust had not changed, while all but one of the chemical industry firm said trust had decreased. This suggests that the relocation had differential impacts on trust among value chain actors. In cases where it led to increased competition, such as among the chemical industries, trust was eroded. However, increased competition among these input suppliers could benefit tanneries in RLC if they were to reduce prices or improve the quality of their product. Taken together, the evidence suggests that medium-sized and large firms often share orders with others, and that trust has improved among small firms. Overall, this presents a positive picture of the potential for collection action and improved collaboration in RLC.

Channels for solving financial challenges. Survey evidence suggests that financial mechanisms in the cluster rely on a degree of coordination and trust among value chain members. When asked how they would solve financial difficulties, 43 percent of respondents said they would borrow from relatives and friends, while another 42 percent said that they would reduce production or find solutions to reduce their costs (Table 3.13). Only 13 percent of the sample (almost entirely large firms) reported having ever taken a bank loan, and only 22 percent of the firms surveyed reported wanting a loan. This indicates that small and medium-sized firms tend to rely on noncommercial sources of financing for their activities. Furthermore, the results showed that small and medium-sized firms mostly tend to resolve payment- and quality-related issues privately. In contrast, large firms are somewhat more likely to pursue litigation because outstanding payments could be significant. Overall, 43 percent of the surveyed firms said they would solve an issue of late payment from a customer privately, and a further 32 percent said they would simply abandon the issue. With supplier disputes over quality, 28 percent of firms said they would solve the problem privately, whereas 62 percent said they would either abandon the issue or change suppliers.

3.5. Key opportunities and policy recommendations

3.5.1 Enhance institutional capacities

Promote MARL's role in monitoring and raising awareness of livestock health. Efforts would focus on organizing farmer campaigns to raise awareness of preventative measures to prevent skin diseases; assessing the cost effectiveness of vaccination programs; and training existing extension services to provide information, guidance, and support to livestock farmers.

Expand the role of the local government and existing business associations to provide training to workers. Providing opportunities for professional development is key, yet small and

medium-sized firms are often reluctant to invest in their workers and provide training because of high turnover rates within the industry, especially within an industrial park. Worker turnover reduces the propensity of firms to innovate, so it would be beneficial for training to be provided through governing institutions.

Promote technological advancement and mechanization in existing facilities along the value chain to add value. In slaughterhouses, this would involve enhancing workers capacity to handle hides appropriately (avoiding unnecessary cuts, holes, and scratches to preserve the market value of hides and ultimately the leather and resulting products) and developing infrastructure and hygiene within slaughterhouses. For leather collectors, it would be beneficial to formalize their status in order to improve their access to business development, financial, and insurance services. Other advances would involve enhancing transportation linkages and equipping leather collectors with cold chains (temperature-controlled supply chains) and storage facilities to preserve the quality of hides during hot summer months.

Develop export-promotion strategies to attract new international markets. This would involve enhancing the marketing and branding skills of businesses and encouraging small and medium-sized businesses to participate in international trade fairs. Since marketing costs are often too high for these businesses, MTI could facilitate their participation with the aid of the Export Council.

3.5.2 Addressing relocation-specific bottlenecks

Enhance workers quality of life. Significant effort is needed to develop a supportive community with associated infrastructure, such as schools and hospitals, in order to improve workers' overall quality of life and encourage more workers to move to RLC. This involves enhancing working conditions by introducing low-cost amenities, including housing, social and recreational venues, and transportation facilities (or subsidized public transit passes) to make working and living in RLC more convenient. Some of these amenities can be provided as part of employee benefit packages.

Empower the Chamber of Tanning Leather to address collective constraints stemming from the relocation. Activities could include monthly meetings with value chain representatives to address collective action issues and strategize means of lobbying for policy reform. Many of the bottlenecks facing firms—such as higher water prices, lack of skilled labor, and quality control—cannot be solved at the individual firm level and require collective action. Introducing a clear mandate and set of responsibilities for the tanning association, would empower its role in advocating on behalf of businesses within the cluster.

3.5.3 Capitalize on opportunities arising from the relocation to RLC

Scaling up production and meeting international export standards. With enhanced sanitation, a better working environment, and the ability to meet international standards, firms are in a better position to enter new markets. This also enables firms within RLC to attract foreign direct investment, receive direct assistance from international partners, and increase their exports.

Promoting effective collective action. Evidence indicates the existence of informal private transactions in the sector. These longstanding relationships have required the development of a certain level of trust, which can form the foundation for developing greater cooperation in achieving mutual goals through effective collective action.

4. THE MEDICINAL AND AROMATIC PLANT SECTOR

Being a huge source of foreign currency and directly tied to an export market, Egypt's MAPs sector was particularly exposed to market disruption stemming from the recent COVID-19 outbreak. For these reasons, the sector was chosen as an interesting case study through which to assess the impact of external shocks on cluster resilience.

4.1 Methodology

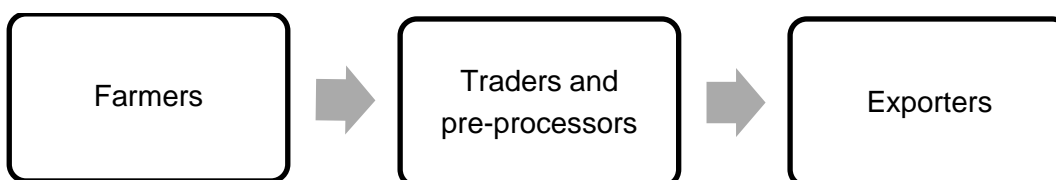
The impact of COVID-19 on a MAPs cluster located in Beni-Suef and Fayoum (Upper Egypt) was examined by employing what is known as a "rapid assessment." The cluster is of significant importance to the Egyptian agri-food system and is vulnerable to disruptions caused by lockdowns and curfews related to COVID-19. The rapid assessment involved phone interviews with a small number of value chain actors to assess how their work and livelihoods had been affected. The phone interviews were mostly conducted between November 8 and 16, 2020. While the results reported may not be nationally representative, they highlight important insights from key stakeholders to provide policymakers with timely information. The results can also form the basis for more in-depth studies, while also informing immediate policy responses.

