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20

Lebanon's agrifood system in times of turbulence: obstacles and opportunities

FAO AGRICULTURAL DEVELOPMENT ECONOMICS TECHNICAL STUDY

20

Lebanon's agrifood system in times of turbulence: obstacles and opportunities

By

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Preface

In Lebanon, the Ministry of Agriculture (MoA) is the institution responsible for setting the agriculture strategic framework, formulating, and implementing policies/programmes for the development of the sector in Lebanon. The MoA is responsible for developing a suitable legal and regulatory framework and enhancing infrastructure development to promote investment and improve agricultural production and marketing. The MoA also plays an important role in the management of natural resources of the country (agricultural land, irrigation water, forests, fisheries, pasturelands) and contributes to rural development programmes.

The MoA with support from the European Union funded Agriculture and Rural Development Programme (ARDP) have formulated the National Agricultural Strategy (NAS) 2015–2020. This Programme is now completing its cycle of implementation and the MoA has requested the Food and Agriculture Organization of the United Nations (FAO) to conduct studies/assessment in support of agricultural policy design and implementation and to update the NAS.

In support to NAS preparation, the Agriculture Sector Review was produced by the end of September 2020 and published in June 2021 based on findings and literature and reviewed and approved by the MoA. Jointly with the findings of the consultative workshops on the national priorities for the sector, the Agriculture Sector Review findings provided the basis and rationale to define the priority axes of the NAS 2020–2025.

But after the preparation of the ASR, the Lebanese economy went into more disarray. The economic and financial crisis and the COVID-19 pandemic have had a serious impact on the economy and the agricultural sector in particular that was already suffering from grave problems, including productivity constraints, limited access to finance in rural areas, insufficient agricultural technologies, employment challenges, inefficiency in the use of water and inputs, poor agricultural infrastructure, inefficiencies in the public extension service and weak institutional support. Moreover, the COVID-19 crisis is aggravating the challenges faced by Lebanon. Worldwide containment measures have had a significant impact on the market for agricultural inputs, and the pandemic has caused a substantial decline in the availability of agricultural labour due to illness, risk-aversion, and quarantine restrictions, among other reasons.

Therefore, an update of the agricultural sector review is required to identify the main economic and social challenges related to the agrifood sector that the country has been facing since May 2020 and recommend evidence-based strategies and priority areas for public investment to cope with the impacts of the COVID-19 pandemic and the economic and financial crisis. The updated agricultural sector review complements the ASR published in June 2021. This study was prepared during the period from September 2021 to February 2022 and does not incorporate latest developments emerging from the impact of the war in Ukraine on the agricultural and food security sectors in Lebanon.

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Acronyms

ASR	agricultural sector review
CH4	methane
CPI	consumer price index
CNRS-L	Conseil National pour la Recherche Scientifique
ESCWA	United Nations Economic and Social Commission for Western Asia
GEF	Global Environment Facility
GHG	greenhouse gas
GDP	gross domestic product
GVC	global value chain
ILO	International Labour Organization
KII	key informant interview
KWH	kilowatt hour
LBP	Lebanese pound
MoA	Ministry of Agriculture
MoE	Ministry of Environment
MoET	Ministry of Economy and Trade
N2O	nitrous oxide
PoB	Port of Beirut
OxCGRT	Oxford COVID-19 Government Response Tracker
RCA	Revealed comparative advantage
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
USD	United States dollar
WFP	World Food Programme
WITS	World Integrated Trade Solution

Executive summary

This study aims to identify Lebanon's main economic and social challenges related to the agrifood sector and to recommend evidence-based strategies and priority areas for public investment to cope with the impacts of the financial crisis, the COVID-19 pandemic and the PoB explosion. It aims to update and complement the June 2021 ASR. It should be noted that this study was prepared during the period from September 2021 to February 2022 and does not cover latest developments, such as the impact of the war in Ukraine on the agricultural and food security sectors in Lebanon.

Section 1 presents the aim and scope of the study. Section 2 describes the current macroeconomic situation in Lebanon and outlines the causes and magnitude of the multiple crises that Lebanon has faced since 2019, including the financial crisis arising in August 2019, the COVID-19 pandemic in February 2020, and the explosion in the Port of Beirut (PoB) in August 2020. Prior to the financial crisis, the Lebanese economy had already struggled with slow growth and continuous decline in gross domestic product (GDP) per capita since 2011. The main aim of Section 2 is to highlight the macroeconomic impact of the financial crisis, and its effect on the country's agrifood systems. Lebanon has witnessed a huge contraction of the economy in the last two years, which has affected household income and labour force participation. The devaluation of the currency and draining of foreign reserves has added additional pressure on the ability of the country to import, affecting both household consumption and the purchase of intermediate goods, such as agricultural inputs, e.g. seeds and fertilizers.

The social and economic impact of the financial crisis has been aggravated by the COVID-19 pandemic. Section 3 describes the magnitude of the COVID-19 outbreak in Lebanon and the policy responses used to mitigate the social and economic impacts of the pandemic. It highlights the exacerbated impact of the pandemic on the Lebanese agrifood sector, especially on food security and international trade.

Section 4 provides a detailed overview of Lebanon's agrifood systems using the latest available data provided by the Lebanese government and FAOSTAT.[1] It briefly highlights the impact of the financial crisis on agricultural production and discusses the major agricultural products produced in Lebanon, mainly fruits (including citrus fruits) and, to a lesser extent, vegetables, meat, and milk. Major crops include tomatoes, wheat, olives, and apples; while major livestock products include poultry meat, fresh whole cow milk and hen eggs in shell. Furthermore, this section briefly discusses the socioeconomic characteristics of Lebanese farmers and the minimal contribution of the agricultural sector to greenhouse gas (GHG) emissions in Lebanon.

Section 5 discusses Lebanon's agrifood international trade. Lebanon's agrifood sector contributes a significant portion of total Lebanese trade, representing nearly a fifth of total exports and imports in 2020. The devaluation of the Lebanese pound and the pandemic has improved the agricultural trade balance, leading to a decrease in imports and an increase in exports between 2019 and 2020, a pattern confirmed in the first months of 2021. Food exports and imports are widely distributed across a variety of products and markets, mostly in neighbouring Arab countries, so that the country is not overly reliant on a limited range of exports and imports, value chains or partners. However, the export concentration index increased between 2018 and 2020, putting the country on a less diversified trajectory.

[1] The Food and Agriculture Organization Corporate Statistical Database (FAOSTAT) website disseminates statistical data collected and maintained by FAO.

Lebanon maintains a comparative advantage in vegetable, fruits, and food products, particularly when compared to similar countries. In terms of agricultural inputs, Lebanon still depends largely on imports for pesticides and seeds

Section 6 reports the perceptions of stakeholders drawn from key informant interviews (KIIs) conducted during October–November 2021. The KIIs engaged with several major actors engaged in the agrifood sector, including input suppliers, wholesale traders, exporters of agricultural products, agricultural holders engaged in plant and animal production activities, farmers' associations, chambers of commerce, industry and agriculture, organic experts, extension agents and financial institutions.

Finally, Section 7 proposes several strategies and recommendations that could be adopted by policymakers in response to the current challenges. Given the severe drop in production capacity due to reduced agricultural investments, increased production costs, shortages in imported agricultural inputs and a straitened water supply, it will be essential to facilitate the availability of adequate financial services for Lebanese farmers at affordable prices. It is equally important to prioritize farmers' access to agricultural inputs in the short term, possibly through cash transfers, to mitigate the impact of inflated input prices, while aiming to increase public expenditure on agriculture in the longer term. Formalizing agricultural employment would provide legal and social protection for workers and could increase government revenues from taxes, which could be used to increase public expenditure on agriculture.

Currency devaluation and disruptions in global value chains during the pandemic had a positive impact on Lebanon's agricultural exports during 2020 and the first quarter of 2021. The MoA could encourage the production of labour-intensive cash crops, such as fruits and vegetables, to improve farmers' income and sustain or increase employment opportunities in the sector. In addition, increasing the production of staple foods could mitigate the impact of hyperinflation on food prices and ensure access to affordable and nutritious food.

1 Introduction

Today, Lebanon faces unprecedented economic and sociopolitical challenges. The financial crisis in August 2019, followed by the COVID-19 pandemic in February 2020, and the explosion in Port of Beirut (PoB) in August 2020, have created one of the most severe economic crisis since the mid-twentieth century.

Lebanon was already suffered from political deadlock and social unrest before August 2019, while the economy struggled with slow growth and pressure from external geopolitical instabilities. The agricultural sector faced significant burdens, including productivity constraints; limited access to finance in rural areas; insufficient agricultural technologies; employment challenges; inefficiency in the use of water and inputs; poor agricultural infrastructure; inefficiencies in the public extension service; and weak institutional support.

Political deadlock, compounded by the financial crisis and the explosion in the PoB, intensified the impact of the COVID-19 pandemic. These shocks have affected nearly all major economic activities in Lebanon. For example, Lebanon's ability to import goods has been hugely constrained by limited foreign reserves and the devaluation of the currency, affecting both food security and agricultural production. The constraints to international trade have led to fuel shortages, which has caused frequent electricity outages. In addition, food prices shot up to extreme levels due to the devaluation of the Lebanese pound (LBP) and declines in imported food and agricultural inputs. Nevertheless, some opportunities for the agricultural sector have arisen from the compound crises: the devaluation of the LBP and the disruption of global value chains (GVCs) – due to the pandemic –increased Lebanon's agricultural exports in 2020 and first quarter of 2021.

The main objective of this study is to identify the main economic and social challenges to the agrifood sector since May 2020 and to recommend evidence-based strategies and priorities for public investment. Quantitative and qualitative data were used to draw a current picture of the impact of the pandemic and the economic crisis on the agrifood sector. Secondary quantitative data were collected from official government sources, United Nations specialized agencies and other socioeconomic open data sources. In addition, a total of 26 key informant interviews (KIIs) were conducted between October–November 2021. The KIIs covered several key actors engaged in the agrifood sector, including input suppliers (9), wholesale traders (3), exporters of agricultural products (3), agricultural holders engaged in plant and animal production activities (5) and other key stakeholders (6).

The report is structured as follows. Section 2 provides an overview of Lebanon's economic crisis and its impacts. Section 3 focuses on the social and economic impacts of COVID-19 on the agrifood sector. Section 4 provides a current account of agrifood systems in Lebanon. Section 5 discusses Lebanon's exports and imports in agriculture and food commodities, and Section 6 presents stakeholders' perceptions as drawn from key informant interviews (KIIs). Section 7 concludes the report with evidence-based policy recommendations.

2 Lebanon's multiple crises

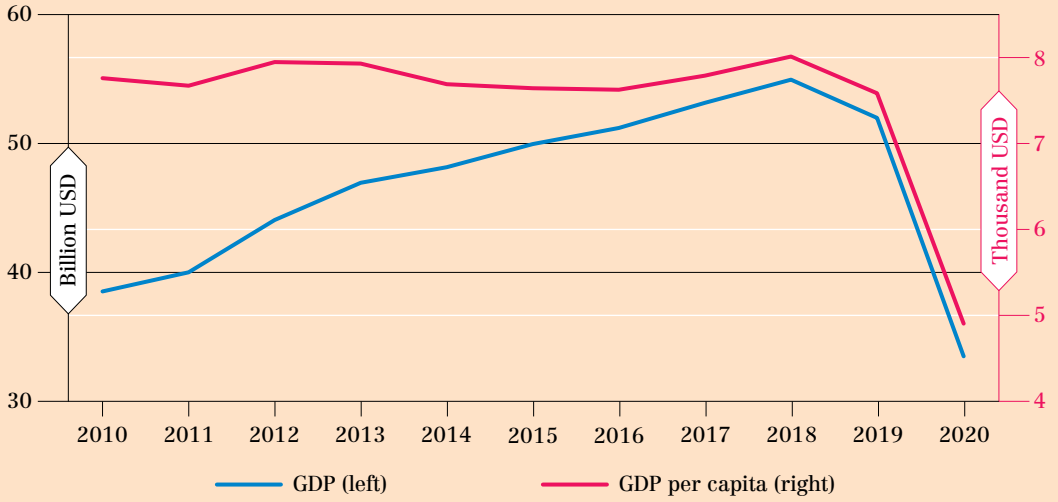
KEY MESSAGES

- Lebanon has witnessed a massive contraction of the economy over the past two years, with real gross domestic product declining from USD 51.9 billion in 2019 to USD 33.4 billion in 2020, while the per capita GDP declined from USD 7.6 thousand to USD 4.9 thousand.
- The agricultural sector accounts for a small share of the economy, representing only 3.25 percent of the GDP at current prices. The service sector constitutes the highest share of the Lebanese economy, followed by the industrial sector.
- The Lebanese economy largely depends on remittances, foreign direct investments, and international aid, with most of the investments going to the construction and development sectors.
- The devaluation of the currency and draining of foreign reserves compromised the ability of the country to import, which affected both household consumption and the purchase of intermediate goods.

2.1 The macroeconomic setting

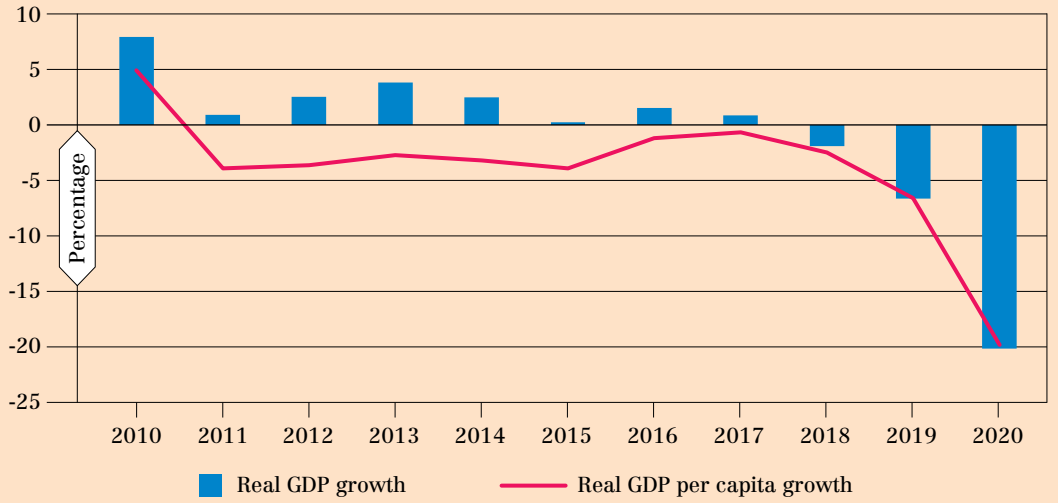
The multiple crises facing Lebanon today have had severe economic and social impacts. The ongoing financial crisis, which started in August 2019, followed by the COVID-19 pandemic in February 2020 and the explosion in the Port of Beirut (PoB) in August 2020 have given rise to one of the most serious global catastrophes since the mid-twentieth century (Harake *et al.*, 2021). Lebanon has witnessed a massive contraction of the economy over the past two years, with real gross domestic product (GDP) declining by more than 20.3, from USD 51.9 billion in 2019 to USD 33.4 billion in 2020, while the per capita GDP declined from USD 7.6 thousand to USD 4.9 thousand (see Figure 1 and Figure 2). Even before the eruption of the financial crisis, the economy was already struggling with slow growth and a continuous decline in per capita GDP since the start of the Syrian war in 2011 (Figure 2).

FIGURE 1 Trends in GDP and per capita GDP in Lebanon, 2010–2020



Source: Authors' elaboration based on World Bank. 2021. DataBank | World Development Indicators. In: *World Bank*. Washington, DC. Cited 12 October 2021. https://databank.worldbank.org/source/world-development-indicators

FIGURE 2 GDP and per capita GDP growth trends in Lebanon, 2010–2020

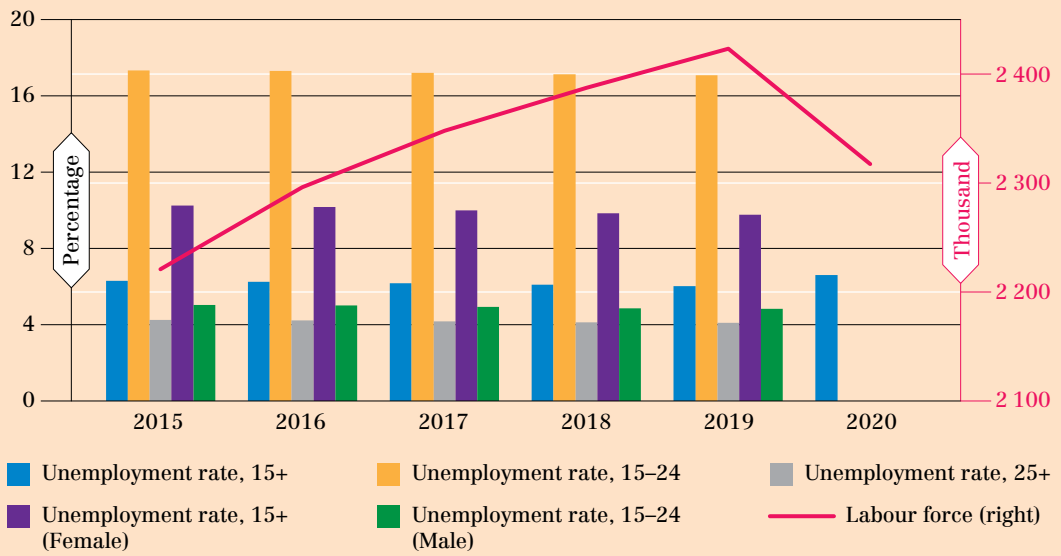


Source: Authors' elaboration based on World Bank. 2021. DataBank | World Development Indicators. In: *World Bank*. Washington, DC. Cited 12 October 2021. https://databank.worldbank.org/source/world-development-indicators

Labour and income indicators show how the multiple shocks have disrupted life in Lebanon. After years of continuous growth in the labour force, the crises have negatively affected labour force participation and the unemployment rate (Figure 3). According to estimates by the International Labour Organization (ILO), the labour force declined by nearly one hundred thousand workers in 2020, and the unemployment rate increased to 6.6 percent in 2020 compared to 6 percent in 2019. A phone survey by the World Bank during November and December 2020 indicated that the unemployment rate of respondents had increased from 28 percent in February 2020 to nearly 40 percent at the time of the survey (Harake *et al.*, 2021).

While we do not have recent estimates for the distribution of the labour force by age or gender,[2] the available data shows the existence of gender and age inequalities in the labour market. For example, while total unemployment rate in Lebanon was 6 percent in 2019, youth (ages 15 to 24) unemployment rate was nearly 17.1 percent and 9.8 percent of economically active women were unemployed compared to only 4.8 percent of men. Access to the formal labour market is even more difficult for minority groups, such as Palestinian and Syrian refugees, whose unemployment rates are estimated to be higher than the national average. The multiple shocks to Lebanon's economy and labour market have worsened labour conditions and unemployment especially among young people and women as well as Palestinian and Syrian refugees (ILO, 2021). Employment in the agricultural sector is expected to be severely affected as well since more than 90 percent of employment in the sector is informal (McKinsey and Company, 2019).

FIGURE 3 Labour force and unemployment since 2015



Note: Data for gender and age distribution of labour force are not yet available for 2020.

