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Agricultural sector review in Lebanon

FAO AGRICULTURAL DEVELOPMENT ECONOMICS TECHNICAL STUDY



Agricultural sector review in Lebanon

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Contents

Preface	vii
Acknowledgements	viii
Acronyms	ix
Executive summary	xi
1 Introduction	1
2 Lebanon's agricultural and food systems	3
2.1 The macroeconomic setting	3
2.2 Structural characteristics of Lebanese agriculture	12
2.3 Agricultural and food trade	16
2.4 Lebanon agrifood value chains	22
3 Policies and institutions	25
3.1 The institutional setting	26
3.2 The policy framework	38
4 Main challenges in agricultural development	49
4.1 Agricultural competitiveness and productivity	49
4.2 Constraints to trade growth	54
4.3 Employment challenges	55
4.4 Agricultural services	57
4.5 Agricultural finance and insurance	57
4.6 Agricultural infrastructures	59
4.7 Climate change and use of natural resources	60
4.8 Organization of the supply chain	63
5 Strategic priorities for 2020–2025	65
5.1 Strategic priorities	66
5.2 Transversal objectives	75
6 Towards a renewed national agricultural strategy after 2020	79
6.1 Lessons learned	79
6.2 SWOT analysis	80
7 Conclusions	85
References	86
Annex 1. Lebanon's agricultural and food systems	92
Annex 2. Value chain analysis briefs	94

Figures

Figure 1	GDP trends in Lebanon 2015–2021	4
Figure 2	Labour and employment trends and country comparisons	4
Figure 3	Trend in public debt in Lebanon 2015–2021	6
Figure 4	Lebanese inflation of consumer prices 2009–2024	6
Figure 5	GDP by economic sector in Lebanon, 2010–2018	8
Figure 6	Country comparisons of agricultural GDP since 2000	9
Figure 7	Lebanon's value-added growth since 2000	9
Figure 8	Labour and land productivity in Lebanon since 2000	10
Figure 9	Agricultural employment and value added in Lebanon since 2000	11
Figure 10	Total agricultural expenditure in Lebanon, 1995–2016	11
Figure 11	Comparison of the percentage of agricultural expenditure in total expenditure by country	12
Figure 12	Land use in Lebanon	13
Figure 13	Production, import and export variation of major group products	16
Figure 14	Revealed comparative advantage of key sectors	19
Figure 15	Comparison of export concentration among countries	20
Figure 16	Imports of pesticides and fertilizers in Lebanon	22
Figure 17	Lebanese agricultural production and market system	23
Figure 18	Number of projects according to the type of donor	34
Figure 19	Budget by type of donor	34
Figure 20	Number of projects by type of executing entity	35
Figure 21	Project budget distribution according to implementation status	35
Figure 22	Overview of challenges from the National Agricultural Strategy, 2015–2019	39
Figure 23	Wheat production and imports, 2000–2020	44
Figure 24	Tobacco exports and imports, trade value, 1997–2018	45
Figure 25	Yields by crop type	50
Figure 26	Agricultural total factor productivity growth in Lebanon since 1991	51
Figure 27	Country comparison of pesticide and nitrogen use in the agricultural sector	53
Figure 28	Country comparison of agricultural credit	58
Figure 29	Eight strategic priorities and three cross-cutting objectives	65
Figure 30	The progress of Lebanon's accession to WTO in dark blue	67
Figure A1	Root cause analysis of the high cost of production	92
Figure A2	Root cause analysis of the low income of farmers	93

Tables

Table 1	Processed agricultural products by tonnes	14
Table 2	Main export markets for Lebanon, 2018	18
Table 3	Main commodities exported by Lebanon, 2018	18
Table 4	Main import markets for Lebanon, 2018	20
Table 5	Main commodities imported by Lebanon, 2018	21
Table 6	Main actors in the Lebanese agricultural sector	25
Table 7	Main actors in the Lebanese agricultural sector	26
Table 8	Key governmental agencies and institutes concerned with agriculture	29
Table 9	List of bilateral agreements	41
Table 10	SWOT analysis for Lebanon's agricultural sector	81



Preface

In Lebanon, the Ministry of Agriculture (MoA) is the institution responsible for setting the agriculture strategic framework, formulating and implementing relevant policies and programs. Specifically, MoA is responsible for developing a suitable legal and regulatory framework and enhancing infrastructure development to promote investment and improve agricultural production and marketing. 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 programs.

In 2019, in view of the completion of the National Agricultural strategy 2015–2020, the MoA requested Food and Agriculture Organization of the United Nations (FAO) support in conducting studies/assessment in support of agricultural policy design and implementation and to update the National Agricultural strategy. To this end, the FAO representation in Lebanon (FAOLEB) mobilized a technical team in the FAO Agrifood Economics Division (ESA), and in the FAO Investment Centre Division (CFI) through three technical cooperation projects. The scope of the work included: (a) the preparation of an Agricultural Sector Review (ASR) – under ESA lead responsibility; (b) the update of the National Agricultural Strategy 2020–2025 (NAS) – under CFI lead responsibility.

The Lebanon ASR provides evidence-based analyses of the performance of the agricultural sector and its challenges, as well as a framework for guiding medium-term priorities. The aim is to assist governments, civil society and the donor community to reform agricultural and trade policies and institutions. The ASR is a tool for prioritizing public interventions to transform the agrifood sector and improve the well-being of marginalized households. It provided the basis for the development of Lebanon’s NAS 2021–2025.

The ASR was prepared by a group of national and international experts under the guidance of the MoA and FAO.

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This study is the culmination of a rigorous process of analysis and dialogue with authorities of the Lebanese Government. It was completed under the general supervision of Cristian Morales-Opazo, Senior Economist in the FAO Agrifood Economics Division (ESA), under the technical direction of Mauro Vigani, independent consultant and researcher, and the direct participation of Ana María Díaz-González, Economist (ESA) and Eléonore Dal, Agriculture Economics Consultant (ESA).

This report benefited immensely from the inputs and comments provided by Tommaso Alacevich, Economist of the FAO Investment Centre (CFIC); Donato Romano, Senior Economist, and Institutional Analysis Expert; and Omar El Yajouri, Agricultural Economist (CFIC).

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Acronyms

ACF	<i>Action Contre la Faim</i> (Action Against Hunger)
AFD	<i>Agence Française de Développement</i> (French Development Agency)
ASR	Agricultural sector review
AUB	American University of Beirut
BdL	Banque du Liban
CAS	Central Administration of Statistics
CCIA	Chambers of Commerce, Industry and Agriculture
CIHEAM	International Centre for Advanced Mediterranean Agronomic Studies
CNRS	National Council for Scientific Research
COMCEC	Standing Committee for Economic and Commercial Cooperation of the Organization of the Islamic Cooperation
CPF	Country Programming Framework
CSO	civil society organizations
EBRD	European Bank of Reconstruction and Development
ECI	export concentration index
EEC	European Economic Community
EFTA	European Free Trade Association
EIB	European Investment Bank
ENP	European Neighbourhood Policy
ESCWA	United Nations Economic and Social Commission for Western Asia
FAO	Food and Agriculture Organization of the United Nations
FBS	Farm Business School
FDI	foreign direct investment
GAFTA	Greater Arab Free Trade Area
GCC	Gulf Cooperation Countries
GDA	General Directorate of Agriculture
GDC	General Directorate of Cooperatives
GDP	gross domestic product
GEF	Global Environmental Facility
GIZ	<i>Deutsche Gesellschaft für Internationale Zusammenarbeit</i> (German Corporation for International Cooperation)
GP	Green Plan
IDAL	Investment Development Authority of Lebanon
IFAD	International Fund for Agricultural Development
IFC	International Finance Corporation
IFPRI	International Food Policy Research Institute
ILO	International Labour Organization
IOM	International Organization for Migration
LARI	Lebanese Agricultural Research Institute
LBP	Lebanese pound

LIBNOR	Lebanese Standards Institution
LDN	Land Degradation Neutrality
LSD	Lumpy Skin Disease
LSMS	Living Standards Measurement Study
MENA	Middle East and North Africa
MFI	Monetary financial institution
MLEB	Maritime Lebanese Exports Bridge
MoA	Ministry of Agriculture
MoE	Ministry of Environment
MoET	Ministry of Economy and Trade
MoEW	Ministry of Energy and Water
MoF	Ministry of Finance
MoI	Ministry of Industry
MoSA	Ministry of Social Affairs
NAP	National Action Plan
NAS	National Agricultural Strategy
NBSAP	National Biodiversity Action Plan
NGO	non-governmental organization
NWSS	National Water Sector Strategy
PO	producer organization
R&D	research and development
OCHA	Office for the Coordination of Humanitarian Affairs (United Nations)
ODA	Overseas development assistance
SDG	Sustainable Development Goal
SPS	sanitary and phytosanitary
TFP	total factor productivity
ToC	theory of change
TRIPS	Trade-Related Aspects of Intellectual Property Rights
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNESCWA	United Nations Economic and Social Commission for Western Asia
UNFCCC	United Nations Framework Convention on Climate Change
UNICEF	United Nations Children's Fund
UNIDO	United Nations Industrial Development Organization
UPOV	Union for the Protection of New Varieties of Plants
USAID	United States Agency for International Development
USD	United States dollar
UTP	unfair trading practices
WHO	World Health Organization
WFP	World Food Programme

Executive summary

The agricultural sector review (ASR) aims to provide an up-to-date picture of the current socio-economic situation in the agricultural sector in Lebanon and to identify key challenges and evidence-based strategies for policy-making.

Section 1 provides a detailed overview of Lebanon's agricultural and food systems. It describes the current economic situation, which has been strongly affected by two major shocks: a financial crisis that started in 2019 and the COVID-19 pandemic.

The governance of the Lebanese agricultural sector, including the roles of relevant national and international organizations, the overall policy framework and the specific policies currently governing the sector are described in Section 2. The review analyses several key actors, including ministries, government bodies and agencies, universities and technical schools, private sector organizations, civil society organizations, agricultural cooperatives, finance institutions, and donors and international organizations.

Section 3 examines the challenges and issues that currently affect the Lebanese agricultural sector, constraining the development of its full potential. These challenges cover a full range of economic, trade, social, environmental and organizational issues. Eight main challenges were identified by the review: agricultural competitiveness and productivity; trade growth and import substitution; employment; agricultural services and research and development (R&D); agricultural finance and insurance (access to loans and credit); agricultural infrastructure; climate change and the sustainable use of natural resources; and organization of the supply chain. The review also identified three transversal issues, namely data collection and access, enabling regulations and governance and social inclusiveness.

Section 4 proposes several strategies and recommendations that could be applied at the policy-making level to drive the improvement of the sector. Given the current economic crisis and the COVID-19 pandemic, these could be prioritized by distinguishing short-term emergency plans to relieve the rural and urban population from the pressure of the crises; recovery strategies to rebuild the agricultural sector in the medium-term (four to five years); and strategies to address structural issues in the Lebanese agricultural sector in the long-term.

It is not in the scope of this ASR to present a full strategic plan for the Lebanese agricultural sector. That is the objective of the National Agricultural Strategy 2020–2025 (NAS) currently under development. However, the ASR provides evidence, based on the current situation, challenges and potential solutions, to serve as the basis for the development of the NAS. Resource mobilization, supported by the ASR rationale, are indeed key for the NAS.

Finally, Section 5 presents some lessons learned from successes in Lebanon's agricultural sector (e.g., extension services, cooperatives, institutional and regulatory capacities, data collection and analysis and gender equality). The coordination of stakeholders, holistic and cross-sectoral approaches and timely decisions are key features of effective interventions. A strengths, weaknesses, opportunities and threats (SWOT) analysis of the agricultural sector summarizes several conclusions presented in this report.





1 Introduction

The Lebanese economy is in disarray. The Syrian crisis has had a serious impact on an economy 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. More recently, political crises, social unrest and the COVID-19 pandemic have compounded Lebanon's economic fragility, further aggravating the situation.

The lag in real earnings between agriculture and other sectors is a fundamental cause of the deep political tensions generated by structural transformation in Lebanon, and it is only getting worse. Historically, the government's response to such tensions has been to protect the agricultural sector from international competition and to provide direct income to farmers. However, there is no budget currently available for these measures. Producers are urged to use modern financial derivatives to hedge their risks from price volatility (both for inputs and outputs), while poor consumers will need to rely on government-sponsored safety nets when food prices spike.

The main objectives of this ASR are to identify key challenges for Lebanon's agricultural sector and evidence-based strategies for policy-making. To ensure effective decision-making, it is necessary to go beyond data analysis and use a range of approaches, such as monitoring, impact evaluation and optimizing investment resources. Quantitative and qualitative data that provide an up-to-date picture of the environmental, social, and economic characteristics of the agricultural sector are essential to define problems and to support assessments, strategies and recommendations.

Policy processes are complex, not only because they have a highly political character, but also because they involve different types of stakeholders. Coordinating these stakeholders is critical to policy decision-making, especially in the agricultural sector where responsibilities are shared by actors both inside (e.g., ministries, agencies) and outside (e.g., private sector and civil society organizations (CSOs), agricultural cooperatives, finance institutions and international donors) of the government.



2 Lebanon's agricultural and food systems

KEY MESSAGES

- ◆ Significant challenges to the agricultural sector in Lebanon include the high cost of production, low income of farmers, limited investment in research and development, non-transparency of market operations and low consumer purchasing power.
- ◆ Lebanon experiences land tenure problems associated with agricultural land degradation. The land market is inefficient, with high registration and transaction costs and unclear roles and responsibilities around the management of common lands.
- ◆ Crop production represents about 60 percent of Lebanon's agricultural output, while livestock production accounts for 40 percent.
- ◆ Potential for export is blocked by insufficient food quality, safety standards and traceability.
- ◆ The agriculture sector employs about 212 000 people, only about 8 percent of whom are formally employed; the rest work informally.
- ◆ Public expenditure on agriculture is quite low, accounting for about 1 percent of the national budget. Research and development expenditure are also less than 1 percent of gross domestic product (GDP).

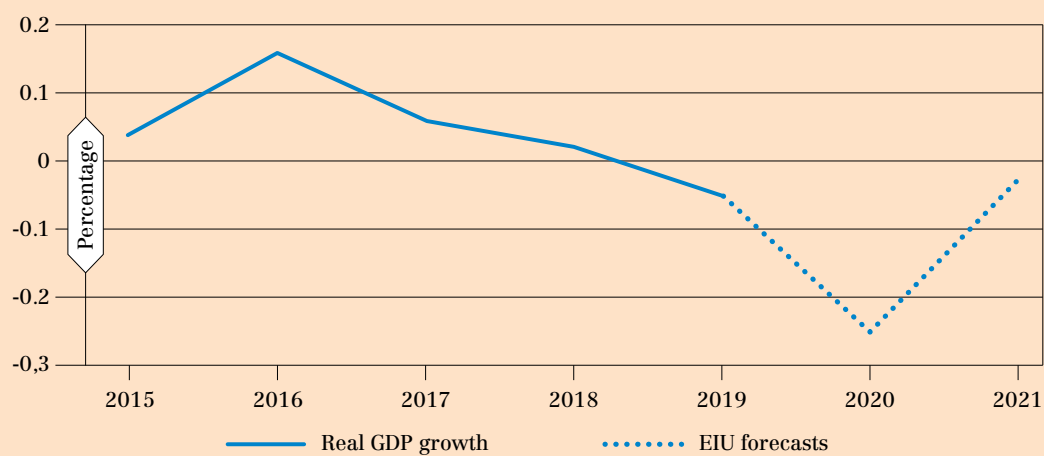
2.1 The macroeconomic setting

Overview of the Lebanese economy

Until 2019, Lebanon was considered an upper middle-income country, with high discrepancies in the distribution of wealth among its citizens. Growth relied on the diaspora and foreign investments, mostly in the construction and development sectors. Real GDP decreased to an average of 0.8 percent between 2015 and 2018 (see Figure 1). The Economist Intelligence Unit estimates that the economy contracted by 0.5 percent in 2019 (EIU, 2020).

The total labour force has been constantly increasing since 2000 (see Figure 2). The growth of the female labour force has been very slow and steady; women currently account for only 20 percent of the total labour force. Unemployment stands at 10 percent for women and between 5 and 8 percent for men. Lastly, the labour participation rate was only about 51 percent in 2019, suggesting that there is a large share of the population of working age that is economically inactive or unemployed.

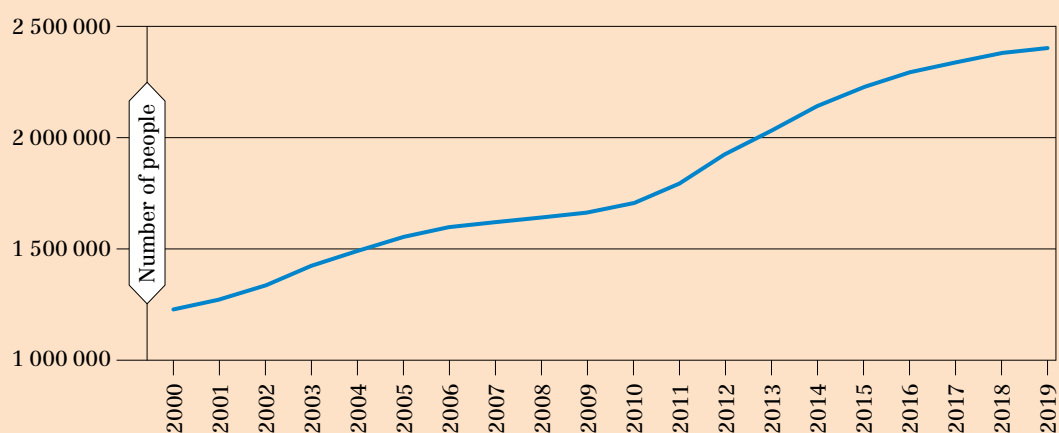
◆ **FIGURE 1** GDP trends in Lebanon 2015–2021



Source: EIU, 2020.

◆ **FIGURE 2** Labour and employment trends and country comparisons

A. LABOUR FORCE, TOTAL



B. LABOUR FORCE (% OF TOTAL LABOUR FORCE)

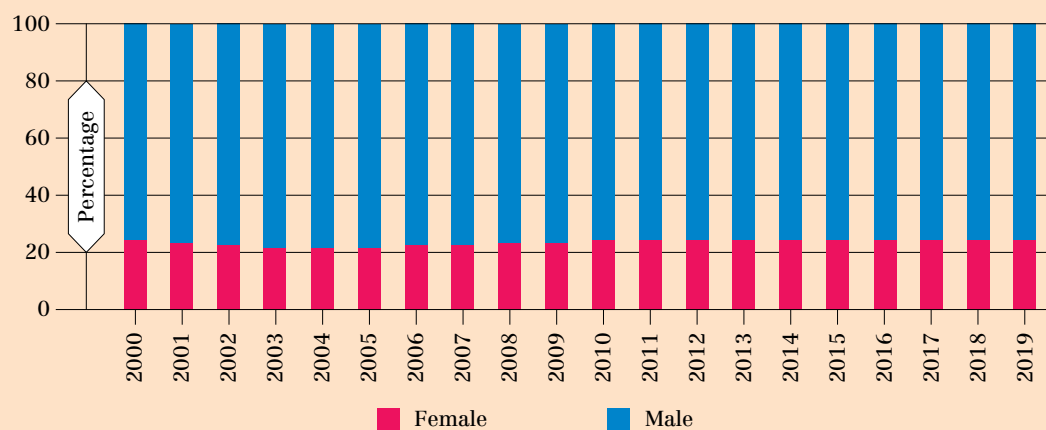
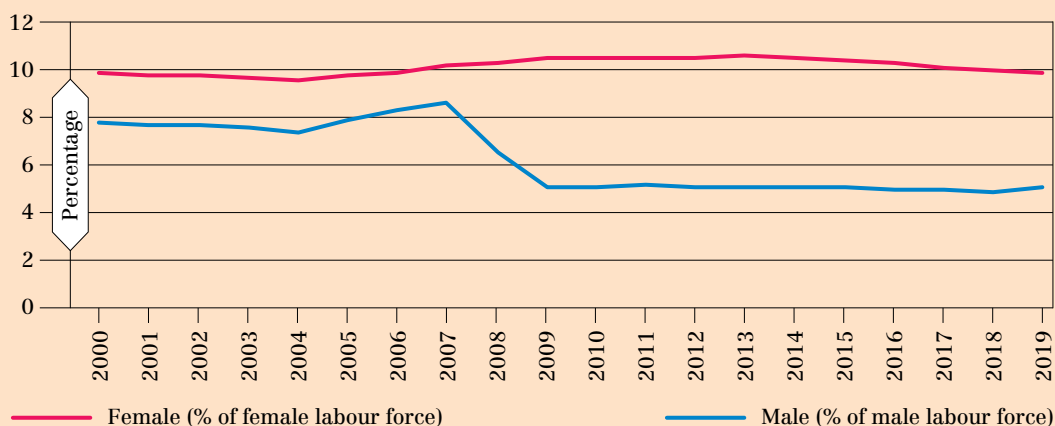
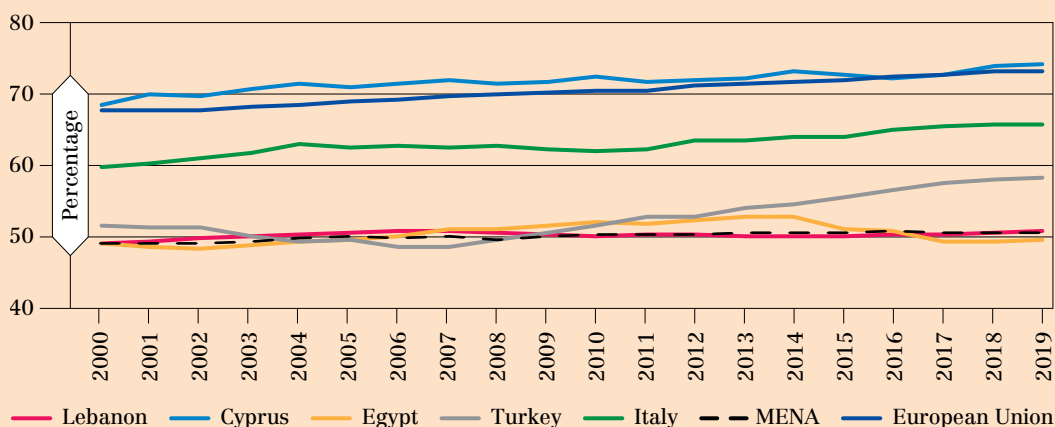


FIGURE 2 (cont.) Labour and employment trends and country comparisons**C. UNEMPLOYMENT (% OF LABOUR FORCE)****D. LABOUR FORCE PARTICIPATION RATE (% OF TOTAL POPULATION AGES 15–64)**

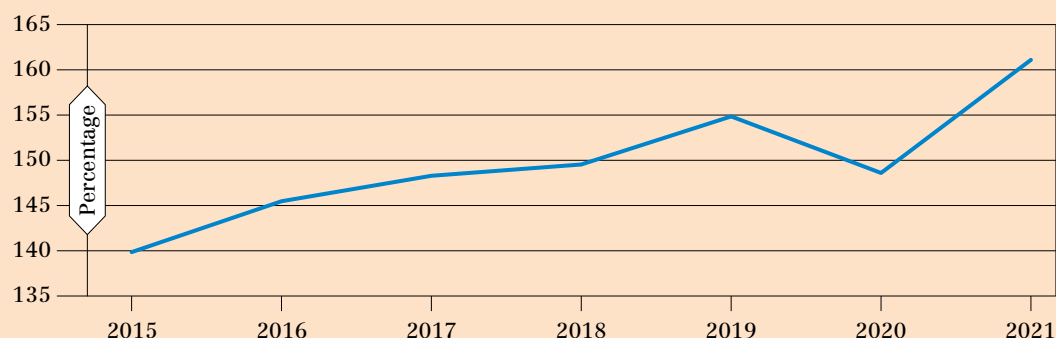
Source: ILOSTAT database (ILO, 2020) and World Bank population estimates (World Bank, 2020b).

The government debt to gross domestic product (GDP) ratio is used by investors to measure a country's ability to make future payments on its debt, thus affecting its borrowing costs and government bond yields. As seen in Figure 3, the debt-to-GDP ratio in Lebanon reached unprecedented levels, surpassing 150 percent in 2019, raising concerns about the capacity of the government to pay its debts in the future.

Despite repeated attempts by the Central Bank (Banque du Liban [BdL]) to support the country's net foreign asset position, the economy has been steadily draining United States dollars over the last ten years. Scheduled debt service consumes around 50 percent of state revenues, hindering the capacity of the government, not only to fund development strategies, but also to respond to crises. In February 2020, the government requested technical assistance from the International Monetary Fund (IMF), and it pledged the restructuring of its Euro-bond debt service for the first time in history in March.

Commercial banks need to restock their balance sheets, since 70 percent of their deposits are tied up in state debt instruments. Some banks have limited withdrawals to USD 50 per week and have suspended withdrawals from automated teller machines (ATMs). Moreover, banks took the opportunity of the general lockdown due to the COVID-19 pandemic to close their premises to casual operations starting on 15 March 2020.

◆ **FIGURE 3** Trend in public debt in Lebanon 2015–2021



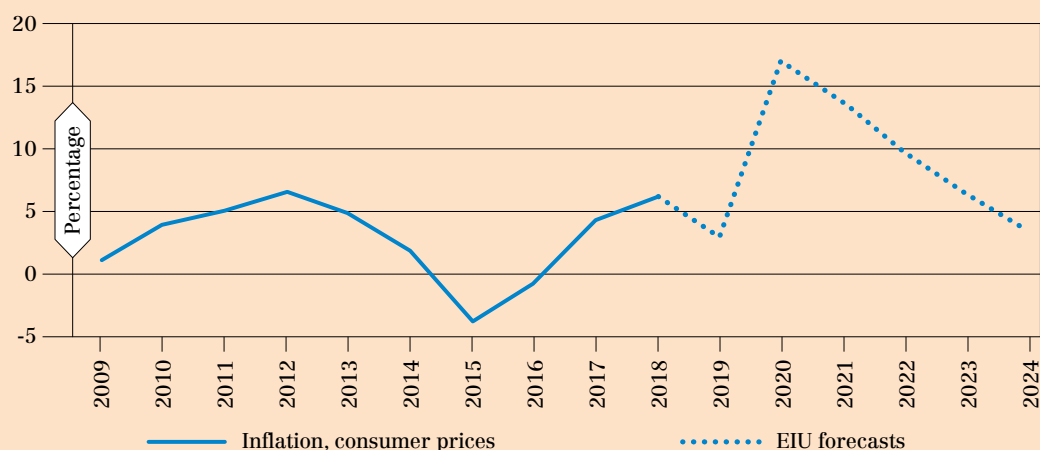
Source: EIU, 2020.

The Lebanese pound has been officially pegged to the USD at about LBP 1 500 since 1997; both USD and LBP are used in the market. The economy was over 70 percent dollarized before the COVID-19 crisis began. While the official rate remains unchanged, the United States dollar was rated at LBP 2 500 on the parallel market on 13 March, due to a shortage of dollars in the country. This shortage is bringing back the local currency in market operations. Depositors are being forced to convert their dollar-denominated deposits into Lebanese pounds at the official exchange rate to withdraw funds.

International transfers of foreign currencies from the diaspora and investors are drying up, while local depositors are seeking to withdraw their savings considering extensive inflation and a potential economic collapse; this has been fuelled by a general mistrust of the banking system, the non-transparent economic policies of the government, and the informal capital control imposed by banks in a weak attempt to preserve liquidity.

The LBP inflation rate has been steadily increasing since 2015, effectively cutting salaries in half and decreasing purchasing power significantly (see Figure 4). According to the Economist Intelligence Unit (2020), inflation was expected to spike to 17 percent in 2020 due to several factors, including an expected devaluation of the LBP, an acute shortage of USD, which is disrupting the import of commodities, the ongoing political crisis and the COVID-19 pandemic.

◆ **FIGURE 4** Lebanese inflation of consumer prices 2009–2024



Source: World Bank, 2020b; EIU, 2020.

The economic and financial crisis and the agricultural sector

The Lebanese agricultural sector is suffering from structural issues as well as new challenges arising from the economic and financial crisis, which started in 2019. While, the crisis has exacerbated the problems of the agricultural sector, the government continues to devote most of its limited resources to the industrial and finance sectors rather than to agriculture (FAO, 2020e).

Farmer debt was estimated to be about USD 80 million in October 2019. Because farmers were not able to pay them, retailers were unable to pay the importers who, in turn, were unable to honour their debts to banks and foreign suppliers. The retailers' debt to banks and importers had grown to USD 60 million by October 2019. This led to the collapse of the credit system for Lebanese agriculture, which was mainly secured by importers (Saade, 2020).

Agricultural inputs are almost entirely imported and therefore expensive. The price of inputs has further increased due to the financial crisis, becoming prohibitively expensive for farmers. As a result, farmers are using fewer inputs, which benefits the environment, leading the government to promote conservation practices. The limited local production of inputs, limited research and development budgets, and farmers' lack of access to credit are further reasons for the high costs of agricultural production. These and other factors, such as crop-oriented public subsidies, a lack of transparency in market operations and poor consumer purchasing power keep the income of farmers low (see Annex 1).

According to Saade (2020), it is estimated that the total value of Lebanese agricultural production in 2020 will be 38 percent lower than it was in 2018, with the value of plant products shrinking by 47 percent, and the value of animal products shrinking by 26 percent. This is mainly due to three factors: i) a total blockage of banking facilities for purchasing inputs from abroad, limiting the availability of inputs in quantity and on time; ii) a drastic decrease in the financial means of agricultural input importers, limiting their imports and reducing their credit to retailers/farmers to almost nothing; and iii) the non-availability of credit from traditional sources, depriving most farmers of their working capital. These factors will impact all aspects of the agricultural value chain, including area planted, yield, quality, and farmer income.

The COVID-19 crisis and the agricultural sector

The COVID-19 crisis is aggravating the challenges faced by Lebanon.¹ Worldwide containment measures have had a significant impact on the market for agricultural inputs, and the COVID-19 pandemic has caused a substantial decline in the availability of agricultural labour due to illness, risk-aversion, and quarantine restrictions, among other reasons.

The volatility of exchange rates makes imports costlier, further affecting their accessibility. In 2019, the Association of Banks in Lebanon announced the temporary closure of all banks, affecting importers and other market players, who require United States dollars to finance their imports. Price inflation, already on the rise due to the lack of hard currency and parallel exchange rates, is likely to increase still further as demand for food items puts additional pressure on prices (FAO, 2020e).

¹ Further analysis is needed, since COVID-19 is a recent and ongoing crisis. The ultimate impact of the COVID-19 pandemic will depend on how long the lockdown continues and other factors (e.g., trade barriers, increases in input prices, etc.).

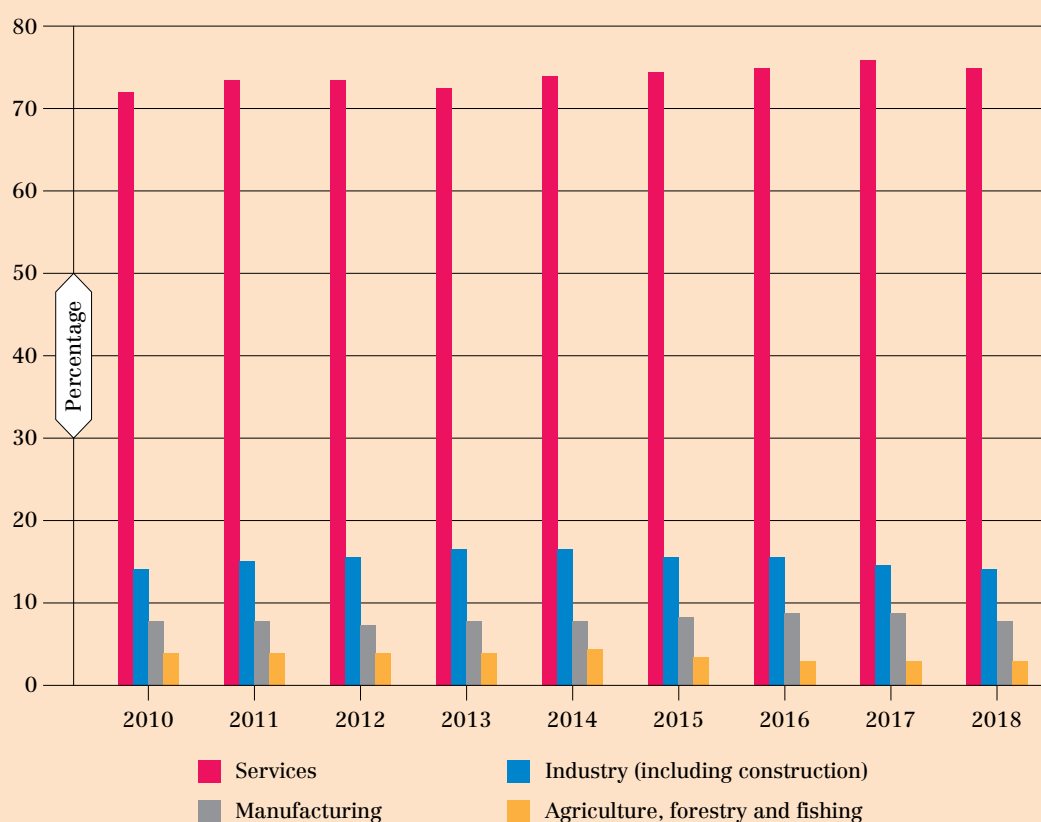
Agriculture in the Lebanese economy

Value added

The agricultural sector represents a small and declining share of Lebanese economy (see Figure 5). Lebanon's service sector has contributed more than 60 percent to the national GDP since 2004, followed by the industrial sector, with a share of around 15 percent. Manufacturing contributes less than 10 percent to the GDP; and the agricultural sector contributes less than 5 percent.

Despite its relatively small size, the indirect contribution of the agricultural sector to the economy is important due to its strong links with food processing, which is the largest industrial sector in Lebanon. The agrifood industry, for example, contributes an additional 5 percent to GDP and is a major and growing employer, while in some rural areas, agriculture-related activities account for up to 80 percent of the local GDP. Agriculture provides secondary income for a large portion of the population and contributes to the food security of many people.

