

СЕКЦИЯ 3
ИНФОРМАЦИОННЫЕ ТЕХНОЛОГИИ
И МОДЕЛИРОВАНИЕ ЭКОНОМИЧЕСКИХ ПРОЦЕССОВ
В СИСТЕМЕ ОБОСНОВАНИЯ ЭФФЕКТИВНЫХ
УПРАВЛЕНЧЕСКИХ РЕШЕНИЙ

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THE COST OF AGRICULTURAL PRODUCTION IN LEBANON

Trade in the agricultural and food sector is an important part of Lebanese trade and agriculture – particularly fruits, vegetables, raw tobacco, spices, live sheep – and the management of agribusiness – especially processed food – is an important source of exports, accounting for more than 20 % of total exports (or an average of \$0.7 billion between 2014 and 2018). At the same time, agricultural and food imports account for a significant share of total imports, accounting for 18 % of the total (or an average of \$2.9 billion between 2014 and 2018).

Domestic agricultural and food production meets only 20 % of domestic demand, and as a result Lebanon depends on imports for most of its food needs, particularly cereals and sugar. Lebanese agriculture is characterized by a clearly defined duality. On the one hand, it is responsible for only 25 % of all agricultural holdings, and it is effective in exporting and running for-profit businesses, and on the other hand, Non-commercial agriculture in smallholdings provides limited opportunities for investment or profitability, particularly small agriculture, which is the main source of income for families or for the preservation of cultural and family heritage.

As a result of the high cost of production, it has become necessary for many small farmers to diversify sources of income and engage in income-generating non-agricultural activities. Lebanon's rural population accounts for 11.2 % of the total population (771,000 in 2019), but is relatively poorer than the rest of the country's population. Agricultural activities in the poorest areas such as Akkar, Dinya, the North Bekaa and the South account for

80 % of rural GDP, with about 9 % of agricultural owners working mainly in dairy, cheese, agricultural manufacturing and small-scale agriculture to provide livelihoods.

Lebanon is self-sufficient in some products, such as olive oil, meat and egg frédérin, while some types of vegetables and fruits are self-sufficient at certain periods consistent with their production periods. With regard to milk, the self-sufficiency rate is 63 %, while the rate of wheat is low, and despite the support of this commodity, it is 20 %, and red meat (lamb 20 %, beef 9 %). This makes it imperative for Lebanon to import these goods to cover its consumption needs. Given the high value of the import bill, more investment in the agricultural sector should be encouraged and increased in the competitiveness of agricultural commodities to increase our exports and thereby reduce the agricultural trade deficit.

Table 1. The development of agricultural trade (a thousand\$)

Year	Exports	Imports	Trade balance	Exports/Imports (%)
2017	178572	979748	-801176	18 %
2018	182687	965484	-782797	19 %
2019	157073	932194	-775121	17 %

The most important agricultural products exported in 2019 were coffee 13 %, grapes 8 %, potatoes 8 % and bananas 7 %.

The most important imported agricultural products in 2019 were wheat 13 %, corn 12 %, shell gambling 9 %, coffee 8 % , rice 7 %.

Table 2. Trade exchange of food products (the value is in thousand \$)

Year	Exports	Imports	Food balance	Exports/Imports (%)
2017	691505	3403027	-2711522	20 %
2018	643692	3496093	-2852401	18 %
2019	628102	3112227	-2484125	20 %

The cost of agricultural production in Lebanon is higher compared to neighboring countries due to several reasons, most notably: absence of agricultural credit and the high interest on loans that farmers incur on loans; high cost of irrigation due to the absence of public irrigation projects and the adoption of traditional irrigation methods and other reasons; high-cost

reliance on imported agricultural inputs, high energy cost, poor guidance, training and oversight; weak role of cooperative and trade union institutions is weak; limited area of agriculture and the high cost of securing agricultural land; small size of agricultural holdings in general, limited use of mechanization and modern technologies; real estate ownership problems, the high cost of labour; absence of direct and indirect support compared to neighboring countries; high cost of transport action is due to the lack of necessary infrastructure; some Lebanese agricultural products suffer from a lack of quality due to several reasons, most notably: the adoption of traditional varieties and patterns; poor guidance and training, poor control; excessive use of agricultural inputs, especially pesticides and fertilizers; absence of traceability and labeling systems, specifications for agricultural commodities are not mandatory; failure to follow good post-harvest transactions (transportation, packaging, storage).

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EXAMPLES OF ECONOMICAL PROBLEMS THAT REDUCE TO SOLVING DIFFERENTIAL EQUATIONS

The most common mathematical models in economics associated with differential equation. The article discusses the connection between the course «Higher mathematics» and «Economics».

Consider two economic problems, that need to be solved using of first-order differential equation

$$\frac{dN}{dt} - kN = 0 \quad (1)$$

where k is the constant of proportionality.

The problem that needs to be solved in this article is formulated as follows:

Problem 1. A person place \$20 000 in a savings account which payss 5 percent interest per annum, compounded continuously. Find (*a*) the amount