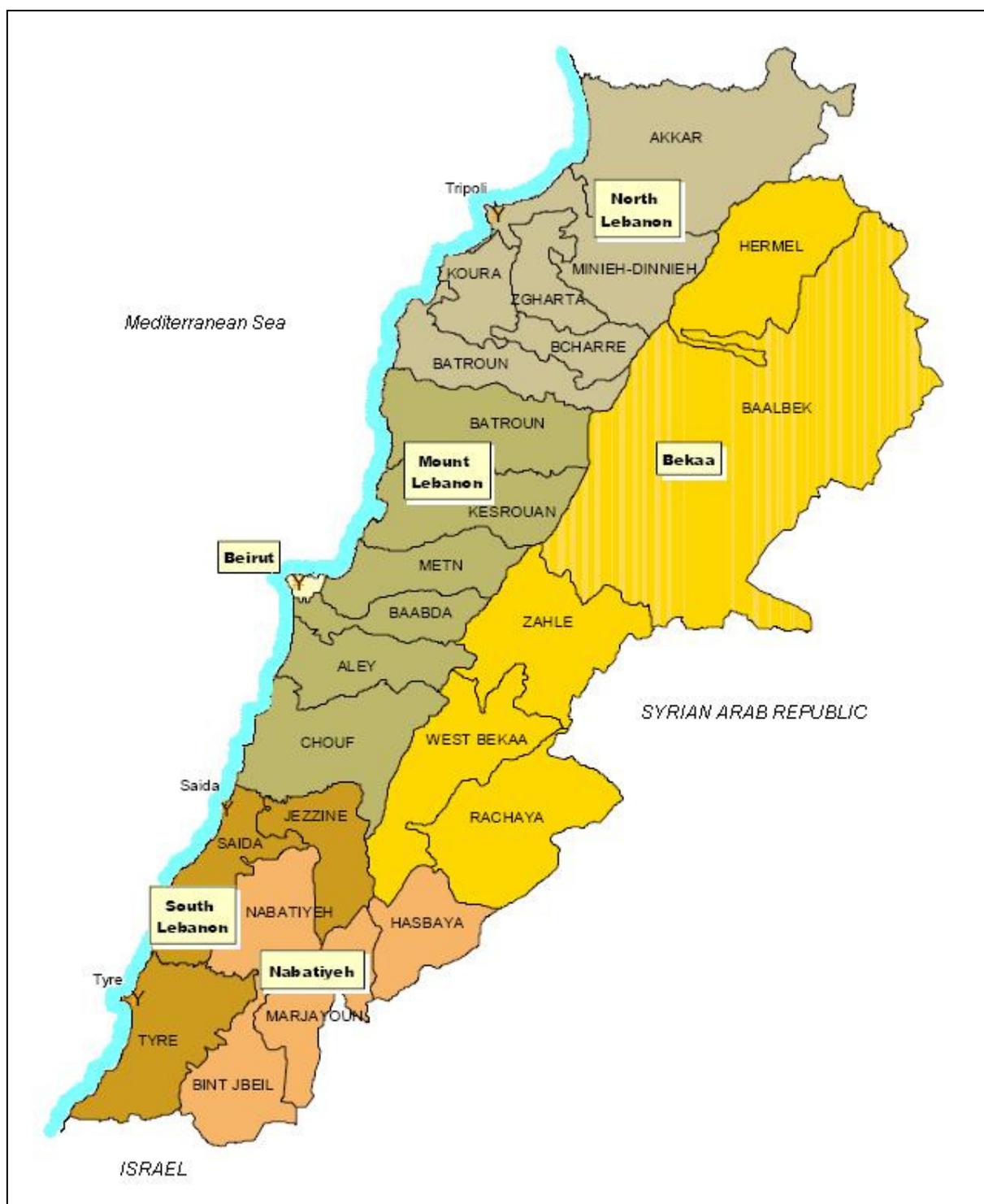


NUTRITION COUNTRY PROFILE
LEBANESE REPUBLIC
2007



Source: MOE, 2001



FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

Acknowledgments

This profile was prepared by Professor Nahla Hwalla, Department of Nutrition and Food sciences, American University of Beirut, in collaboration with Chiara Deligia , Giulia Palma and Amélie Solal-Céligny, Consultants, and Marie Claude Dop, Nutrition Officer, Nutrition Planning, Assessment and Evaluation Service, Nutrition and consumer protection division, Food and Agriculture Organization of the United Nations.

NOTE FOR THE READERS

The following profile was prepared prior to the summer 2006 conflict. Therefore, data and trends presented in this document do not take into account the human and material consequences of the conflict, including the temporary displacement of about one million people, as estimated by WFP, OCHA and UNDP.

Summary¹

Lebanon is a small middle-income country of the Middle-East. With high literacy rates and a traditional mercantile culture, Lebanon is an important commercial hub in the region, although economic and social development was hampered by a long civil conflict from the mid-seventies until beginning of the nineties.

The Lebanese population is young, with a relatively high life expectancy at birth (72 years), reflecting a good access to health care and a full access to safe water and sanitation. Most of the health indicators have improved in the past decade.

The country's economy has been growing steadily since the end of the civil war in 1990, particularly due to the development of the service sector. The current poverty rate is not documented due to the absence of a recent household income and expenditure survey, but previous data and qualitative information suggest high poverty rates are still prevalent in some areas.

The general improvement in the standard of living over the last decades has increased households' access to affordable traditional varied and energy-dense local foods as well as to a "westernized" type of diet, including fat and salt-rich processed foods. According to some studies among adults, the high intake of fruit and vegetables, a unique feature of the Lebanese diet, goes together with an increase in fat intake which is currently at the higher limit of recommendations. These trends in dietary intake associated with a sedentary lifestyle are the major causes of the emergence of an obesity epidemic.

The nutritional status of the Lebanese population is characterized by a nutrition transition with the persistence of micronutrient deficiencies and chronic malnutrition in young children (stunting), especially in the rural areas, and the emergence of a high prevalence of overweight in all age groups, both in rural and urban areas.

Although Vitamin A deficiency is almost inexistent, iodine deficiency persists and iron deficiency anemia is prevalent, mainly among young children and women of childbearing age. Deficiencies in vitamin D, folate and vitamin B12 were also reported among women of childbearing age.

There is a dearth of up-to-date nationally representative data to document current trends of the above nutrition problems and to serve as a basis for a much needed national nutrition strategy.

¹ All data and comments in this profile refer to the country's situation prior the summer 2006 conflict.

Summary Table ¹

Basic Indicators			<i>Year</i>
Population			
Total population	3.398	million	2000
Rural population	13	%	2000
Population under 15 years of age	30	%	2000
Annual population growth rate	1.24	%	2004
Life expectancy at birth	72	Years	2000
Agriculture			
Agricultural area	32	%	2003
Arable and permanent cropland per agricultural inhabitant	3	Ha	2003
Level of development			
Human development and poverty			
Human development index	0.759	[0-1]	2003
Proportion of population living with less than 1\$ a day (PPP)	MDG1		
Population living below the national poverty line	MDG1	28 %	1994
Education			
Net primary enrolment ratio	MDG2	91 %	2002-2003
Youth literacy (15-24 years)	MDG2	92 %	1990
Ratio of girls to boys in primary education	MDG3	0.97 girl per 1 boy	2002-2003
Health			
Infant mortality rate	MDG4	27 ‰	2003
Under-five mortality rate	MDG4	31 ‰	2003
Maternal mortality ratio (adjusted)	MDG5	150 per 100 000 live births	2000
Tuberculosis prevalence	MDG6	13 per 100 000 people	2003
Environment			
Sustainable access to an improved water source in rural area	MDG7	100 % of population	2002
Nutrition indicators			<i>Year</i>
Energy requirements			
Population energy requirements	2 118	kcal per capita/day	2000-2002
Food Supply			
Dietary Energy Supply (DES)	3 160	kcal per capita/day	2000-2002
Prevalence of undernourishment	MDG1	2 %	2002
Share of protein in DES		11 %	2000-2002
Share of lipids in DES		31 %	2000-2002
Food diversification index		63 %	2000-2002
Food consumption			
Average energy intake		n.a.	
Percent of energy from protein		n.a.	
Percent of energy from lipids		n.a.	
Infant and young child feeding			
	Age		
Exclusive breastfeeding rate		n.a.	
Timely complementary feeding rate		n.a.	
Bottle-feeding rate		n.a.	
Continued breastfeeding rate at 2 years of age		n.a.	
Nutritional anthropometry			
Stunting in children under 5 years		12 %	1996
Wasting in children under 5 years		3 %	1996
Underweight in children under 5 years	MDG1	3 %	1996
Women with BMI ≥ 25.0 kg/m ²		49 %	1997
Micronutrient deficiencies			
Prevalence of goitre in school-age children (7-15 years)		26 %	1993
Percentage of households consuming adequately iodized salt		91 %	1996
Prevalence of anemia in women		17 %	2004
Prevalence of iron supplementation in mothers		n.a.	

MDG: Millennium Development Goal; n.a.: not available

¹ All data and comments in this profile refer to the country's situation prior the summer 2006 conflict.

TABLE OF CONTENTS

Acknowledgments	2
Summary	3
Summary Table	4
List of tables and figures	6
Acronyms	7
Part I: Overview and basic indicators	8
I.1 Context	8
I.2 Population	8
Population indicators	8
Population pyramid	9
I.3 Agriculture	9
Land use and irrigation statistics	10
Main crops, agricultural calendar, seasonal food shortage	10
Livestock production and fishery	10
I.4 Economy	11
I.5 Social indicators	11
Health indicators	11
Water and sanitation	12
Access to health services	13
Education	13
Level of development, poverty	13
Other social indicators	14
Part II: Food and nutrition situation	15
II.1 Qualitative aspects of the diet and food security	15
Food consumption patterns	15
Food security situation	15
II.2 National food supplies data	16
Supply of major food groups	16
Dietary energy supply, distribution by macronutrient and diversity of the food supplies	16
Vegetable/animal origin of macronutrients	17
Dietary energy supply by food group	17
Food imports and exports	18
Food aid	19
II.3 Food consumption	20
II.4 Infant and young child feeding practices	22
II.5 Nutritional anthropometry	23
Low birth weight	23
Anthropometry of preschool children	23
Anthropometry of school-age children	25
Anthropometry of adolescents	25
Anthropometry of adult women	26
Anthropometry of adult men	26
II.6 Micronutrient deficiencies	27
Iodine deficiency disorders	27
Prevalence of goitre and urinary iodine	27
Iodization of salt at household level	27
Vitamin A deficiency (VAD).....	27
Prevalence of sub-clinical and clinical vitamin A deficiency	27
Iron deficiency anemia (IDA)	27
Prevalence of IDA.....	27
Interventions to combat Iron deficiency anemia	28
Other micronutrient deficiencies	28
II.7 Policies and programmes aiming to improve nutrition and food security	29
Reference list	30