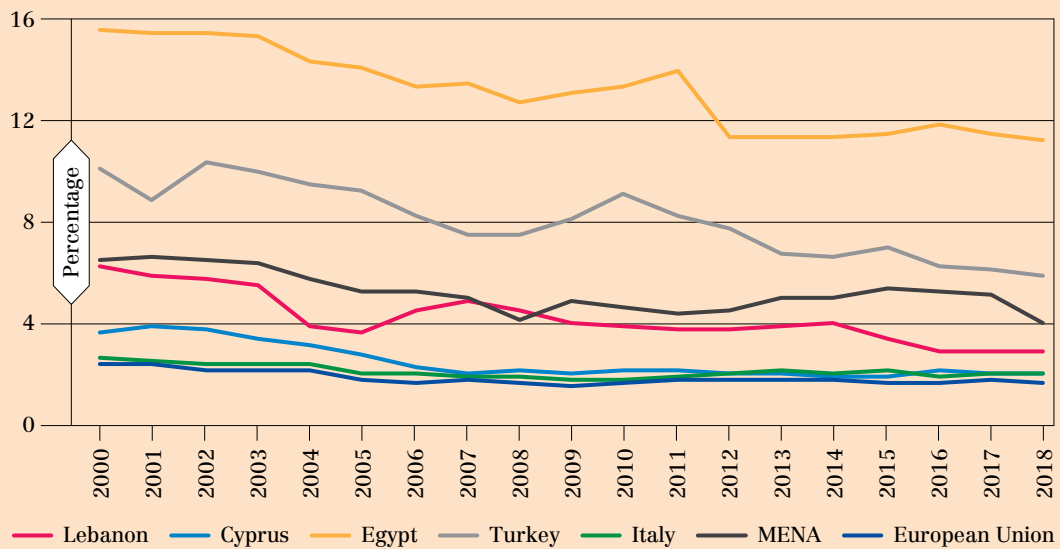
FIGURE 5 GDP by economic sector in Lebanon, 2010–2018



Source: World Bank database (2020b).

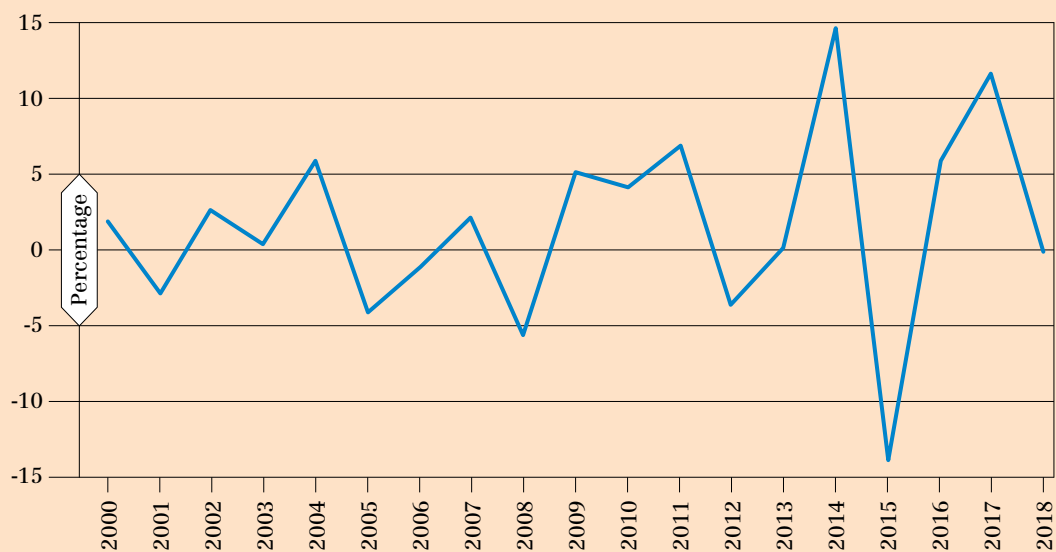
Agriculture's contribution to GDP was on average 5 percent annually from 2000–2007, dropping to an average of 4 percent per year between 2008 and 2013 (see Figure 6). Since 2016, agriculture has accounted for USD 1.5 billion of value added, representing about 3 percent of GDP. On the other hand, agriculture value-added annual growth has been quite volatile since 2000; the average annual growth has been about 2 percent, but with peaks as high as 15 percent in 2014 and as low as -14 percent in 2015 (see Figure 7).

◆ **FIGURE 6** Country comparisons of agricultural GDP since 2000



Source: World Bank database (2020b).

◆ **FIGURE 7** Lebanon's value-added growth since 2000



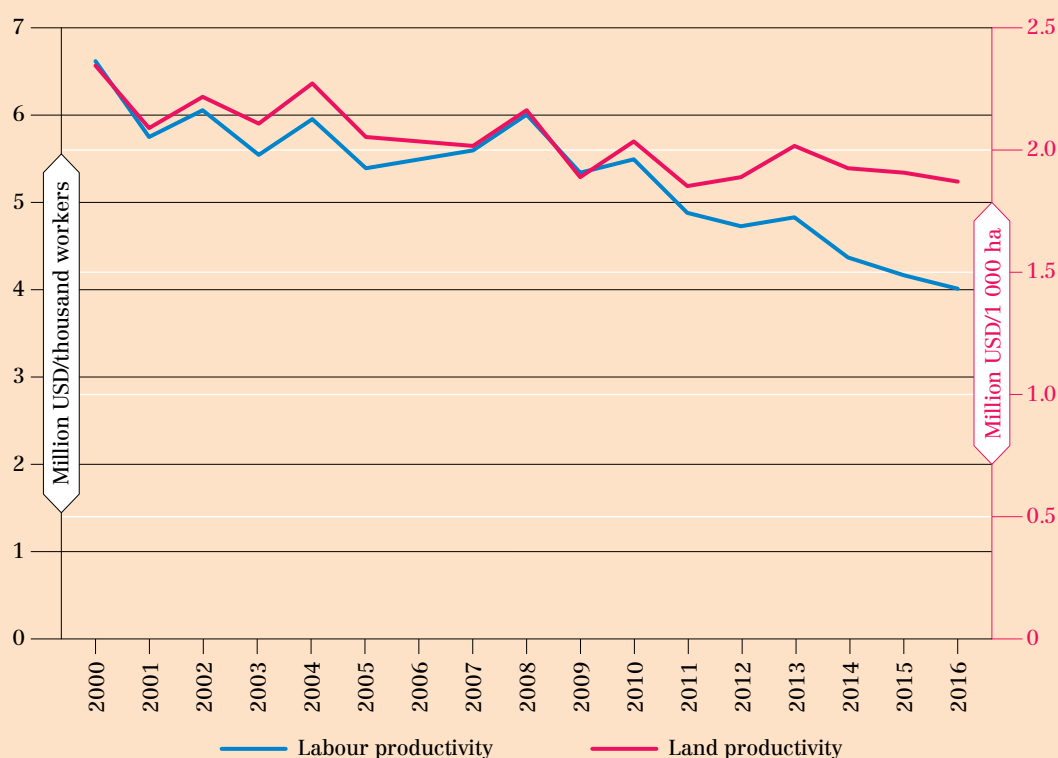
Source: World Bank database (2020b).

Productivity levels for the agricultural sector as an aggregate (including crops and livestock) also reflect the economic structural transformation of the country. Both labour and land productivity, measured as total value of agricultural production per total workers in the agricultural sector and per agricultural land² respectively, have been declining since 2000.

² The value of agricultural production is measured as Gross Production Value (constant 2004–2006 USD million) in FAO's Corporate Statistical Database (FAOSTAT) (FAO, 2020d). Total workers in the agricultural sector are measured as the total number of people employed in the sector as an aggregate (ILO, 2020). Agricultural land is measured as the total land (hectares) used for the cultivation of crops and animal husbandry (FAO, 2020d).

However, the evidence in Figure 8 suggests a greater decline in labour productivity between 2000–2016 than in land productivity, the former decreasing from USD 6.6 to 4 million per 1 000 workers while land productivity went from USD 2.3 to 1.85 million per 1 000 hectares.

FIGURE 8 Labour and land productivity in Lebanon since 2000



Source: FAOSTAT (FAO, 2020d) and ILOSTAT databases (ILO, 2020).

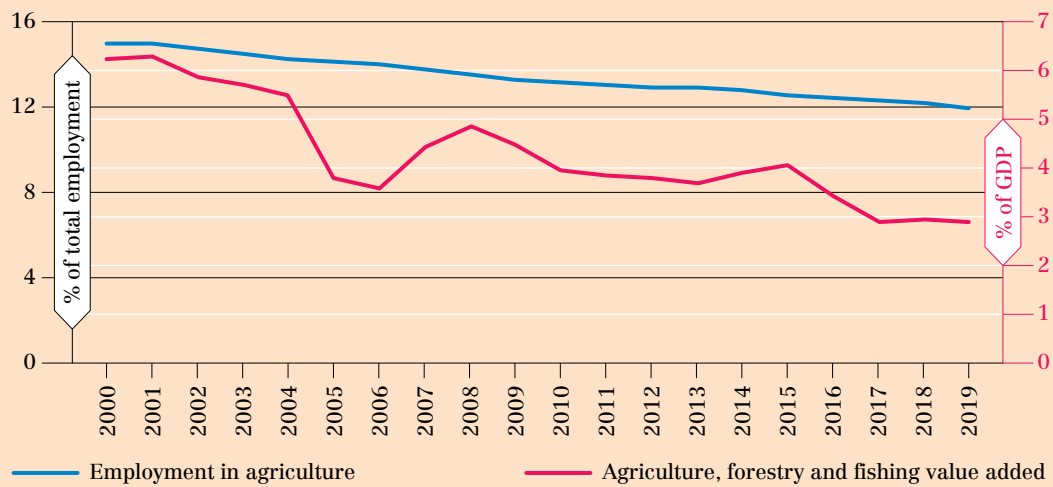
Employment

Agricultural employment is a small share of total employment in Lebanon, but it is much larger than the agricultural added-value share of GDP. The structural transformation in Lebanon, as in other countries, has led to shares of agriculture in GDP and employment, almost always accompanied by serious problems in closing the gap in labour productivity between agricultural and non-agricultural activities.

Currently, the agricultural labour force accounts for 12.1 percent of the total labour force (see Figure 9). The sector employs about 212 000 people, only 8 percent of whom are formally employed; the rest work informally (Mc Kinsey, 2019). Informal workers have limited access to social security, making them vulnerable to economic and financial shocks. Policies that recognize and support farmers could help them to access social protection programmes as well as to receive legal protection under applicable labour laws. It would also facilitate financing and access to government services and would improve the attractiveness of the sector to young people (McKinsey, 2019).

Agricultural and rural development can play a key role in limiting the migration of the labour force to urban areas and alleviating stress on major cities. Enhancing rural development and promoting the adoption of policies that focus on strengthening the agricultural sector can increase the synergies between cities and rural areas and improve living conditions in both areas.

◆ **FIGURE 9** Agricultural employment and value added in Lebanon since 2000

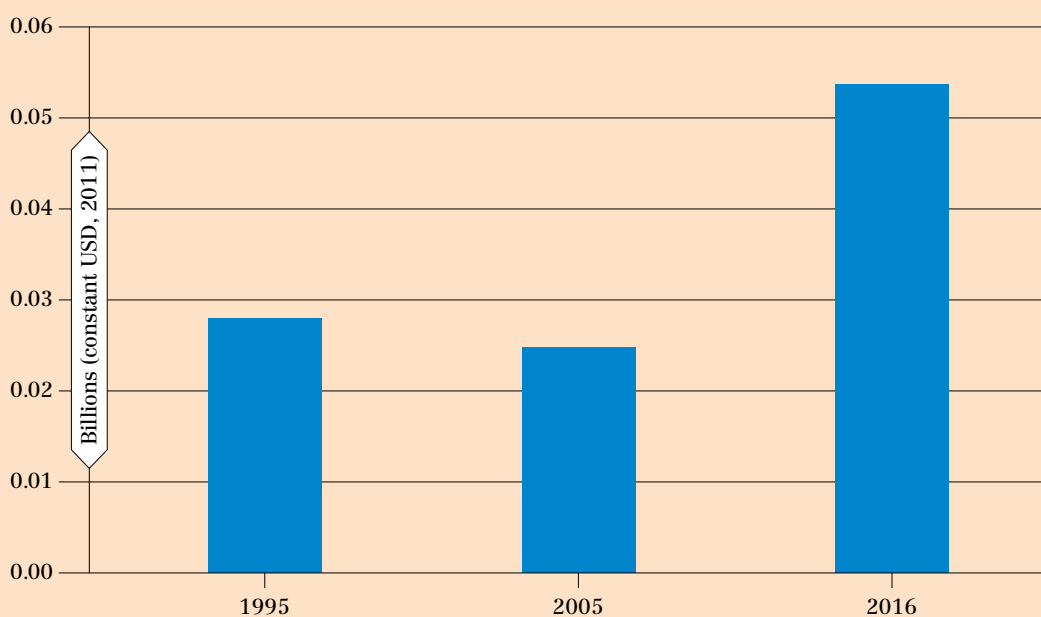


Source: World Bank database (2020b) and ILOSTAT database (ILO, 2020).

Public expenditure

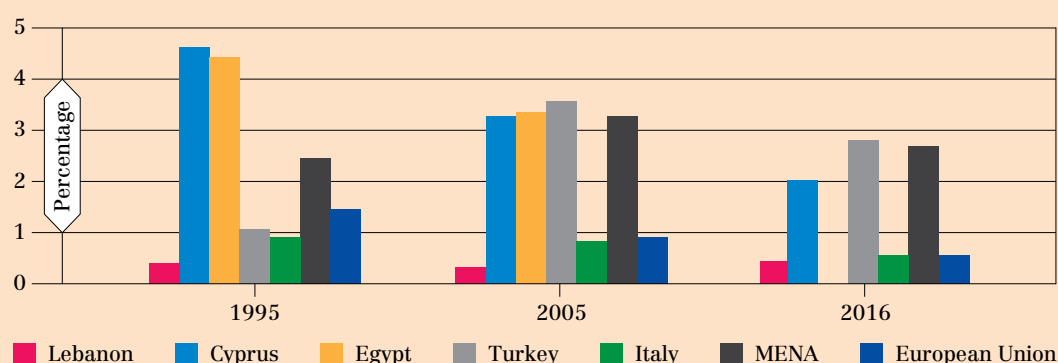
Agriculture has been historically neglected in Lebanese economic policy. Public expenditure on agriculture is quite low, receiving just about 1 percent of the national budget (see Figure 10). According to IFPRI, between 1995 and 2016, agricultural expenditure in Lebanon remained relatively constant at less than USD 0.05 billion, passing this threshold in 2016 (see Figure 11). Research and development expenditure has also been less than 1 percent of GDP, and only 4 percent of the Ministry of Agriculture (MoA) budget is spent on food safety (Boyle, 2019). The MoA budget is mostly spent on recurrent expenditures, specifically salaries.

◆ **FIGURE 10** Total agricultural expenditure in Lebanon, 1995–2016



Source: IFPRI, 2019.

FIGURE 11 Comparison of the percentage of agricultural expenditure in total expenditure by country



Notes: No information is available for Egypt for 2016. MENA countries include Algeria, Bahrein, Egypt, Iran, Jordan, Kuwait, Lebanon, Morocco, Oman, Qatar, Syrian Arab Republic, Tunisia, Turkey, United Arab Emirates and Yemen.

Source: IFPRI, 2019.

2.2 Structural characteristics of Lebanese agriculture

Agricultural holdings

Lebanon has a relatively large and diversified amount of agricultural land, occupying most of its area (see Figure 12). In 2016, 64.3 percent of total land was devoted to agriculture, the largest share in the Middle East (Bahn *et al.*, 2019). The total agricultural land amounts to about 658 000 hectares, of which 132 000 hectares is arable land, 126 000 hectares is for permanent crops and 400 000 hectares is for permanent meadows and pastures. According to the most recent production surveys from the Ministry of Agriculture, most of the cultivated land is in the Baalbeck-Hermel (around 25 percent) and Beqaa (around 20 percent) provinces.

There is a wide disparity in the size of agricultural holdings. According to the 2010 agricultural census, 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. Fewer than 1 percent of farmers have holdings of more than 20 hectares, but these farmers control 30 percent of the national usable agricultural area. While recent data is scarce, it is likely that this continues to be the case. The agricultural sector is thus made up of many small, mostly subsistence farms and a few large, market-oriented modern farms. Small farms are characteristic of agricultural systems that are dedicated to the preservation of cultural and family heritage, where agricultural activity is a source of extra income, with limited investment opportunities. Larger farms are part of commercial-oriented agricultural systems that are generally managed as a business for profit, that are focused on exports, are efficient and depend on adequate financial resources for investment. Around 25 percent of the total agricultural holdings in Lebanon are large farms that integrate pre- and post-production agricultural activities (FAO, 2020e). The challenge is how to effectively transform the small, semi-subsistence farms to operations that are more productive and commercially-oriented.

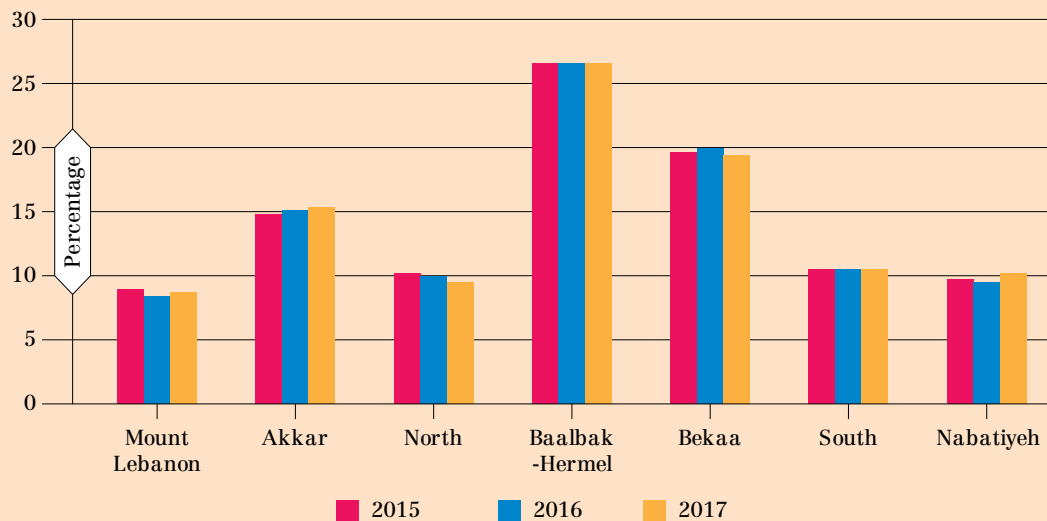
In hilly and mountainous regions, agriculture is characterized by small holdings, which support farm households that rely on agriculture as a secondary source of income. In these regions, farming is often carried out on agricultural terraces, which have been used for centuries to exploit the mountain slopes. Land reclamation and the construction of

agricultural terraces are effective measures for controlling soil erosion and land degradation while improving water conservation and ensuring its sustainable use (Green Plan, 2019). In the area around Beirut, farms produce high-value greenhouses products. These farms are strongly market-oriented and generate significant returns.

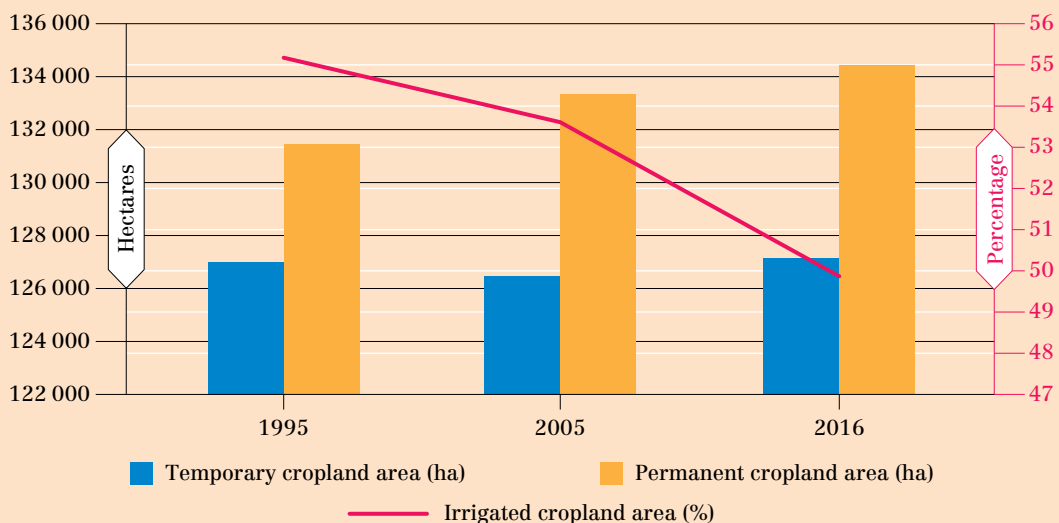
Reportedly, farmland is available for rent, although the extent to which this occurs is not documented. Inheritance systems allow for wills, with fixed proportions going to the surviving spouse and children only if there is no will (Maddock, 2019). Evidence suggests that, with an appropriate mix of public policy and spending, a smallholder-led development would not only succeed in raising national food production but would also effectively reduce rural poverty in the process. Smallholder development underpins economic transformation in many Asian countries. An alternative would be to encourage large-scale investment in commercial farming through a conducive land administration and public spending policy.

◆ **FIGURE 12 Land use in Lebanon**

A. UTILIZED AGRICULTURAL AREA



B. CROPLAND AREA



Source: Ministry of Agriculture, 2020.

Human capital

Agriculture is mostly carried out by older farmers. According to 2010 agricultural census figures, the average male agricultural operator was approximately 52 years old, while female agricultural operators were 55 years old. Younger adults under the age of 35 represented only a minor share of farming operators (11.1 percent).

Farmers in Lebanon have lower rates of literacy and education than the wider population. Sixteen percent of farmers are illiterate; another 61 percent of farmers have only primary-level education but control 60 percent of the total agricultural area in the country (FAO and MoA, 2010; Bahn *et al.*, 2019).

The low level of human capital in the agricultural sector is a significant constraint to Lebanon's growth, poverty reduction and food security.

Agricultural outputs

Lebanese agricultural outputs are quite diverse, which is a strong point for the sector since it reduces the country's dependency on a few key crops (see Table 1). Crop production represents about 60 percent of agricultural output, while livestock production accounts for 40 percent. Lebanon's major agricultural products by volume include fruits (citrus, apples, grapes and bananas), vegetables (potatoes and tomatoes), and roots and tubers (World Bank, 2018). According to the New Food Balance in FAOSTAT (FAO, 2020d), nine of these crops are destined for food processing.

◆ **TABLE 1** Processed agricultural products by tonnes

Product	2014	2015	2016	2017	Total
Apples and apple products	14	14	13	10	51
Barley and barley products	11	11	7	7	36
Coffee and coffee products	5	5	5	5	20
Cotton seed	0	1	0	0	1
Grapes and grape products (excluding wine)	22	22	22	22	88
Groundnuts (shelled)	16	15	11	12	54
Lemons, limes and products	17	17	17	17	68
Maize and maize products	2	2	2	2	8
Olives (including preserved)	90	108	119	117	434
Onions	15	15	15	15	60
Oranges, mandarins	28	30	28	28	114
Palm oil	3	4	4	4	15
Sesame seed	14	15	14	11	54
Soybeans	39	122	158	241	560
Sunflower seed	4	5	7	13	29
Total	280	386	422	504	1 592

Note: The unit of observation is 1 000 tonnes.

Source: FAOSTAT database (FAO, 2020d).

The production of livestock and animal products is also important and has increased in recent decades. The production of animal products, such as fresh cow's milk, poultry, sheep and goats and eggs, is one of the main activities in rural Lebanon, particularly in the southern and northern areas. In these areas, the poorest in the country, approximately 60 percent of farmers depend on dairy production as their primary means of subsistence (Abdallah *et al.*, 2018). While illegal, the cultivation of cannabis is significant in the central and northern Beqaa Valley, occupying about 20 000–30 000 hectares (15–22 percent of national arable land and more than half of the cultivated land in Beqaa Valley). Cannabis cultivation consumes a significant amount of water for irrigation and contributes to agricultural livelihoods (Bahn *et al.*, 2019).

Agricultural inputs

Lebanon has no specific financial products for working capital and investment in agriculture. A farmer chooses which credit source to use based on the purpose of the loan: formal loans from financial institutions are mainly used to cover large investment costs, while informal loans are mostly used to cover operational costs (e.g., seed, fertilizer and pesticide). The most common source of credit for the purchase of inputs by medium and large farms are input suppliers themselves. A farmer usually receives credit from a single input supplier; the amount depends on the farmer's credit history, their relationship with the input supplier, their reputation, and the size of their farm. Farmers describe input suppliers as practical and realistic in their demands. They offer credit without declared interest rates or penalties in case of late payments. They are easy to access, quick and efficient. They are flexible in terms of payment schedules; they do not impose a tight schedule or deadline.

Agricultural agrochemicals and seeds are mostly imported. Insufficient extension and advisory services have led farmers to overuse fertilizers and pesticides. Historically, most farmers in border areas obtained their inputs (including seed, fertilizer and pesticide) from the Syrian Arab Republic, where these inputs were subsidized. The conflict in the Syrian Arab Republic cut off the supply of fertilizers to Lebanon and farmers have been forced to seek alternative sources, leading to an increase in prices. The sharp devaluation of the Lebanese pound and the scarcity of United States dollars for imports have also contributed to the rising prices.

Another structural feature of the agricultural sector in Lebanon is land competition, which is fiercer near urban areas. In Lebanon, land tenure problems are associated with agricultural land degradation. The land market is inefficient, with high registration and transaction costs. Unclear roles and responsibilities for managing common lands has led to overexploitation for grazing, quarrying and agriculture. However, the increase in land prices is mostly due to fragmentation caused by inheritance laws, which reduces the size of holdings from one generation to another. These conditions are exacerbated by low investment in the sector, limited access to financing, poor infrastructure, and a lack of modern organization in the supply chain.

Finally, all farming machinery used in Lebanon is imported. Because of the large number of smallholdings and the high cost of agricultural machinery, it is common to hire contractors. Food processing equipment is imported as well as manufactured locally. However, even locally-made equipment contains imported components (typically pumps and motors). Lebanon's topography is also a challenge to mechanization. Terraced agriculture on mountain slopes is an obstacle to the use of agriculture machinery.

2.3 Agricultural and food trade

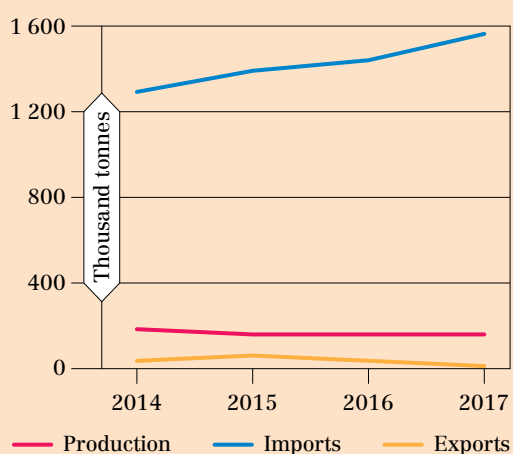
Lebanese food exports are distributed among a variety of products and account for about a fifth of all national exports. Lebanon has a comparative advantage in the trade of vegetables, agricultural raw materials and food products, but a comparative disadvantage with respect to animal products.

Lebanon depends on imports of its most consumed foods, such as wheat and other cereals. It also relies heavily on foreign markets for pulses and, to a smaller extent, tree nut products. While the country can usually maintain a reasonable supply, access to food can be threatened during price shocks.

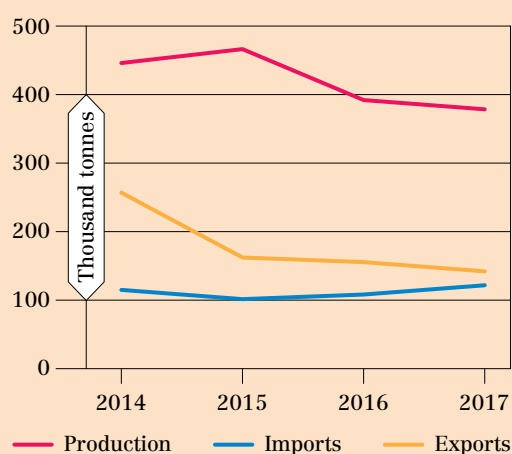
To analyse the potential of the value chains of different crops, the following figures compare the trend lines for production, import and export (in terms of quantity) of Lebanon's six major product groups (see Figure 13). The priority for the Lebanese agricultural sector is to seek export markets. Looking at production levels, Lebanon should focus on markets in which roots and tubers, vegetables and fruits are in high demand.

◆ **FIGURE 13** Production, import and export variation of major group products

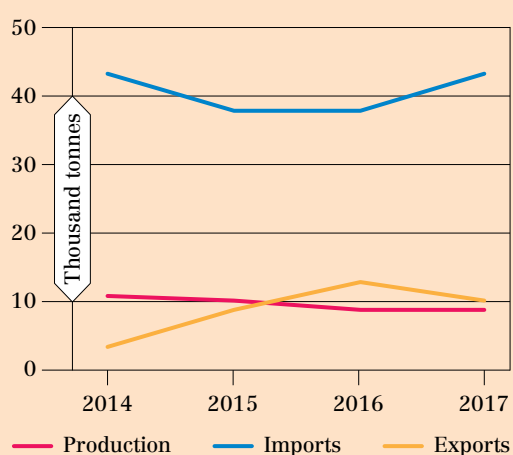
A. CEREALS



B. ROOTS AND TUBERS



C. PULSES



D. TREE NUTS

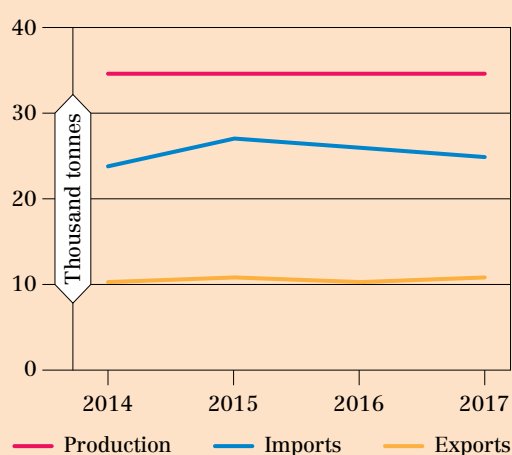
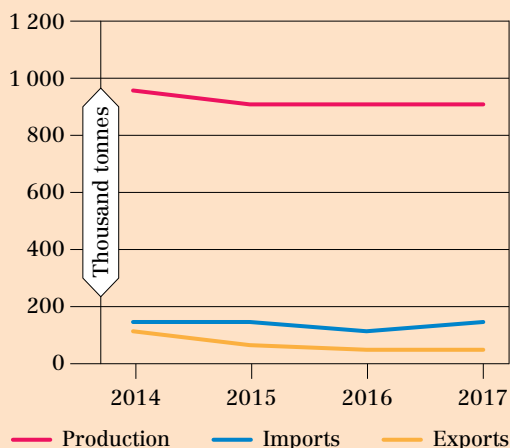
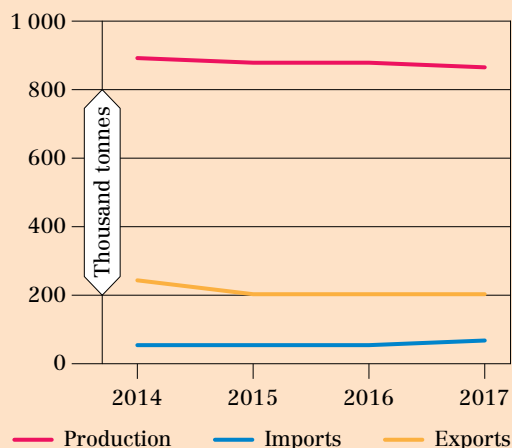


FIGURE 13 (cont.) Production, import and export variation of major group products**E. VEGETABLES****F. FRUITS**

Source: FAOSTAT database (FAO, 2020d).

Exports

From 1998 to 2017, food exports from Lebanon accounted for about 21.1 percent of national exports, with a steady increase from 2014. In 2018, the value of food exports was about USD 665 million. The potential to increase food exports is significant, especially of fruits and vegetables such as apples, banana (fresh or dried) and potatoes, however, this potential is blocked by insufficient food quality, safety standards and traceability. Food imports account for about 50 percent of the calories consumed domestically and dependence on the global markets is increasing (Bahn *et al.*, 2019).

Agribusiness exports grew rapidly until 2014 (+11 percent) but have since stagnated (-12 percent since 2014). The exports in greatest decline are potatoes, wheat, chocolate and non-alcoholic beer. The decline in exports between 2014 and 2016 was driven by disruptions to land routes through the Syrian Arab Republic. The impact of the war was partially counterbalanced by the successful implementation of the Maritime Lebanese Exports Bridge (M.LEB)³ (McKinsey, 2019).

Before the civil war, the Fruit Office – an autonomous public institution – was responsible for procuring, sorting, packaging, processing, marketing and exporting fruit products. The Fruit Office decided on fruit quality standards and worked in close collaboration with the MoA in terms of extension, fruit prices, planning, etc. The office was dismantled during the civil war in 1982 and never reopened, despite the acknowledgement of its importance by the private sector.

Most of Lebanon's top agricultural export destinations are Arab countries: Egypt, Iraq, Kuwait, Qatar, Arabia, the Syrian Arab Republic, Saudi Arabia and the United Arab Emirates.

³ The Maritime Lebanese Exports Bridge (M.LEB) programme was put in place by the Lebanese Government in September 2015 to create a temporary maritime bridge for trucks loaded with Lebanese produce. This aimed to provide an alternative to land transport, due to the closing of land borders between Jordan, Lebanon and the Syrian Arab Republic, which have historically been fundamental for Lebanese exports. For more detailed information, see IDAL (2015).

The other main partners are Greece, the United Kingdom and the United States of America (see Table 2). The top ten commodities exported by Lebanon in 2018 were predominantly vegetable and food products; no animal products were included in the top ten (see Table 3).

◆ **TABLE 2** Main export markets for Lebanon, 2018

Partner	Commodity	Trade value (USD)
Syrian Arab Republic	Fruit, nuts and peel of citrus fruit	22 146 688
Saudi Arabia	Vegetable, fruit, nuts and food preparations	20 310 034
Egypt	Fruit, nuts and peel of citrus fruit	11 482 120
Iraq	Cereal, flour, starch, milk products	11 005 882
United States of America	Animal, vegetable fats and oils	10 398 171
Qatar	Live animals	9 715 838
United Arab Emirates	Vegetables, roots and tubers	9 079 682
United Kingdom	Beverages, spirits and vinegar	8 395 009
Greece	Tobacco and manufactured tobacco substitutes	8 294 342
Kuwait	Fruit, nuts and peel of citrus fruit	7 969 618

Source: UN, 2020.

