

CHAPTER 3 – SOIL, BIODIVERSITY AND AGRICULTURE

The National Centre for remote sensing considers that the green space in Lebanon consists of non timber land with low vegetation of height less than 2 meters and of natural open spaces without or with some vegetation. This space is divided into three separated sets:

- ✚ the high mountain higher than 1 900 m which is a weak and sensitive space to water which erodes it;
- ✚ the Cedars corridor and the mountain arboriculture which is located on the west hillside of the Mount-Lebanon Chain and which altitude varies between 1 500 and 1 900 meters. It is the altitude stage of the Cedars natural forests and the high orchard. It consists of vineyards and of seasonal vegetable cultivation and it can host the industry of mineral water because mineral water spurts out at an altitude equal to 1 400 m.
- ✚ The big valleys control the rivers water quality. The forests host the fir tree, juniper, pine-tree and oak. The spaces of ecological continuity maintain the natural continuities between Mount-Lebanon and Anti-Lebanon and between the mountain mass and the other natural entities (CDR, 2004).

1 Land Infringements

The land suffers from the effects and ravages of human intervention such as the country planning, urbanisation and housing. Human intervention and especially crushing plants destroy the environment and their effect is irreversible because they transform agricultural lands and green spaces into building sites.

In fact, at least 710 crushing plants operate in Lebanon and 50% are located in Mount-Lebanon and in the suburb (Sarraf & al., 2004). Most of them operate without authorisation. These crushing plants exploit 3 000 ha of lands and provide an annual quantity of 3 millions cubic meters of gravels and they exploit tens of new hectares each year. Nevertheless, the authorised crushing plants do not respect the legal arrangements governing the extraction and restoration.

Thus and considering the limitedness of the Lebanese territory and its quick urbanisation, the impact of restraining the expansion of crushing plants should be assessed on economic and environmental plans. Hence, a rigorous management and control policy of the extracting activity is a must. In fact, the protection of the forests and of the green spaces allows the increase of the oxygen quantity in the air and slows down the erosion. Consequently, extracted sand quantities will be reduced and their prices will increase. In addition, ceasing the crushing plants activities means a higher rate of unemployment (CDR, 2004). So what would be the impact over biodiversity?

2 Biodiversity

Lebanon enjoys a rich and exceptional biodiversity due to its altitude pillars and to its hillsides exposure. It is essential to preserve the biodiversity on Lebanon in order to preserve the main ecosystem equilibriums and in order to progress with the research and especially the medical research. Fauna and flora are composed of living non human organisms and of their ecosystems and their preservation is the object of several international conventions. For each animal taxonomic group (mammalian, birds, reptiles, amphibians, fish, and invertebrates) and vegetal taxonomic group (vascular and non vascular), we have the number of total species and of species of the following categories defined by UICN:

- ⚡ species in "grave danger" exposed to a very high risk of extinction in the wild state and in the short term;
- ⚡ species "in danger" without being "in grave danger" exposed to the risk of extinction in the wild state and in the short term;
- ⚡ "vulnerable" species without being "in grave danger" nor "in danger" exposed to a high risk of extinction in the wild state and in the middle term;
- ⚡ "decreasing" species which are displaying a decrease in number.

Table 16 – State of animal and vegetal species

		Known species		Species in danger		Species in grave danger		Vulnerable species		Decreasing species	
		Total	End.	Total	End.	Total	End.	Total	End.	Total	End.
Animals	Mammals	65	2	11						18	1
	Birds	338								90	
	Reptiles	48	1	13						9	
	Amphibians	5		2						1	
	Fish	382	8	8						226	8
Plantation	Invertebrate	1 540	87							187	
	Vascular	35								2	
	Non vascular	1 028	29					3		52	

End. : Endemic

Source: Ministry of Agriculture (1999)

There are 65 mammal species in Lebanon of which two are endemic. The number of mammal species in danger is relatively high (11) and the number of decreasing species is higher (18) and of which one type is endemic. Of the 338 known bird species, 26.6% (90 species) are decreasing. 27.1% of reptiles are in danger and 18.8% are decreasing. 40% of the amphibian species are in danger. The fish species state is serious because 59.2% are decreasing of which 2.1% are endemic. The invertebrate state is similar because 5.6% are endemic and 12.1 are decreasing. The flora in Lebanon is also suffering from the same degradation rhythm of the fauna. 5.7% of vascular plantation is decreasing but the plantation state is serious because 2.8% are endemic and 5.1% are decreasing. Now, what are the repercussions of the land and biodiversity wealth on agriculture in Lebanon?

