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Republic of Lebanon

Office of the Minister of State for Administrative Reform

Center for Public Sector Projects and Studies

(C.P.S.P.S.)

PROSPECTIVE DEMAND

FOR FOODSTUFFS IN LEBANON

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I N T R O D U C T I O N

The aim of this report is to estimate the Potential Increase in the domestic demand for food-stuffs. This, However, in volves forecasting which in it-self is Probably one of the most stimulating guidelines for a sound agricultural development policy. Su ch an exercise usu ally brings into perspective the various social and economic factors that normally influence demand particularly population and nation al income. However, there are other factors influencing demand among which are the following: 1) changes in the price level , 2) changes in the age structure of the population , 3) changes in tastes and habits , 4) rural migration to urban areas and 5) changes in income distribution.

The need in Lebanon for su ch studies arises in view of the persisting discrepancies between agricultural production and demand requirements that are usually met through imports which cause heavy pressures on the country's balance of international payments.

Grosse income from agriculture while increasing in recent years, has not kept pace with the rates of growth in other sectors and in consequence the percentage contribution of agriculture to gross domestic out-put declined consistently in recent years. The persistance of such a situation may weaken still further the comparative position of this sector with the other sectors and could discourage the inflow of investment capital in agriculture.

In the ensuing pages an attempt will be made to prodect the likely levels of future demand for major foodstuffs by 1990. Subsequently, this will be followed by a look on the evolution of prices of foodstuffs taking 1970 as a base year.

2- Methodology

This study covers the demand projections for major foodstuffs for 1990. The demand functions used in this study were the semi-logarithmic and log-inverse functions expressed as follows.

$$Y1 = Yo\ (1+2.3026E \log 10 \frac{X1}{Xo})\ \text{(semi-log)}$$

$$Y1 = Yo\ (\text{Antilog}\ (0.4343E(1-\frac{Xo}{X1}))\ )\ \text{(Log-Inverse)}1$$

Where:

Y1 = Per caput demand in target year
Yo = Per caput demand in base year
E = Income Elasticity
X1 = Per caput income in target year
Xo = Per caput income in base year

The indices of demand by 1990 were calculated as follows:

$$I = \frac{\Sigma(Q_n P_o)}{\Sigma(Q_o P_o)}$$

Where:
I - Index of demand
Q_n = The demand for a commodity in the n^{th} year
Q_o = Quantity demanded of a commodity in the base period
P_o = relative price weight of ε commodity at base period

1-Source: FAO, Agricultural Commodity Projections 1970-1980, Rome 1971, Page XXXVII.

The relative price weights for the construction of the quantum indices are listed in the appendix. These represent the average retail prices for each product.

3- Prospective demand for 1990

Two major criteria are normally applied in such projections namely the linear projection approach which is an extrapolation of the past trends and the aggregate approach where the volume of net supplies at the base period is weighted by such influencing factors as the changes in population, in national income and in the income elasticity of demand.

Under the linear projection approach a series of social and economic factors, particularly in the cases of population and national income are assumed to maintain their past degrees of emphasis in influencing the total levels of demand. Little consideration here is paid to the likely changes that may take place in the future consumption patterns as income increases,

or as prices change in varying magnitudes among different commodity groups. This approach however is used with great reservations. To reach more realistic indications of the likely levels of future demand, the aggregate approach was used in this study taking into consideration the rate of growth of population, rate of growth of per capita private consumption expenditure and the coefficient of income elasticity of demand. Different demand functions were used depending on the consumption habits of the country, the actual levels of total consumption at the base period and on the normal sensibility of demand for differnet commodities as income and purchasing power increases.

For the purpose of this study, the population data for the base period was taken from the United Nations data for the year 1970 and two annual rates of increase of 2.2% and 2.4%, the latter

allowing, among other things, for greater inflow of tourism into the country and a decline in migration as income and employment opportunitées increase in the country, were used in estimating the future levels of population by 1990.