◆ **TABLE 3** Main commodities exported by Lebanon, 2018

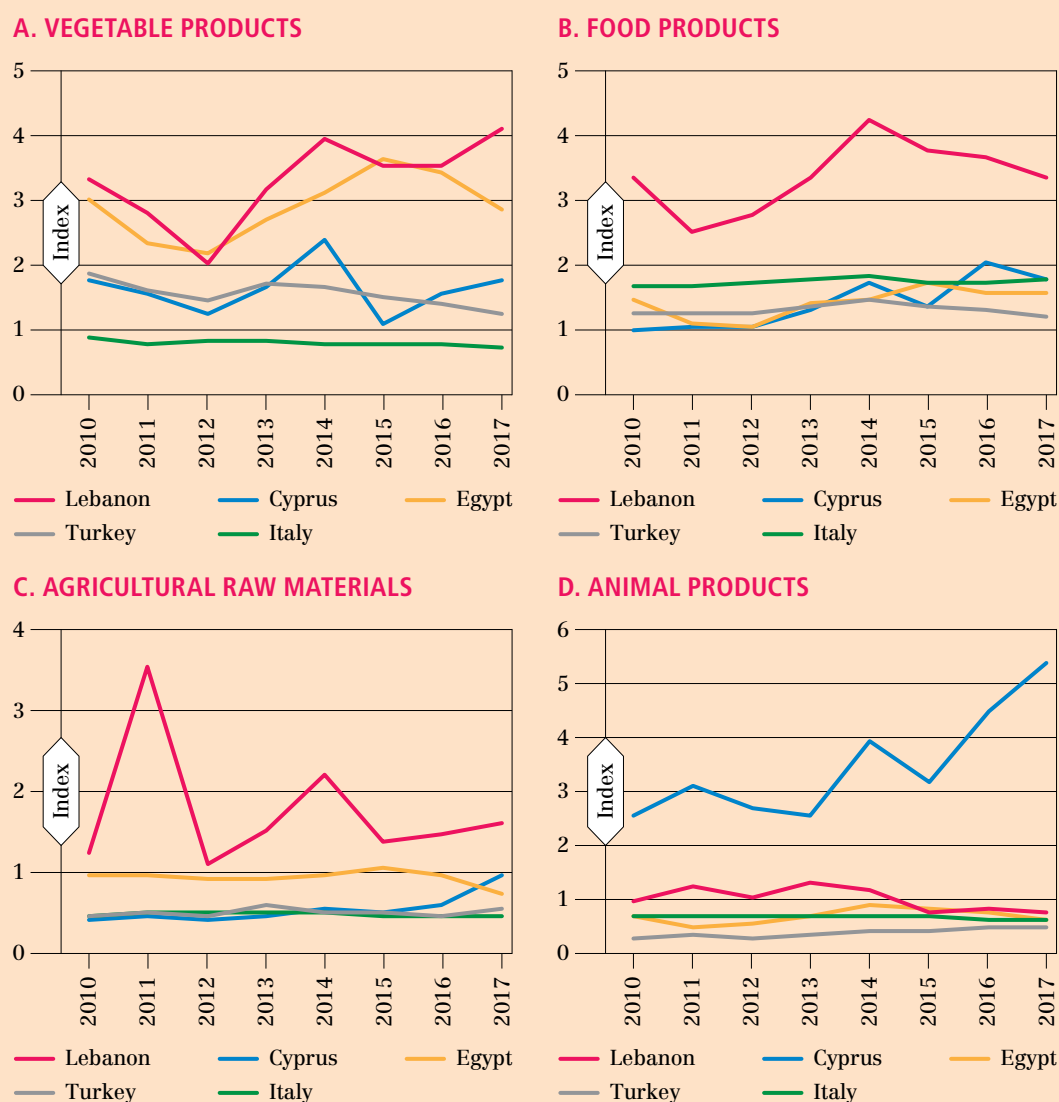
2-digit classification	4-digit classification
Vegetable, fruit, nuts, food preparations	Fruit, nuts, edible plant parts, prepared/preserved
Edible fruit, nuts, peel of citrus fruit, melons	Chocolate and other foods containing cocoa
Beverages, spirits and vinegar	Sauce, condiments, mixed seasoning and mustard
Miscellaneous edible preparations	Tobacco unmanufactured, tobacco refuse
Animal and vegetable fats and oils, cleavage products	Vegetables, prepared/preserved, not frozen/vinegar
Cereal, flour, starch, milk preparations and products	Olive oil and its fractions, not chemically modified
Edible vegetables and certain roots and tubers	Coffee, coffee husks and skins and coffee substitutes
Coffee, tea, mate and spices	Food preparations
Cocoa and cocoa preparations	Bananas, including plantains, fresh or dried
Tobacco and manufactured tobacco substitutes	Grape wines (including fortified)

Notes: The Harmonized System (HS) 1988/92 uses an international nomenclature for the classification of products. It allows participating countries to classify traded goods on a common basis for customs purposes. The HS for classifying goods employs a six-digit code system. The HS comprises approximately 5 300 article/product descriptions that appear as headings and subheadings, arranged in 99 chapters, grouped in 21 sections. The six digits can be broken down into three parts. The first two digits (HS-2) identify the chapter in which the goods are classified, e.g., 09 = coffee, tea, mate and spices. The next two digits (HS-4) identify groupings within that chapter, e.g., 09.02 = tea, whether flavoured.

Source: UN, 2020.

The revealed comparative advantage (RCA) indicator for Lebanon between 2010 and 2017 shows that the country was a competitive producer and exporter in three key sectors (see Figure 14): vegetable products, agricultural raw materials and food products (UNCTAD, 2020). However, Lebanon has had a comparative disadvantage for animal products – another key sector – since 2010.

◆ **FIGURE 14** Revealed comparative advantage of key sectors

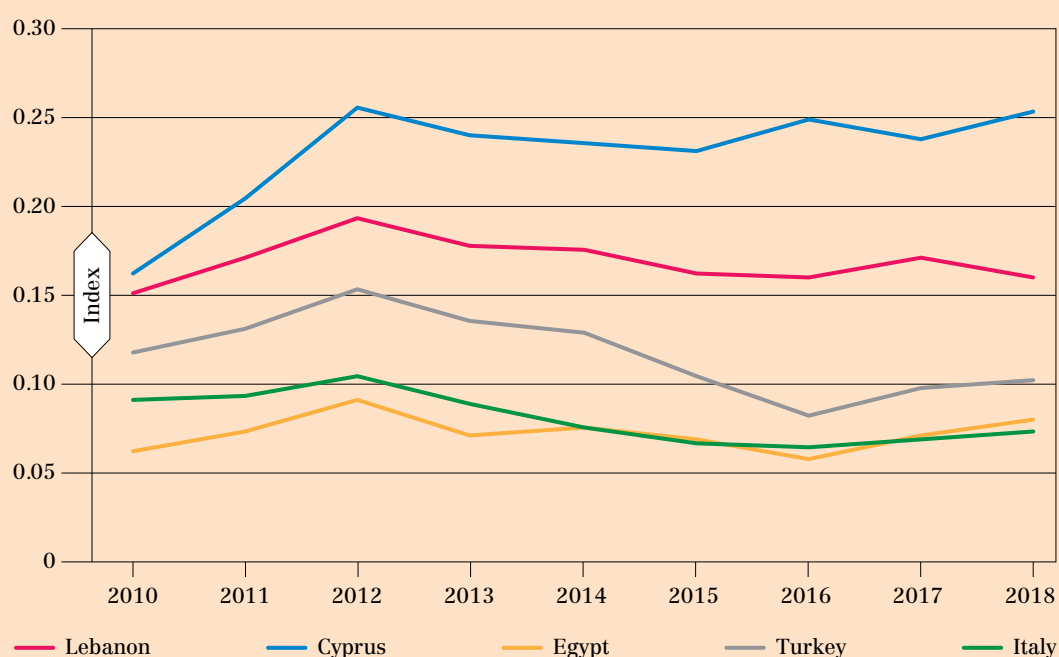


Notes: In panel a, b and c, the Harmonized System 1988/92 is used as the classification system for this product group. In panel d, SITC Revision 2 is used as the classification system for this product group.

Source: WITS, 2020.

Lebanon's export concentration index (ECI) has been relatively low compared with countries like Iraq (0.95), Angola (0.94), Guinea-Bissau (0.87), Libya (0.79) and Venezuela (Bolivarian Republic of) (0.68), fluctuating between 0.1 and 0.15 throughout 2010–2018 (see Figure 15). This index measures the degree of concentration of exported goods. In the case of Lebanon, it shows that exports are well distributed among a variety of products. Indeed, in 2018, Lebanon occupied 28th place in the global ranking of countries with the most diversified agricultural exports, according to the ECI.

◆ **FIGURE 15** Comparison of export concentration among countries



Source: UNCTAD, 2020.

Imports

Outputs

The import of food products is declining in key markets, such as Egypt, Jordan, Saudi Arabia and the United Arab Emirates. Meanwhile, high growth is taking place in parts of Eastern Europe and Southeast Asia, which could offer important growth opportunities for Lebanese exporters (e.g., tomato exports to Azerbaijan, Bahrain, Bangladesh, Belarus and Bulgaria (McKinsey, 2019).

Heavily indebted, Lebanon is also highly dependent on the import of wheat and other cereals. And while the country maintains a reasonable supply of food, economic access to food and nutrition can be disrupted, especially during price shocks (UNESCWA & WFP, 2016). Lebanon's main markets for imports, in 2018 were Argentina, Brazil, Croatia, the Netherlands, the Russian Federation, Spain, Sudan, Turkey, Ukraine and the United Kingdom (see Table 4). Table 5 shows that most of the commodities that were imported in 2018 were vegetable products.

◆ **TABLE 4** Main import markets for Lebanon, 2018

Partner	Commodity	Trade value (USD)
Russian Federation	Cereals	103 049 170
Brazil	Meat and edible meat offal	96 423 122
Spain	Live animals	86 906 024
Argentina	Residues, waste from food industry and animal fodder	68 256 716



TABLE 4 (cont.) Main import markets for Lebanon, 2018

Partner	Commodity	Trade value (USD)
Ukraine	Cereals	65 356 898
Croatia	Live animals	53 688 473
Netherlands	Dairy products, eggs, honey and edible animal products	51 402 271
United Kingdom	Beverages, spirits and vinegar	43 398 863
Turkey	Cereal, flour, starch, milk preparations and products	41 655 530
Sudan	Oil seed, oleagic fruits, grain, seed and fruits	39 797 739

Source: UN, 2020.

◆ TABLE 5 Main commodities imported by Lebanon, 2018

2-digit classification	4-digit classification
Live animals	Live bovine animals
Dairy products, eggs, honey, edible animal products	Cheese and curd
Cereals	Wheat and meslin
Cereal, flour, starch, milk preparations and products	Baked bread, pastry, wafers, rice paper, biscuits
Miscellaneous edible preparations	Food preparations
Edible fruit, nuts, peel of citrus fruit, melons	Malt extract, flour, dairy preparations, low cocoa
Oil seed, oleagic fruits, grain, seed, fruit	Maize
Animal, vegetable fats and oils, cleavage products	Milk and cream, concentrate or sweetened
Meat and edible meat offal	Meat of bovine animals, fresh or frozen
Sugar and sugar confectionery	Solid cane or beet sugar and chemically pure sucrose

Note: Harmonized System 1988/92 is used as the classification system.

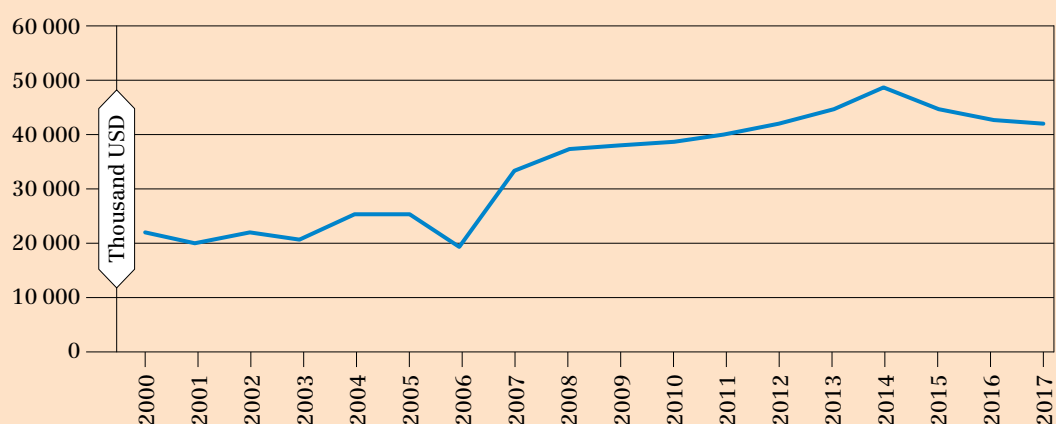
Source: UN, 2020.

Inputs

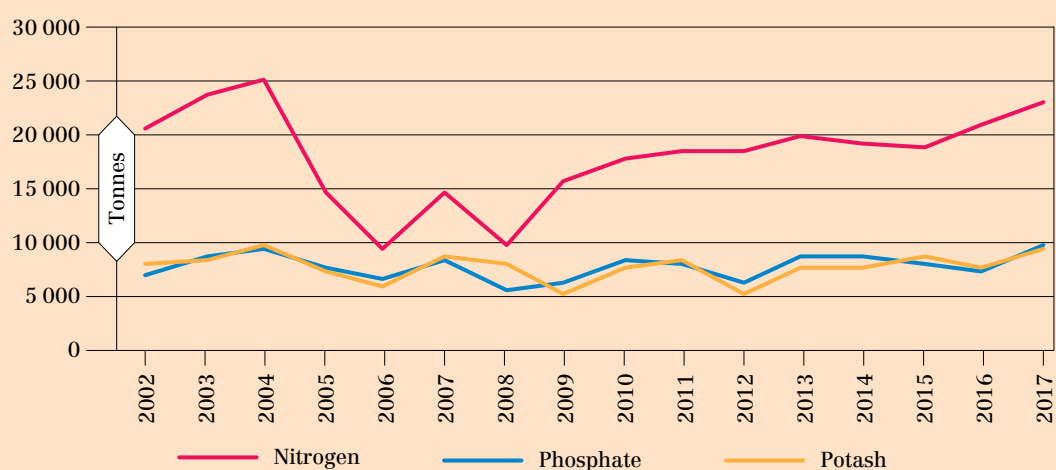
The import of pesticides has steadily increased since 2006, reaching a value of almost USD 50 million in 2014 (see Figure 16). The level of fertilizer imports depends on the type of nutrient; while imports of phosphate and potash remained relatively constant between 2002 and 2017, imports of nitrogen have been increasing since 2008 (from 10 000 tonnes to almost 25 000 tonnes in 2017). The fact that different units are used to measure pesticides (import value) and fertilizers (import quantity) indicates the limitations in data availability.

◆ **FIGURE 16 Imports of pesticides and fertilizers in Lebanon**

A. PESTICIDES (TOTAL) – IMPORT VALUE



B. FERTILIZERS (BY NUTRIENT) – IMPORT QUANTITY



Source: FAOSTAT database (FAO, 2020d).

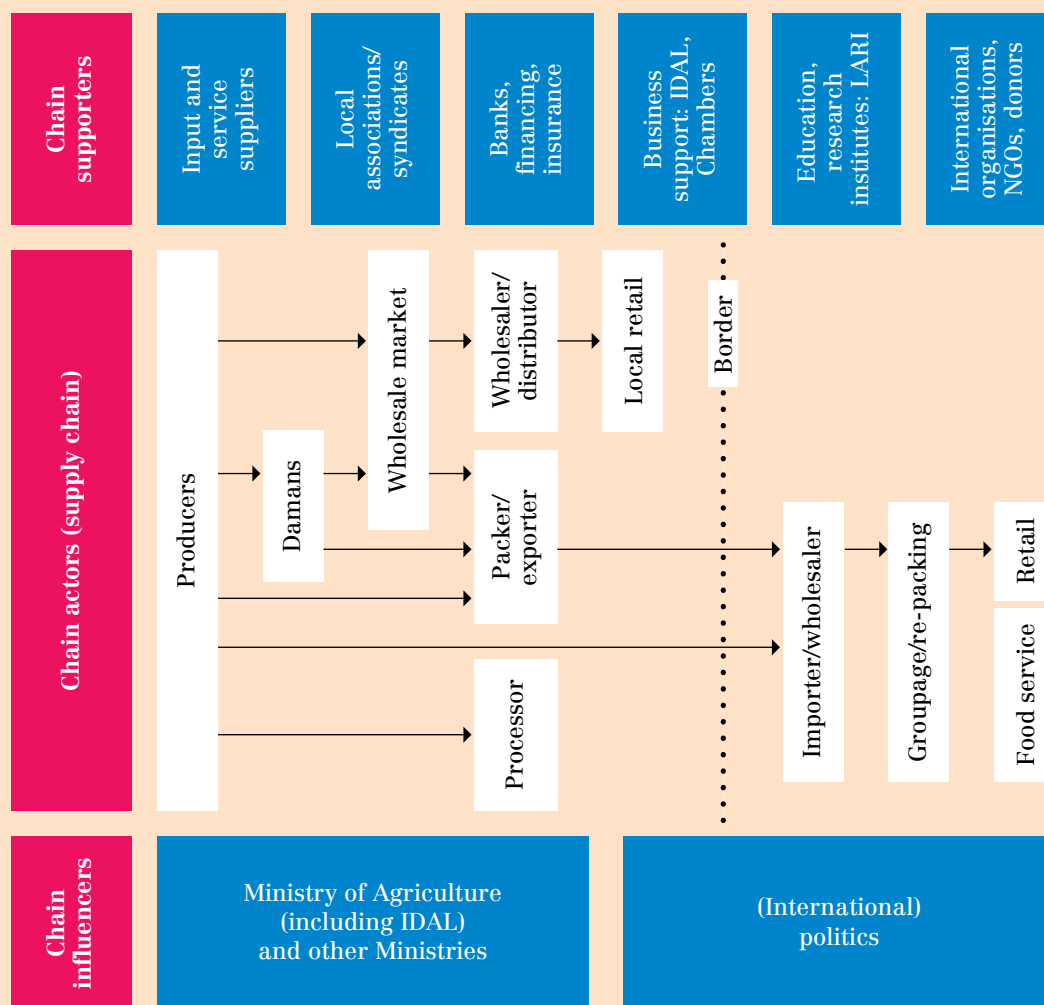
2.4 Lebanon agrifood value chains

The Lebanese agricultural production and market system for fresh products is typically organized as shown in Figure 17. Three main groups are generally involved in the value chain: the actors, the supporters and the influencers. The first group includes private parties that have a key role in the value-adding process throughout the chain, from seed to domestic market or export destination; these are usually the key actors in the supply chain and include primary producers/farmers, nurseries, input providers, wholesale markets and traders, and food processors and exporters. However, the organization of the supply chain can vary greatly, depending on the crop and product. The second group includes the people that support the value chain through commercial (e.g., technical suppliers and service providers) or institutional means (e.g., business support organizations, trade associations and educational institutions) as well as international and national donors. The last group includes parties from the institutional environment, such as local and national governments and international stakeholders (USAID, 2014). Examples of important value chains in Lebanon are provided in Annex 2.

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 with less than 0.2 hectares; the small plot size of many citrus, grape and olive oil farms limits the potential for economies of scale; and most of the production of potato and fresh fruit and vegetables not only lacks consistency in volume and quality, but also faces high costs of production and low profitability, mainly due to the small scale of operations.

Most farmers in Lebanon have limited education, are upwards of 50 years in age and inherited land from their parents. All these factors reduce their capacity to adopt new technologies and farming practices, affecting productivity levels, quality and (sometimes) the supply of commodities. In the cherry value chain, for example, most orchards were once part of larger properties that were divided into parcels as the land was passed down through generations or were sold (USAID, 2014). In the case of citrus, fresh fruit and vegetables, grapes, and potato, harvesting is based on traditional practices and technology levels are low.

◆ **FIGURE 17** Lebanese agricultural production and market system



Notes: IDAL is the International Development Authority of Lebanon; LARI is the Lebanese Agricultural Research Institute.

Source: USAID, 2014.

The Lebanese agribusiness sector shows a marked dualism, characterized by many small firms (in terms of number of employees) and a few larger companies. No official data is available on firm size in the agrifood industry. However, according to Maddock (2019), about one quarter of registered firms employ fewer than 19 workers and only 3 percent employ more than 100 workers. There are some 1 400 agrifood companies in Lebanon. Bakeries (23 percent) and confectionary (16 percent) dominate, while 8 percent of the companies produce dairy products, 4 percent produce vegetable oils (mainly olive oil) and 4 percent process fruit and vegetables.

Lebanon has numerous producers of low volume, high value products. These include manufacturers of olive oil products, including olive oil infusions and high-quality oils and soaps. They require high quality packaging and labelling, much of which is imported. These products are sold in local markets to affluent customers as well as exported (Maddock, 2019).

Wholesalers and distributor networks are large and well organized, with a dominant position and leverage over small-scale and less organized farmers. As a result, farmers are often forced to sell their products at low prices and to buy costly inputs. Wholesale markets are rudimentary and lack the necessary logistics and equipment needed to preserve the quality of products. Wholesalers take advantage of the absence of packaging and labelling and use non-transparent sale operations, e.g., randomly timed auctions (except for fisheries) to control prices to the disadvantage of producers.

Initiatives, such as Fair-Trade Lebanon, Souk Al Tayyeb, and farmers' street markets, shorten the supply chain and allow farmers to reach consumers directly and to improve their benefit margins and the quality of their products. Many farmers sell products, such as honey, olive oil, dairy products, dried legumes, and medicinal plants, directly to loyal clients.

Cooperatives in Lebanon are largely ineffective and weak; two-thirds of them are inactive and cannot provide farmers with supply chain services. Most cooperatives operate at a local scale and have limited market access. They mostly focus on securing funds from government sources and international donors and facilitating direct sales to local markets, but they have limited linkages with the food processing industry, which account for less than 5 percent of cooperative sales. In the fresh fruit and vegetable value chain, for example, there is no culture of cooperation and cooperatives are ineffective in collective sales and marketing. Similarly, most citrus and banana farmers do not belong to cooperatives, which could enable wholesale purchasing and facilitate cost savings on key agricultural inputs such as fertilizers and pesticides.

Yet active cooperatives do exist; some of these focus on food processing and marketing, emphasizing a greater role for women. Some are innovative and manage water distribution networks (i.e., the Qobayyat cooperative), while others are market oriented (i.e., fishermen cooperatives). In many cases, cooperatives have been replaced by farmers' associations, which are crop-production oriented.

3 Policies and institutions

KEY MESSAGES

- ◆ Several ministries are involved in the agricultural sector, including the Ministry of Agriculture, the Ministry of Environment, the Ministry of Economy and Trade and the Ministry of Industry of Lebanon.
- ◆ Most agricultural cooperatives in Lebanon are struggling. In 2017, there were 1 238 cooperatives. Only 10–20 percent are active; just 4.5 percent of farmers are members.
- ◆ International support for agriculture comes mainly from countries, United Nations organizations, the United States Agency for International Development (USAID) and the European Union.
- ◆ Lebanon has been an active participant in the international processes related to the United Nations Sustainable Development Goals (SDGs).
- ◆ Lebanon's economic strategy around trade liberalization features free trade agreements. Bilateral free trade agreements are mostly with countries in the Middle East and North Africa (MENA).

The main actors involved in the agriculture sector of Lebanon are presented in Table 6.

◆ **TABLE 6** Main actors in the Lebanese agricultural sector

Roles	Institutions	Research institutes	Government bodies	Extension departments
Improved seed and other inputs		<i>Centre National de la Recherche Scientifique</i> (CNRS)	Ministry of Energy and Water (MoEW)	Ministry of Agriculture (MoA)'s Lebanese Agricultural Research Institute (LARI)
Energy			MoEW	
Water/irrigation			MoEW	MoA's LARI
Processing			Ministry of Industry (MoI)	MoA's Directorate General of Cooperatives
Marketing/trade			Ministry of Economy and Trade (MoET)	



TABLE 6 (cont.) Main actors in the Lebanese agricultural sector

Roles	Institutions	Research institutes	Government bodies	Extension departments
Food safety		Lebanese Standards Institution (LIBNOR)		MoA's LARI
Data/statistics			MoA	Central Administration of Statistics (CAS)
Sustainability/sustainable practices			MoA, Ministry of Environment (MoE), MoEW	
Investments				MoA's Green Plan Investment Development Authority of Lebanon (IDAL)

Source: Authors' own elaboration.

3.1 The institutional setting

Government bodies: ministries

Several different ministries have responsibilities in the agricultural sector in Lebanon. These include the Ministry of Agriculture (MoA), the Ministry of Social Affairs (MoSA), the Ministry of Industry (MoI), the Ministry of Environment (MoE) and the Ministry of Economy and Trade (MoET). Table 7 describes their mandates, objectives and activities with respect to agriculture.

◆ TABLE 7 Main actors in the Lebanese agricultural sector

Name	Mandate	Objectives	Activities
Ministry of Agriculture, General Directorate of Agriculture (GDA)	<ul style="list-style-type: none"> ◆ To improve the performance of the agricultural sector and contribute to economic, social, environmental and sustainable rural development in Lebanon. ◆ To formulate a strategic framework for the agricultural sector and develop practical policies and programmes to promote the sector. ◆ To develop legal and legislative frameworks and the infrastructure to facilitate investment, production and marketing in agriculture. 	<ul style="list-style-type: none"> ◆ To provide safe and high-quality food. ◆ To improve the contribution of agriculture to the economic and social development of the country. ◆ To promote the sustainable management of natural and genetic resources. 	<ul style="list-style-type: none"> ◆ Agriculture Strategy 2015–2019. ◆ The Green Plan. ◆ Extension services. ◆ The Ministry of Agriculture's response plan.



TABLE 7 (cont.) Main actors in the Lebanese agricultural sector

Name	Mandate	Objectives	Activities
Ministry of Agriculture, General Directorate of Cooperatives (GDC)	<ul style="list-style-type: none"> ◆ To register and issue permits. ◆ To supervise and monitor cooperatives. ◆ To provide financial support to cooperatives and their unions. 	<ul style="list-style-type: none"> ◆ To offer technical and financial support to cooperatives. ◆ To develop MoA's skills in negotiation activities. ◆ To strengthen the capacities of the MoA in disaster and crisis risk management. 	<ul style="list-style-type: none"> ◆ GDC decides whether to dissolve cooperatives or not based on their effectiveness.
Ministry of Industry (MoI)		<ul style="list-style-type: none"> ◆ To provide support to small and medium enterprises by improving business environments. ◆ To provide businesses with access to finance. ◆ To provide accurate industrial statistics. ◆ To promote exports. ◆ To develop measures to promote innovation. ◆ To provide business development services and incubation. 	
Ministry of Environment (MoE)	<ul style="list-style-type: none"> ◆ To set conditions and standards for how to use pesticides and wastewater disposal. ◆ To define guidelines for plant and animal protection. ◆ To combat pollution and forest fires to limit deforestation. 		



TABLE 7 (cont.) Main actors in the Lebanese agricultural sector

Name	Mandate	Objectives	Activities
Minister of Economy and Trade (MoET)	<ul style="list-style-type: none"> ◆ To control food quality and prices at the retail market through the consumer protection service. ◆ To elaborate geographical indexing, copyright and patent laws, traceability of products and their regulations. 		<ul style="list-style-type: none"> ◆ Quality Programme.
Ministry of Finance (MoF)	<ul style="list-style-type: none"> ◆ To oversee tobacco subsidies. 		

Source: Authors' own elaboration.

Lebanon's agriculture sector has received increasing government attention since 2010. The MoA has undertaken various initiatives to support sector development and undertake institutional and organizational reforms. As an example, the MoA develops an agriculture strategy every five years through a participatory approach that involves technical working groups, relevant ministries and institutions, non-governmental organizations (NGOs) and other stakeholders. There are seven active technical schools in Lebanon; these which are located in different regions and provide agricultural education and skills to students. The MoA has recently updated the curricula of the technical schools and produced a training package for teachers.

The MoI has developed a strategic plan (2016–2020) for all industrial sectors, including agribusiness. There are currently some 130 private industrial zones; these have grown spontaneously, reflecting local specialization. The plan predicts that some of the new zones will concentrate on agrifood and other types of agribusiness (Maddock, 2019).

The General Directorate of Cereals and Sugar Beets, which falls under the MoET, aims to ensure the stability and safety of bread supply in Lebanon and to increase the local production of cereals. The General Directorate may purchase locally produced wheat from Lebanese farmers under the terms of a decree issued by the Council of Ministers. The MoET stopped subsidizing beet due to a collapse in the value chain; this was triggered by malpractice in the production chain, which led to a decrease in the sugar content of beets and raised production costs.

Other ministries focus on issues that are indirectly linked to agriculture. For example, the Ministry of Labour is concerned with child labour, which is particularly concentrated in the agricultural sector. While there are numerous examples of such associations, we have chosen to restrict our discussion to direct links only.

Governmental bodies: agencies

One of the main governmental organizations is the Lebanese Agricultural Research Institute (LARI), which is under the supervision of the MoA and has a budget of about USD 15 million. Research is conducted in the following areas: cereals, root crops, pastures, legumes, veterinary medicine, plant nutrition and pest management. In addition, LARI performs monitoring tests for water and soil pollution. Research findings are directly transferred to farmers through a free smart phone application, LARI-LEB.

Two of the most important government bodies dedicated to disaster risk reduction and management in the agricultural sector are the Disaster Risk Management Unit (DRM) and the High Relief Committee (HRC). The former aims to help the Lebanese Government strengthen its capacity to develop disaster risk reduction and disaster risk management strategies, while the HRC is a key actor in times of crisis, accepting donations, determining procedures for receiving, storing, and distributing necessary goods, and managing all tasks related to disasters relief.

Table 8 provides an overview of the government agencies that are active in the agricultural sector.

♦ **TABLE 8** Key governmental agencies and institutes concerned with agriculture

Name	Mandate	Objectives	Activities
Lebanese Agricultural Research Institute (LARI)	<ul style="list-style-type: none"> ♦ To conduct applied research projects that support the agricultural sector. 	<ul style="list-style-type: none"> ♦ To carry out applied and basic scientific research for the development and advancement of the agricultural sector in Lebanon. ♦ To keep close ties with farmers and develop research activities to solve their problems. 	<ul style="list-style-type: none"> ♦ LARI's main services are plant breeding and improvement; irrigation and agrometeorology; pomology and viticulture; crop protection; animal health; soil and water laboratories.
Central Administration of Statistics (CAS)	<ul style="list-style-type: none"> ♦ To collect, process, produce and disseminate social and economic statistics at the national level. ♦ To provide users with evidence-based information for decision-making. ♦ To provide technical supervision of statistics produced by ministries and public administrations as well as improving methods and harmonizing statistics. 	<ul style="list-style-type: none"> ♦ To produce relevant and accurate statistics 	<ul style="list-style-type: none"> ♦ CAS provides the following information: demographic and social statistics; national accounts; housing; economic statistics; gender-disaggregated data. ♦ CAS disseminates thematic time series and statistical yearbooks.



TABLE 8 (cont.) Key governmental agencies and institutes concerned with agriculture

Name	Mandate	Objectives	Activities
Investment Development Authority of Lebanon (IDAL)	<ul style="list-style-type: none"> ◆ To provide economic, commercial and legal information of relevance to investors. ◆ To identify business opportunities across various economic sectors. ◆ To grant fiscal exemptions and fee reductions to investment projects. ◆ To provide data and support to companies in accessing external markets. 	<ul style="list-style-type: none"> ◆ To promote Lebanon as a key investment destination, attracting, facilitating and retaining investments in the country. ◆ To provide a framework for regulating investment in Lebanon. ◆ To provide investors with a range of incentives and business support services. 	<ul style="list-style-type: none"> ◆ Eight sectors are eligible for IDAL incentives: industrial technology; information technology; food and beverages; tourism; industry; agriculture; media; telecom. ◆ Agricultural export subsidies.
National Council for Scientific Research (CNRS)	<ul style="list-style-type: none"> ◆ To formulate proposals and suggestions for the government and carry out surveys and inventories of ongoing research activities in private and public institutions. ◆ To lead and organize scientific research activities within its defined work programmes and research centres. 	<ul style="list-style-type: none"> ◆ To encourage scientific research and support human resources development aligned with the general scientific policies adopted by the government. ◆ To keep the scientific community in Lebanon connected with worldwide advances and, at the same time, to dedicate its resources to meet local development objectives. 	<ul style="list-style-type: none"> ◆ Various research programmes, notably around marine sciences and biodiversity; management of natural resources; renewable energy; food security; archaeology; and water. ◆ CNRS is involved in remote sensing, fisheries and quality control.
Lebanese Standards Institution (LIBNOR)	<ul style="list-style-type: none"> ◆ To improve the quality and safety of products, services and organizations. ◆ To protect the environment and the well-being of society in Lebanon. ◆ To enhance economic development and business competitiveness. 		<ul style="list-style-type: none"> ◆ A public institution attached to the Ministry of Industry, LIBNOR develops and promotes consensus-based standards. ◆ LIBNOR conducts training programmes and conformity assessment schemes.

Source: Authors' own elaboration.

Private sector organizations

The private sector organizations most concerned with agriculture in Lebanon include: input providers (i.e., traders that import or locally procure the necessary inputs for agriculture); industries that produce inputs (organic and chemical fertilizers, pesticides, agricultural machinery, packaging, etc.); nurseries that produce seedlings; companies that produce cooling storage units, packaging and sorting units; agricultural entrepreneurs providing services in the field (pruning, spraying, harvesting, precision agriculture, etc.); quality control and certification bodies; and processing industries (mills, factories, etc.).

There are many such private sector companies in Lebanon, and while it is not in the scope of this review to cite them all, the following are particularly important.

Antagro is a privately-owned company established in 2000. It works as an importer and exporter of agricultural products, equipment and materials. Antagro supplies the Lebanese market with pesticides and fertilizers and advises on international standards, with support from a team of engineers. The company has offices in Dbayeh (Mount Lebanon), Ghazieh (South Lebanon), and Tripoli (North Lebanon) (MEDRESET, 2018).

The **Al Zoghbi General Trading Company**, which was established 40 years ago, is a major private sector player in the agriculture sector in Lebanon. The company produces fertilizers, pesticides, seeds, and irrigation equipment and works through direct trade with farmers and distributors. An important feature of the company's services is that it makes engineers available to guide clients free of charge (MEDRESET, 2018).

Four Chambers of Commerce, Industry and Agriculture (CCIA) are active in agriculture. Grouped under a federation, the CCIAs are non-profit organizations under public law. They represent the interests of the private sector, contribute to the formulation of economic policies and legislation that impact business activities, develop partnerships and dialogues between the business sector and the government, and provide a broad array of services to enterprises. Faithful to their role as the prime backer of the interests of the private economy, the CCIA serve as resource leaders for business and the community at large.