List of tables and figures

List of tables

Table 1: Population indicators	9
Table 2: land use and irrigation	10
Table 3: Livestock and fishery statistics	10
Table 4: Basic economic indicators	11
Table 5: Health indicators	12
Table 6: Access to safe water and sanitation	12
Table 7: Access to Health Services	13
Table 8: Education	13
Table 9: Human development and poverty	13
Table 10: Other social indicators	14
Table 11: Trends in per capita supply of major food groups (in g/day)	16
Table 12: Share of the main food groups in the Dietary Energy Supply (DES), trends	18
Table 13: Food consumption data	21
Table 15: Anthropometry of preschool children	24
Table 17: Anthropometry of adolescents	25
Table 18: Anthropometry of adult women	26
Table 19: Anthropometry of adult men	26
Table 20: Prevalence of anemia in preschool children	28

List of figures

Figure 1: Dietary energy supply (DES), trends and distribution by macronutrient	16
Figure 2: Vegetable/animal origin of energy, protein and lipid supplies, 2000-2002	17
Figure 3: Dietary energy supply by food group	17
Figure 4: Major food exports as percentage of Dietary Energy Supply (DES), trends	18
Figure 5: Major food imports as percentage of Dietary Energy Supply (DES), trends	19

Acronyms	
BMI	Body Mass Index
CAS	Central Administration of Statistics, Beirut
DPT3	Diphtheria, Pertussis (whooping cough) and Tetanus vaccine – three doses
ESCWA	United Nations regional economic and social development commission in Western Asia
FAO	Food and Agriculture Organization of the United Nations
FAOSTAT	FAO Statistical Databases
FIVIMS	Food Insecurity and Vulnerability Information and Mapping Systems
GDP	Gross domestic product
ICCIDD	International Council for the Control of Iodine Deficiency Disorders
IDP	Internally Displaced Person
ILO	International Labour Organization of the United Nations
MDGR	Millennium Development Goals' Report
MET	Ministry of Economy and Trade
MICS	Multiple Indicator Cluster Survey
MOE	Ministry of Environment
MPH	Ministry of Public Health
NGO	Non Governmental Organisation
OCHA	United Nations' Office for the Coordination of Humanitarian Affairs
PAPCHILD	Pan Arab Project of Child Development
PPP	Purchase Power Parity
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNHCR	Office of the United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
UNIDO	United Nation Industrial Development Organization
UNPD	United Nations Population Division
UNSTAT	United Nations Statistics Division
WB	World Bank
WFP	World Food Programme of the United Nations
WHO	World Health Organization

Part I: Overview and basic indicators

I.1 Context

The territory of the Lebanese Republic covers 10 400 km², extending 217 km from North to South and 80 km from east to West. It is bounded by Syria on both the North and East, by Israel on the South and by the Mediterranean Sea on the West. From 1975 until the early 1990s, Lebanon was locked in a bitter civil war (WFP, 2005; WB, 2005).

The main agricultural region is a narrow plain running along the seacoast. The inland hosts the Lebanese Mountains' range, with the country's highest peak, Qurnat-as-Sawda, at 3 083 m. Another range, the Anti-Lebanon Mountains, runs along the country's eastern border. The two mountainous ranges are separated by a fertile valley called the Bekaa, 8 to 16 km wide. The main Lebanese rivers are the Litani, the Nahr Ibrahim and the Orontes.

Most of Lebanon has a Mediterranean climate with warm, dry summers and cool, wet winters. The coastal plain is subtropical, with 900 mm of annual rainfall and a mean temperature of 29°C in summer and 13°C in winter. In the mountains, temperatures are lower and precipitations higher (up to 1 500 mm per year), mainly falling as snow at higher altitude. The Bekaa Valley and the Anti-Lebanon Mountains are situated in the rain shadow of the Lebanon Mountains and have hot, dry summers and cold winters with only occasional rain (FAO, Forestry Division).

Arable land is scarce (17%), but the climate and the relatively abundant water supply from springs favour biodiversity and the intensive cultivation of a variety of crops on mountain slopes, in the Bekaa valley and in the coastal region.

Lebanon has made progress towards rebuilding its institutions since the end of the civil war in 1990 (MDGR, 2003).

I.2 Population

Population indicators

The Lebanese population is young, with about 30% under 15 years of age, but the population growth rate is currently decreasing.

Lebanon witnessed major movements of IDPs during the civil war (1975-1990), followed by intense internal rural to urban migrations of people in search of better living conditions, encouraged by the improvement of the security situation.

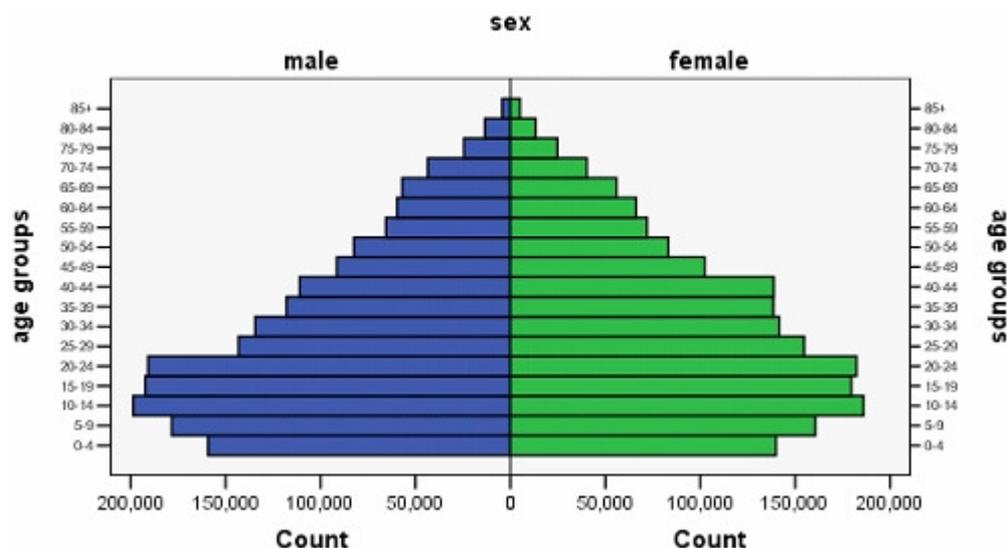
As for refugees, their number increased from 1 359 in 1994 to 4 172 in 1999 and stabilized around 2 522 in 2003 (UNHCR, 2005).

With no official figures available regarding emigration, it is estimated that 600 000 people left the country during the civil war (1975-1990); however some have returned since. Emigration of men of working age is the main explanation for the unbalanced population sex ratio (table 1).

Table 1: Population indicators

Indicator	Estimate	Unit	Reference Period	Source
Total population	3.398	millions	2000	UNPD
Annual population growth rate	1.24	%	2004	WB
Crude birth rate	19.0	‰	2000-2005	UNPD
Population distribution by age:			2000	UNPD
0-4 years	10	%		
5-14 years	20	%		
15-24 years	19	%		
60 and over	10	%		
Rural population	13	%	2000-2005	UNPD
Agricultural population	4	%	2000	FAO
Population density	327	inhabitants per km ²	2000	UNPD
Median age	25	years	2000	UNPD
Life expectancy at birth	72	Years	2000-2005	UNPD
Population sex ratio	96	males per 100 female	2000	UNPD
Net migration rate	-2	‰	2000-2005	UNPD
Total dependency rate	60	%	2000	UNPD

Population pyramid



Source: CAS, 2005.

I.3 Agriculture

Although agriculture contributed only an estimated 13% of the total GDP in 2004, it is considered essential to the economy of the country, mainly as a source of food and foreign exchange earnings, generated by the export of fruit, vegetables, eggs, cereals, sugar, vegetable oils and livestock products (WB, 2005). Despite this, the agricultural trade balance has become increasingly negative from 1979 till 2003 (FAO, 2005).

Land use and irrigation statistics

Table 2: land use and irrigation

Type of area	Estimate	Unit	Reference period	Source
Total Land Area	1 023	1000 Ha	2002	FAO
Agricultural Area	32	%	2003	FAO
Arable lands & Permanent Crops	31	%	2003	FAO
Permanent Crops	14	%	2003	FAO
Permanent Pasture	2	%	2003	FAO
Forested land areas	3	%	2003	FAO
Irrigated agricultural land	10	%	2003	FAO
Arable & Permanent cropland	3	Ha per agricultural inhabitant	2003	FAO

N.B. Percents are calculated on the total land area.

More than half of Lebanese farms are of small size, with less than 2% exceeding 100 dunums (1 dunum=0.1 ha=1000 m²). The vast majority (85%) of farms are on private land. Public land represents 15% of the total cultivated area in Lebanon and includes *machaa* (land that belongs to the whole village but not to a specific owner and is usually managed by the municipality), *amiri* (land that belongs to the state) and *waqf* (land that belongs to religious structures and monasteries) (MOE, 2001).

Main crops, agricultural calendar, seasonal food shortage

In 1999, the major food crops were cereals, fruit, olives and vegetables (MOE, 2001). The 5 major food and agriculture commodities produced in Lebanon in 2002 were potatoes, tomatoes, cow milk, olives and oranges (FAO, Statistics Division). Tomatoes, cow milk and olives were mainly destined to local human consumption; potatoes and oranges were for local consumption and export (FAO, FAOSTAT food balance sheets).

On the irrigated coastal plain, market vegetables, bananas and citrus crops are grown. In the foothills, the main crops are olives, grapes, tobacco, figs, and almonds (MOE, 2001).

Summer, from July until September, is the harvest season for fruit and vegetables. In the autumn, from October till December, there is a decrease in the production of many fruit and vegetables, except for cruciferous vegetables.

Livestock production and fishery

Livestock is either locally raised or imported. Livestock production faces many constraints concerning feeding, health, genetics, socio-economics, and environmental factors (Hilan, 2000). Nonetheless, the total number of livestock has increased by about 38% from 1980 to 1999 (MOE, 2001).

As for fisheries, two types exist: marine captured fish, the quality of which has been increasing thanks to the introduction of modern fishing techniques, and pisciculture, with about 1 200 stations distributed in the Bekaa area, along the Assi River, and producing mainly trout (Hamze and Khoudoud, 2005).

Table 3: Livestock and fishery statistics

Livestock production and fishery	Estimate	Unit	Reference period	Source
Cattle	86 182	number of heads	2003	FAO
Sheep and Goats	730 548	number of heads	2003	FAO
Poultry Birds	34 000	thousands	2003	FAO
Fish catch and aquaculture	4 688	tons	2003	FAO

I.4 Economy

Lebanon's devastating 15 years Civil War (1975-1990) resulted in massive economic, social and structural destruction. In less than a decade impressive progress had been made in reconstructing the country's infrastructure, restoring public services and recovering per capita income. The progress was fostered by a modern financial sector, a qualified workforce and favourable geographical position (WB, 2005).