3 Agriculture

Agricultural land constitutes 61.2% of the total Lebanese area. It is potent given the nature of their ground, depth, content in organic material, acidity, capacity to retain water and slope. Nearly half of the lands in Lebanon are arable. In addition, the altitude differences allow various cultivations starting with the quasi-tropical products on coastal plains and finishing with the high altitude orchards with a variety of products between these two pillars. They also offer a big reservoir of groundwater, magnificent landscapes combining mountains, valleys and plains crossed by rivers.

Tableau 17 – Distribution of lands in Lebanon in Km²

Type of land	Agricultural lands	Forests and other timber lands	Constructed land and connected	Dry zones	Water	Total area
Area in Km ²	6,400	2,620	890	526	16	10,452
% with regard to total area	61.2	25.1	8.5	5.0	0.2	100.0

Source: Lebanese Environment & Development Observatory (LEDO (1999))

Still, these agricultural lands are arable (26.2%), forests (25.1%), planted with permanent cultivations (23.9%), meadows (23.9%), and meadows permanent pastures (49.6%).

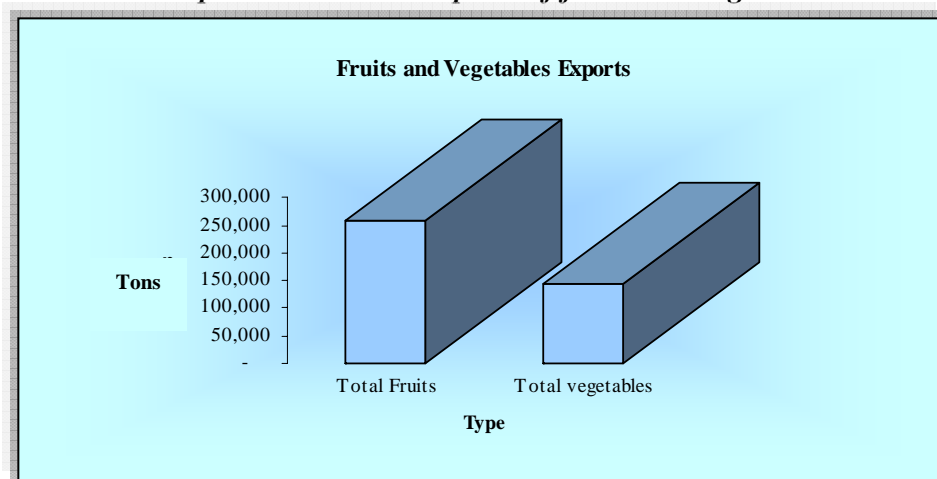
Table 18 – Distribution of agricultural land in Km² in Lebanon

Type of land	Arable land	Permanent cultivation	Meadow and permanent et pastures	Others	Total area of agricultural land
Area in Km ²	1,678	1,529	3,175	18	6,400
% with regard to total area	26.2	23.9	49.6	0.3	100.0

Source: LEDO (1999)

Lebanon exports 400 019 tons of fruits and vegetables, of which 257 451 tons of fruits (64.4% of exports) and 142 568 tons of vegetables (35.6% of exports).