Source: Authors' elaboration based on ILO. 2021. ILOSTAT labour statistics. In: ILO. Geneva, Switzerland. Cited 12 October 2021. https://ilostat.ilo.org/data

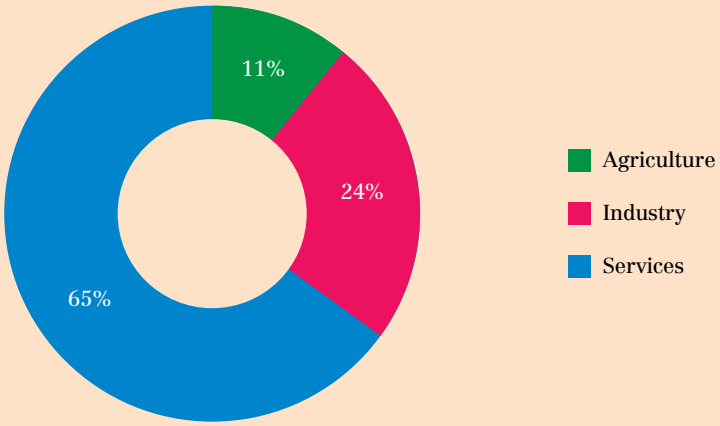
The agricultural sector accounts for a small share of the economy, representing only 3.25 percent of the GDP at current prices. The service sector constitutes the highest share of the Lebanese economy, followed by the industrial sector (including construction) (see Figure 4). In 2019, the service sector contributed nearly 83 percent to the GDP, followed by the industrial sector with nearly 13.5 percent. Nevertheless, despite its relatively small contribution to national GDP, agriculture has a significant indirect role in the economy due to its strong links with the food processing industry, which is the largest manufacturing sector in Lebanon contributing an additional 2 percent to GDP and representing 16 percent of the industrial sector in 2019 (CAS, 2020). Besides its importance for national food security, agriculture is a major source of employment and income for a large part of the population: in some rural areas, agriculture-related economic activities contribute nearly 80 percent to the local economy (Dal *et al.*, 2021). In 2019, the agricultural sector contributed to 11 percent of total employment in Lebanon, employing nearly 270 thousand people (see Figure 5).

[2] For labour and employment trends and country comparisons for the period prior to the pandemic and the economic crises, please see the original Agricultural Sector Review in Lebanon (Dal *et al.*, 2021).

FIGURE 4 GDP by economic activity in 2019

Source: Authors' elaboration based on World Bank. 2021. DataBank | World Development Indicators. In: *World Bank*. Washington, DC. Cited 12 October 2021. https://databank.worldbank.org/source/world-development-indicators

FIGURE 5 Employment by economic activity in 2019



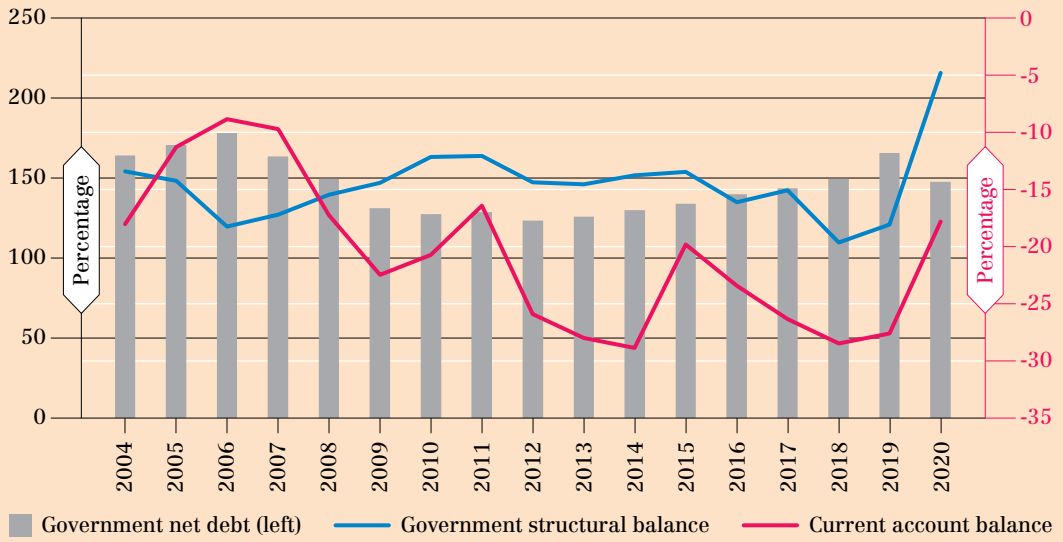
Source: Authors' elaboration based on World Bank. 2021. DataBank | World Development Indicators. In: *World Bank*. Washington, DC. Cited 12 October 2021. https://databank.worldbank.org/source/world-development-indicators

Lebanon's financial crisis has roots in long-term structural economic imbalances. The Lebanese economy largely depends on remittances, foreign direct investments, and international aid, with most of the investments going to the construction and development sectors. However, since 2011, regional political instabilities have severely affected the inflows of remittances and foreign investments, especially from the Arab Gulf countries. The government has relied heavily on international and domestic debt to cover the continuous deficit in its budget, which reached 19.6 percent of GDP in 2018 (see Figure 6). Lebanon has one of the highest public debts to GDP ratio in the region (Dal *et al.*, 2021), reaching nearly 166 percent in 2019 before it slightly declined to 148 percent in 2020. Moreover, the decline in remittances and foreign investments have created an unremitting downtrend in the current account balance, recording a deficit of nearly 28 percent of GDP in 2019 and depleting the foreign reserves held by the central bank (Banque du Liban) (see Figures 6 and 7).

These factors have contributed to severe instability in the financial sector, increasing the fear that the government may default on maturing debt repayments in August 2019. The COVID-19 pandemic has further exacerbated the economic crisis, causing a huge decline in tourism, and disrupting most economic activities, including in major sectors like

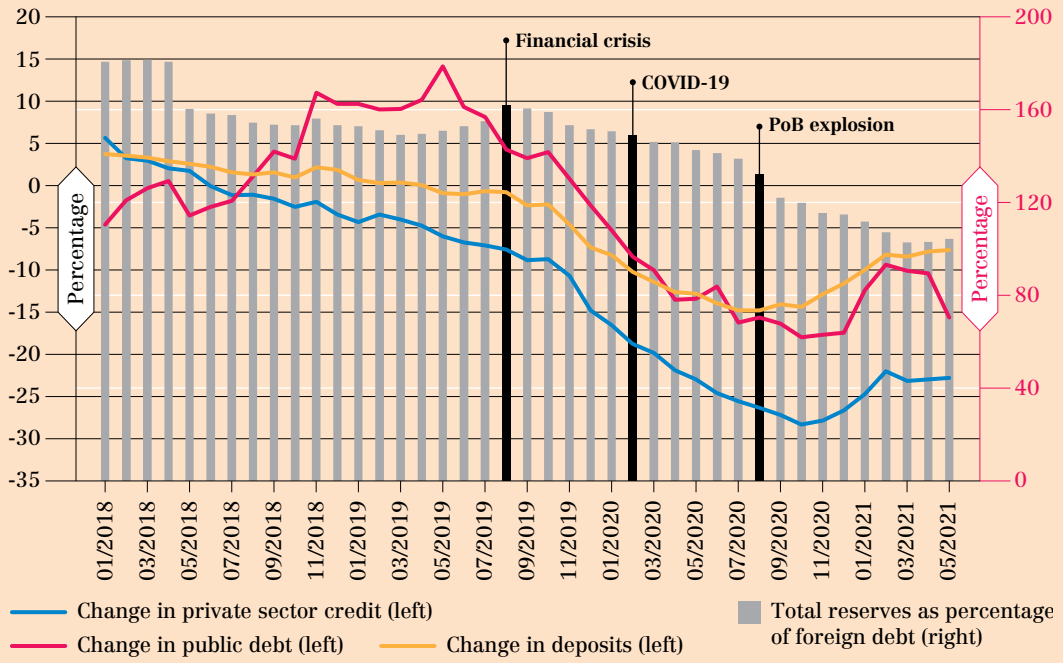
construction and real estate. The financial crisis has shattered public trust in the banking sector, causing total deposits to shrink substantially at a time when domestic credit to private sector was already declining as interest rates significantly increased (see Figure 7).

FIGURE 6 Trends in fiscal balance, current account and public debt (yearly, % GDP)



Source: Authors' elaboration based on IMF. 2021. World Economic Outlook Database. In: *IMF*. Washington, DC. Cited 30 October 2021. www.imf.org/en/Publications/WEO/weo-database/2021/October

FIGURE 7 Foreign reserves and monthly changes in total deposits and domestic credit (2018–May 2021)

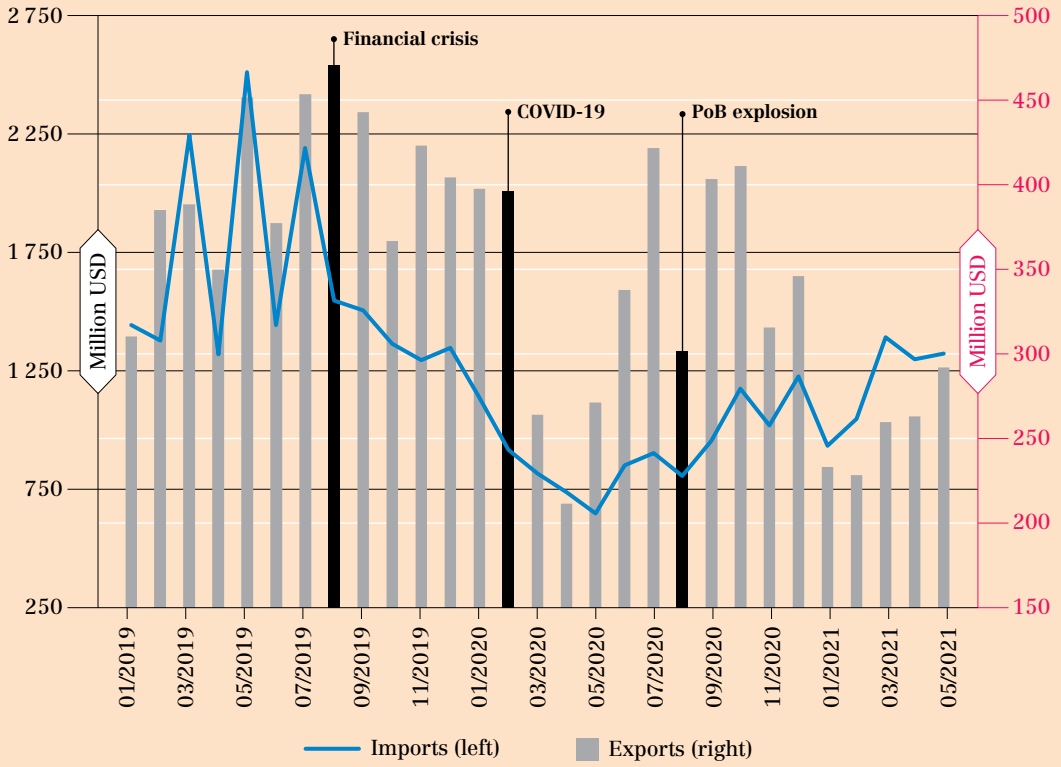


Source: Authors' elaboration based on Banque du Liban. 2021. Economic and financial data. In: *Statistics and research*. Beirut. Cited 20 October 2021. https://bdl.gov.lb/webroot/statistics

2.2 Trade, exchange rate and commodity prices

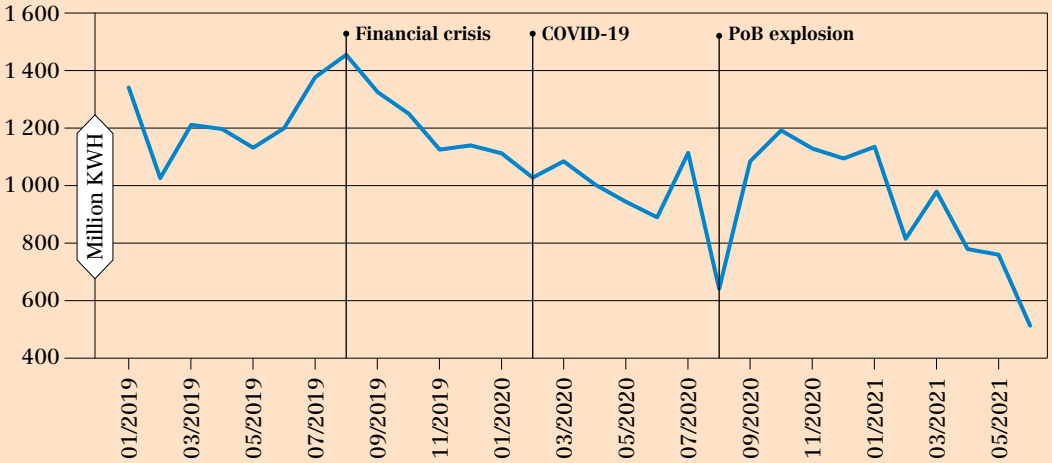
The multiple shocks described in this report have affected nearly all major and strategic economic activities in Lebanon. The devaluation of the currency and draining of foreign reserves compromised the ability of the country to import, which affected both household consumption and the purchase of intermediate goods, such as agricultural inputs, e.g. seeds and fertilizers (discussed further in Section 5). The value of total monthly imports declined from nearly USD 2.2 billion in July 2019 to USD 1.1 billion prior to the first reported COVID-19 case in February 2020. The pandemic weakened international trade still further: total imports in Lebanon reached a peak low of USD 650 million in May 2020 before they began to increase slightly, reaching USD 1.3 billion in May 2021. At the same time, exports have not benefited from the devaluation of the currency: total monthly exports in May 2021 (USD 292 million) were nearly half the value of exports in August 2019 (USD 471 million) (see Figure 8). Moreover, regional political tensions with some oil-exporting countries have exacerbated an energy crisis that was already underway due to the worsening international trade situation and the draining of foreign reserves, which caused the gradual lifting of fuel subsidies. Lebanon relies mainly on imported oil for its energy supply and fuel shortages have caused frequent electricity outages, affecting the country's social and economic life. Monthly electricity production has been in continuous decline since the start of the crisis, reaching a new low of 513 million kilowatt-hours (KWH) in June 2021 compared to 1 342 million KWH in August 2019 (see Figure 9).

FIGURE 8 Monthly imports and exports



Source: Authors' elaboration based on UNSD (United Nations Statistics Division). 2021. Monthly Bulletin of Statistics Analytical Trade Tables. In: *UN Trade Statistics*. Washington, DC. Cited 30 October 2021. https://unstats.un.org/unsd/trade/data/tables.asp?msclkid=227b5d7dc56711ecab6729cd90a188ec

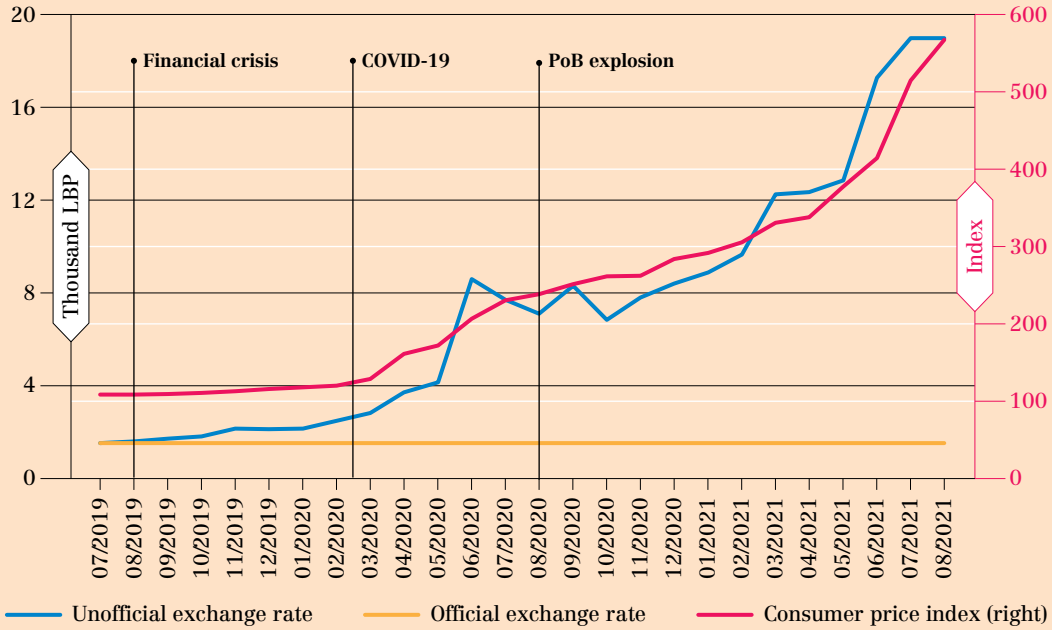
FIGURE 9 Monthly electricity production



Source: Authors' elaboration based on Banque du Liban. 2021. Electricity production. In: *Main indicators*. Beirut. Cited 20 October 2021. https://bdl.gov.lb/statistics/a2z.php

While the official exchange rate remains fixed at 1 515 Lebanese pounds per USD, the Lebanese pound has lost nearly 90 percent of its value since August 2019, with unofficial exchange rates reaching 25 000 pounds per dollar in November 2021. The extreme fall of the Lebanese pound has caused the worst hyperinflation witnessed in the country since the end of the civil war in 1990 (see Figure 10).

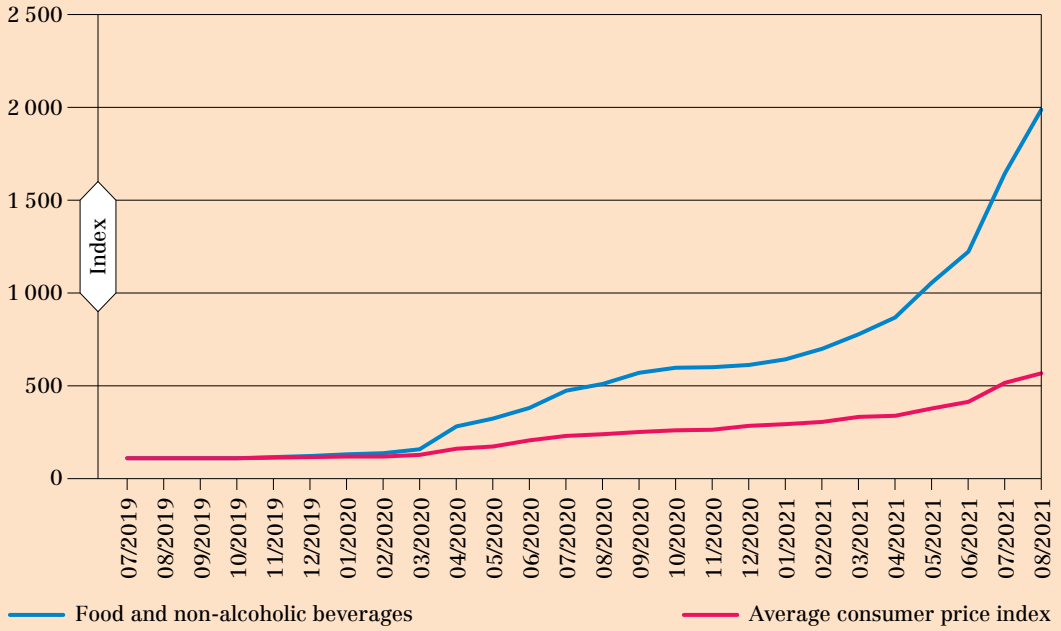
FIGURE 10 Exchange rate and consumer price index (monthly)



Sources: Authors' elaboration based on Central Administration of Statistics (CAS). 2021a. Consumer Price Index (CPI). In: *Economic statistics*. Beirut. Cited 20 October 2021. http://cas.gov.lb/index.php/economic-statistics-en; CAS. 2021b. Annual National Accounts 2004-2020. In: *National Accounts. Beirut*. Cited 20 October 2021. http://cas.gov.lb/index.php/national-accounts-en#annual-national-accounts-2004-2020; Lira Rate. 2021. Lebanon market rates today. In: *Lira Rate*. Cited 20 October 2021. https://lirarate.org

The consumer price index (CPI) recorded 568 points in August 2021, compared to 109 in August 2019, and inflation reached 138 percent by August 2021. The hyperinflation has been even worse for food prices, which soared to extreme levels, affecting the food security of millions of people in Lebanon (further discussed in Section 3.3). Figure 11 shows how the consumer price index for food and beverages has nearly tripled, reaching nearly 2 000 points in August 2021 compared to only 109 points in August 2019.