To assess the impact of COVID-19 on Egypt's oldest MAPs cluster, 26 value-chain members were interviewed by phone: 10 farmers, 10 traders/ pre-processors, and 6 exporters. To ensure broad representation, the actors interviewed were determined to be small, medium-sized, or large members of the value chain. To assess the direct impact of COVID-19 and control for other external factors, interview questions focused on crops cultivated in the winter of 2019 (that is, September to December) and harvested between February and May of 2020 (February to May), the peak of the COVID-19 outbreak. Chamomile, which is the most prominent crop cultivated during winter and directly exported to European markets from February to May formed the focus of most of the analysis. Despite limitations in both the sample size and the study timeframe, the chosen approach is effective for assessing impacts given both the limitation on field access and the urgent need for policy responses.

4.2 Overview and value chain description

The MAP sector's value chain comprises three sets of actors: farmers who grow and harvest crops, traders and pre-processors who transport and in some cases also prepare crops for export, and exporters, who promote and sell crops on international markets (Figure 4.1). We focus only on the export-oriented market as chamomile is primarily exported.

Figure 4.1: MAPs value-chain



Source: Authors.

4.2.1 Crop cultivation and harvesting of medicinal and aromatics plants

Farmers in Fayoum and Benisuef dedicate a significant share of their land to MAPs, especially chamomile and calendula, along with a series of high-value crops that have the potential to yield high incomes. The area's farmers have been working in the sector for at least 30–40 years. Crops like chamomile are cultivated in September and October, ready to export to Europe from February

to May. Egypt's farmers have developed the necessary expertise in cultivating and harvesting the plants efficiently to achieve a high quality with minimal waste. Long-term skills are also evident in harvest and postharvest techniques to achieve the standards demanded in European markets. Sometimes farmers commission intermediaries to supply labor during harvest periods of harvest because crops like chamomile are labor-intensive and require skilled labor. Nonetheless farmers are facing challenges as they attempt to cultivate their lands organically (relying on organic fertilizers and zero pesticide use). Water shortages and the risk of contamination are binding constraints for farmers wanting to take advantage of the increased demand for organically grown MAPs.

4.2.2 Trade and pre-processing of medicinal and aromatics plants

Traders of MAPs link farmers with exporters. Traders either collect MAPs from farmers on a weekly basis during harvest time and transport them to pre-processing facilities, or they engage in both trading and pre-processing harvests within their own facilities. Pre-processing involves drying the harvest either naturally by sunlight or artificially in drying facilities. Most traders subcontract farmers early in the season based on orders taken from exporters. This allows sufficient advance notice to cover the necessary input costs, for example, in terms of land, labor, fertilizer, and pesticides. By entering into a contract, farmers commit to sell their produce exclusively to a specific trader. In the pre-processing facilities, MAPs are sorted into flowers, petals, and stems, after which they are cleaned or dried and graded before being transported to the exporter's facilities.

4.2.3 Exporters

Exporters are considered leaders and primary marketers within the MAPs value chain. They direct the supply of crops to meet international demand, closely monitoring fluctuating international prices. Exporters increase added-value and enhance product differentiation using sophisticated facilities with large storage capacities. Exporters manage the necessary logistical arrangements to package and transport MAPs to the ports of Alexandria or Damietta, ready for shipment. The export market has been increasingly controlled by a few large exporters that take most of the profit out of the value chain. In addition, it is a great challenge for small exporters to access international markets. Many have established their own websites, but language barriers and the lack of creative marketing tools act as barriers.

4.4 Key bottlenecks

4.4.1 Farmer-level impacts

The curfew imposed by the government to contain the spread of COVID-19 had no pronounced impact on farming activities for crops grown in the winter of 2019. The COVID-19 pandemic spread to Egypt when farmers were harvesting the crops like chamomile and calendula. Drawing any direct correlation between the winter 2019 crop production and the COVID-19 outbreak would be misleading. And given that farmers are contracted to sell their crops prior to cultivation, they were insulated from direct shocks resulting from any decline in demand. As previously mentioned, farmers usually decide on the size of their plantings based on contracts with traders.

In responding to interview questions, farmers claimed that their working hours were not affected by the COVID-19 lockdown and curfew. Farmers mostly employ temporary labor on a needs basis. Few farmers cited that laborers were reluctant to undertake field work during the pandemic. In some instances, farmers were obliged to pay higher wages to laborers to compensate them for risking their health. One farmer explained that nothing would stop a laborer from working, even if it meant risking their life.

Farmers did not lose the season; the majority reported having experienced no negative impact. The main reason cited was that in the early months of 2020 prices actually rose significantly for specific MAPs. The price per ton for chamomile for winter 2019, for example, doubled compared with the winter 2018 price. Fifty percent of interviewed farmers reported a two- to three-week delay in receiving payment from traders, attributing this to the general slowing of the market, but their revenues were either equal to or greater than revenues for the winter 2018 season. None of the farmers reported having experienced a default in payments due.

Some farmers attributed price increases to a sudden spike in international demand for specific MAPs, which are directly tied to pharmaceutical industries and to boosting immunity. Others, who particularly reported no change in their overall profit levels compared with other seasons, claimed that the price increases were simply due to the low quantity of product available in the market. One farmer reported that many neighboring farmers in his area had decided to reduce the area of land allocated to chamomile cultivation because they perceived prices had been low for the previous two seasons. These respondents interpreted that this may have created a shortage of specific MAPs, increasing the price per ton for what was available. There was, however, consensus among the interviewed sample of farmers that unfavorable weather conditions in winter 2019 had negatively affected yields, which supports the argument of a shortage of stock in the market. Nonetheless, high market prices compensated, or insulated, farmers from incurring pronounced losses.