Civil society organizations/non-governmental organization

Many CSOs and NGOs are active in the Lebanese agriculture sector in various capacities. Some of these are described below.

Emkan is a local NGO established in 2008. Associated with Bank Med, Emkan aims to support Lebanon's economic development and to strengthen the agricultural sector by supporting rural communities and farmers with microloans. Emkan founded a fruit and vegetable trading market in 2014, the Souk Akkar, to benefit farmers and traders and reduce post-harvest losses (EMKAN, 2019; MEDRESET, 2018).

The **René Moawad Foundation (RMF)** was founded in 1991 in the memory of the former Lebanese president. The RMF started as a grassroots organization and grew to become a nationally recognized NGO. The RMF's aim is to promote economic, social, and rural development in Lebanon in collaboration with national and international institutions. For example, a European Union-funded RMF project in Akkar sought to enhance the dairy sector in North Lebanon by distributing milk storage units that can preserve dairy products and retain high quality. The goal was for the farmers to gain new skills that could increase the quality and quantity of their production and help them to sell their products at a better price (RMF, 2017).

The **Association for Urban Agriculture (LAUA)** links Lebanon to international organizations concerned with urban agriculture. LAUA promotes the use of small areas in cities to restore environmental balance and increase the productivity and revenue of

the agricultural sector through peri-urban agriculture and raises awareness on the sector among people (MEDRESET, 2018).

The **SOILS Permaculture Association Lebanon** disseminates sustainable agricultural practices that preserve the environment. SOILS developed an internationally-known permaculture design certificate course between 2014 and 2016 for farmers, engineers, consultants and social workers. The purpose of the course was to impart the principles of sustainable design in agriculture, waste management, community building and energy conservation (SOILS, 2020).

Agricultural cooperatives

Cooperatives are well distributed across Lebanon, with a high concentration in the South and Nabatieh (30 percent) and a relatively low concentration in Beqaa (7 percent in Zahleh) and West Beqaa, which are regions of intensive agricultural production where medium and large agricultural estates prevail (ILO, 2018). By law, no more than one cooperative with the same purpose can be established in any one village unless the town population is more than 20 000 inhabitants.

It is estimated that only 10 to 20 percent of the approximately 1 250 cooperatives registered in Lebanon are active and functioning. Half (51 percent) are agricultural cooperatives, while around 27 percent work in the agrifood processing sector; 125 of these are registered to women and mostly produce Lebanese traditional food products (Polat, 2012).

Agricultural cooperatives are usually organized around relatively large-scale mechanized facilities for production, transformation, or packaging. They provide inputs and marketing support to farmers. In the case of olives and olive oil production, the cooperatives provide milling facilities. In a few cases, fruit and vegetable cooperatives have provided sorting, packaging and cold storage facilities (Polat, 2012).

Cooperatives for animal products (e.g., dairy, beekeeping, fisheries) represent around 15 percent of the total. These cooperatives usually specialize in gathering the products of small producers, including home-based production in the case of poultry and beekeeping. Food processing cooperatives offer a range of facilities; some have modern small-scale production technologies, while others have more basic facilities.

Governmental support for cooperatives has focused on infrastructure, providing equipment, capacity building and training on management and production techniques. This has allowed many cooperatives to meet the quality standards required for local and export markets, although it has not fully solved marketing and sales challenges. Experts interviewed for this review perceive that the capacity of farmers to improve and expand their production is linked to the capacity of the cooperatives to diversify export markets as well as to create linkages with industrial firms as suppliers of semi-processed goods.

Women's cooperatives have been active in advocating for rural social change, economic empowerment, political and economic rights, and access to financial and productive resources. These groups face gender-based challenges and are unable to explore markets, meet and negotiate with clients and suppliers, and deliver and buy merchandise (ILO, 2018). Since the Syrian crisis in 2011, women's cooperatives have played a key role in making peace between refugees and host communities in rural areas through the development of Syrian Lebanese community kitchens, training Syrian women's groups to produce home-based products and providing training on food safety (ILO, 2018).

Financial institutions

Kafalat is probably the most important financial institute providing credit to Lebanese farmers. It is owned by the National Institute for the Guarantee of Deposits and Lebanese commercial banks, which offers loan guarantees to banks' lending to industry, agriculture, tourism and crafts industries. Only 2 522 agricultural loans were extended in 2017 and the agricultural portfolio has declined since then (McKinsey, 2019). Interest rates are subsidized at 2.5 to 5 percent (compared to the prevailing market rate of around 7 percent). Loans range from five to seven years, with a grace period of one to three years for investment lending. The short grace period is because farms often do not start generating revenue until the third year. Borrowers report that loan procedures and requirements are not complicated (Maddock, 2019).

There are some 20 microfinance institutions in Lebanon, with a total portfolio of USD 120 to 150 million. According to Wahidi (2017), most are NGOs, with some anonymous Lebanese companies playing a role. Microloans range from USD 300 to 7 500; some institutions offer loans of up to USD 20 000. Interest rates range from 12 to 16 percent and loan durations are typically six to 18 months. Personal guarantees from two formally employed people are required to receive a loan (FAO, 2019). The United States Agency for International Development (USAID) supports eight microfinance organizations in Lebanon: **Association du Développement Rural (ADR)**, **Association d'Entraide Professionnelle du Liban (AEP)**, **AlMajmoua**, **Ameen**, **The Lebanese Cooperative for Development (CLD)**, **Emkan**, the **Entrepreneurial Development Fund (DEF)**, and the **Makhzoumi Foundation**. These organizations specialize in lending capital and providing technical assistance to agribusinesses, tourism, and technology companies, as well as women and young entrepreneurs (FAO, 2019).

According to Levy-Tadjine and Zouiten (2005) and Chebil and Levy-Tadjine (2010), women suffer from gender discrimination when applying for bank loans. Some institutions, like **Al-Majmoua**, **AEP**, **Makhzoumi** and **Tanmiyat Al-Rouwad**, are interested in supporting women and carry out professional training sessions for them.

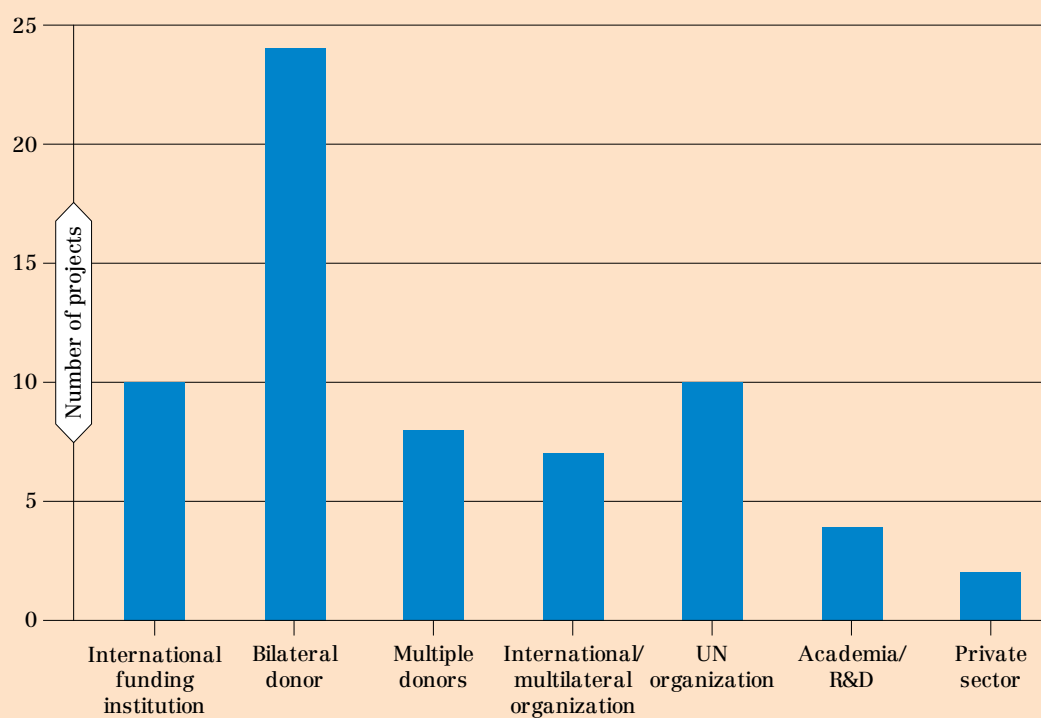
Overall, few farmers use microfinance (Maddock, 2019). It is important to note that cooperatives are another source of lending to small farmers. They can give in-kind loans to members. The sugar beet cooperative in the Beqaa, for example, provides farmers with inputs such as fertilizers and pesticides. The farmers then sell their products to the cooperative and the price of the inputs is deducted from the selling price (FAO, 2019).

Donors

The methodology for mapping ongoing and pipeline projects in Lebanon's agrifood sector includes five steps. First, data is checked to eliminate redundancy and ensure quality control. Next comes data analysis, including descriptive statistics on the number of projects and budget by donor and implementing entity. Third, projects are allocated to one or more of the five pillars defined in the draft strategic framework of the NAS. Fourth, projects are disaggregated according to implementation status (ongoing – started before 2020 or pipeline – started after July 2020). Finally, the budget is estimated based on an estimated yearly pro rata disbursement by ongoing projects active during the NAS life cycle (2020–2025) and the equivalent for pipeline projects.

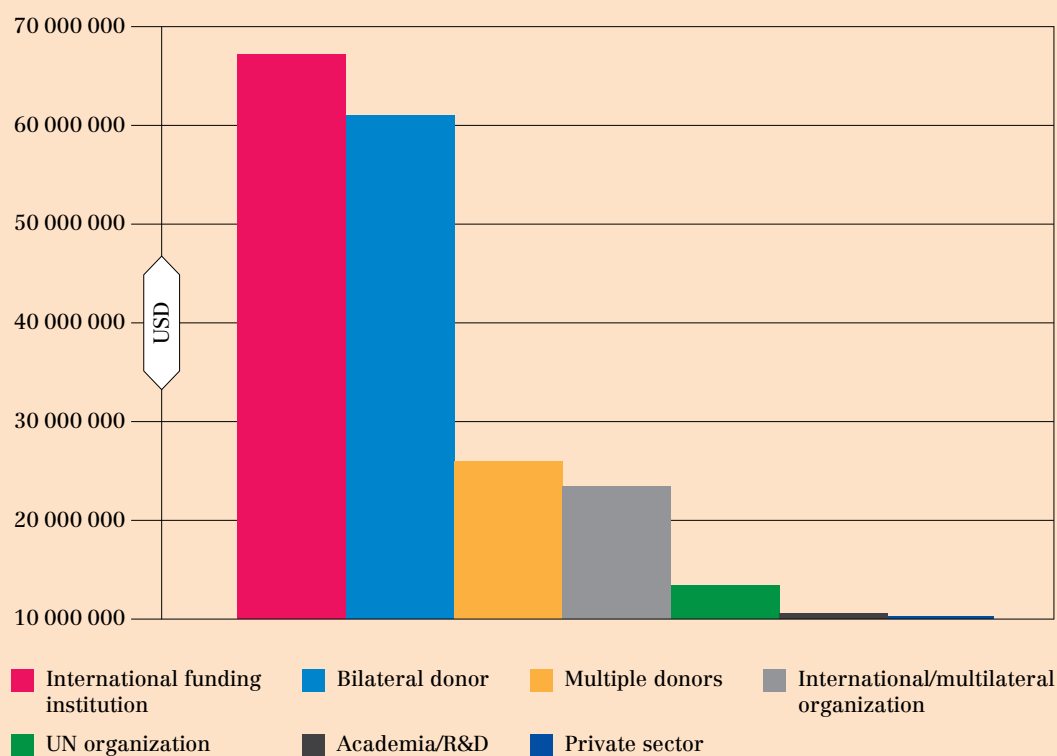
A major result of the mapping exercise was the finding that most projects are financed by bilateral donors, followed by international funding institutions (IFI) and UN organizations (see Figure 18). In terms of budget, however, IFI and bilateral donors are the largest stakeholders in ongoing and pipeline projects in the Lebanese agrifood sector.

◆ **FIGURE 18** Number of projects according to the type of donor



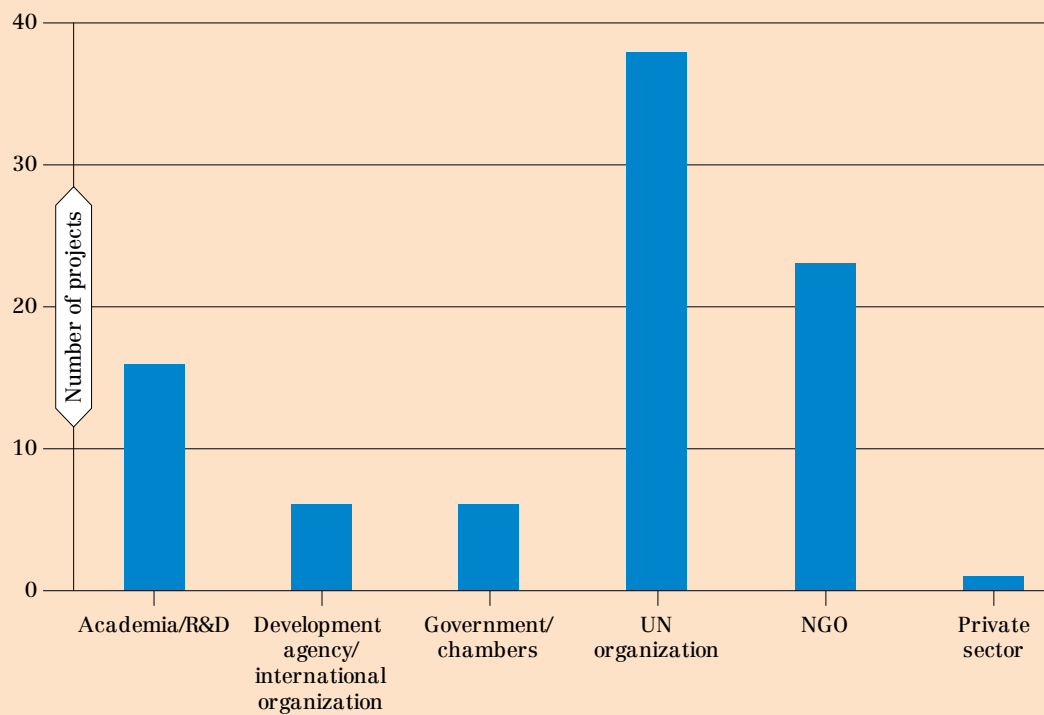
Source: Authors' own elaboration.

◆ **FIGURE 19** Budget by type of donor



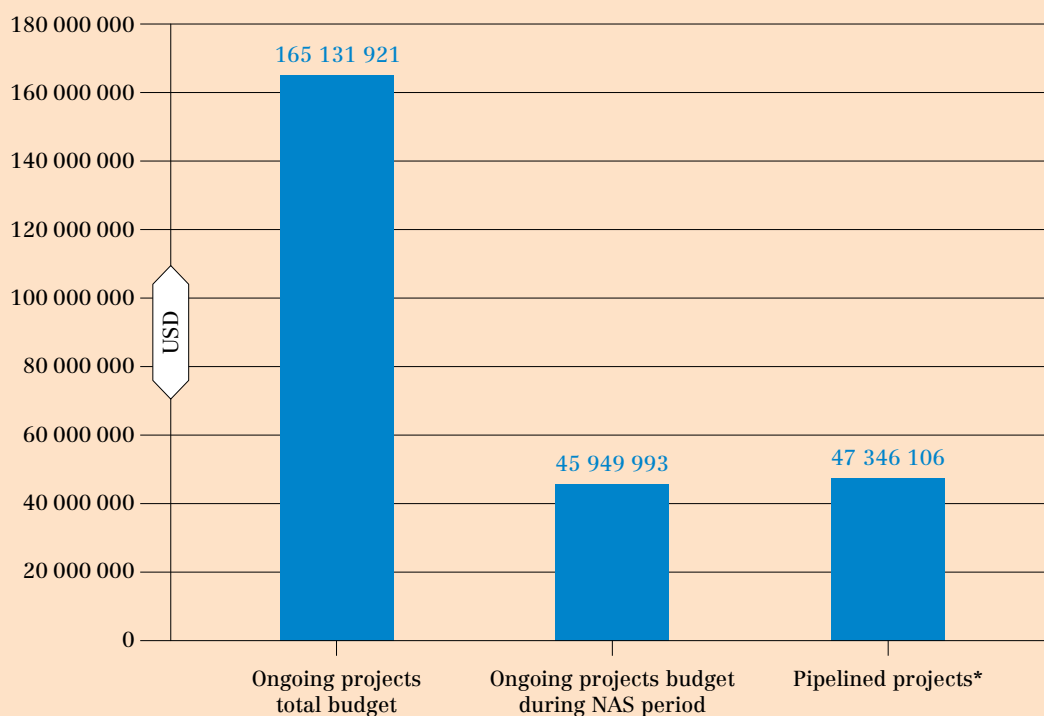
Source: Authors' own elaboration.

◆ **FIGURE 20** Number of projects by type of executing entity



Source: Authors' own elaboration.

◆ **FIGURE 21** Project budget distribution according to implementation status



Note: * only for projects with available budget estimates.

Source: Authors' own elaboration.

The data presented in Figures 18, 19, 20 and 21 comes from a range of national stakeholders, including four development agencies, one embassy, one multilaterally-funded project, 11 NGOs, two public institutions, seven research and development institutions and five United Nations organizations. There are currently 66 projects being carried out in Lebanon, implemented by 38 executing entities, with a total budget of just over USD 165 million. To date, the inventory shows that USD 93 million have been allocated to ongoing and pipelined agricultural projects for the NAS period (2020 to 2025). **FAO** supports the largest number of projects, including those financed by internal funding, while **KfW**, a German development bank, is the largest donor, followed by **the Netherlands**, the **Agence Française de Développement (AFD)**, the **Global Environment Facility (GEF)** and the **European Union's European Neighbourhood Instrument**.

According to Saade (2020), international support for Lebanon historically comes mainly from three main groups: i) countries (i.e., France, Germany, Italy, the Netherlands and the United States of America); ii) UN Organizations (i.e., FAO, IFAD and World Bank); and iii) the European Union.

Each of these donors has its own policy agenda, which can sometimes make it difficult to direct foreign support to the country's interests. Moreover, international projects are frequently conceived by non-native experts, who often have limited knowledge about Lebanese agriculture, a lack of knowledge often shared by Lebanese authorities (Saade, 2020). Indeed, the hundreds of projects conceived and financed by the international community to help Lebanese agriculture seem to have failed to reach significant development targets.

Countries

Donor countries act mainly through their development agencies. For example, the **Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)** is a non-profit private company owned by the Government of Germany. GIZ implements government support policies in collaboration with partner governments. A recent project worked with the MoEW to improve access to water for Syrian refugees and their host communities and to develop an infrastructure for sanitation and wastewater management.

Similarly, the **Agence Française de Développement (AFD)** has focused its work in Lebanon on projects for agriculture and rural development. The Daman project, for example, has supported seven olive-growing cooperatives, aiming to modernize production tools, to provide technical expertise to improve practices, and to diversify activities and sources of income.

From 2011 to 2019, **Italian Development Cooperation** focused on water scarcity issues, funding a USD 2.4 million project in Lebanon, Egypt and Jordan. Beneficiaries include farmers and rural communities as well as government and water management institutions, educational centres, the private sector and NGOs.

As a result of the crisis in the Syrian Arab Republic, Lebanon has the largest number of refugees in the world. This has put immense pressure on the country's resources, public services and infrastructure and has created unprecedented social and economic challenges. An FAO project, funded by the **Government of the Netherlands** and implemented in close collaboration with the Green Plan, worked to improve livelihood and food security levels in Lebanon during the refugee crisis. The project ran from 2016 to 2019 and had a budget of USD 8.25 million (FAO, 2019).

United Nations organizations

Food and Agriculture Organization of the United Nations (FAO)

FAO's programme in Lebanon is guided by the joint FAO-MoA Country Programming Framework (CPF) 2016–2019. The CPF addresses the priorities identified in the NAS 2015–2019, as well as the Lebanon Crisis Response Plan/Food Security Strategic Response Plan 2017–2020. The CPF is organized around two major government priority areas: expanding economic and livelihood opportunities benefiting local economies and the most vulnerable communities; and improving the performance of the agricultural sector to support economic, social, environmental and sustainable rural development. The CPF focuses on several thematic areas, including food security and the resilience of the agricultural sector; sanitary, phytosanitary and food safety; sustainable natural resources management; and data and policy support for agriculture, including strengthening social protection systems. The CPF highlights cross-cutting issues such as gender, and information and knowledge exchange.

FAO provides technical support to the agriculture sector, working with the MoA and other ministries to implement projects such as: i) land reclamation initiatives in partnership with the Green Plan; ii) agricultural and vocational school programmes to improve Lebanon's seven veterinary schools; iii) support for backyard poultry production in vulnerable communities through an European Union-funded project that provides training on management and biosafety; and iv) a reforestation programme funded by GEF and implemented with the help of MoA to increase reforested area from 13 percent to 20 percent of the total surface area of Lebanon by 2030 (MEDRESET, 2018).

The World Bank

The World Bank Group Country Partnership Framework (CPF) FY17–FY22 for the Lebanese Republic was launched on 14 July 2016. The CPF prioritizes scaling up access and the quality-of-service delivery and expanding economic opportunities and increasing human capital. Through these two focus areas, the World Bank assists Lebanon to mitigate the economic and social impact of the Syrian crisis, safeguarding the country's development gains and enhancing stability and development prospects. In parallel, the International Finance Corporation (IFC) supports the development of the private sector through investments and advisory services in key sectors with the aim to increase employment opportunities.

In 2019, the World Bank's total portfolio in Lebanon USD was 2.17 billion and included projects covering a range of sectors, including water, transport, education, health, poverty, environment, small and medium enterprises (SMEs), land administration and job creation (World Bank, 2020a). The World Bank's specific actions on agriculture in Lebanon are limited. In cooperation with other regional and international development partners, the World Bank has deployed concessional resources to help Lebanon respond to the impact of the Syrian refugee crisis through an exceptional USD 100 million International Development Association (IDA) allocation and the establishment of the Global Concessional Financing Facility (GCFF). This is in addition to a multi-donor trust fund established in December 2013, which provides grants for projects directly linked to the impact of the Syrian crisis on Lebanese citizens.

International Fund for Agricultural Development (IFAD)

IFAD's main objective in Lebanon is to reduce rural poverty by substantially increasing agricultural productivity and incomes in poor communities. Current projects focus on enhancing smallholder production, processing and marketing. Some of IFAD's activities specifically target poor, smallholder households that have been affected by the conflict in the Syrian Arab Republic. IFAD has established a Facility for Refugees, Migrants, Forced Displacement and Rural Stability (FARMS) in Lebanon to ensure that displaced people can overcome poverty through remunerative, sustainable and resilient livelihoods.

In 2009, IFAD provided a country grant of USD 200 000 to support capacity-building for a pro-poor review and launch of a national agricultural development strategy. IFAD also supports the Harmonized Actions for Livestock Enhanced Production and Processing (HALEPP) project, which launched in 2019. The overall goal of the HALEPP project is to contribute to reducing rural poverty among resource-poor rural households and Syrian refugees. IFAD also has important programmes on agricultural extension, such as the HASAD project (Hilly Areas Sustainable Development), which established three agricultural service centres under the Green Plan, providing services such as olive mills and cold storage facilities (Goss, 2019; IFAD, 2020).

European Union delegation to Lebanon

Through academic institutions and civil society agencies, the European Union's delegation promotes cooperation between the European Union and Lebanon, according to the terms of a 2002 agreement. Originally focused on water conservation, the European Union's priorities shifted after the Syrian crisis to address water scarcity by drilling for water and building water tanks. Currently, the delegation is working on two projects with the help of CSOs, the MoEW and the United Nations Children's Fund (UNICEF): rehabilitation of the current water network to stop leakage; and wastewater treatment. The European Investment Bank is providing loans for coastal wastewater treatment plants (MEDRESET, 2018).

3.2 The policy framework

The international policy framework

Lebanon has been an active participant in the process around the **Sustainable Development Goals (SDGs)**, starting with its contribution to the UN Conference on Sustainable Development in 2012 (Rio+20). Lebanon participated in consultations to provide inputs to the formulation of the SDGs and in summits related to sustainable development and the SDGs. The Lebanese Government recognized the 2030 Agenda for Sustainable Development and the SDGs in September 2015 and, in July 2018, submitted its Voluntary National Review at the High-Level Political Forum.

Lebanon's performance on the Millennium Development Goals, the predecessor to the SDGs, was mixed, mainly because the country faced significant development challenges at the time, including poverty reduction and environmental sustainability.

Lebanon contributes to the **United Nations Framework Convention on Climate Change (UNFCCC)**. In 2015, Lebanon submitted its new climate action plan to the UNFCCC. Through national and sectoral planning, Lebanon has developed low-carbon, climate-resilient adaptation strategies for the long term (e.g., a full restructuring of the power sector between 2011 and 2030).

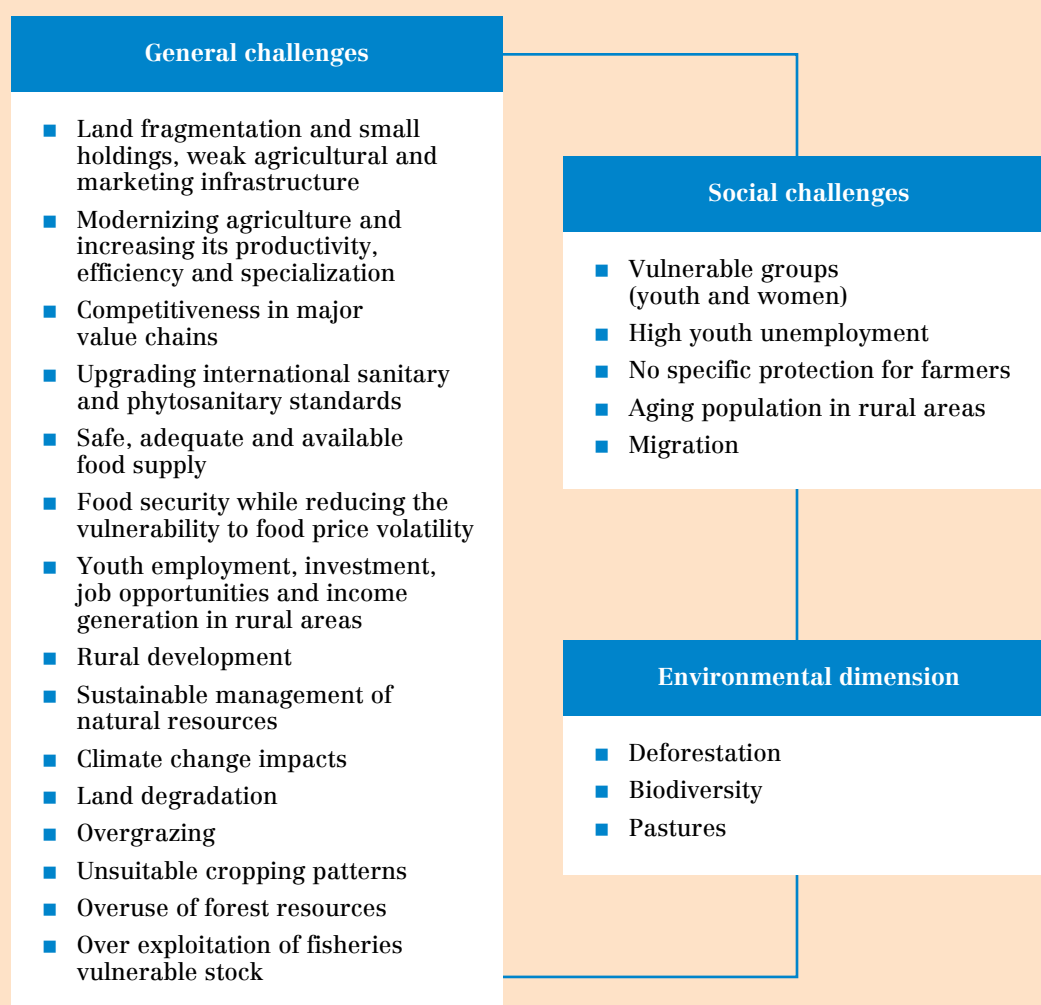
The National Agriculture Strategy 2015–2019

The goal of the National Agriculture Strategy 2015–2019 was the "... development of the agricultural sector in view of ensuring food security, including food safety, reducing poverty and rural urban migration, creating job opportunities, and increasing efficiency and sustainable use of natural resources." The specific objectives of the NAS 2015–2019 were to: i) provide safe and good quality food; ii) improve the contribution of agriculture to the economic and social development of the country; and iii) promote the sustainable management of natural and genetic resources (Saade, 2019).

The challenges identified in the NAS 2015–2019 include (see also Figure 22):

- ◆ modernizing agriculture and increasing its productivity, efficiency, and specialization and ensuring the competitiveness of major value chains in the face of land fragmentation and smallholdings, and weak agricultural and marketing infrastructure;
- ◆ upgrading sanitary and phytosanitary standards in conformity with international standards, thus facilitating access to foreign markets in view of trade liberalization;
- ◆ ensuring the availability of adequate and safe food supplies and enhancing food security, while reducing vulnerability to food price volatility;
- ◆ encouraging young people to engage in agriculture-related investments, increasing job opportunities and generating income in rural areas, and reducing rural-urban migration in the framework of an integrated rural development approach;
- ◆ ensuring the sustainable management and use of natural resources (land, forest, water, genetic resources, fisheries and aquaculture resources) in response to climate change, land degradation, overgrazing, unsuitable cropping patterns, overuse of forest resources and overexploitation of vulnerable fisheries stocks.

◆ **FIGURE 22** Overview of challenges from the National Agricultural Strategy, 2015–2019



Source: Authors' own elaboration.

Based on the challenges presented in Figure 22, the NAS 2015–2019 aimed to: i) improve the safety and quality of locally-produced and imported food products; ii) increase the productivity and competitiveness of Lebanese agricultural products; iii) improve the governance and sustainable use of natural resources; iv) strengthen agricultural extension and education; v) develop agricultural research and laboratories; vi) develop the cooperative sector and mutual funds; vii) develop MoA capacities; and viii) respond to climate change impacts.

It is important to note that the NAS 2015–2019 recognized the weakness of the Lebanese cooperative system (MoA, 2015; ILO, 2018). Lebanese women working in agriculture have been identified as a vulnerable group in the strategy; their empowerment and engagement in agriculture-related investments is emphasized as crucial to increasing overall productivity and competitiveness.

The NAS 2015–2019 had a logical structure. The strategy was highly inclusive, promising to reflect national priorities and serve as a tool for alignment. For some reason, however, the strategy lacked a mechanism for monitoring and measuring results. A ‘demand’ (or push) factor was missing, perhaps due to weak enforcement of the governance aspect of the strategy or a lack of demand from stakeholders.

Trade policies and free trade agreements: current benefits and potential reforms

Over the past ten years, the Lebanese Government has focused its economic strategy on regaining the country’s traditional comparative advantage as a business leader in the region. A key element of that strategy is trade liberalization. Free trade agreements (FTA) were signed with Lebanon’s major trading partners: the European Union, the European Free Trade Association (EFTA) States (Switzerland, Lichtenstein, Norway, Iceland) and the Gulf Cooperation Countries (GCC). The Greater Arab Free Trade Area (GAFTA) was established in January 2005.

An important policy adopted by the MoET, in close collaboration with the Central Bank, is to use subsidies to support the food basket. This allows importers to receive a subsidy from the Ministry for key products, including sugar, rice, soya and sunflower for oil extraction, lentils, chickpea, beans, fava bean, yeast, powdered milk, canned tuna, live dairy cattle, live dairy sheep and goats, fodder ensilage (corn, soybean, barley), fertilizers (N, P, K and organic), and plant material (seedlings and seeds for fruits, vegetables and tubers). This initiative mainly benefits input providers that import animal and plant material and fertilizers.

Bilateral free trade area agreements

Most bilateral agreements follow a general framework whereby traders and trade transactions are granted a most favoured nation treatment in both countries. Most trading countries are also allowed, under such agreements, to increase economic cooperation, to have special treatment in terms of tariffs and exchange of information, and to receive and make payments in convertible currency, among others (MoET, 2020). The most relevant and extensive bilateral agreements between Lebanon and countries in the Middle East and North Africa are listed in Table 9.

♦ **TABLE 9** List of bilateral agreements

Country	Date signed	Highlights
Egypt	September 1998	Free trade zone agreement.
Iran	October 1997	Framework agreement.
Iraq	April 2002	Free trade agreement.
	December 1999	Encourages economic, trade, technical cooperation and the exchange of expertise.
	April 1967	Lists tariff reductions and exemptions. Most favoured nation (maritime). Allows free zones.
Jordan	April 1967	Lists tariff reductions and exemptions. Defines rules of origin.
Kuwait	January 1996	Tariff reduction and exemption.
	September 1998	Defines rules of origin.
Morocco	March 1972	Encourages cooperation in agriculture, industry and the establishment of joint ventures.
Qatar	August 2000	Framework agreement.
Saudi Arabia	November 1971	Encourages transit trade, tourism, capital movement, most favoured nation (transport), cooperation in custom regulations. Includes a list of tariff exemptions (mainly agriculture, animals).
Syrian Arab Republic	August 1998	Reduces tariff rate on industrial products by 25 percent per annum.
Turkey	October 1991	Encourages trade, economic, industrial and scientific cooperation.
United Arab Emirates	April 2000	Free trade zone agreement. Lists tariff exemptions and reductions. Facilitates transport. Encourages trade and economic cooperation.
Yemen	November 2000	Encourages economic cooperation and the exchange of experience. Framework agreement (encourages trade).

Source: MoET, 2020.

Multilateral agreements

Greater Arab Free Trade Area (GAFTA) Agreement

Goods of Arab origin that are exchanged between the member states of the GAFTA are exempted from all customs, duties and taxes normally imposed on imports. The establishment of GAFTA supports the Arab trade environment and the intra-Arab trade movement, thus expanding opportunities for integration of Arab markets.

A key objective of the GAFTA agreement is to attract investments and improve the competitiveness of Arab products by removing tariffs, cancelling many procedures and fees, and reducing non-tariff barriers to a minimum. The agreement includes the following key points: i) products that cannot be traded for religious, environmental, security and health reasons are exempted from the Execution Programme of GAFTA; ii) all non-trade barriers (administrative, quotas and monetary) are removed.

Standing Committee for Economic and Commercial Cooperation of the Organization of Islamic Cooperation (COMCEC)

COMCEC is the main multilateral economic and commercial cooperation platform for the Islamic world, and it serves as a central forum for addressing common development problems in the region. One of the most important projects of the COMCEC is the Trade Preferential System among the member states of the OIC (Organization of Islamic Cooperation).