In the case of national income, the data published by the central statistical office was used where private consumption expenditure was estimated at 4196.9 million LL. in 1970. Two rates of annual growth were utilized. These were 6% (low) and 7% (high) for the period 1970-1990 . Conseqaently , for 1990, there were two levels of per capita consumption expenditures, namely the two assumptions of total private consumption expenditures divided by the two population assumptions. The income and population data used in this study were there fore as follows:

	1970	1990	
		Low	High
Population (1000)	2.650*	4.095	4.258
Total Private consumption expenditures (million LL.)	4196.9*	13460.0	16240.7
Per caput (L.L.	1583.7	3286.0	3814.2

* Ibid, page 117

** Recueil de Statistiques Libanaises N^a 8, 1972

The relationship between income and consumption or demand for different products is expressed by the income elasticity of demand or the ratio between the relative change in demand and in income. The income elasticity used in determining the levels of prospective demand for 1990 (see appendix) was derived from the household consumption survey,

and some slightly modified figures were used for the period 1970-1990.

Taking into consideration the consumption pattern in the past, it was found advisable to use only two main functions in calculating the likely levels of future demand for separate comodities. These functions were the semi-logarithmic function and the log-inverse function. The semi-logarithmic function implies a decline in the relative value of the income elasticity coefficient proportional to the changes in the quantities consumed without providing for a saturation level. The log-inverse fun ction, however implies a decline in the absolute value of the elasticity coefficient proportional to the increase in per caput income, as income tends toward infinity, consumption also tends toward a saturation level.

The results obtained are illustrated in tables 1 to 6 showing the prospective demand for major food-stuffs and commodity groups in 1990 and the respective role of these commodity groups in the composition of total demand.

. Broadly speaking two major courses of likely trends have emerged from the data namely the likelihood of a continuous increase in total domestic requirements but at declining rates of growth and the tendency for a continuous increase in demand for more nutritive and richer food groups.

The quantum index of total demand for foodstuffs is shown in table 5.By 1990 the minimum and maximum increases over the base period of 1970 will be in the magnitude of 112 percent and 133 percent respectively. While aggregate demand will continue to increase in the future the data indicated that some serious declines may take place in the expected rates of growth especially when taken on a per capita basis from nearly 6% per annum to some 2.0 percent per annum between 1970 and 1990. Hance the bulk of the increase in demadd that may be registered in the future will

be due to the expected growth in population rather than because of any expected rise in income and individual consumption needs.

The second conclusion on the composition of prospective demand and the changes that may take place in the demand for different commodity groups are illustrated in table 6. As can be seen, the greatest increase in the expected volume of demand will continue to take place among the high value and nutritive commodities especially among some edible animal products, These latter will constitute some 33.9% of the total value of domestic demand by 1990. Slight improvements may be seen in selected fruits such as citrus and bananas. Conversely, the place of cereals, starchy roots, sugar, pulses and nuts, and vegetables in the total aggregate demand will continue to decline from the level of 1970. They are unlikely to constitute more then 17.6% of the total value of aggregate demand by 1990.

Price evolution of foodstuffs

The consumer price indices for foodstuffs are shown in table 7. As can be seen, the prices of cereals have slightly risen in 1972 compared with base year 1970. Sugar has fallen by 1.4% in 1971 then rose by 3.9% by 1972 compared to 1970. Vegetables prices have doubled by 1972 compared to 1971, and have risen by 12.9% in 1972 compared with 1970. Fruits and eggs prices have fallen by 1.5% and 4.5% in 1972 compared with base year. Meat and meat products, fish, milk and dairy products, fats and oils prices have risen by 22.8% , 5.6% , 31.7% and 16.2% consequently. However, the annual average increase in prices of foodstuffs was 2.7% and 11.6% in 1971 and 1972 consequently compared with the base year 1970.