In contrast, the COVID-19 outbreak did alter farmers crop-allocation decisions for the winter 2020 season. One interviewed farmer stated the opinion that when the largest exporter's operations are disrupted, the impact would affect the smallest farmer (and vice versa), nonetheless with a time lag. When farmers were asked about their crop decisions for the winter 2020 season (given that crops were planted after the peak of the pandemic), almost all indicated having changed their allocations. This confirms the time lag between the initial outbreak of the virus and the change in farmers' behavior. The decisions were based on farmers' perceptions of the impact of COVID-19 on markets. Five of a total of eight farmers reported that they chose to cultivate less land area because they viewed the market as unstable and anticipated the likelihood of a second wave in Egypt. One smallholder farmer who claimed to be reluctant to invest more this season revealed that he had cultivated 3 feddans (a little over 3 acres) in 2019, and he planned to cultivate only 1 feddan in 2020. Another farmer indicated that he had cultivated 7 feddans in the 2020 season compared with 20 feddans in 2019.

Only two farmers stated that they cultivated more land in the 2020 season in response to increased demand from traders. Yet another farmer reported that he had not changed his usual crop allocation because he perceived an opportunity to increase profits in 2020 based on better weather conditions and the spike in prices for plants such as chamomile, calendula and basil.

None of the farmers reported wastage due to their pre-existing sales contracts. All the farmers interviewed avoided wastage because traders took all of their produce. The larger farmers, who have their own storage facilities, reported having successfully managed their harvests. One farmer highlighted that his lack of capacity to store crops prevented him from waiting for higher market prices.

Most of the farmers had not applied any COVID-19 precautions because of the relatively high costs of sanitary tools. At the peak of the pandemic a shortage in the supply of masks and gloves in Fayoum and Benisuef was reported, which increased their prices. This comes in addition to the lack of farmer awareness regarding the transmission of the virus. Social distancing was only applied in the field by one large farmer.

4.4.2 Trader-level impacts

Traders of MAPs generally have a competitive advantage over traders of perishable fruits and vegetables. Many of the interviewed traders reported that the fact that most of the processed MAPs can be stored for a period up to three years insulates them from market shocks and resulting losses. Meanwhile, low yields of some MAPS crops, such as chamomile, due to unfavorable weather conditions in winter 2019, coupled with increased demand in March/April 2020 inflated market prices and created an opportunity for traders who had stocks of chamomile stored from previous seasons. As one trader illustrated, prices of chamomile nearly doubled during 2020, such that the price per ton of chamomile had risen from EGP 60,000 in March 2019 to EGP 100,000 in March 2020.

One trader noted that they incur high or low marginal profits, but never losses because traders always set their own profit margin as a commission on the quantity sold. Hence they don't face risk associated with fluctuations in market prices as do farmers. Nevertheless, this does put traders at a disadvantage when the quantity of processed plants is low. Traders working with contracts were likely to have been insulated from some of the negative market impacts of the COVID-19 outbreak.

Low availability of some MAPs, coupled with the COVID-19–related mobility restrictions, limited some traders' productive capacity, and thus their profits. Whereas the international market prices of some MAPs did increase, one interviewee noted that price increases do not necessarily translate into higher revenues for traders; traders are mostly affected by increased yields. Some traders acknowledged being adversely affected by weather conditions, which resulted in lower yields and caused some supply disruptions.

Less than half of the interviewed sample of traders reported experiencing limited or no profits resulting from limited productive capacity during the peak months of COVID-19. One trader explained that curfew had restricted his business activities, causing a decrease in the working hours of his workers and a decline in the amount of MAPs traded from 270 tons in recent seasons, to only 180 tons in 2020. Other traders reported that mobility restrictions increased their order-processing times and caused a few minor delays in collecting payments from exporters, which in turn caused them to be late paying farmers.

Greater storage capacity was a significant contributor to traders' ability to generate higher profits. Whereas traders bare some risk in storing what they purchase from farmers, large traders usually have the power to sell stock when prices are high. Findings from the structured interviews reveal that small and medium-sized traders had little incentive to store produce and wait for higher prices during these market disruptions. The majority were reluctant to wait and to store product in fear of a second wave COVID-19 and the possibility of another lockdown. Large traders were more interested in storing stock and waiting for higher prices. One large trader reported to have doubled his profits in the 2020 season; he explained that those who lost out failed to plan properly or had poor storage capacity or low capital.

Large traders were the only ones to report pronounced profits. All large traders in the sample reported to have gained from the market disruption. Counter to previous arguments, one large trader explained that, although the quantity of MAPs available for processing was low, prices had significantly increased, which counteracted the loss in quantity and enabled positive net profits overall. Another trader noted that his business had expanded in 2020 due to a pronounced spike in demand from exporters; his overall profits had increased by at least 40 percent over the previous season. This trader stated that there was no such thing as loses for a trader, and that if you have sufficient capital you wouldn't be forced to sell when prices were low.

4.4.3 Exporter-level impacts

The exporters interviewed generally reported that supply disruptions flowing from farmers and traders in response to COVID-19 were limited, partly because the peak outbreak occurred after the 2019 harvest season and partly because MAPs are nonperishable. Other exporters highlighted lack of impact because most international orders were already confirmed prior to the outbreak. All interviewees reported that international prices for MAPs had increased steeply. The majority of exporters interviewed perceived that the sector was positively affected by the shock of the pandemic. The price of chamomile, for example, had doubled compared with the prior season (2019 US\$4000–5000 per ton in 2019 compared with a high of \$10,000 in 2020). Five of 6 exporters reported an increase in volume of MAPs exported in 2020, and an associated increase in profits.

In line with other value chain members, some exporters attributed price increases to the limited availability of some MAPs because lower prices in prior seasons had prompted farmers to reduce the area allocated to chamomile this season. Other exporters attributed the price increase to an unprecedented increase in demand due to the COVID-19 outbreak. Other exporters attributed the increased demand for MAPs to a global phenomenon of “panic shopping” during prolonged lockdown periods in Europe. While some MAPs are fall under the category of medicinal and immunity-boosting products, other MAPs are categorized as food products, such as spices, herbs, and teas, for which demand also increased.

It is clear that exporters benefited from the opportunity the market disruption created. Findings from the interviews reveal that exporters succeeded in reaching out to new markets. One exporter highlighted that certain competing suppliers were unable to operate during the pandemic, and that this created new opportunities for Egypt. Nevertheless, there was consensus among all exporters that their daily business activities had been disrupted as a result of the lockdowns and curfew. One exporter reported being negatively affected due to border closures because most of his export business was based around importing MAPs from Sudan for pre-processing and re-export to other countries.