Free Trade Agreement with the European Free Trade Association (EFTA)

The main objectives of the EFTA are to achieve the liberalization of trade in goods, to increase investment flows and enhance trade in services, and to ensure adequate and effective protection of intellectual property rights among member countries. It also contains substantive provisions on investment and government procurement, competition and dispute settlement and covers certain aspects of services.

The agreement concerns trade in industrial goods, including fish and other marine products, as well as processed agricultural products. It takes into consideration the different levels of economic development between the EFTA states and Lebanon by providing for asymmetric tariff dismantling, particularly under bilateral agreements focused on basic agricultural products.

Lebanon-European Union Association Agreement

This agreement replaced the 1977 Cooperation Agreement, and it consists of three major components: political and security issues, economic and financial partnership, and partnership in social and human affairs. The entry into force of the Lebanon–European Union Interim Agreement on trade and commercial issues in 2003 formally triggered the start of the 12-year transition period to free trade, one of the fundamental planks of the Euro–Mediterranean Partnership (see below). The trade-related objectives of the Association Agreement focus on establishing the conditions for the gradual liberalization of trade in goods, services and capital and promoting trade and the expansion of harmonious economic and social relations between the parties.

Euro-Mediterranean Partnership

The Euro–Mediterranean Partnership Agreement allows reciprocal free trade on most industrial goods. It also liberalizes trade on a large basket of agricultural, fisheries and processed agricultural products. The partnership aims to establish a free trade area in the Mediterranean region. No new customs duties on imports or exports or charges having equivalent effect shall be introduced in trade between Lebanon and the European Community. Similarly, no new quantitative restriction on imports or similar measures shall be introduced.

The agreement aims to support Lebanon’s efforts to achieve sustainable economic and social development. In the case of agriculture, for example, the partnership supports policies to diversify production; provides assistance and technical training; promotes integrated rural development; strengthens the agricultural credit system; harmonizes phytosanitary and veterinary standards; and promotes the development of packaging, storage and marketing techniques and the improvement of distribution channels.

European Neighbourhood Policy (ENP)

The ENP governs the European Union's relations with 16 of its closest eastern and southern neighbours. It proposes priorities for cooperation suited to actual regional challenges, such as good governance, democracy, the rule of law and human rights, economic development for stabilization, security dimension, and migration and mobility.

A major objective is to strengthen the trade relationship between Lebanon and the European Union. To this end, both parties have established a joint working group to facilitate trade and reduce existing non-tariff barriers for goods and services. Enhanced cooperation and technical assistance on sanitary and phytosanitary standards will be provided, including cooperation with the Lebanese private sector, to adequately address these issues.

The ENP can help Lebanon increase its exports of agricultural products and maximize benefits from existing market access opportunities, which include fulfilling agricultural tariff-rate quotas under the Lebanon-European Union Association Agreement. A potential benefit of the ENP is that it will help to mitigate the impact of the Syrian crisis on trade, as well as helping to promote investment in labour-intensive sectors, such as agriculture and industry.

Commodity programmes (output subsidies)

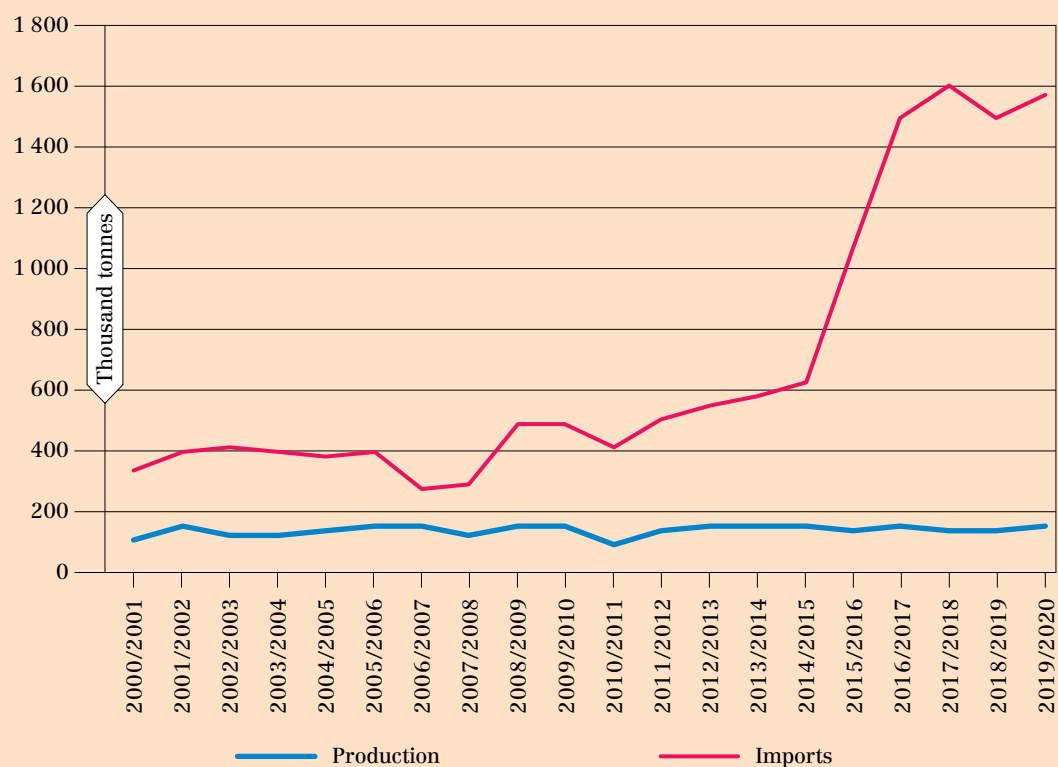
The Government of Lebanon supports the cultivation of wheat and tobacco through price support programmes. The government is involved in all elements of the value chain, from the procurement of commodities to setting production quotas and procurement prices and selling and/or exporting both commodities. The level of procurement prices exceeds international market prices, thus guaranteeing comparatively high production prices for farmers and incentivizing the allocation of their resources to wheat and tobacco production.

Wheat

Cereal production is essential for food self-sufficiency in Lebanon. The Government of Lebanon thus supports the cultivation of wheat to increase food security (MoE and UNDP, 2011). The Ministry of Finance manages the price support for bread and wheat. The price of imported wheat is lower than local farm gate prices. For example, the support price stood at USD 390 per tonne of wheat in 2014, 80 percent above the international average benchmark price (Khraiche, 2016). The government spent USD 94.8 million on wheat subsidies in 2009 (World Bank, 2010).

Figure 23 shows the development of wheat production and wheat imports over the 20-year period between 2000 and 2020. A stagnation in wheat production can be observed during the last two decades, as well as a significant increase in wheat imports since 2011. This indicates that, first, wheat subsidies failed to increase local wheat production and, second, that the level of local supply and demand are increasingly disconnected, leading the government to largely rely on wheat imports. Hence, the strategic goal of increasing food security by subsidizing wheat production has not been achieved.

◆ **FIGURE 23** Wheat production and imports, 2000–2020



Source: USDA, 2020.

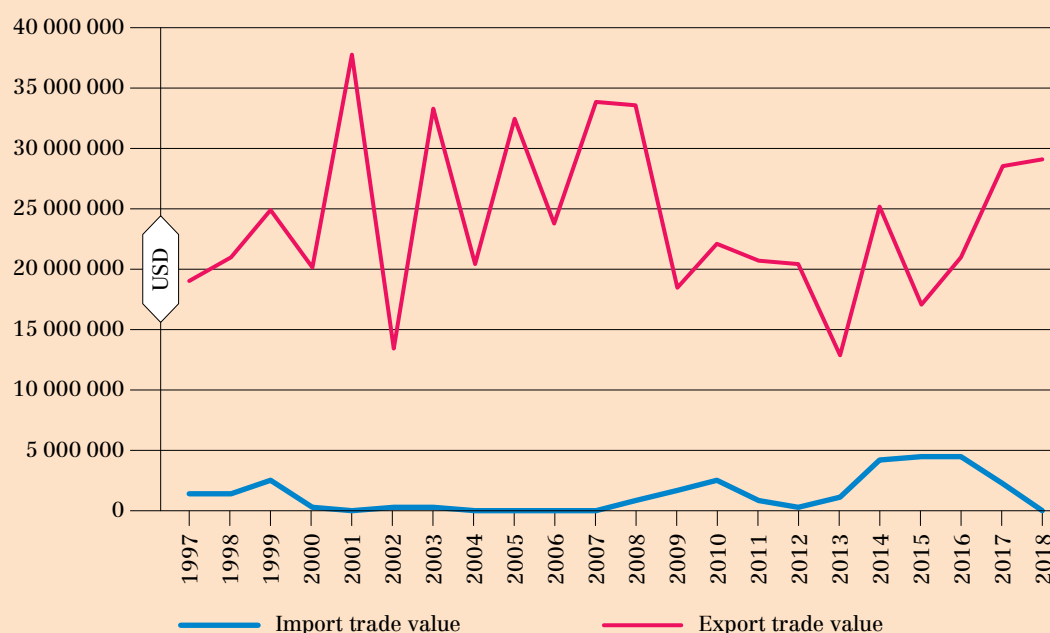
Tobacco

A price support programme for tobacco aims to motivate farmers to remain in the southern part of Lebanon, where most tobacco (57 percent) is produced. The MoF manages the programme through the *Régie Libanaise des Tabacs et Tombacs*. The *Régie* controls all elements of the supply chain by licensing tobacco farming, setting production quotas and procurement prices (World Bank, 2009; Hamade, 2014). The cost of tobacco subsidies is directly covered by import taxes on tobacco and amounted to USD 51.1 million in 2008 (World Bank, 2010). While the tobacco subsidy is an important source of income for rural households, 40 percent of Lebanon's 24 000 licensed tobacco farmers rely on other sources of income (Salti *et al.*, 2014; World Bank, 2009).

Lebanon exports most of its raw tobacco. The trade value of tobacco imports and exports is shown in Figure 24. In 2018, the export value of tobacco was USD 30 million, while the import value of raw tobacco is relatively low. Yet, while raw tobacco is exported, the Government of Lebanon imports processed tobacco, in the form of cigarettes and is a net importer of tobacco.

The demand for tobacco has increased since 2011. This development coincides with the influx of Syrian refugees to Lebanon and the breakdown of Syrian tobacco factories due to the Syrian civil war. While there is high demand for the export of Lebanese cigarettes to neighbouring countries, demand currently outpaces supply. In response, the *Régie* continues to invest in the tobacco processing plants under its supervision (Gulf News, 2016; Ghanem, 2019).

◆ **FIGURE 24 Tobacco exports and imports, trade value, 1997–2018**



Note: The missing data was generated using simple linear interpolation.

Source: UN, 2020.

Future pathways

Due to falling international prices, the price support programmes for tobacco and wheat production have become increasingly expensive (Salti *et al.*, 2014; World Bank, 2009). A reform of the subsidy programme could help to liberate public funds. Furthermore, phasing out the subsidies could motivate farmers to engage in market-oriented decision-making and to adopt cultivation choices that are more appropriate to the Lebanese context. Funds could be reallocated to other critical areas in the agricultural sector, such as infrastructure, technology adoption, food processing, food safety and non-invasive irrigation schemes. Reforming the price support programme would require an analysis of the long- and short-term impacts of different approaches on farmers and the identification of measures for budget reallocation that would support the sustainable development of the agricultural sector.

Input interventions

Agrochemicals

Since most agricultural inputs (fertilizers, agrochemicals, seeds, animal feed, etc.) are imported, the agricultural sector has been particularly affected by the rapid devaluation of the Lebanese pound on the parallel market and the consequent disruption of imports. As a result, farmers, who were already struggling with high production costs, were faced with a sudden and substantial increase in input prices in the months leading to planting and field operations. Suppliers now request full payment in cash, rather than the usual end-of-season payments. Some inputs were not available in the market in sufficient quantities, forcing many farmers to use their own seed at the risk of getting much lower yields, or to plant other crops. In the worst-case scenario, higher input prices combined with reduced availability could have resulted in many farmers missing the planting season.

The Ministry of Agriculture managed to distribute wheat seeds free of charge to farmers in many areas in time for the wheat-sowing season. However, the limited availability of vegetable seeds, coupled with high prices, could jeopardize the sowing of vegetables in early spring. Although an official devaluation is not being discussed for the time being, devaluation would make Lebanese products cheaper for buyers abroad and thus more competitive in export markets. Not everybody is suffering equally from the current situation. Entrepreneurs that rely mostly on domestic inputs and make payments in Lebanese pounds, such as producers of local import substitutes including compost and manure, are better off than others. Fishermen, who do not face competition from imports, are also not particularly affected.

Public extension services are spotty in Lebanon and the private sector is reeling from the impact of the financial crisis, with the result that plant health might be compromised, causing additional losses. Some of the laboratories for organoleptic and chemical testing are well equipped. However, all diagnostic material and chemicals are imported, and any disruption in the supply of material could affect the food chain. Current stocks are sufficient for a few months. Short-term assistance is needed to replenish the laboratories with material.

Access to land

The General Directorate of Land Registry and Cadastre in the Ministry of Finance oversees a land registry, but this seems to target the needs of construction businesses more effectively than the needs of agriculture and farming communities. Lebanon appears to lack zoning laws that divide land into areas in which certain land uses are permitted (or prohibited). Consequently, very small agricultural holdings (such as greenhouses) might be found in many locations, particularly close to urban centres, next to high rise buildings, while landowners wait for better compensation for their land.

Land is usually rented out for very short periods (often a single season) and compared to the value of agricultural production, can be extremely expensive. The actual rental price depends on the proximity of water sources, the presence of irrigation, whether crops are already being cultivated on the land, etc. Very brief rental periods discourage farmers from making any significant improvements in the land and a focus on short-term profit only. High rental rates increase fixed costs for farming households, even if they improve the financial wellbeing of landowners.

The registration of agricultural property remains optional. Farms run on a commercial basis, which are usually larger than non-commercial farms, are registered with the Ministry of Finance and are subject to income taxes. Small farms are not subject to income taxes but are not eligible for financial or social aid. Agricultural workers are not entitled to wage increases. Consequently, the social standing of non-registered farmers and hired agricultural labourers in the society is on par with domestic and other hired labour.

Many livestock farms are 'informal,' meaning they lack the certification that would allow them to operate legitimately. Laws and regulations requiring, for example, a minimum distance between settlements and the existence of water sources make it difficult for many livestock farms to obtain such certification. Inhabitants in rural areas can shut down uncertified livestock farms if they find them to be a nuisance in terms of noise, smell, etc. When clashes occur among farmers, the local department of the MoA can act as a mediator, for example by suggesting that beehives be moved to a different location on the farmer's property. Uncertified farms can still be supported by government programmes such as vaccinations, input distribution, etc.

There is very limited traceability of agricultural products back to partially or non-registered farms. Farmers, particularly smallholders, are reluctant to embrace traceability, even if it can be profitable, particularly for early adopters. Traceability would improve transparency in local markets as well as allowing more efficient exporting. In the longer run, however, if traceability is required from all farmers, there would be no profit advantage.

Regional initiatives

FAO implements three different regional initiatives in the North East and North Africa region. These initiatives reflect the priorities expressed by Member Countries and are based on the principles of country ownership, participation and partnership. They focus on innovations and enhanced collaboration between the countries of the region (FAO, 2020a; FAO, 2020c).

Water scarcity

This initiative aims to support the countries of the North East and North Africa region to cope with food and water insecurity and to assist in sustainable social and economic development under an unprecedented severe escalation of water scarcity.

The region is naturally exposed to chronic shortages of water and it will be exposed in the coming decades to a severe intensification of water scarcity due to several factors, including demographic growth efforts to increase food self-sufficiency to reduce vulnerability to import and price volatility, urbanization expansion, energy demand and overall socio-economic development (FAO, 2020b).

Building resilience for food security and nutrition

The objective of this initiative is to support countries to achieve their goals in food security and nutrition while being exposed to challenges of acute vulnerabilities, shocks and stresses. Specifically, the project focuses on building resilient food security and nutrition institutions, markets and production systems.

One of the projects carried out under this initiative seeks to establish a common understanding of the regional food and nutrition security situation among stakeholders in the countries affected by the Syrian crisis, including Lebanon. At the national level, projects focus on establishing efficient and sustainable food systems, with specific attention to reducing food losses and waste and ensuring sustainable access by households to safe, nutritious, and diversified food, as well as strengthening the capacity of households, communities, and agro-ecosystems to anticipate, absorb and recover from the negative impacts of human-induced and natural shocks.

Small-scale family farming

The overall objective of this initiative is to support countries in reducing rural poverty in the region through a cohesive programme for small-scale agriculture development. To address the challenges of small-scale agriculture, the initiative uses a three-pronged approach: i) improve the understanding of various types of smallholders, their labour dimensions, linkages with markets and their barriers, in order to support evidence-based policies and strategies, to prioritize interventions and better target public and private investment; ii) sustainably improve productivity, quality, value addition, social sustainability and viability of the agricultural sector; and iii) empower smallholders engaged in agriculture, forestry and fisheries, including through strengthening professional organizations and supporting the creation of decent rural employment opportunities for youth and women (FAO, 2020c).



4 Main challenges in agricultural development

KEY MESSAGES

- ◆ Eight main challenges were identified in the Lebanese agricultural sector, including agricultural competitiveness and productivity, constraints to trade growth, employment, public extension services (agricultural, finance and insurance and infrastructures), climate change and use of natural resources, and organization of the supply chain.
- ◆ Three cross-cutting issues were also identified: data collection and access, enabling regulations, and governance and social inclusiveness.

4.1 Agricultural competitiveness and productivity

The competitiveness of the Lebanese agricultural sector is constrained by challenges such as limited access to finance in rural areas, inadequate marketing systems and quality standards, insufficient agricultural technologies, water scarcity, and input use inefficiency, poor agricultural practices, and weak institutional support (Boyle, 2019). All these issues result in productivity constraints.

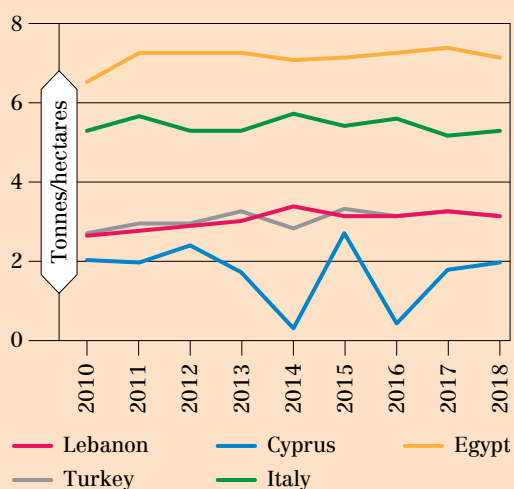
Crops and yields

In Lebanon, low value crops dominate (e.g., loss-making tobacco, olives) (Boyle, 2019). More than 50 percent of cultivated land is dedicated to olives, wheat, potatoes and barley, which account for less than 25 percent of total production value. Meanwhile, only 1.7 percent of cultivated land is used to grow tomatoes, which account for 9 percent of total production value (Mc Kinsey, 2019). Tobacco, olives, wheat and barley are mostly rainfed and rarely benefit from supplementary irrigation. In most cases, olive and tobacco producers must rely on another source of income.

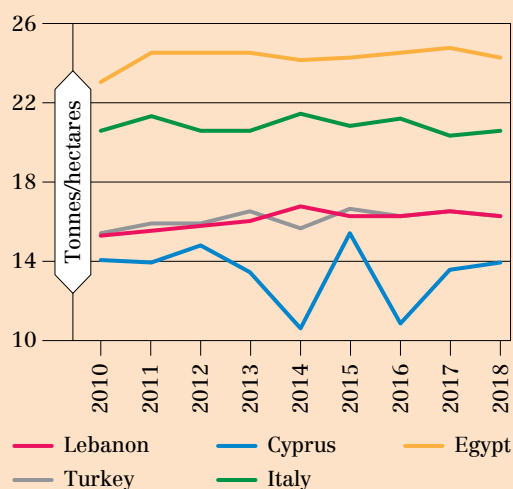
Lebanese agribusiness has grown over the past decade. However, this growth is mainly due to the positive performance of the food processing industry and not of the agricultural sector – which has stagnated (McKinsey, 2019). In fact, average crop yields have been languishing since 2010 in Lebanon, with only marginal improvements. In this period, cereals had the highest yield increase (10 percent), which is lower than the world average for the same period (14 percent). With respect to the other countries in the MENA region, Lebanon has higher yields in cereals and citrus fruits, but has lower than the regional average yields of other fruits, nuts, pulses, roots, tubers and vegetables (see Figure 25).

FIGURE 25 Yields by crop type

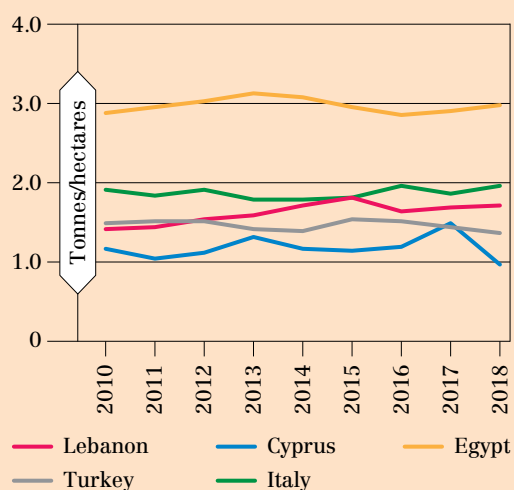
A. CEREALS



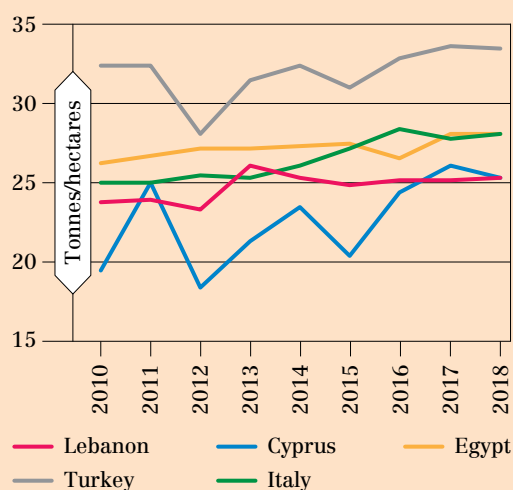
B. FRUITS



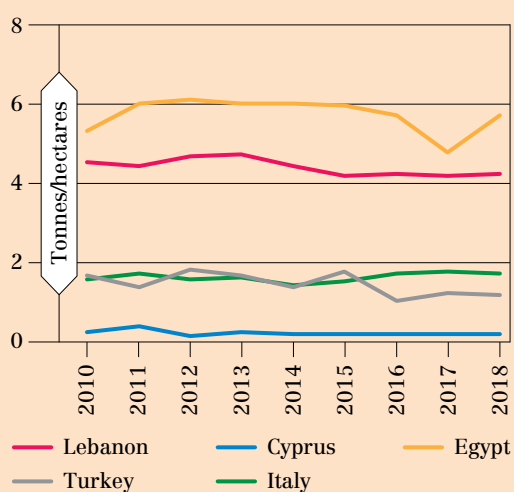
C. PULSES



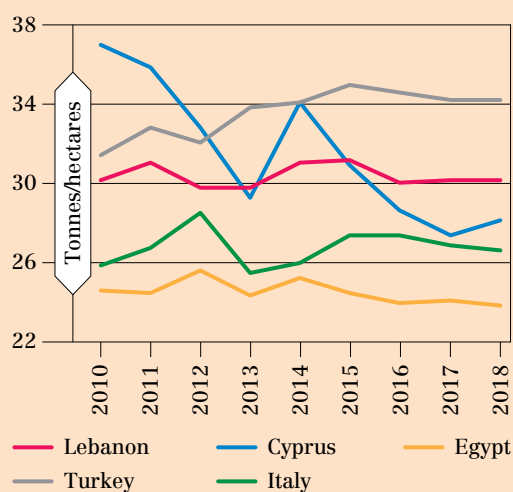
D. ROOTS AND TUBERS



E. TREE NUTS



F. VEGETABLES



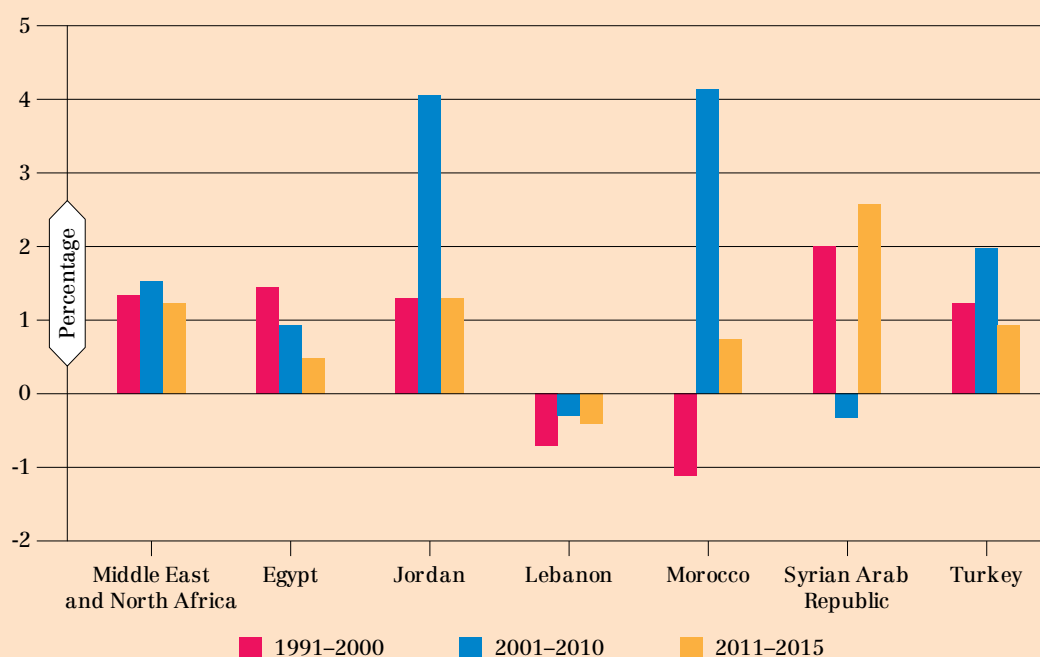
Source: FAOSTAT database (FAO, 2020d).

Total factor productivity (TFP)

From 1991–2015, the total factor productivity (TFP)⁴ in the MENA region remained constant (see Figure 26). However, Lebanon performed poorly compared to other countries in the region, especially Egypt, Jordan and Turkey. While the average annual TFP growth in these countries was positive, Lebanon had an average decrease of 0.46 percent. Between 2001 and 2010, there was a substantial growth in TFP in some MENA countries, like Morocco (+4.1 percent), Jordan (+4 percent) and Turkey (+2 percent), but a modest deceleration in Lebanon (-0.3 percent) and the Syrian Arab Republic (-0.4 percent).

The decreasing rate of TFP in Lebanon suggests that the constant or slightly increasing crop yields are probably due to input consumption, particularly of chemical fertilizers, rather than technical efficiency (Boyle, 2019). Lebanese crops also suffer from poor management and inefficient irrigation systems, lack of extension, ineffective early warning systems, ill-adapted plant material, poor agriculture practices in general covering all systems (greenhouses, open field, orchards) and limited farmer knowledge around integrated crop production, among others.

♦ **FIGURE 26** Agricultural total factor productivity growth in Lebanon since 1991



Source: IFPRI, 2019.

Farm holdings and labour productivity

Low productivity and competitiveness are also linked to the structure of the agricultural sector, which is fragmented across small- and medium-scale agricultural holdings. The total cultivated area in Lebanon (230 995 ha) is distributed over 165 370 agriculture holdings, with a relatively small average farm size (less than 1.4 ha). The average farm size is significantly different between regions; it reaches 2.9 ha in the Beqaa and only 0.66 ha in Mount Lebanon.

⁴ Total factor productivity (TFP) is the portion of output not explained by the amount of inputs used in production.

Some farms are market oriented while others are subsistence farms, which mainly produce food to support the household. Both farm types face high production costs. The fragmented structure of farm holdings and high production costs makes the allocation of production resources difficult and ultimately leads to production inefficiencies. High production costs are a major challenge for the sector, reducing the profitability of farming activities, while ineffective transportation networks and high operating costs challenge the development of the agricultural sector and of rural areas as well as the competitiveness of goods, in both internal and external markets (PSDP, 2020).

Agricultural labour productivity in Lebanon is higher than average labour productivity in MENA. Official statistics show that there has been a decline in the number of nationals working in agriculture in Lebanon. This combined with an increase in agricultural production (especially of high-value crops) during the last three decades, has resulted in a significant increase in the agricultural value-added per worker (World Bank, 2018). However, the fact that the number of informal foreign workers may have increased could put this last observation into perspective.

Land use

Arable land has increased only modestly, remaining at an average of 130 000 hectares since the beginning of the century and, because yields are not growing significantly, the overall agricultural production remains constrained (World Bank, 2018).

There are various reasons for the modest increase in crop yields. Land tenure problems are associated with agricultural land degradation in Lebanon. The Lebanese land market is inefficient, with large registration and transaction costs and unclear roles and responsibilities for managing common lands. This leads to over-exploitation of lands for grazing, quarrying and agriculture (World Bank, 2018). Communal lands are rarely used for agricultural crops, mostly serving as forests and rangeland. The forests are used for fuelwood harvesting or pine nut production. Rangeland is used for grazing small ruminants.

Lebanon is small and arable land represents almost 30 percent of total land area, mostly due to topography. The increase in land prices is mostly due to fragmentation caused by inheritance laws, which reduces the size of holdings from one generation to another. Moreover, there is no strategic land use planning process that aims to protect arable land.

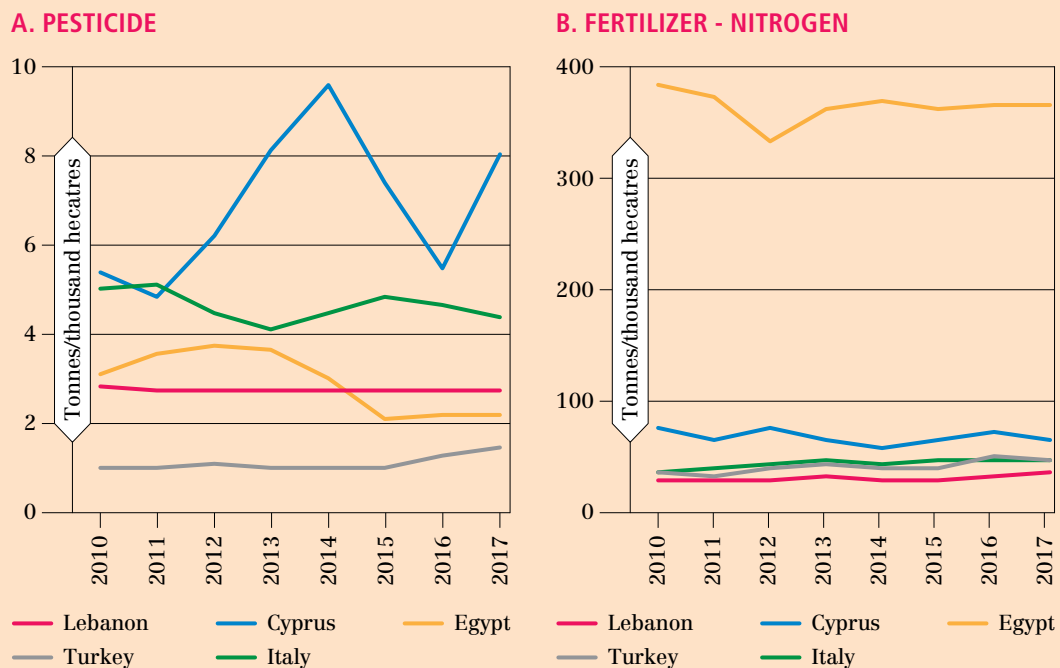
Land scarcity and the lack of arable land varies across regions and has increased the price of land and likewise the cost of production. The fragmentation of land into many small farms lots decreases the possibility of achieving economies of scale and the small volumes of production are obstacles to export. These conditions are exacerbated by low investments in the sector, limited access to financing, poor infrastructure, and a lack of modern organization of the supply chain (e.g., organized wholesalers or cooperatives) (PSDP, 2020).

Input use

Agricultural inputs were widely available to farmers prior to the economic crisis. This, combined with insufficient extension and advisory services, led to the overuse of fertilizers and pesticides. This in turn caused the collapse of sugar beet production in the Beqaa and the deterioration of citrus production, which was replaced by banana in the south.

As in Turkey, the use of pesticides in Lebanon has remained relatively constant throughout the years (see Figure 27). The rates of application are lower than in Cyprus and Italy and slightly higher than in Turkey. On average, the number of pesticides used in Lebanese agriculture was around 2.8 tonnes per 1 000 hectares between 2010 and 2017.

◆ **FIGURE 27** Country comparison of pesticide and nitrogen use in the agricultural sector



Source: FAOSTAT database (FAO, 2020d).

Historically, a significant number of farmers living near borders obtained their inputs (including fertilizer, seeds and pesticides) from the Syrian Arab Republic, where these inputs were subsidized. However, the conflict cut the supply of fertilizers to Lebanon and farmers have been forced to seek alternative and more expensive sources, leading to an increase in prices.

Input providers have long benefited from the absence of an efficient and active extension service in Lebanon, which has allowed them to promote the intensive use of chemicals to farmers. Most farmers are not aware of integrated pest management (IPM) and input providers refrain from promoting the practice, despite attempts by the MoA to promote pest management. The MoA has provided bio-pesticides and pheromone traps to farmers for free. Mating disrupting pheromones for apple cod were also once distributed.

Water scarcity

Water scarcity and severe water stress are significant concerns in Lebanon. However, while water scarcity may be a challenge at the national level, it may be a less pressing concern to individual farmers, who are able to access enough water from groundwater resources (Bahn *et al.*, 2019). This is supported by the fact that a relatively high share of agricultural land (65 percent) is irrigated. Nevertheless, water is generally only available at a high cost and water control and conservation are necessary to ensure the long-term sustainability of agriculture.

Irrigation schemes in Lebanon are inefficient; most distribution channels need rehabilitation and are not pressurized, leading to large losses through evaporation and leakages. This hinders any initiative to regulate and automate irrigation according to the crop-climate demand. Surface water is highly polluted in both the Akkar and Beqaa plains, which causes land and soil degradation and reduces the quality of agriculture products.

