



**THE STATE OF FOOD AND NUTRITION IN
THE NEAR EAST COUNTRIES**



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The descriptions employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

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FOREWORD

Raising the levels of nutrition and standards of living of the peoples, under the perspective jurisdictions of the Member Nations of the Food and Agriculture Organization of the United Nations, is one of the main purposes underlined in the Preamble of the FAO Constitution, since the inception of the Organization fifty years ago. On the other hand, one of the important tasks of FAO is to work closely with its Member Nations for collecting, analyzing and disseminating information relating to nutrition, food and agriculture, with a view to spreading appropriate knowledge on agriculture production, food availability, and other socio-economic and cultural variables.

This publication provides a succinct summary of the food and nutrition situation, as well as the extent, magnitude and causes of food and nutrition problems in the countries of the Near East Region. The information and figures provided could be put to various uses, including conducting comparative analyses, reviewing past trends, assessment of the present situation, and identifying actions needed to achieve nutritional well-being.

The FAO Regional Office for the Near East is pleased to put this publication at the disposal of those concerned in the Member Countries, hoping that it would be of benefit to them. The contents will be updated in future, in the light of progress achieved and comments received.



A.Y. Bukhari
ADG/Regional Representative
for the Near East

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Demographic and Socio-Economic Trends*

The total population in the Near East Region increased from 263 million in 1969/71 to 450 million in 1988/90 and is expected to reach 760 million by the year 2010; an increase of 189% since 1969/71. Population growth rates recorded for the Region are higher than those of the rest of the world, developed and developing countries alike. Annual population growth rates registered for the 1970s and 1980s were 2.7% and 3.1%, respectively. Expected growth rates for the 1990s and the following decade are 2.7% and 2.3%, respectively. These rates are high enough to warrant serious national and regional policy considerations.

Countries of the Region exhibit wide diversity in the size and growth of their populations. The Gulf Cooperation Council (GCC) countries and West Asia sub-regions recorded the highest population growth rates. As a result, the population of the GCC countries will increase dramatically by 334% and of the West Asia by 256% by the year 2010, over their 1969/71 levels. Egypt, Iran, Pakistan, and Turkey, on the other hand, had 61% of the total population of the Region in 1969/71 and are expected to reach 58% of the Region's total population in year 2010. This indicates the highly positive correlation between the size of population and the demand for the main food commodities. These four countries alone consumed about two-thirds of the cereals, meat, and sugar and about 83% of the total consumption of rice in the Region in 1969/71. The same pattern may prevail for the year 2010 with a combined demand of two-thirds for wheat and sugar and 71% for rice. In addition to the size of the population, the level of effective demand for food has been influenced by the other demographic attributes of age and sex structure, family status, and educational levels. These important factors have contributed to the change in food habits and consequently the pattern and volume of demand for food.

A positive correlation also exists between the rate of bona fide urbanization (as opposed to pseudo-urbanization) and that of the level of demand for food items. This has mainly been a result of the conversion of most of the rural migrants from net food producers to net food consumers and of the high income levels of the rural migrants, generated through new employment opportunities in the urban centers, which can positively contribute to increasing their demand for food, mainly through change of eating habits and diet.

* Based on : FAO/RNE (1993)

The degree of urbanization, defined as the increase in urban population as a percentage of total population, is increasing in the Near East at an annual rate of 4 - 6%. Urban population increased from 57 million in 1960 to 210 million in 1990. The highest rate of urbanization during this period (from 30% to 75%) took place in the Maghreb and Gulf subregions (Table 1).

The magnitude of consumption and expected demand for food in the Region are influenced by the levels of gross and per capita GDP, as well as their growth rates. Regional GDP grew annually by about 7% per capita GDP, as well as their growth rates. Regional GDP grew annually by about 7% between the 1970s and 1980s but declined sharply to only 1% during the 1980s. However, positive growth rates of 4.5% per annum are projected for the coming twenty years. On a sub-regional basis, the GDP growth rate in the 1970s was the highest for the Arab Gulf Countries (10.3% per annum), followed by West Asia (9.6% per annum), and revolved around the regional average for the Maghreb and Northeast Africa subregions. This situation changed during the 1980s, when GDP declined for both the Arab Gulf countries and West Asia subregions due to the sharp fall in oil revenues and the high level of spending on regional wars. Only Northeast Africa, Middle Asia, and Southern Europe maintained, to some extent, the GDP growth rates of the 1970s, with agriculture's contribution to GDP still the highest among the subregions.

The average regional per capita GDP showed a marked downturn as a result of the declining total GDP combined with increasing population. It registered a negative growth rate of -0.8% per annum during the 1980s. In contrast to the 1970s level of 2.6%. This decline was evident in all the subregions, except for Northeast Africa and Southern Europe. The level of per capita GDP in the Region in 1988/90 was about US \$2,000 and is expected to reach about US \$3,200 by the year 2010. The differences between the countries of the Region are remarkably sharp and significant. These variations are bound to be reflected in the levels and patterns of food demand. The growth in per capita food consumption in the Region continued in line with the per capita GDP trend, albeit at a declining rate of 2.0% to 0.2% per annum during the 1970s and 80s respectively.

TABLE 1
SOME DEMOGRAPHIC INDICATORS FOR THE NEAR EAST COUNTRIES

Country	Population (million) 1994	% Population annual growth 1980-94	% Population urbanized 1994	Pre capita GNP US \$ 1993	Life expectancy at birth (years) 1994	Total fertility 1994 rate	Adult literacy 1990	
							M	F
Afghanistan	18.9	1.2	20	280	43	6.7	42	11
Pakistan	136.7	3.4	34	430	61	6.0	46	21
Sudan	27.4	2.7	24	480	53	5.6	53	28
Yemen	13.9	3.7	33	520	50	7.5	53	26
Libya	5.2	3.9	86	5310	63	6.2	84	54
Iraq	10.3	3.0	74	1100	65	5.6	66	38
Algeria	27.3	2.7	56	1780	67	3.7	68	41
Morocco	26.5	2.2	48	1040	63	3.6	52	26
Turkey	60.8	2.2	67	2970	66	3.3	90	69
Egypt	61.6	2.4	45	660	63	3.7	61	34
Iran	65.8	3.7	58	2200	67	4.9	72	52
Lebanon	2.9	0.6	87	2150	68	3.0	94	88
Syria	14.2	3.5	52	1160	67	5.7	82	49
S. Arabia	17.5	4.3	80	7510	69	6.2	69	44
Tunisia	8.7	2.2	57	1720	68	3.0	73	47
Oman	2.1	4.5	13	4850	69	7.0	--	--
Jordan	5.2	4.1	71	1190	68	5.4	91	73
U.A.E.	1.9	4.3	83	21430	74	4.1	77	76
Kuwait	1.6	1.2	99	19360	75	3.0	79	72
Cyprus	0.73	--	--	10380	77	--	--	--
Qatar	0.54	2.9	--	15030	70	3.0	--	--
Bahrain	0.55	3.0	--	8030	71	--	--	--

Source : UNICEF (1996)

Land and Water Resources*

Land Resources

The area of the Near East countries is about 16.2 million square kilometers, equivalent to 12.1% of the total area of the world's countries. The area of the Arab countries in the Near East is larger than Europe (138%), Australia (177%) or the United States of America (145%).

The vast majority of the lands in the Region (93.1%) are arid deserts or badia, and a relatively small percentage (6.9% or 1.088 million square kilometers) of this is arable. This translates into an average per capita share of 0.2426 hectares (ha). More than half of the arable lands (55.1%) are located in three countries (Islamic Republic of Iran, Pakistan and Turkey), and the rest are located in 18 countries of the region. There are seven countries in the region where the ratio of arable lands to total area is less than 2%. This ratio is between 2% and 5% in five countries, between 5% and 9% in two countries, from 10% to 20% in three countries, 20% to 30% in three countries and is above 30% in only one country (Turkey).

Among all the countries of the Region, there are only four with land areas under permanent cultivation exceeding 100,000 square kilometers (sq. km) or 10 million ha. These countries are: Turkey (22.73 million ha), Pakistan (20.9 million ha), the Islamic Republic of Iran (14.84 million ha) and the Sudan (12.5 million ha) with a total of 70.97 million ha under permanent cultivation. This translates into respective per capita shares of 0.3967 ha, 0.1805 ha, 0.2572 ha, and 0.4826 in the four countries.

Horizontal expansion in agricultural production in the Region has to come from irrigated agriculture, and there is room for improvement in agricultural yields from both rain-fed and irrigated agriculture.

The total irrigated land area in the Near East Region is about 397,00 sq. km or 39.7 million ha. This constitutes 2.54% of the total land area of the countries of the region. This percentage is slightly higher than the percentage in all developing countries (2.18%) and higher than the percentage in other country groups. This percentage is 1.22% in the Organization for Economic Cooperation and Development (OECD) member countries, 1.16% in all industrial countries, and 1.75% in all the countries in

* Based on : ESCWA/FAO (1994)

the world. The average percentage of irrigated land in the arable land in the region is 36.5%, which is high compared with the average of 20.63% for all developing countries, the average of the OECD countries which is 10.24%, the average for all industrial countries which is 9.40%, or the world average which is 15.5%. This shows the aridity of the countries of the region relative to the other country groups in the world.

Forest land in the Near East countries forms 7.45% of the total land area; this is slightly larger than the arable land area and is three times the irrigated land area. Three countries possess 73.7% of the forest area in the region. These are: the Islamic Republic of Iran with 15.5%, the Sudan with 40.9% and Turkey with 17.3%. Agricultural land resources per capita of the countries in the region are shown in table 2.

The underpinnings of land and water policies in a country are closely related to the Government's objectives in agricultural development. Increasing food security, reducing food import dependency, increasing foreign exchange earnings through increasing the exports of tradable agricultural commodities, and raising rural incomes have all been important objectives in countries of the Arab region. Land and water policies have directly or indirectly revolved around these, often conflicting, objectives.

In the past, the de facto land policy in the Arab region was considered to be primarily commensurate with agrarian reform, complemented in a few countries by land reclamation and soil conservation. Water policies, at the same time, were synonymous with the expansion of irrigated areas, irrigation investment and construction of drainage networks.

Government interventions in the form of land reforms were implemented in many of the Arab countries in the past three decades. In many cases, lands appropriated by the Governments were redistributed to landless or small farmers. In others, Governments retained large tracts of land for agricultural production as State farms, as in Algeria, Egypt, Iraq, Tunisia and Yemen. Ceilings on ownership were fixed. In the Syrian Arab Republic, the Agrarian Reform of 1958 fixed the maximum size of the ownership, which was reduced further in 1980. Tenurial arrangements were revised in some of the countries such as Egypt, the Syrian Arab Republic, Tunisia and Yemen, while in others cropping patterns were fixed, as in Egypt where it was compulsory under the law to devote 33% of the area to cotton and another 33% to wheat.

Land tenure has an impact on the use of land through changes in the operational size of holdings. Tenancy in the region varies from 4% of land holdings in Oman to 25-30% in Jordan and Egypt. Tenurial arrangements in Egypt for a long time gave the heirs of the tenant the right to inherit the tenancy on land where rents remained fixed and at below market prices.

Evolution of such practices after land reforms led to a reduction in the values of land, decreasing incentives for landowners to invest and sub-optimal returns. The supply response of both producers and landowners to invest and sub-optimal returns. The supply response of both producers and landowners to administered rent and crop prices in Egypt led to a reduction in the leased-out area.

Whereas landless peasants, tenants and sharecroppers benefited from the distribution of land, in general, the efficacy of land policies in the region remained circumscribed owing to less than optimal implementation of land reforms, substantial State intervention in the land market through fixing of rent controls and cropping patterns, and social and cultural traditions governing land Tenurial arrangements and management rights.

Land concentrations remained high. In Egypt, despite successive land reforms, only 14% of total agricultural households benefited from the reform, which distributed about 12% of the total cultivated area.

Where the land reforms were successful in reducing the inequity in land distribution, they also contributed to a process of polarization and fragmentation of land-holdings over a period of time. The boom of the 1970s in the region artificially raised the prices of land, forcing many subsistence farmers to sell off their parcels and leading to polarization. In addition, inheritance laws and the regulatory framework governing ownership resulted in fragmentation of land. In the mid- 1980s in the Sudan more than 25% of the landholdings were on cropped areas of less than 2.5 feddans (1 feddan equals 1.038 acra), and 73% of the holdings were less than 5 feddans. The agricultural census of 1981 in the former Yemen Arab Republic indicated a similar trend. More than two thirds of the landholdings comprised less than 1 ha of land.

Fragmentation of land became a serious constraint on modern agriculture in the region. In Tunisia about 50% of landholdings consisted of 6-10 plots with an average size of 1.8 ha. In the Syrian Arab Republic, the total number of agricultural holdings in 1970 was 396,282, comprising 1.8 million plots of land. Reductions in landholdings per capita served to

reduce household income and consumption. An offshoot of low farm incomes was a lack of investment in - and management of - land. Despite the provision made in the 1952 land reform and laws later for private investment in the reclamation of land in Egypt, private investment ranged between 4-12% of total agricultural investment between 1960-1980.

TABLE 2
AGRICULTURAL LAND RESOURCES, (IN HA/CAPITA) IN THE NEAR EAST COUNTRIES (1991)

Country	Irrigated	Rain-fed	Pastures	Sum
Algeria	0.0134	0.2800	1.1829	0.3202
Bahrain	0.0020	0.0020	0.0080	0.0080
Egypt	0.0587	--	--	0.1761
Iraq	0.1357	0.1980	0.2139	0.6051
Islamic Republic of Iran	0.0997	0.1447	0.7626	0.4438
Jordan	0.0146	0.0920	0.1929	0.1358
Kuwait	0.0005	0.0014	0.0638	0.0029
Lebanon	0.0307	0.0764	0.0036	0.1685
Libyan Arab Jamahiriya	0.0502	0.3828	2.8298	0.5334
Mauritania	0.0057	0.0890	18.690	0.1061
Morocco	0.0486	0.2806	0.8132	0.4264
Oman	0.0256	0.0038	0.6250	0.0806
Pakistan	0.1354	0.0414	0.0432	0.4476
Qatar	-	0.0100	0.1250	0.0100
Saudi Arabia	0.0649	0.0494	5.5195	0.2441
Sudan	0.0718	0.4100	2.1622	0.6254
Syrian Arab Republic	0.056	0.4000	0.6585	0.5680
Tunisia	0.0317	0.5410	0.3720	0.6361
Turkey	0.0436	0.4423	0.1501	0.5731
United Arab Emirates	0.0013	0.0088	0.1250	0.0127
Yemen	0.0248	0.0970	1.2852	0.1714

Source : ESCWA/FAO (1994).