An interesting indicator of the movement of prices in terms of a change in the value of the Lebanese pound is shown in table 8. The purchasing power of Lebanese lira in terms of different commodities is calculated for 1971 and 1972 i.e.

the purchasing power of milk and dairy products in 1972 is 75 piastres of what it was in 1970. Put in other words, one Lebanese pound was only worth 75 piastres in 1972 in terms of milk and dairy products. For all foodstuffs, the purchasing power was 0.97 or 97 piasters in 1971 and 89 piasters in 1972 compared with the base year 1970.

Concluding observations

It is understandable that varying figures for prospective demand will arise principally in the application of different assumptions and estimates of national income, prospective growth in population and of income elasticity of demand. It is therefore necessary to consider the various findings in the light of these reservations.

For the lack of dispensible data, it was assumed in this study that the age structure of the population as well as its occupational distribution between urban and rural areas will remain unchanged, For long-run projections , certain modifications need to be made when the relevant detailed data become available. Another equally important factor is to consider the impact of tourists on the volume of demand since this sector is rapidly gaining weight. Also needed is a national household consumption survey in order to obtain more relevant income elasticity figures. Finally, other factors such as income distribution and changes in consumption habits that are usually reflected in the type of demand function used should be taken into consideration.

Table 1- Aggregate projection of total domestic demand

(1000 Metric tons

Commodity	1970 (1)	1990	
		Low	High
Cereals	322.8	613.8	654.9
Wheat	267.4	516.0	552.3
Rice	22.8	40.1	43.0
Coarse grains	32.6	54.0	57.1
Starchy roots	49.8	88.0	94.1
Sugar	63.9	116.7	125.2
Pulses and nuts	30.2	52.4	55.8
Vegetables	262.1	511.0	548.0
Fruits	388.7	850.1	924.0
Citrus	121.6	269.9	294.2
Bananas	15.6	38.1	42.6
Other	251.8	453.3	481.2
Meat	76.3	182.6	203.5
Beef and veal	19.6	45.9	50.7
Mutton and lamb	24.6	60.2	67.3
Poultry	18.8	48,7	54.1
Others	13.0	25.4	27.7
Eggs	9.8	22.5	24.7
Fish	8.7	24.2	27.7
Milsk	126.9	325.1	365.3
Fosts and oils	27.8	52.4	56.6
Vegetable oils	22.3	49.1	54.1
Butter	2.1	4.1	4.7
Others	3.4	5.7	6.4

1)- FAO, Agricultural commodity projections, 1970-80 vol II, Rome 1971.

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Table 2: Aggregate projection of per caput demand

(Kg./yr)

Commodity	1970	1990(Low)	1990(high)
Cereals	121.8	149.9	153.8
WHEAT	100.9	126.0	129.7
RICE	8.6	9.8	10.1
COARSE GRAINS	12.3	13.2	13.4
STARCHY ROOTS	18.٤	21.5	22.1
SUGAR	24.1	28.5	29.4
PULSES AND NUTS	11.4	12.8	13.1
VEGETABLES	98.9	124.8	128.7
FRUITS	146.7	207.6	217.0
CITRUS	45.9	65.9	69.1
BANANAS	5.9	9.3	10.0
OTHERS	94.8	110.7	113.0
MEAT	28.8	44.6	47.٤
BEEF AND VEAL	7.4	11.2	11.9
MUTTON AND LAMB	9.3	14.7	15.8
POULTRY	7.1	11.9	12.7
OTHERS	4.9	6.2	6.5
EGGS	3.7	5.5	5.8
FISH	3.3	5.9	6.5
MILK	47.9	79.4	85.8
FATS AND OILS	10.5	12.8	13.3
VEGETABLE OILS	8.4	12.0	12.7
BUTTER	0.8	1.0	1.1
OTHERS	1.3	1.4	1.5

Table 3: Value of total domestic demand at 1970 constant prices

(Million L.L.)