Exporters highlighted that COVID-19–related mobility restrictions slowed their business operations. The production of certain MAPs is highly labor-intensive, and adhering to social distancing guidelines necessitated decreasing the number of workers in their facility, which lowered their production capacity. One exporter noted that production was reduced due to the lockdowns and curfew but this only led to delays in supply as opposed to overall losses.

Financial delays were also reported with many clients postponing disbursement of their payments. One main challenge repeatedly cited was transportation and related mobility restrictions, which led to longer processing times for orders from February to May 2020. Shipment schedules were disrupted, and some ports were temporarily closed, leading to delays in the delivery of orders. In addition, the curfew made it difficult for some exporters to transport their products to the ports of Alexandria and Damietta. While the government enacted a law of freedom of movement for food trucks, it was reported to be weakly enforced at the local level because many officials were unaware of the exemptions. One exporter reported to have been negatively affected by the cancellation of international trade fairs in 2020, which resulted in loss of new orders.

Overall findings reveal that, while global value chain operations slowed, goods related to food and nutrition needed to be available to consumers. Again, exporters highlighted that disruptions tended to cause delays rather than actual losses.

4.5 Key opportunities and policy recommendations

The value chain members were asked to make recommendations both for addressing overarching bottlenecks related to rising global demand for organic MAPs and for mitigating further negative impacts resulting from COVID-19 and related market disruptions.

4.5.1 Interventions targeting farmers

Expand extension services. Farmers need more guidance on how to take advantage of the rising global demand for MAPs. Extension services could direct farmers on the optimal allocation of land area. When farmers were asked about the type of interventions that would assist farmers in responding to a potential second wave of COVID-19, all the farmers interviewed agreed that they needed more advice and direction on how best to respond to increasing global demand for MAPs. In order to minimize crop losses and waste, farmers need greater access to information and guidance, especially during market disruptions—including shocks to supply and demand, adverse weather conditions, and external factors like the COVID-19 pandemic.

Enhance farmer capacity to cultivate organic crops. Farmers need to acquire more knowledge about organic farming in order to comply with international quality standards. With rising global demand for organic MAPs, this is one way for farmers to add value along the value chain, thereby increasing their incomes.

Increase the effectiveness of community associations. Community associations usually have a role in times of crisis, yet some farmers reported that such associations did not provide sufficient support and guidance during the pandemic, for example, in terms of general awareness, precautionary measures, and financial support for vulnerable farmers.

Launch more COVID-19 awareness campaigns targeting rural communities. Rural communities received very little media attention in terms of applying precautionary measures in response to COVID-19.

4.5.2 Interventions targeting traders

Increase collection and storage capacities. It was suggested that it would be beneficial to encourage donors to launch public–private partnerships focusing on building common storage facilities in order to allow farmers to maintain high-quality stores for use during times of low demand or low prices. The private sector should be encouraged to build common collection centers and storage facilities to enable smallholders to overcome storage and processing constraints. Traders have a competitive edge because MAPs are nonperishable and able to be stored for up to three years, if handled properly. Having larger storage capacities would assist traders in maintaining products in the event of market slowdowns or shutdowns.

Ensure that traders are exempt from curfews. In the event of a second wave of COVID-19, traders need to be exempt from curfews to ensure they can harvest, pre-process, and store their crops without incurring delays.

Encourage local markets to take advantage of the opportunity to serve locally. MAPs are not only in demand international markets, but also in local markets. Traders have suggested that developing these local markets would benefit the entire value chain and reduce or even eliminate the need to import MAPs.

4.5.3 Interventions targeting exporters

Policies directed to exporters would have flow-on effects to traders and farmers. For this reason, most value chain members highlighted that any policy supporting exporters would benefit the entire value chain.

Develop new markets to mitigate risk. Exporters have highlighted the importance of developing new markets (beyond Europe) by increasing participation in international trade fairs and subsidizing the participation of small and medium-sized enterprises.

Establish a transparent market platform for information sharing. Value chain members need accurate and accessible information on market prices to guide farmers in making crop allocation decisions, to create necessary value chain linkages, and to strengthen bargaining power. Short-term there are numerous cost-effective ways to enhance availability and access of market data. For example, the local government can disseminate price information in local newspapers, via podcasts or television, and at major wholesale markets. Longer term, commodity exchange markets need to be developed to create a more resilient market monitor/platform that displays timely market-based information on the most-demanded crops, such as current prices.

Enhance online marketing and digitalization. To overcome mobility limitations during the COVID-19 pandemic, the Ministry of Trade and Industry should offer services to support exporters in developing online marketing and improving their IT and digital capacities.

4.5.4 Interventions addressing bottlenecks beyond COVID-19 shock

Resolve sectoral constraints related to developing organic MAPs for international markets. A clear opportunity exists to fill the demand for organic MAPs, but this would require meeting international quality standards, which in turn would require local government intervention and collective action to eliminate existing barriers.

Address water scarcity and contamination issues. Taking advantage of the growing international demand for organic MAPs will necessitate addressing water scarcity and contamination issues in Beni-Suef and Fayoum. Farmers rely on agricultural drainage water, which is often contaminated by pesticides and residues from other crops, thereby preventing farmers' from producing organic MAPs. This should be the joint responsibility of the Ministry of Water Resources and Irrigation and the Ministry of Agriculture and Land Reclamation.

Establish a separate database for MAPs production and exports in Egypt. Currently the sector lacks data with which to forecast and track developments over time. Such data would assist agricultural experts in times of crisis or market shocks, and enable them to quantify production shifts and overcome potential losses. Information on the crops in highest demand and records of transactions, such as production and exported amounts and waste tracking, could guide value chain members in identifying and hence addressing local and global market dynamics. MARL should be responsible for this and could enhance its data collection in order to guide the sector and promote evidence-based policymaking.