TABLE 3

**SHORTAGES IN LAND AND IRRIGATION WATER RESOURCES IN THE
NEAR EAST COUNTRIES (1991)**

Country	Current irrigated land equivalent	Irrigated land shortage ha/cap	Additional irrigated land thousands ha	Additional irrigated water MCM
Algeria	0.1067	0.020	514	7 196
Bahrain	0.0026	0.072	36	504
Egypt	0.0587	0.044	2358	33 012
Iraq	0.2170	-	-	-
Islamic Re. of Iran	0.1480	-	-	-
Jordan	0.0452	0.0506	208	2 912
Kuwait	0.001	0.0728	153	2 142
Lebanon	0.0562	0.0452	127	1 778
Libyan Arab Jamahiriya	0.1778	-	-	-
Mauritania	0.0354	0.0566	119	1 666
Morocco	0.1421	0.0022	57	798
Oman	0.0268	0.0598	96	1 344
Pakistan	0.1492	-	-	-
Qatar	0.0033	0.0716	29	406
Saudi Arabia	0.0813	0.0326	502	7 028
Sudan	0.2084	-	-	-
Syrian Arab Republic	0.1893	-	-	-
Tunisia	0.2120	-	-	-
Turkey	0.1910	-	-	-
United Arab Emirates	0.0042	0.0712	114	1 596
Yemen	0.0571	0.0447	559	7 826

Source : ESCWA/FAO (1994)

In the face of the rapid increases in population, survival for many farmers depended on encroachment of marginal lands and intensive exploitation of available parcels. Migration from rural to urban areas also caused a shift of fertile arable land to commercial use.

Soil conservation policy, at the same time, focused on erosion control. Rates of soil loss were given attention through conservation measures aimed at reducing these to acceptable levels. Extension services focused on erosion control in isolation from other agricultural improvements. Declines in soil fertility due to physical, biological and chemical soil degradation were not considered in an integrated manner.

Despite the fact that large-scale land reclamation projects were undertaken, these fell short of desired objectives owing to lack of adequate planning, inadequate knowledge of soils and weak post-project extension services. In Egypt, conversion of fertile areas to non-agricultural uses at rates higher than the rate of reclamation of additional lands decreased the irrigated arable area by 2% between 1960-1985. The construction boom between 1975-1977 led to a loss of 250,000 feddans of highly fertile agricultural land in Egypt. In the Syrian Arab Republic and Tunisia there has been no net increase in cultivated land since 1975. All these factors contributed to an intensive use and degradation land resources.

Water Resources

Average renewable water resources in the Near East Region average about 850.5 billion cubic meters (BCM). The average per capita share in 1991 was about 1,895 cubic meters (m^3) per year and will drop to 1,018 m^3 per year in the 2025. These "comfortable" averages mask the discrepancies in the distribution of the renewable water resources over the countries of the region. Table 3 shows these water resources per country in 1991, and what they will be in the year 2025 when a country like Jordan, for example, will have a per capita share of 66 m^3 , hardly enough for municipal consumption. Six other countries in the region will have a per capita share of less than 100 m^3 , the amount required for municipal and industrial consumption.

Shortages in land resources are calculated and parallel shortages in irrigation water are computed based on a water duty of 14,000 m^3 per hectare per year. The results are shown in Table 3. In terms of the 1991 irrigation water need per capita, the results were as follows: Kuwait (1,020 m^3 /capita), Qatar (1,015), Bahrain (1,008), United Arab Emirates (998), Oman (840), Mauritania (793), Jordan (710), Lebanon (635), Yemen (626), Egypt (616), Saudi Arabia (456), Algeria (280), and Morocco (31). Not included in the need for irrigation water are the quantities already pumped in excess of the safe yields of aquifers. These are believed to be substantial in Saudi Arabia, which uses no less than 14 BCM (909 m^3 per capita) of fossil water for irrigation. In Jordan, for example, groundwater aquifers are being over

pumped at a rate of 200 million cubic meters (MCM)/year, and fossil water is being used at the rate of 65 MCM per year. This translates into about 65 m³/capita of water needed to ensure the sustainability of irrigated agriculture there. The same can be said about Yemen, the Libyan Arab Jamahiriya, the Gulf States, some regions of the Syrian Arab Republic (Barada and Awaj basin) and others.

Countries without deficits/shortages in 1991 (seven) will eventually develop such deficits/shortages in the future as their populations increase. Other reasons for development of shortages would be loss of part of the agricultural resource base due to soil erosion, water logging, desertification, or groundwater depletion, increased salinity, or water quality degradation.

It is important to remember the bases and assumptions on which the above shortages have been computed, and to recall that half of the deficits in agricultural trade are to be offset by increments in yields of agricultural lands, and the other half by horizontal expansion in irrigated agriculture. Even with those assumptions, the additional irrigation water needed is beyond the potential of the renewable water resources of the above countries with the exception of Mauritania.

The above regional analysis of land water resources indicates that countries of the region have to deal with water management and planning issues and with institutional issues sooner than most of them anticipate.

In the Near East Region, water policies are inextricably linked to land policies and issues of food security. In the past, water policies have focused on the supply-side management of water resources. Water policy has been synonymous with irrigation policy with the objective of expansion of irrigated areas through investments in irrigation and drainage systems. Water development projects included the construction of dams, reservoirs, well fields, canal or pipe networks. In some countries government policy has encouraged the digging of wells through subsidizing the costs thereof. The Syrian Arab Republic in the last 10 years has devoted 60-70% of its entire agricultural budget to irrigation. Eighty per cent of the new land since 1987 has been irrigated through drilling wells supported by government fuel subsidies for the operating pumps.

In many countries, externalities in water sector activities resulted when large irrigation investments were undertaken in the past without controlling for drainage; this resulted in waterlogging and salinity in sloping and downstream area. Improper irrigation practices were the cause of an

unsustainable rise in the water table in Egypt, which went from a depth of 15-20 meters to 2-3 meters per year. In the Syrian Arab Republic, critical contents of gypsum cover 21% of the total area and 50% of the fertile Euphrates basin. The middle and lower Euphrates terraces and adjoining areas are composed of soils with more than 70% gypsum.

In Pakistan, government policies in the past have contributed to misuse of groundwater resources, inequitable water distribution and a consequent detrimental effect on environment. The annual recharge added to the groundwater if the single most important variable that contributes to the waterlogging problem in Pakistan. Development of canal systems without due consideration of drainage has resulted in a serious problem of waterlogging and salinity, and the situation is deteriorating at a distressing rate. In the saline areas, the water table has risen to levels that render land uncultivable and pose serious environmental challenges. In some areas past policies have also contributed to lowering of the water table to more than the desired level and to making pumping uneconomical (negative recharge). Inappropriate design, cheap credits, water charges far below the economic or even the financial prices and an electricity subsidy are some of the policies that might have contributed to over extraction of underground water.

Whereas the expansion in the network of canals and watercourses contributed to a rapid rise in agricultural production and yields initially, insufficient maintenance led to leakages and a gradual rise in the water table which, in turn, adversely affected yields in the long run. It was found that the increase of gypsum from "low" to "high" has reduced the yield of cotton from 3.9 tons/ha to 1.6 tons/ha and in the case of wheat from 4.0 tons/ha to 1.6 tons/ha in the Raqqah area in the Syrian Arab Republic.

Demand management of water resources was not explicitly included in water policies in the past in most of the Arab region partly because the focus, initially, was on expanding the supply and partly because socio-culturally water was believed to be a free good.

Lack of demand management practices in the past also contributed to a low efficiency of water use and consequent waste. In addition, improvements in the availability of water due to the introduction of high technology in the past diverted attention from demand management and reduced emphasis on low cost alternatives such as improving efficiency, conservation and reduction of waste through maintenance.

Water charges in the agricultural sector, which uses about 80% of the water in the Arab countries, have been kept low in a bid to offset the price controls on agricultural produce. The price of water is so low that in many countries it does not cover the operation and maintenance costs. With increasing water scarcity leading to rising marginal costs of an additional unit of water in the region, such a policy has not been sustainable in the long run.

Irrigated water charges were (and still are) typically well below full recovery levels. Subsidies on water are provided as a means of offsetting low farm incomes brought about by controlled producer prices and often over valuation of the exchange rate. As such, pricing policies in agriculture, especially of water, are self-defeating in as much as they conflict with the stated objectives of enhancing food security and maximizing agricultural exports.

Food Production

Plant Production

Annual growth in production of the major food commodities in the Region as a whole slowed down from 3.3% during the 1970s to 2.2% during the 1980s. Growth in the production of cereals, which constitute the bulk of the diet of the population, dropped by almost the same percentage over this period (Table 4). Growth in sugar production also declined from 2.8% during the 1970s to 2.1% during the 1980s (Table 5). Only citrus and vegetable oils showed remarkable improvements in their production. Growth in citrus production increased from 4.2% per annum during the 1970s to 5.5% per annum during the 1980s and that for vegetable oils increased from 1.6% to 2.5% per annum during the two periods, respectively (FAO/RNEA, 1993).

The Region exhibits clear diversity between its member states in terms of their resource bases and production potentials. More than three quarters of the cereals produced in the Region came from Egypt, Iran, Morocco, Pakistan, Saudi Arabia, and Turkey. These countries accounted for more than 80% of the Region's total wheat production of 32 million MT in 1969/71 and 57 million MT in 1988/90 (Table 6). On the other hand, 90% of rice output in the Region (8 million MT in 1969/71 and 10 million MT in 1988/90) was produced in only three countries : Egypt, Iran and Pakistan (Table 7) (FAO/RNEA, 1993).

Production of all food crops is expected to increase in the year 2000 by almost one third over the base year (the average of the 1988/90 period). Cereals will grow at an average annual rate of 2.6% during the 1990s. While the rate for sugar and vegetable oils will grow by 2.9% and 3.6%, respectively. Output growth could extend into the first decade of the twenty-first century but at lower rates, except for rice which is expected to grow at a rate of 3.0 %per annum compared to 2.2% and 1.8% for total cereals and for wheat, respectively. The corresponding annual growth rates for sugar and vegetable oils are 2.7% and 3.0%. Egypt, Iran, Morocco, Pakistan, and Turkey will still maintain their lead in cereals production (three-quarters of the Region's total production) and wheat (82%). Egypt, Iran, and Pakistan are expected to produce 89% of rice production in the Region (FAO/RNEA, 1993).

The expanding projected production of food crops over the twenty years until to 2010 can be achieved by a combination of yield increases, intensification of farming, and by area expansion. About 70% of the increase

TABLE 4

TRENDS IN PRODUCTION, CONSUMPTION AND SELF-SUFFICIENCY RATIOS FOR CEREALS IN THE NEAR EAST REGION

Region	Year	Production (000MT)			Consumption/Demand (000MT)			Self-Sufficiency Ratio (%)								
		69/71	79/81	88/90	2000	2010	69/71	79/81	88/90	2000	2010					
Maghreb		7358	6948	9999	12934	15875	9111	13707	21001	27675	35094	81	51	48	47	45
N.E. Africa		8887	10598	13943	19030	24559	10927	16593	23231	30309	37841	81	64	60	63	65
A. Peninsula		1319	1216	4593	4486	6171	1903	4811	9904	14480	20951	69	25	46	31	30
West Asia		3400	4950	5819	7853	10638	4594	8354	13152	17991	24252	70	59	44	44	44
Middle Asia		19838	27953	33150	45054	54616	21444	29121	39646	54862	70015	93	96	84	82	78
Southern Europe		17945	25130	28111	37115	44946	17987	24624	29133	36945	44173	100	102	97	101	102
N.E. Region		58746	76796	95615	126472	156805	66266	97210	136068	182261	232324	89	79	70	69	68

Source : Data and projections are from the FAO, Agriculture : Towards 2010 Project, Rome 1993.

TABLE 5

TRENDS IN PRODUCTION CONSUMPTION AND SELF-SUFFICIENCY RATIOS FOR SUGAR IN THE NEAR EAST REGION

Region	Year	Production (000MT)			Consumption/Demand (000MT)			Self-Sufficiency Ratio (%)								
		69/71	79/81	88/90	2000	2010	69/71	79/81	88/90	2000	2010					
Maghreb		178	374	663	974	1308	852	1547	2271	3119	3957	21	24	29	31	33
N.E. Africa		938	1096	1726	2330	2857	1057	1829	2461	3174	3924	89	60	70	73	73
A. Peninsula		0.0	0.0	0.0	0.0	1	191	353	627	1020	1561	0.0	0.0	0.0	0.0	0.0
West Asia		54	96	72	135	203	570	1019	1248	1755	2410	9	10	6	8	8
Middle Asia		2919	3578	4175	5673	7793	3082	4282	5006	7090	9421	95	84	83	80	83
Southern Europe		700	1178	1579	2150	2570	682	1179	1686	2200	2630	103	100	94	98	98
N.E. Region		4790	6322	8215	11262	14732	6433	10209	13300	18357	23902	75	62	62	61	62

Source : Data and projections are from the FAO, Agriculture : Towards 2010 Project, Rome, 1993.

in cereals production over the projected period would be attributed to yield improvement. This forecast applies across the subregions with no significant variations between them except for the Arab countries of the Gulf, where Saudi Arabia has already reached remarkable average yields of more than 5 tons/ha. The considerable scope for yield improvement is indicated by the existing wide inter-country yield differential and the fact that most countries at present have yield levels well below those achieved by the better performers. Although many factors are involved in this, the high yields achieved by the better performers suggest that even with the existing technology of improved cultivars, improved land and water management, judicious use of modern inputs (especially fertilizers). There is still considerable promise for increasing yield, assuming that farmers will have improved access to agricultural inputs and that appropriate policies and measures are adopted (FAO/RNEA, 1993).