Mechanization

The high cost of energy and electricity and the small size of land and production limit the ability of farmers to invest in technology, which affects productivity (PSDP, 2020). All farming machinery is imported. Because of the large number of smallholdings and the high cost of agricultural machinery, contracted services are common. These are run either by agricultural entrepreneurs or, less commonly, through cooperatives, which carry out multiple operations (land preparation, transport, spraying and combine harvesting) for hire. The food processing equipment is both imported and manufactured locally. However, the local equipment also contains imported components (typically pumps and motors).

Lebanon's topography is also a challenge for mechanization. Terraced agriculture on mountain slopes blocks the use of some agricultural machinery. Moreover, orchard design, vigorous rootstocks and tree training forms can hinder mechanized spraying, pruning, or harvesting. Organizational structures are a concern as well. The lack of effective cooperatives and farmers' associations that would reduce the costs of machinery, inputs and agricultural services is a major constraint.

Lebanon is considered to have great potential for adopting precision agriculture and digital innovations (Bahn *et al.*, 2019). Several private sector vendors offer digitally-enhanced precision agricultural technologies and larger, more profitable farms are already introducing such technologies in their production systems (Bahn *et al.*, 2019). For example, some vineyard owners are adopting drone-based technologies to assess growing conditions and vine performance.

Digitalization in the agricultural sector could be enabled through mobile subscriptions, which in Lebanon is quite low (72.3 subscriptions per 100 people while the world average is 106.8). This could be due to low mobile connectivity, especially in rural areas. However, the fixed broadband subscription is higher than the world average (21.3 subscriptions per 100 people compared to the 13.7 world average). Around 78.2 percent of the Lebanese population uses the internet, compared to 49.4 percent of the world population (Bahn *et al.*, 2019).

4.2 Constraints to trade growth

The main factors limiting the growth of trade in Lebanese agricultural and food products include limited access to international markets, product quality and certification, inadequate trade infrastructure, lack of competitiveness, lack of trade agreements, and difficulties in substituting imported goods with domestic products.

There is little access to international markets for Lebanese agricultural and food products. This is especially true for high-value products (Boyle, 2019) and is mainly because the food supply chain is not able to comply with internationally-recognized quality and safety standards, both at the harvest and post-harvest stages. This is due to a lack of accreditation and certification systems and little traceability along the supply chain. Other constraints relate to the absence of precooling and cooling infrastructure at shipping points, and the packaging and sorting systems. Concentration on a narrow product range for export, combined with dependency on markets in the Gulf, other Arab states and the Lebanese diaspora is another limiting factor. The risks inherent in this market concentration were exacerbated by severe transport constraints brought on by the Syrian crisis (Maddock, 2019).

The quality of Lebanese products is a major issue, which affects their international trade potential. At the farming level, quality concerns are related to chemical usage (e.g., pesticides), antibiotics, water quality and sanitary and phytosanitary (SPS) norms. The non-adherence of Lebanese farmers to quality standards is likely due to the lack of enforcement of quality regulations for the internal market and limited testing of product quality (PSDP, 2020).

Poor agricultural practices (e.g., use of wastewater for irrigation, excessive use of pesticides) have a negative impact on product quality. At the level of the food industry, the investment in quality and safety strategies is quite low, estimated to be about 7 percent of the total budget of companies.

The support for quality assurance from the international community, coupled with assessment work conducted by national laboratories (Lebanese Agricultural Research Institute, Industrial Research Institute and the Lebanese University), increased the awareness and interest of producers in the importance of quality schemes. However, Lebanon still lacks an accreditation system to meet export requirements (PSDP, 2020). Finally, farmers (and other actors in the value chain) often lack knowledge about the quality standards required for export, both at the farm level (product quality) nor at the post-harvest (sorting, packaging, transport, cooling and processing) level.

Another issue is the mismatch between local varieties and demand in export markets. Farmers often do not grow varieties for which there is export demand. Rectifying this would require replanting and/or grafting, with costs and loss of income as the new saplings, rootstocks and grafts grow to maturity (Maddock, 2019). Exports are also constrained by a lack of investment in marketing Lebanese products. Design, packaging, branding and adaptation to international consumers' tastes is often overlooked.

Insufficient infrastructure for export is also a significant barrier to trade. For example, there are no standardized procedures for shipment (packaging and cooling), and this affects product quality. Additional challenges include the lack of proper procedures for sorting, packaging and cooling agricultural goods; the limited capacity of laboratories to conduct quality control for imported and exported products; the limited capacity to quarantine to control pests and parasites; the absence of infrastructure to produce high quality plant material and animal breeds; the limited capacity to conduct plant certification, propagation and early warning, which requires special labs, software, meteorological stations, outreach system, etc.

Lebanon also suffers due to strong competition from neighbouring countries (mainly Turkey, Egypt, Morocco, Tunisia and Israel), which produce a similar portfolio of agricultural products. Increasing the diversity of available products with respect to these competitors could open new market opportunities for Lebanon.

Agricultural trade is also constrained by a lack of trade agreements with potential trade partners. Many existing trade agreements are old and ineffective, and need to be renegotiated (PSDP, 2020).

4.3 Employment challenges

The Lebanese agricultural labour market is characterized by high costs, compared to the competing countries in the region, and poor working conditions. A lack of decent working conditions excludes better qualified labourers, with the result that only relatively unskilled labour is available, leading to low productivity (PSDP, 2020).

The public perception towards technical and vocational education in agriculture is quite negative; farming is considered as the last option for students who fail at academia. These factors make the agricultural sector risky and unattractive. Moreover, the high influx of Syrian refugees has added pressure to the labour market. Agriculture is the main sector where displaced Syrians are legally able to work; this has increased unemployment among Lebanese farmers, especially in disadvantaged areas (PSDP, 2020).

Gender issues

In rural communities, there are often clear-cut divisions of labour based on gender. Female agricultural workers in Lebanon are less likely to own land; they tend to manage smaller parcels than male farmers and they generally have less access to productive resources and markets.

Women, especially in the most disadvantaged areas, face disproportionately high levels of unemployment and vulnerability. Women's labour force participation was 26.5 percent in 2017, compared to 75.7 percent for men. The estimated earned income for women is four times lower than for men and female unemployment is estimated to be twice as high as male unemployment (PSDP, 2020).

Since 2000, female employment in agriculture has constantly increased. Lebanese women working in agriculture were identified as a vulnerable group by the Ministry of Agriculture (MoA) in its 2015–2019 strategy; their empowerment and engagement in agriculture-related investments was emphasized as crucial to increasing productivity and competitiveness (PSDP, 2020).

Youth and children employment

Youth unemployment rates are high, ranging between 17 and 35 percent according to different estimates. Economic and educational participation among youth also needs improvement, with 27 percent of female youth and 16 percent of male youth in Lebanon neither employed nor in school (PSDP, 2020).

According to the Lebanese Code of Labour, the minimum working age is 14 years for safe work and 16–18 years for jobs that are considered less safe, provided the children are offered full protection. Decree No. 8987 specifically stipulates that minors should not be employed in agricultural activities that require operating farming machines, handling pesticides, fertilizers, or poisonous plants, climbing trees or ladders, using sharp tools, or working more than four hours per day. Despite these laws, it is estimated about 60 percent of child laborers work in the agricultural sector, especially in the Akkar, Hermel and Baalbeck districts (FAO and UNICEF, 2019).

A survey of 422 farmers revealed that women and children make up a sizable proportion of the labour force on farms (43 percent women, 30 percent children and 27 percent men). Of the full-time child workers, girls comprise between 32 percent (Akkar) and 64 percent (Beqaa). Eighty two percent of full-time child labourers on Beqaa farms are out of school and, therefore, fall under the definition of 'child labour' (FAO and UNICEF, 2019). According to the survey, children aged 5–11 are the least likely to be employed and, if they are employed, their tasks are peeling, or sorting. Children aged 12–13 tend to be involved in weeding, harvesting and transportation (FAO and UNICEF, 2019).

Most full-time working children in Lebanon are of Syrian nationality (FAO and UNICEF, 2019). According to a survey of 12 780 Syrian refugees, 75 percent of the working children of refugees were employed in agriculture. Harsh working conditions were commonly experienced by children and 30 percent reported being injured at work. On average, the workday was 6.7 hours long for males and 6.4 hours for females (Habib, 2019). Only 18.3 percent of these children were enrolled in some form of schooling. Around 51 percent of the children not attending school cited 'work' as the main barrier to education. Among the working children, about 58 percent reported giving all or part of their wages to their parents (Habib, 2019).

4.4 Agricultural services

The Lebanese Ministry of agriculture delivers extension through 31 field offices across the country's 27 districts. Total staff members amount to 135 people who are responsible for multiple tasks in addition to extension, including inspections, statistics, phytosanitary control, veterinary control and implementing ministry support policies such as the distribution of inputs. Despite a structure being in place, extension has no dedicated budget line, depending on the overall ministry budget for fuel, stationery, printed materials etc. Because of the limited availability of fuel, many activities have been cancelled across the country (Goss, 2019).

The multifunctionality of the field offices significantly reduces the effectiveness of the extension services. The staff is often unqualified or lacking in experience. Moreover, ministry requirements such as the collection of data or implementation of policies, regularly take precedence over the demand of extension (Boyle, 2019; Goss, 2019).

The inefficiencies of the public extension service, which lead farmers to mainly receive advice through input providers, constrain the adoption of good farming practices. At the farm level, the selection of crops is not optimized, and this limits the Ministry of Agriculture's capacity to design a strategy with a clear perspective on crops. As a result, investments, support, and subsidies do not target the most promising crops, agriculture systems or best practices. Moreover, the use of fertilizers, pesticides and water resources is suboptimal and harvest and post-harvest techniques are outdated and even harmful (McKinsey, 2019).

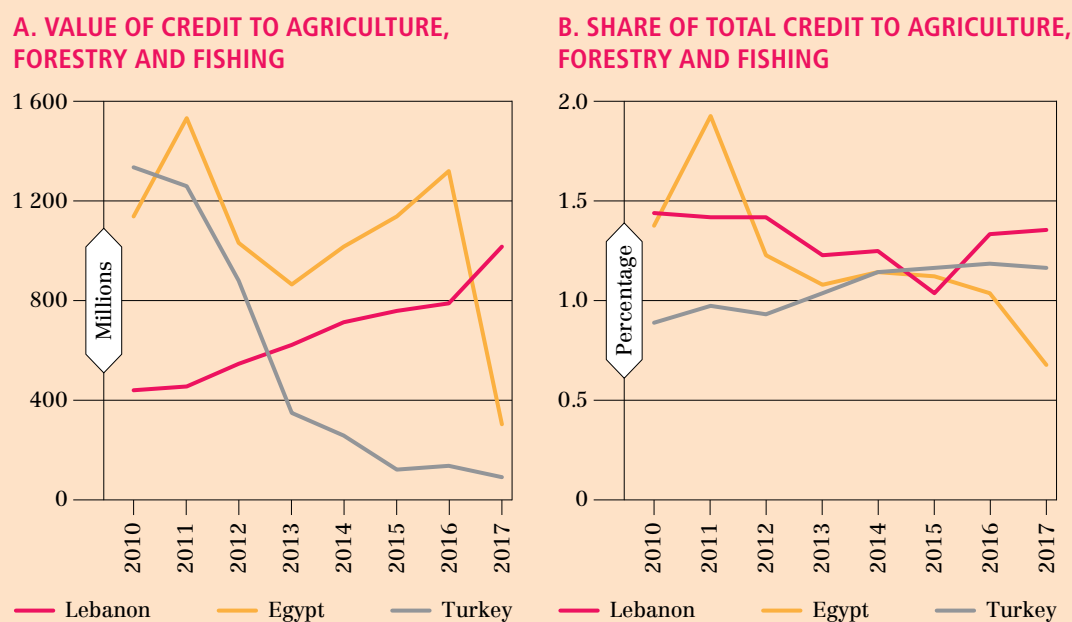
The agricultural education and training system in Lebanon is weak and there are few links between research, extension, and education/training. As a result, the quality and performance of practical research, extension and education are below international norms (Boyle, 2019).

4.5 Agricultural finance and insurance

A lack of access to loans and credit hinders the growth of agricultural and agrifood businesses in Lebanon. The financing available for agriculture is about 1.19 percent of the total loan portfolio of the Central Bank, whereas international benchmarks suggest that it should be about 5 percent. Most agricultural loans range between USD 20 000 and USD 33 000 and only 0.37 percent of agricultural lending goes to unsubsidized loans.

The value of credit to agriculture, forestry and fishing in Lebanon has increased over the years, from USD 298 million in 2010 to almost USD 785 million in 2017. Comparing trend to other countries in the region, Lebanon's value of credit has been much lower than Egypt's but higher than Turkey's since 2013. The share of total credit to agriculture, forestry and fishing in Lebanon has been slightly increasing since 2012, although the variation has been relatively small (between 0.8 percent and 1.2 percent). The share of total credit has been decreasing in Egypt and Turkey, however (see Figure 28).

◆ **FIGURE 28 Country comparison of agricultural credit**



Source: FAOSTAT database (FAO, 2020d).

Credit from suppliers

As mentioned previously, different types of creditors provide loans for a variety of farmers' expenses. Loans from formal financial institutions (e.g., Kafalat) are mainly used to cover large investments, while informal debt is mostly used to cover operational costs (e.g., seeds, fertilizers and pesticides), which are financed by input suppliers.

A farmer usually receives credit from a single input supplier for up to USD 5 000 worth of inputs. The amount varies, depending on the farmer's credit history, their relationship with the input supplier, their reputation, and the size of their farm. A relationship of trust is crucial. Farmers describe input suppliers as being flexible, practical, and realistic in their demands. They offer credit without (declared) interest rates or penalties in case of late payments. They are easy to access and react quickly. In addition, input suppliers are flexible in terms of payment schedules; they do not impose on farmers a tight schedule or deadline. Suppliers understand the farm cycle and set realistic due dates. In fact, when asked about possible financial products, farmers stressed that flexibility in payment scheduling based on an understanding of their revenue cycle would encourage them to approach a bank or financial institution for a loan. However, over-reliance on input suppliers creates a relationship of dependency that could ultimately harm farming and food production, especially if the suppliers push farmers to use more inputs than they need (IMF and World Bank, 2016).

Farmers with very small holdings are unable to access loans since both banks and input suppliers refuse to lend to them (IMF and World Bank, 2016; FAO and MoA, 2010). They may receive credit from traders and moneylenders in the wholesale market to cover operational costs. These sources usually provide only small amounts of credit and are the farmers' last resort for covering operational costs. This clearly implies that farmers have little bargaining power with these agents. Moneylenders often impose extremely high interest rates and require collateral in the form of bank checks or mortgages. Similarly, wholesale traders give credit to farmers with a collateral condition. In return, the farmers commit to giving

their crops to the trader until they can pay off the debt. Farmers try to avoid borrowing from traders since they can control crop prices and hence the credit management (IMF and World Bank, 2016).

Barriers to formal credit

Bank loan interest rates tend to be prohibitively high for farmers, especially smallholders (McKinsey, 2019). Many small farmers do not own property or any form of capital to use as collateral and this is a barrier to obtaining loans. Most farmers use their own resources to start their businesses or rely on informal loans from family members or friends. High interest rates mean that small farmers avoid unsubsidized loans and financial institutions.

Banks impose difficult collateral conditions on the ownership of property: farmers are required to own the property fully and property shares are not accepted. Land is often not accepted as a collateral for two reasons: Lebanon's land registry system does not provide clear evidence of ownership and there are high transaction costs involved in selling agricultural land in case of default. Farmers are also concerned about offering their land as collateral guarantees considering the high risks of losing their property if they default.

Farmers with medium-sized holdings, who have another source of income besides agriculture, are the ones who most often apply for subsidized loans, specifically the Kafalat Trees loan or the Kafalat Small Agriculture loan. These loans require that the farmers take on mortgages over the duration of the loan, which ranges between seven and ten years. Very few farmers can repay the loan solely from their farm revenue; they may also need to draw on their salaries from other jobs and agricultural activities and take on informal debts.

The small size of the typical farm in Lebanon and the lack of familiarity with agricultural credit increases the costs of administering bank loans. The high level of market risk and the volatile prices of agricultural outputs further increase the reluctance of banks to venture into farming credit. A lack of agricultural expertise, the absence of specialized products and risk management plans for agriculture also keep banks away. The fact that most of the shares of credit institutions are owned by the government deter any private sector capital inversion. Finally, the banks hesitate to provide loans to farms due to weather fluctuations, which is perceived as a high-risk factor as it negatively affects yield stability (and by extension, non-performing loan rates). In the end, farmers are not sufficiently insured against natural risks, given the absence of efficient collective insurance schemes (McKinsey, 2019).

4.6 Agricultural infrastructures

Investments in infrastructure, such as roads, irrigation technology and post-harvest storage, directly affect agricultural output per capita and output per unit of land. Such investments can occur either through private or public sector actors, public-private partnerships, or foreign direct investment (FDI). The public sector in Lebanon plays a crucial role by investing in essential infrastructure as well as in forging public-private partnerships to ensure capital investments (World Bank, 2018).

Historically, Lebanese traders exported agricultural and food goods to the Gulf countries and imported fertilizers on roads passing through the Syrian Arab Republic. However, the closing of the borders between Lebanon and the Syrian Arab Republic due to the war constrained the transport of goods to and from Lebanon by land. As a result, trade had to shift to sea and air transport for both exports and imports (Maddock, 2019).

The level of transport infrastructure and safety in Lebanon is quite poor. The quality of port infrastructure in Lebanon is lower than average for the MENA region and it has deteriorated since 2010. Air transportation in the MENA region increased significantly

between 2000–2018, more than in the European Union, but in Lebanon it dropped slightly. The overall quality of trade and transport-related infrastructure in Lebanon has been declining since 2010 and, in 2016, Lebanon had the lowest score in comparison to world, European Union and MENA averages. According to McKinsey (2019), not only is the transport infrastructure insufficient, but also storage facilities. In particular, the shortage of cold storage facilities often forces farmers to discard unsold crops, causing large food losses.

The National Water Sector Strategy (NWSS) indicates that the water sector in Lebanon has both infrastructural and management shortcomings, highlighting that more than 50 percent of the transmission and distribution networks have passed their useful lifespan. A large share of the current irrigation network consists of open channels, which makes irrigation efficiency quite poor (World Bank, 2018).

When it comes to water infrastructure, the three main issues are that: i) water resources are constrained and their exploitation is suboptimal, but at the same time, water demand is growing fast; ii) water distribution systems and networks are inefficient and poorly maintained, leading to high water loss and interruptions of supply; and iii) wastewater networks are limited and there is a severe shortage in treatment efficiency (Bassil, 2010).

Water is not metered in Lebanon and water is low-cost, mainly for socio-economic reasons. Water metering requires pressurized distribution systems and given the outdated open channels; it is impossible to price water based on consumption. To solve these problems, there is the need to develop alternative irrigation tariff structures based on irrigation schemes, where volumetric metering would be the preferred solution where possible. Water consumption should be reduced by improving the efficiency of existing and planned irrigation schemes, as well as optimizing on-farm irrigation techniques.

4.7 Climate change and use of natural resources

The agricultural sector in Lebanon is predicted to face an acceleration in challenges from climate change in the coming decades. Due to climate change, the deterioration of soil conditions and the loss of biodiversity and water scarcity are expected to accelerate. Lebanese agriculture will likely face higher production costs for fuel, fertilizers, irrigation, and other actions that will be required to adapt to such challenges. Shepherds are highly vulnerable, especially to desertification, which may reduce the carrying capacity of grazing lands severely. A lack of access to financial resources and limited capacities will make it difficult for Lebanon to address the challenges posed by drier soils and higher water demand (Bahn *et al.*, 2019).

Rainfed crops, such as cereals, are particularly vulnerable, as are crops that rely on water for irrigation such as summer vegetables and fruit. Other crops, such as potato, tomato and cherry, might be affected by an increase in temperature. A growing number of pest outbreaks are likely to affect olives, apples, peaches, apricots, tomatoes and other fruit. Honey production, fisheries and small ruminants are also vulnerable to climate change.

CO₂ emissions

The contribution of the agricultural sector to total Lebanese CO₂ emissions is lower than the world and MENA average. However, while at the world and MENA level, agricultural emissions have decreased with respect to total emissions, in Lebanon they have remained quite unchanged with a slight increase from 2014 onwards. Most emissions are from enteric fermentation from dairy production, the excessive use of fertilizers, the burning of agriculture residues and the untreated disposal of manure.

Natural hazards

Rainfall is becoming less predictable as the onset and duration of the rainy seasons become more variable. The cold season has started to come later in the year, disturbing the seasonal calendars of crops and decreasing their productivity (Abdallah *et al.*, 2018). Climate change is increasing the risk of extreme weather events, including droughts, floods and heatwaves. Average temperatures are expected to increase by up to 4.8 percent by 2100 in the MENA region (Bahn *et al.*, 2019).

Lebanon is prone to many natural hazards due to its geographical location. Agriculture is particularly affected by natural hazards, especially weather-related events. The major risks to the agricultural sector come from floods, storms, wind, hail, cold and heat waves, and late frosts, which affect both plant and animal production.

The ranking of agricultural risks and the cost of the damage are as follows: floods (USD 330 million) are considered the most damaging, followed by cold waves (USD 241 million), winter storms (USD 212 million), heavy rainfalls (USD 177 million), heat waves (USD 149 million), wildfires (USD 125 million), heavy wind (USD 93 million) and landslides/land erosion (USD 74 million). In a worst-case scenario, the damage to Lebanese agricultural sectors in a year could reach USD 605 million (Abdallah *et al.*, 2018).

The greatest combined damage across all governorates is estimated to be the greatest during winter (USD 131 million), followed by summer (USD 129 million), autumn (USD 96 million); the lowest average losses were experienced in the spring (USD 29 million) (Abdallah *et al.*, 2018).

Biological hazards

Crop damage and the death of animals are regular occurrences. These can cause significant household income losses, the scale of which is often underestimated. The most frequent vegetable pests and diseases are late blight, potato blight, tomato leafminer (*Tuta absoluta*), *Fusarium* and mildew. Fruit tree pests and diseases include apple scab, Mediterranean fruit fly, Olive fly, Apple maggot, *Leptoglossus*, pine shoot beetle and witch broom *Phytoplasma* (Abdallah *et al.*, 2018). The risk of fruit flies is exacerbated by climate change, with frequent outbreaks affecting local crops.

Animal diseases in Lebanon include influenza, glanders and lumpy skin disease (LSD). These are known to cause mortality and can trigger export restrictions that lead to significant losses in household income. There is emerging evidence to suggest that climate change effects, such as rising temperatures and more variable rainfall, is causing increased uncertainty regarding the occurrence of animal diseases (Abdallah *et al.*, 2018).

Water

Agriculture consumes more water than any other sector in Lebanon (65 percent of water is used in agriculture), therefore water scarcity is a major concern for agricultural production (Bassil, 2010). Lebanon's water stress levels continue to increase, calling for the active management of water usage in agriculture to ensure sustainability (McKinsey, 2019). Currently, most underground water resources are at risk from pollution and surface water is subject to considerable evaporation (Boyle, 2019).

In the major agricultural plains, most water for irrigation is pumped from underground, whereas in Mount Lebanon and the northern part of the country, surface water prevails. Surface water is harvested from water springs, rivers and earth hill-lakes, which are developed by farmers to catch surface water from snowmelt and rain. The most irrigated regions include Central and West Bekaa, Saida-Zahrani plain, Danniyeh and northern Mount Lebanon.

Inefficient water usage is very common; most distribution channels are not pressurized and are subject to leakage and evaporation. Some farms face water shortage, while others are over-watered. Pressurized irrigation (drip and sprinkler) is prevalent in the Bekaa valley, whereas surface or gravity irrigation predominates in North Lebanon and Mount Lebanon. Sprinkler irrigation is exclusively used for annual field crops, such as cereals, alfalfa, corn, potatoes and onions, while drip irrigation is common in fruit orchards and for the field production of vegetable and ornamental crops. In total, surface irrigation is used in half of the irrigated cropland, while drip and sprinkler irrigation account for 30 and 20 percent, respectively. Irrigation scheduling follows water availability rather than soil characteristics or plant and climate demand, even when pressurized irrigation is used.

Water salinity is common in coastal areas, especially where there is a heavy dependence on underground water; these areas face sea intrusion, due to heavy pumping from wells for both domestic and agricultural usage.

Biodiversity

Lebanon's agrobiodiversity, together with its climate and soil diversity, allows the production of more than 60 types of crops and more than ten livestock products (McKinsey, 2019; Abdallah *et al.*, 2018). A wide variety of agroclimatic zones, ranging from subtropical areas to temperate zones, greatly expands the spectrum of production and cultivation techniques, allowing for the cultivation of a wide variety of crops that normally grow in both cold and tropical countries. Lebanon is also characterized by its rich forests, especially cedars, pines and oaks (Abdallah *et al.*, 2018). Lebanon's forests cover 13.4 percent of the territory (FRA, 2005). A biodiversity hotspot, Lebanon can claim more than 2 600 species of plant, 92 of which are endemic. It is also an important bird area as Lebanon is located on the main route of migratory birds between Africa, Asia and Europe.

The National Biodiversity Action Plan (NBSAP), adopted in 2016, has established several marine and terrestrial protected areas based on Aichi targets. Several laws are being implemented to enhance biodiversity conservation and regulate the exploitation of biological resources.

Lebanon has started negotiations to join the World Trade Organization (WTO) and it has observer status in the International Union for the Protection of New Varieties of Plants (UPOV). To join the WTO, several national laws need to be enforced. Lebanon is not currently a signatory to the Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement. This status hinders the protection of local cultivars and varieties and local know-how. Moreover, the absence of copyright or patent laws hinders the development of plant and animal breeding at the national level. Nevertheless, Lebanon acknowledges the Bonn protocol for access and benefit sharing of agrobiodiversity. Lebanese legislation on intellectual property complies with the requirements of the TRIPS Agreement. However, certain elements will need to be added or amended to allow Lebanon to benefit from exceptions and other limitations that are allowed under international conventions referred to in the TRIPS Agreement.

Soils

The loss of soil fertility, due to chronic malpractice, is a major problem for Lebanon. Farmers tend to use monocropping, instead of appropriate crop rotation, and to favour the overuse of fertilizers, especially nitrates, coupled with improper irrigation management, which lead to soil salinity and the pollution of underground water. Excessive ploughing in dry areas also leads to soil compaction and erosion, whereas conservation agriculture is beneficial in semi-arid regions. Composting organic residues whether from plant or animal origin is

very rare; the direct application of manure and burning of agriculture residues are favoured instead. Planting green cover or green mulch is very limited.

According to the 2019 National Action Programme (NAP) report, the main drivers of land degradation include changes in the human population, policy and political changes, deep societal changes, climatic factors, land tenure and poor management of key natural resources and ecosystems.

4.8 Organization of the supply chain

Farming systems

Most farmers in Lebanon inherit their profession and their land from relatives and do not benefit from separate agricultural education. There are few professional agricultural engineers, technicians, or veterinarians. Most farmers have modest educational backgrounds and are older than 50 years of age; there are very few young farmers in Lebanon. The older farmers tend to be hesitant to adopt new technologies and farming practices. Farmers usually own their properties, but due to their age and their reluctance to adopt mechanization, they rely on seasonal workers to conduct their agriculture activities. Most of the workers are foreign and are not skilled.

About half of the farmers in Lebanon rely solely on their agricultural production for their livelihoods. The remainder have other work and agriculture is generally the secondary source of income. When agriculture is less of a priority, producers rely almost totally on seasonal nonskilled labour and are less likely to seek innovation and improvement in their cropping systems. 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 the quality and reliability of supply. Despite the presence of traders and wholesalers, who act as aggregators of supply, fragmented agricultural production across small-scale farms has thus far limited the development of the agroprocessing industry (Maddock, 2019). The limitations of small farms have not been corrected by cooperation, as cooperatives are largely ineffective and contract farming is not widely practiced.

The agricultural supply chain is marked by imbalanced market power and risks of unfair trade practices. Wholesalers and distributor networks are large and well-organized, with a dominant position and leverage over the small-scale and unorganized farmers. As a result, farmers are often forced to sell their products at low, unfair prices (McKinsey, 2019).

Cooperatives

The weakness of Lebanese cooperatives has often been mentioned as one of the factors hampering growth and development in the agricultural and agrifood sectors (ILO, 2018). Lebanon has a large but inactive network of cooperatives. There are 1 238 cooperatives in the country, two-thirds of which are inactive, and only 5 percent of the Lebanese farmers are members. This weak cooperative system fails to fulfil its role to enable and expand market access for small farmers (McKinsey, 2019).

Most cooperatives operate on a local scale and have limited market access. They largely focus on facilitating direct sales to local markets, but they have limited linkages with the food processing industry, which accounts for less than 5 percent of cooperative sales. Only 55 percent of fruit cooperatives provide access beyond their local district (39 percent of olive cooperatives) and only 25 percent of fruit cooperatives provide export access to international markets (7 percent of olive cooperatives) (McKinsey, 2019).

Cooperatives face a range of challenges in Lebanon. Above all, the Directorate General of Cooperatives lacks the financial and human resources to provide technical support to agricultural cooperatives. The current regulatory framework for cooperatives is outdated and prevents them from expanding beyond their municipal or village borders. Additionally, cooperatives have limited access to financing and are dependent on international donors' programmes for funding projects, organizing, and delivering meaningful education and training to their members and unlocking export market access (McKinsey, 2019).

Only half of existing cooperatives have made investments in the last three years. More than half of the investments were supported by international donors and only one in six were supported by the Ministry of Agriculture. Three percent of the investments over the last three years were directed to developing innovative technologies to increase productivity, including ICT solutions and advanced irrigation and production systems (McKinsey, 2019).

5 Strategic priorities for 2020–2025

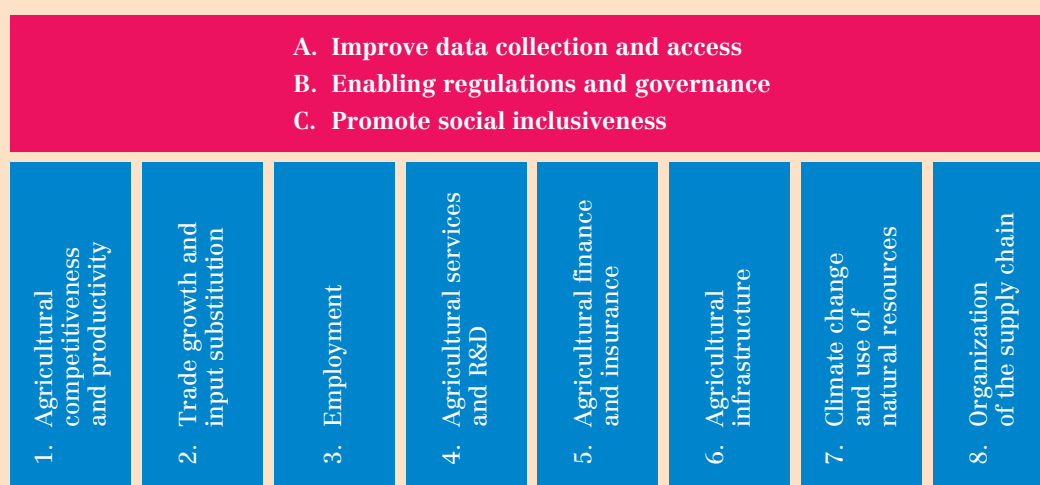
KEY MESSAGES

- ◆ Considering the current economic and financial crisis in Lebanon and the continuing COVID-19 pandemic, three types of strategies are recommended: i) an emergency plan to relieve the rural and urban population in the short term; ii) a plan to rebuild the agricultural sector in the medium-term (four to five years); and iii) plans that address structural issues in the Lebanese agricultural sector over the long-term.
- ◆ Food security should be ensured through social protection programmes, financial or food aid, social protection programmes, livelihood recovery programmes, local food production and stabilization of food prices.

This section provides an overview of the strategic priorities that should be addressed during the policy-making process. Addressing these priorities should facilitate an effective recovery of the Lebanese agricultural sector, which has been dramatically hit by the financial and COVID-19 crises. It will also address longer-term structural issues that have affected the sector in the last decade. The section aims to review potential solutions and to present recommendations for achieving the priorities and objectives.

This report identifies eight strategic priorities, which mirror the challenges discussed in Section 1. On top of these eight priorities, there are three objectives (data collection and access, enabling regulations, governance and social inclusiveness), which cut across all priorities and are critical to addressing all challenges. These structure of the strategic priorities and objectives is presented in Figure 29.

◆ **FIGURE 29** Eight strategic priorities and three cross-cutting objectives



Source: Authors' own elaboration.

5.1 Strategic priorities

Agricultural competitiveness and productivity

The competitiveness of the Lebanese agricultural sector can be enhanced by taking measures to address total factor productivity and technical changes at the sectorial level, while the productivity and profitability of farming can be improved with farm-level measures.

A first step towards improving competitiveness and productivity is to promote the development of sector- and farm-level productive investments. Policies for co-financing investments are well diffused in both less developed countries and the European Union. Co-financing enables the cost of the investment to be shared between the government and the farmer/firm/producer's organization.

At the farm level, such investments could be, for example, the purchase of new machinery, the construction of irrigation systems or greenhouses, or the development of orchards with improved fruit varieties. At the sectorial level, productive investments could include the development of facilities for processing and storing agricultural products, or nurseries for breeding certified fruit varieties.

For example, the Georgian Ministry of Agriculture has provided co-financing to recover old and abandoned tea plantations and develop tea processing facilities. This programme aims to improve the production quantity and quality of Georgian traditional tea varieties, including organic teas, to improve export capacity and increase national self-sufficiency of tea.

Fertilizers, pesticides and herbicides are mainly imported. The dependency on imports makes the agricultural sector vulnerable to trade interruption: the supply of inputs must be continuous to avoid drops in productivity. Shortages or cost increases for agricultural inputs puts pressure on farmers' gross margins, reducing profits. Supporting better access to financing for local input suppliers should be considered (Maddock, 2019).

There is a wide variety of agricultural technologies that are suitable for improving productivity, such as machinery for precision farming, digital technologies, biotechnology for inputs and seeds, etc. However, the Lebanese agricultural sector has been slow to adopt new technologies compared to its main competitors. It is highly recommended that the government take steps to promote the widespread adoption of modern agricultural methods and technologies to improve yields and quality and limit the overuse of fertilizers and pesticides. For example, the availability and adoption of digital technologies could be improved by policies promoting them, either new policies or existing policies adapted to include modern digital technologies. This can be achieved through pro-technology policies and by promoting private-public partnerships and co-financing the development of new technologies and disseminating information about their use.

Finally, innovation requires skills and knowledge that the farmers may not have. Demonstrations in model farms are important for showing farmers the benefits of new technologies and the skills needed to operate them. Low or no cost training programmes should accompany the promotion of new approaches to ensure sufficient uptake to achieve long-term productivity goals.