5. CONCLUSION

Cluster-based business development is a favorable business model in the context of Egypt. The government has introduced macroeconomic reforms to facilitate improvements in the country's competitiveness, and a young labor force provides labor-intensive sectors with a clear comparative

advantage. The key is to overcome obstacles within and beyond the clusters, and to expand markets to drive growth. As expected, challenges and obstacles, whether overarching or in response to shocks, vary greatly by sector and context.

The relocation of business clusters is a rarely studied phenomenon. The relocation of Egypt's leather cluster to RLC solved the immediate problems of environmental pollution and lack of production space, allowing firms the scope to install modern machinery, increase the scale of their production, and meet the more stringent international standards for the export market. Hence, the relocation provides great future potential for the cluster to modernize and expand. Nevertheless, new challenges have emerged, including the rising cost of production inputs, such as water, electricity, and labor; issues with quality levels; lack of skilled labor; and declining international demand. These are not challenges that can be addressed at the firm level; they require coordinated collective action facilitated by enabling government policies and interventions. Lack of skilled workers, for example, is a significant constraint to achieving the level of quality needed on international markets, but businesses are reluctant to invest in training due to high rates of staff turnover: the provision of training at the cluster level would address this constraint. More studies are needed, especially focusing on marketing strategies and effecting the third phase of investment in RLC, developing an integrated industrial community with the necessary infrastructure and services to attract and expand the cluster.

The MAPs sector in Egypt faced an entirely new kind of shock as a result of the COVID-19 pandemic, and being a huge source of foreign currency and directly tied to an export market, the sector was exposed to market disruptions. Overall, however, the sector responded well to the initial impact of the outbreak for numerous reasons: (1) MAP harvests are pre-sold to traders and exporters and thus farmers were insulated from direct shocks resulting from any decline in demand, (2) MAPs are nonperishable, (3) exporters had already secured international orders and the 2019 harvest was ready for export when the outbreak occurred, and (4) the pandemic potentially increased the market for Egyptian products. Key opportunities to offset the negative impacts of the pandemic will be to take advantage of new markets for Egyptian MAPs stemming from supply disruptions in other countries; increased global demand for MAPs due to their pharmacological and health properties; and increased international demand for organically grown MAPs. In addition to increasing awareness of dealing with COVID-19, key supporting government interventions needed include increased extension services to assist farmers in taking advantage of the increased demand for MAPs; support for growing organic crops, including complying with international standards; and capacity building of community associations to increase their effectiveness.

REFERENCES

- Abdelaziz, F., H. El-Enbaby, X. Zhang, and C. Breisinger. 2018. *Clusters as Drivers of Local Industrial Development in Egypt: Which are the Promising Sectors and Locations?* MENA RP Working Paper 10. Washington, DC, and Cairo: International Food Policy Research Institute.
- Abou El-Kheir, M. 2010. Promoting International and Intra-African Trade in Leather, Supply/Demand Survey Egypt. International Trade Center, COMESA.
- Banerjee, A., and K. Munshi. 2004. "How efficiently is capital allocated? Evidence from the knitted garment industry in Tirupur." *Review of Economic Studies*, 71 (1): 19–42.
- Central Agency for Public Mobilization and Statistics (CAPMAS). 2020a. *April 2020 Livestock Bulletin*. https://www.capmas.gov.eg/Pages/Publications.aspx?page_id=5104&YearID=23466
- _____. 2020b. Livestock statistics. https://www.capmas.gov.eg/Pages/IndicatorsPage.aspx?Ind_id=2370
- CID (Cairo Investment for Development). 2019. "About Us." <https://cid-egypt.com/about-us/>.
- Dai, R., D. Mookherjee, K. Munshi, and X. Zhang. 2018. *Community networks and the growth of private enterprise in China*. Cambridge Working Papers in Economics 1850, Cambridge, UK: Faculty of Economics, University of Cambridge.
- Egypt Today. 2019. "Leather exports decline in 8 months due to global demand." www.egypttoday.com/Article/3/75952/Leather-exports-decline-in-8-months-due-to-global-demand.
- Fleisher, B., D. Hu, W. McGuire, and X. Zhang. 2010. "The evolution of an industrial cluster in China." *China Economic Review*, 21 (3): 456–469.
- Haddad, G., & Samy, S. (2018). *The Status of Leather Supply Chain in Egypt*. (A. a. technology, Ed.) Innolea Project. Retrieved from Arab Academy for Sciences, Technology and Maritime transport.
- Hassan, I. 2014. The Role of Integrated Industrial Societies in Promoting the Egyptian Industry with Application to the Leather Industries. Masters' thesis, Ain Shams University, Cairo.
- Huang, Z., X. Zhang, and Y. Zhu. 2008. The role of clustering in rural industrialization: A case study of Wenzhou's footwear industry. *China Economic Review* 19: 409–420.
- IDA (Industrial Development Authority). 2019. *Number of registered tanning establishments*. Accessed in 2019.
- Kali, R. 1999. "Endogenous business networks." *Journal of Law, Economics, and Organization*, 15 (3): 615–636.
- Kranton, R. 1996. "Reciprocal exchange: A self-sustaining system." *American Economic Review*, 86 (4): 830–851.
- Lin, J. 2012. *The Quest for Prosperity: How Developing Economies Can Take Off*. Princeton, NJ, USA: Princeton University.
- Long, C., and X. Zhang. 2011. "Cluster-based industrialization in China: Financing and performance." *Journal of International Economics*, 84 (1): 112–123.
- Macchiavello, R., and A. Morjaria. 2015. "The value of relationships: evidence from a supply shock to Kenyan rose exports." *American Economic Review*, 105 (9): 2911–2945.
- _____. 2019. "Competition and relational contracts in the Rwanda coffee chain." CEPR Discussion Paper 13607. Centre for Economic Policy Research Discussion Papers.
- Marshall, A. 1920. *Principles of Economics*. London: Macmillan.
- McMillan, J., and C. Woodruff. 1999a. "Dispute prevention without courts in Vietnam." *Journal of Law, Economics, and Organization*, 15 (3): 637–658.
- _____. 1999b. "Interfirm relationships and informal credit in Vietnam." *Quarterly Journal of Economics*, 114 (4): 1285–1320.
- Morsi, B. 2018. An economic study of leather as one of the most important waste of livestock massacres in Greater Cairo. Ain shams University Press.MTI (Ministry of Trade and Industry).
- Robbiki Leather City Mega Project, Egypt Industrial Projects pipeline. Cairo.
- Porter, M. 1990. "The competitive advantage of nations." *Harvard Business Review*, 6 (2): 73.