Graph number 13 – Exports of fruits and vegetables

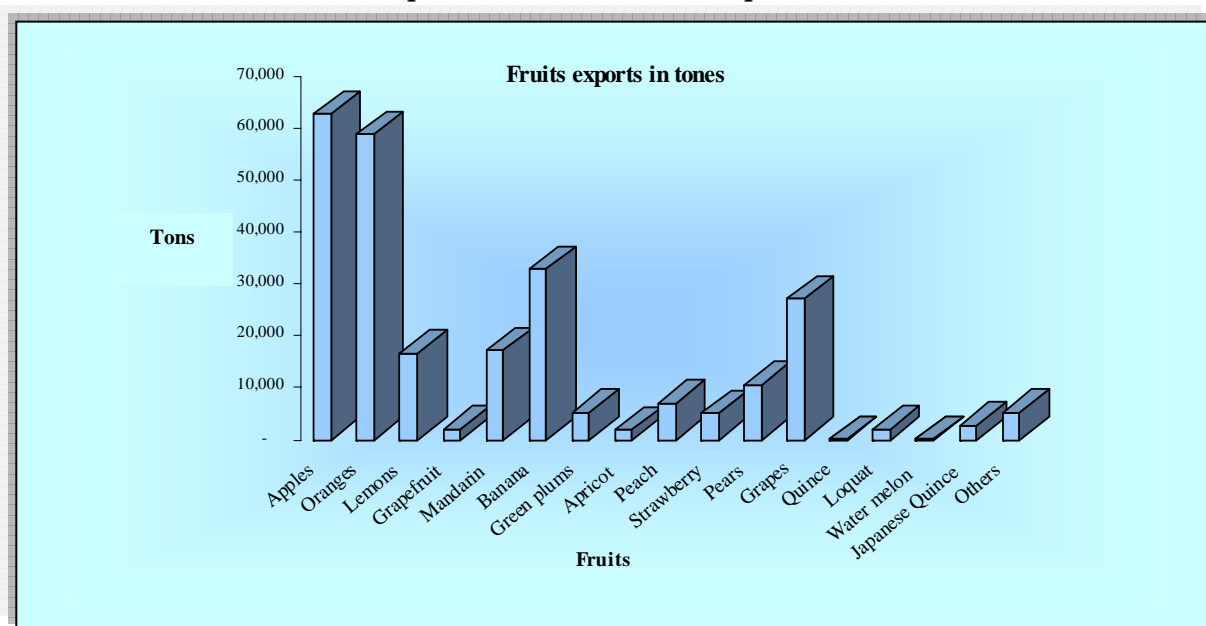


Source: Ministry of Agriculture (2006)

3.1 Exports by product

Regarding fruits, Lebanon exports mainly apples (62 816 tons or 24.4% of fruit exports), oranges (58 804 tons or 22.8%), bananas (32 788 tons or 12.7%) grapes (27 44 tons or 10.6%), mandarin (17 159 tons or 6.7%), and lemons (16 722 tons or 6.5%).

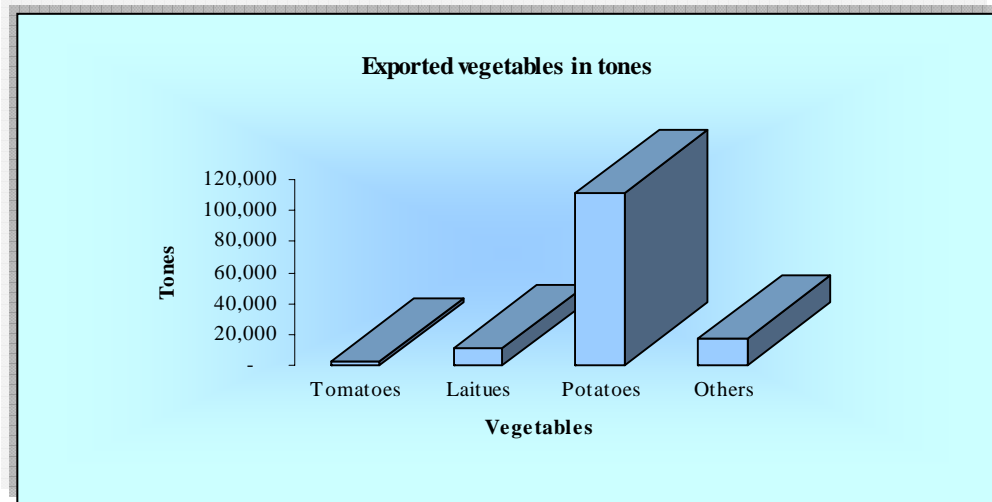
Graph number 14 – Fruits exports



Source: Ministry of Agriculture (2006)

Regarding vegetables, Lebanon exports mainly potatoes (111 814 tons or 78.4% of vegetables exports).