Commodity	1 9 7 0	1990(Low)	1990(High)
CEREALS	125.6	23 ٤. ٤	254.7
WHEAT	80.2	154. ٤	165.7
RICE	13.2	23.2	24.9
COARSE GRAINS	9.4	15.5	16.4
STARCHY ROOTS	22.4	39.6	42.3
SUGAR	49. ٤	91.0	97.6
PULSES AND NUTS	24.0	41.6	44.4
VEGETABLES	202.3	394.5	423.0
FRUITS	351.0	767.6	834.4
CITRUS	68.1	151.1	164.7
BANANAS	15.6	3 ٤.1	42.6
MEAT	405.0	969.2	1080.2
PEEF AND VEAL	118.6	277.7	306.7
MUTTON AND LAMB	166.5A	407.5	455.6
POULTRY	35.9	93.0	103.3
OTHERS	84.5	165.1	180.0
EGGS	17.2	39.6	43.5
FISH	26.1	72.6	83.1
MILK	76.1	195.1	219.2
FATS AND OILS	111.6	210.3	227.1
VEGETABLE OILS	43.5	95.7	105.5
BUTTER	7.0	13.7	15.7

Table 4: Value of per caput domestic demand at 1970 constant prices

(L.L.)

COMMODITY	1970	1990	
		LOW	HIGH
CEREALS	47.4	58.3	59.8
WHEAT	30.3	37.8	38.9
RICE	5.0	5.7	5.8
COARSE GRAINS	3.5	3.8	3.9
STARCHY ROOTS	8.5	9.7	9.9
SUGAR	18.8	22.2	22.9
PULSES AND NUTS	9.1	10.2	10.4
VEGETABLES	76.4	96.3	99.4
FRUITS	132.5	187.5	195.9
CITRUS	25.7	36.9	38.6
BANANAS	5.9	9.3	10.0
MEAT	152.9	236.7	253.7
BEEF AND VEAL	44.8	67.8	72.0
MUTTON AND LAMB	68.0	99.5	107.0
PULTRY	13.6	22.7	24.3
OTEHRS	31.8	40.3	42.3
EGGS	6.5	9.7	10.2
FISH	9.9	17.7	19.5
MILK	28.7	47.6	51.5
FATS AND OILS	42.1	51.4	53.4
VEGETABLE OILS	16.4	23.4	24.8
BUTTER	2.7	3.4	3.7

Table 5: Index of Domestic Demand

(1970=100)

COMMODITY	TOTAL		PER CAPUT	
	1990		1990	
	LOW	HIGH	LOW	HIGH
CEREALS	190	203	123	126
WHEAT	193	207	125	128
RICE	176	187	114	116
COARSE GRAINS	165	174	108	111
STARCHY ROOTS	177	189	114	116
SUGAR	183	196	118	122
PULSES AND NUTS	173	185	112	114
VEGETABLES	195	209	126	130
FRUITS	219	238	142	148
CITRUS	222	242	143	150
BANANAS	244	273	158	169
MEAT	239	267	155	166
BEEF AND VEAL	234	259	151	161
MUTTON AND LAMB	245	274	158	170
POULTRY	259	288	167	179
OTHERS	195	213	127	133
EGGS	230	253	149	157
FISH	278	318	179	197
MILK	256	288	166	179
FATS AND OILS	188	203	122	127
VEGETABLE OILS	220	243	143	151
BUTTER	196	224	126	137
TOTAL	212	233	137	145

Table 6: Composition of aggregate demand

(percent)