- Ruan, J., and X. Zhang. 2009. "Finance and cluster-based industrial development in China." *Economic Development and Cultural Change*, 58 (1): 143-164.
- Sonobe, T. and K. Otsuka. 2006. *Cluster-Based Industrial Development: An East Asian Model*. London: Palgrave MacMillan.
- United Nations Conference on Trade and Development Statistics (UNCTADstat). 2020. Revealed Comparative Advantage. <https://unctadstat.unctad.org/en/RcaRadar.html>
- UN Comtrade. 2020. <https://comtrade.un.org/data/>
- UNIDO (United Nations Industrial Development Organization). 2010. Future Trends in the World Leather and Leather Products Industry and Trade. https://leatherpanel.org/sites/default/files/publications-attachments/future_trends_in_the_world_leather_and_leather_products_industry_and_trade.pdf.
- _____. 2017. "Case study: Leather industrial Parks: Planning, implementation, challenges and experiences." Vienna, https://leatherpanel.org/sites/default/files/publications-attachments/case_study_leather_industrial_parks_p.pdf
- USDA (United States Department of Agriculture). 2018. *Egypt Livestock and Products Annual 2018 Report No. EG-18021*. USDA Foreign Agricultural Service Global Agricultural Information Network.
- Tiberti, M. & Costa, V. 2019. *Disability Measurement in Household Surveys: A Guidebook for Designing Household Survey Questionnaires*. Washington
- Whyte, J. 1982. "Levels of Language Competence and Reading Ability: An Exploratory Investigation." *Journal of Research in Reading*. <https://doi.org/10.1111/j.1467-9817.1982.tb00138.x>.
- WTO (World Trade Organization). 2018. Trade Policy Review body. WT/TPR/S/367. <https://docs.wto.org/dol2fe/Pages/SS/directdoc.aspx?filename=q:/WT/TPR/S367R1.pdf>.
- Yoshiko, Y., ed. 2011. *Industrial Clusters and Micro and Small Enterprises in Africa*. Washington, DC: World Bank.
- Zhang, X. 2019. "Building effective clusters and industrial parks." In *The Oxford Handbook of Structural Transformation*, Célestin Monga and Justin Yifu, ed. Oxford University Press.
- Zhang, X. and Hu, D. 2014. "Overcoming successive bottlenecks: The Evolution of a potato cluster in China." *World Development*, 63: 102–112.
- Xu, C. and X. Zhang, 2009. *The evolution of Chinese entrepreneurial firms: Township-village enterprises revisited*. IFPRI Discussion Paper 854. Washington, DC: International Food Policy Research Institute.

APPENDICES

Appendix 1: Supplementary tables

Appendix Table 3.1 Entrepreneur survey questionnaire type

Categories of questions	Numbers of questions	Hypothesis or research questions
Business owner's information	3	Describe the historical evolution and inner workings of the Egyptian leather cluster
Internal production	5	
Borrowing of funds	3	What are the significant variables that create incentives for firms to cooperate?
Trade credit from suppliers	4	
Trade credit from customers	6	
Quality control	6	What are the typical bottlenecks facing firms in the cluster?
Cluster risk	6	
Human capital development	4	What is the role of local government and business associations in organizing joint actions?
Business environment	5	How do firms perform within clusters compared with those outside them?

Source: Authors, based on survey of business owners.

Appendix Table 3.2: Survey coding system

Code	Extent of the problem	Percentage
1	NO problem/action	0–4%
2	MILD problem	5–24%
3	MODERATE problem	25–49%
4	SEVERE problem	50–95%
5	COMPLETE problem/action	96–100%

Source: Based on Tiberti and Costa, 2019..

Note: The International Classification of Functioning, Disability and Health (ICF) codes for impairments and environmental factors use the same qualifiers to denote the extent (or severity) of the problem and the nature of the change.

Appendix Table 3.3: HS (Harmonized System) code related to leather products

HS code	Description
4101	Rawhides and skins of bovine (including buffalo), preserved but not tanned, or split
4102	Raw skins of sheep or lambs (fresh, salted, dried, limed, pickled or otherwise preserved, but not further prepared), or split
4103	Rawhides and skins in headings 4101 and 4102; fresh, salted, dried, pickled or otherwise preserved, not further prepared
4104	Tanned or crust hides and skins of bovine (including buffalo) or equine animals, without hair, whether split or not
4105	Tanned or crust skins of sheep and lambs, without wool, whether split or not, but not further prepared
4106	Tanned or crust hides and skins of other animals, without wool or hair, whether split or not, but not further prepared
4107	Leather further prepared after tanning or crusting, including parchment-dressed leather, of bovine (including buffalo) leather under heading 4114
4112	Leather further prepared after tanning or crusting, including parchment dressed leather, of sheep or lamb, without wool whether split or not, other than leather of heading 4114
4113	Leather further prepared after tanning or crusting, including parchment-dressed leather, of animals (other than ovine), without wool

Source: UNCOMTRADE 2020.