Services - mainly commerce, tourism, and the financial sector - represented 68% of the country's GDP in 2004. Agriculture represented about 13%, while the industrial sector constituted the remaining 19% of GDP.

Lebanon has infrastructure for transportation and communication, including railways, highways, pipelines, airports, harbours and mobile telephone networks, radio stations, TV stations, and internet, but it is not sufficient to meet the country's needs.

Table 4: Basic economic indicators

Indicator	Estimate	Unit	Reference Period	Source
Gross Domestic Product per capita	5 074	PPP US \$	2003	UNDP
GDP annual growth	6.3	%	2004	WB
Gross National Income per capita	4980	\$	2004	WB
Industry as % of GDP	19	%	2004	WB
Agriculture as % of GDP	13	%	2004	WB
Services as % of GDP	68	%	2004	WB
Paved roads as % of total roads	n.a.	-	-	-
Internet users	1 117	per 10 000 people	2002	WB
Total debt service as % of GDP	66	%	2003	WB
Military Public expenditure	4.3	% of GDP	2003	UNDP

n.a.: not available

Major non-food imports are machinery and metals, chemicals and raw materials, oil and oil products, as well as electricity. Major non-food exports are manufactured goods and services (MET, 2005).

I.5 Social indicators

Health indicators

Thanks to primary health care programmes initiated by the Lebanese authorities and NGOs, child health has improved since the nineties: infant and under five mortality rates respectively declined from 35‰ and 43‰ in 1990 to 27‰ and 31‰ in 2003 (UNICEF, 2003). Infant and under five mortality rates are higher in North Lebanon than in Mount Lebanon and Beirut. Immunization levels are good, and newborn tetanus has been eradicated in 1995 (MDGR, 2003; CBS/UNICEF, 2001).

Although prevalence of HIV/AIDS and tuberculosis appear to be low and to be decreasing, the MDG 2003 Progress Report for Lebanon indicates that these are possibly under-reported and therefore recommends that their trends be monitored (MDGR, 2003).

Concerning non-communicable diseases, a study among the middle-aged and older (≥ 50 yrs) population in Beirut between 1983 and 1993, showed that cardio-vascular diseases were the leading cause of death (60% of deaths), while cancer represented 15% (Sibai et al., 2001).

Table 5: Health indicators

Indicator	Estimate	Unit	Reference Period	Source
<i>Mortality</i>				
Infant mortality	27	‰	2003	UNICEF
Under-five mortality	31	‰	2003	UNICEF
Maternal mortality ratio :				
reported	100	per 100 000 live births	1985-2003	UNICEF
adjusted	150	per 100 000 live births	2000	UNICEF
<i>Morbidity</i>				
Prevalence of diarrhea in the last 2 weeks in under-fives	19	%	2000	MICS II
Oral Rehydration rate among under-fives	96	%	2000	MICS II
Percentage of under-fives with acute respiratory infections in the last 2 weeks	4	%	1998-2003	UNICEF
Tuberculosis prevalence	13	per 100 000 people	2003	UNSTAT
<i>HIV/AIDS</i>				
Prevalence of HIV/AIDS cases in adults	0.1	%	2003	UNICEF
Percentage of women (15-24) who know that a person can protect herself from HIV infection by consistent condom use	n.a.	-	-	-
<i>Immunization</i>				
Percent of infants with immunization against tuberculosis at 1 year of age	n.a.	-	-	-
Percent of infants with DTP3 immunization at 1 year of age	92	%	2003	UNICEF
Percent of infants with immunization against measles at 1 year of age	96	%	2003	UNICEF
Percent of pregnant women immunized against tetanus	n.a.	-	-	-

n.a.: not available

Water and sanitation

Lebanon is a water-surplus country in a water-deficient region. Almost all the population of both urban and rural areas has access to safe water and sanitation. Nonetheless, given the rate at which water consumption is increasing and the inadequacy of water management, shortages might occur in the future (MDGR, 2003).

Table 6: Access to safe water and sanitation

Indicator	Estimate	Unit	Reference period	Source
<i>Sustainable access to an improved water source</i>				
Urban	100	% of population	2002	UNICEF
Rural	100	% of population	2002	UNICEF
<i>Access to improved sanitation</i>				
Combined urban/rural	98	% of population	2002	UNICEF

Access to health services

The population has good access to affordable essential drugs. A very high proportion of births are attended by skilled health personnel. Most Lebanese have good access to health services (MDGR, 2003).

Table 7: Access to Health Services

Indicator	Estimate	Unit	Reference Period	Source
Health personnel: number of physicians	325	per 100 000 people	1990-2004	WHO
Access to affordable essential drugs *	good*	-	1999	WHO
Percentage of births attended by skilled health personnel	89	%	1995-2003	UNICEF
Public expenditure on Health	3.5	% of GDP	2002	UNESCO

* estimated between 80 and 94% of total population

Education

A high proportion of children are enrolled in the public school system. However, dropouts are still numerous among poor families because of the cost of higher education, of the low occupational and economic return of education, and due to the insufficient number of government schools in poor neighbourhoods. Nevertheless available data show an increase in post-primary school enrolment (especially among girls) and a narrowing of the gender gap in enrolment in general (UNICEF, 2005).

Table 8: Education

Indicator	Estimate	Unit	Reference Period	Source
Adult literacy	87	%	2003	UNESCO
Adult literacy rate : females as % of males	n.a.	%	1999	
Youth literacy (15-24 years)	92	%	1990	UNESCO
Net primary enrolment ratio	91	%	2002-2003	UNESCO
Grade 5 completion rate	92	%	2002-2003	UNESCO
Ratio of girls to boys in primary education	0.97	number of girls per 1 boy	2002-2003	UNESCO
Public expenditure on education	2.7	% of GDP	2000-2002	UNESCO

n.a.: not available

Level of development, poverty

In 1994, 28% of Lebanese families were estimated to live below the national poverty line, which is defined in Lebanon as the income level at which an average family of five can meet its food requirements and other basic needs such as health, education, housing and clothing. About 7% live below the extreme poverty line, defined as the income level at which a family of five can meet only its food requirements. In rural areas, more than 25% of the population were estimated to be extremely poor (Haddad, 1996).

Table 9: Human development and poverty

Indicator	Estimate	Unit	Reference period	Source
Human development index (HDI)	0.759	value between 0-1	2003	UNDP
Proportion of population living with less than 1\$ a day (PPP)	n.a.	-	-	-
Population living below the national poverty line	28	%	1994	UNDP
Human poverty index (HPI-1)	9.6	%	2003	UNDP

n.a.: not available

Other social indicators

According to World Development Indicators (2000), the status of women in Lebanon has been improving (as quoted by ESCWA, 2002). However, there is still a great discrepancy between men and women's incomes (ESCWA, 2002). In 2004 women appeared to have undertaken an active role in education and in the economy, but continued to be excluded from political institutions

Five percent of active women work in agriculture, 11.6% in industry, 0.8% in construction, 15.9% in trade, and 66.7% in services (CAS, 1998). According to the 1998 report *Labour Force in Lebanon* of the Central Administration of Statistics, in 1995 the share of women in wage employment in the non-agricultural sector was 14%. In the year 2000, women held about 2% of seats in the National Parliament (MDGR, 2003).

Child labour is still an issue in Lebanon. In 2000, it was estimated that 1% of children aged 5-9 years and 2% of children aged 10-14 years were working for wages, while 3% of children aged 5-9 years and 8% of children aged 10-14 years were doing unpaid labour. Most of them were boys, and the phenomenon was most prevalent in the South and Bekaa areas. The problem of child labour in Lebanon is being addressed by several organizations, among them UNICEF, the Parliamentary Committee for Children's Rights, the Higher Council for Childhood which includes representatives from governmental and non-governmental organizations, and the Unit for the Combat against Child Labour of the Ministry of Labour (MDGR, 2003; CBS/UNICEF, 2001).

Table 10: Other social indicators

Indicator	Estimate	Unit	Reference period	Source
Gender related development index (GDI)	0.745	value between 0-1	2003	UNDP
Women's wage employment in non-agricultural sector as % of total non agricultural employees	14	%	1995	CAS
Ratification of ILO Convention 182 on The Worst Forms of Child Labour	ratified	-	2001	ILO

II.1 Qualitative aspects of the diet and food security

Food consumption patterns

The staple foods are wheat (often consumed as flat bread *pita*) and rice. Common accompanying foods include meat (usually lamb and chicken) or fish and vegetables, often stuffed. Popular main courses are *kebbe* - mutton pounded and served with crushed wheat -; *chawarma* - grilled lamb -; *tabbouleh* - chopped parsley, mint, tomatoes and cracked hard wheat; *fattoush* - a blend of seasonal vegetables such as purslane, lettuce, radishes, tomatoes, cucumbers, parsley and mint, combined with pieces of dry *pita*.

Although most *mouhafazat* share the same staple foods and main dishes, there are some regional variations in recipes: the North, for example, is known for its *kebbe trabolsieh* characterized by a high content of ghee whereas in the South most of dishes are rich in rice and meat.

Some differences exist between urban and rural diets. Urban diets are becoming westernized: home-made traditional dishes are progressively replaced by fast-food and snack-foods, with a high content of fat, added sugars and sodium. Urban life has brought a redefinition of roles among families: both husband and wife are now working and this has reduced time available for home preparation of food. Moreover, ready-to-eat food is easily available and cheap.

No data exist on intra-household food distribution or gender issues regarding food consumption patterns in Lebanon.

Food security situation

Food security is defined as “A situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (FIVIMS).

From 1993 to 1997, Lebanon was placed in the so-called “neutral” food security group, along with Algeria, Egypt, Iran, Jordan, Kuwait, Libya, Morocco, Syria and Tunisia (Diaz-Bonilla et al., 2000). Countries in this group suffer neither from extreme famine and hunger (food insecurity) nor enjoy a state of completely secured access to sufficient food (food security).

Food self-sufficiency, defined as the proportion of consumer demand that is met by local production expressed in dietary energy supply (kcal), has remained stable since the 1990's at approximately 55% due to an improvement in food security, food availability and autonomy in food production, especially since the end of war (FAO, FAOSTAT).