COMMODITY	1970	1990 LOW	1990 HIGH
CEREALS	6.1	5.3	5.2
WHEAT	3.9	3.4	3.4
RICE	0.6	0.5	0.5
COARSE GRAINS	0.5	0.3	0.3
STARCHY ROOTS	1.1	0.9	0.9
SUGAR	2.4	2.0	2.0
PULSES AND NUTS	1.2	0.9	0.9
VEGETABLES	9.8	8.8	8.6
FRUITS	17.1	17.1	16.9
CITRUS	3.3	3.4	3.3
BANANAS	0.8	0.8	0.9
MEAT	19.7	21.6	21.9
BEEF AND VEAL	5.8	6.2	6.2
MUTTON AND LAMB	8.1	9.1	9.2
POULTRY	2.7	2.1	2.1
OTHERS	4.1	3.7	3.6
EGGS	0.8	0.9	0.9
FISH	1.3	1.6	1.7
MILK	3.7	4.3	4.5
FATS AND OILS	5.4	4.7	4.6
VEGETABLE OIL	2.1	2.1	2.1
BUTTER	0.3	0.3	0.3
T O T A L	100.0	100.0	100.0

Table 7: Consumer Price Indices

(1970=100)

Commodity	Coeffi-cient of Ponderation	Y E A R				
		1 9 6 8	1 9 6 9	1 9 7 0	1 9 7 1	1 9 7 2
Cereals	7,70	101,2	100.7	100	99,1	100.7
Sugar	1,60	92.2	96.5	100	98.6	103.9
Vegetables	5,05	93.3	106.7	100	106.0	112.9
Fruits	5,50	76.1	97.9	100	93.0	98.5
Meat and meat products	10,00	96.1	103.3	100	104.9	122.8
Eggs	0.90	98.4	108.8	100	94.1	95.5
Fish	0.70	85.5	93.8	100	107.0	105.6
Milk and dairy products	3.60	99.4	98.6	100	109.2	131.7
Fats and oils	2.10	90.5	95.7	100	115.7	116.2

Source: Recueil de Statistiques Libanaises, N°8, 1972, Figures were converted to base year 1970.

Table 8: Purchasing Power

C O M M Ð D I T Y	1 9 7 1	1 9 7 2
Cereals	1.009	0.993
Sugar	1.014	0.962
Vegetables	0.943	0. 886
Fruits	1.075	1.015
Meat and meat products	0.953	0.814
Eggs	1.063	1.047
Fish	0.934	0.947
Milk and dairy products	0.916	0.759
Fats and oils	0.864	0.860

Appendix 1: Retail Prices of Agricultural Products (1970)

Commodity	Average (Price(LL./Ton)
CEREALS	389
WHEAT	300
RICE	580
COARSE GRAINS	288
STARCHY ROOTS	450
SUGAR	780
PULSES AND NUTS	795
VEGETABLES	772
FRUITS	903
CITRUS	560
BANANAS	1000
OTHERS	--
MEAT	5308
BEEF AND VEAL	6050
MUTTON AND LAMB	6770
POULTRY	1910
OTHERS	6500
EGGS	1760
FISH	3000
MILK	600
FATS AND OILS	4013
VEGETABLE OILS	1950
BUTTER	3350

Source: Recueil de Statistiques Libanaises

Appendix II: Income Elasticity of Demand

Commodity	Elasticity	Funetion
CEREALS	0.40	LI
WHEAT	0.43	LI
RICE	0.20	SL
COARSE GRAINS	0.10	SL
STARCHY ROOTS	0.20	SL
SUGAR	0.25	SL
PULSES AND NUTS	0.17	SL
VEGETABLES	0.45	LI
FRUITS	0.67	LI
CITRUS	0.70	LI
BANANAS	0.80	SL
OTHERS	0.30	LI
MEAT	0.75	SL
BEEF AND VEAL	0.70	SL
MUTTON AND LAMB	0.80	SL
POULTRY	1.00	LI
OTHERS	0.37	SL
EGGS	0.65	SL
FISH	1.10	SL
MILD AND BUTTER	0.90	SL
FATS AND OILS	0.30	SL
VEGETABLE OILS	0.59	SL
BUTTER	0.40	SL
OTHERS	0.20	SL

Source: Household consumption survey, central statistical office with certain interpolations.