Appendix Table 3.4: Type of incentives for industrial sector

Type of incentive	Related laws
Exemption from taxes on the registration of the land required to establish the company.	Exemption Law No. 186/1986) on the value of imports of machinery and equipment to be used to set up the company or in any public utility project. (used by the large investor in Robbiki when they import their new machinery)
Fifty percent discount on the net profits for investment costs incurred in specific areas defined in Decree No. 2310/2017. Examples include Economic Zone of the Suez Canal, the Economic Zone of the Golden Triangle, and areas most in need of development (high levels of poverty and low levels of education and health services).	Industrial investment projects subject to the Investment Law may import exempt from customs duties for temporary use in the manufacturing of products to be re-exported abroad. It could be applied in the imports of chemical materials necessary for the tanning industries and export as finished tanned leather.
Thirty percent discount on net profits under Decree No. 2310/2017. Example include labor-intensive projects as defined in the Regulations (at least 500 Egyptian workers, with the cost of wages representing at least 30 percent of the production costs). Represents small and medium-size enterprises and projects like the firms in RLC.	Decree No. 72/2017, Section 2, Article 11. Refund 50 percent of the value of the land allocated to industrial projects in case the production starts within two years of the land delivery date <ul style="list-style-type: none"> • Establish customs offices dedicated to an investment project's exports or imports in agreement with the Ministry of Finance. • Under the Investment Law, investors may import raw materials, production supplies, machinery, equipment, spare parts, and transport equipment that suit the nature of the investment project and are required for the establishment, expansion, operation, or exportation without the need to register in the Register of Exporters or Importers. • Investors may deduct income tax expenses up to 10 percent of their yearly profits to create a social development system in one of the following categories: (1) enhancing the protection of the environment, (2) providing social or cultural support, (3) providing vocational training or supporting university-based research

Source: WTO 2018.

Appendix Table 3.5: Major leather industry institutions and their roles

Organization name	Organization mandate	Organization role
Chamber of Tanning Industries and Chamber of the Leather industry	Legal representatives of the sector, the chambers are nonprofit organizations that provide services to more than 750 manufacturers of shoes, leather goods, apparel, and related components, and 200 tanneries. Both organizations and their memberships are private businesses.	<ul style="list-style-type: none"> • Provide technical and marketing assistance • Participate in local and international trade fairs • Members can obtain assistance in resolving business-related issues
Leather export council	Non-governmental authority under the supervision of the Ministry of Trade and Industry. Members have specific export development goals.	<ul style="list-style-type: none"> • Plays an effective role with various sectors • Has shown impressive export growth
Egyptian Exporters Association (Expo link)	The association was established in 1997 with the assistance of the United States Agency for International Development. It is currently supported by the Industrial Modernization Center	<ul style="list-style-type: none"> • Mainly focuses on the professional organization of overseas trade fairs, as well as local exhibitions • May provide expert services as requested by enterprises on the basis of a share contribution

/Continued

Appendix Table 3.5 (continued)

Name of the organization	The mandate of the organization	Roles
Footwear and Leather Industry Service Centre (FLISC)	FLISC was established in 2000 with the support of the social fund for development to formulate a design center using modern systems for shoe design	<ul style="list-style-type: none"> • Provides services to the leather industry • Provides fashion design and marketing information • Provides direct assistance to local small-scale footwear and leather-goods manufacturers
Footwear Training Centre, Amereya	A vocational training center was established with assistance of the German GTZ (The Egyptian German Footwear Training Centre) equipped with a design center, a small testing laboratory and a very modern complete production line for shoes.	<ul style="list-style-type: none"> • Gives long term course for 2 years with a certificate covering designing like the German ways. • Offer short term courses for upgrading labor skills.
Leather Technology Centre	Under the Ministry of Trade and Industry within series of Technology Centers, based on Robbiki cluster	<ul style="list-style-type: none"> • Provides assistance to leather goods manufacturers on technology-related issues
Egyptian Organization for Standardization and Quality Control	Started in 1957, was established by a presidential decree and assigned to test products & materials, and industrial calibrations. Considers as inspection authority to validate the tanning leather.	<ul style="list-style-type: none"> • Issued a set of standards and testing methods for different types of leather materials, footwear, and components.
Industrial development authority (IDA)	Created by Presidential Decree No. 350/2005 is the body in charge of implementing industrial policy in Egypt. As example of main purpose is to provide land policies especially for industrial purposes, giving lands for investors; promulgate instructions to build new clusters with vision to increase the value added of Egyptian industrial production.	<ul style="list-style-type: none"> • Focuses on attracting more foreign and local investment • Is supporting local manufacturing, rationalizing the use of natural resources, and minimizing the trade deficit • Is responsible for establishing factories, providing utilities, and issuing licenses for them
Industrial modernization center (IMC)	Established by a Presidential Decree in December 2000 to drive a sustainable, modernized, vibrant and competitive Egyptian industry. IMC built up a portfolio based on a demand driven to maintain a dynamic approach to accommodate challenges of the industry.	<ul style="list-style-type: none"> • Supports firms in developing their businesses under the supervision of Ministry of Trade and Industry
Italian agency for the development cooperation (ACI)	This agency offers the technical assistance to implement the Robbiki Cluster City through the project management unit in collaboration with the Egyptian government.	<ul style="list-style-type: none"> • Provides technical assistance for the tannery industry • Assists RLC's technology center
The General Authority for Investment and Free Zones (GAFI)	Administrative governmental body responsible for facilitating investment in Egypt by indicating the investment map and the industrial opportunities in target sectors.	<ul style="list-style-type: none"> • Law No. 83/2016 granted IDA exclusive authority over industrial land, including planning, development, and installation of utilities and infrastructure, maintenance, and the bidding process for use of land
Ministry of Trade and Industry (MTI)	The official body mandated to coordinate activities among the 22 relevant entities.	<p>The strategy for 2016–2020 focused on five key pillars:</p> <ol style="list-style-type: none"> 1. Industrial development 2. Micro, small-sized, and medium enterprises and entrepreneurship development 3. Export development 4. Upgrading technical and vocational education 5. Governance and institutional development

Source: Abou El-Kheir 2010.