II.2 National food supplies data

Supply of major food groups

Table 11: Trends in per capita supply of major food groups (in g/day)

Major food groups	Supply for human consumption in g/day					
	1965-67	1972-74	1979-81	1986-88	1993-95	2000-2002
Fruits and vegetables	601	627	652	1062	1310	1030
Cereals (excl. beer)	390	349	361	376	364	352
Milk and eggs	250	229	330	241	242	331
Starchy roots	48	68	101	118	160	167
Meat and offals	77	69	106	106	106	140
Sweeteners	74	83	94	95	93	93
Pulses, nuts, oilcrops	41	33	56	80	88	120
Other	26	32	39	41	60	52
Vegetable oils	22	28	34	41	50	48
Fish, seafood	12	11	2	2	14	31
Animal fats	8	7	13	15	13	9

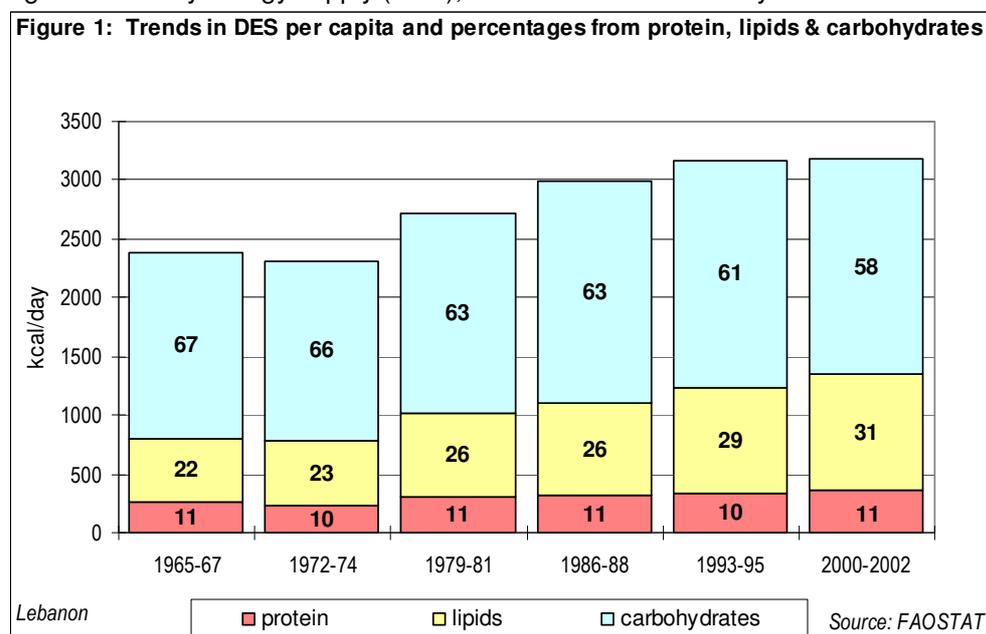
Source: FAOSTAT

A unique feature of the Lebanese food supply is the importance of the fruit and vegetable group. It is the first group, in terms of supply and its importance has grown since the mid-80s. Fruit and vegetables are an important part of the Lebanese diet and constitute an abundant source of micronutrients. Nevertheless, it must be noted that the data relate to the supply of these foods and not to actual intake by the population. Cereals are the second most important group. Supplies of animal origin food are also noticeable, especially that of milk and eggs. In contrast, supply of fish and seafood is low considering that the country has access to the sea, although an increase has been recorded since the beginning of the 90's. Supply of many food groups has increased gradually during the last forty years, as that of starchy foods, meat and offals, sweeteners, pulses, nuts, oilcrops, and vegetable oils.

While the increase in the meat supply contributes to ensuring a diet rich in protein and iron, unfortunately unhealthy processing techniques such as frying are also increasing. Pulses, nuts and oilcrops, which are good sources of protein, are considered as staple foods in Lebanon and are available in poor regions at a reasonable price. The supply of vegetable oil has increased due to a shift in cooking habits from boiling and steaming to frying and to a substitution of animal fats with oil.

Dietary energy supply, distribution by macronutrient and diversity of the food supplies

Figure 1: Dietary energy supply (DES), trends and distribution by macronutrient

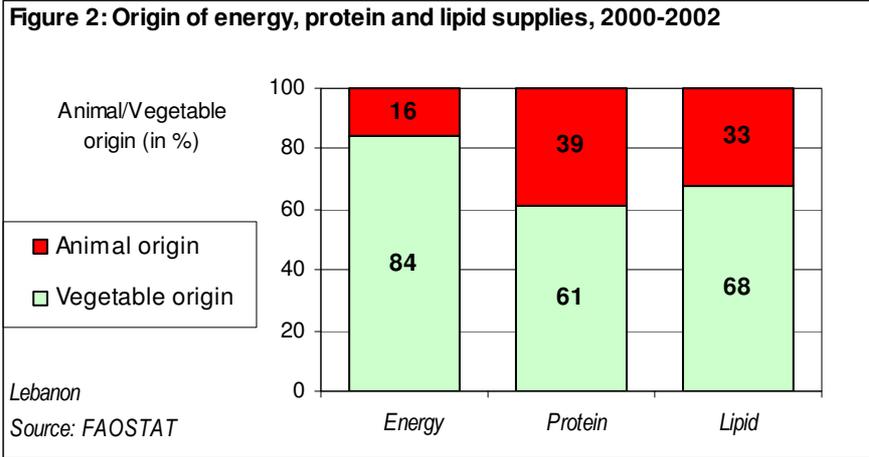


The Dietary Energy Supply (DES) increased steadily since the 70's, due to a greater availability of food. While the DES per capita was only slightly above energy requirements between 1965 and 1974, it has been increasing and now far exceeds population energy requirements. In 2000-2002, the per capita energy requirement³ was 2 118 kcal/day while the per capita energy supply was 3 160 kcal/day (FAO, 2004b). Although energy supply does not translate directly into intake, nevertheless the high energy supply could be one of the main reasons for the increasing prevalence of overweight and obesity which is observed among the Lebanese population.

The share of lipids in the energy supply has increased gradually since the 60's reaching 31% of energy in 2000-2002. Current recommendations for the share of energy from fat in the diet are of 15-30 % (WHO/FAO, 2003).

Vegetable/animal origin of macronutrients

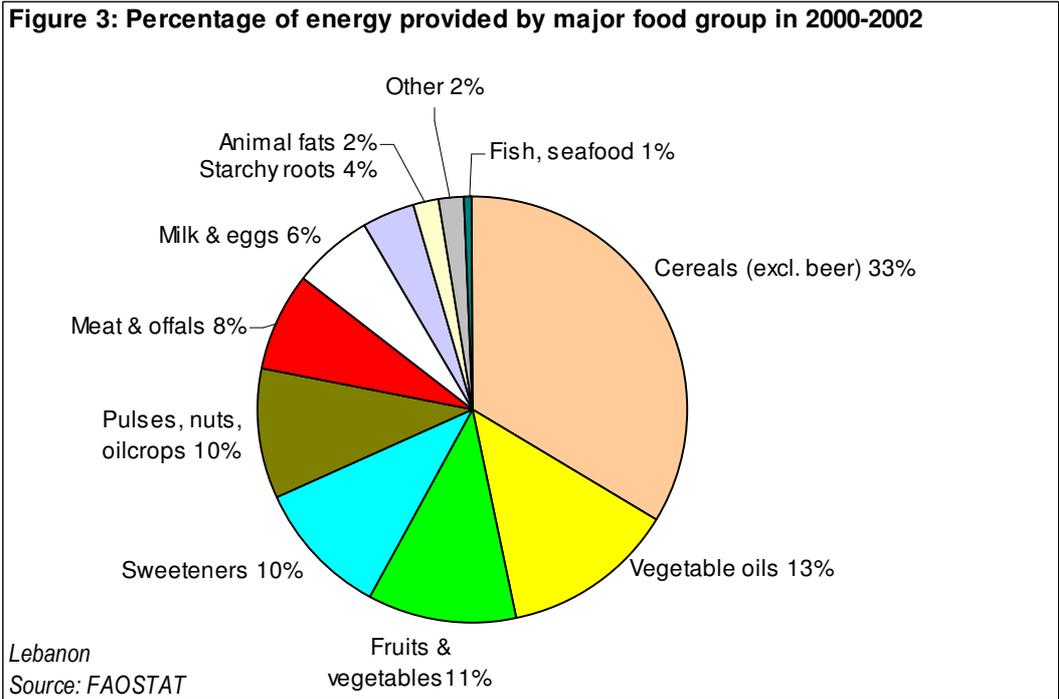
Figure 2: Vegetable/animal origin of energy, protein and lipid supplies, 2000-2002



According to FAO's 2002 food balance sheets, energy, protein and lipid supplies are mostly of vegetable origin. This is due to local food habits and to the reasonable price of vegetables in comparison with animal products.

Dietary energy supply by food group

Figure 3: Dietary energy supply by food group



³ Energy requirements are for a healthy and active lifestyle. Software default values attribute to 90 % of the urban adult population a light Physical Activity Level (PAL=1.55) and greater than light activity to the remaining 10% (PAL=1.85), and to 50% of the rural adult population a light activity (PAL=1.65) and greater than light physical activity (PAL=1.95) to the other 50%. (FAO, 2004a).

Cereals and cereal-based products are the major contributors (33%) to the dietary energy supply of the Lebanese population, followed by fruit and vegetables (11%).

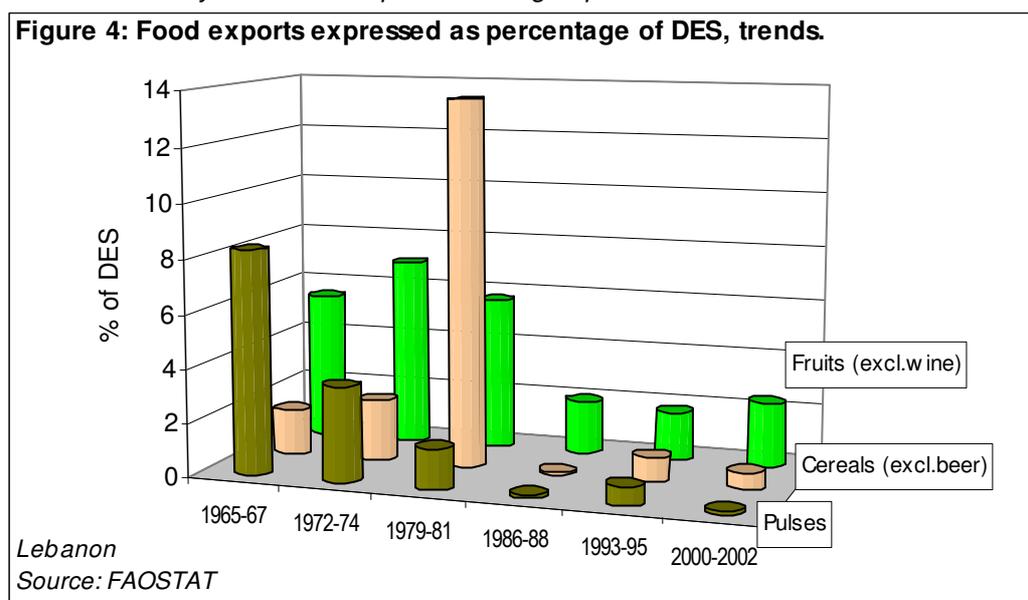
Table 12: Share of the main food groups in the Dietary Energy Supply (DES), trends

Food groups	% of DES					
	1965-67	1972-74	1979-81	1986-88	1993-95	2000-2002
Cereals (excl. beer)	49	45	40	38	35	33
Vegetable oils	8	11	11	12	14	13
Sweeteners	11	13	12	11	11	10
Fruits and vegetables	9	10	8	12	14	11
Pulses, nuts, oilcrops	6	5	7	8	8	10
Meat and offals	7	6	7	6	6	8
Milk and eggs	6	5	7	5	5	6
Animal fats	3	3	4	4	3	2
Starchy roots	2	2	3	3	4	4
Other	1	1	1	1	2	2

The food diversification index, which is the share of non-starchy foods (all except cereals and starchy roots) in DES, was 49% in 1965-67 and increased slowly but constantly reaching 63% in 2000-2002 indicating an improvement in terms of dietary quality.