FIGURE 11 Average consumer price index vs food consumer price index



Source: Authors' elaboration based on CAS. 2021. Consumer Price Index (CPI). In: *Economic statistics*. Beirut. Cited 20 October 2021. http://cas.gov.lb/index.php/economic-statistics-en

3 The impact of COVID-19 in Lebanon

KEY MESSAGES

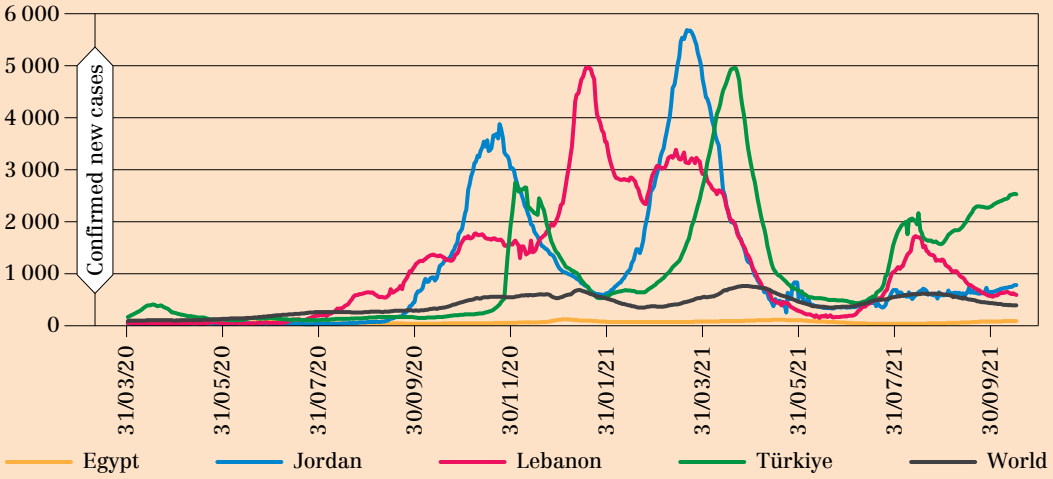
- Lebanon's monitoring effort, while adequate, should be complemented by a more ambitious vaccination campaign. By October 2021, Lebanon had administered more than 3 million vaccinations, but the numbers fell short of national vaccination targets.
- The country's vaccination programme depends heavily on external aid, making it more difficult to coordinate the purchase and administration of doses.
- Informal employment, which is common in Lebanese agriculture and particularly among temporary workers and Syrian refugees, been severely affected by the COVID-19 pandemic.
- Although most economies experienced negative or slow growth during the pandemic, Lebanon was particularly affected by multiple crises, with the GDP shrinking by nearly 20 percent in 2020.

There is no doubt that the COVID-19 pandemic has significantly disrupted economies around the globe. Due to the different reporting methods and time-lags when it comes to data collection, the most reasonable way to build a picture of the magnitude of the outbreak in Lebanon is by looking at various statistics and comparing them to the situation in nearby countries.

3.1 COVID-19 health indicators

The number of cases and deaths is an indicator of the severity and periodicity of the pandemic, as well as the readiness of countries to overcome the health crisis. Figure 12 shows that SARS-CoV-2 (the strain of coronavirus that causes COVID-19) reached Lebanon later than other countries. It was not until the summer of 2020 that the novel coronavirus spread widely across the country and the number of confirmed cases per million exceeded the world average. Unlike in Jordan and Türkiye, the number of cases in Lebanon increased gradually until mid-2021, a major objective for governments aiming to contain the crisis and relieve pressure on hospitals and health workers. Lebanon also differed in the number and size of COVID-19 waves compared to neighbouring countries. While Jordan and Türkiye suffered two large quick waves – followed by an ongoing third wave in Türkiye – Lebanon experienced a large rise in the number of infections between the summer of 2020 and the first months of 2021. The country was able to cope fairly well with a second increase in cases during the summer of 2021, despite concerns that another large wave could be devastating. Hospitals are working at 50 percent capacity, due to the lack of resources in a deteriorated health system. Meanwhile, many doctors and nurses have left the country because of the economic and financial crisis (WHO, 2021).

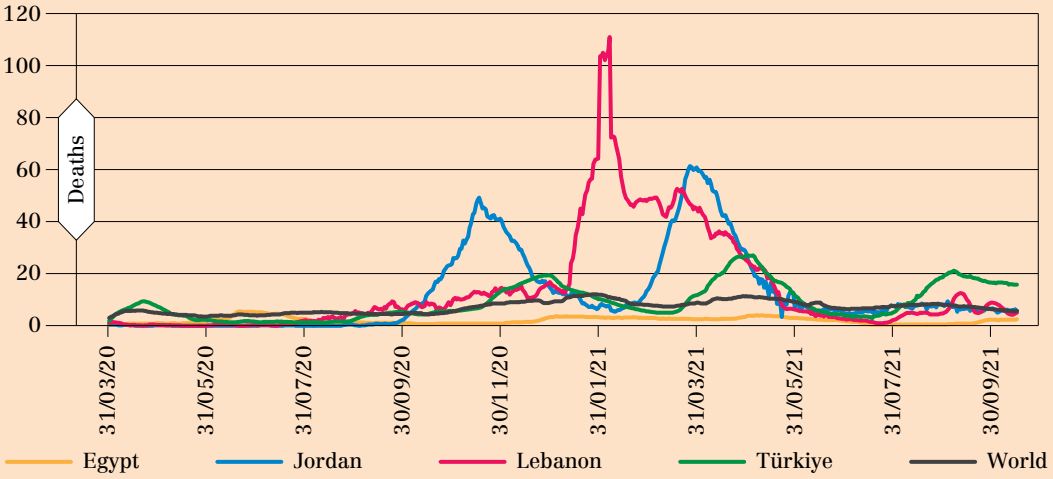
FIGURE 12 Weekly confirmed new cases per million people



Source: Authors' elaboration based on JHU (Johns Hopkins University and Medicine). 2021. Daily confirmed new cases (7-day moving average). In: *New COVID-19 cases worldwide*. Cited 20 October 2021. https://coronavirus.jhu.edu/data/new-cases

The pandemic is having fatal consequences for the country. Figure 13 shows the extraordinarily high level of deaths per million that Lebanon experienced during the first wave. The numbers reflect the difficulties that Lebanon has in dealing with severe COVID-19 cases compared to Jordan and Türkiye. Egypt reports a significantly lower number of cases and deaths, but the data should be taken with caution since it does not correspond with other health indicators.[3]

FIGURE 13 Weekly new deaths per million people



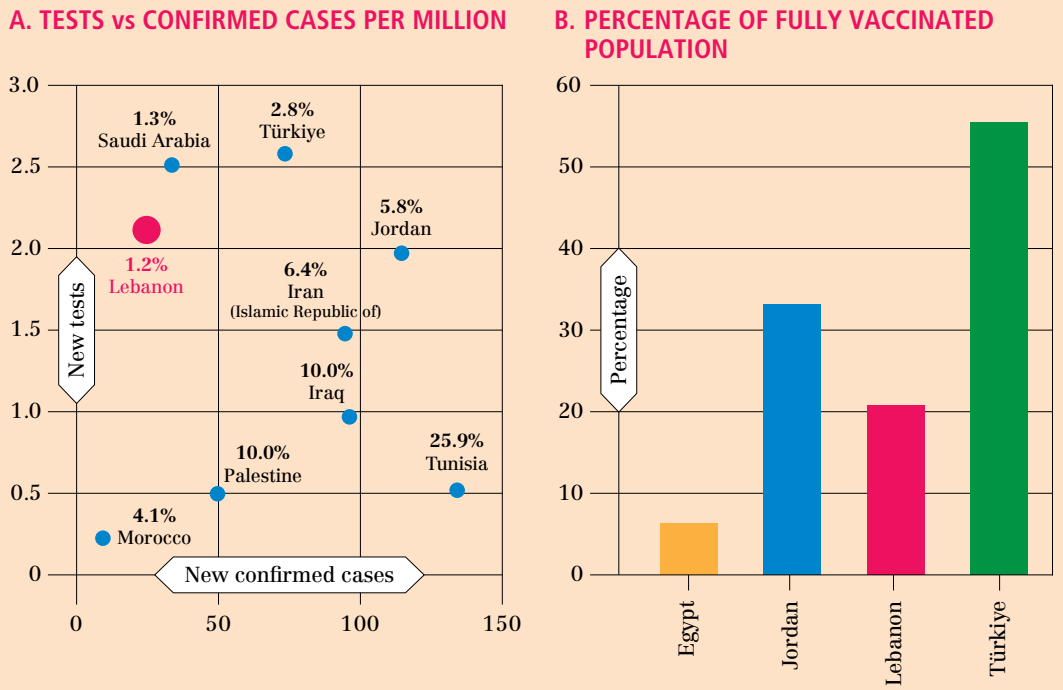
Sources: Authors' elaboration based on JHU. 2021. Worldwide mortality. In: *Mortality analyses*. Cited 20 October 2021. https://coronavirus.jhu.edu/data/mortality

[3] Figures on excess mortality per million refers to total reported deaths minus an estimate of expected deaths based on data from previous years and adjusted by population size. During the pandemic period, these figures suggested that Egypt might have underreported the number of COVID-19 deaths and, by definition, cases. The excess number of deaths might have been 80 percent higher than estimated had the COVID-19 pandemic not occurred (Ritchie *et al.*, 2020).

It is important to understand that the number of deaths attributed to COVID-19 in a country is directly related to the number of tests that country can carry out. Globally, the number of deaths is certainly higher than reported, due to the impossibility of testing every person who may have died due to COVID-19 complications. The extent to which the real and reported number of deaths also varies across countries as a result of disparities in the scope of testing programmes as well as other reporting differences.[4]

Figure 14a compares the number of new tests to the number of cases adjusted by population for a selection of Arab countries in June 2021.[5] The lack of testing data for Lebanon does not allow an in-depth evaluation, but the chart still allows us to visually assess the monitoring capacity, as it is weighted by the magnitude of the outbreak at a given time. Lebanon's testing volume is considerably larger than other countries in the region. For example, Jordan carried out a similar number of tests despite a much higher number of confirmed cases. Looking at the vertical axis, Lebanon did significantly more tests than Morocco, while the countries experienced a similar rate of cases per million.

FIGURE 14 Testing and vaccination rates compared to the world average (October 2021)



Notes: Calculations based on total population, as the criteria to vaccinate people varies across countries. Tests and confirmed cases refer to June 2021 (latest available data for comparison in Lebanon). Vaccination rates compare to the world average by October 2021 (latest available data).

Sources: Authors' elaboration based on Our World in Data. 2021a. Testing. In: *Coronavirus pandemic (COVID-19)*. Cited 20 October 2021. https://ourworldindata.org/coronavirus-testing; Our World in Data. 2021b. Cases. In: *Coronavirus pandemic (COVID-19)*. Cited 20 October 2021. https://ourworldindata.org/covid-cases; Our World in Data. 2021c. Vaccinations. In: *Coronavirus pandemic (COVID-19)*. Cited 20 October 2021. https://ourworldindata.org/covid-vaccinations

[4] For example, some countries report only hospital deaths, while others also include home deaths that tested positive for COVID-19, even if the official cause of death was not confirmed by a health professional.

[5] Data on new tests and confirmed cases show a seven-day rolling average due to disparities in reporting frequencies.

Lebanon's monitoring effort, while adequate, should be complemented by a more ambitious vaccination campaign. Vaccines are fundamental to limiting the spread of new outbreaks and reducing workplace disturbances and other disruptions that affect the economy. By October 2021, Lebanon had administered more than 3 million vaccinations – mostly Pfizer – but the numbers fell short of national vaccination targets. Slightly more than 20 percent of the population has been fully vaccinated, far from the world average of 36 percent (see Figure 14b). The country's vaccination programme depends heavily on external aid, making it more difficult to coordinate the purchase and administration of doses. Other countries in the region, such as Türkiye, have been able to purchase vaccine batches in a timely fashion and this is reflected in higher immunization rates. Additionally, vaccine acceptance is lower in Lebanon than in other countries, with around 40 percent of the population exhibiting a negative attitude towards COVID-19 inoculation (Kasrine Al Halabi *et al.*, 2021). According to figures from the Ministry of Public Health, vaccinations are concentrated in major cities. The lower vaccination rates in rural areas implies future potential outbreaks that could hamper agricultural production. It thus is necessary to raise awareness about the importance of vaccines as well as to fully deploy vaccination programmes in rural areas to strengthen the resilience of local food supply chains.

3.2 Policy responses during the COVID-19 pandemic

The first pandemic measures imposed by the Lebanese government date to February 2020. According to the Oxford COVID-19 Government Response Tracker database, Lebanon started screening international travel arrivals and testing key workers and people with symptoms at that time. The emergency situation escalated rapidly, and by the end of February there were international travel bans in place. In early March, school and workplace closings had already been imposed. The stringency index – a composite measure of nine response indicators that indicates where an economy has been most severely disrupted during the pandemic – shows the highest peak occurring between November 2020 and March 2021. Income support from the government has mostly come from freezing financial obligations, such as debts and loan repayments. Direct income support to households was only rolled out in September 2020, once the pandemic had already spread widely.

It is well known that the pandemic has severely affected labour worldwide. According to a web-based survey by the World Food Programme, 29 percent of Lebanese respondents lost their jobs during the pandemic, while another 23 percent had their salary reduced (WFP, 2020). In 2019, 11 percent of Lebanon's workforce was occupied in the agricultural sector, a figure significantly less than in neighbouring countries. Egypt employs 21 percent of its workers in the agricultural sector, while Türkiye employs 18 percent; the average in the Arab region is 19 percent.

Informal employment is common in Lebanese agriculture, particularly among temporary workers and Syrian refugees. This has been severely affected by the pandemic (Kebede *et al.*, 2020). Currently, 95 percent of Syrian refugees do not have work permits. Temporary workers are fundamental in certain agricultural subsectors, such as the production of fruits, vegetables, and tobacco (Turkmani and Hamadé, 2020). Protecting these workers is of vital importance to ensure that these export-intensive sectors continue to function.

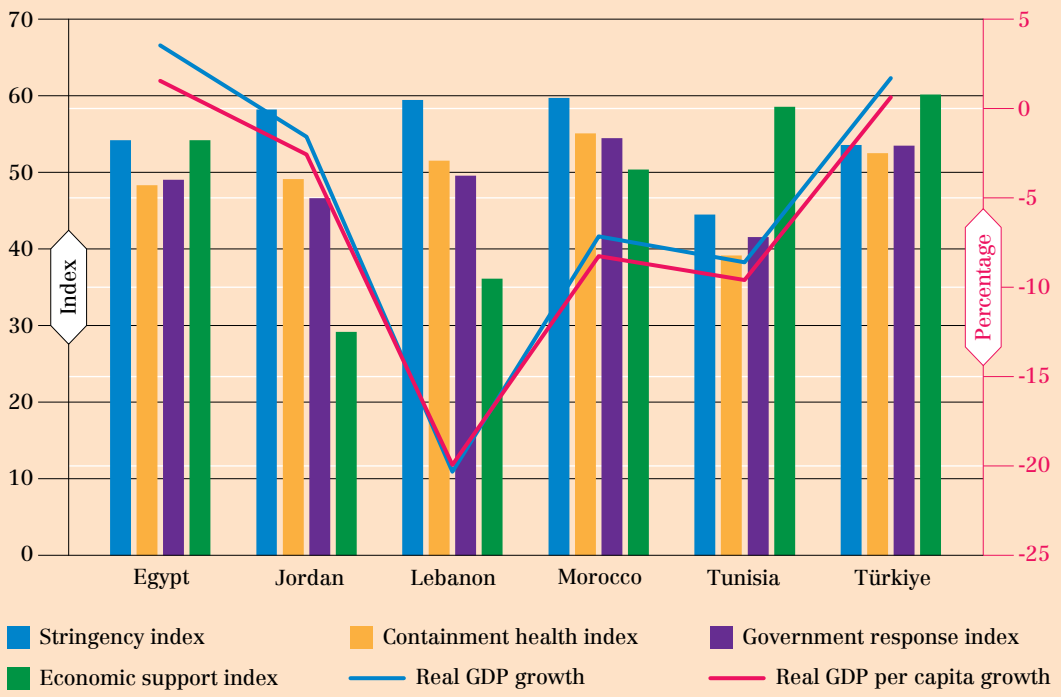
3.3 The impact of multiple crises

Figure 15 shows government responses to COVID-19 in neighbouring countries (Hale *et al.*, 2021). The stringency and containment health indices include indicators for public information campaigns; stay at home requirements; closure of schools, workplaces, and public

transport; cancelling public events; and restrictions on gatherings, internal and international travelling. Lebanon and Morocco recorded high stringency and containment health indices during the pandemic as compared to Jordan, Egypt, Türkiye, and Tunisia. As expected, due to its ongoing economic crisis, Lebanon recorded lower values in the economic support index compared to Türkiye, Tunisia, Egypt, and Morocco. Finally, a government response index includes all of the indicators included in the other three indices. In terms of overall government response, Lebanon recorded the third highest value after Morocco and Türkiye.

Overall, although most economies experienced negative or slow growth during the pandemic, Figure 15 shows that Lebanon was particularly affected by multiple crises, with the GDP shrinking by nearly 20 percent in 2020. Nonetheless, the severity of the pandemic was similar compared to neighbouring countries. For example, the Moroccan economy only declined by 7 percent, while Egypt and Türkiye managed to maintain positive growth in 2020.

FIGURE 15 Impact of multiple crises and COVID-19 response: cross-country comparison for 2020



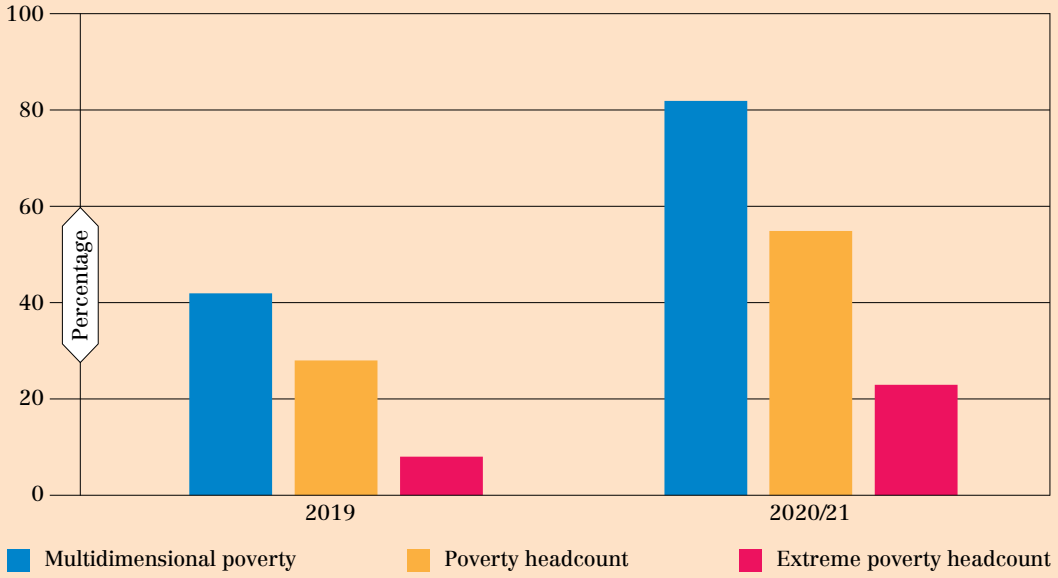
Sources: Authors' elaboration based on Hale, T., Webster, S., Petherick, A., Phillips, T. & Kira, B. 2020. *Oxford COVID-19 Government Response Tracker*. Blavatnik School of Government. Cited 20 October 2021. https://covidtracker.bsg.ox.ac.uk; World Bank. 2021. DataBank | World Development Indicators. In: *World Bank*. Washington, DC. Cited 12 October 2021. https://databank.worldbank.org/source/world-development-indicators

Food security and nutrition

The impact of the economic collapse on employment and prices exacerbated poverty and extreme poverty rates. In 2020, the United Nations Economic and Social Commission for West Asia (ESCWA) (2020b) estimated that the headcount poverty rate jumped to 55 percent from 28 percent in 2019. Extreme poverty is also estimated to have nearly tripled, reaching 23 percent in 2020 compared to only 8 percent in 2019. Similarly, the multidimensional poverty rate doubled, reaching 82 percent in 2021 compared to 41 percent in 2019 (see Figure 16).