Most countries of the Near East Region have virtually reached their limits of area expansion and would have to rely heavily on increasing cropping intensities. If adequately pursued, this could contribute about 21% of the projected increase in cereals production. Few countries can still expand their arable irrigated and rainfed areas. About 5.25 million hectares of the total projected area expansion of 6.9 million hectares could come from countries in Northeast Africa, Southern Europe and Middle Asia. Cereals production is projected to increase by about 9% as a result of area expansion.

There is also room for change in the national cropping patterns by introducing new crops such as soybeans and sunflowers. Countries like Egypt, Jordan, the Gulf States, Libya, and Morocco have also made remarkable advances in controlled environment (greenhouse) farming, noted for its high productivity, controlled use of agricultural chemicals and water saving (FAO/RNEA, 1993)

Generally, the main food crop production constraints in the Region may be summarized as follows (FAO/RNEA, 1992) :

1. Problems of land fragmentation which hinders the application of modern technologies in agriculture. e.g. in Tunisia, Jordan and Egypt.
2. The land tenure system is still a problem facing food production e.g. in Egypt.
3. Inadequate water control and management combined with inefficient drainage systems have led to a progressive loss of

- cultivated land through soil salinity and water logging e.g. in Iraq and Egypt.
4. The use, in some countries, of agricultural inputs such as improved seeds, fertilizers and insecticides are still below the required level e.g. in Sudan and Afghanistan.
 5. The result of the continuous and high rate of urbanization, more and more of the good agricultural land is lost to building construction e.g. in Egypt, Pakistan, Syria, and many other countries.
 6. In certain countries of the Region the problems of desertification and deforestation are becoming a real threat to the life of the rural population and food production capacities e.g. in Somalia and Sudan.
 7. Agricultural credit facilities have not been always used in favour of the small farmers. e.g. in Sudan.
 8. In certain countries of the Region the marketing of major food crops is still controlled by Governments to the disadvantage of the producers. However, it is interesting to note that more countries are moving towards liberalization of food prices e.g. in Egypt, Sudan, Tunisia, Morocco, Syria and Pakistan.
 9. In several countries of the Region there is a wide gap between agricultural research results and their application at the field level due to weaknesses in the agricultural extension services e.g. in Sudan, and Yemen.

Livestock production

Contemporary trends and projected statistics demonstrate the potentials of livestock production in the Region as a whole and especially for the Northeast Africa, Middle Asia, and Southern Europe subregions. The main sources of growth in meat production in the Region. (The former will contribute 35% and the latter 27% of growth in meat production during the coming two decades.) Raising production in this way would require enlarging the feed resource base by increasing the intensity of range and pasture use and by using more feed concentrates and agricultural byproducts. Striking a careful balance between livestock numbers and forage and feed availability in the semi-arid conditions of the Region is of paramount importance for conserving the natural environment and sustaining livestock production systems. There are, however some countries in the Region, like Egypt and countries of the West Asia subregion, where the difficulty of expanding the grazing areas or raising their productivity will make higher yields per animal increasingly important sources of growth. The intensive and semi-intensive production

systems which are more responsive to market conditions, like dairy and poultry, are also spreading in many countries of the Region. Improved production systems and animal health development and use of genetic resources, and expanding and upgrading the Region's feed base will all be essential for achieving the projected growth in livestock production, regardless of the source of growth (FAO/RNEA, 1992). Table 8 shows the trends in production and self-sufficiency for meat in the Near East Region.

The main constraints to livestock production in the region can be summarized as follows :

1. The increased numbers of livestock caused an overgrazing of natural pastures and range, a condition which has led to misuse of the natural range and a reduction in productivity of livestock and specially pastures. As a result of overgrazing livestock has been pushed into poorer pasture lands in almost all the countries of the Near East Region.
2. Livestock continues to be raised under nomadic and semi-nomadic conditions resulting in low productivity.
3. The introduction of intensive animal production systems is still limited in the Region due to poor animal feed base and lack of proper management.
4. The veterinary services in several countries are inadequate to cover the animal health needs.
5. The processing and preservation of animal products and by-products is still practiced under traditional systems.

Fish Production

In spite of the high potential for fish production, this sector has not been fully developed in many countries of the Region. However, some countries such as Morocco, Tunisia and Saudi Arabia managed to develop this potential and are exporting fish and fish products. More and more of the traditional small-scale sector in this field is being mechanized in certain countries on a limited scale. It should be noted that fish consumption in the Region is increasing both from local production and imports. There is, therefore, a need to stimulate more investments and to improve the technical know how and means of production for the development of this sector (FAO/RNEA, 1992).

The total overall fish catch from all sources in the Arab countries as reported by FAO in 1994 is 1.92 million tons or about 2.0% of the world catch

for the same year of 109 million tons. Over the last few years there has been an increasing trend in fishing activities in the Arab waters which adds to the belief that fish actually caught from Arab waters is between 3 to 4 million tons annually. The unreported balance which does not appear in Arab fisheries statistics, of 1.5 to 2 million tons, is caught mostly by foreign fleets operating in Arab waters. However, about 85% of Arab reported catches are landed by artisanal small-scale fishermen (Feidi, 1996).

In recent years, demand for fish in Arab countries has increased steadily and the per capita fish consumption rose from 5.2% kg/y in 1985 to about 6.4Kg/y in 1993, but it is still much below the international average of about 13Kg/y. There is a shortage of production as compared to consumption. With the rapidly increasing population, the gap is expected to grow even bigger and causes food security risks. The shortages are covered through fish imports mostly from outside the region creating a drain on hard currencies (Feidi, 1996).

Iran possesses a wide variety of fishing areas, including the Caspian, the Gulf and a number of inland waters. Other than in the caviar industry, however, which has a worldwide market, the development of fisheries is inadequate. Annual caviar exports earned \$43.5m in 1990/91, according to Bank Markazi (the central bank), but earnings were down to \$32.3m by 1993/94. In August 1993 Iran joined Russia, Azerbaijan, Kazakhstan and Turkmenistan in forming a cartel to protect caviar prices and sturgeon stocks in the Caspian sea to correct a fall in prices caused by smuggling after the collapse of the Soviet Union. In March 1994, Iran announced that sturgeon stocks in the Caspian had fallen so severely that ceilings should be introduced on catches. The country also has plans to farm sturgeon in order to safeguard what is a vital industry in the provinces bordering the Caspian (E.I.U., 1996).

In Pakistan, fisheries plays an important role in the national economy. It is most important economic activity along the coastal of Sindh and Balochistan. In addition to domestic human consumption of fish, a substantial parts of the fish catch is converted into low quality fish meal for utilization in local poultry industry. A large quantity of catch is exported in frozen, chilled or cured form. Marketing channels are complex and money lenders and middlemen play important roles in these channels (FAO/RNEA, 1995a).

Karachi Fisheries Harbour is the main centre of fishing activity where catch from all major centres are landed and auctioned through "mole

holders" and other unauthorized auctioneers. Mole holders and auctioneer charge a commission of about 6.25% of the total fish sale proceeds. Government of Pakistan has taken steps to strengthen infrastructure facilities for fisheries including construction of fish harbours at Pasni, Gwadar and Korangi. In addition, road linkage between the coastal towns has been improved resulting in transportation of fish from distantly located fishing centres to Karachi (FAO/RNEA, 1995a).

Development projects in fisheries activities in the Near East Region may substantially contribute to an improved food security situation. These will enhance employment opportunities, increase income, develop rural areas and a general improvement in the standard of living of an important section of the rural population. Several proposals are suggested to overcome the present state of affairs through increase and development of research, statistical compilation and analysis, and better utilization of fishery resources. These suggestions also include closer surveillance, monitoring and control of marine and inland fisheries resources, establishment of joint venture companies between partners from capital-rich countries and their counterparts from fish-rich countries, more intensive participation of the private sector in fisheries projects supported by an adequate financial and legal frame work that encourage investments, transfer of suitable and appropriate technologies to up-grade the management and products, intensive programmes in mariculture and aquaculture projects of indigenous fish species, more efficient marketing and distribution channels and a comprehensive fish consumption public awareness campaign as well as concentrated efforts to increase inter-regional as well as an intra-regional trade in fish and fishery products (Feidi, 1996).

TABLE 6

TRENDS IN PRODUCTION, CONSUMPTION AND SELF-SUFFICIENCY RATIOS FOR WHEAT IN THE NEAR EAST REGION

Region	Year	Production (000MT)			Consumption/Demand (000MT)			Self-Sufficiency Ratio (%)								
		69/71	79/81	88/90	2000	2010	69/71	79/81	88/90	2000	2010					
Maghreb		3773	3732	5423	7258	8952	5650	9195	13267	17622	22219	67	41	41	41	40
N.E. Africa		1644	2049	3710	5195	6603	4263	7472	11236	13623	15619	39	27	33	38	42
A. Peninsula		143	247	3484	2967	4151	451	1418	3424	4800	6808	32	17	102	62	61
West Asia		2071	2831	2716	3607	4678	3237	5146	7694	10599	13693	64	55	35	34	34
Middle Asia		12967	19195	22751	31500	36816	14677	19910	28451	37925	46807	88	96	80	83	79
Southern Europe		11423	17058	18914	24000	28000	11510	16869	19384	23223	26505	99	101	98	103	106
N.E. Region		32020	45111	56998	74527	98199	39788	60009	83456	107791	131651	81	75	68	69	68

Source : Data and projections are from the FAO, Agriculture : Towards 2010 Project, Rome 1993.

TABLE 7

TRENDS IN PRODUCTION, CONSUMPTION AND SELF SUFFICIENCY RATIOS FOR RICE IN THE NEAR EAST REGION

Region	Year	Production (000MT)			Consumption/Demand (000MT)			Self-Sufficiency Ratio (%)							
		69/71	79/81	88/90	2000	2010	69/71	79/81	88/90	2000	2010				
Maghreb	36	35	78	153	215	87	206	342	571	810	41	17	23	27	27
N.E. Africa	2572	2402	2675	3256	3948	1761	2323	2646	3467	4375	146	103	101	94	90
A. Peninsula	2.5	0.2	0	0	0	0	262	675	641	1083	0.18	1	0	0	0
West Asia	270	162	201	300	500	430	851	1398	1836	2697	63	19	14	16	19
Middle Asia	4846	6747	7023	8380	11702	4554	5700	6390	9130	12861	106	118	110	92	91
Southern Europe	257	314	274	350	423	272	345	552	765	966	94	91	50	46	44
N.E. Region	7982	9660	10251	12440	16787	7367	10100	11969	16851	23490	108	96	86	74	72

Source : Data and projections are from the FAO, Agriculture : Towards 2010 Projects, Rome, 1993.

TABLE 8

TRENDS IN PRODUCTION, CONSUMPTION AND SELF-SUFFICIENCY RATIOS FOR MEAT IN THE NEAR EAST REGION

Region	Year		Production (000MT)				Consumption/Demand (000MT)				Self-Sufficiency Ratio (%)				
	69/71	79/81	88/90	2000	2010	69/71	79/81	88/90	2000	2010	69/71	79/81	88/90	2000	2010
Maghreb	424	617	843	1197	1681	427	706	905	1333	1874	99	87	93	90	90
N.E. Africa	701	931	1255	1659	2163	680	1034	1421	1882	2390	103	90	88	88	91
A. Peninsula	88	134	403	841	1457	113	473	770	1288	1944	78	28	52	65	75
West Asia	227	362	551	872	1281	264	612	826	1264	1843	86	59	67	69	70
Middle Asia	1010	1505	2205	3715	5243	1022	1702	2428	3992	5617	99	88	91	93	93
Southern Europe	623	761	950	1411	1824	609	734	912	1392	1809	102	104	104	101	101
N.E. Region	3073	4310	6207	9695	13649	3116	5261	7261	11151	1547	99	82	86	87	88

Source : Data and Projections are from the FAO, Agriculture : Towards 2010 Project, Rome, 1993.

Food Imports*

The escalating shortage in food production in the Near East Region has mainly been balanced by imports. Cereal imports in physical terms increased from 8.1 million MT in 1969/71 to 44.3 million MT by 1988/90 and will reach 78.7 million MT by the year 2010, if no efforts are made to accelerate production. Wheat is the largest single cereal commodity imported. Wheat imports of 6.6 million MT in 1969/71 (representing 82% of cereals imports and increased from 0.7 million MT in 1969/71 to 3.1 million MT (a sharp increase of 450%) and may increase by two more million MT by the year 2010 (Table 9).

Coarse grains imports increased much faster than wheat or rice imports into the Region, reflecting the rising feed requirements for the expanding livestock sector. Between 1969/71 and 1988/90, coarse grains imports increased thirteen fold to reach 13.3 million MT and is projected to reach 20.3 million MT by the year 2010.

With this considerable increase in cereal imports, self-sufficiency ratios for the Region declined from 89% in 1969/71 to 70% in 1988/90, and could fall to 68% at the horizon year of 2010. The decline in self-sufficiency was most pronounced for coarse grains - from 99% in 1969/71 to 71% in 1988/90, and could drop to 34% by the year 2010. The wheat self-sufficiency ratio has declined from 80% in 1969/70 to 68% in 1988/90 and could maintain this level for the coming twenty years (Table 6).

Regional imports of other food items such as livestock products, vegetable oils and sugar have also grown substantially. Meat imports increased ninefold from 121 thousand MT in 1969/71 to 1.12 million MT in 1988/90 and may reach 1.9 million MT by 2010. Milk imports increased fivefold during the same period, from 1.2 million MT in 1969/71 to 6.1 million MT in 1988/90 and may double to reach 13 million MT by the year 2010. The self-sufficiency ratios of livestock products declined substantially from 99% to 86% between 1969/71 and 1988/90 and are projected to fall to 39% by 2010 over the same periods. Figures for meat declined from 85% to 75% and then to 31%. These trends, however, do not reflect the substantial potential for increased livestock production and improved self-sufficiency ratios in the Region.

* Based on : FAO/RNEA (1993).