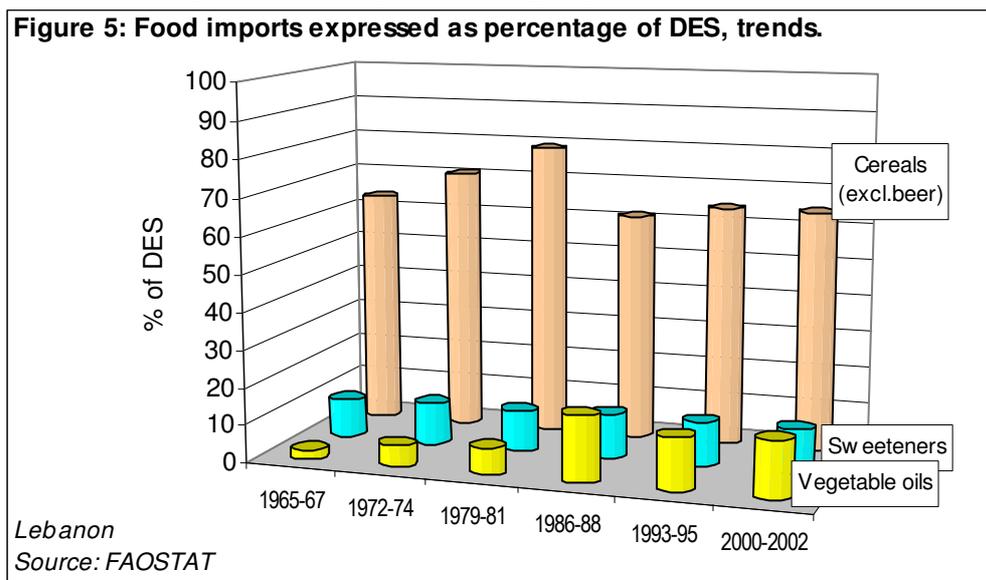
Food imports and exports

Figure 4: Major food exports as percentage of Dietary Energy Supply (DES), trends
Note that only the 3 most important food groups are shown.



During the war, the yield of cereals was at its highest, compared to other years (WB, *World Development Indicators Database*).

Figure 5: Major food imports as percentage of Dietary Energy Supply (DES), trends
 Note that only the 3 most important food groups are shown.



Because cereals are a staple food, cereals imports were maintained at a high level (around 60-80% of DES) throughout the period from 1965 until 2002. Although the local production of cereals was high during the war, from 1975 to 1990, allowing cereals to be exported, imports remained high in order to prevent any food shortage and to satisfy the increased local need, due to presence of the military contingent.

The use of vegetable oils increased over time, due to changes in food habits. Vegetable oils became the main substitute for lard, ghee and butter in food preparation, leading to an increase in their imports.

Food aid

Many assistance programmes were conducted in Lebanon to ensure food security, especially during the civil conflict period (1975-1990). Between 1993 and 2005, Lebanon was removed from the list of countries in need of food aid.

II.3 Food consumption

Very little information on food consumption in Lebanon during the last decades is available. The political instability and insecurity has made it impossible to conduct large scale studies. A national Household Budget Survey was conducted in 1997 (CAS, 1998). The survey showed high intakes (in terms of weight of food) of fruit and vegetables including potatoes, followed by cereals, dairy products, meat and poultry and sodas/juice/sugary beverages. While consumption of fish and seafood was low, that of sugar and sugar derivatives, fats and oils was high (48 g and 44 g/person/day respectively).

A review by Hwalla (2000) of various studies conducted over several decades shows a major shift in the Lebanese population's eating patterns, towards increased intake of fat, milk and animal products and a decrease in the consumption of cereal products, (bread in particular). The contribution of fat to energy intake has increased gradually and is currently above the recommended level of 30% of energy (WHO/FAO, 2003). While the various data sources did not provide a representative assessment with regard to recommended nutrient intakes, it seemed nonetheless that the diet provided low intakes of zinc among all age groups. The observed trends in dietary intakes probably reflect an improvement in access to food together with an increasing consumption of fast-food and restaurant-made meals, prepared with fats and oils.

A national study was conducted by Iskandar in all six *mouhafazat* (regions) of Lebanon, between September 2003 and April 2004 (Iskandar, 2004). Five hundred and one adults (286 women and 215 men between the age of 16 and 66) were surveyed, with a mean age of 36 years. The sample, recruited from health centres, was composed of people regularly attending medical consultations: the subjects were chosen to reflect the distribution of the population of the six Lebanese administrative *mouhafazat*. A 24-hour dietary recall method was used to collect information on food and nutrient intake of subjects. The mean BMI was found to be 26.6. The results shown in table 13 indicate that overall energy intake was adequate for both men and women. The diet provided 14% of energy from protein for men and 13% for women; 36% of energy from fat for men and 39% for women, higher than the 30% recommended by WHO/FAO (2003). Intake of saturated fats (11% of energy for both sexes) was at the upper limit of the recommended level (maximum 10% of energy intake) (WHO/FAO, 2003). This could be due to the increasing consumption of processed and ready-to-eat foods (Iskandar, 2004). The results of this survey should, however, be interpreted with caution as the sample was drawn from health centres and might not represent the general population.

A cross-sectional dietary study was conducted in Beirut and its suburbs between the months of April and September 2001 on 444 adults (210 males and 234 females between 25 and 54 years). The study was a preliminary investigation for a broader risk assessment survey (Nasreddine et al., 2005). The surveyed area was stratified into nine units based on the administrative classification of the city and its suburbs. Within each unit, an equal number of households were selected randomly. Within each household, an adult subject (25-54 yrs) was invited to participate. Ethnic minorities, refugees, pregnant and lactating women, people following restrictive diets and people with chronic diseases were excluded. The refusal rate was about 25%. A quantitative food frequency questionnaire was used to estimate the average daily intake of different food groups. The list consisted of 112 food items and a number of composite dishes. Mean energy intake was 2 524 kcal/person per day, with 13% of energy from protein, 39% from fat and 47% from carbohydrates. Contribution of macronutrients to energy intake was similar in both sexes. Results pertaining to consumption of food are shown in table 13; they indicate that cereals were the greatest contributors to energy intake, followed by fruit and vegetables, milk, dairy products and eggs, ensuring a noticeable intake of many nutrients including protein, calcium, fibre and others. Meat and offals followed, representing a good protein and iron source. Consumption of fruit and vegetables was substantial (mean 367 g/day) but still slightly lower than the recommended level of 400g/day. The consumption of fish, the best source of omega-3 fatty acids, was lower than the recommended two servings per week (WHO/FAO, 2003; Nasreddine et al., 2005).

Table 13: Food consumption data

Survey name and date (Reference)	Sampling frame	Survey population: households/ individuals	Sample characteristics			Average food consumption									
			Age (years)	Sex	Sample size	Nutrient intake (per person/day)									
Diet and physical activity as determinants of non-communicable disease risk factors in Lebanon (Iskandar, 2004)						Energy (kcal)	% from protein	% from lipid		Protein (g)	% protein from animal origin		Lipid (g)	% lipid from animal origin	
	Health centres in 6 <i>mouhafazat</i>	Individuals	16-66	M	215	2 569	14.4	35.7		95.4	n.a.		107.5	n.a.	
			16-66	F	286	1 724	13.2	38.8		56.9	n.a.		78.0	n.a.	
						Percentage of energy intake provided by *									
						Cereals	Starchy roots	Pulses, nuts & oilcrops	Fruits & vegetables	Oils & fats	Meat & offals	Fish & seafood	Milk, dairy products & eggs	Sugar & derived products	
	Health centres in 6 <i>mouhafazat</i>	Individuals	16-66	M	215	11.6	5.5	1.4	10.0	14.1	12.0	n.a.	9.4	4.8	
		16-66	F	286	12.9	7.0	2.4	11.1	17.1	11.0	n.a.	8.8	5.1		
Quantitative Food Frequency Questionnaire, 2001 (Nasreddine et al., 2005)						Major food groups (g/person/day) *									
						Cereals	Starchy roots	Pulses, nuts & oilcrops	Fruits & vegetables	Oils & fats	Meat & offals	Fish & seafood	Milk, dairy products & eggs	Sugar & derived products	
	Beirut and suburbs	Individuals	25-54	M/F	444	324.5	63.5	52.4	531.0	20.4	91.7	19.7	243.1	33.9	
						Percentage of energy intake provided by *									
					Cereals	Starchy roots	Pulses, nuts & oilcrops	Fruits & vegetables	Oils & fats	Meat & offals	Fish & seafood	Milk, dairy products & eggs	Sugar & derived products		
Beirut and suburbs	Individuals	25-54	M/F	444	18.9	6.5	5.6	12.2	6.8	8.8	1.0	10.9	6.0		

n.a.: not available

* Food groups do not include alcoholic beverages, sodas and pre-packed juices. Oils and fats represent only those that were added at the table. Thus food groups presented do not represent 100% of energy intake.

II.4 Infant and young child feeding practices

In a study by Kallas (2005), infant and young child feeding practices were investigated in Greater Beirut, on a sample of 292 infants and young children, aged 0-15 months, of different socioeconomic status. Greater Beirut was selected since it is a reflection of Lebanon in its social, economic and religious disparities. Ten public health care centres providing paediatric services were selected as well as 10 private centres. The study showed that although the majority of infants were breastfed, mixed feeding (breastfeeding combined with artificial feeding) was very common (Kallas, 2005).