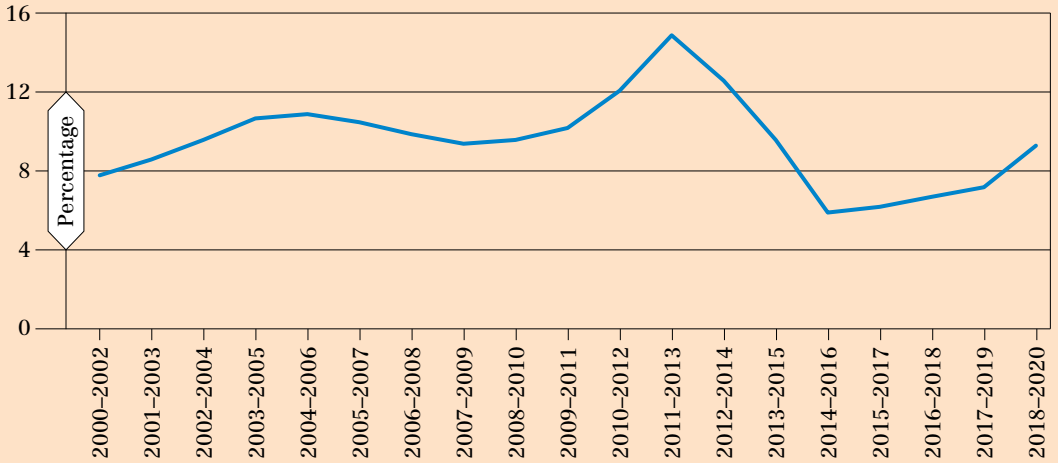
The multidimensional poverty index accounts for non-income aspects of living conditions, such as quality of health, education, employment, and housing. Furthermore, deteriorating incomes and soaring food prices are expected to have increased food insecurity in Lebanon, with the three-year average percentage of the undernourished population increasing from 5.9 percent in 2016 to 9.3 percent in 2020[6] (see Figure 17).

FIGURE 16 Poverty rates, 2019–2020



Sources: Authors' elaboration based on ESCWA. 2020b. *Poverty in Lebanon: solidarity is vital to address the impact of multiple overlapping shocks.* Policy Brief No. 15. Beirut; ESCWA. 2021. *Multidimensional poverty in Lebanon (2019-2021) Painful reality and uncertain prospects.* Policy Brief No. 1. Beirut.

FIGURE 17 Prevalence of undernourishment (three-year average)



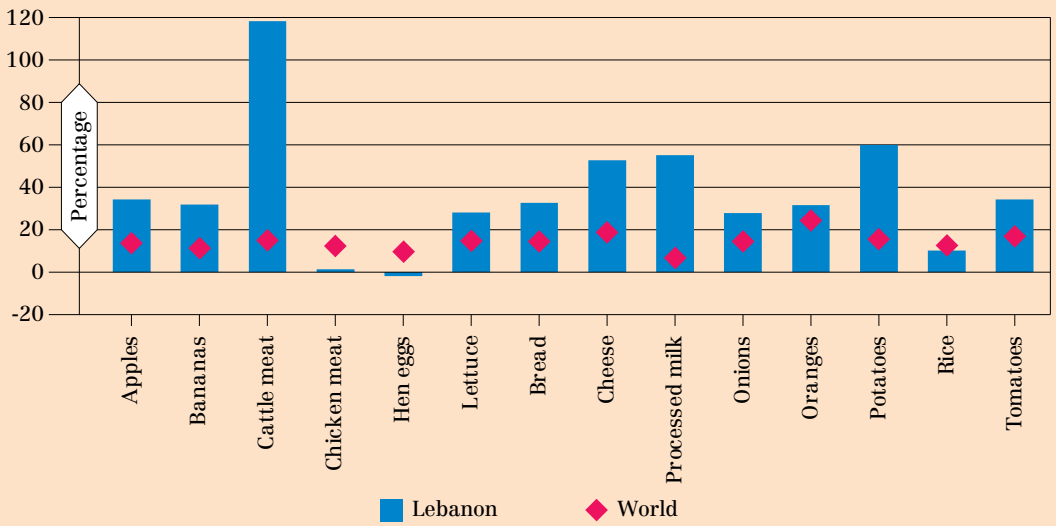
Source: Authors' elaboration based on FAO. 2021. Suite of Food Security Indicators. In: FAOSTAT. Rome. Cited 15 October 2021. www.fao.org/faostat/en/#data/FS

[6] The proportion of the population with insufficient food consumption and dietary energy levels to maintain a normal active and healthy life.

ESCWA (2020a) has estimated that nearly half of the population of Lebanon is at risk of being unable to meet its basic food needs. Similarly, a recent survey by the World Food Programme (WFP and World Bank, 2021) suggests that 22 percent of Lebanese households suffer from food insecurity, and 47 percent was unable to access food and other basic needs during March–April 2021.

The Food and Agriculture Organization of the United Nations (FAO) tracks changes in consumer prices for 14 food products and compares them to pre-pandemic levels.[7] Lebanon is on the top ten list of countries with highest exposure to price shocks, likely exacerbated by its economic and financial crises. The aggregated price is currently 38 percent higher than it was on 14 February 2020. Figure 18 compares the change in prices in Lebanon to the global average. With nearly a 120 percent increase, beef and cattle meat exhibit the highest price increases. Potatoes and dairy – cheese and milk – have also experienced dramatic price spikes, with market values increasing by more than 50 percent. By contrast, prices in the poultry sector have remained fairly stable. Chicken meat prices increased less than 5 percent, while eggs are cheaper than pre-pandemic. Rice – an important staple food for Lebanon – experienced a 10 percent price rise, less than the global increase. This heterogeneity in price changes, along with eroded purchasing power at the household level, led to drastic changes in the food consumption patterns of families. In February 2020, the MoA and the Ministry of Economy and Trade (MoET) put into place a system for monitoring the wholesale prices of fresh fruits and vegetables on a weekly basis. The MoA has also taken several decisions to control price increases, including introducing export permits for some agricultural products to avoid supply shortages in the local market and to limit increases in food prices. In addition, the government has implemented a subsidy programme for major foodstuffs and agricultural inputs to decrease production costs for agricultural products and avoid further increases in consumer prices. A limited number of agricultural inputs are covered by the subsidy programme (for example, imports were subsidized at the exchange rate of 3 900 LBP per USD).

FIGURE 18 Percentage change in prices from 14 February 2020 to 24 October 2021



Source: Authors' elaboration based on FAO. 2021. Food price monitoring and analysis. In: FAO. Rome. Cited 20 October 2021. www.fao.org/giews/food-prices

[7] Data available at www.fao.org/datalab/website/web/food-prices

International trade

Lebanon chose not to introduce high trade policy interventionism during the pandemic. According to the Global Trade Alert policy database, export restrictions focused on personal protective equipment and other medical supplies. The only food restriction introduced during the COVID-19 pandemic (in March 2020) was a temporary 7 percent import tax on refined white sugar to contain local sugar prices. Imports of agricultural products did not experience major changes due to the pandemic. Unlike during the previous world food price crisis in 2007-2008, major food exporters refrained from imposing export restrictions or, if they did, the measures were short-lived. An example was the wheat export restrictions imposed by Ukraine in March 2020, which were lifted in May of the same year. Lebanon relies heavily on imported Ukrainian wheat. On the other hand, although international trade was disrupted by the COVID-19 pandemic, the devaluation of the Lebanese pound had positive impact on agricultural exports during the pandemic, as will be seen in Section 5.

The COVID-19 pandemic distorted the farming supply chain. Production in Lebanon is highly dependent on the supply of agricultural inputs from foreign partners, which was severely disrupted by the pandemic. Figure 19a shows that imports of fertilizers, pesticides, and seedlings experienced declines of around 50 percent in the first quarter of 2020 compared to the same quarter in the previous year.[8] While the foreign supply of seedlings was already decreasing in the pre-pandemic years, it has recovered faster than imports of pesticides and fertilizers (particularly nitrogenous fertilizers), remained at low levels in 2021. This led to an increased reliance on locally produced seedlings due to the relatively high cost of the imported seedlings. It is also noticeable that the trade disruption happened before Beirut's port blast in August 2020. Seed imports declined less than other inputs, but they remain in a decreasing trend, putting future harvests at risk.

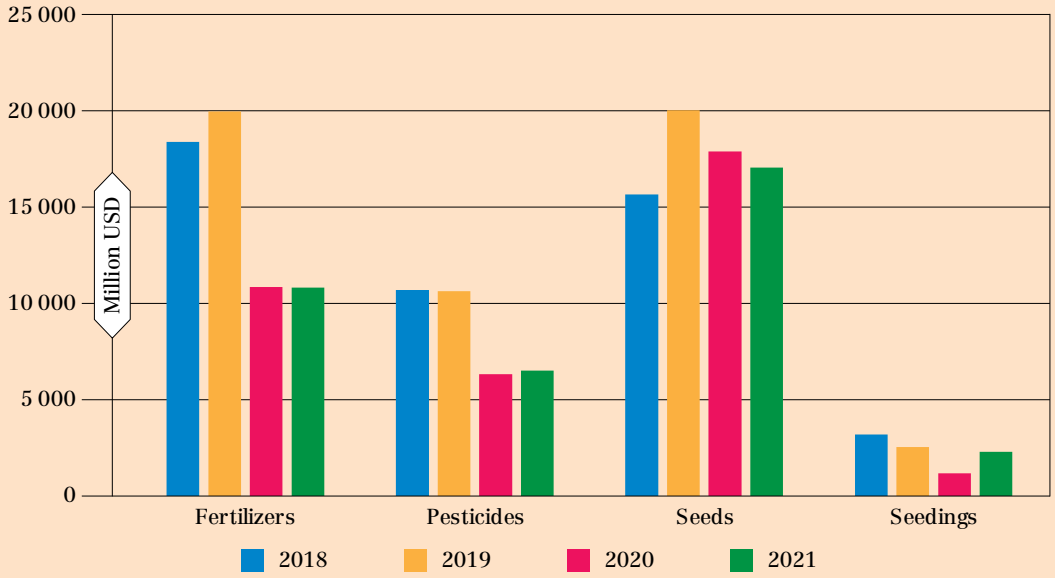
The picture in the livestock sector is slightly different. Imports of live animals remained stable, with total 2020 imports valued at USD 288 million compared to USD 277 million in 2019 (see Figure 19b). A comparison of first quarter imports in the last four years even identified an increasing trend. Imports of animal feed also increased in 2020, with major increases in maize and soybeans. The latest data show that the trend continued over the first months of 2021, with imports in January to March almost doubling those recorded during the same months in 2020. The downside is clearly seen in imports of veterinary vaccines, with annual imports declining 33 percent in 2020, and continuing to remain low in 2021.

To support the purchase of inputs by small-scale farmers, the Ministry of Agriculture, in collaboration with the World Bank and FAO, launched an agricultural voucher scheme in September 2021. The programme is aimed at both crop and animal production farmers and includes the provision of 1 million animal vaccine doses.

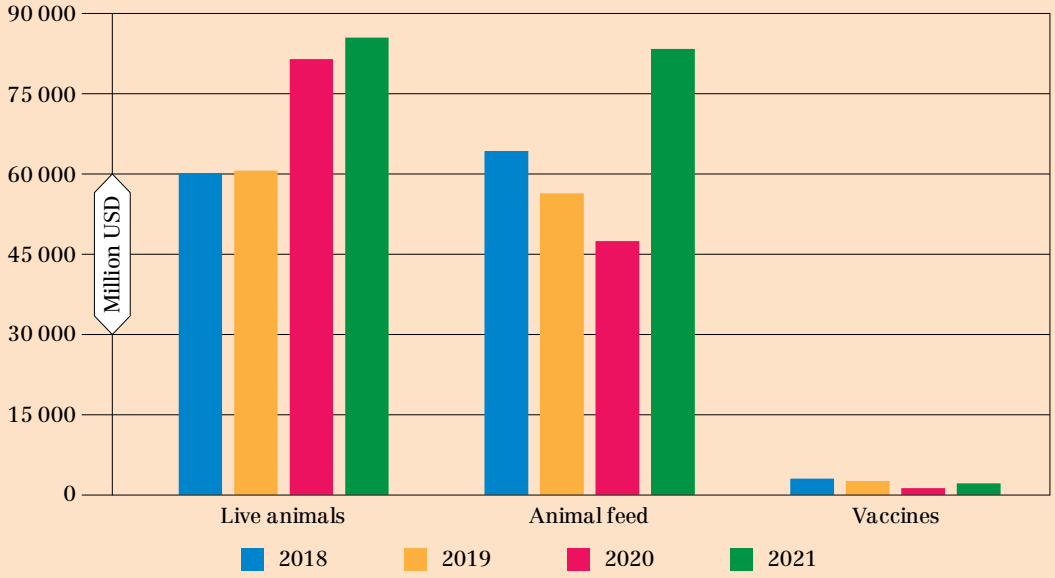
[8] The latest available monthly data refers to March 2021. However, the first quarter of the year is fairly indicative of the trade disruption as it represented nearly 40 percent of total crop inputs and a quarter of livestock inputs for the years 2018 to 2020.

FIGURE 19 Imports of agricultural inputs in Q1

A. CROP INPUTS



B. LIVESTOCK INPUTS



Source: Author's own elaboration based on Lebanese Customs, 2021.

4 Agrifood systems

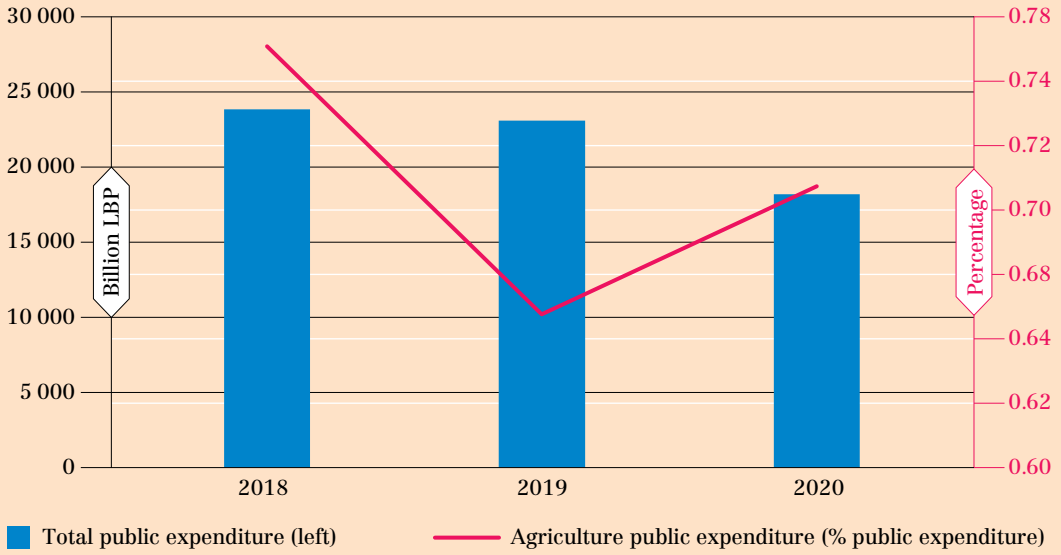
KEY MESSAGES

- The multiple crises placed a significant burden on agricultural production, which relies heavily on imported inputs (especially seeds, fertilizers, and pesticides). In addition, agricultural irrigation has been put in danger as fuel shortages reduce the water supply across the country.
- Livestock and animal products are rising in Lebanon, becoming as important as crop production. In fact, animal production is a major activity in rural areas, particularly in the southern and northern zones where approximately 60 percent of farmers depend on dairy production as their chief means of subsistence.
- There is a wide disparity in the size of agricultural holdings: 70 percent of Lebanese farmers operate in areas of less than one hectare; 26 percent operate in areas of two to six hectares, and the remaining 4 percent operate on more than six hectares.
- The agricultural sector contributes minimally to total greenhouse gas emissions in Lebanon, due to the relatively small size of the sector compared to the service and industry sectors.

4.1 Agricultural production

In 2011, the Syrian civil war occasioned the arrival of the arrival of more than 1.5 million Syrians in Lebanon, imposing serious pressure on the country's ability to meet the expanding demand for food. However, this pressure had a positive impact on agricultural production, as private investment in agriculture increased in greenhouses, vegetables, and potatoes, absorbing a significant number of Syrian workers. Domestic private investment – including small and medium-scale investments – contributed to an expansion in agricultural land and supported the resilience of the rural economy, especially after the economic crisis in 2020 (Hamadé, 2020; Dal *et al.*, 2021). Nevertheless, the multiple crises placed a significant burden on agricultural production, which relies heavily on imported inputs (especially seeds, fertilizers, and pesticides). In addition, agricultural irrigation has been put in danger as fuel shortages reduce the water supply across the country. In Lebanon, nearly 50 percent of agricultural land is irrigated (Eid-Sabbagh and Ray, 2021; Dal *et al.*, 2021). The agricultural sector is already underfunded, without adequate access to finance from commercial banks. Although public expenditure on agriculture as percentage of total public expenditure slightly increased in 2020, it remains low, constituting less than 1 percent of total public expenditure since 1995 (Dal *et al.*, 2021) (Figure 20). In addition, total public expenditures decreased between 2019 and 2020 in absolute value. The economic crisis is threatening the sector's production capacity, as production costs have increased substantially since 2019 (Hamadé, 2020).

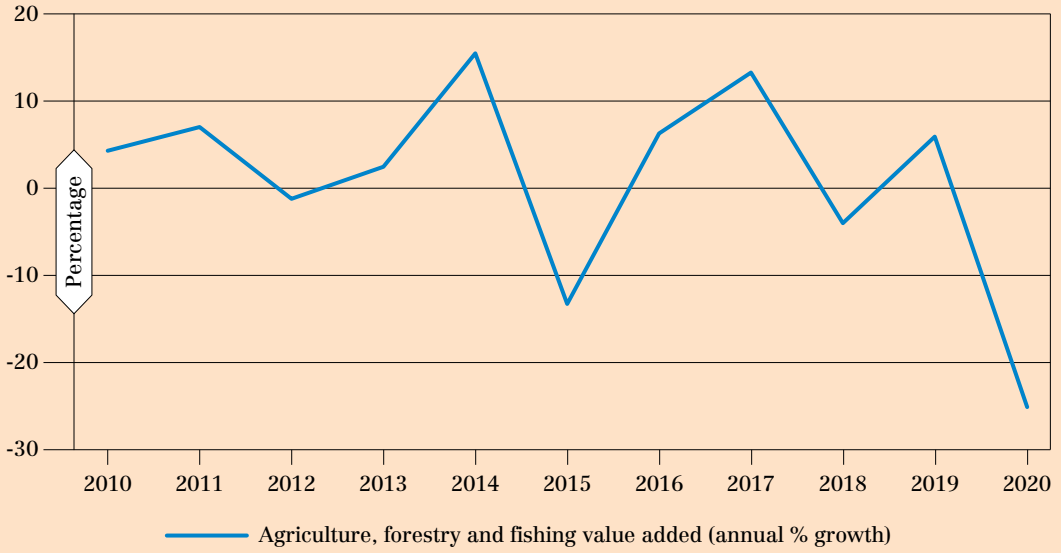
FIGURE 20 Total public expenditure and agriculture public expenditure



Source: Author's own elaboration based on Ministry of Finance. 2021. Annual budget documents and process. In: *Budget information*. Beirut. Cited 20 October 2021. www.finance.gov.lb/en-us/Finance/BI/ABDP

The annual growth in agriculture value-added has been quite volatile since 2010. The average annual growth was 3.7 percent from 2010 to 2019. Although, the agriculture sector witnessed very high growth rates in 2014 (15.5 percent) and 2017 (13.4 percent), this was followed by a significant retraction in 2015 (-13.3 percent) and 2018 (-4 percent), and the sector is expected to have lost nearly one-quarter of its value added in 2020 (-25.1 percent) (see Figure 21).