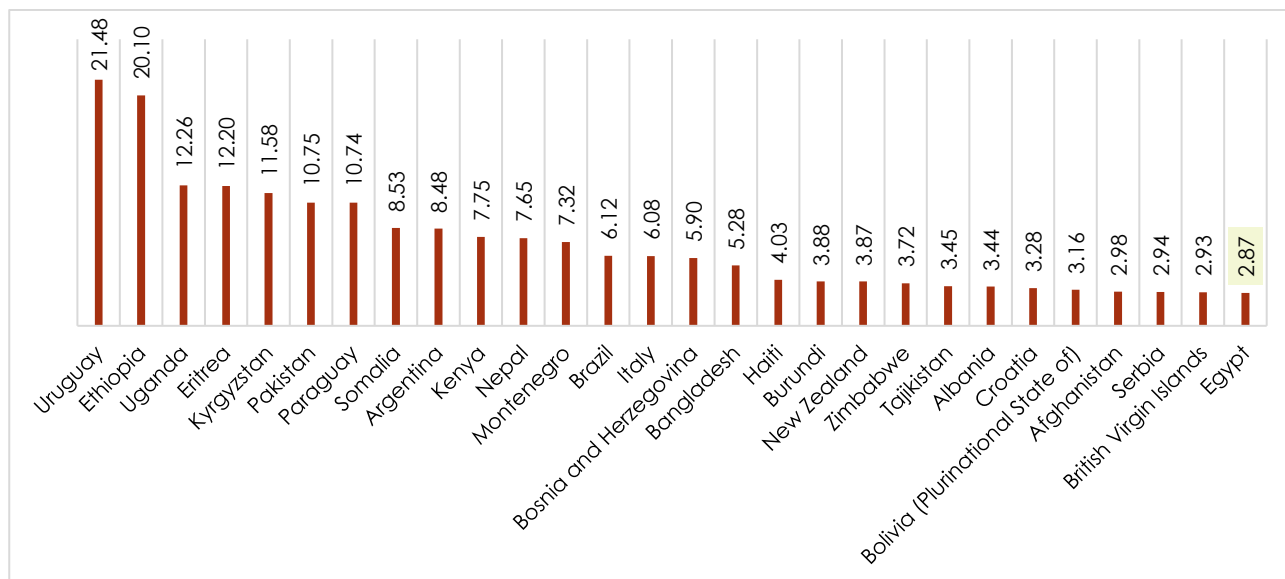
Appendix Table 3.6: Livestock information, 2007–2018

Year	No. of livestock (1,000 head)	No. of slaughterhouses	Fortifications by lumpy skin vaccine	Fortifications against foot-and-mouth disease
2007	1,987	7,487	2.1	14.2
2008	1,825	7,634	2.3	7.4
2009	1,822	7,581	2.9	7.9
2010	1,650	7,670	2.0	6.0
2011	1,700	7,667	2.2	10.3
2012	1,550	7,700	2.2	9.5
2013	1,620	7,536	3.1	6.1
2014	1,700	7,491	1.0	7.0
2015	1,780	7,403	1.5	6.6
2016	1,850	7,500	1.7	6.7
2017	1,850	5,673	1.7	1.2
2018	1,930	5,673	2.9	8.1

Source: CAPMAS 2020a, CAPMAS 2020b.

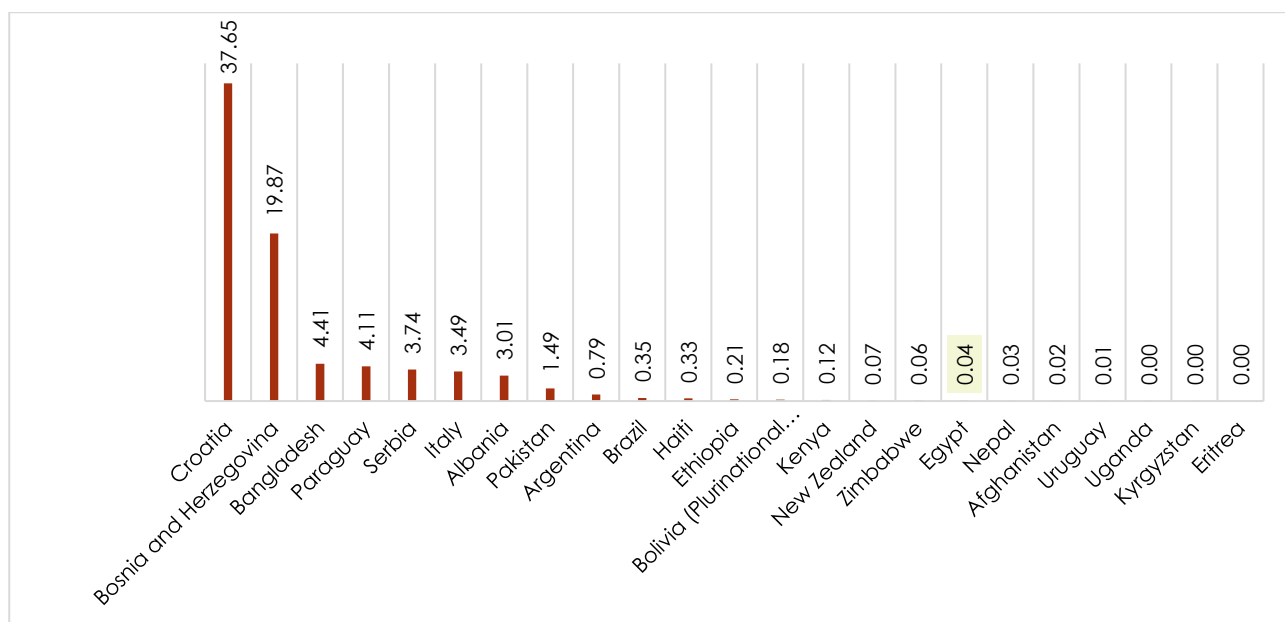
Appendix 2: Supplementary Figures

Appendix Figure 3.1: Yearly revealed comparative advantage index, selected countries



Source: UNCTAD 2020.

Appendix Figure 3.2: Leather manufacturing, selected countries



Source: UNCTAD 2020.

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ACKNOWLEDGMENTS

The findings presented in this Working Paper are based on a collaborative project funded by the Food and Agriculture Organization of the United Nations and implemented by the International Food Policy Research Institute.

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The Middle East and North Africa Regional Program is managed by the Egypt Strategy Support Program of the International Food Policy Research Institute (IFPRI). The research presented here was conducted as part of the CGIAR Research Program on Policies, Institutions, and Markets (PIM), which is led by IFPRI. This publication has been prepared as an output of the Egypt Strategy Support Program. It has not been independently peer reviewed. Any opinions expressed here belong to the author(s) and do not necessarily reflect those of IFPRI, PIM, or CGIAR.

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