A national study was conducted in 2005 among people who were attending health centres to determine the patterns of breastfeeding as well as the various social and cultural factors that shape these patterns. Data were collected from 830 Lebanese mothers with a child between one and five years of age randomly recruited from a representative sample of health centres selected by the Ministry of Social Affairs in all of the six *mouhafazat* of Lebanon (Batal et al., 2006). The majority of mothers (96%) breastfed their infant at some point. While 56% started breastfeeding within a few hours after birth, 21% started later, within a few days. Only 18% of mothers started breast-feeding within half an hour after birth. Timing of initiation of breastfeeding was associated with the type of delivery and with the facilities offered by the hospital. Fourteen percent of mothers reported that their infant was administered sweetened water as the first food after birth, whereas 38% gave breast milk as the first food. Formula milk was administered as the first food in 28% of the cases. At 1 month of age, the proportion of infants who were exclusively breastfed was 52%. It declined quickly thereafter to 23% at 4 months and 10% at 6 months (Batal et al., 2006).

In conclusion, breastfeeding initiation rates are very high but rates of exclusive breastfeeding are low and bottle-feeding is common. The Baby Friendly Hospital Initiative has not been very successful in Lebanon. More efforts are needed to train hospital personnel on how to provide information and encouragement for mothers to breastfeed soon after birth and exclusively for six months (Batal et al., 2006).

II.5 Nutritional anthropometry

Low birth weight

According to UNICEF, the prevalence of low birth weight was 6% in 2000 (MPH & UNICEF, 2000). This prevalence was slightly higher for girls (6%) than for boys (5%). About 89% of births were assisted by skilled health personnel.

In Lebanon, there is still a need to improve care during gestation in order to avoid complications and to review follow-up procedures in the immediate postpartum period.

Anthropometry of preschool children

The nutritional status of preschool children is documented only by one nationally representative survey carried out in 1996 (PAPCHILD, 1998). The survey was conducted among a sample of 2 156 boys and girls, aged 0-5 years, coming from all six *mouhafazat*, of which 1 767 were weighed and measured. Results indicated that 12% of children were stunted (chronic malnutrition) (table 15). Prevalence of wasting (3%) and underweight (also 3%), were low and indicated that neither wasting (acute malnutrition) nor underweight were public health issues in Lebanon. Overall, prevalence of malnutrition was found to be slightly higher in boys than in girls. The Bekaa region, which is the poorest in the country, had the highest prevalence of stunting, but in the South region both stunting and wasting were present. Analysis by age shows fluctuations in prevalence that are difficult to interpret. The persistence of stunting, several years after the end of the war, is a reflection of the poor access to health services and low access to nutritious foods together with low diversity of diets of young children in some population groups, especially in the Bekaa region. Lebanon was thus assessed to be in a middle position in terms of its stunting prevalence compared to countries in the region (PAPCHILD, 1998).

In a study conducted in 1997, anthropometric data of 400 rural and urban infants and young children, aged 4-24 months, were reported (Mahboub, 1997). Infants and children were selected from different geographic and socio-economic backgrounds: the Bekaa area was selected to represent rural areas and Beirut to represent urban areas. In each area, infants and young children of both high and low socio-economic status were chosen based on their place of residence. A random sample of houses from high and low economic level residential areas was selected and all infants and children in the selected age range participated in the study. The results are shown in table 15 and indicate a noticeable prevalence of stunting, while wasting was not at all prevalent. Prevalence of stunting was higher among the rural sample but the prevalence found in the urban sector was unexpectedly high. Moreover a very high prevalence of overweight was observed among both the urban and rural children. Due to the complex sampling procedures, the sample cannot be considered as representative of the population. Nevertheless, the data show a high prevalence of both stunting and overweight, typical of the nutrition transition (Mahboub, 1997).

Another survey was carried out in Beirut in 1993-94 among under fives (data not shown), but the sampling procedures were such that it is not possible to assess the representativeness of the data (El Sheikh, 1995).

Information on prevalence of overnutrition among under fives is not available at national level. There is a dearth of nationally representative and up-to-date data on prevalence of under- and over-nutrition among preschool children in Lebanon.

Table 15: Anthropometry of preschool children

Name/date of survey (month/year) (Reference)	Background characteristics	Age (years, unless otherwise specified))	Sex	Sample size	Prevalence of malnutrition							
					Percentage of children with							
					Stunting Height-for-age		Wasting Weight-for-height		Underweight Weight-for-age		Overweight Weight-for-height	
					< -3 Z-scores	< -2 Z-scores*	< -3 Z-scores	< -2 Z-scores*	< -3 Z-scores	< -2 Z-scores*	> +2 Z-scores	
Nutritional adequacy of weaning foods, 1997 (Mahboub, 1997)	Total	4-24 mos	M/F	400	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	
	Residence (not nationally representative)											
	Rural	4-24 mos	M/F	200	7.5	24.0	0.5	1.0	1.5	3.0	28.0	
Urban	4-24 mos	M/F	200	2.0	14.5	0.0	0.0	0.0	0.0	35.5		
Lebanon maternal and child health survey, Jan-March 1996 (PAPCHILD, 1998)	Total	0-4.99	M/F	1 767	2.9	12.2	0.7	2.9	0.3	3.0	n.a.	
	Sex											
		0-4.99	M	922	3.3	12.6	0.8	3.0	0.4	3.3	n.a.	
		0-4.99	F	845	2.5	11.8	0.6	2.8	0.1	2.8	n.a.	
	Region											
	Beirut	0-4.99	M/F	221	0.9	4.9	n.a.	3.1	n.a.	2.2	n.a.	
	Bekaa	0-4.99	M/F	226	7.3	31.2	n.a.	3.7	n.a.	4.1	n.a.	
	Mount Lebanon	0-4.99	M/F	534	0.8	4.9	n.a.	3.1	n.a.	1.0	n.a.	
	Nabatieh	0-4.99	M/F	97	3.2	17.9	n.a.	3.2	n.a.	4.2	n.a.	
	North	0-4.99	M/F	498	3.5	12.6	n.a.	1.4	n.a.	2.3	n.a.	
	South	0-4.99	M/F	191	4.4	15.2	n.a.	4.9	n.a.	9.8	n.a.	
	Age											
		0-0.49	M/F	152	3.3	12.6	n.a.	2.7	n.a.	0.0	n.a.	
		0.5-0.99	M/F	161	2.6	10.7	n.a.	5.0	n.a.	2.5	n.a.	
		1-1.99	M/F	363	2.4	9.9	n.a.	2.7	n.a.	3.8	n.a.	
	2-2.99	M/F	364	1.6	7.9	n.a.	3.6	n.a.	4.6	n.a.		
	3-3.99	M/F	393	3.2	15.5	n.a.	2.3	n.a.	3.5	n.a.		
	4-4.99	M/F	334	4.5	16.4	n.a.	2.1	n.a.	1.7	n.a.		

n.a.: not available

Anthropometry of school-age children

There is also a paucity of data on school-age children.

Data on anthropometry of children between the age of 6 and 10 is based on a secondary analysis of the data from Sibai et al. (2003). Data were collected in 1996 as part of a national survey including all age groups from all Governorates of Lebanon conducted by the Ministry of Social Affairs in collaboration with the United Nations Fund for Population Activities. The sampling frame was that of the mini-census (10% population) of the Population and Housing Survey (PHS). The sample of school-aged children was relatively small (197 children of both sexes). To account for sampling effect, prevalence rates were estimated using weighted data. Neither stunting, nor wasting nor underweight was detected among the schoolchildren. The prevalence of overweight and obesity, defined as the percentage of children above +1 Zscore of the NCHS reference median, was 20% among boys and 28% among girls (Hwalla et al., unpublished data). These data should be interpreted with caution due to the small sample size.

A reanalysis of the same survey for the age group 6-11 years using BMI as the indicator also showed a high prevalence of overweight and obesity. The percentage of children with a BMI-for-age $\geq 85^{\text{th}}$ percentile of the WHO reference was 23%, with gender differences, prevalence being higher among girls (19% among boys and 26 % among girls) (Hwalla et al, 2005; WHO, 1995). Prevalence of obesity (BMI-for-age $\geq 95^{\text{th}}$ p) was 7% for boys and 8% for girls.

Overall, the high prevalence of overweight and obesity among school-age children is probably due to unhealthy eating habits, including unhealthy school snacks, and lack of physical activity which in many schools is not part of the curriculum, along with an environment which is not conducive to physical activity (Hwalla et al., 2005).

Anthropometry of adolescents

The 1997 survey included a nationally representative sample of 593 adolescents (10-19 years), 257 boys and 336 girls, from households covering the six *mouhafazat* (Sibai et al., 2003). The initial analysis as well as the reanalysis (Hwalla et al., 2005), which pertains to the same data but with slightly different age groupings, showed that overweight and obesity were prevalent among adolescents. Contrary to what was observed among school-age children, young adolescent men are more affected by over nutrition than young women (table 17).

Table 17: Anthropometry of adolescents

Name/date of survey (month and year) (Reference)	Background characteristics	Age (years)	Sex	Sample size	Anthropometry of adolescents	
					Percentage of adolescents with	
					Body Mass Index (kg/m ²) BMI for age	
					(at risk of overweight and obesity) $\geq 85^{\text{th}}$ p*	obesity $\geq 95^{\text{th}}$ p*
Prevalence and covariates of obesity in Lebanon, Apr-Sep, 1997 (Sibai et al., 2003)	Total	10-19	M/F	593	20.0	5.0
	Sex					
		10-19	M	257	26.9	7.7
	10-19	F	336	14.7	2.9	
Adolescent obesity and physical activity, Apr-Sep, 1997 (Hwalla et al., 2005)	Total	12-19	M/F	453	20.8	5.5
	Sex					
		12-19	M	206	29.3	9.3
	12-19	F	247	13.4	2.0	

p: percentile

* of the BMI-for-age reference (WHO, 1995). Both publications refer to the same survey. Category $\geq 85^{\text{th}}$ percentile comprises category $\geq 95^{\text{th}}$ percentile.

Anthropometry of adult women

The 1997 survey also included a nationally representative sample of 1 216 adults, including 715 women aged 20 years and over, from households covering the six *mouhafazat* (Sibai et al., 2003).

The results indicate that, overall, 31% of adult women were overweight and 19% were obese. Although analysis by age must be interpreted with caution due to small sample sizes, overweight and obesity prevalence appeared to increase with age. This is probably due to the decline in physical activity and the slightly lower rate of energy expenditure rate among older people.