Trade growth and import substitution

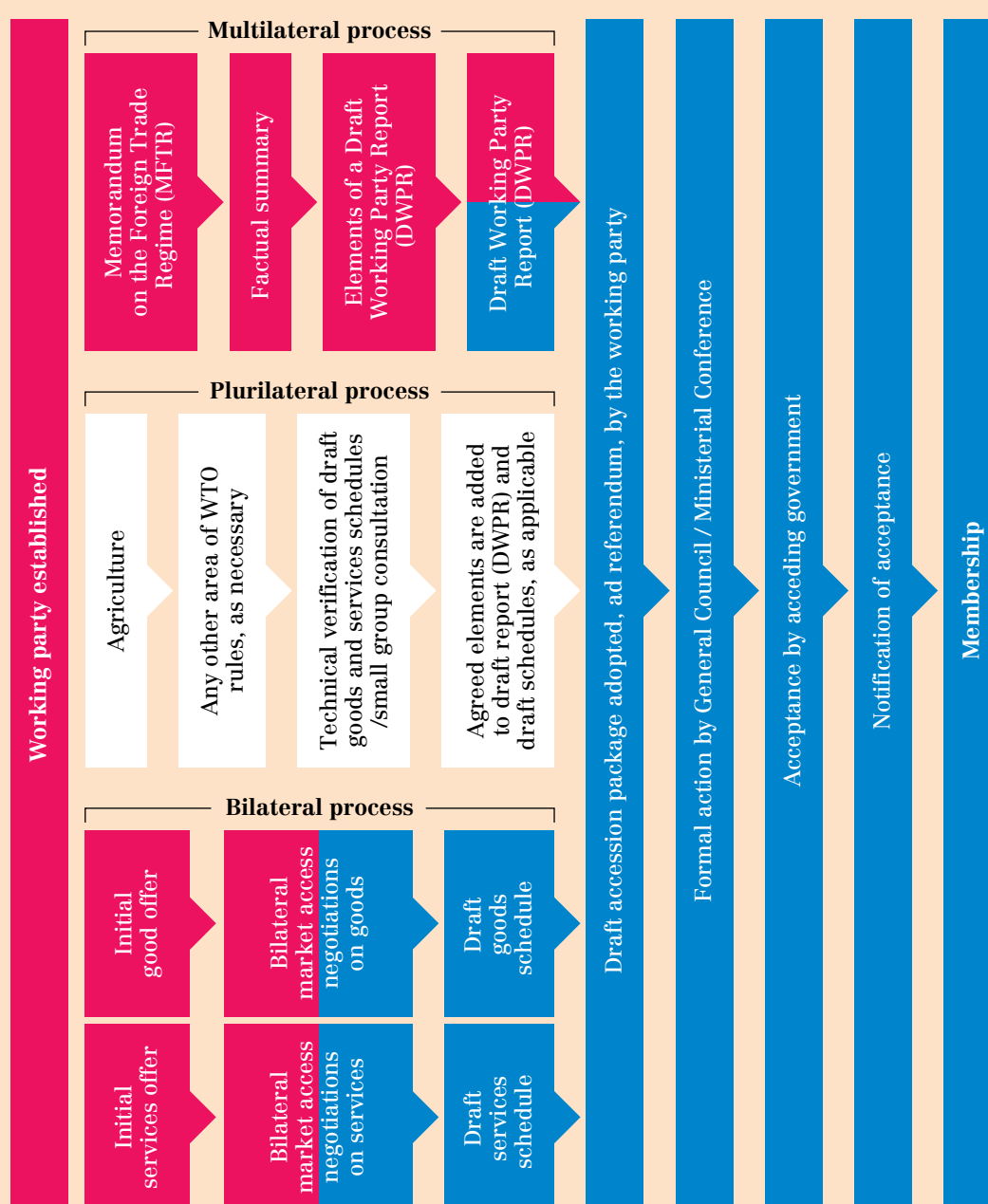
The relationship between the Lebanese agricultural sector and its potential trading partners is defined by three national characteristics:

- ◆ Lebanon depends on imports of various agricultural goods to fulfil domestic food demand.
- ◆ Lebanon depends on imports of agricultural inputs, mainly fertilizers and pesticides and of agricultural machinery and technology.

- ♦ Compared to its agricultural production potential, Lebanon agricultural exports are relatively small in volume and value.

Overall, these aspects can be dealt with by improving access to new markets. This requires strengthening the capacities of ministries and stakeholders to undertake trade agreements (regional or bilateral), which will involve training, policy guidance and technical support. It is particularly important for Lebanon to become a member of the World Trade Organization (WTO) Agreements. The WTO accession process started in 1999 but there is still a long way to go before Lebanon becomes a member, as can be seen in Figure 30. Given the dependency of Lebanon on trade and its ambition to grow its export market, the process should be accelerated and prioritized.

♦ **FIGURE 30** The progress of Lebanon's accession to WTO in dark blue



Source: WTO, 2020.

Apart from becoming a WTO member, Lebanon can also take more targeted approaches to improving its trade balance by: i) reducing dependence on food imports by substituting them with domestically-produced food; ii) negotiating more affordable prices for agricultural inputs and machinery that cannot be produced domestically due to a lack of natural resources and industrial capacity; iii) replacing certain imported inputs with domestically-produced inputs, such as locally developed seed varieties (see agricultural services and R&D); iv) supporting and developing the export of agricultural products.

Increasing the competitiveness of domestic agriculture and the productivity of key crops will help reduce dependence on exports. Lebanon currently subsidizes the prices of wheat and tobacco. While tobacco exports exceed imports, far less wheat is exported than imported, suggesting that the domestic production of wheat is not adequate to fulfil internal demand. A thorough assessment of the Wheat Price Policy Programme is needed to identify what is not working. Agricultural reform will require a strategic vision describing the long and short-term expectations of farmers. It will also require measures for budget reallocation to the long-term development of the overall agricultural sector. Over time, if not combined with other measures, price subsidies can reduce the overall competitiveness of the sector.

To facilitate affordable imports of inputs, machinery and technologies, it is necessary to have agreements with relevant trade partners, whether regional or bilateral. The process of trade negotiations is complex, long and requires specific expertise. Therefore, it is recommended to: i) strengthen the capacity of the government by properly training trade negotiators; ii) use stakeholder consultations to identify and prioritize the products that should be included in the agreements; iii) improve the way trade agreements are implemented at the national level. Trade policies and agreements should consider the needs of large corporate input suppliers as well as small-scale farmers, who are ultimately the users of agricultural inputs.

Several measures could be adopted to improve agricultural exports. This could include taking advantage of the devaluation of the Lebanese pound, which makes imports more expensive and exports cheaper, to gain market access and develop trade relationships with new partners and supporting new markets and removing trade barriers through international agreements. The government should build a business culture around exports as a key element to growth by supporting producers with better information on developing export promotion strategies and promoting Lebanese products through innovative branding and geographic indications. This would not only advertise the quality and specialty of traditional Lebanese products, but also protect them against potential counterfeiting.

Lebanon could consider establishing food export promotion agencies, following the example of Chile. The Chilean government developed two agencies for the valorisation, marketing, and development of Chilean products worldwide. The first one, ProChile, falls under the Ministry of External Affairs and assists large companies in all sectors, including the agrifood sector, to enter international markets. The second agency, Indap, is part of the Chilean Ministry of Agriculture. It helps smallholders to develop and trade products at local, national and international levels. Indap developed the brand '*Manos Campesinas*' to certify the origin and quality of products. A market intelligence unit or agency could provide information to farmers and agrifood actors on, for example, prices, standards, competitors and consumer preferences.

Many countries regulate product standards, such as minimum residues of phytosanitary products, or standards for organic agriculture. Aligning such regulations with those of key trade partners would facilitate the export of agricultural commodities. Farmers would need assistance in complying with such standards. Accessing certain global value chains is feasible only by complying with private standards and certification schemes. Farmers should be adequately informed of the pros and cons of such schemes and standards and assisted in complying with them. Moreover, a network of recognized certifiers needs to establish at the national level for different products.

Promoting the cultivation of fruit varieties demanded by international markets can be expensive and complex. The conversion of current orchards to new varieties can be expensive due to grafting and can lead to loss of income before the new plants reach maturity, while promoting new varieties in new orchards would require access to certified saplings and rootstocks.

Employment

In Lebanon, the migration of workers from rural to urban areas is on the rise. This is a common phenomenon for many countries going through economic development and changing lifestyles. For many, jobs in agriculture are perceived as uncertain, poorly remunerated, and not very socially acceptable. The remoteness of rural areas and limited infrastructure, including communication infrastructure, offers few opportunities for education and the development of communities and villages. As a result, large numbers of people abandon rural areas in search of better jobs and opportunities in urban or industrialized areas. Creating and promoting jobs in agriculture is a major objective of most national agricultural policies to stop the outmigration of workers from the agricultural sector.

Typical instruments used by governments to improve agricultural employment include farm subsidies. In the European Union, such subsidies take the form of direct payments to farmers per hectare. This guarantees farmers a minimum income regardless of the amount of production. However, several studies show that this type of subsidy only slows down the process of farm closures and abandonment of rural areas, while they rarely create new jobs (Schuh *et al.*, 2019).

Other policy instruments address the rural economy rather than the farming sector alone. Such policies typically take the form of rural development projects or programmes that address the potential of economic activities, such as agritourism and the development of rural services and infrastructures. These programmes can take various forms, such as co-financed investments in new production facilities conditional to job creation. An example is the Agriculture Modernization, Market Access and Resilience project funded by the International Fund for Agricultural Development (IFAD) and the Global Environment Facility (GEF). This scheme assists farmers, processors, warehouses, or cooperatives in rural areas to invest in a climate-adapted production chain for agricultural products. The project, which takes place in Georgia, and targets several products (e.g., apple, peach, vegetables, honey, berries, walnuts and flowers). The objective is to increase the income of small farms and firms in rural areas and to create new jobs.

It should be recognized that the jobs created through subsidies or programmes often do not continue after the funding period has ended (Schuh *et al.*, 2019). This calls for the consideration of additional, or complementary measures. For example, farms or rural firms could be granted tax exemptions on new workers for some years after the project ends. Such exemptions could be extended to all farms and rural firms hiring new workers as an incentive to all businesses.

Training and education are critical for achieving a strong and vital rural economy over the long run, especially if they promote the development of managerial expertise and entrepreneurship as well as the acquisition of technical skills. These ‘soft’ skills can support economically robust and resilient farms or firms and an overall growth of the rural economy with new employment opportunities.

Finally, it should be noted that any activity, whether public or private, conducted in rural areas has the potential to generate new jobs. This is particularly relevant in, for example, the creation of a network of extension services, which require hiring several new employees to deliver. There is also potential for the private sector to engage in irrigation system management, thus creating jobs in service delivery.

Agricultural services and R&D

The technical development of the agricultural sector in Lebanon has mostly been led by the private sector, which delivers inputs, machinery, extension and advice. Inputs, such as fertilizers, pesticides and machinery, are mostly imported, partly due to the limited public resources devoted to agricultural R&D and extension services. Despite the efficiency of the private sector in delivering agricultural services, its commercial nature and vested interests can lead to leading to transparency issues and distrust among farmers. It is therefore recommended that additional public funding be directed to the development of agricultural services and research and development.

In many countries, public extension services are provided by independent organizations that work in close contact with farmers to understand their needs and provide them with relevant services. The current Lebanese public system of extension services, which is overseen by field offices of the MoA, is weak and the services it provides are very limited. Additional resources and a dedicated budget are required to strengthen the current system. While the financial crisis is a constraint, donor projects can make a valuable contribution to the development of extension services.

The LARI and CNRS are in the best position to provide agricultural research and development. Greater investment in agricultural R&D would allow the development of inputs and machinery tailored to the country's agro-ecological conditions. These might include, for example, fertilizers that safeguard soil pollution; machinery and practices that reduce land degradation and desertification; pesticides and herbicides with a lower impact on local biodiversity; and crop varieties adapted to climatic conditions with improved water use efficiency. The development of new technologies and inputs will need to be accompanied by a strategy to improve agricultural technology uptake. This might include demonstrations on model farms and training for farmers.

Finally, the lack of a testing system and facilities is a barrier to the development of high-quality, certified agricultural products for international export. Therefore, it is also recommended that Lebanon develops a strategy, legislation, and facilities to test residues of pesticides and other substances. The objective is to provide farmers with an easy-to-access testing service that would benefit both domestic and international consumers.

Agricultural finance and insurance

The system of providing credit to farmers through informal loans from input providers and wholesalers collapsed after the financial crisis of 2019. The already limited financial services provided by banks and credit institutes also disappeared as liquidity disappeared due to the depreciation of the Lebanese pound and the uncertain exchange rate with the United States dollar. Small farms are particularly vulnerable to financial risk because they have few financial resources and collateral to compensate for prolonged periods of loss. This calls for short-term measures, such as grants, loans to commercial banks for lending to farms, as well as targeted tax credits, combined with financial assistance and advice to maximize the support.

As demonstrated by the current circumstances, a farm credit system based on input providers and wholesalers is unsustainable, risky and vulnerable. Once the financial crisis has abated, these should be replaced by a formal credit system in which banks and financial institutes provide products and services to farmers. These are currently absent, therefore the agricultural finance sector in Lebanon needs interventions and restructuring. Several different approaches are possible:

- ◆ **Earmarked lending.** Specified loans could be provided through commercial banks (earmarking refers to the act of setting aside funds for special purposes or specific projects).

- ◆ **Subsidized credit.** The government could cover part of the loan interest so that the cost of credit is cheaper for farmers and others in the agrifood supply chain. To retain oversight, the government could select the financial institutions and banks that provide farmers with subsidized loans; these must comply with specific terms and conditions. The subsidized loans can be limited to certain farming activities or investments. For example, a farmer can use subsidized loans for capital investments but not for purchasing inputs, or vice versa, depending on the objectives of the government.
- ◆ **Credit vouchers.** The government could provide farmers with vouchers of fixed amounts or amounts proportional to the farm size to purchase inputs or to pay for specific services, such as soil tillage or phytosanitary treatments. Credit vouchers have limited monetary value, but they are usually distributed to many farmers and thus they are costly in terms of government budget. Moreover, while they might reduce informal credit, their effect on productivity and production volumes is limited since they do not cover long-term investments.
- ◆ **Debt restructuring.** The government could facilitate access to debt relief or debt restructuring for farmers that are experiencing difficulties in repaying loans due to disasters or crises. These measures would be particularly useful in the current situation, where the simultaneous hit of the financial and COVID-19 crises is making it hard for farmers to honour their debts.

Lebanon, like some other countries, lacks an agricultural insurance market for farmers. Agricultural insurance is typically expensive, and many insurance companies are reluctant to offer it. First, agricultural risks are systemic, meaning that damage can occur in a vast area, simultaneously affecting many insured farms. Second, agricultural insurance is affected by market failure due to information asymmetries (i.e., the farmers have a better knowledge of the risk exposure of its farm than the insurance company), such as moral hazard and adverse selection (Tangermann, 2011). In other words, a farm can change its production behaviour (e.g., by using less inputs), feeling safer because it has purchased insurance, but increasing the probability of crop failure. The farmers facing the greatest risk are more likely to purchase crop insurance. As a result, the insurer's portfolio becomes riskier and the premiums more expensive. These present barriers to the development of a purely market-based agricultural insurance sector.

Some countries, facing similar problems, developed policies to support the agricultural insurance market. For example, the Government of Georgia developed a programme promoting farmers' acquisition of crop insurance against weather risks by subsidizing the insurance premiums. The government developed agreements with several insurance companies to offer agricultural insurance to farmers; the government directly covers up to 70 percent of the insurance policy premium, making it cheaper and affordable for farmers.

Agricultural insurance is designed to protect farmers against production loss (e.g., hail, pests, drought) or market risks (e.g., price volatility). The most common policies cover crop or livestock loss. The insurance premium covers different types of damage and farmers receive compensation proportional to the loss suffered. A more innovative approach is index insurance, which protects farmers against production and market risks. Index insurance is based on indexes and thresholds. For example, if a farmer has an index insurance covering drought, they will receive compensation when the average seasonal precipitation is lower than a fixed value in mm/mm², whether the farmer incurs losses. The same applies to price or income index insurance: if the price of the commodity falls below a certain threshold, the premium covers the price gap between the market price and the average price in recent years. Index insurance has the advantages of reducing moral dilemmas (the behaviour of the farmer cannot make him voluntarily reach the threshold nor the compensation amount) and lowering the costs of compensation given that field assessments of the damages are not required.

Agricultural infrastructure

As seen in Section 1, the development of agricultural infrastructure in Lebanon is a key priority, playing an important role in rural development, reducing production costs, and improving the productivity and competitiveness of the agricultural sector.

In Lebanon, infrastructure is needed to support on-farm production, including irrigation, energy, transportation, pre- and post-harvest storage. Other infrastructure is needed to ensure efficient trading and exchange (e.g., telecommunications); to add value to agricultural products (e.g., processing and packaging facilities) and to enable products and inputs to be exported and imported rapidly and efficiently (e.g., ports and warehouses for storage).

The private sector may be reluctant to participate in the development of agricultural infrastructure. This is because rural areas are typically remote and have a low population density, reducing the possibility of a high return on investment. For this reason, agricultural infrastructure, especially in small/medium-scale farming systems such as in Lebanon, tends to be supported by public investment. Such support can take the form of subsidies or financial support, such as grants, credit guarantees and concessional loans. It is also possible to develop public-private partnerships.

Transport infrastructure, such as roads, is crucial to facilitate the delivery of inputs and services in remote areas of Lebanon. Roads are also important for transporting commerce from the farm gate to local, national, or international markets. In poor rural areas, road construction and maintenance must be financed by public support.

Some parts of Lebanon are characterized by hilly lands, which need terracing and retaining walls to be used in agricultural production. These techniques are generally too expensive for most farmers and need public support.

In addition to the development of new infrastructure, Lebanon should also consider investing in the maintenance and improvement of existing infrastructure. This may require the active collaboration of local communities in planning, management and sustainable development.

To improve Lebanese infrastructure for the agricultural sector, the government could:

- ◆ start an open dialogue with farmers and stakeholders to identify and prioritize infrastructural requirements;
- ◆ develop a strategy based on growth predictions in the use of the infrastructure and the available financial resources;
- ◆ develop an inventory of available infrastructure and requirements. Since different regions have different agricultural specializations and therefore different infrastructural needs, it is suggested to conduct the inventory at the regional level.

The Ministry of Industry's plan to develop industrial zones (2018–2030) is a good opportunity for establishing agribusiness districts with improved infrastructure. Industrial zones for agribusinesses should consider maximizing the benefit in the sectors with the greatest growth potential for the whole supply chain and not only for the final products. At the same time, the development of agricultural infrastructure outside the industrial zones should not be neglected.

Climate change and use of natural resources

Climate change is likely to increase the risks to Lebanese agriculture from drought, storms and floods, as well as to introduce new threats that can lead to disasters and crises. As a result, the Lebanese agricultural sector needs tools to assess and monitor such risks and to include adaptation and mitigation measures in agricultural development plans and investments.

Mitigation measures should be prioritized to address short and long-term challenges to agriculture due to climate change. Such measures could include the following:

- ◆ training farmers to use an effective and early emergency response system;
- ◆ training farmers on agronomic measures to improve adaptation to changing environmental conditions, such as by promoting crop diversification, growing drought- and temperature-resistant cultivars, and adapting planting dates and tillage schedules;
- ◆ establishing water management and irrigation plans and establishing infrastructure to address heat waves and droughts;
- ◆ launching monitoring and vaccination campaigns, prioritizing the most probable and detrimental diseases to protect the animal sector;
- ◆ developing emergency response and crisis plans and funding to avoid delays in the financial aid available to farms hit by a disaster;
- ◆ raising awareness of farmers and stakeholders about potential local risks. This can be done using agricultural risk maps and seasonal agricultural risk calendars.

Technology, conservation agriculture, good agricultural practices and adapted cultivars play a fundamental role in adapting to climate change and ensuring the efficient use of resources. Digital technology is particularly effective in:

- ◆ reducing the environmental impact of agriculture through improved efficiency of fertilizers and pesticides;
- ◆ improving water conservation and avoiding unnecessary waste (e.g., sensors and smart meters);
- ◆ enhancing mitigation and adaptation to climate change.

In Lebanon, water is an important resource, and its use efficiency needs to be maximized. A combination of actions and measures could be implemented to achieve this objective. On the one hand, water resources need to be made accessible, for example by expanding water infrastructure such as dams and water reservoirs. On the second hand, the capacity of regional institutions to better plan and manage water resources needs to be strengthened. Moreover, irrigation also needs improvement from a technical (e.g., adoption of drip irrigation, variable rate irrigation) and management perspective (e.g., develop irrigation plans, schemes and schedules). Finally, there are opportunities to re-utilize wastewater for agricultural purposes. Such opportunities should be carefully considered to avoid health risks; therefore, its treatment is fundamental. It is recommended to consider the most up to date technology for wastewater treatment.

Organization of the supply chain

Most farmers suffer from unbalanced market power in the agrifood supply chain. Both upstream (e.g., fertilizers, plant protection) and downstream (processing, retail) sectors are progressively becoming more concentrated. By increasing their scale and reducing competition, they can achieve greater negotiating power over the much smaller and less organized Lebanese farmers. Moreover, big agrotech and food retail companies have a clearer view of markets, thanks to a greater capacity to acquire and analyse market and price data. The unbalanced power along the supply chain can lead to unfair trading practices (UTPs) at the expense of small farmers, such as unilateral or retroactive changes to contracts, anticipated termination of trade and late payments.

To improve the organization of the supply chain and minimize the risks of UTPs, the Lebanese agricultural sector could benefit from improving the vertical and/or horizontal coordination of the supply chain.

The main vertical arrangements in the supply chain are contractual relationships. Informal agreements between farmers and input providers or wholesalers are quite common in Lebanon. These can take the form of verbal agreements, which cannot be legally enforced or protect the farmers from UTPs, and they can unduly influence farmers' purchases of agricultural inputs or farmers' delivery of agricultural products on credit. It is recommended that the adoption of formal contracts is promoted to provide Lebanese farmers with protection and certainty regarding payments and prices. To guarantee protection, the government could consider establishing minimum requirements in agricultural contracts or prohibiting certain practices. Examples of prohibited trade practices can be found in the recent European Union Directive on unfair trading practices in the agricultural and food supply chain (European Union, 2019). These include:

- ◆ a buyer cancelling orders of perishable goods at very short notice;
- ◆ a buyer changing unilaterally and retroactively the terms of the agreement;
- ◆ a buyer returning unsold food products to a supplier;
- ◆ a buyer charging a payment to secure or maintain a supply agreement on food products;
- ◆ a supplier paying for the promotion of food products sold by the buyer.

Horizontal coordination in the agricultural sector typically takes the form of farmers cooperatives or producer organizations (PO). POs and cooperatives improve the farmers' bargaining power, allowing for a higher share of a product's added value, better access to agricultural inputs and higher price stability; they can also help producers to acquire the knowledge needed to apply productive practices or operate technology.

As mentioned previously, a network of agricultural cooperatives already exists in Lebanon (although the number of farmer members is still relatively low) as well as several governmental and donors' programmes focused on developing agricultural cooperatives. Notwithstanding, the agricultural cooperative sector in Lebanon could be further strengthened. A report of the International Labour Organization (ILO, 2018) suggests that the cooperative sector in Lebanon could become more sustainable if it succeeds in becoming private and economic-oriented instead of aid dependent. The actions proposed to strengthen agricultural cooperatives in Lebanon include:

- ◆ reforming and updating the regulatory framework to enable cooperatives to grow and to finance production, for example by simplifying registration;
- ◆ facilitating linkages among cooperatives and between industrialists and cooperatives;
- ◆ promoting new sales channels to help integrate Lebanese agricultural cooperatives;
- ◆ providing training prior to ensure cooperatives are run by educated managers and board members and thus likely to grow and expand.

In addition, the following actions and measures could be taken to improve the efficiency of value chains and to improve farmers' access to them:

- ◆ improving and promoting the development of local and regional food markets and their links to urban areas;
- ◆ increasing the transparency of wholesale markets and distributors, including through digital and regulatory solutions;
- ◆ supporting and promoting market research and providing farmers with information on competition, standards, and logistics in domestic and international markets.
- ◆ investing in facilities, practices, and logistics to develop the supply chain for high-quality products;
- ◆ improving the way wholesale markets work, exploring digital approaches to direct market access such as online trading.

5.2 Transversal objectives

Data collection and access

The improvement of data availability is an important objective, which cuts across all of Lebanon's strategic priorities for the agricultural sector. Government ministries, international organizations and other stakeholders (e.g., agrotech suppliers and retailers) need high quality data to ensure evidence-based decision-making, planning, monitoring and impact evaluation at different levels of the agrifood chain.

Several data sources and datasets on the agricultural sector are currently available. The most comprehensive source is the agricultural census of 2010. In the following years, supplemental statistical modules targeted specific themes based on surveys and representative samples; these were supported by a grant contract between FAO and the European Union.

Despite the existence of these fundamental data sources, there is a need for updated data, including a new agricultural census. The available data should be made accessible to relevant organizations, which should ensure that they make lawful, public, and transparent use of them.

To produce up-to-date data covering a wide spectrum of themes, the following should be considered:

- ◆ **Collecting data on the farm business along with household data.** The objective is to link production and farm business data with indicators on rural development, food security and health. Farm business data should cover accountancy aspects (e.g., production costs and prices, land use, inputs, labour, fixed assets, credit and liabilities) as well as production practices (e.g., organic production, conservation and irrigation). To facilitate policy assessment, it is highly recommended to record the participation of farmers in programmes and projects.
- ◆ **Collecting data on agrifood companies.** Like farm household surveys, data on agribusiness is valuable for decision-making regarding the supply chain.
- ◆ **Gathering information for trade and trade agreements.** Good quality and current data are essential for the development of strategies for increasing exports of Lebanese products; replacing imports of staple commodities with domestic products; and facilitating imports of products that are not available domestically. For these purposes, raw data is useful but not sufficient. There is a need to develop and strengthen the capacity of the government systems to monitor and analyse trade prices and data, and to understand international trade rules and their implications.
- ◆ **Collecting data on agrometeorological and biological hazards.** Providing farmers with this information would allow improved planning and management of crop production. However, the full potential of this data needs to be explored in synergy with agricultural extension services, which could provide farmers with advice on strategies and management solutions.
- ◆ **Developing information systems on disasters in the agriculture sector.** A system for recording, monitoring, and reporting agricultural losses provides a baseline for mitigation measures. This also requires advice and capacity building, which are critical to risk management in the agricultural sector.

To improve access to data, some measures that should be considered are:

- ◆ updating, unifying and centralizing sector-related data;
- ◆ developing a user-friendly data repository that can allow different levels of access – from open-access data to secure login requests – depending on the sensitivity of the data;

- ◆ providing data analyses to inform farmers and supply chain stakeholders about market issues and opportunities, such as price volatility and import-export trends;
- ◆ developing a data service to monitor production flows, costs, and prices at different levels of the supply chain, from farm gate to the border.

Enabling regulations and governance

Enabling regulations and governance are critical for the further development of the agricultural sector. Lebanon already has in place an institutional framework for the sector, with specialized ministries, agencies, and other CSOs responsible for making decisions and providing support on aspects such as agricultural competitiveness, productivity and services, among others. For example, the LARI and the system of public extension service under the MoA are well positioned to provide agricultural services, research, and development, but their capacity and effectiveness is somewhat weak. The reasons for this are multiple and go beyond the agricultural sector. Notwithstanding, two key factors can be identified: i) lack of financial resources and regular budgets, which has been exacerbated by the current financial crisis; and ii) lack of political stability nationally and regionally.

To improve governance and decision-making in the agricultural sector, the following could be considered:

- ◆ clarifying the mandates and responsibilities of all institutions involved in the agrifood sector, promoting inter-institutional dialogue, cooperation and coordination;
- ◆ enforcing existing rules and regulations and speeding up the process between regulation design;
- ◆ increasing the transparency of the legal framework and procedures, especially those concerning investments and subsidies, to improve farmers' trust in the institutions;
- ◆ increasing the capacity of existing institutions to deliver services and promote Lebanese agricultural products;
- ◆ developing a vision and a strategy to reform of the current institutional framework that identifies inefficiencies and prioritizes budget allocation for strategic objectives;
- ◆ encouraging international agencies and donors to coordinate their interventions, maximizing the value for money, avoiding repetition of programmes, and creating synergies for maximum impact;
- ◆ improving regulation and laws related to food quality, covering the food inspection system and the implementation of standards and certifications;
- ◆ reforming regulations on land registration to produce an ordered and up-to-date cadastral and land ownership inventory;
- ◆ improving the regulation of agricultural workers and jobs to formalize the role of agricultural operators and develop targeted policies for social protection of vulnerable citizens in rural areas;
- ◆ improving the targeting of beneficiaries and the delivery of grants. For example, the neediest farmers could be assisted to develop a successful application and investment project for the Green Plan.

Social inclusiveness

The development of the agricultural sector in Lebanon needs to ensure equal participation and benefit-sharing by all groups of society, including the most vulnerable people such as small farmers, women and young people. The aim is the creation of decent jobs and

business opportunities to achieve long-term sustainable and resilient socio-economic growth in rural areas.

Actions to promote social inclusiveness could include:

- ◆ supporting the economic empowerment of woman and youth through the promotion of an enabling environment for inclusive and good job creation for women and youth;
- ◆ focusing on the most disadvantaged areas and vulnerable communities;
- ◆ supporting host communities as well as Syrian refugees, with special consideration given to female-headed families;
- ◆ developing a system and a methodology to assess social inclusion in projects, programmes and policies in order to identify good practices and failures and to design better strategies;
- ◆ granting all members of society universal access to infrastructure and facilities, such as cooperatives, processing and storage facilities, extension services, water and input supplies;
- ◆ granting all members of society equal access to public information, data, and services for the development of agricultural and food businesses;
- ◆ promoting the engagement of target groups in the policy-making process. All members of society should be encouraged to participate in civic, social, economic and political activities, both at local and national levels. Engaging vulnerable citizens helps the development of innovative and targeted solutions, while improving the transparency, accountability and effectiveness of public institutions and decision-making processes.

During periods of crises, it is the responsibility of policy-makers to ensure food security for society's most vulnerable individuals. As short- and long-term food security strategies, the following could be considered; with support from international cooperation:

- ◆ providing social safety net programmes, financial or food aid, social protection programmes and livelihood recovery programmes;
- ◆ providing government assistance to farmers to help them absorb losses;
- ◆ delivering food to vulnerable people at subsidized prices or stabilizing food prices;
- ◆ stimulating local food production to meet future demand and ensure trade and supply chains remain open and functional.



6 Towards a renewed national agricultural strategy after 2020

KEY MESSAGES

- ◆ The agricultural sector review supports the design of Lebanon's National Agricultural Strategy, including the theory of change used to define long-term goals and the actions necessary to achieve them.
- ◆ The five pillars of the NAS are based on the challenges and cross-cutting objectives identified in this review.
- ◆ This section presents lessons learned from initiatives in Lebanon's agricultural sector (extension services, cooperatives, institutional and regulatory capacities, data collection and analysis and gender equality) and concludes with a SWOT analysis.

6.1 Lessons learned

Lebanon's agricultural sector has high potential, despite the country's complex economic, social and political circumstances. The current governance of the sector, however, presents challenges to achieving this potential. The implementation of the last National Agricultural Strategy (2015 – 2019) was met by obstacles and not all of its objectives were achieved. However, there are important lessons to be learned from the various projects and plans carried out during this period by technical directorates in the Ministry of Agriculture, LARI, the General Directorate of Cooperatives and the Green Project.

First, the agricultural sector has utilized some approaches that have been effective in building capacity and these should be further developed. The extension services provided by the Farm Business School (FBS) programme is one such approach. Training offered by FBS explores a range of topics, including the establishment of a farm, orchard management, and the elaboration of feasibility studies and business plans. Beneficiaries of the scheme are already moving to more sustainable agricultural practices and many other farmers have expressed an interest in participating in the programme.

An FAO project assisted the Ministry of Agriculture to strengthen and modernize the agricultural statistics systems by introducing a new methodology that included supplemental statistical modules targeting agricultural production, cost of production and agricultural price surveys. Using the new methodology, the Ministry was able to produce four annual production surveys while reducing the cost of data entry operators and enhancing the autonomy of the ministry in the process.

A second lesson is that achieving gender equality and youth encouragement requires dedicated support. It is important to consider the different roles of men and women in value chains and to promote gender mainstreaming activities. Support for active cooperatives can promote social and gender equity by raising awareness and changing attitudes about

women's contribution to household livelihoods. Likewise, job creation for women in the agribusiness sector and vocational training for young people could support the development of a more productive agricultural sector.

A third lesson is that coordination between stakeholders is critical to success. Exchanging information and expertise between universities, research centres, NGOs and government entities could improve the effectiveness of agricultural extension programmes and help farmers to develop more sustainable practices for agricultural production to meet the requirements of domestic and external markets.

Likewise, coordination and greater cooperation with donors and international organizations is key to increasing the success of aid programmes. National institutions should consider hosting regular meetings with donors, developing joint work programmes, and submitting annual proposals to donors for fundraising.

Enhancing synergies between projects and aligning them under a common framework improves their effectiveness and visibility, avoids overlapping activities, increases the scope of the individual projects and creates complementarity between respective impacts. For example, two projects (Smart Adaptation of Forest Landscapes in Mountain Areas [SALMA] and Forest and Landscape Restoration Mechanism [FLRM]) on forest and rangeland management took a holistic and cross-sectoral approach to ensure multistakeholder engagement, resulting in strong participation from local communities and the Ministry of Agriculture, and the introduction of important changes at policy, regulatory and institutional levels.

A fourth lesson is that current agricultural policies are addressing climate change effectively. The agricultural sector needs to examine its institutional, organizational and governance mechanisms to facilitate decision-making, support monitoring and evaluation, streamline budget allocation and garner greater support from managers and high-level officials.

Finally, the sector should consider adopting methods for increasing productivity without putting pressure on employees, increasing training and workshops, executing the budget in its entirety, paying debt to the institutions and companies, adopting specialization in the delegation of tasks to the regions, completing previously scheduled recruitments and increasing seasonal employment.

6.2 SWOT analysis

For the benefit of policy-makers and stakeholders involved in the design of policies, measures and tools for agricultural development, Table 10 compiles and summarizes the strengths, weaknesses, opportunities and threats facing the Lebanese agricultural sector as described in this agricultural sector review.