TABLE 9

FOOD IMPORTS IN THE NEAR EAST REGION
(A) Quantity (00 MT)

Region	Cereals			Wheat			Rice			Coarse Grains		
	1969/71	1988/90	2010	1969/71	1988/90	2010	1969/71	1988/90	2010	1969/71	1988/90	2010
Sub-region	1969/71	1988/90	2010	1969/71	1988/90	2010	1969/71	1988/90	2010	1969/71	1988/90	2010
Maghreb	1839	11342	19219	1567	7913	13267	66	295	596	228	3232	5555
N.E. Africa	1922	9217	13942	1887	7450	9017	53	165	446	71	1657	4629
Arabian Peninsula	752	6863	14821	342	1593	2656	334	655	1781	187	4833	10977
West Asia	1733	7258	13739	1259	4782	9016	176	1053	2197	356	1774	3258
Middle Asia	870	7272	15886	751	5790	9991	36	649	1885	95	1055	4638
Southern Europe	884	2371	1126	812	1457	50	18	282	547	60	726	711
N.E. Region	8070	44322	78733	6618	28985	43996	683	3098	7457	997	13276	29767

Region	Meat			Milk			Vegetable Oils			Sugar		
	1969/71	1988/90	2010	1969/71	1988/90	2010	1969/71	1988/90	2010	1969/71	1988/90	2010
Sub-region	1969/71	1988/90	2010	1969/71	1988/90	2010	1969/71	1988/90	2010	1969/71	1988/90	2010
Maghreb	23	86	205	453	2312	4824	220	720	1341	647	1618	2649
N.E. Africa	10	159	230	86	416	712	145	753	953	160	622	1067
Arabian Peninsula	26	372	487	169	1511	3269	16	179	464	177	478	1560
West Asia	47	252	562	290	927	2548	119	417	866	549	1082	2206
Middle Asia	13	223	374	120	807	1492	231	1451	3443	214	669	1627
Southern Europe	9	28	46	112	119	70	17	534	608	16	258	81
N.E. Region	121	1120	1903	1229	6093	12915	748	4053	7676	1763	4727	9191

Imports of vegetable oils sharply increased from 0.7 to 4.1 million MT between 1969/71 and 1988/90 and may reach 7.7 million MT by the year 2010. Their respective self-sufficiency ratios declined from 80% in 1969/71 to 40% in 1988/90 and could maintain the same level up to the year 2010. This is another food commodity for which the potential for increased production seems to be substantial. Total imports of sugar by the Region increased threefold from 1.8 million MT in 1969/71 to 4.7 million MT in 1988/90 and could reach 7.7 million MT by the year 2010.

The most recognizable feature with respect to food imports for the Region is that the Arab Gulf states (notably Saudi Arabia) managed to increase its production of wheat and transform its deficit of 330 thousand MT in 1969/71 into a surplus of nearly 1.5 million MT by 1988/90. Nonetheless, this sub-region still imports more than 25% of the quantities of coarse grains and livestock products (meat and milk) imported in the Region. The surplus in the production of rice in Middle Asia also increased from 325 thousand MT in 1969/71 to 758 thousand MT in 1988/90. Southern Europe recorded a meat surplus of 6000 MT in 1969/71 which has become a deficit of 28000 MT in 1988/90.

The value of regional food imports has risen even more steeply in the last two decades. The value of total food imports into the Region (Table 9) increased more than fourfold from about US \$3.6 billion in 1969/71 to about US \$16.6 billion in 1988/90 and may reach US \$ 30.1 billion by the year 2010. Cereals remain the major item of foreign exchange expenditure among the imported foods, accounting for 35-39% of the total value of food imports. The import value of livestock products recorded an astronomical increase of about 600% from US \$566 million in 1969/71 to US \$3.5 billion in 1988/90 and may register a further 200% increase to reach US \$6.6 billion by the year 2010.

Most of the expenditure on imports of livestock products is accounted for by the high-income oil-producing countries. For example, the value of imports of livestock products in the Arab countries of the Gulf increased from 16% of the total value of livestock products imported into the Region in 1969/71 to 27% in 1988/90 and will maintain the same level by the year 2010. Analysis of the value of food imports on a per capita basis reveals an interesting picture. The per capita value of food imports in the Near East Region increased by about 250% from US \$14 in 1969/71 to US \$37 in 1988/90. The corresponding figures for the Northeast Africa, Middle Asia and Southern Europe subregions, though rising over time, fall below the regional averages. The per capita value of food imports in the Maghreb and

West Asia subregions almost doubled from US \$32 in 1969/71 to US \$65 in 1988/90 for the former and from US \$44 to US \$74 over the same period for the latter. The per capita value of food imports for the Arab countries of the Gulf recorded nearly a share increase of 375% from US \$27 in 1969/71 to US \$101 in 1988/90. These food imports may not severely affect the oil-producing countries but will certainly aggravate the balance-of-payment difficulties of other countries in the Region, especially the low-income food-deficit countries like Afghanistan, Egypt, Mauritania, Morocco, Pakistan, Somalia, Sudan, Syria, and Yemen.

Total cereals food aid provided to the Near East Region amounted to 3.5 million MT in 1980/81 and decreased to about 2.4 million MT in 1990/91. The Region's share of food aid dropped from 38% in 1980/81 to 20% of the global food aid increases in 1990/91. Food aid to the low-income food-deficit countries accounted for 30% of their total cereal imports in 1979/81 and about 15% in 1990/91. In view of the foreign exchange constraints for financing imports in the low-income food-deficit countries, food aid plays an important role in improving food supplies in these countries.

Food Exports

Food exports in the Near East are limited and varied from country to country. The percentage of food exports as total exports ranging from 0% in Bahrain, Kuwait and Qatar to 50% in Somalia, for the period 1990-1992 (Table 10). Livestocks are the main food exports in Mauritania, Somalia and Sudan, while vegetables and fruits are the main food exports in Jordan, Lebanon, Syrian Arab Republic, and Egypt. Rice is the major food exported in Pakistan (FAO/RNEA, 1995b).

Although the share of food exports to the total exports in most Near East countries is very low (ranged from 0% to 10% in 11 countries), the quantity of food exported increased steeply in some countries. The quantity of food exported as million US dollars in Iran, for example, increased from 30.5 to 424.3 million US \$ during the period 1961 - 1992. Most countries showed a significant increase in food exports during 1961 - 1983, however some countries (Afghanistan, Iraq, Jordan, Lebanon, Kuwait, Mauritania, Somalia, and Sudan) showed a marked decrease in food exports during 1981 - 1992 (Table 11). This is mainly due to civil wars and other political crises (FAO/RNEA, 1995b).

TABLE 10

FOOD EXPORTS IN SOME NEAR EAST COUNTRIES 1961-1992 (AS PERCENTAGE OF TOTAL EXPORT)

Country	1961-63 %	1971-73 %	1981-83 %	1990-92 %
Afghanistan	23	40	24	27
Bahrain	--	3	0	0
Egypt	15	16	7	9
Iraq	4	2	0	1
Islamic Republic of Iran	3	2	0.1	2
Jordan	56	29	24	12
Kuwait	0	0	1	0
Lebanon	40	20	22	24
Mauritania	21	21	20	47
Oman	4	0	1	2
Pakistan	45	19	22	10
Qatar	--	1	--	0
Saudi Arabia	0	0	0	1
Somalia	90	87	89	50
Sudan	32	25	46	37
Syrian Arab Republic	30	16	4	12
Tunisia	49	32	8	10
United Arab Emirates	--	1	1	2

Source : FAO/RNE (1995b)

TABLE 11

FOOD EXPORTS IN SOME NEAR EAS COUNTRIES 1961-1992 (MILLION US \$)

Country	1961-63	1971-73	1981-83	1990-92
Afghanistan	14.0	50.4	170.9	66.4
Bahrain	-	3	0	0
Egypt	68.9	143.9	227.8	263.2
Iraq	26.9	38.5	40.7	25.6
Islamic Republic of Iran	30.5	80.7	84.9	424.3
Jordan	7.7	13.5	166.4	134.1
Kuwait	5.4	15.1	127.8	14.8
Lebanon	21.6	73.1	168.1	125.8
Mauritania	14.5	24.5	82.9	202.8
Oman	0.1	1.0	28.5	91.5
Pakistan	65.3	117.1	588.9	602.2
Qatar	--	2.6	-	8.5
Saudi Arabia	0.6	5.1	78.2	385.4
Somalia	25.1	38.0	161.1	60.1
Sudan	65.8	93.2	253.8	176.0
Syrian Arab Republic	45.4	45.4	87.9	442.6
Tunisia	48.8	100.8	166.0	301.0
United Arab Emirates	--	11.6	171.0	515.8

Source : FAO/RNE (1995b)

Food Consumption Patterns

Studies on food consumption, particularly on dietary intake in the Near East Region are lacking. Reviewing the food availability and food consumption patterns in the Region is a difficult task due to the large socio-economic, geographical and cultural differences among countries, as well as due to insufficiency and irrelevant statistical data. The current review on trends in food consumption depends on FAO Food Balance sheets which shows total availability per commodity. It is well known that Food Balance sheets do not show the differences that may exist in the diets consumed by different socio-economic groups, ecological zones and geographical areas within a country, neither do they provide information on seasonal variation in food availability.

Using two relevant indicators, per caput GNP and Daily Energy Supply (DES), derived from FAO Food Balance Sheets, the Near East Region can be divided into three major groups of countries as follows (FAO, 1990) :

1. High-income countries with GNP/caput above US \$6 000 and DES above 3000 kcal/caput/day. This group includes petroleum exporting countries : Libya, Saudi Arabia, Kuwait, the United Arab Emirates (UAE), Qatar, Bahrain and Oman.
2. Middle income countries with GNP/caput between US \$600 and US \$3000 and DES between 2700 and 3300 kcal/caput. This group includes Algeria, Cyprus, Egypt, Iraq, Iran, Jordan, Lebanon, Morocco, Syria, Tunisia and Turkey.
3. Low-income countries with GNP/caput below US \$600 and DES between 2000 and 2300 kcal/caput. This group includes Afghanistan, Djibouti, Mauritania, Pakistan, Somalia, Sudan and Yemen.

The petroleum-exporting countries which are comparatively sparsely populated have an average daily energy supply (DES) exceeding 3000 kcal/caput. Cereal consumption seems to have reached a ceiling, with a contribution to the calorie supply of 35% to 40%. Sugar consumption is rising despite its already very high level (30 to 40 kg per caput per annum) and its contribution to the calorie supply of about 10% to 15%. The same trend may be seen for oils and fats, with consumption around 30 kg per caput per annum and contribution to calorie supply of 30%. Consumption levels of animal products are high, comparable to those in industrialized countries : 60 to 70 kg of meat, 150 to 180 kg of milk and 8 to 12 kg of eggs per person per annum (Table 12).

TABLE 12

AVERAGE CONSUMPTION OF CALORIES, PROTEIN AND FAT PER CAPUT/DAY ACCORDING TO THE NATIONAL FOOD BALANCE SHEETS

Country	1961			1971			1981			1989		
	Calories (Kcal)	Protein (g)	Fat (g)									
Afghanistan	2295	65.1	31.2	2259	64.1	33.1	2216	61.3	41.7	2022	54.6	38.5
Algeria	1736	47.9	32.1	1834	48.1	35.9	2604	66.9	59.6	2866	76.6	61.2
Egypt	2272	61.3	45.2	2467	64.7	53.3	3206	79.4	73.3	3336	83.5	78.4
Iran	1929	52.1	34.0	2328	61.2	45.0	3046	79.9	67.6	3181	84.1	62.2
Iraq	2066	58.3	41.9	2291	61.3	43.6	2815	73.8	62.1	2887	71.8	75.3
Jordan	2218	56.3	48.1	2497	68.3	62.2	2629	68.9	56.5	2634	71.4	62.0
Kuwait	2594	76.8	76.0	2640	74.6	71.3	2961	90.2	93.0	3195	95.3	104.9
Lebanon	2466	65.0	62.2	2474	64.2	61.9	2875	83.0	85.2	3274	86.2	97.1
Libya	1654	39.2	32.2	2506	60.5	73.8	3564	88.0	128.9	3324	80.5	108.3
Malta	2827	88.6	80.4	3051	96.7	93.8	2925	90.8	106.6	3248	97.6	120.1
Morocco	2141	57.3	35.3	2464	65.5	42.1	2697	71.2	49.6	3020	81.3	55.6
Mauritania	1939	77.3	49.0	1874	71.8	50.9	2095	71.8	57.3	2685	79.3	61.0
Pakistan	1705	53.8	26.9	1961	56.5	31.2	2224	61.5	42.7	2219	61.6	50.8
Saudi Arabia	1772	48.1	26.5	1886	48.3	33.9	2777	77.7	80.2	2874	86.5	82.5
Somalia	1699	59.0	56.4	1714	58.1	62.8	2075	62.0	78.5	1906	59.1	65.3
Sudan	1832	55.9	53.8	2209	61.6	68.2	2312	68.6	76.8	1974	57.2	63.7
Syria	2362	65.1	59.7	2412	64.2	65.0	3105	84.2	93.7	3003	78.6	82.7
Tunisia	2103	56.4	43.1	2368	63.1	57.6	2779	77.5	65.3	3119	83.3	85.7
Turkey	2696	83.8	60.0	2912	83.4	68.5	2997	84.6	73.9	3236	86.0	86.7
U.A.E.	2814	72.5	85.2	3208	78.2	76.1	3199	101.6	110.3	3309	101.6	111.5
Yemen	1908	58.9	36.4	1961	58.8	36.0	2070	61.8	39.1	2142	60.0	33.5
World	2262	61.9	49.9	2455	65.2	56.0	2610	68.5	62.7	2710	71.0	68.5

Bahrain, Cyprus, Djibouti, Oman and Qatar : No data available

Source : Agrostat, FAO 1992

The average per caput calorie supply in the middle-income countries as a whole, is between 2700 and 3300 kcal. Cereals contribute more than half the calorie supply are at present around 200 kg per caput per annum. Wheat is by far the most popular cereal in these countries where, in many circumstances, it is largely imported and heavily subsidized. Wheat is being supplemented by rice in Jordan, Iraq, Egypt and Iran and by barley in Morocco despite its rapid decline in consumption. Only in Egypt there is still substantial direct consumption of maize (58 kg/caput/year). Sugar consumption has also risen considerably to reach an average level of 30 to 40 kg per person per year. Similarly, vegetable oil consumption (12 to 15 kg) has increased two-fold or more between 1972-74 and 1984-86 in several countries (Algeria, Iran, Turkey, Lebanon and Egypt). Sugar, oils and fats contribute 20% to 30% of calorie intake. Consumption of animal products is also rising and is reaching the level of 20 kg for meat and 60 to 100 kg for milk per person per year. Their contribution to calorie intake is around 10% and they supply 20% to 30% of the total protein in the diet. Fruit and vegetable consumption has also risen appreciably in almost all countries of this group. In the major consumer countries such as Syria, Turkey, Lebanon, Iraq, Tunisia and Egypt, the per capita consumption is 200 to 300 kg of fruit and vegetables per year while in other countries such as Algeria, Morocco, and Iran, consumption is far more modest (less than 100 kg/caput/year). In summary, the diet in the intermediate countries is being diversified, with a sufficient calorie intake to cover the energy requirement of most of the population but it is actually undergoing structural changes towards higher consumption of sugar, fats and animal products (FAO, 1990, Miladi, 1994a).