Table 18: Anthropometry of adult women

Name/date of survey (month/year) (Reference)	Background characteristics	Age (years)	Anthropometry of adult women					
			Body Mass Index ¹ (kg/m ²) (BMI)					
			Sample size	Mean (kg/m ²)	Percentage of women with BMI			
					<18.5 (chronic energy deficiency)	18.5-24.9 (normal)	25.0-29.9 (overweight)	≥30.0 (obesity)
Prevalence and covariates of obesity in Lebanon, Apr-Sep 1997 (Sibai et al., 2003)	Total	≥20	715	26.9	n.a.	n.a.	30.6	18.8
	Age							
		20-29	177	22.9	n.a.	n.a.	14.0	5.1
		30-39	193	25.0	n.a.	n.a.	31.6	11.0
		40-49	143	27.2	n.a.	n.a.	47.3	20.4
		50-59	100	28.8	n.a.	n.a.	37.9	39.3
		60-69	63	29.7	n.a.	n.a.	35.1	41.2
	≥70	39	27.6	n.a.	n.a.	38.5	33.4	

n.a.: not available

¹excludes pregnant women

Anthropometry of adult men

The 1997 survey included a nationally representative sample of 501 men aged 20 years and over from the six *mouhafazat* (Sibai et al., 2003). The results indicated that 43% of adult men were overweight and 14% were obese. Although analysis by age must be interpreted with caution due to small sample sizes, it appears that prevalence of overnutrition increased with age.

Table 19: Anthropometry of adult men

Name and date of survey (month/year) (References)	Background characteristics	Age* (years)	Sample size	Anthropometry of adult men				
				Body Mass Index (kg/m ²) (BMI)				
				Mean (kg/m ²)	Percentage of men with BMI			
					<18.5 (chronic energy deficiency)	18.5-24.9 (normal)	25.0-29.9 (overweight)	≥30.0 (obesity)
Prevalence and covariates of obesity in Lebanon, Apr-Sep 1997 (Sibai et al., 2003)	Total	>20	501	26.0	n.a.	n.a.	43.4	14.3
	Age							
		20-29	97	24.5	n.a.	n.a.	32.2	8.0
		30-39	101	25.9	n.a.	n.a.	46.5	15.9
		40-49	103	26.8	n.a.	n.a.	49.3	19.4
		50-59	80	27.2	n.a.	n.a.	55.4	19.7
		60-69	73	26.2	n.a.	n.a.	47.1	13.8
	≥70	47	25.5	n.a.	n.a.	41.1	16.1	

II.6 Micronutrient deficiencies

Iodine deficiency disorders

Prevalence of goitre and urinary iodine

In 1997 a national study was conducted on a sample of 586 school-age children (7-15 years). The median urinary iodine was found to be 95 µg/l (mild iodine deficiency), and 56% of the children had a urinary iodine level lower than 100 µg/l. Lebanon's iodine nutrition status was thus classified as mildly iodine deficient (MPH, 1997).

In 1996, in a joint survey by UNICEF and WHO with national coverage conducted among 4 923 school-age children 7-15 years old, goitre prevalence was reported to be 22% in coastal areas and 37% in rural areas. This indicates that there was moderate iodine deficiency in coastal areas, versus a condition of severe iodine deficiency in rural areas (PAPCHILD, 1998).

In 1993, in a national study on 7 319 children between the age of 7 and 15, the total goitre prevalence was found to be 26%, indicating moderate iodine deficiency (MPH, 1994).

Iodization of salt at household level

Salt iodization is mandatory by law in Lebanon: salt produced or imported in Lebanon must contain adequate amounts of iodine. A 1971 law required salt iodization with potassium iodate or potassium iodide. However, it was in 1995 that the actual production of iodized salt started. In 1995, it was shown that 85% of salt consumed at household level, throughout Lebanon, was iodized (PAPCHILD, 1998). A year later, in 1996, a study on 894 families from all Lebanese *mouhafazat*, showed that coverage had increased, with 91% of households consuming adequately iodized salt: 94% in Beirut, 91% in Mount Lebanon, 93% in the North, 86% in the South and 92% in Bekaa (PAPCHILD, 1998).

In Lebanon, at the end of the 90's, iodized salt production was estimated to be around 11 000 tons per year. Spray mixing was the usual method applied. Iodization levels were found to be around 15-30 ppm. Iodate was preferred to iodide for fortification due to its higher stability upon processing (ICCIDD, 1999 and 2001).

Vitamin A deficiency (VAD)

Prevalence of sub-clinical and clinical vitamin A deficiency

According to the 2003 MDG progress report, no Vitamin A deficiency has been recorded in Lebanon since 1994 (MDGR, 2003).

Iron deficiency anemia (IDA)

Prevalence of IDA

Data from a national survey, conducted in 1998 on 310 children aged 12-60 months, to assess the prevalence and determinants of anemia and iron deficiency, showed that 25% of Lebanese preschool children had low hemoglobin levels (Hwalla, personal communication). Iron stores, measured using serum ferritin, were found to be low in 25% of children. Approximately 11% of children had both low levels of hemoglobin and serum ferritin. Iron deficiency anemia was more prevalent in children below three years of age.

No data about prevalence of iron deficiency anemia exist for school-age children.

Table 20: Prevalence of anemia in preschool children

Survey name/date (Reference)	Background characteristics	Age (months)	Sex	Sample size	Percentage of children with	
					Any anemia (<11.0 g/dL)	Severe anemia (<7.0 g/dL)
Prevalence of IDA in children under five years in Lebanon in 1998 (Hwalla N., Personal communication)	Total	12-60	M/F	310	24.8	n.a.
	Sex					
		12-60	M	n.a.	n.a.	n.a.
		12-60	F	n.a.	n.a.	n.a.
	Age					
		12-36	M/F	91	44	n.a.
		36-48	M/F	81	18	n.a.
	48-60	M/F	135	15.6	n.a.	

n.a.: not available

A 2004 study conducted among a sample of 499 women of childbearing age, non-pregnant and non-breastfeeding (14-44 years, with a mean age of 29 years), from different Lebanese *mouhafazat*, showed that 17% were anemic (Hb<12g/dl), 28% were iron deficient (serum ferritin <15ug/l), whereas 8% had iron deficiency anemia, i.e. were both iron deficient and anemic (Al-Khatib, 2004).

Another 2004 survey was conducted among a national sample of 539 non-pregnant women of childbearing age (15–49 years) (Hwalla et al., 2004). The sampling frame was based on 68 650 households, distributed in 1 373 urban enumeration areas (smallest geographical areas for which census data are reported) and villages, covering all six Lebanese *mouhafazat*. The results showed that 21% of the women were anemic, 34% were iron deficient and 13% had iron deficiency anemia. The eating habits of the Lebanese population were considered the main cause of iron deficiency. Indeed, this study showed that 60% of women consumed insufficient amounts of iron, folate, vitamin B12 and vitamin A and 45% did not have sufficient vitamin C intake. The low dietary intake of important hemopoietic nutrients may have contributed to the low hemoglobin values observed in this study (Hwalla et al., 2004).

There are no data available on anemia in adult men.

Interventions to combat Iron deficiency anemia

Iron and folate supplements are distributed to pregnant women through the health care system. Children also receive iron supplements through the same channel (MDGR, 2003). Moreover, Lebanon is in the process of implementing national policies concerning flour fortification with iron.

Other micronutrient deficiencies

The study by Al-Khatib (2004) also assessed other micronutrient deficiencies. The results showed that folate deficiency (defined as plasma folate <6.6 ng/mL) was found among 25% of women and vitamin B12 deficiency among 39% (defined as plasma B12 < 300 pg/mL). Among the anemic women, 15% had folate deficiency, 29% vitamin B12 deficiency and 13% had both folate and B12 deficiencies. In general, a high prevalence of vitamin B12 deficiency was observed among Lebanese women, suggesting that further research is needed on the status of this vitamin (Al-Khatib et al, 2006).

In a study conducted in the summer of 1999 on a sample of 465 women from central Lebanon, most of whom consuming a regular Middle Eastern diet including dairy products, 60% were found to suffer from vitamin D deficiency, as defined by serum 25-hydroxyvitamin D less than 40nmol/L (Fuleihan and Deeb, 1999). This result was explained by the lack of skin exposure to the sun among these veiled women, as well as by a lack of governmental initiatives regarding the supplementation of food with vitamin D (Fuleihan and Deeb, 1999). Nevertheless it is unclear whether this sample is representative at national level.

II.7 Policies and programmes aiming to improve nutrition and food security

A Nutrition Unit was established in the Ministry of Public Health (MPH) in August 1997, with the support of WHO. The mandate of the unit includes:

- Development of a nutrition strategy based on surveillance of nutrition related diseases.
- Communication and coordination with public and private sectors regarding the prevention of food borne diseases.
- Coordination of nutrition education activities, implementation of nutrition education at primary health care level and coordination with the Ministry of Education to integrate safe nutrition habits in the school curriculum.
- Development of national nutritional and food safety guidelines.

WHO also supported the Micronutrient Initiative by promoting salt iodization as well as flour fortification with iron and folic acid. Salt iodization was decided in 1971 following a Parliament decree but practical implementation only started in 1995, under the authority of the Ministry of Health in collaboration with UNICEF. In the late 90's, salt fluoridation was envisaged because of the high prevalence of tooth decay but studies showed that fluor levels were high in drinking water, so the project was not implemented. A project for fortification of bread with iron has been submitted under the umbrella of the International Atomic Energy Agency in 2006. A preliminary efficacy study is underway.

Between 1997 and 2001, Primary Health Care services focused on improving maternal and child health. In this context, special attention was given to such domains as the promotion of proper child nutrition and of healthy living habits within households, including the implementation of the "Safe Motherhood Initiative", addressing the various aspects of health and development of young children and mothers.

Concerning food safety, no unified norms and standards exist in Lebanon. A Food Safety Panel was established in 2001 in collaboration with UNIDO. A Food Safety Act was drafted by the Ministry of Economy and Trade but has not yet been approved by the Parliament. Lebanon does not yet participate in the Codex. Standards concerning agro-foods, along with other industrial products, are under the authority of LIBNOR, the Lebanese Standards Institution attached to the Ministry of Industry.

Many United Nations' agencies and NGOs are active in Lebanon, supporting several activities and projects directly or indirectly related to nutrition. FAO, for example, supports projects for the development of school-gardens and home-gardens. The Popular Aid for Relief and Development (PARAD), an NGO registered in Lebanon, has provided public health services to displaced Lebanese and Palestinians in Beirut and the South of Lebanon every year since 1983.

Additional efforts could however be made to monitor overweight and obesity trends, the evolution of food consumption patterns and micronutrient deficiencies, particularly concerning iron, folate, vitamin B12 and vitamin D in certain population groups.