Graph number 15 – Vegetables exports



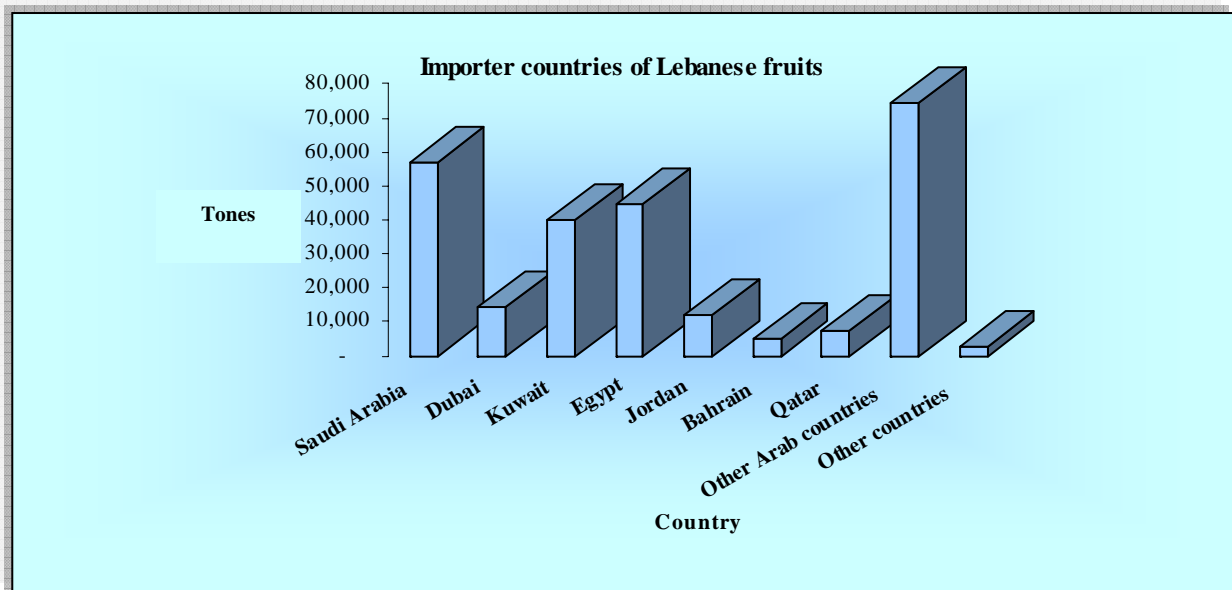
Source: Ministry of Agriculture (2006)

September displays the highest exports of fruits and vegetables (68 630 tons or 17.2% of fruits and vegetables exports). However, December displays the highest fruits exports (35 337 tons or 13.7% of total fruit exports). September displays the highest vegetables exports (46 726 tons or 32.8% of total vegetables exports).

3.2 Main importer countries

Arab countries are the main importers of Lebanese fruits and vegetables. In fact, they import 254 440 tons of fruits or 64.0% of total fruits and vegetables exports and 140 458 tons of vegetables or 34.8% of total exports. Regarding fruit exports, Saudi Arabia is ranked first (56 970 tons of fruits or 22.1% of fruit exports), then Egypt (44 497 tons or 17.3%), Kuwait (39 908 tons or 15.5%), Dubai (14 219 tons or 5.5%) and finally Jordan (11 937 tons or 4.6%).

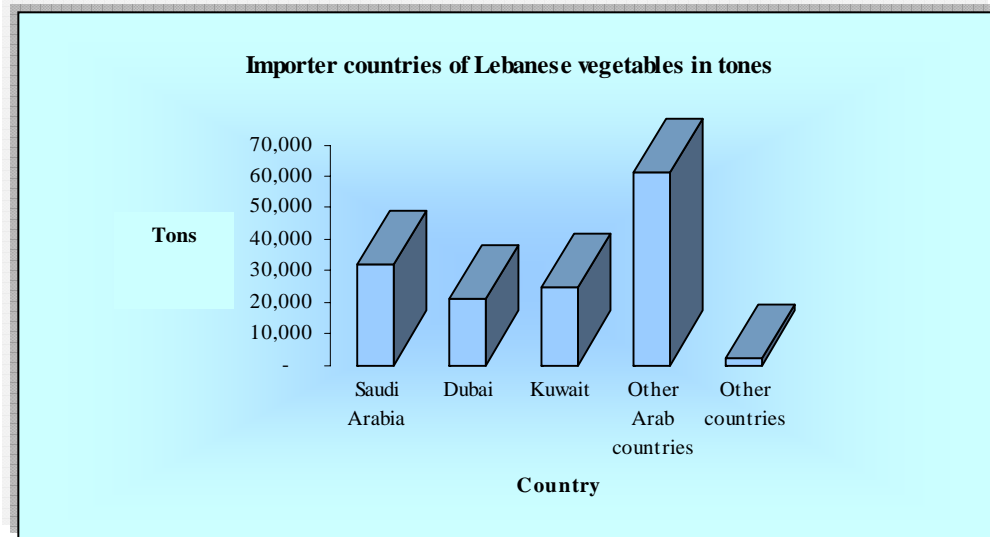
Graph number 16 – Importer countries of Lebanese fruits



Source: Ministry of Agriculture (2006)

Regarding vegetables exports, Saudi Arabia is ranked first (32 085 tons of vegetables or 22.8% of total vegetables exports), then Kuwait (24 361 tons or 17.3%) and finally Dubai (21 122 tons or 15.0%).

Graph number 17 – Importer countries of Lebanese vegetables



Source: Ministry of Agriculture (2006)