The main feature of the diet in low-income countries is the insufficient supply of calorie - 2000 to 2300 kcal/person/day - with cereals and roots and tubers contributing 60% to 80% of total calorie supply. Wheat in Afghanistan, Pakistan and Yemen, sorghum in the Sudan, and a mixture of several cereals in Mauritania (wheat, rice and millet) and in Somalia (wheat, rice and sorghum) constitute the main staple foods. In quantitative terms, cereals supplies are a little more than 100kg per person per year in Somalia and the Sudan whereas in other countries it is higher and ranges from 160 to 180 kg. Per caput sugar supply is also rising and attain 20 to 25 kg per year and vegetable oils are leveling at 8 to 10 kg with the two combined contributing 15% to 25% of total calorie intake, a figure significantly different from the intermediate countries (20% to 30%) and the high-income countries (40% to 45%). Protein supply is 60 to 70 g per person per day with the exception of Mauritania, a traditional consumer of fish, milk and meat and where per caput protein supply is 96 g per day. About 60% to 80% of

proteins in the other countries are of plant origin, contributed mainly by cereals. In summary, the diet in low-income countries is insufficient in calories. It is little diversified, traditionally cereal-based with insufficient fruit and vegetable intake, and with cereals contributing 60% to 80% of total calorie and protein intake (FAO, 1990).

Factors Associated with Food Consumption Patterns

Income

Income is considered to be one of the most important factors in determining food consumption patterns in the countries of the Region. A substantial increase in income occurred in all countries in the region, especially during the 1973-80 period, which resulted in a significant change in dietary patterns. This was more apparent in the oil-exporting countries (especially the Arab countries of the Gulf), where the per capita income increased dramatically at an annual rate of 10% between 1973 and 1980 (Khaldi, 1984) mainly due to oil revenues. In general, as income increase the intake of animal protein foods increased. The high income countries showed a marked rise in the consumption of meat, poultry, milk and eggs during 1970s, and 1980s.

At low-income levels, the cheap foods such as potatoes, bread, sugar and rice are the main source of energy. As incomes rise, people switch to more expensive foods such as meat, poultry, fruit and luxury foods (Tangerman, 1986). A study in Kuwait showed that, as household income increased, the availability of meat, fish, milk, eggs, fruit and vegetables increased (Kamel and Martinez, 1984). Analysis of the situation, however, is more complex because the income distribution within the population is unequal. In general, income inequity tends to increase during the early stages of economic development. If the per-capita income exceeds 2,000 US dollars this inequity becomes very low (Willet, 1976). This means that, for the majority of the countries in the Region facing income mal-distribution, diversification occurs in the quantity and quality of food consumed.

Food Subsidy

The food policies conducted in most of the countries have also done much to change consumption in recent years by subsidizing staple food products. In all the countries the main objective has been to develop industry and to keep industrial costs relatively low by limiting salaries, which is made possible by a policy of low food prices. In the Maghreb and

most of the Middle East countries the prices of staple products are artificially kept at a very low level through direct or indirect subsidies on consumption. With the rise in the prices of agricultural commodities on world markets between 1972 and 1976 and again in recent years, these subsidies have become a very heavy burden on the state budget for the countries which practice them (FAO, 1987)

The immediate effects of subsidization policies are, of course, positive, because they enable a very wide range of the population to have access to basic foodstuffs, thereby by improving the nutritional status of the most impoverished. For example, calculations made for Tunisia on the effect of the compensation on income distribution and diet, show that the subsidies have a redistributive effect, despite their unequal nature (the poorest quarter of the population receives 14% of the subsidy and accounts for only 8% of the total expenditure, while the wealthiest quarter of the population receives 35% of the subsidy and accounts for more than half - 52.5% - of the total expenditure). In addition, food subsidies have usually made it possible to keep price rises at a reasonable level (FAO, 1987).

However, this policy of fixing a uniform price for consumers which is generally lower than the cost price and making up the difference from the state budget has its risks. From the point of view of consumption, it has the drawback of subsidizing primarily the households which consume most, i.e. the middle and wealthy classes. From the point of view of production, low food prices tend to discourage local farmers. The countries of the Region provide many examples of such negative effects. In Morocco, the system of subsidizing imported vegetable oils, particularly soyabean oil, has checked the development of local oilseed crops, particularly sunflower, thus increasing dependence on imported oils. In Tunisia, the inadequate price paid to sugar producers led to a decrease in the number of sugarbeet producers between 1971 and 1975. In Egypt and Algeria, the relative success of fruit and vegetable farming and livestock rearing owes much to the farmers' loss of interest in the traditional crops, for which prices are not very remunerative (rice, wheat).

Urbanization

The influence of urbanization on food consumption can be clearly seen in the food consumption surveys. All the surveys conducted in the Region over the past fifteen years reveal the same facts: higher average overall consumption in urban areas and a much more diversified diet, in particular much greater consumption of animal products, fruit, vegetables and sugar

certain economic functions, such as food production and preservation, because in the cities foods must be bought from groceries or supermarkets (Den-Hartog, 1981). This trend toward urban living has had an effect on the population growth in urban areas, with a resultant increase in the demand for food. In Sudan, for instance, the main reason for increasing wheat consumption in the cities is the continuous shifting of rural people to urban areas in search of better-paying jobs (Mustafa, 1973). About 36.7% of the population growth in the province of Khartoum (the capital of Sudan) was attributed to rural urban Migration (Zakaria and Adam, 1980). Similar situations have been observed in most countries in the Region.

The second type of migration is occurring within the population of the Middle Eastern countries. Beginning with the oil-price boom in 1973, the oil-producing countries became highly affluent and attracted labourers from other countries in the Region, particularly from Egypt, Syria, Jordan, West Bank, Sudan and Yemen (Mamarbachi et al, 1980). These immigrants brought with them new food habits. In Iraq, for example, the influence of Egyptian food habits on those of the local population has been observed. Since 1980 Iraq has imported Egyptian labourers to cover the shortage in their labour force due to the involvement of a high percentage of Iraqi men in the Iran-Iraq war. As a result, Egyptian foods such as *foul madamis* and *tamia* have become popular in Iraq (Musaiger, 1993).

A similar influence has been seen in Jordan, a country experiencing both labour exporting and importing. A large population of male Jordanian labourers are working outside the country, particularly in the Arab countries of the Gulf. Consequently, Jordan imports migrant labourers to replace the shortage in manpower. Thousands of Egyptians are working in Jordan and hence Egyptian foods have been widely introduced (Musaiger, 1993).

The third type of migration is that related to non-Arab nationals. The migration has not been limited to the Arab people, but has expanded to include nationals from India, Pakistan, Sri Lanka, Bangladesh, Korea, the Philippines and Indonesia. In the Arab Gulf countries, foods of the Indian subcontinent have become part of the diets of most local households. Jordan also attracted many Pakistani immigrants to work in agriculture production in the West Bank (Gehart, 1986). Although no investigation has been done on the influence of Pakistani food habits on those of the local inhabitants, it can be expected that these immigrants have introduced new food habits. Generally, in most Middle Eastern Arab countries, food consumption becomes more diversified to satisfy the different ethnic origins and various tastes and preferences of the immigrant labour forces.

Mass Media and Advertisements

The increase in family income has put television and other electrical appliances within the reach of most households in the Region. In Kuwait, 100% of families have at least one television set (Al-azhari, 1974). In Bahrain, the percentage was 99% (Musaiger, 1983) while in Libya about 94% of the households in Tripoli had a television set (Mamarbachi et al 1980). Even in rural areas ownership of radios, television, and tape recorders is widespread. This is especially true for migrant workers who return to their homeland with considerable resources. People spend much of their time watching television or listening to the radio, and these media are therefore expected to have a remarkable impact on food beliefs and practices. In Tunisia, for example, the government used public service spots on the radio to encourage the people to eat certain nutritious foods, for example, people were recommended to eat lentils and 6 months later, the demand for lentils had so increased that the government was forced to import more lentils to satisfy the local demand (Gehart, 1986).

Advertising deals with all mass media and it is widely accepted that food advertisements have an influence on what the people eat. In most Near East countries advertising has developed rapidly since it represents a good income source for the media industries. A careful study of the influence of advertising on the food habits of housewives was done in Bahrain (Musaiger, 1983). It was found that television food advertising played an important role in shaping the food attitudes and practices of housewives. Almost 42% of the housewives strongly believed food advertisements, and 47% moderately believed them. About 42% of the housewives used a newly advertised beverage products. Another study showed that 59% of the children in Bahrain always requested food items they saw advertised on television, 29.8% sometimes requested them, and only 11% rarely requested them (Musaiger et al, 1986).

Food Quality and Safety

A safe and adequate quality food supply is essential for proper nutrition. Foods must not endanger consumer health through chemical and biological contamination and they must be presented honestly. Food safety and quality start at the farm and continue throughout the processing and distribution chain to storage and final preparation by the consumer or food service industry (FAO/WHO, 1992). However, the food quality control systems in most Near East countries are inadequate. Thus, strengthening food control systems and educating consumers about appropriate food handling practices are both essential to proper nutrition and healthy diet (Miladi, 1994b)

Chemical Food Contaminants

Foods may be contaminated by harmful metal such as lead, cadmium and mercury. This kind of contamination can be done during the initial stages of production, and during post-harvest processing, handling and preparation. High level of heavy metals such as lead and cadmium have been found in staple foods and water from industrialized areas in Europe and North America (UNEP, 1992).

Reports on food contamination with heavy metals in the Region are scarce. However, indicators show that the heavy metal contamination in some countries in the Near East is alarming. For example, lead poisoning has been reported in many Near East countries and children are more vulnerable to such poisoning, because of their developing central absorption and tendency to put objects in their mouth. In Kuwait, Shaltout et al (1989) screened 902 infants and children aged 3 months to 5 years for lead poisoning. The results showed that 20% of the children had an elevated erythrocyte protophyrin (EP) (750 ug/dl). Of those, 11 (6%) had values above 159 ug/dl. One hundred and forty children were further tested for blood lead levels (pbB) haemoglobins, mean cell volumes, and percentage of transferrin saturation; 41 (29%) had blood lead levels >25 ug/dl which is the current definition of elevated blood lead levels. The main reason for lead poisoning in these children is using traditional remedies for treating certain diseases.

Pesticides are employed widely to protect seeds, growing plants and crops from devastation by insect pests. The risk of using pesticides include possible poisoning or even death of man and domestic animals. Another risk is the contamination of air, water, food or soil.

In most Near East countries, pesticides and chemical fertilizers are subsidized by the Government, and although this helps to increase production of vegetables, it can also lead to harmful results. Farmers are illiterate and often not instructed on the safe and appropriate use of chemicals and may grossly over-spray the crops. Other important factor is that many countries imports most of their foods from various countries making the control of contaminants in foods, including pesticides a difficult task. In Saudi Arabia, for example, Barakat, et al (1985) found that all tested vegetables (Cquash, tomatos, potatoes, cucumber, spinach and lettuce) and apple contained pesticide residues, varied in kind and levels. The residues of Malathion, DDVP, and Dimethoate were detected, but their concentrations were below the established tolerance levels. More information on food contaminants in the Arab Gulf countries is reported elsewhere (Musaiger and Miladi, 1996a).

In Pakistan, the National Institute of Health repoted that out of 48 types of foods studied (dairy products, meat, fish, poultry, cereals, vegetables, fruit and fat) organochlorine residues were found in all these foods, whereas organophosphorous residues were detected in 94% of these foods. There had been wide spread distribution of DDT and its degradation products as residues in food. Dieldrin and HCB residues were detected at levels beyond Codex recommended maximum limits. Among organophosphorous pesticides methyl parathion was most prevalent (94%), while malathion and diazinon levels were low and ethion was not detected (Nutrition Division, 1984).

Foodborne Diseases

Foodborne diseases are considered one of the main health problems facing most of the countries in the Region, as these diseases still contribute to substantial numbers of illness. The World Health Organization (1989) reported that foodborne diseases are now represented a major public health problem all over the world. Health consequences due to these diseases can be very severe and may lead to death, especially in persons with low disease resistance such as infants, young children, and the elderly. These diseases also have major economic impacts through loss of income, manpower, foodstuffs, medical care and decreases in tourism (Kafestein et al, 1992).

Foodborne diseases may be toxic or infectious in nature and are caused by ingestion of contaminated food. These diseases can be grouped to four

in the towns than in the rural areas. In all the countries with a big deficit, imports go mainly to supplying the urban centers: in Egypt imported wheat and flour are intended essential for Cairo and Alexandria, where they constitute the basis of the urban population's diet; the traditional cereals other than wheat (barely, maize, millet), consumed in rural areas, are being increasingly replaced by bread, products based on wheat flour, and rice (FAO, 1987).

The spread of new types of consumption is also greatly facilitated by the rise of a middle class which gradually adopts the food habits of the wealthy classes. The middle class, a relatively recent phenomenon, which started to grow during the seventies with the development of industry and above all of services, consists mainly of salaried employees and officials living in the big cities.

Migration

The rapid change in consumption models owes much to the migratory movements which have reached an unusual scale in the Region. In Europe this already long-standing phenomena reached its peak during the sixties and undoubtedly helped to spread the consumption models of the more developed European countries to the southern European and Maghreb countries from which most of the immigrants came. With the halt in migration to the EEC countries and the industrial development of the petroleum-producing countries that began in the seventies, the main poles of migration have moved to the Middle East (FAO, 1987).