Reference list

- Al-Khatib, L.** 2004. *Assessment of anemia, iron, folate and vitamin B12 status in Lebanese women of childbearing age*. MS thesis, American University of Beirut, Lebanon.
- Al Khatib, L., Obeid, O., Sibai, AM., Batal, M., Adra, N., Hwalla, N.** 2006. Folate deficiency is associated with nutritional anaemia in Lebanese women of childbearing age. *Public Health Nutr.*, 9(7):921-927.
- Batal, M., Boulghourjian, C., Abdallah, A. & Afifi, R.** 2006. Breast-feeding and feeding practices of infants in a developing country: a national survey in Lebanon. *Public Health Nutr.*, 9(3):313-319. (available at http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&list_uids=16684382&dopt=Books)
- CAS.** 2005. *Living Conditions National survey 2004/First Statistical results*, Central Administration for Statistics, Presidency of the Council of Ministers, Lebanese Republic. (available at: http://www.cas.gov.lb/Newsrep_en.asp)
- CAS.** 1998. *Conditions de Vie des Ménages en 1997*. Etudes Statistiques, No. 9, Février 1998. Central Administration of Statistics, Beirut. (available at <http://www.cas.gov.lb>)
- Diaz-Bonilla, E., Thomas, M., Robinson, S. & Cattaneo, A.** 2000. *Food Security and Trade Negotiations in the World Trade Organization: A Cluster Analysis of Country Groups*. Discussion Paper 59, Trade and Macroeconomics Division. International Food Policy Research Institute (IFPRI): Washington, DC. (available at <http://www.ifpri.org/divs/tmd/dp/tmdp59.htm>)
- EI Sheikh, L.** 1995. *Nutritional status of preschool children from different socioeconomic backgrounds: comparison between day-care centres and at-home*. MS thesis completed in 1995, American University of Beirut, Lebanon.
- ESCWA.** 2002. *Women and Men in the Arab Countries: Employment*. ESCWA/STAT/2002/1, 28 March 2002. Economic and Social Commission for Western Asia. (available at <http://www.escwa.org.lb>)
- FAO.** 2005. *FAOSTAT Compendium of food and agriculture indicators, 2005*. Food and Agriculture Organization of the United Nations, Statistics Division. Rome. (available at http://www.fao.org/ES/ess/compendium_2005/default.asp)
- FAO.** 2004a. *Human energy requirements. Report of a Joint FAO/WHO/UNU Expert Consultation, Rome, 17-24 October 2001*. FAO Food and Nutrition Technical Report Series No. 1. Food and Agriculture Organization of the United Nations. Rome. (available at http://www.fao.org/documents/show_cdr.asp?url_file=/docrep/007/y5686e/y5686e00.htm)
- FAO.** 2004b. *FAO Statistical Country profile 2004*. FAO Statistics Division, Food and Agriculture Organization of the United Nations. Rome. (available at <http://www.fao.org/countryprofiles/index.asp?lang=en&iso3=LBN&subj=3>)
- FAO.** *Forestry Division Country Profiles*. Food and Agriculture Organization of the United Nations. Rome. (available at <http://www.fao.org/forestry/foris/webview/forestry2/index.jsp?sitetreeld=18927&langId=1&geold=0>). Accessed in 2006.
- FAO.** FAOSTAT statistical database. Food and Agriculture Organization of the United Nations. Rome. (available at <http://faostat.external.fao.org/faostat>). Accessed in 2006.
- Fuleihan, G.E. & Deeb, M.** 1999. Hypovitaminosis D in a sunny country. *New England J. Med.*, 340(23):1840-1841.
- Haddad, A.** 1996. The Poor in Lebanon. *The Lebanon Report*, number 3, summer 1996. The Lebanese Center for Policy Studies. Beirut. (available at http://www.lcps-lebanon.org/web04/english/publications/periodicals/lreport/poor_in_lebanon.html)

- Hamze, M. & Abul Khoudoud, A.** 2005. *Agriculture, fishery, food and sustainable rural development in the Mediterranean region: Annual Report 2005, Lebanon*. National Council for Scientific Research (CNRS), Beirut, and International Centre for Advanced Mediterranean Agronomic Studies (CIHEAM). (available at <http://www.medobs.org/panorama/rapport2005/>)
- Hilan, C.** 2000. Lebanon Country Paper. In Thomson E.F., von Kaufmann R., Li Pun H., Treacher T. and van Houten H., eds. *Global Agenda for Livestock Research. Proceedings of a Consultation on Setting Livestock Research Priorities in West Asia and North Africa (WANA) Region, ICARDA, Aleppo, Syria, 12–16 November 1997*. ILRI (International Livestock Research Institute), Nairobi, and ICARDA (International Center for Agricultural Research in the Dry Areas), Aleppo, Syria. (available at <http://www.ilri.cgiar.org/InfoServ/Webpub/Fulldocs/Wana/Lebanon.htm>)
- Hwalla, N.** 2000. Dietary intake and nutrition related disorders in Lebanon. *Nutr. Health*, 14(1):33-40.
- Hwalla, N., Adra, N. & Jackson, R.T.** 2004. Iron deficiency is an important contributor to anemia among reproductive age women in Lebanon. *Ecol. Food Nutr.*, 43(1-2): 77-92.
- Hwalla, N., Adra, N. & Sibai, A.** 2005. Adolescent obesity and physical activity. *World Rev. Nutr. Diet.*, 94:42-50.
- ICCIDD.** 2001. IDD in the Middle-East. *IDD Newsletter*, 17(3). International Council for the Control of Iodine Deficiency Disorders (ICCIDD), Zürich, Switzerland. (available at www.iccidd.org)
- ICCIDD.** 1999. *IDD Newsletter*, 15(2). International Council for the Control of Iodine Deficiency Disorders (ICCIDD), Zürich, Switzerland. (available at www.iccidd.org)
- Iskandar, M.** 2004. *Diet and physical activity as determinants of non-communicable disease risk factors in Lebanon*. MS thesis completed in Oct. 2004, American University of Beirut, Lebanon.
- ITU.** *World Telecommunication Indicators Database*. International Telecommunication Union. (available at <http://www.itu.int/ITU-D/ict/statistics/>). Accessed in 2006.
- Kallas, L.** 2005. *Infant feeding practices in Greater Beirut: Impact on nutritional and health status*. Thesis. American University of Beirut, Lebanon.
- Mahboub, N.** 1997. *Nutritional adequacy of weaning foods in rural and urban Lebanese infants*. Thesis. American University of Beirut, Lebanon.
- MDGR.** 2003. *Millenium Development Goals Report for Lebanon*. September 2003. Lebanese government and UN Country Team. (available at: <http://www.undg.org/content.cfm?id=79>)
- MET.** 2005. *Economic Accounts of Lebanon 1997-2002*. Ministry of Economy and Trade, compiled and published under the supervision of Robert Kasparian with the support of the Economic Unit, UNDP Project, Ministry of Economy and Trade. July 2005, Beirut. (available at: <http://www.economy.gov.lb/MOET/English/Panel/Publications/>)
- MOE.** 2001. *State of the Environment Report 2001*. Ministry of Environment, Republic of Lebanon. (available at <http://www.moe.gov.lb/Reports/SOER2001.htm>)
- MPH.** 1997. *Evaluation Studies of the IDD programme in Lebanon 1997*. Collaboration between the Ministry of Public Health of Lebanon and UNICEF. Beirut.
- MPH.** 1994. *IDD survey in Lebanon, 1993 – final report*. Ministry of Public Health of Lebanon, UNICEF, WHO, American University of Beirut, Beirut.
- MPH & UNICEF.** 2000. *National Report on Follow-up to the World Summit for Children*. Ministry of Public Health and UNICEF Survey on Perinatal Morbidity and Mortality, 2000.
- Nasreddine, L., Hwalla, N., Sibai, A., Hamze, M. & Parent-Massin, D.** 2005. Food consumption patterns in an adult urban population in Beirut, Lebanon. *Public Health Nutr.*, 9(2):194-203.

PAPCHILD. 1998. *Lebanon Mother and Child Health Survey; Pan Arab Project for Child Development, 1996.* Ministry of Public Health supported by UNFPA, WHO, UNICEF and AGFUND. The League of Arab States, Cairo.

Sibai, A., Hwalla, N., Adra, N. & Rahal, B. 2003. Prevalence and covariates of obesity in Lebanon: Findings from the first epidemiological study. *Obes. Res.*, 11(11):1353-1361. (available at www.obesityresearch.org/cgi/reprint/11/11/1353.pdf)

Sibai, A., Fletcher, A., Hills, M. & Campbell, O. 2001. Non-communicable disease mortality rates using the verbal autopsy in a cohort of middle aged and older populations in Beirut during wartime, 1983-1993. *J. Epidemiol. Community Health*, 55(4):271-276.

UNDP. *Human Development Report 2004.* United Nations Development Programme. New York. (available at <http://hdr.undp.org/reports/global/2004/>).

UNESCO. *Global Education Digest 2004.* Unesco Institute for Statistics, Montreal, 2004. (available at http://www.uis.unesco.org/TEMPLATE/pdf/ged/2004/GED2004_EN.pdf)

UNHCR. 2005. *Statistical Yearbook 2003: Trends in displacement, protection and solutions.* May 2005. United Nations High Commissioner for Refugees, Geneva. (available at <http://www.unhcr.org/cgi-bin/texis/vtx/statistics/opendoc.htm?tbl=STATISTICS&id=42aff7e84>)

UNICEF. 2005. *The State of the World's Children 2005.* United Nations Children's Fund. New York. (available at http://www.unicef.org/publications/index_24432.html).

UNICEF. *Information by country.* United Nations Children's Fund. New-York. (available at <http://www.unicef.org/statistics/>). Accessed in 2006.

UNPD. *World Population Prospects: the 2004 Revision.* Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat. New York, USA. (available at <http://esa.un.org/unpp>). Accessed in 2006.

UNSTAT. *Millennium Indicators Database.* United Nations Statistics Division. New-York. (available at http://unstats.un.org/unsd/mi/mi_goals.asp). Accessed in 2006.

WFP. 2005. *The 2004 Food Aid Flows. The Food Aid Monitor - May 2005.* International Food Aid Information System of the World Food Programme. World Food Programme of the United Nations. Rome. (available at <http://www.wfp.org/interfais>)

WHO. 1995. *Physical status: the use and interpretation of anthropometry. Report of a WHO Expert Committee.* Technical Report Series no. 854. World Health Organization, Geneva. (available at <http://www.who.int/nutrition/publications/emergencies/en/>)

WHO/FAO. 2003. *Diet, Nutrition and the Prevention of Chronic Diseases.* WHO Technical Report Series 916. Report of a Joint WHO/FAO Expert Consultation, Food and Agriculture Organization and World Health Organization of the United Nations, Geneva. (available at <http://www.fao.org/docrep/005/AC911E/AC911E00.HTM>)

WB. 2005. *Country Assistance Strategy for the Republic of Lebanon, Report No. 34463-LB, November 22, 2005.* International Bank for Reconstruction and Development. World Bank. Washington D.C.

WB. *World Development Indicators Database.* World Bank. Washington D.C. (available at <http://ddp-ext.worldbank.org/ext/DDPQQ/member.do?method=getMembers>). Accessed in 2006.