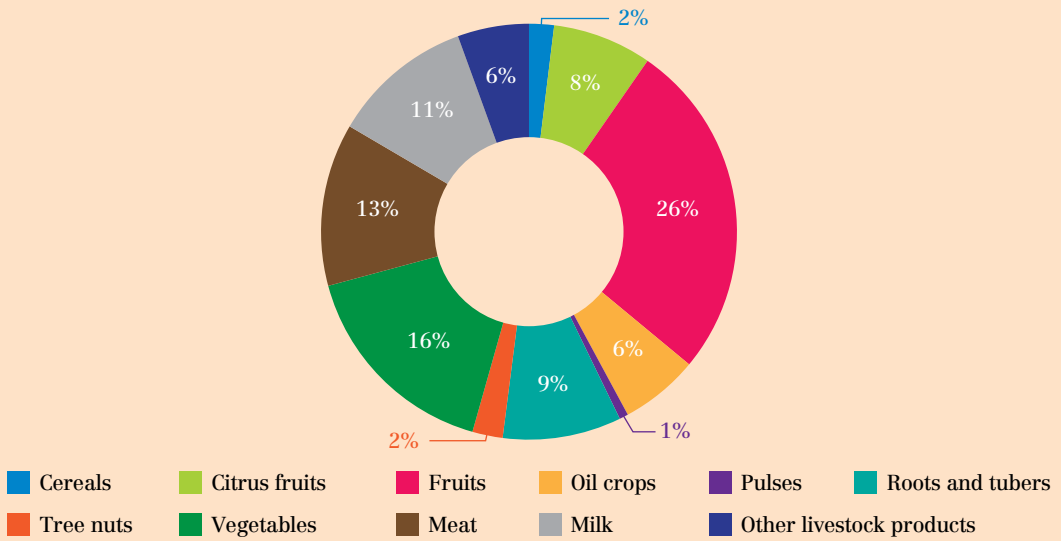
FIGURE 21 Annual agriculture value-added growth since 2010



Source: Authors' elaboration based on World Bank. 2021. DataBank | World Development Indicators. In: *World Bank*. Washington, DC. Cited 12 October 2021. https://databank.worldbank.org/source/world-development-indicators

Lebanon's major agricultural outputs by gross production value (constant 2014–2016 thousand LBP) comprise mainly fruits (including citrus fruits) and, to a lesser extent, vegetables, meat and milk, accounting for 34, 16, 13 and 11 percent, respectively, of total agricultural production (see Figure 22). Additionally, and as seen in Figure 23, major crops include tomatoes, wheat, olives and apples, while major livestock products include poultry meat, fresh whole cow milk and hen eggs (see Figure 24). In terms of area harvested (ha), fruits rank first (accounting for 25 percent of total area) as the country's major agricultural output, followed by oil crops, cereals, and vegetables (see Figure 25). Major crops by area harvested are similarly to those determined by gross production value (see Figure 26).

FIGURE 22 Agricultural output in 2019 by subsector (% share of gross production value in LBP 1 000)



Sources: Authors' elaboration based on FAO. 2021. Value of Agricultural Production. In: *FAOSTAT*. Rome. Cited 15 October 2021. www.fao.org/faostat/en/#data/QV; MoA. 2021. *Agriculture Production Surveys*. Beirut.

FIGURE 23 Major crops by subsector in 2017 (gross production value)

Tomatoes account for **38%** of the total gross production value of vegetables.

Wheat account for **83%** of the total gross production value of roots and tubers.

Olives account for **97%** of the total gross production value of oil crops.

Apples account for **32%** of the total gross production value of fruits.

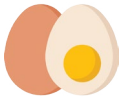
Sources: Authors' elaboration based on FAO. 2021. Value of Agricultural Production. In: *FAOSTAT*. Rome. Cited 15 October 2021. www.fao.org/faostat/en/#data/QV; MoA. 2021. *Agriculture Production Surveys*. Beirut.

FIGURE 24 Major livestock product by subsector in 2017 (gross production value)

Poultry meat account for **94%** of the total gross production value of meat.

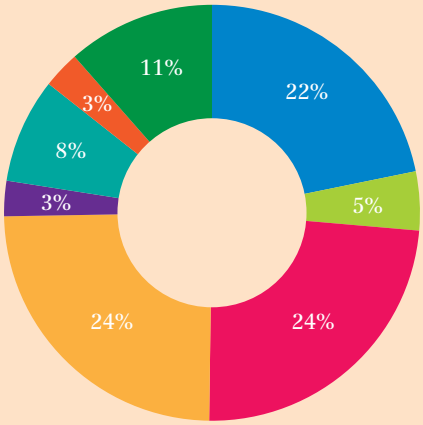
Whole fresh cow milk account for **90%** of the total gross production value of milk.

Eggs account for **72%** of the total gross production value of other products (including natural honey, greasy wool and eggs in shell).



Sources: Authors' elaboration based on FAO. 2021. Value of Agricultural Production. In: *FAOSTAT*. Rome. Cited 15 October 2021. www.fao.org/faostat/en/#data/QV; MoA. 2021. *Agriculture Production Surveys*. Beirut.

FIGURE 25 Area harvested in 2019 by subsector (% share of total area)



Cereals | Citrus fruits | Fruits | Oil crops | Pulses | Roots and tubers | Tree nuts | Vegetables

Source: Authors' elaboration based on FAO. 2021. Production – Crops and livestock products. In: *FAOSTAT*. Rome. Cited 15 October 2021. www.fao.org/faostat/en/#data/QCL

FIGURE 26 Major crops by subsector in 2017 (area harvested)

Tomatoes account for **20%** of the total area harvested to vegetables.

Wheat account for **73%** of the total area harvested to cereals.

Olives account for **98%** of the total area harvested to oil crops.

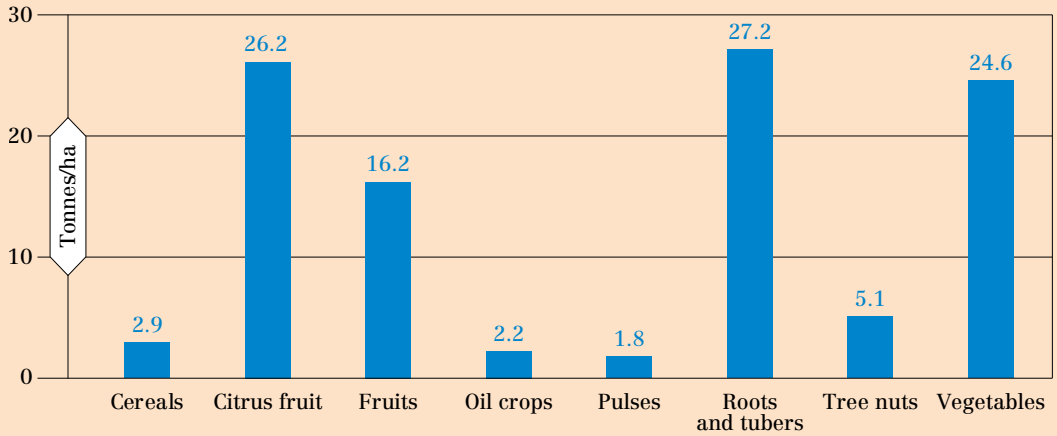
Apples account for **27%** of the total area harvested to fruits.

Source: Authors' elaboration based on FAO. 2021. Production – Crops and livestock products. In: *FAOSTAT*. Rome. Cited 15 October 2021. www.fao.org/faostat/en/#data/QCL

Roots and tubers, citrus fruits and vegetables have the highest yield values (27.2, 26.2 and 24.6 tonnes per hectare, respectively). Cereals, oil crops and pulses account for less than 3 tonnes per hectare (see Figure 27).

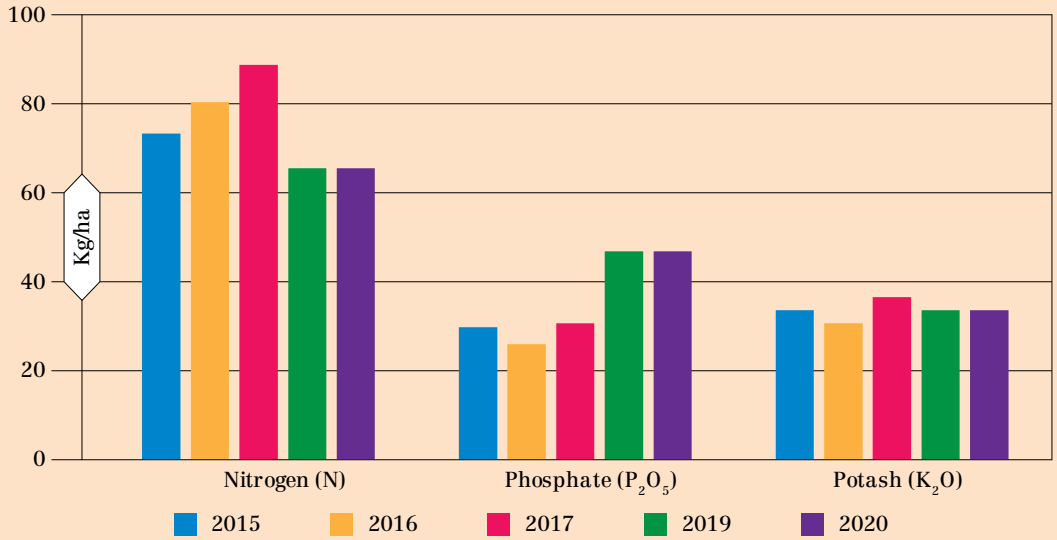
As for the use of inputs, Figure 28 shows that nitrogen is the most widely used fertilizer in Lebanon, followed by phosphate and potash. Each nutrient exhibited different use rates during the period between 2015–2019. Nitrogen used increased during the first three years (from 73.3 kg/ha to 88.8 kg/ha) but ended the period with a rate lower than in 2015 (65.6 kg/ha). Phosphate showed a constant increase, going from 29.9 to 46.9 kg/ha. Potash remained constant throughout the period, with an average rate of 33.6 kg/ha. The use of pesticides also remained constant at 7 kg/ha.

FIGURE 27 Yields in 2019 by subsector



Source: Authors' elaboration based on FAO. 2021. Production – Crops and livestock products. In: *FAOSTAT*. Rome. Cited 15 October 2021. www.fao.org/faostat/en/#data/QCL

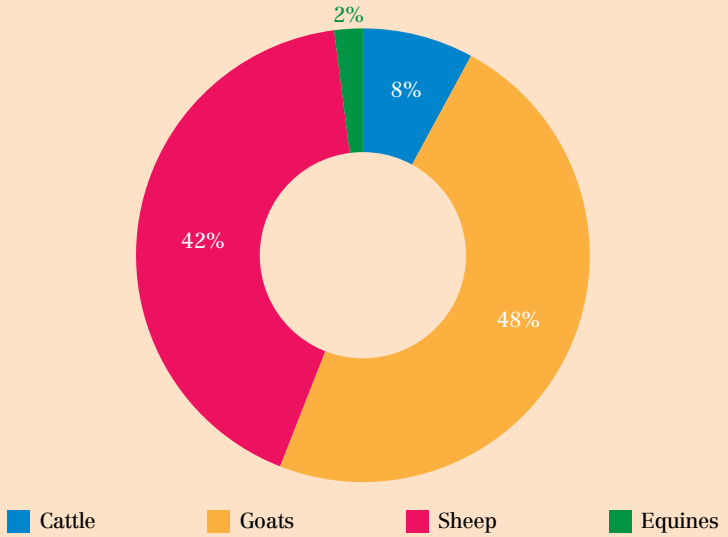
FIGURE 28 Fertilizer use per area of cropland by nutrient



Sources: Authors' elaboration based on FAO. 2021a. Fertilizers by Nutrient. In: *FAOSTAT*. Rome. Cited 15 October 2021. www.fao.org/faostat/en/#data/RFN; FAO. 2021b. FAOSTAT: Land Use. In: *FAOSTAT*. Rome. Cited 15 October 2021. www.fao.org/faostat/en/#data/RL

According to CNRS-L (Conseil National pour la Recherche Scientifique), FAO, the Lebanese Ministry of Agriculture (2018) and the Investment Development Authority of Lebanon (IDAL) (2017), the production of livestock and animal products is rising in Lebanon, becoming as important as crop production. In fact, animal production is a major activity in rural areas, particularly in the southern and northern zones where approximately 60 percent of farmers depend on dairy production as their chief means of subsistence. As seen in Figure 29, sheep and goats are the main livestock types, representing 42 and 49 percent, respectively, of total animal stock.

FIGURE 29 Number of livestock heads in 2019 (% share total animal stock)



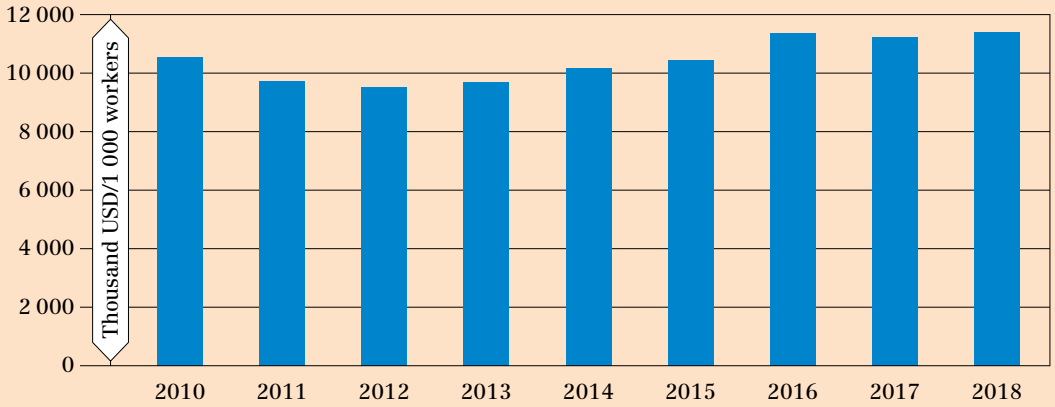
Source: Authors' elaboration based on FAO. 2021. Production – Crops and livestock products. In: *FAOSTAT*. Rome. Cited 15 October 2021. www.fao.org/faostat/en/#data/QCL

4.2 Structural characteristics of Lebanese agriculture

Productivity levels in the agricultural sector as an aggregate (including crops and livestock) reflect the economic structural transformation of the country. On the one hand, labour productivity (which is calculated as total value of agricultural production per total workers in the agricultural sector)[9] has been slowly increasing since 2012 (see Figure 30). Land productivity, on the other hand, is disaggregated by crop and livestock to provide a clear picture of the land use that provides the highest returns. The former is measured as the total value of crop production per total cultivated land, while the latter is the total value of livestock production per total land under permanent meadows and pastures. Figure 31 shows that crop production provides higher returns than animal production in terms of land use.

[9] The value of agricultural production is measured as gross production value (constant 2014–2016 thousand USD). Total workers in the agricultural sector are measured as the total number of people employed in agriculture as an aggregate.

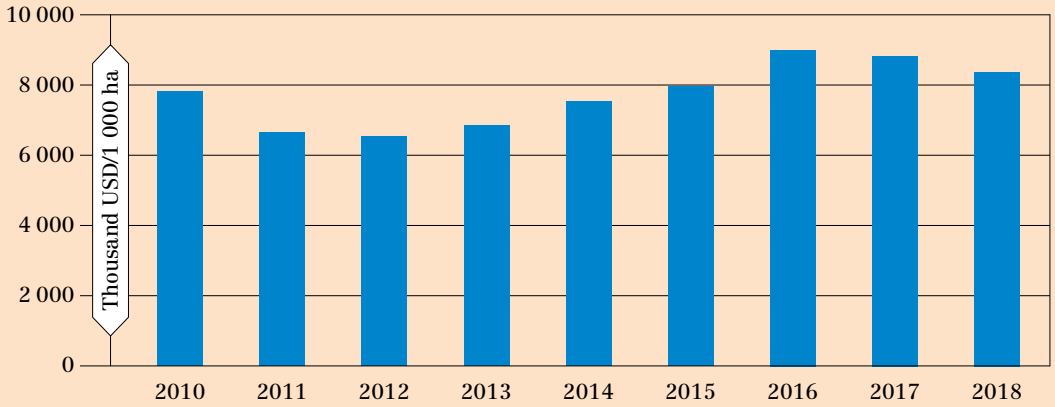
FIGURE 30 Labour productivity



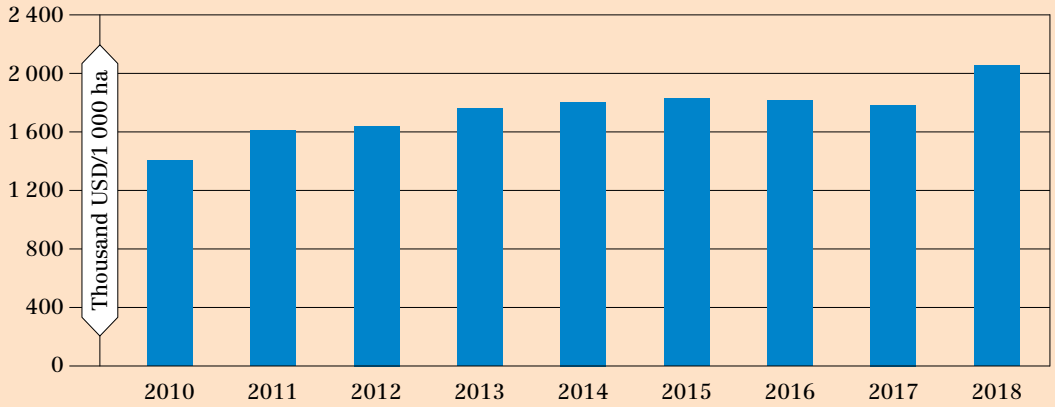
Sources: Authors' elaboration based on FAO. 2021. Value of Agricultural Production. In: *FAOSTAT*. Rome. Cited 15 October 2021. www.fao.org/faostat/en/#data/QV; ILO. 2021. Labour Statistics. In: *ILOSTAT*. Geneva, Switzerland. Cited 12 October 2021. https://ilostat.ilo.org/data

FIGURE 31 Land productivity

A. CROP PRODUCTION



B. ANIMAL PRODUCTION

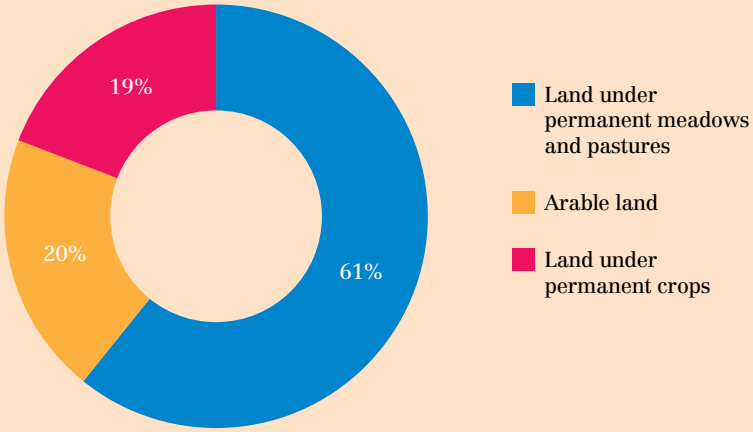


Sources: Authors' elaboration based on FAO. 2021a. Value of Agricultural Production. In: *FAOSTAT*. Rome. Cited 15 October 2021. www.fao.org/faostat/en/#data/QV; FAO. 2021b. Land Use. In: *FAOSTAT*. Rome. Cited 15 October 2021. www.fao.org/faostat/en/#data/RL

Lebanon's geographical characteristics (i.e. moderate climate, rich soil, and water resources) provide the country with perfect conditions for agricultural production with relatively high yields, making it suitable for raising diverse varieties of livestock and growing a wide variety of crops that normally grow in both cold and tropical countries (IDAL, 2017). Furthermore, Lebanon has a relatively large expanse of agricultural land,[10] occupying around 64 percent (658 000 hectares) of total land area, the largest share in the Middle East and North Africa (Bahn *et al.*, 2021).