Migration has a big impact on food consumption. In the countries with a shortage of labour the influx of foreign workers has led to a very rapid growth in population, 5% to 7% a year during the seventies, and a correspondingly rapid increase in food demand. In the countries supplying the labour, the consumption models of the largely westernized petroleum-producing countries spread very rapidly through population movements, a spread facilitated by the size of the earnings sent home by the foreign workers. The growth in consumption is increasingly covered by imports, local farmers no longer being able to produce enough for the national markets.

There are three types of migration which determine the food consumption patterns in the Region. The first of these is the migration of rural people to urban areas, which affects the food consumption of both rural and urban inhabitants. The shifted rural families are deprived of

categories; bacterial infection and intoxications, viral infections, protozoa infections, and helminthiasis.

Bacterial Infections and Intoxications

Bacteria are the leading cause of most foodborne diseases in the Region. Of these diseases, *Bacillus cereus* gastroenteritis, *Campylobacteriosis*, *Clostridium perferingenes* enteritis, *Escherichia Coli* disease, *Salmonellosis*, *Shigellosis* and *Staphylococcus auras* intoxication are most frequently reported (Table 13). The incidence of *Salmonellosis* and *Shigellosis* are higher among infants and young children, indicating the importance of prevention and control of these diseases among children below five years of age. The high prevalence of bottle-feeding and unhygienic preparation of weaning foods may responsible in part for these diseases among infants. In addition, young children have an incomplete immune system, and thus are more susceptible to infection.

Food poisoning outbreaks due to *Salmonellosis* occur frequently in the Region. Epidemiological investigations showed that improper thawing of foods, inadequate cooking, inadequate reheating of cooked foods, cross-contamination and infected food-handlers are the main factors contributing to salmonellosis in homes and food establishment. The foods mostly involved in these outbreaks are chicken, turkey and meat (Musaiger, 1995).

Viral Infection

Food can only act as a vehicle for the transmission of viruses. The important viral infections transmitted via food in the Region are *Rotavirus* gastroenteritis and *Hepatitis A*. The source of infection in foodborne viral infection is usually human feces. Contamination can occur either directly by means of infected food handlers or polluted water. In the Arab Gulf countries, is widely believed that expatriate foodhandlers (mainly Asians) play a major role in the spread of hepatitis A.

Protozoa Infections and Helminthiasis

Protozoa infections are problems of concern in all countries in the Region. *Amoebiasis*, *Cryptospridiosis* and *Giardiasis* are the most common infections in the Region. As for helminthiasis, *ascariasis* and *trichuriasis* are frequently reported.

TABLE 13

ESTIMATION OF OCCURRENCE OF DISEASES WHICH ARE OR MAY BE FOODBORNE IN NEAR EAST REGION

Diseases	Occurrence ^a
<i>Bacterial infections and intoxications</i>	
Bacillus cereus gastroenteritis	+++
Brucellosis	+ / +++ ^b
Botulism	+
Campylobacteriosis	+++
Clostridium perfringens enteritis	+++
Cholera	+
Escherichia coli disease	+++
Listeriosis	+
Typhoid and paratyphoid fevers	++
Salmonellosis	+++
Shigellosis	+++
Staphylococcus aureus intoxication	+++
<i>Viral infections</i>	
Hepatitis A	++
Norwalk virus gastroenteritis	+
Poliomyelitis	+
Rotavirus gastroenteritis	+++
<i>Protozoa infections</i>	
Amoebiasis	++ / +++
Cryptosporidiosis	+++
Giardiasis	++ / +++
Toxoplasmosis	+ / ++
<i>Helminthiasis</i>	
Ascariasis	+++
Fasciola hepatica infection	++
Hydatidosis	+ / ++
Taeniasis/cystocercosis	+
Trichinellosis	- / + ^b
Trichuriasis	+++

a. -Not occurring; + occasional or rare; ++ frequent, +++ very frequent

b. great regional variation

Giardia is the most common protozoa infections prevalent among young and school children in the Region. This parasite is endemic throughout the world. The frequency of Giardia in the Near East countries is underestimated because examination of one stool sample (as usually happened) may not detect the forms of Giardia (or even of other parasites) which are irregularly released in the stool (WHO, 1987).

Although Trichuris is widespread all over the world, it has been neglected more often than the other parasites, and this has led to a lack of recognition of this infection as a public health problem in the Region. Intensive infection of Trichuris was found to cause a severe clinical syndrome associated with mucoid dysentery and growth retardation in children (Cooper et al 1986). It is widely accepted that Trichuris may be a major cause of chronic malnutrition in young children in developing countries (WHO, 1987). This whipworm is also spread among the adult population and it is a common cause of bloody diarrhoea (Sander, 1981). These findings suggest the importance of detecting Trichuris in the Near East countries, particularly among infants and young children.

Some factors contributed to occurrence of Foodborne Diseases in the Region.

Changes in Food Habits

The food habits of the people in the Region, especially in high and middle income countries have changed dramatically during the last two decades, as a result of the increase in income. The consumption of processed and take-out foods has increased steeply. Nowadays the practice of eating out is becoming more popular and thus, people have a greater chance of becoming sick due to eating contaminated foods prepared at restaurants. Moreover, there is a rapid growth of shops and canteens which are providing take-out meals, and many families reheat such meals at home or keep them for a long period before eating. This practice provides the ideal conditions for microbial growth (Musaiger, 1995).

Food Handlers

Food handlers often have little information about the risks of food contamination or how to avoid it. The work is considered low status and is low paid, which lead to poor motivation (WHO, 1989a). The majority of food handlers in the Region are at low socio-economic class, illiterate and have poor personal hygiene. Additionally those food handlers have

insufficient or no training in hygienic handling preparation and storage of foods, and probably play an important role in the occurrence of many cases of foodborne diseases.

In the Arab Gulf countries, expatriate food handlers play a major role in occurrence of most foodborne diseases. Most of food handlers in the Gulf countries are low socioeconomic expatriates who came from endemic countries such as Indian-Subcontinent and Far East countries. A high percentage of these expatriates work in restaurants and in homes. Reports of the Ministries of Health in the Arab Gulf countries showed that expatriate food handlers were involved in many bacterial foodborne illness such as Salmonellosis, typhoid and paratyphoid fevers, and food-poisoning outbreaks. In addition, several intestinal parasites were isolated from feces of food handlers and housemaids during their routine medical checkups.

Another important factor is the increase in the demand for the services of foreign housemaids by many high and middle income families in the Region. Even unemployed mothers depend on the services of housemaids to help in home management, preparation and cooking the meals. These housemaids are poorly educated, have little or no information on hygienic preparation of foods and thus contributed in the occurrence of food poisoning at home.

Lack of Health Awareness

Ignorance on sound handling, preparation, and storage of foods is common among both food handlers and the public. Most food-poisoning outbreaks which occurred in homes, restaurants, and schools in the Region have been due to lack of knowledge about food preparation such as improper thawing of frozen foods, inadequate cooking, keeping the cooked food at room temperature for several hours, and bad personal hygiene during preparation of foods (Musaiger, 1995).

A study on food sanitation knowledge and practices of 372 Bahraini housewives showed that 13% of them did not cover their hair and 28% did not remove their rings during food preparation and cooking. Moreover, 54% of those housewives thawed frozen food in a water bath and 34% at room temperature. About 60% of those who eat grilled fish did not eviscerate it before grilling. Among the total samples, 18% had at least one episode of diarrhoea during the month proceeding the survey (Musaiger, 1995).

Inadequate Legislations and Regulations Related to Food Safety

Most outbreaks of foodborne disease and food contamination with heavy metals and pesticide residues throughout the world are caused by failure to observe satisfactory standards in the preparation, processing, handling, and storing of food (WHO, 1989b). National food standards in all countries of the Region are lacking in many aspects related to food safety. Adequate legislations and regulations for food handling and processing are a great help in keeping food safe for human consumption. Although the Near East countries adopted the Food Regulations recommended by the Codex Alimentarius Committee of FAO/WHO, the need for regulations to consider the local situations is essential.

Inadequate Training of Workers Involved Food Inspection

Food and health inspectors in the Region usually receive little training through their education. These inspectors rarely updated about the new trends in food and health inspection. In addition, their training contains little information about the local situation. For example, the majority of food inspectors did not receive any training in implementation of the HACCP system. This system ensures that all foodhandling operations are properly controlled and has proved to be more efficient and cost-effective than traditional systems.

Improvement of Food Quality and Safety in the Region

It is well recognized that without an effective food quality control system, it would be difficult to ensure that food supplies are safe. To obtain an adequate and effective food safety programme in the Near East countries the following measures should be taken into consideration (Musaiger, 1995):

1. Revising the current Food Law. Unfortunately the Law is far from being comprehensive in all countries in the Region. In view of the rapid technical development in food processing and handling, more attention should be given to updating the current Food Law, with more emphasis on local situations in each country.
2. Active and effective food inspection services. Food inspection in the Region has concentrated more on general hygienic and sanitation aspects, without taking into consideration many other sources of contamination of foods. This is particularly true given the great limitations in facilities and number of health inspectors. Inspection should focus on storage and

preservation of foods, cooking methods, cleaning materials and methods, sterilization and disinfection, kitchen design and equipment and control of infestation. This can be done effectively through adoption of the HACCP system.

3. Improve quality and quantity of analytical services. This can be achieved by training the staff and carrying out more chemical tests such as determining pesticide residues in foods, mycotoxins, food additives, and artificial hormones.

4. Preparation of food standards which are related to local circumstances in each country. Standards relating to levels of mycotoxins in foods, additives, pesticide residues, and heavy metals are urgently needed. Equipment used in preparation and processing should be standardized to avoid any defect in processing unsafe foods.

5. Proper training for both food inspectors and chemists. This should be done in two ways: inservice training to update knowledge and improve skills of these staffs, and overseas training for senior staff to gain skills in specific techniques or advanced methods in inspection and analysis of foods.

6. Revising the current food inspection organization in order to cover a wider aspect of food control and to increase the efficiency of activities.

7. Involvement of other related governmental and private bodies in preparation of food standards, such as Ministry of Agriculture, non governmental societies, food factories and others.

8. Adequate educational programmes for the public and foodhandlers on different aspects of food safety. This educational programme should be an integral part of the primary health-care education approach.

Nutrition Situation

Health Indicators

The Near East Region has reduced child mortality faster than any other in the developing world. In 1960, about 25% of all children died before age five year; however by 1993, under five mortality rate had been reduced to 7%. Nevertheless, the survival prospects of children are lower than those in regions where income is comparable. Maternal mortality, still a problem of concern in the low income countries, especially Afghanistan, Pakistan, Sudan, Morocco, Egypt and Yemen (UNICEF, 1996).

Access to health services has improved dramatically in most countries in the Region. More than 90% of the population in 14 countries in the Region have access to health services. Rural areas are still facing the shortage of health services especially in Afghanistan and Yemen, where only 17% and 32% of population have access to health services (Table 14).

Access to safe water and adequate sanitation are important health indicators. Many countries in the Region are lacking the access to safe water or proper sanitation condition. About 12% of people in Afghanistan and 44% in Iraq have an access to safe water, while the percentage ranging from 55% to 100% in other countries. As for access to adequate sanitation the percentage ranging from 22% in Sudan to 100% in Cyprus and Gulf states (Table 14).

Breastfeeding Patterns

Studies have demonstrated the benefit of breast-feeding for both the mother and her infant. However, the duration of breast-feeding has declined gradually in most developing countries, and more and more mothers started bottle-feeding at a very early time.

The duration of breast-feeding vary from country to country, and also from area to area in the same country in the Near East Region. The duration of breast-feeding varied from 19 months to 6 months with a mean duration of about 13 months (Musaiger, 1990).

There is a great geographical differences in breast-feeding patterns in the Near East countries. In general rural mothers tend to breast-feed their children longer than urban ones. About 93% of mothers in urban areas

TABLE 14
HEALTH INDICATORS FOR THE NEAR EAST COUNTRIES

Country	% population access to safe water (1990-95)		% population access to adequate sanitation (1990-95)		% population access to health services (1990-95)		Under 5 mortality rate 1994 (1,000)	Infant mortality rate 1994 (1,000)	Maternal mortality rate 1980-92 (1,000)
	total	urban	total	urban	total	urban			
Afghanistan	12	39	-	13	20	80	257	165	640
Pakistan	79	96	33	62	55	99	137	95	500
Sudan	60	84	22	79	4	90	122	74	550
Yemen	55	89	65	87	60	81	112	78	--
Libya	97	100	98	100	85	---	95	64	70
Iraq	44	--	70	85	37	97	71	57	120
Algeria	79	96	77	93	61	100	65	54	140
Morocco	55	94	41	69	18	100	56	46	330
Turkey	80	91	--	--	--	--	55	47	150
Egypt	80	97	50	80	26	100	52	41	270
Iran	84	89	67	89	38	95	51	40	120
Lebanon	94	96	63	81	8	98	40	33	--
Syria	85	92	83	84	82	96	38	32	140
S.Arabia	95	100	86	100	30	100	36	31	41
Tunisia	99	100	95	98	94	100	34	28	70
Oman	63	--	78	--	96	100	27	22	--
Jordan	89	--	95	--	97	98	25	21	48
U.A.E.	95	---	77	93	22	--	20	17	--
Kuwait	100	--	100	--	100	--	14	12	6
Cyprus	100	--	100	--	100	--	10	9	--
Qatar	100	--	100	--	100	--	24	19	--
Bahrain	100	--	100	--	100	--	20	17	--

Source : UNICEF (1996)

breast-fed their infants for the first three months compared to 97% in rural areas. The prevalence of breast-feeding declined to 57% and 65% at the end of the first year, for urban and rural areas respectively (Musaiger, 1990)

Although breast-feeding is a common practice in many countries in the Region, there is a good evidence that the duration of breast-feeding has declined, and this decline was more observed in urban areas rather than rural ones. In Pakistan, for example, it was found that over all duration of breast-feeding declined from 17.2 months to 14.6 months during the period 1975-1980, a decline of 15% (22% in urban areas compared to 13.4% in rural areas) (Musaiger, 1990).