♦ **TABLE 10** SWOT analysis for Lebanon's agricultural sector

Strengths
<ul style="list-style-type: none"> ♦ Lebanese agricultural outputs are quite diversified, making it possible to reduce dependency on a few key crops. ♦ Despite the relatively small size of the agricultural sector, its indirect contribution to the economy is important due to strong linkages with the food processing sector, which is the largest industrial sector in Lebanon. ♦ Agricultural production (both crop and livestock) has been increasing for the last three decades. ♦ Lebanon has a comparative advantage in trading vegetables, agricultural raw materials, and food products, but a comparative disadvantage regarding animal products. ♦ The Export Concentration Index shows that Lebanon's exports are well distributed among a variety of products. ♦ Cooperatives have been largely replaced by farmers' associations, which are more crop-production-oriented and are free from geographical limitations. ♦ Fruit production has increased by about 40 percent since the early 1960s. ♦ Annual vegetable production has been close to a million tonnes during the past five years, up from less than a quarter of a million during the early 1960s. ♦ Lebanon has displayed an agile response to the Syrian crisis. ♦ Lebanon has a dense network of NGOs and associations. ♦ There are international trade and cooperation agreements in place (e.g., the European Union-Lebanon Agreement, the ENP and the Euro-Mediterranean Agreement). ♦ Lebanon has an impressive diversity of high-quality fruit and vegetable products with potential for exploiting niche opportunities. ♦ Until the Syrian crisis, Lebanon achieved substantial growth in agricultural exports, reaching about 25 percent of merchandise exports. ♦ Agribusiness is on the rise.
Weaknesses
<ul style="list-style-type: none"> ♦ Agricultural inputs are mainly imported (e.g., farming machinery, food processing equipment, components of local equipment, agrochemicals and seeds). ♦ The country experiences land competition, land tenure problems, land fragmentation, land degradation and inefficiencies in the land market. ♦ There are insufficient extension and advisory services in the agricultural sector ♦ The sector has poor infrastructure, especially in terms of storage capacity and packaging, but also outdated irrigation facilities. ♦ There is a lack of modern organization in the supply chain. ♦ There is a low level of human capital in the agricultural sector, mostly elderly people and people lacking literacy and education. ♦ The sector has a dualistic structure characterized by many small farms and a few large farms. ♦ Public expenditure on agriculture is quite low. ♦ Wholesale markets are rudimentary and lack the necessary logistics and equipment to preserve the quality of products. ♦ Roles of different institutions are not clearly defined and may overlap. ♦ Cooperatives are weak and malfunctioning due to lack of funding, negative perception of farmers.



TABLE 10 (cont.) SWOT analysis for Lebanon's agricultural sector

Weaknesses
<ul style="list-style-type: none"> ◆ Donors often have different agendas and these are not well-coordinated. ◆ The sector has high production and input costs. ◆ Lebanon exclusively relies on international market for inputs. ◆ Informal livestock farms lack certification. ◆ There is a lack of traceability of products. ◆ There is limited access to finance in rural areas (loans, credits, conditions). ◆ Lebanon has inadequate marketing systems. ◆ There is limited access to international markets. ◆ Inefficient irrigation systems (evaporation, leakages) squander water and other inputs ◆ Water surfaces are polluted. ◆ Farmers often engage in poor agricultural practices (greenhouses, open fields, orchards). ◆ There is weak institutional support. ◆ Low value crops often dominate. ◆ Farmers lack social security. ◆ Gender discrimination leads to inequities overland rights, access to markets, remuneration. ◆ Child labour is prevalent. ◆ There is a lack of transparency in wholesale markets.
Opportunities
<ul style="list-style-type: none"> ◆ Lebanon is considered to have great potential for adopting precision agriculture and digital innovation. ◆ Strengthening the agricultural sector and enhancing rural development could enhance synergies between cities and rural areas and improve living conditions by limiting the migration of labour force to the urban areas and alleviating stress on major cities. ◆ Agricultural value added (in constant USD, 2010) doubled between 1995 and 2015. ◆ Better traceability of the products (marketing advantage, exports). ◆ There are success stories of cooperatives that could be replicated (e.g., beekeeping sector, women cooperatives). ◆ Organic agriculture (still a niche so far). ◆ Improve quality standards. ◆ Integrated pest management. ◆ Adoption of precision agriculture. ◆ Digital innovations. ◆ Improve trade agreements. ◆ Reduce imports, increase exports. ◆ Make the agricultural sector more attractive for the youth. ◆ Investment in research and development. ◆ Irrigation tariff structures, planned irrigation schemes. ◆ Improve transparency along the supply chains.



TABLE 10 (cont.) SWOT analysis for Lebanon's agricultural sector

Threats
<ul style="list-style-type: none"> ♦ The devaluation of the Lebanese pound continues. ♦ Import of food products is declining in key markets, such as Egypt, Jordan, Saudi Arabia and United Arab Emirates. ♦ Budget cuts for public institutions. ♦ Production costs are high. ♦ The financial crisis continues. ♦ Water scarcity is a continuing threat. ♦ Climate change and natural disasters continue to threaten the sector. ♦ Pest outbreaks have been accelerated by climate change. ♦ There is market competition from the Gulf and other Arab States.

Source: Authors' own elaboration.





7 Conclusions

This Agricultural Sector Report identifies the current challenges facing the agricultural sector in Lebanon and maps the wide range of institutions responsible for the national agricultural strategy. Planners have used the ASR to develop a theory of change (ToC) that describes the goals of the National Agriculture Strategy and the steps needed to achieve them.

According to the ToC, by supporting the five pillars of the NAS, Lebanon will activate a more resilient and food-secure households and a more inclusive, competitive, and sustainable agrifood sector. The rationale for the ToC and the five pillars respond to the challenges and cross-cutting issues identified in this review.

Looking ahead, the ASR can help set priorities for policies to support the NAS. For example, the document could underpin new policies around agricultural competitiveness, quality standards, good agricultural practices, water efficiency, agricultural infrastructure and so on.

The solutions proposed in the ASR will require significant investment and must be considered within the context of the financing mechanisms and financial resources that are likely to be available to the agricultural sector now and in the future. The mobilization of additional resources is likely to be critical.

Updating legal frameworks around agriculture will be critical to improving the effectiveness of the sector as will streamlining cooperation and coordination between the public and private sectors. Defining roles and responsibilities for implementing the strategy and putting in place a results-oriented framework based on monitoring and evaluation will be key to ensuring the success of Lebanon's National Agriculture Strategy.

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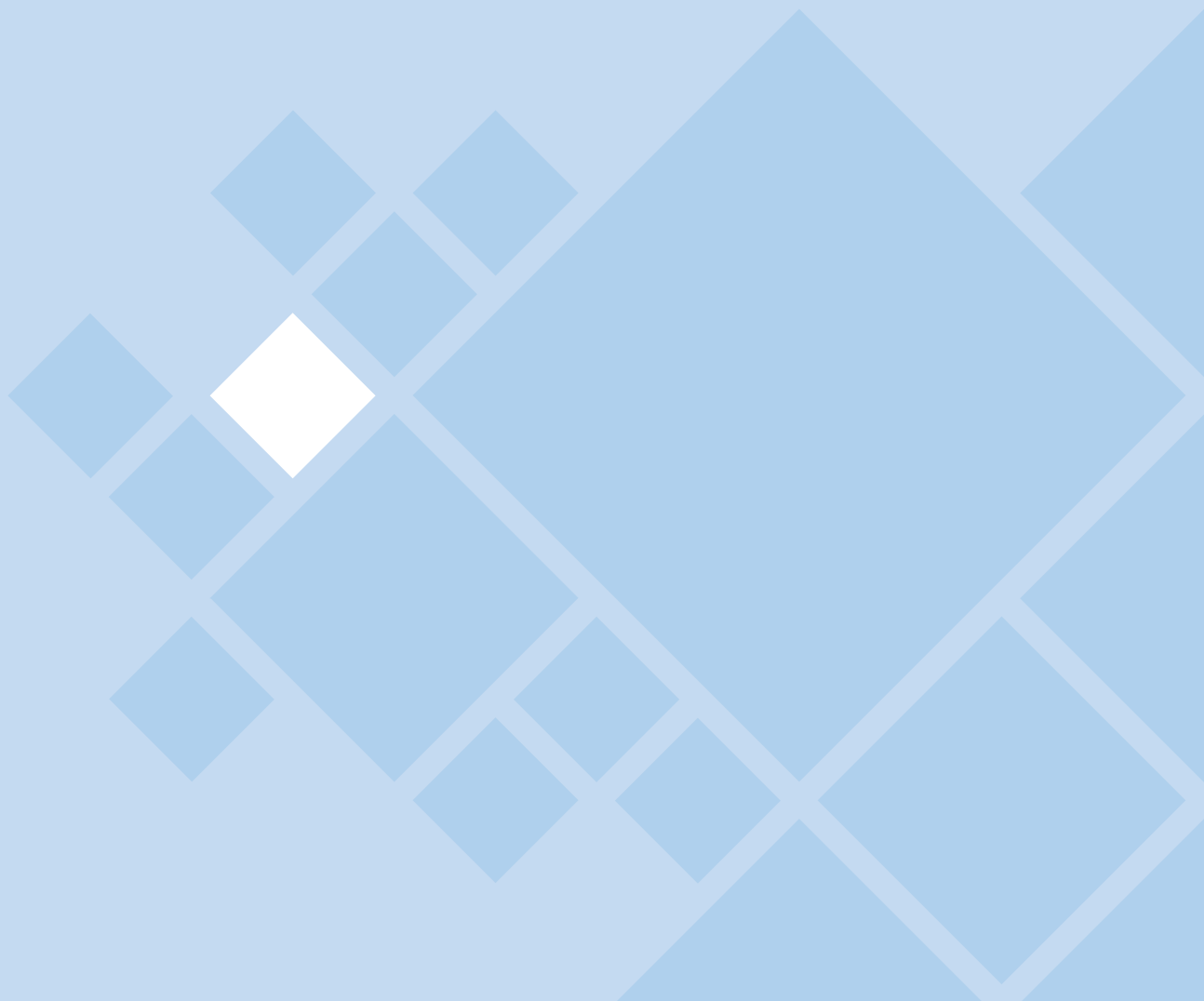
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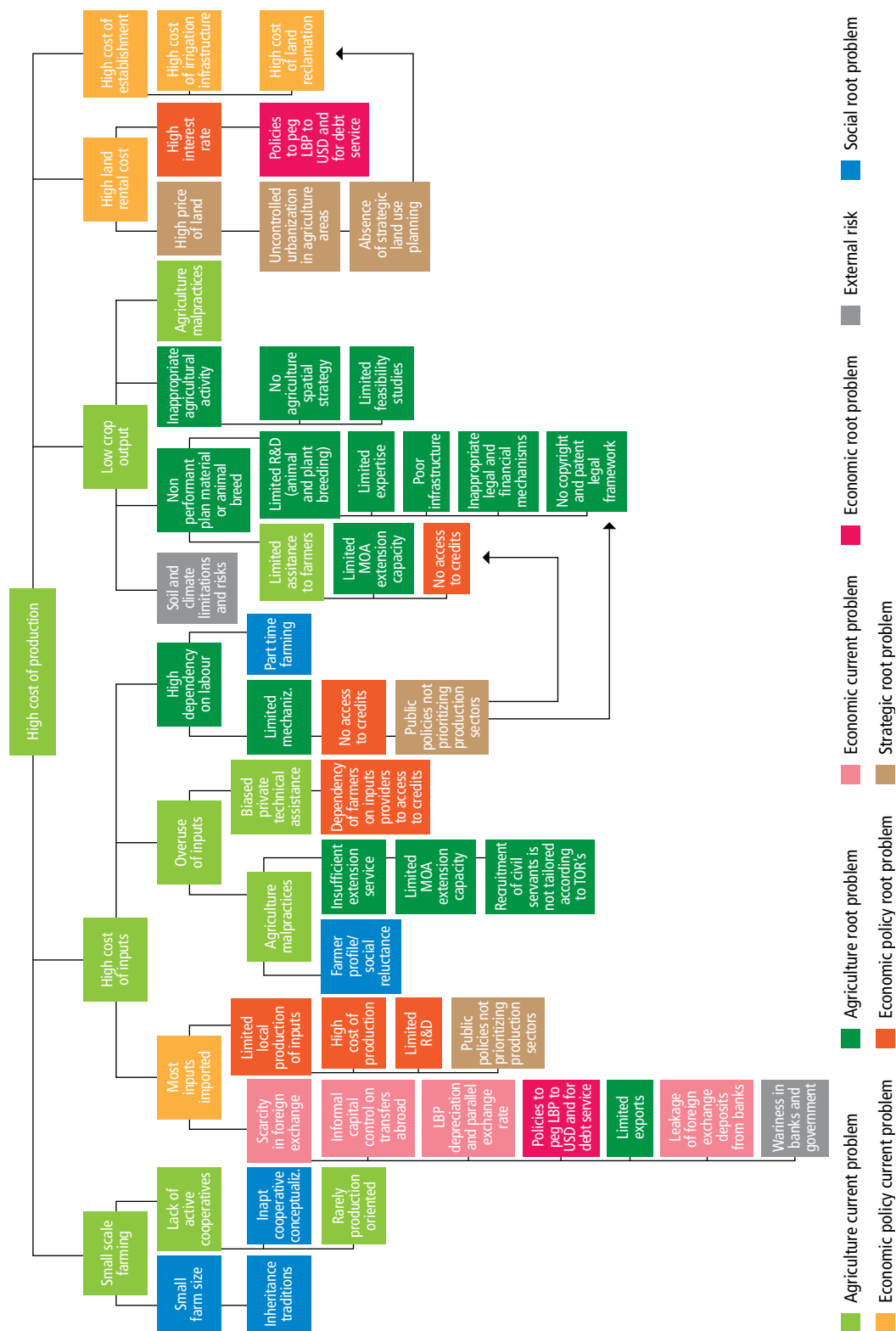


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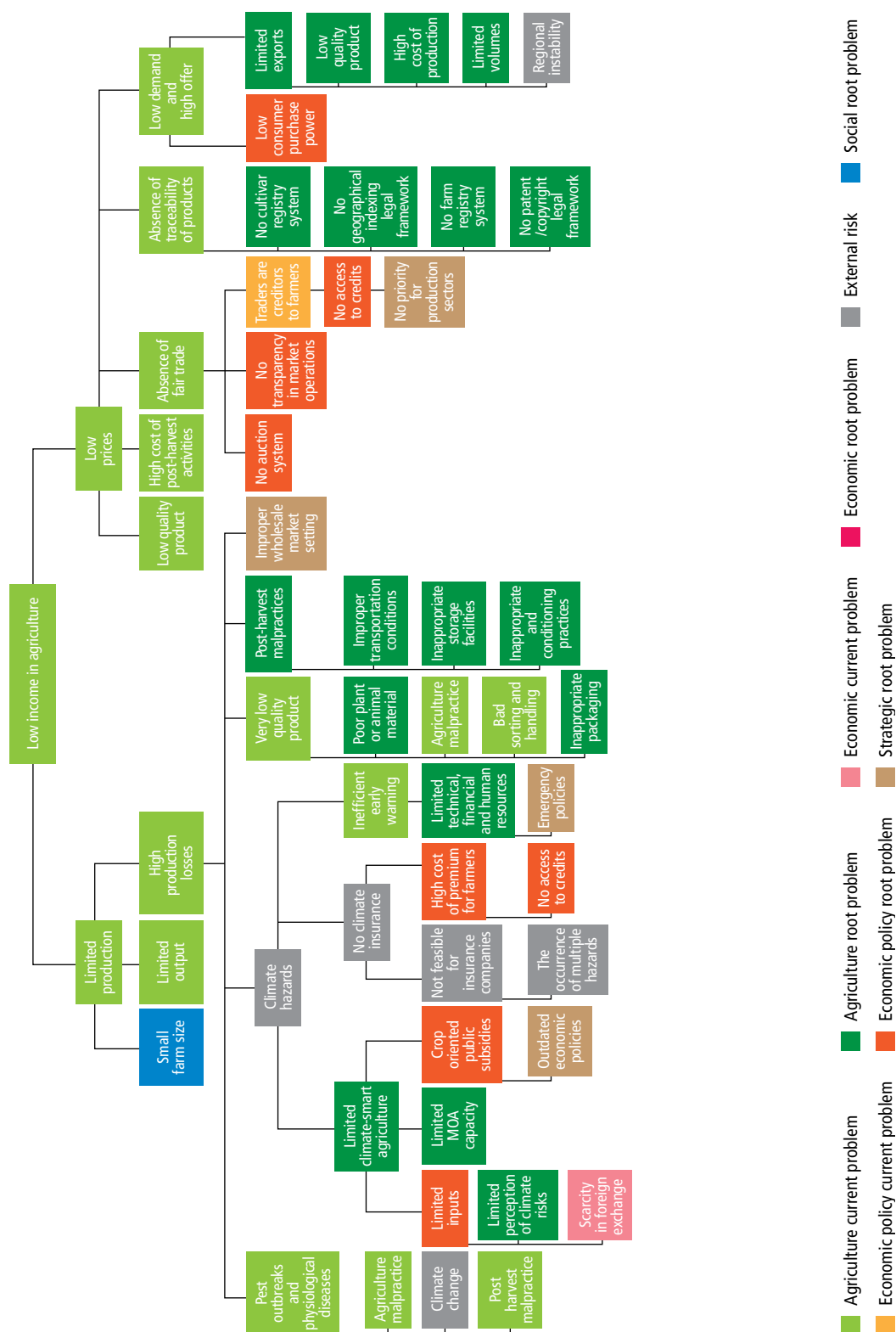
Annex 1. Lebanon's agricultural and food systems

◆ **FIGURE A1** Root cause analysis of the high cost of production



Source: Authors' own elaboration.

FIGURE A2 Root cause analysis of the low income of farmers



Source: Authors' own elaboration.

Annex 2. Value chain analysis briefs

Apple

Overview and production

Lebanon's most valuable fruit is apple. Although Egypt is the main market destination, absorbing almost 70 percent of all exports, there is a large domestic demand for fresh apples, as well as a strong and increasing regional demand for high quality apples (USAID, 2014; Maddock, 2019). Estimates put Grade 1 apple production at 10–15 percent; this is mostly consumed locally, while lower quality fruit is exported (Maddock, 2019). The production of apples in Lebanon is also increasing, with high yields according to international standards. However, production is relatively fragmented: landholdings have been dividing into smaller plots with each passing generation and apples are now produced on small, fragmented plots.

Constraints

A major constraint to the apple value chain in Lebanon is that the production of Grade 1 apples is inadequate to meet consumer demand in both the domestic and export markets. Competitiveness is also constrained by high production costs due to inefficient farming and post-harvest practices (e.g., over-application of pesticides, inappropriate transport methods, and below-standard cold storage). This results in more expensive higher-quality Lebanese apples in export markets compared to those from South America and United States. There is also a shortage of traders who are familiar with the higher standards applied at the upper levels of the regional market (Maddock, 2019). Other constraints are access to finance, which is limited despite the potential of this large and sophisticated sector, and the lack of extension support services and programmes for apple farmers.

Opportunities for development

Four main actions could help to create a more competitive apple value chain (USAID, 2014). First, the sector could respond to domestic and regional demands by increasing the production of good quality apples of the right varieties. This increased production should be based on improvements in production and post-harvest systems. Second, the sector could respond to growing regional markets by facilitating new contacts and links with regional food buyers through study tours, trade show participation and buyer visits, and by helping Lebanese exporters to develop the capacity to react to export market opportunities. Third, the sector could enhance investments in new orchards to lower production costs by improving fruit tree production and plant protection practices. Finally, it could help to diversify sales channels for farmers and rural processors, e.g., by incentivizing grading and sorting, hence minimizing the risk to producers of having unsold low-quality apples, and the risk to processors of not securing a consistent supply of low-price apples for processing.

Avocado

Overview and production

Production areas for avocado are owned by large landowners, who derive income from non-agricultural sources and tend to be environmentally conscious and/or interested in agriculture. Many of these landowners rent the orchards to a handful of 'wood' daman, who pay annual rent based on the productivity of the orchard (CBI, 2018a; USAID, 2014). Lebanon has a great opportunity to increase its market share in the GCC and Europe. The GCC is a small but growing market, while Europe is a large market with potential for additional growth. Lebanon's existing olive oil pressing infrastructure can support the establishment of an avocado oil industry, which will open new markets internationally as well as in Lebanon's vibrant health food and cosmetics sectors (CBI, 2018b).

Constraints

One of the main constraints to the development of this value chain is access to finance, since most avocado producers are self-financed or work on credit obtained from input suppliers and/or wholesale traders. Such loans cover the costs of production and harvesting and, in most cases, also include an agreement that the farmer will sell his products to the wholesaler at market prices. Another constraint is the lack of extension services and support programmes for small avocado farmers. While larger farmers may hire specialists for advice, smaller farmers have virtually no source of information on improved techniques and often rely on neighbours, the local nursery or even input suppliers for advice. The major constraint to orchard expansion is the high cost of land and competition from real estate developers.

Opportunities for development

There are two main opportunities for developing this value chain. The first relates to export markets. Demand for avocado is growing in the MENA region, and Europe is a lucrative market that offers huge potential for Lebanese producers, aggregators and exporters who can meet the demand for high quality product and stringent import requirements. The second opportunity involves converting low value, non-commercial orchards to commercial varieties (e.g., the lucrative Hass variety). In terms of the domestic market, it is possible to benefit from existing infrastructure to produce high-value avocado oil for cooking and/or industrial uses (CBI, 2018b; USAID, 2014).

Cherry

Overview and production

Lebanon produces both high- and low-quality cherries, although the majority are high quality. Most Lebanese cherries are consumed domestically, even though wholesale prices in European markets are significantly higher than domestic wholesale prices (USAID, 2014). Cherry production is dominated by smallholders on less than 0.2 hectares and individually owned orchards are typically parcels that were once part of larger orchards, which were subdivided as the land passed down the generations through inheritance or was sold (Maddock, 2019). Cherry producers are mostly poor rural farmers, making this an excellent value chain for targeting a small, rural production base.

Constraints

A major constraint to this value chain is the competition between Lebanese and Syrian cherries across the MENA region, with Syrian cherries being more competitive due to lower production and transportation costs (ground transport costs for Lebanese cherries will always be higher due to Syria's geographic position) (USAID, 2014). Furthermore, investment in orchard renewal and/or expansion is limited in Lebanon, mainly because of diseases in the topsoil. Growers are very unsophisticated in terms of production, harvesting and post-harvest handling practices.

Finally, access to finance and extension services is limited. Most producers are self-financed or work on credit obtained from input suppliers and/or wholesale traders, which usually require the farmer to sell to the wholesaler at market prices. Cherry farmers receive little to no extension support and, while some larger farmers hire agricultural engineers to provide production and management advice, smaller farmers have virtually no source of advice on improved techniques and must often rely on neighbours, the local nursery or input suppliers for advice (USAID, 2014).

Opportunities for development

There are two major opportunities for the development of a more competitive cherry value chain (USAID, 2014). The potential for increasing market share in both domestic and export

markets exists. Cherries offer great potential for increasing exports to non-traditional regional markets, with exporters suggesting that Lebanese prices are competitive in Europe and the Russian Federation. There is also a possible opportunity to capture Syrian market share in MENA (especially GCC) and Iranian market share in the United Arab Emirates in the short to medium term. Finally, there is an opportunity to develop small-scale processing to meet domestic demand. Nevertheless, Lebanese cherry production practices are rudimentary. The application of modern practices will increase yields and product quality, as well as extend the harvest season. If production is better-organized, cherry growers will have the opportunity to sell more cherries at higher prices for a longer time.

Citrus

Overview and production

The citrus subsector has traditionally been important in Lebanon, producing for both the domestic and regional markets. Most Lebanese citrus producers are small-scale and they typically engage in other forms of agriculture as well or have part time jobs in other sectors (USAID, 2014; CBI, 2018a). Oranges, lemons, clementines and mandarins are widely produced. Lebanon imports very small quantities of citrus (about 1 000 tonnes, compared to annual exports of over 120 000 tonnes), importing only when there is a shortage in local production or when preferred varieties are not available (Maddock, 2019). The Lebanese citrus sector is in decline due to low profitability, the prevalence of relatively poor production practices, weak extension services, and the likely re-emergence of Egypt as a highly competitive citrus exporter.

Constraints

Citrus farmers face a variety of constraints to the development of the value chain. Low profitability at the farm level, for example, is a major limitation, due to relatively high cost of production and low yields. High cost, in part, is due to structural issues in the value chain: most citrus is produced in small plots, which limits the potential for economies of scale. Citrus farmers are not involved in cooperatives, which could enable wholesale purchasing and cost savings on inputs. Yields have been declining for various reasons, such as widespread disease and pests, combined with under-investment in pesticides and limited access to technical extension services.

Lebanese citrus farmers have little access to cold storage facilities, which leads to high post-harvest losses. Only about half of Lebanese citrus production, the portion that is destined for international markets, passes through cold storage (USAID, 2014; CBI, 2018b). Furthermore, the lack of capacity to meet international product specifications limits Lebanon's export potential.

Finally, the legal and institutional environment for citrus in Lebanon is largely underdeveloped. For example, Lebanon currently does not have citrus pest and disease quarantine programmes to ensure that fruits and plants entering the country are not contaminated or threatening to domestic crops. Moreover, the citrus industry has no regulations for pesticide use or pest management beyond a list of banned pesticides established by the Ministry of Agriculture in 2010 (USAID, 2014; CBI, 2018a).

Opportunities for development

Opportunities to develop and upgrade the Lebanese citrus value chain include improving market intelligence on key export markets in terms of seasonality and pricing, upgrading production practices, investing in improved post-harvest practices, organizing citrus producers, and improving the regulatory environment and supporting expanded markets for lower-quality oranges, such as for juice processing (USAID, 2014).

Fresh vegetables

Overview and production

Vegetables constitute a major agribusiness subsector in terms of production area and volume, rural development, and livelihood enhancement (CBI, 2016, 2018a). The moderate climate, soil fertility and availability and quality of water favour the production of fresh vegetables and the use of greenhouses allows production throughout the year (Ruijs, 2017). The main vegetables produced for export are potatoes, cabbage and lettuce, the last being almost exclusively exported to the Gulf region. Nevertheless, due to low productivity and inefficiencies in the value chain, Lebanon is not meeting its potential, both to respond to domestic demand and to supply the entire Middle East.

Constraints

Vegetable farmers lack technical knowledge on how to properly use improved technologies. For example, greenhouse production systems offer more options than outdoor cultivation for controlling and managing the growing environment of a crop, but they require specific knowledge to operate. The concept of cold chain is barely known, hence optimal conditions for harvesting, storage and transport of vegetable products are scarce, leading to high levels of post-harvest losses. Most growers have small-scale farms and use old equipment, traditional cultivation methods and local varieties, which do not always meet sophisticated market demands. Moreover, farmers have limited access to the high-end domestic and international markets, mainly because other chain actors have a stronger position in negotiations. Likewise, smallholder farmers have little access to financial means (Ruijs, 2017).

Opportunities for development

Vegetable's products (especially coming from greenhouses, like cherry tomatoes, small cucumbers, coloured peppers, strawberries and iceberg lettuce) have good opportunities in high-end markets in Lebanon and in export markets in the Gulf States, Africa and Europe. The organic market is growing in Europe and organic production can easily open doors to Lebanese exporters (CBI, 2018b). Vertical integration in the domestic value chain, under the guidance of large-scale farmers or exporters and using modern pre- and post-harvest methods, could significantly increase the participation of small and medium-scale farmers in export market channels.

Grapes

Overview and production

Grapes are among Lebanon's most important agricultural products. Most of the Lebanese grape production is exported, mainly to GCC and other Arab countries. Grapes for export are from medium and large-scale producers, with a small group achieving production standards enabling exports to European market, although total exports to Europe are still very small (Maddock, 2019; USAID, 2014; CBI, 2018b). These exporters experience some degree of vertical integration, can control their grape production, and can guarantee quality. The domestic market is served mainly by small farmers.

Constraints

The technical capacity of farmers tends to decline in relation to farm size: small farmers can not follow proper production, harvest and post-harvest practices. Most grape farmers do not have access to pre-cooling and modern cold storage. Hence, grapes lose quality and shelf life, which is critical due to the relatively long transport time to Europe. Finally, a potential risk, which may become a constraint for the development of the grapes value chain, is the saturation of the domestic market. Any measurable increase in volume sold will cause prices

to fall to a level that will not cover the costs of production. The saturation of the Lebanese table grape market poses a special challenge to smaller, less efficient farmers who are now exclusively dependent on local wholesale markets (USAID, 2014; CBI, 2018b).

Opportunities for development

Major opportunities for the grape value chain include improving market linkages and technical practices to increase grape exports to GCC and EU markets (Maddock, 2019; USAID, 2014). New export markets for high quality grapes are emerging in both markets. Lebanon should expand table grape exports to Europe, with the necessary documentation on farming practices and pesticide residues required by European countries, as well as the sale of high-quality grapes to the Arab Gulf countries (USAID, 2014).

Lebanon should also enhance the participation of small and medium-scale farmers in export markets by vertically integrating the value chain and providing access to finance and technical support for new production methods. For example, under the guidance of a large-scale farmer or exporter and using modern pre- and post-harvest methods, small and medium-scale farmers could increase their participation in export market channels.

Olive oil

Overview and production

Olive production covers over 20 percent of agricultural land in Lebanon and accounts for over seven percent of agricultural GDP. Most olive producers have small orchards, although there are some large orchards. Milling is mainly by small-scale mills in production areas, both in traditional mills and an increasing number of upgraded facilities (Maddock, 2019). The most significant improved production practice in the field relates to harvesting, where farmers are shifting from beating olives off trees with sticks to using manual electric harvesters. This reduces the likelihood of broken olive branches and increases yields for the next season (USAID, 2014).

Constraints

A major constraint to the development of the olive oil value chain is the high cost of olive production, which has negative consequences for its competitiveness in international markets. To compensate, Lebanon imports inexpensive oil from other Mediterranean countries, where the cost of production is much lower. Such imports profit bottlers, who mix lower-priced imported oil with Lebanese oil to reduce costs and sell in both domestic and international markets (USAID, 2014). Another obstacle to accessing high value and high-quality export markets is the overall small volume of production in Lebanon, particularly of high-quality oil.

The olive oil value chain is heavily influenced by international trade agreements, government policies affecting value chain participants, notably cooperatives, and a high level of donor engagement. Issues regarding product quality, food safety, and labelling requirements for origin will continue to grow in importance (USAID, 2014). The lack of quality control measures, for example, is a significant issue: most mills and bottlers in Lebanon do not have quality certifications (e.g. ISO or Good Management Practices) that help promote exports.

Opportunities for development

There are two main opportunities for improving the olive oil value chain in Lebanon. The first is to export the highest quality extra virgin oil to specialty markets, making the most of improved production practices and new modern mills. Private sector investment in milling and storage should increase the volume of high-quality extra virgin olive oil.

The second opportunity relates to increasing the income of small and medium-scale farmers by improving the direct sales of olive oil for household consumption.

Potato

Overview and production

Lebanon has been an important regional producer of potatoes, with imports of quality seeds coming from western countries (e.g., the Netherlands) and exports to mainly Arab countries. Jordan, Saudi Arabia, the Syrian Arab Republic and United Arab Emirates have accounted for 90 percent of potato exports over the past decade (Maddock, 2019).

Constraints

The potato subsector is characterized by small-scale operations, high production costs and low profitability. Farming practices are traditional; despite the existence of many cooperatives, the use of machinery for soil preparation and crop maintenance (e.g., ploughs, hilling machines and spraying equipment) is not common practice. At the farm level, government policies are not visible and potato farmers do not experience the effects of the policies in their everyday life (CBI, 2016).

Most potato varieties are not suited for high-end markets and none of the potato fields have received Global G.A.P certification. Lebanon faces strong competition supplying both its traditional export markets (neighbouring countries and GCC states) and the European market. Among the constraints to developing the potato value chain, according to ILO (2015), are the improper use of pesticides and fertilizers, the large number of small-scale cultivated farms, the inaccuracy of agricultural information provided to farmers, lack of adequate information and statistical data on the sector, the lack of coordination among stakeholders, weak cooperatives, and inadequate market access.

Opportunities for development

Investing in post-harvest facilities and quality systems would allow farmers to release their products into the market when prices are right. In addition, facilities that include equipment for proper cleaning and packing would open export market opportunities to small farmers and potentially improve pricing. Another opportunity for development is improving access to finance to facilitate access to higher quality inputs. This could help to increase productivity and allow farmers to invest in modern irrigation systems. It could also enable processors to compete with higher value-added products. Furthermore, promoting cooperation and building the capacity of existing producer organizations is important to developing a more sustainable value chain (Farole and Konishi, 2017).

Tomato

Overview and production

Approximately 38 percent of the tomatoes in Lebanon are grown in greenhouses. Tomatoes grow in every region; however, the Baalbek region dominates production with over 50 percent of open field production and greenhouses. Small farmers are widely distributed throughout the Beqaa region and make up about 50 percent of all farms. According to Mercy Corps (2014), Lebanon consumed approximately 290 000 of the 310 000 tonnes of tomatoes produced nationally. Only about 2 000 tonnes are exported, and 18 000 tonnes imported.

Constraints

Low-cost practices are mostly unknown to farmers. For example, while the principles and benefits of composting are well known, farmers have little practical experience on the proper production and application of compost (Mercy Corps, 2014). Likewise, there is a

limited seed selection and production, along with poor market coverage of new tomato varieties. Farmers lack the financial capacity to invest in improved production technologies (e.g., solar-powered technologies). Furthermore, there is a lack of guaranteed sales channels and limited packaging options for small producers.

Opportunities for development

There is an opportunity to promote and subsidize the adoption of low-cost and/or improved tomato production technologies by vulnerable farmers. The use of soil tests, for example, allows farmers to gauge the correct number of fertilizers and pesticides to maximize their output. Similarly, using greenhouses allows farmers to plant earlier, extending the production season and producing higher yields than open field production. Another option is to promote the production and marketing of higher-valued tomato varieties. Subsidizing improved seedlings for vulnerable farmers could lead to an increase in production. Finally, marketing services could be provided to cooperatives that produce high-quality and specialized products (Mercy Corps, 2014).

The agricultural sector review aims to provide an up-to-date picture of the current socio-economic situation of the agricultural sector in Lebanon and to identify key challenges and evidence-based strategies for policy-making. The first part provides a detailed overview of Lebanon's agricultural and food systems, including a section focused on the governance the overall policy framework and the specific policies currently governing the sector. The second part of this study consists of an identification of the challenges and issues that are currently affecting and constraining the development of the Lebanese agricultural sector to its full potential. Once identified these challenges, the study proposes several potential strategies and recommendations that could be applied at the policy-making level to drive the improvement of the sector. Finally, we provide a discussion towards a renewed national agricultural strategy; in which we reviewed some lessons learned from previous success stories in the agricultural sector in Lebanon and compile the strengths, weaknesses, opportunities and threats of the agricultural sector.

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