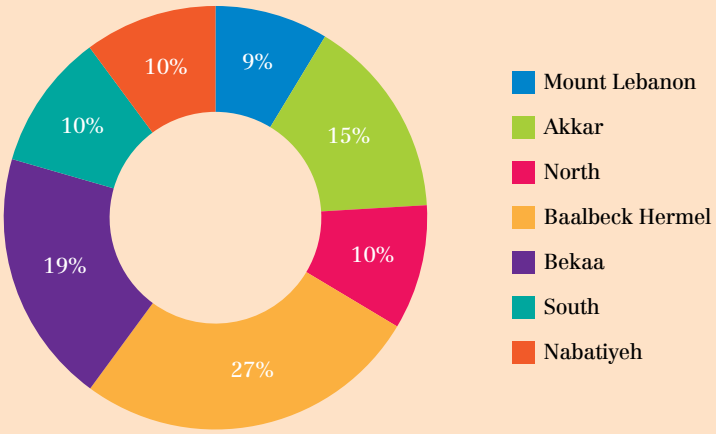
Twenty percent of Lebanon´s agricultural land (132 000 hectares) is arable land, 19 percent (126 000 hectares) is for permanent crops and 61 percent (400 000 hectares) is for permanent meadows and pastures (see Figure 32). According to FAO (2021b), 51.2 percent of Lebanon's cultivated land was irrigated in 2018. As can be seen in Figure 33, most of the agricultural area under use is in the Baalbeck-Hermel (27 percent) and Beqaa (19 percent) governorates.

FIGURE 32 Agricultural land use (% share of total agricultural land) in 2019



Source: Authors' elaboration based on FAO. 2021. FAOSTAT: land use. In: FAO. Rome. Cited 15 October 2021. www.fao.org/faostat/en/#data/RL

FIGURE 33 Utilized agricultural area (% share) in 2017 by governorate

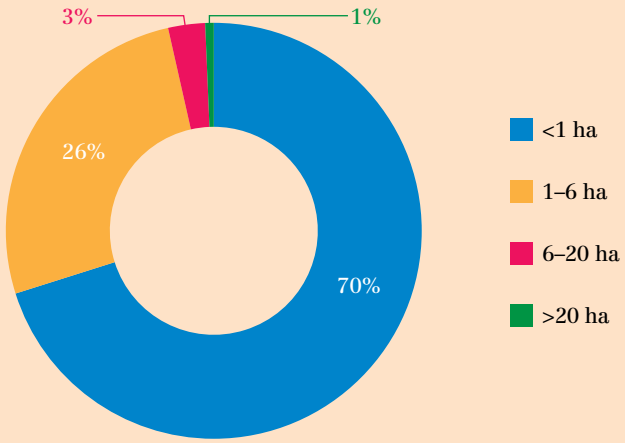


Source: Authors' elaboration based on MoA. 2021. Agriculture Production Surveys. Beirut.

[10] Agricultural land is measured as the total land (in hectares) used for the cultivation of crops (i.e. arable land and permanent crops) and animal husbandry (i.e. permanent meadows and pastures).

There is a wide disparity in the size of agricultural holdings: 70 percent of Lebanese farmers operate in areas of less than one hectare; 26 percent operate in areas of two to six hectares, and the remaining 4 percent operate on more than six hectares (see Figure 34). According to Bahn *et al.* (2021) and Dal *et al.* (2021), although fewer than 1 percent of farmers have holdings of more than 20 hectares, these farmers control 30 percent of the total agricultural area. The Lebanese agricultural sector is thus made up of many small, mostly subsistence farms and a few large, market-oriented modern farms. While recent data is scarce, it is likely that this continues to be the case.

FIGURE 34 Size of holdings in hectares of utilized agricultural area in 2010 (% share)



Source: Authors' elaboration based on MoA. 2010. *Agriculture in Lebanon. Facts and figures. The core module of the census of agriculture 2010 (main results).* Beirut. Cited 12 October 2021. https://data2.unhcr.org/en/documents/details/44733

4.3 Socioeconomic characteristics of Lebanese farmers

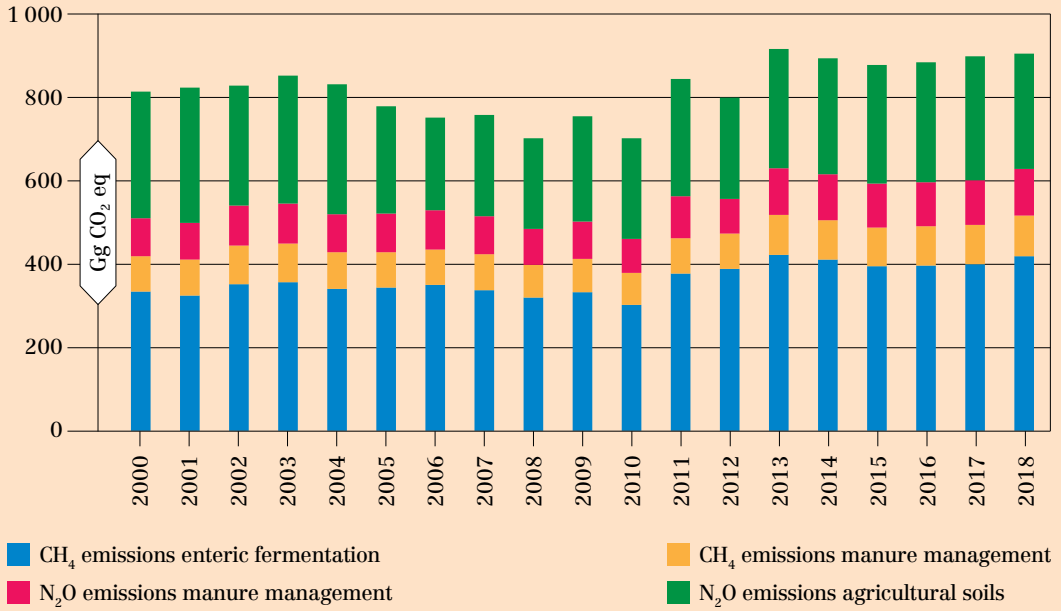
According to FAO (2021), around 10 percent of the Lebanese population lives in rural areas. The last agricultural census showed that women farmers are, on average, three years older than men (55 versus 52 years old). Younger farmers (adults under 35 years of age) represented a minor share of agricultural holders: 11 percent of male holders for men and only 7 percent of women. The numbers are even more limited for farmers under 25 years, who represent only 2 percent of agricultural holders (Bahn *et al.*, 2021; FAO, 2021). Farmers in Lebanon have lower rates of literacy and education than the general population: 16 percent of farmers are illiterate, while another 61 percent have only primary-level education (with the latter controlling more than 60 percent of the total agricultural area) (Dal *et al.*, 2021).

4.4 Agriculture and climate change

The agricultural sector contributes minimally to total greenhouse gas (GHG) emissions in Lebanon, due to the relatively small size of the sector compared to the service and industry sectors. In 2012, agriculture was responsible for only 3.56 percent of total GHG emissions in Lebanon (MoE *et al.*, 2015a). Total GHG emissions from the agricultural sector declined slightly during period 2003–2010, increasing in the following three years, and remaining fairly stable from 2013 until 2018. In 2018, the total greenhouse gas CO_2 equivalent (Gg CO_2 eq) from the agricultural sector was 880.25 Gg CO_2 eq (see Figure 35).

In 2018, the main GHG emissions from the sector were methane (CH_4) emissions from enteric fermentation generated from livestock (47.6 percent) and nitrous oxide (N_2O) from agricultural soils (28.4 percent). The contribution of manure management emissions (both N_2O and CH_4) in 2018 was 24 percent of the total GHG emissions from agriculture.

FIGURE 35 Trend of greenhouse emissions from agriculture (CO_2 equivalent), 2000–2018



Source: Author's own elaboration based on MoE, UNDP & GEF. 2021. *Lebanon's fourth biennial update report the UNFCCC.* Beirut. https://unfccc.int/sites/default/files/resource/Lebanon%20BUR4%202021.pdf

Despite its minor contribution to GHG emissions, climate change imposes serious threats to agricultural productivity in Lebanon due to the limited availability of land and water and pressure of population growth. In 2015, the Ministry of Environment (MoE), estimated that if current trends in GHG emissions continue, overall agricultural production will decrease by USD 860 million in 2040 (MoE *et al.*, 2015b).

5 Agrifood trade

KEY MESSAGES

- Agrifood exports steadily increased between 2010 and 2017, both in absolute terms and as a share of total Lebanese exports.
- The devaluation of the Lebanese pound and the COVID-19 pandemic have boosted agricultural exports, probably because the disruption of global value chains has reduced exports from other markets, increasing the demand for food products from Lebanon.
- Lebanon is almost self-sufficient in poultry products (meat and eggs), however, the country depends on imports for its most consumed foods, particularly cereals, live animals and dairy products, and honey.
- The priority for the Lebanese agricultural sector is to seek export markets. Specifically, the agribusiness sector should focus on markets in which roots and tubers, vegetables and fruits are in high demand.
- Lebanon has faced difficulties in the supply of agricultural inputs, with limited domestic production leading to a high dependence on imports. Particularly with respect to pesticides, seeds and veterinary drugs, the trade balance is still very negative, with imports much higher than exports.

According to Lebanese Customs (2021), Lebanon's agrifood sector contributed a large proportion to total Lebanese trade in 2020, nearly a fifth of total exports and a fourth of total imports (20.1 percent and 20.3 percent, respectively). Compared to 2019 values, there was an increase in total exports (19.8 percent) and a decrease in total imports (24.6 percent), indicating its relative relevance for the Lebanese economy during the COVID-19 pandemic.

The devaluation of the Lebanese pound and the pandemic have improved the agricultural trade balance, leading to the decrease in imports and the increase in exports between 2019 and 2020, a pattern confirmed in the first months of 2021. Lebanese food exports and imports comprise a variety of products and markets, most of which are destined to neighbouring Arab countries, so that the country does not rely on only a few exports and imports value chains or partners. However, the export concentration index has increased between 2018 and 2020, putting the country on a less diversified trajectory.

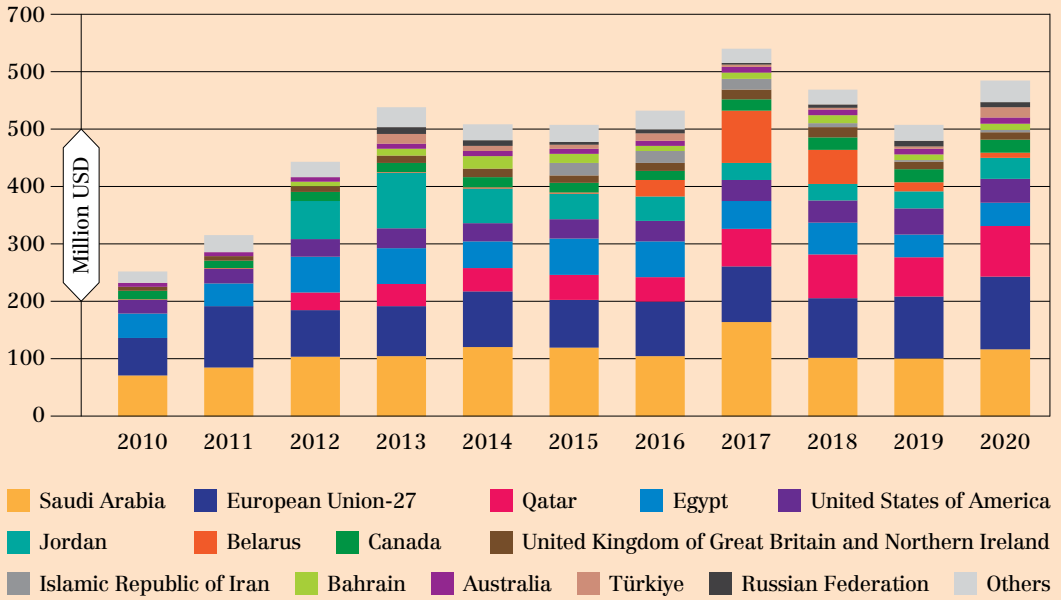
Lebanon maintains a comparative advantage in vegetable, fruits, and food products, particularly when compared to other countries, while the revealed comparative advantage (RCA) is just below 1 for animal products. Based on production levels, the country should focus on exporting to markets where roots and tubers, vegetables and fruits are in high demand. Lebanon still depends largely on imports of pesticides and seeds.

5.1 Exports

Agrifood exports steadily increased between 2010 and 2017, both in absolute terms and as a share of total Lebanese exports. In 2018 and 2019, exports showed minor inflexions,

while 2020 levels nearly returned to the peak level of 2017. In 2020, total agrifood exports amounted to USD 701 million, representing 19.8 percent of total national exports. As shown in Figure 36, the three main export destinations over the past decade have been the EU-27, Qatar and Saudi Arabia, which made up more than 50 percent of total agricultural exports in 2020, followed by Egypt, Jordan and the United States of America. The destinations with the largest percentage increases in the last five years were Canada, the EU-27 and Qatar, while the largest decreases were in Belarus, Egypt and the Islamic Republic of Iran.

FIGURE 36 Annual agricultural exports by partner

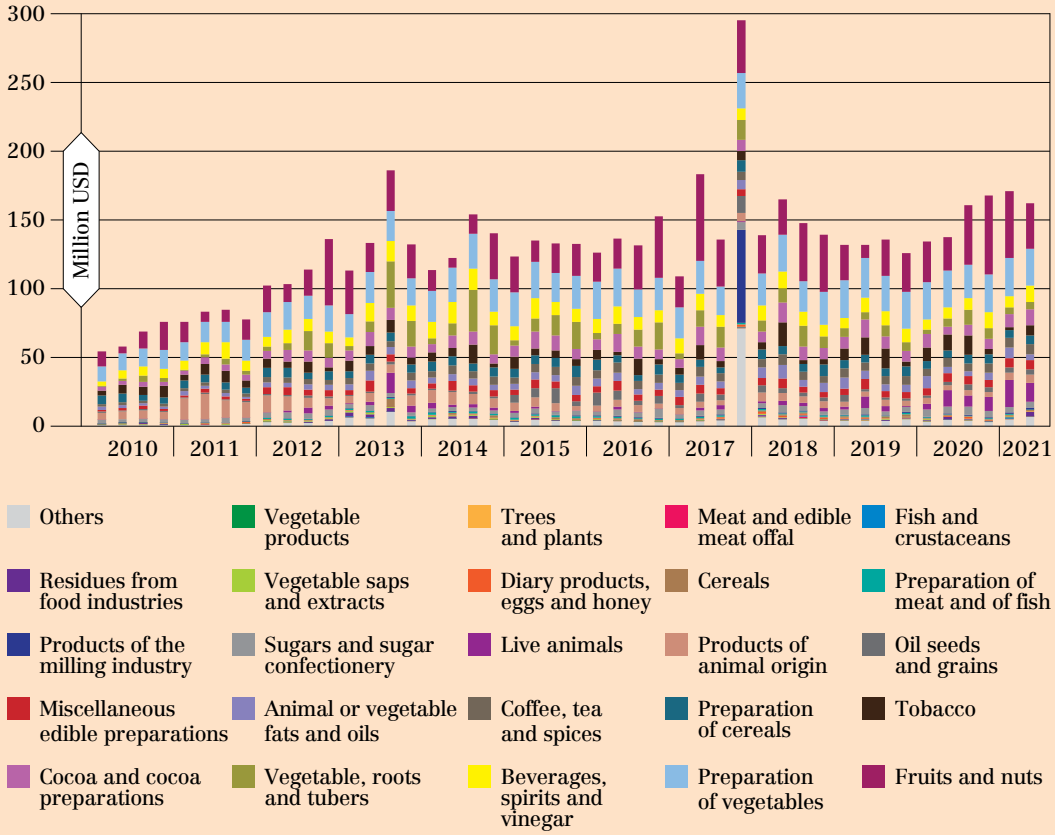


Source: Authors' elaboration based on Trade Data Monitor. 2021. Customized trade data systems. In: *Features*. Geneva, Switzerland. Cited 20 October 2021. https://tradedatamonitor.com/index.php

As shown in Figure 37, the devaluation of the Lebanese pound and the COVID-19 pandemic have boosted agricultural exports, probably because the disruption of global value chains (GVCs) has reduced exports from other markets, increasing the demand for food products from Lebanon. In fact, quarterly exports increased, particularly from Q2 in 2020 to Q1 in 2021, to more than USD 160 million. The main export commodities have historically been fruits and nuts, products prepared from vegetables, and beverages, spirits, and vinegar, which all together represent almost half of the total. The other key export goods are vegetables, roots and tubers, cocoa and cocoa preparations and tobacco. The commodities that have experienced the largest increases in exports over the past five years are fruits and nuts, live animals and tobacco, while the largest decreases are reported for vegetables, roots and tubers, and oil seeds and grains.

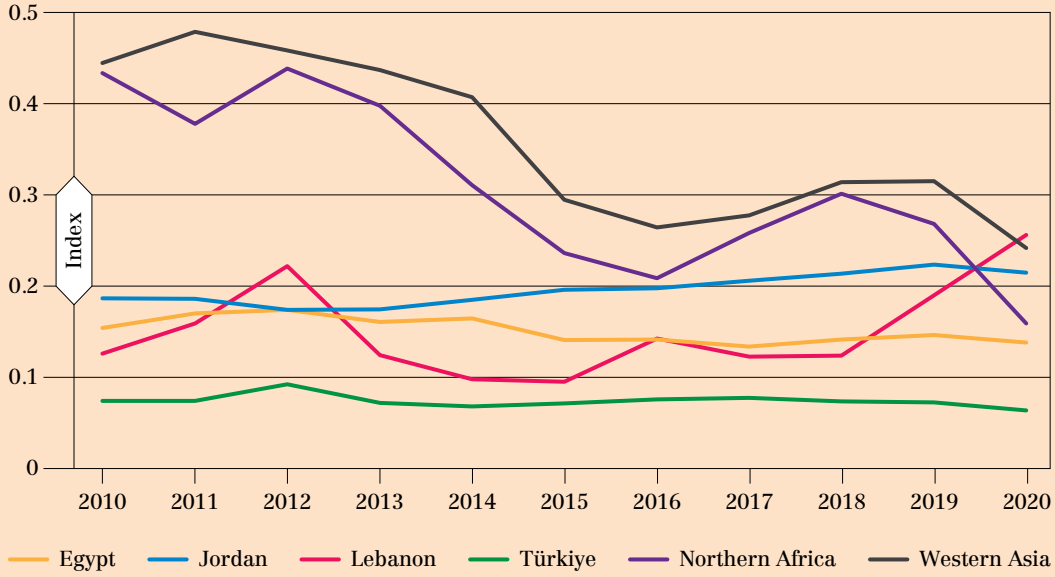
Lebanon's dependence on a relatively few product categories has resulted in a moderate level of export diversification. The export product concentration index measures a country's concentration of exported goods, i.e. whether exports are well-distributed among numerous product groups or mostly accounted comprise a small number of commodities. As shown in Figure 38, the index for Lebanon has been historically low and close to countries such as Egypt and Türkiye. However, in 2020 it reached a level of 0.26, exceeding Jordan and the averages for the Western Asia and Northern Africa regions. This is still lower than the figure for most Northern Africa countries but is a negative trend. Lebanon should thus strive to diversify its exported goods.