Breastfeeding and Post-partum Amenorrhoea

If the infants are fully or nearly fully breast-fed and a mother consequently remains amenorrhoeic, breast-feeding provides more than 98% protection in the first six months post-partum, but the risk of pregnancy increases when breast-milk is supplemented or menses return (WHO, 1990). Study conducted by A. I. D (1990) showed that breast-feeding reduced total fertility by an average of 34% for five countries in Africa, by 30% for 12 countries in Asia and by 16% for 12 countries in America.

Few studies related to breast-feeding and lactational amenorrhoea were carried out in Near East countries. Studies in 5 countries (Jordan, Syria, Egypt, Sudan and Pakistan) showed that the median duration of post-partum amenorrhoea was the highest in Pakistan and the lowest in Jordan. There was a positive association between amenorrhoea and duration of breast feeding. It was found that as duration of breast-feeding increases the duration of post-partum amenorrhoea increases in these five countries (Musaiger, 1990).

In Pakistan, Khan and Siraj (1986) found that there was a positive association between age of women and duration of lactation. The period of amenorrhoea was longer in case of rural mother than in urban ones. No systematic pattern in resumption of menses was found in relation to parity.

Time of Starting Breastfeeding

Several studies in the region showed that breast-feeding was delayed for one day or even more after delivery. During which time glucose water or infant formula are given to the infant. In many countries colostrum, the first milk, is discarded and replaced by formula or other local foods during

the first three days of infant's life, believing that colostrum is harmful to infants. In Bahrain, for example, it was found that 28% of mothers started breast-feeding immediately after birth, 15% after 1-6 hours, 3% after 7-12 hours, 10% after 13-24 hours and 44% after 24 hours (Musaiger, 1990). In North part of Yemen, Greiner (1980) found that the mean duration of beginning breast-feeding ranged from 1.8 to 2.2 days after delivery.

Data illustrated in Table 15 shows that the percentage of mothers initiating breast feeding during the first hour of delivery ranged from 11.5% in Saudi Arabia to 54.4% in Sudan. Late initiation of breast-feeding has serious hazardous on mother and her infant. It delays mother-infant bonding, increases the risk of hypothermia in the new born, expose the infant to diarrheal pathogen, and contributing to insufficient milk due to reduced suckling breast (A.I.D., 1990).

Exclusive breastfeeding

Exclusive breastfeeding (the supply of breast milk without supplementation of any other foods or liquids) not only influences lactation infertility, but also, prevent diarrhoea, and provides protection against respiratory infection, eczema and asthma (WHO/UNICEF, 1990). In general, the duration of exclusive breastfeeding is very short even in countries with the greatest median duration of breastfeeding. However, data presented in Table 16 indicates that the percentage of mothers who exclusively breastfeed for first 3 months ranged from 12% in Tunisia to 65% in Morocco. These figures may be questionable, as the definition of exclusive breastfeeding is not well understood by both the health workers and mothers.

Age at Introduction of Bottle-feeding

Bottle-feeding has introduced at an early time in many countries in the Region. This practice was found to be widely spread among urban, educated and employed mothers than rural, illiterate and unemployed mothers. A study in United Arab Emirates showed that bottle-feeding introduced as early as at the first months by 12.5 - 64.5% of mothers in 8 geographical regions, and the great majority introduced bottle-feeding during the three to fourth months of infant's life (Osman, 1981).

The early introduction of bottle-feeding plays an important role in early cessation of breast-feeding in some Near East countries, and leads to high dependent on infant formula as well as other commercial baby foods.

TABLE 15

**TIME OF STARTING BREASTFEEDING (HOURS) IN SOME NEAR EAST COUNTRIES
(PERCENT OF MOTHERS)**

Country	Year	Sample Size	Time of starting breastfeeding (Hours)			
			<1	1-6	7-12	>12
Bahrain	(1986)	499	28.0	15.0	3.0	54.0
Egypt	(1990)	1072	67.5	12.8	5.7	14.0
S. Arabia	(1990)	990	11.5	52.6	19.6	16.3
Sudan	(1990)	1455	54.4	26.8	12.9	5.9
Oman	(1992)	1028	36.9	52.2	2.9	8.1
Pakistan	(1990)	1117	17.9	23.5	29.0	29.6

Source : MUSAIGER, A. O (1995)

TABLE 16

PERCENTAGE OF CHILDREN WHO ARE EXCLUSIVELY BREASTFED, BREASTFED WITH COMPLEMENTARY FOOD AND STILL BREASTFEEDING IN SOME NEAR EAST COUNTRIES (1986-1994)

Country	Exclusively breastfed (0-3 months)	Breastfed with complementary food (6-9 months)	Still breastfeeding (20-23 months)
Pakistan	25	29	52
Sudan	14	45	44
Yemen	15	51	-
Morocco	65	35	-
Egypt	38	52	-
Tunisia	12	53	16
United Arab Emirates	-	-	26
Oman	20	-	-

Source : UNICEF (1996)

Reasons for Discontinuing Breastfeeding

Data from 10 countries in Near East (Bahrain, Egypt, Iraq, Kuwait, Oman, Pakistan, Saudi Arabia, Sudan, Tunisia and UAE) showed that new pregnancy was the main reasons given by mother for stopping breastfeeding (27%), followed by insufficient breast milk (23%), and child old enough (15%) (Musaiger, 1990).

Spacing between deliveries should therefore be encouraged. The recommendation in Koran that the child should be breast-fed and weaned during 2 years can be utilized in health education programme to encourage mothers to continue breast-feeding as well as encourage spacing between deliveries.

Conclusions

Based on the revision of studies on breastfeeding patterns in the Near East countries, the following conclusions were noted (Harfouche and Musaiger, 1993) :

1. Prolonged breast-feeding is still a common practice in some Near East countries, especially in rural areas.
2. There is a gradual decline in duration of breast-feeding in the majority of Near East countries.
3. The most hazardous patterns which were reported are :
 - a. Bottle feeding following early abrupt weaning under three months of age.
 - b. Mixed feeding at an early time (during the first month).
 - c. Early introduction of supplementary foods.
4. Delayed supplementation associated with traditional prolonged breast-feeding patterns continues to be a major hazard in some countries.
5. The high availability of various brands of baby food and formula in the market in most countries encourages mothers to start bottle-feeding at an early time.

6. There are a numerous unsound beliefs and attitudes which are widely spread in these countries and negatively affected the continuation of breast-feeding.
7. There are several social and economic factors affecting breast-feeding such as educational level and employment of mothers.
8. Lack of legislations and regulations concerning marketing of baby foods.

Undernutrition

Low Birth-Weight (<2.5Kg)

Low birth weight (LBW) is one of the most important factors contributing to infant-mortality in developing countries. It is always used as an indicator for the assessment of the social and health status of a community. The prevalence of LBW (<2.5 Kg) in the Near East Region ranged from 7% in some Gulf countries to 25% in Pakistan (Table 17). Studies on factors associated with low birth weight in the Region are few and limited in their scopes and objectives. It was found that the sex of child, geographical location, mother's age, parity, and interval between births contributed significantly to birth weight of the newborn. Iron deficiency anemia may play an important role in prevalence of low birth weight in this region. Malnutrition among mothers is also another important factor in some countries such as Afghanistan, Pakistan, Sudan and Yemen.

Protein - Energy Malnutrition (PEM)

Comprehensive nutritional surveys have been carried out in some countries of the Region. However, adhoc surveys have been conducted in most of countries. Findings of these surveys revealed that PEM is a problem of concern in infants and young children in the Near East countries. Nevertheless, the magnitude of the problem varies from country to another. In general, the prevalence of undernutrition among infant and young children is very low in Kuwait and Cyprus, low in most Gulf states, relatively high in middle-income countries and very high in Afghanistan, Pakistan, Sudan, Yemen and Djibouti.

Moderate and severe underweight (weight-for-age) is highly prevalent in Pakistan, Sudan and Yemen (20%-40%). Weight for age is more sensitive to any deterioration or improvement in the health of the child. Change in

weight is also a very rapid indicator since it can take place in a matter of a few days. Excluding the low income countries, the prevalence of wasting is low in most Near East countries (2%-3%). Wasting (weight-for-height) is more specific to the child's degree of thinness than the measurement of weight for age, which does not distinguish between a tall thin child and a short fat one. Stunting (height-for-age) is more prevalent compared to underweight and wasting, 12%-50% (Table 17). Stunting is a stable measure that reflects the total increase in size of the child up to the moment that it is determined, and therefore the child's total previous health history (WHO/EMRO, 1991).

Micronutrient Deficiencies

Micronutrient deficiencies are amongst the most nutritional problems worldwide. The common micronutrient deficiencies of public health significant are iron deficiency anaemia, iodine deficiency disorders and vitamin A deficiency. According to WHO about 149 millions are at risk and affected by iron deficiency anaemia in the Eastern Mediterranean region. The corresponding figures for iodine disorders and vitamin A deficiency are 45 and 14 millions, respectively (WHO, 1992).

Iron Deficiency Anaemia

This deficiency is the main nutritional problem in all Near East countries. It is estimated that about 30%-70% of pregnant women in the Region suffered from iron deficiency anaemia. The prevalence ranged from 10% to 50% among pre-school children, and from 20% to 70% among school children. Main causes of this problem are poor dietary intake of iron, low iron absorption, parasitic infection, malaria, vitamin A deficiency, multiparity and early age of marriage (Musaiger and Miladi, 1996b).

The intake of food rich in iron was found to be low in many parts in the Region, particularly by infants, young children and pregnant women. In Jordan, it was reported that the diet was markedly low in iron during the first three years of life (UNICEF, 1992). In Saudi Arabia, Sawaya et al (1988) showed that the iron intake of children 0-6 years did not exceed 38% of FAO/WHO RDA. Mean daily iron intake of Lebanese children aged 1-3 years ranged from 50% to 75% of the RDA. In general, the percentage of children who consumed less than 2/3 of RDA was 40% in 1986, decreased to 32% in 1992 (Shaar and Ayyas, 1986, Shaar and Shaar, 1992). Similar findings were reported among pregnant and lactating women in the Region. In Kuwait,

for example, Parakash et al (1984) showed that the intake of iron by pregnant women was below 75% of USRDA.

Studies, both among children and adults, suggested that food rich in vitamin C, which enhance iron absorption, are poorly consumed in this Region. In Iran, it was found that in some southern areas with a hot and dry climate, where the consumption of fruit and vegetables is very low, the intake of vitamin C is inadequate among 20% of rural and 50% of urban families (INSFT, 1988). Vitamin C is mostly found in some fresh fruit and vegetables. The daily consumption of fresh fruit and vegetables by children, adolescents and adults in the Arab countries of the Gulf was found to be low (Musaiger and Miladi, 1995).

Many compounds are known to inhibit the absorption of iron, among them in polyphenols (including tannins) which are present in tea and to a lesser extent in coffee, and phytates which are present in wheat and other cereals (DeMayer, 1989). The consumption of tea is very high in this Region, especially after the heavy midday meal, the lunch.

Infections interfere with food intake and the absorption, storage, and use of many nutrients, including iron. The morbidity from viral and bacterial infection in most countries in the Region is high, especially in rural areas where the environmental sanitation is poor and lack of safe water supply. The repeated episodes of infection may result in the development of anaemia particularly in infants and young children.

Several other factors contributed to the high prevalence of anaemia in this Region. These includes high fertility rate of the women, as multiple deliveries tend to lower the haemoglobin level in women, because closely spaced pregnancies deplete the iron stores in the women. This is particularly true when there is no iron supplementation during pregnancies. There are many beliefs and attitudes negatively associated with anaemia in the Region. Among them is the widely spread belief that iron supplement which are given to pregnant women, can cause enlargement of fetus or abortion to the women. Consequently, some women do not take these iron supplements. Malaria, which is highly prevalent in some countries of the Region is also another contributing factor (Musaiger, 1996a). The high prevalence of hereditary anaemia such as sickle cell trait and thalassaemia minor in many countries has complicated the problem (El-Hazmi, 1996). Table 18 shows the prevalence of anaemia, iodine deficiency disorders and vitamin A in the Near East countries.

TABLE 17

PREVALENCE OF LOW BIRTH WEIGHT (<2.5 KG) AND MODERATE AND SEVERE MALNUTRIION IN CHILDREN UNDER FIVE YEARS OF AGE IN THE NEAR EAST COUNTRIES

Country	% of infant with low birth weight 1990	% of under fives (1980-90) suffering from moderate and severe malnutrition		
		Underweight	Wasting	Stunting
Afghanistan	20	-	-	-
Pakistan	25	40	9	50
Sudan	15	20	14	32
Yemen	19	30	13	44
Libya	5	-	-	-
Iraq	15	12	3	22
Algeria	9	9	6	18
Morocco	9	9	2	23
Turkey	8	10	3	21
Egypt	10	9	3	24
Iran	9	-	-	-
Lebanon	10	-	-	-
Syria	11	-	-	-
Saudi Arabia	7	-	-	-
Tunisia	8	10	3	18
Oman	10	-	-	-
Jordan	7	9	2	16
U.A.E.	6	-	-	-
Kuwait	7	6	3	12
Qatar	6	-	-	-
Bahrain	7	-	-	-
Cyprus	5	-	-	-

Source : UNICEF (1996).

TABLE 18

ENDIMICITY OF MICRONUTRIENT DISORDERS IN NEAR EAST COUNTRIES

Country	A Vitaminosis	Goiter	Anaemia
Algeria	NA	23-71% b,c,d	19-42% c
Bahrain	NA	NA	21-42% a,b
Djibouti	8-14% c	NA	↑ a, c
Egypt	↑ b, d	12-43% b	20-70% b,c,d
Iraq	↑ d	30-80% d	↑ d
Iran	NA	27-60% b,d	NA
Jordan	0.6-1.3% a,b	6-15.7% d	34% a
Lebanon	NA	12-70% d	↑ b
Morocco	↑ d	↑ d	NA
Oman	NA	NA	38-65.9% a, b
Saudi Arabia	NA	↑ b	21-50% a, b, c
Sudan	3.7-4.3% b, d	13-86% b, c, d	36% b, c
Syria	NA	69-77% b	30% c
Turkey	15% b, c	↑ b, d	↑ b, c
Tunisia	NA	15-51% b, d	50% b, c
U.A.E.	NA	NA	28-43% a, b, c
West Bank / Gaza Strip	NA	NA	25-50% a, c
Yemen	NA	↑ d	↑ d

a- pre-school children ; b-school children; c-women; d-whole population;
 ↑- common health problem; NA- no information available.