FIGURE 37 Quarterly agricultural exports by commodity



Source: Authors' elaboration based on Trade Data Monitor. 2021. Customized trade data systems. In: *Features*. Geneva, Switzerland. Cited 20 October 2021. https://tradedatamonitor.com/index.php

FIGURE 38 Export product concentration index by selected countries



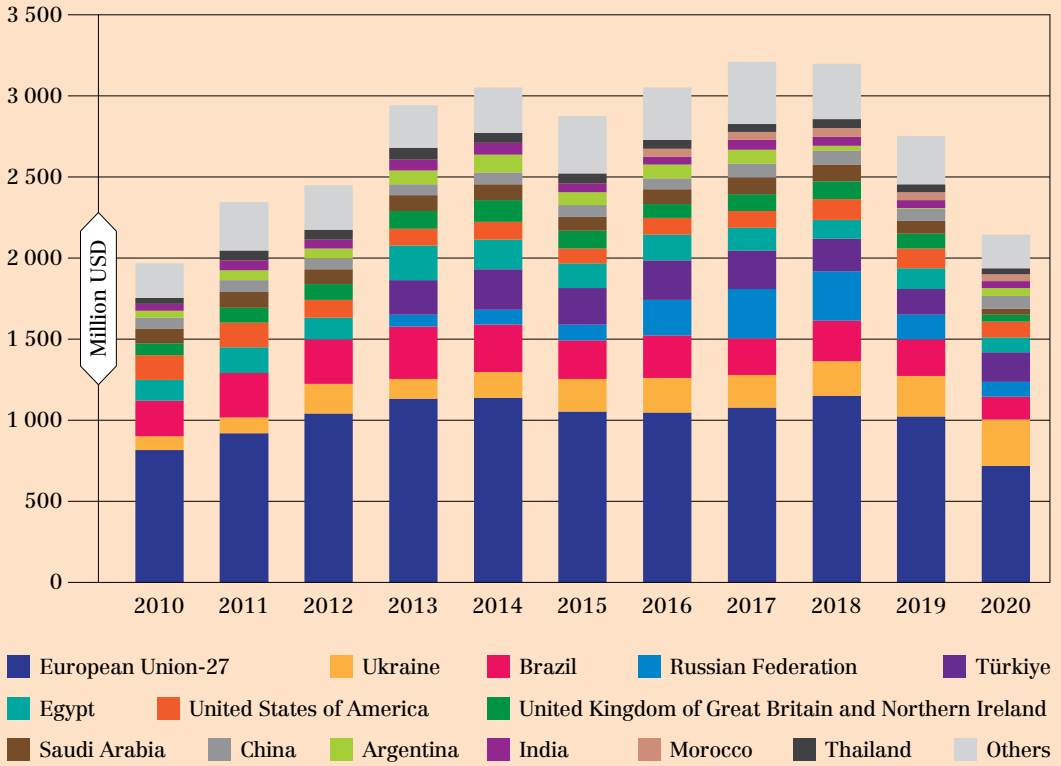
Source: Authors' elaboration based on UNCTAD. 2021. Data Center. In: *UNCTAD STAT*. Geneva, Switzerland. Cited 12 October 2021. https://unctadstat.unctad.org/EN

Lebanon's agribusiness sector is characterized by a large degree of dualism, with many small firms (both in terms of number of employees and farm size) and a few larger companies. The dominance of smallholder production in Lebanon, where the average farm size is 1.4 hectares, affects agribusiness and export potential, particularly in terms of quality and reliability of supply. This is the case for most Lebanese value chains. For example, cherry production is dominated by smallholders on than 0.2 hectares. The small plot size of many citrus, grape and olive oil farms limits the potential for economies of scale, while and most of the production of potatoes and fresh fruit and vegetables not only lacks consistency in volume and quality, but also faces high costs and low profitability, mainly due to the small scale of operations.

5.2 Imports

As shown in Figure 39, after some increases between 2010 and 2013, agrifood imports remained steady until 2018 at around USD 3 billion per year. In the two years following, imports plummeted by about a third, reaching USD 2.15 billion in 2020, which is 32.2 percent of total national imports. This extreme drop, coupled with the increase in exports, greatly improved the agribusiness trade balance and was likely due to the combined economic, financial, and COVID-19 crises. The main supplier of Lebanon agricultural products during the last ten years has been the European Union, followed by Brazil, the Russian Federation, Türkiye and Ukraine. China and Ukraine have gained relative importance over the past five years, while Brazil, the Russian Federation, Saudi Arabia and the United Kingdom of Great Britain and Northern Ireland have decreased their importance among Lebanon's trade partners.

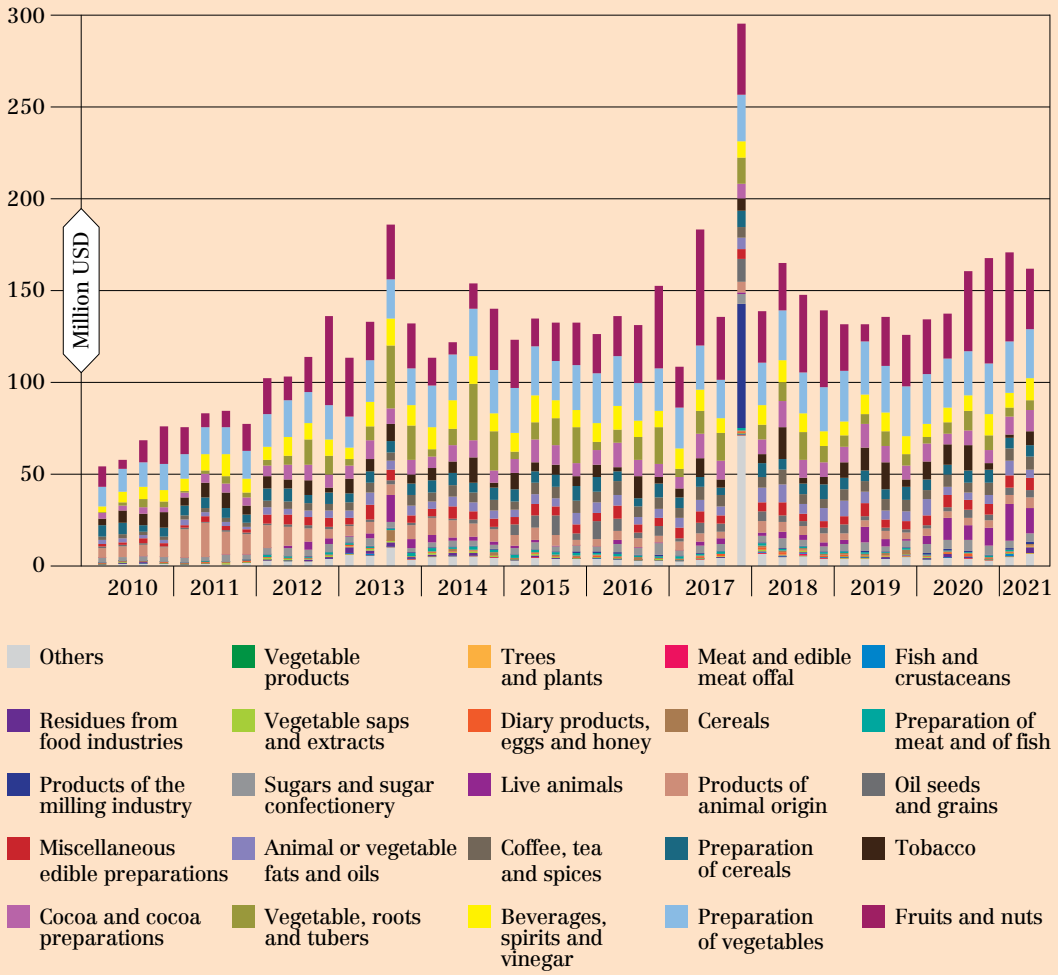
FIGURE 39 Annual agricultural imports by partner



Source: Authors' elaboration based on Trade Data Monitor. 2021. Customized trade data systems. In: *Features*. Geneva, Switzerland. Cited 20 October 2021. https://tradedatamonitor.com/index.php

The effect of the compound crises can be seen clearly in quarterly data, as shown in Figure 40. In the third quarter of 2020, total agrifood imports plunged and then almost doubled in Q4. In the first two quarters of 2021, imports decreased again to close to the lowest levels in the last ten years. Lebanon is almost self-sufficient in poultry products (meat and eggs); however, the country depends on imports for its most consumed foods, particularly cereals, live animals and dairy products, and honey. The imported commodities that have enjoyed the largest increases over the past five years are cereals, animal and vegetable fats and oils, while the main decreases are reported for dairy products, eggs and honey, and goods prepared from cereals.

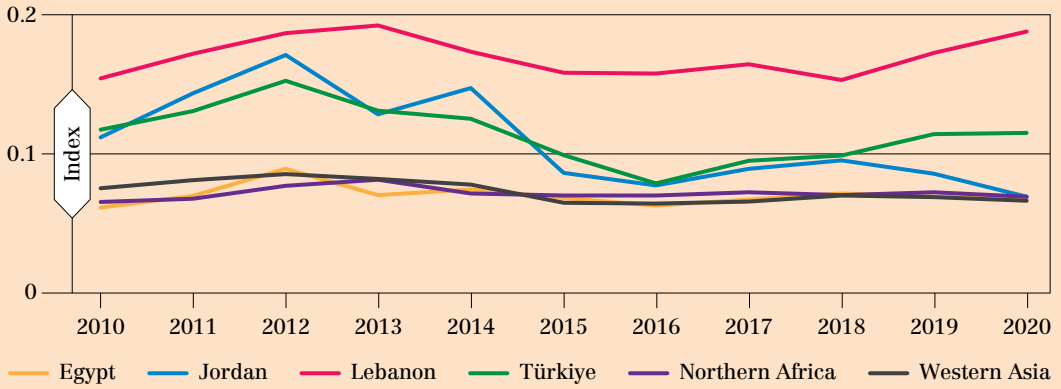
FIGURE 40 Quarterly agricultural imports by commodity



Source: Authors' elaboration based on Trade Data Monitor. 2021. Customized trade data systems. In: *Features*. Geneva, Switzerland. Cited 20 October 2021. https://tradedatamonitor.com/index.php

In terms of diversification of imports, the product concentration index is lower than for exports, amounting to 0.19 in 2020 (see Figure 41). However, this was higher than in Egypt, Jordan, Northern Africa, Türkiye and Western Asia throughout the period between 2010 and 2020. It should be thus noticed that the low import diversification is not a by-product of the recent crises since the index has been historically high. In this case, the main policy implication is the need to diversify the range of imported products to reduce vulnerability to price crises. This clearly depends on the interplay between production and trade, to which we now turn.

FIGURE 41 Import product concentration index by selected countries



Source: Authors' elaboration based on UNCTAD. 2021. Data Center. In: *UNCTAD STAT*. Geneva, Switzerland. Cited 12 October 2021. https://unctadstat.unctad.org/EN

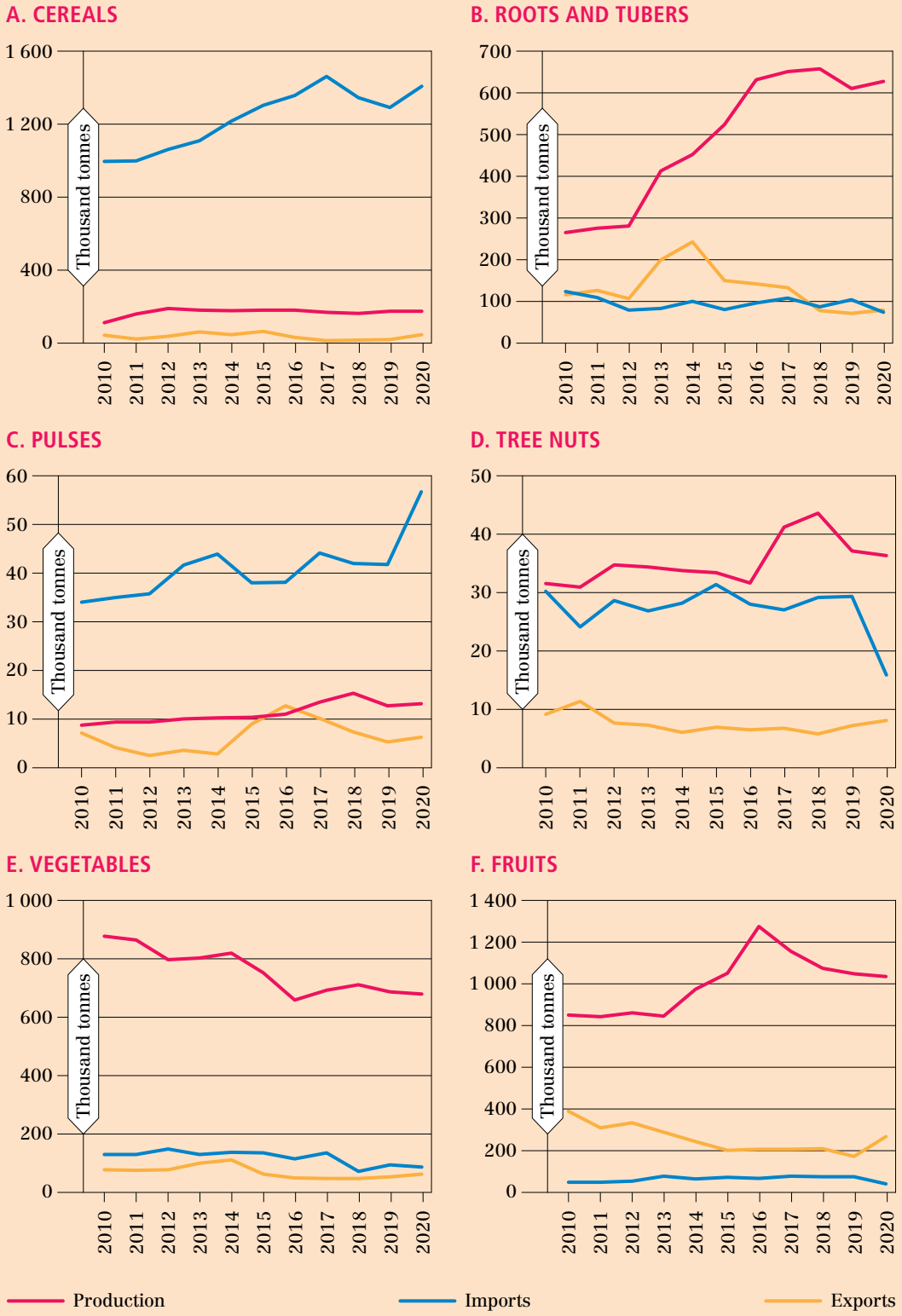
5.3 Trade opportunities for specific value chains

To analyse potential trade opportunities for specific value chains, the charts under Figure 42 compare the trend lines of production, imports, and exports (in quantity terms) in six of Lebanon's major product groups (cereals, roots and tubers, pulses, tree nuts, vegetables, and fruits) between 2010 and 2020. The priority for the Lebanese agricultural sector is to seek export markets. Specifically, the agribusiness sector should focus on markets in which roots and tubers, vegetables and fruits are in high demand. The potential to increase exports is significant especially for fruits and vegetables such as apples, bananas (fresh or dried) and potatoes, but this potential is blocked by insufficient food quality, safety standards and traceability.

These charts reveal a range of patterns for the different commodities. Over the past ten years, production levels have generally been stable or increasing for most product groups. The only exception is for vegetables, whose production slightly declined from 880 000 tonnes in 2010 to 680 000 tonnes in 2020. While fruits enjoyed a temporary production spike in 2016, the most notable increase was in the production level for roots and tubers; this more than doubled, from around 265 000 tonnes in 2010 to 629 000 tonnes in 2020. Export levels have been generally low for all six-product groups and, according to Bahn *et al.* (2019), food imports account for about 50 percent of all calories consumed domestically.

When production levels are much higher than exports and imports, it implies opportunities to export surplus products abroad (or to reduce dependence on imports). In Lebanon, this is particularly the case for roots and tubers, vegetables and fruits, whose production is much higher than both exports and imports. By contrast, the production and export quantities of cereals and pulses are much lower than the import levels, and the gaps are increasing, as was particularly evident in 2020. This implies that Lebanon should aim to strengthen their production to meet consumption needs while reducing imports. Over the last decade, the cultivated areas of cereals and pulses decreased due to the high cost of production and demand was largely met by imports. However, this has changed with the devaluation of the Lebanese pound as the import prices of these products have increased and the cultivated areas of cereals and pulses have started to increase. Finally, both the production and import of tree nuts are high relative to the export level, so there may be an opportunity to increase exports for this commodity as well. In 2020, imports of tree nuts fell sharply while production levels remained stable, making the case for increasing exports even more relevant.

FIGURE 42 Exports, imports and production quantities of selected product groups

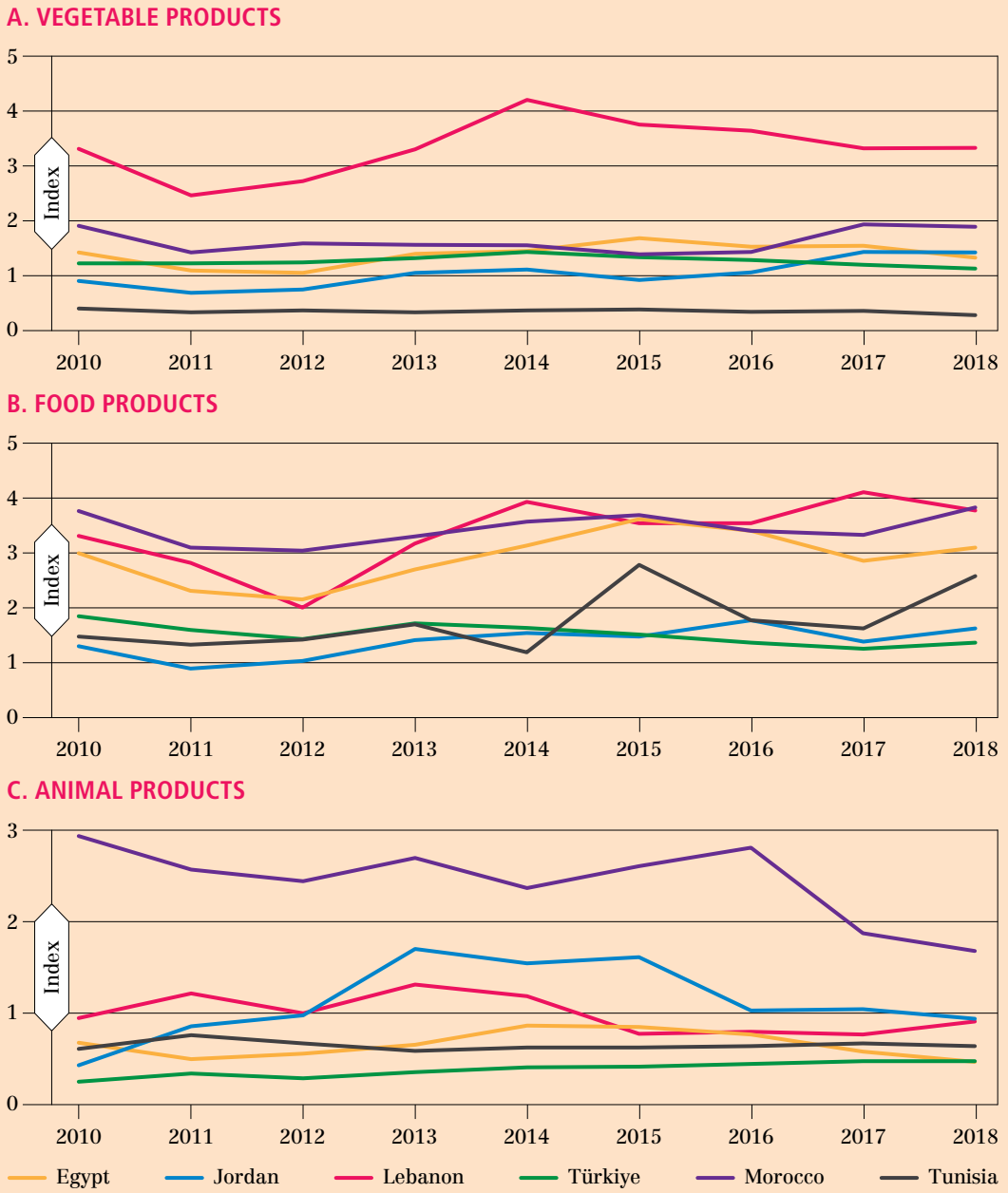


Sources: Author's own elaboration based on FAO. 2021a. Production – Crops and livestock products. In: *FAOSTAT*. Rome. Cited 15 October 2021. www.fao.org/faostat/en/#data/QCL; FAO. 2021b. Trade – Crop and livestock products. In: *FAOSTAT*. Rome. Cited 15 October 2021. www.fao.org/faostat/en/#data/TCL

The recommendations for the product groups described above are confirmed by the revealed comparative advantage (RCA) indicator. An estimated RCA above (below) 1 implies that Lebanon has a relative advantage (disadvantage) in a certain product group based on import and export volumes compared to other countries. A country should expand production and increase exports in those sectors in which it has a competitive edge.

Figure 43 shows that Lebanon has a comparative advantage in vegetable and food products when compared to similar countries. In fact, for these product groups, Lebanon's RCA is higher than that of Egypt, Jordan, Türkiye, Tunisia and Morocco (except for the latter for food products). It has a comparative disadvantage in animal products (since the RCA is slightly below 1), especially with respect to Morocco.

FIGURE 43 Revealed comparative advantage of selected product groups

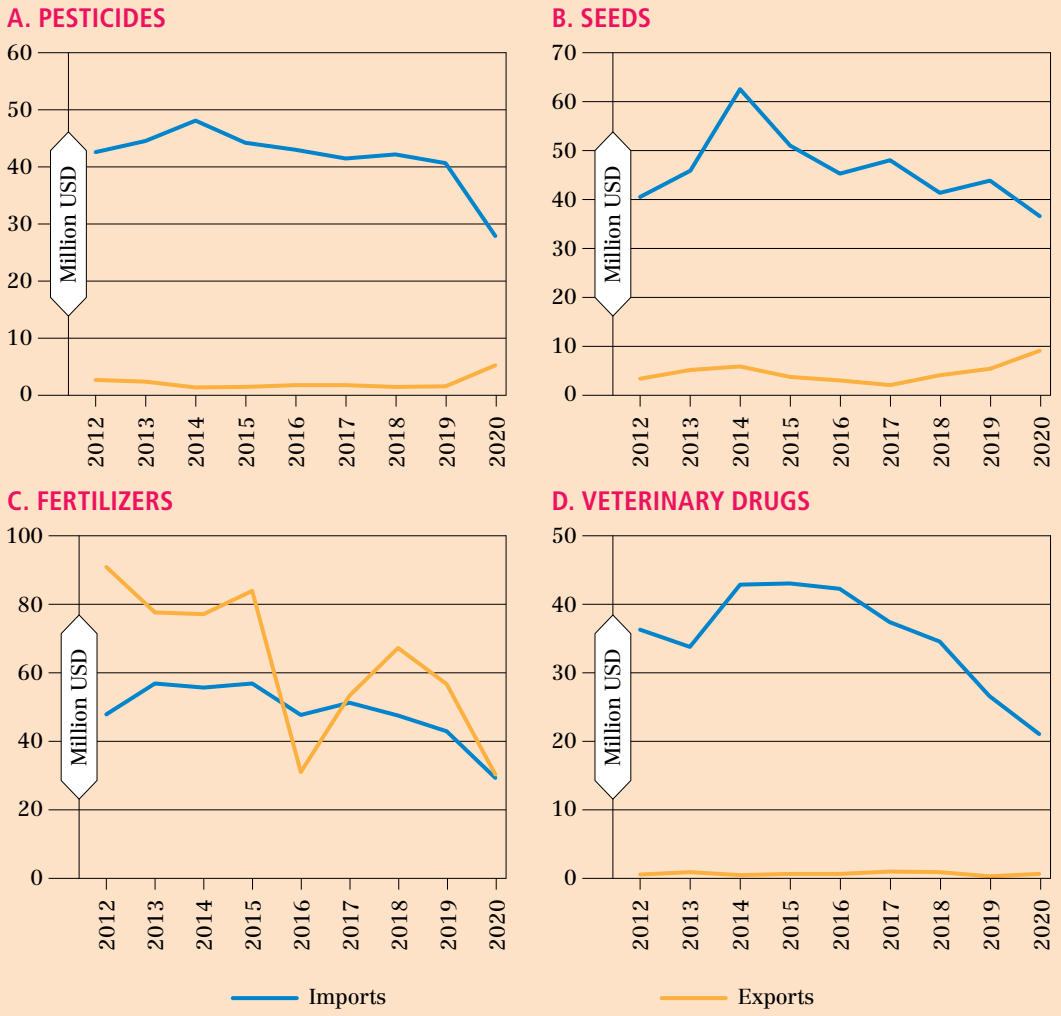


Source: Authors' elaboration based on World Bank. 2021. Trade stats. In: *World integrated trade solution*. Washington, DC. https://wits.worldbank.org/Default.aspx?lang=en

5.4. Agricultural inputs trade

Lebanon has faced difficulties in the supply of agricultural inputs, with limited domestic production leading to a high dependence on imports. Particularly with respect to pesticides, seeds and veterinary drugs, the trade balance is still very negative, with imports much higher than exports, as shown in Figure 44, Lebanon imports most of its agricultural inputs and exports are limited. However, the gap has been steadily closing, especially during 2020, with both a decrease in imports (with values of USD 28 million for pesticides, USD 36.6 million for seeds and USD 21.1 million USD for veterinary drugs in 2020) and an increase in exports (with values of USD 5.3 million for pesticides, 9 million for seeds, and 0.6 million for veterinary drugs in 2020). The level of imports and exports of fertilizers is roughly the same, with a value of around USD 30.3 million in 2020. However, this parity hides broad heterogeneity between the different types of nutrients: Lebanon only produces phosphatic fertilizers, which represent most of the category's export value, and largely imports nitrogenous and phosphatic fertilizers.

FIGURE 44 Import and export value of agricultural inputs



Sources: Author's own elaboration based on FAO. 2021a. Production – Crops and livestock products. In: *FAOSTAT*. Rome. Cited 15 October 2021. www.fao.org/faostat/en/#data/QCL; FAO. 2021b. Trade – Crop and livestock products. In: *FAOSTAT*. Rome. Cited 15 October 2021. www.fao.org/faostat/en/#data/TCL

6 Stakeholders' perceptions: key informant interviews

KEY MESSAGES

- The limited availability and increased cost of fuel and diesel have drastically impacted farmers' operations, which has led to a decrease in the required quantities of irrigation water to reduce their costs.
- The devaluation of the LBP and the restrictions imposed by banks on money withdrawals and transfers have had a drastic impact on the business operations of input suppliers. Many suffered profit losses, especially at the beginning of the crisis.
- The decrease in purchasing power caused by the financial crisis, together with the increase in transportation costs due to the fuel crisis has caused a major decline in the availability of fresh fruits and vegetables in wholesale markets.
- The agricultural sector is facing new challenges, namely the increase in the prices of agricultural inputs, lifting of fuel subsidies, the increase in land rent costs, as well as access to finance, and liquidity problems that hinder the development of agricultural holdings and limit new investments in the sector.

6.1 Agricultural holders

The KIIs targeted five agricultural holders engaged in agricultural production (plant and animal) operating in different agricultural regions. These included small, medium, and large agricultural operators cultivating mainly fresh fruits and vegetables and vegetables under greenhouses as well as a livestock farmer.

The economic and financial crisis had a major impact on agricultural holders. Increased production costs, mainly due to rising costs of imported agricultural inputs (seeds, fertilizers, pesticides, feed) led farmers to purchase low-cost inputs when available, decrease the use of fertilizers and pesticides and revert to low-cost seeds from the previous season. Overall, this affected the production as well as the quality of some agricultural produce.

The limited availability and increased cost of fuel and diesel have drastically impacted farmers' operations, which has led to a decrease in the required quantities of irrigation water to reduce their costs. Some farmers have recently made costly investments in solar systems to save on the high cost of fuel. In addition, some farmers have opted to market their agricultural products in nearby markets to reduce transportation costs.

Many farmers were forced to reduce their total cultivated area (including in greenhouses) due to the high cost of inputs and limited or no access to finance (farmers do not have access to credit from inputs suppliers nor to their own savings in the banks due to financial restrictions). Some shifted to crops requiring lower input levels and/or less irrigation. There were also

delays in planting during the 2021—2022 agricultural season due to the uncertainty caused by changes in the exchange rate of LBP against the USD and the lifting of fuel subsidies.

The financial crisis had a major impact on farmers' revenues since most inputs are purchased in USD (or the equivalent in LBP based on the market exchange rate) and the produce is sold in LBP. Despite the increase in farm gate prices, profits decreased, mostly due to the increasing cost of inputs, fuel, and land rent. While the cost of agricultural labour has doubled since the crisis began, farmers are paying the agricultural workers in LBP and the share of labour cost in the total cost has declined.

COVID-19 imposed some mobility restrictions on farmers, herders, labourers, milk collectors (mostly at the beginning of the pandemic) and made it difficult for agricultural holders to reach the markets, causing the loss of highly perishable crops. In addition, the closure of restaurants during lockdowns and disruption in retail marketing outlets led farmers to abandon the cultivation of some crops to reduce their losses.

6.2 Input suppliers

The KIIs targeted nine input suppliers operating across the country. These included small, medium, and large input suppliers and distributors selling seeds, fertilizers, pesticides, greenhouse equipment and small irrigation equipment. In addition, interviews were carried out with specialized suppliers of potato seed, greenhouse materials and fruit tree seedlings.

Since most agricultural inputs are imported, the devaluation of the LBP and the restrictions imposed by banks on money withdrawals and transfers have had a drastic impact on the business operations of input suppliers. Many suffered profit losses, especially at the beginning of the crisis when they had to accept the repayment of farmers' debts at a lower exchange rate than the market exchange rate.

To cope with the financial crisis, input suppliers and distributors have gradually started to rely on self-financing in a transformed cash-based economy. Some have accepted a decrease in their profit margins as they shift from selling inputs to farmers on credit to a strictly cash basis. Nevertheless, some input suppliers are still granting limited financial facilities to a small number of farmers where the payment of the credit is required in cash.

Lebanon's financial crisis has resulted in a gradual decline in the total sales of input suppliers, which started at the end of 2019 and now exceeds 40 percent for most suppliers. While many input suppliers have been able to preserve good relations with manufacturing companies in Europe and to continue their imports from traditional sources, albeit in lower quantities, some have started to shift towards importing low-cost inputs from other countries to meet the demand of farmers. Some farmers have shifted to less costly agricultural inputs, while others have decreased the quantities of fertilizers and pesticides they use, all of which affects total production and quality of the produce. There has also been an increase in demand for locally produced seedlings, which are much cheaper than imported seedlings. Some large input suppliers had to close some satellite offices or to downsize the number of employees to reduce their operating costs. Some have also started to expand their business operations in other countries.

The COVID-19 pandemic had limited or negligible effects on the business operations of the input suppliers. The most important impacts were due to mobility restrictions as well as delays in administrative procedures for the import of agricultural inputs.

Overall, despite a decrease in the volume of imported agricultural inputs in 2020–2021, input suppliers were able to meet farmers' demands for inputs with a few exceptions. The prices of agricultural inputs skyrocketed in LBP (but remained stable in USD) compared to pre-crisis prices. The depletion in the suppliers' stocks of agricultural inputs along with

the increase in international prices and the increase in shipping costs may lead to a price increase in agricultural inputs (mainly fertilizers) during the 2021–2022 season.

6.3 Wholesale traders

The KIIs targeted three traders in two wholesale markets (Beirut and North) who specialize in sales of fresh fruits and vegetables. The decrease in purchasing power caused by the financial crisis, together with the increase in transportation costs due to the fuel crisis which led farmers to market their crops in nearby markets resulted in a gradual decline in the quantities of fruits and vegetables available in wholesale markets. The volume of imported agricultural products in wholesale markets has also considerably decreased due to the high exchange rate and reduced demand for imported products. These factors caused a major decline in the availability of fresh fruits and vegetables in wholesale markets in 2021. This reached more than 50 percent for some traders.

Not surprisingly, prices for fresh fruits and vegetables rose considerably in wholesale markets, with an estimated increase of around 7–10 times by the end of 2021 compared to 2019. This led consumers to buy less and rely more heavily on potatoes and other hardy vegetables and to decrease their consumption of fruits.

Traders now require all payments to be paid in cash upon delivery, with some exceptions, mostly for highly perishable crops. Farmers that sell their crops to wholesale markets are paid in cash, not by cheque as was common prior to the crisis. In addition, there have been changes in the packaging used for fruits and vegetables to decrease costs and accommodate the new consumer preferences.

COVID-19 restrictions during the lockdown also influenced the operations of the wholesale markets. The immediate reaction was an increase in demand for fruits and vegetables due to consumers' panic. At the same time, traditional markets outlets, such as restaurants, were closed for a prolonged period of time during lockdown leading to decreasing demand of some types of vegetables (mainly leafy vegetables). During the lockdown period, there was also an increase in the online marketing and e-commerce of fruits and vegetables.

6.4 Exporters of agricultural products

The KIIs targeted three large exporters specialized in exporting fresh fruits and vegetables to neighbouring Arab and European countries. The devaluation of the LBP and consequent increases in the cost of locally produced food and agricultural products helped to increase the competitiveness of Lebanese products in export markets. An increase in total agricultural exports of fruits (grapes, avocado, apples, cherry, peaches, etc.) and vegetables (potatoes, leafy vegetables, etc.) was registered in 2020 and 2021, reaching 20 percent for some products.

Lebanese exporters have worked to open new markets in Europe and the United Kingdom of Great Britain and Northern Ireland in addition to more traditional markets in neighbouring Arab and Gulf countries. While there has been an increasing demand for fresh agricultural products, Lebanese agricultural exports have also been able to reach big supermarket chains. Exporters, like many other businesses, have had to cope with the financial restrictions imposed by the Lebanese commercial banks. Some exporters have started paying farmers in USD.

Most exporters have faced delays in exporting their products due to the decreased number of shipments and flights to destination countries, in addition to delays due to in administrative procedures and logistical problems at the borders. There has also been an increase in transportation costs.

6.5 Other key actors

The KIIs targeted six other key actors, including representatives from farmers' association, chambers of commerce, industry, and agriculture; an organic expert; an extension agent and a financial institution. The interviews confirmed the new challenges facing the agricultural sector following the economic and financial crisis, namely the increase in the prices of agricultural inputs, lifting of fuel subsidies (leading to increases in irrigation and transportation costs), the increase in land rent costs, as well as access to finance, and liquidity problems that hinder the development of agricultural holdings and limit new investments in the sector. In addition, the current economic crisis had a major effect on access to agricultural loans, which were already limited prior to the crisis and have completely stopped since the end of 2019.

7 Conclusions

Lebanon currently faces one of the worst economic crises of this century. The political deadlock, the economic crisis and the COVID-19 pandemic have further intensified the country's existing economic fragility. Based on preliminary estimates, it is expected that the total cultivated area (mainly temporary crops and crops under greenhouses) will decrease during the 2021–2022 agricultural season due to the expected further increase in prices of inputs and soaring fuel prices. Overall, farmers will tend to shift to low-cost and less water demanding crops to reduce their overall production costs. Farmgate prices for agricultural products are also on the rise with the increase in production costs due to further depreciation of the Lebanese pound. Despite the increase in export costs, exports of fresh fruits and vegetables are projected to increase for a variety of products and countries.

This study identified the main economic and social challenges related to Lebanon's agrifood sector, reaching five main conclusions.

First, the agricultural sector may suffer from a severe drop in production capacity due to reduced agricultural investment, increased production costs, a shortage in imported agricultural inputs and reduced water supply. These challenges will be further aggravated by the lack of institutional support, access to credit from the banking sector, and low levels of public expenditure. Accordingly, it will be important to facilitate the availability of adequate financial services for Lebanese farmers at affordable prices. Regulatory and institutional reforms are urgently needed to support the establishment of an agricultural credit institute, and to explore other channels for agriculture finance and strengthen the institutional capacity of agricultural cooperatives to provide sufficient credit services. Institutional reforms are also needed to enhance the effectiveness of agricultural research and development services, and to strengthen agricultural knowledge information systems as well as sectoral governance to maximize the benefits of public and private investments.

Second, public expenditure on agriculture remains very low, accounting for less than one percent of total public expenditure since 1995, despite its importance for food security, and its contribution to more than 10 percent of total employment and nearly 5 percent of total GDP. In the short-term, the government should prioritize supporting farmers' access to agricultural inputs, possibly through cash transfers, to mitigate the impact of inflated input prices. In the longer-term, the government should increase public expenditure on agriculture, especially investments in land, water, and irrigation infrastructure. Public investments should also focus on promoting sustainable and climate-resilient farming practices, as well as supporting the adoption of innovative and modern technologies in agriculture.

Third, agricultural employment remains extremely precarious, with nearly 90 percent of agricultural workers employed on an informal basis and lacking legal rights and social protection. Regulatory intervention is extremely necessary to formalize agricultural labour and protect the workers, including by extending work permissions to non-Lebanese workers. The formalization of agricultural employment could increase government revenues from taxes, which could support increased public expenditure on agriculture.

Fourth, currency devaluation and disruptions in global value chains during the pandemic had a positive impact on Lebanon's agricultural exports during 2020 and the first quarter of 2021. Lebanon has a relative comparative advantage in vegetables and fruits, and the MoA could encourage the production of such crops to improve farmers' income and sustain

or increase employment opportunities in the sector. In addition, increasing the production of staple foods can mitigate the impact of hyperinflation on food prices and ensure access to affordable and nutritious food. Moreover, the MoA should encourage local agricultural production by increasing total cropped areas and animal production as well as supporting local production of agricultural inputs.

Finally, there is an urgent need to support farmers in the short and medium term by scaling voucher schemes for small- and medium-scale farmers as well as to provide financial facilities to medium- and large-scale farmers to support the adoption of new technologies, including the use of renewable energy (e.g. solar systems for irrigation). Furthermore, there is need to support and develop the export infrastructure, including facilitating administrative procedures related to certification, market quality compliance and laboratory testing, as well as providing logistics support for the export of agricultural products by land, sea, and air in addition to reducing export transportation costs and other export fees.

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This study aims to identify the main economic and social challenges related to the agrifood sector that Lebanon has been facing and recommend evidence-based strategies and priority areas for public investment to cope with the impacts of the COVID-19 pandemic and the economic and financial crisis.

It proposes several strategies and recommendations that could be adopted at the policymaking level in response to the current challenges. For example, and given the severe drop in production capacity due to drop in agricultural investments, increased production costs, shortage in imported agricultural inputs and reduced water supply; it will be essential to facilitate the availability of adequate financial services for Lebanese farmers at affordable prices. It is equally important to prioritise farmers' access to agricultural inputs in the short term, possibly through cash transfers, to mitigate the impact of inflated input prices, while aiming to increase public expenditure on agriculture in the longer-term. Formalisation of agriculture employment will provide legal and social protection for workers and could increase government revenues from taxes, which could support the aim to increase public expenditure on agriculture.

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