Source : Karrar, A. O. (1993)

Iodine Deficiency Disorders (IDD)

In many countries of the Near East Region endemic goiter has been a familiar condition for decades with the result that alarming prevalence rates in certain regions have continued unchecked. Results of surveys, indicate that the Near East Region have about 15 countries in which iodine deficiency disorders (IDD) might pose a public health problem (WHO/EMRO, 1990).

The prevalence of IDD ranged from 6% to 80%. In Iran, for example, it was estimated that 7-15 million people suffer from various degrees of goiter (Aziz 1987). The main countries reported these disorders are Egypt, Iran, Iraq, Jordan, Lebanon, Pakistan, Sudan, Syria, Algeria and Tunisia. Iodine deficiency disorders were also reported in some mountains areas in Saudi Arabia and the United Arab Emirates, but these disorders are not common health problems (Miladi 1995, Musiager and Miladi, 1996). Low iodine in soil and in most foods commonly consumed are the main causes of IDD in this Region.

Vitamin D Deficiency

Despite abundant sunlight in this part of the world, vitamin D deficiency was found to be a public health problem in some countries. Rickets is a major public health problem in Yemen. A study in the North part of Yemen showed that 27% of children under five years of age had rickets (Underwood and Margetts, 1987). The condition was most common at the end of the first year and had disappeared by the fifth year (FAO/RNEA, 1995b).

Vitamin D deficiency among infants and children has been confirmed in Jordan. This may be due to use of non-fortified milk and cereals, in addition to lack of exposure to sunlight during the period of children's repaid growth. A higher prevalence of vitamin D deficiency was reported among children in poor slums and remote villages (Hijazi et al, 1986). Several studies in Saudi Arabia, suggest low levels of vitamin D in mothers plasma and in their infants. This indicates the role of the pathogenesis of rickets in infants born to mothers with inadequate vitamin D status, and the disease has its origin in the perinatal period. Even among Sudi adults, vitamin D deficiency is frequently seen (Madani and Khashoggi, 1996). Factors responsible for prevalence of vitamin D deficiency are : low exposure

to sunlight, wrapping of infants for long time, low dietary intake of vitamin D and unavailability of other nutrients specially calcium.

Vitamin A Deficiency (VAD)

Few studies were carried out on vitamin A deficiency in this Region. Studies in Djibouti, Egypt, Iran, Iraq, Jordan, Lebanon, Oman, Pakistan, Somalia, Sudan and Yemen indicate that vitamin A deficiency is a public health problem, though the prevalence varied from country to country.

The national survey (1991) in Oman showed that 20.8% of those surveyed had serum retinal levels less than $0.70 \mu\text{mol/l}$, indicating a moderate to severe subclinical problem. Children aged 18 months were mostly affected (22.8%) having serum retinol levels less than $<0.70 \mu\text{mol/l}$. In several urban slums of Karachi, Pakistan, the biomedical data indicate the VAD is a public health problem with 29% to 70% of preschool children having serum retinol levels below $0.70 \mu\text{mol/l}$. Results of a biochemical study in Riyadh, Saudi Arabia, revealed that 10% of the population surveyed had serum retinol levels less than $0.70 \mu\text{mol/l}$, and that 1.1 had serum values less than $0.33 \mu\text{mol/l}$, indicating that VAD is not a severe problem. In Yemen it was found that 62.4% of children aged 1-5 years had serum retinol levels less than $0.70 \mu\text{mol/l}$ (WHO, 1995).

Prevention and Control of Micronutrient Deficiencies in the Near East Region (Musaiger and Miladi, 1996b)

Assessment: In spite of scarcity of data on magnitude and factors associated with micronutrient deficiencies, it is highly recommended that each country should start carrying out a national survey to identify these problems. Target group should be clearly defined for each deficiency. Priority must be given to iron deficiency anaemia surveys, with emphasis to use two of the following parameters: Haemoglobin, PCV, serum ferritin, protoporphyrin and blood film.

Dietary Intervention: Dietary modification is an important approach to reduce the prevalence of micronutrient deficiencies in the communities. Encouragement and support intake of food rich in micronutrients such as green leafy vegetables, yellow fruit and vegetables should be done through various mass media and school feeding programmes. Consumption of goitrogenic foods should be reduced as possible. It is highly recommended that these countries should establish dietary guidelines for healthy eating taking into consideration consumption of foods that are rich in

micronutrients, and reducing intake of that contain constituents inhibit or interfere with absorption of the micronutrients especially iron, zinc, and calcium.

Fortification of Staple Foods : Food fortification is an important method to overcome micronutrient deficiencies. Fortification of salt with iodine and iron has proved in many countries to be one of successful method to control iodine deficiency disorders and iron deficiency anaemia. Fortification of sugar with vitamin A has also given an encouraging results. However, it is very essential to study carefully the main food vehicle for fortification in each country. Wheat flours and rice are the main staple foods in the Near East countries. Fortification of these foods, especially wheat flour, with several micronutrients is a major intermediate strategy to control micronutrient deficiencies. Emphasis should also be put on the infant formula, weaning foods and other processed foods which are widely consumed by children. Most of imported whole powdered milk in the Region is fortified with Vitamin A and D. This should be extended to other imported dairy products such as butter, margarine and yoghurt.

Nutrition Education : One of the main causes of micronutrient deficiencies in this Region is the lack of nutrition information on sound dietary habit to prevent these deficiencies. Nutrition education and communication are an important supporting strategy to prevent any nutrient deficiency. Information on causes, consequences and measures to prevent and control these problems should be disseminated through various mass media. Nutrition education material should be pretested and evaluated. Involvement of target groups in these process is highly recommended.

Public Health Measures : Several public health measures should be carried out by health and other related authorities in the Region. These measures can be summarized as follows:

1. **Supplementation with micronutrients:** This can be done through maternal and child health centers and through schools or other local systems. Supplementation of iodized oil for iodine deficiency disorders, capsules (oil) in massive or small dose for vitamin A deficiency and iron folate tablets for iron deficiency anaemia are now carried out in many countries in the Region suffered from these micronutrients.

2. **Prevention and control of infections through environmental health programmes** such as water sanitation, immunization, MCH services,

control of endemic diseases, oral dehydration therapy, antiparasitic measures and food hygiene.

3. Food legislation is another public health approach which should be enforced. Legislations regarding food additives, fortification and labeling are essential strategy to prevent these problems. Many countries in the Region lack such legislations.

4. Training of health and community workers on management of micronutrient deficiencies.

5. Nutrition surveillance system should be established in health sector to provide essential indicators on micronutrient deficiencies.

Role of Private Sector : Private sector can play an important role in preventing and control of micronutrient deficiencies in the Region. Private sector can provide assistance in equipment, research and training.

Role of International Organizations : International Organizations particularly FAO, WHO and UNICEF should provide the following support:

1. Conducting training courses in assessment, planning, implementation and evaluation of programmes related to prevent and control of micronutrient deficiencies.
2. Providing technical assistance in several aspects related to micronutrient deficiencies.
3. Strengthening the national programmes for preventing and control of micronutrient deficiencies.
4. Supporting research projects to study the magnitude and causes of these problems.
5. Supporting co-operation and co-ordination among countries in the region to overcome micronutrient deficiencies.

Diet-Related Chronic Diseases

Diet-related chronic diseases such as cardiovascular diseases, hypertension, diabetes, cancer and obesity have become the major health problems in high income countries, and in some urban areas in other countries in the Region.

Cardiovascular Disease (CVD)

Cardiovascular diseases in general are emerging as a major health problem in most of Near East countries. Although, reliable mortality data are hard to obtain, and some countries do not report death by cause, data provided from Arab countries of the Gulf, Cyprus, Iran, Iraq, Jordan and

Syria revealed that CVD were the leading cause of death represented 18% to 40% of total death (Table 19).

Studies on risk factors associated with CVD in the Near East countries are limited. However, studies conducted in some countries on the risk factors profile and related lifestyle patterns reveal levels generally similar to those in industrialized communities. High fat and cholesterol diet, lack of physical activity, obesity, diabetes, hypertension and tobacco smoking were the main factors responsible for the high incidence of CVD in the Near East countries (WHO/EMRO, 1995a).

Available data indicate a considerable and progressive increase in tobacco consumption over the last three decades. Imports and manufacture of cigarettes are progressively increasing. Data also demonstrate high rates of smoking in populations of the Near East, especially among men (WHO/EMRO, 1995a).

A population - based case-control study to explore the importance of lifestyle in the occurrence of Acute Myocardial Infarction (AMI) among Bahraini aged 30-79 years was carried out (Al-Roomi et al, 1994). The findings showed that the prevalence of tobacco smoking among the first-time AMI cases (64%) was higher than that among controls (44%), with current cigarette smokers being 2.1 times more likely to have an episode of myocardial infarction than those who had never smoked regularly. Walking regularly and spending less time watching television at home also appeared to be associated with a reduced risk of developing AMI. It is interesting to note that patients with myocardial infarction tended to consume fresh vegetables and fruit less frequently per week than the community controls (although the risk estimates were not statistically significant). Of the control subjects, 12% had hypertension compared with 44% of patients with myocardial infarction. The comparative figures for diabetes were 9% and 22% among community controls and AMI cases, respectively. Because the AMI cases and community controls had different sex age distributions, multiple logistic regression was used to estimate the risks of the occurrence of AMI in relation to hypertension, diabetes, lifestyle and dietary habits. The adjusted Odds Ratio, (OR) (adjusted for age, sex and several other confounding variables) for the occurrence of an episode of first-time AMI in a subject with history of hypertension was 5.04 and in those with history of diabetes 3.28. The risk of developing AMI in the line with many studies from western communities, was higher among men than women in those not currently married and increased with older age. People who did walk regularly for exercise, who reported infrequent intake

of fruit and who infrequently consumed fresh vegetables were still at an increased risk of developing myocardial infarction, even after adjusting for the effects of all the other factors.

Hypertension

Several studies have examined blood pressure levels in the Near East population. Using the WHO criteria of 160/95, the prevalence rates of hypertension ranged from 10% to 17% of adult population (Alwan, 1994). Some epidemiological surveys on hypertension (> 140/90) reported prevalence rates among adults of up to 30% in some urban areas. The prevalence of hypertension appears to be lower in rural than urban areas (WHO/EMRO, 1995a).

Based on these figures, there are over 7 million hypertensives in Pakistan alone (Pakistan Medical Research Council, 1980). Moreover, the prevalence of hypertension appears in Egypt since 1959 confirm this rising trend (Badawi, 1987).

Detection rate and the level of awareness among hypertensive persons are generally low. In the report from Iraq, only 19% of hypertensives were aware of their high blood pressure prior to the survey. Similarly, in Pakistan, for every known case of hypertension, there are three undetected cases. Hypertension, like diabetes, may remain asymptomatic for years and is only detected when one of its devastating consequences occurs (WHO/EMRO, 1995a).

Diabetes Mellitus

Diabetes and impaired glucose tolerance, are increasingly encountered. During the last decade, data on the epidemiology and clinical characteristics of the two types of diabetes have been reported from several countries. On the basis of various diagnostic criteria, diabetes has been detected in 4.3%, 4.8% and 5% of Egyptian, Iraqi, and Saudi Arabian samples respectively. Based on the results of epidemiological surveys using the WHO standardized criteria, it is estimated that 10% of Tunisians and 14% of Omani in the age range 30-64 years have diabetes. A survey in Oman, using WHO diagnostic criteria, revealed a prevalence of 9.8% in a sample of people aged 20 years and over. The intermediate category of impaired glucose tolerance, which may be associated with increased susceptibility to macrovascular complications, affects an additional proportion of people. In the Omani survey, this condition occurred in 10.9% of the sample, and so

the overall prevalence of glucose tolerance abnormalities exceeded 20% (WHO/EMRO, 1993).

The proportion of non-insulin dependent diabetics who suffer from obesity range between 75% in Iraq to 46% in Sudan. A substantial proportion of insulin dependent diabetes presents with ketoacidosis. This serious and potentially fatal condition has been reported to be present in 82% and 67% of diabetic children at the time of diagnosis in Sudan and Saudi Arabia respectively and is the presenting manifestation in about 30% of Iraqi diabetics (Alwan, 1996).

While these data demonstrate the high susceptibility of Near East populations to diabetes, reports have also shown that diabetics develop long term complications such as coronary heart disease at a rate similar to that seen in Western countries. This means that up to 20% of non-insulin dependent diabetics have been found to have retinal complications at the time of first diagnosis and that most would develop them over subsequent decades. A substantial proportion of people with IDDM eventually develop end stage renal failure and the majority of the diabetic population will eventually develop a potentially lethal cardiovascular complication (Alwan, 1996).

Cancer

Cancer has become the third cause of death in many countries of the Region, behind diseases of circulatory system and accidents and injuries. Published reports on the magnitude of the cancer problem are scarce and population based cancer registries are established in only a few countries. However, hospital -based data are available from the major cancer treatment centers in most countries in the Region (WHO/EMRO, 1995b).

Based on estimates made by the International Agency for Research on Cancer (IARC), approximately 361800 new cancer cases occurred in the Near East Region in 1985. They account for 4.7% of total cancers in the world and their share of global cancer mortality is around 4.8%. Generally, the common cancers among males include lung, lymphoma, bladder, stomach and mouth/pharynx. Among females, breast, urinary bladder, lymphoma and cervix are common cancers sites. However, regional variation exist, as can be observed from the country profiles; for example, high frequencies of nasopharyngeal carcinoma in males and uterine cervical cancer in females are reported from Morocco and Sudan (Table 20)

TABLE 19
DEATHS DUE TO DISEASES OF CIRCULATORY SYSTEM, NEOPLASMS AND
ACCIDENTS AND INJURIES IN SOME NEAR EAST COUNTRIES

		% of total deaths			
Country	Year	Circulatory system diseases	Neoplasms	Accidents & injuries	
Bahrain	1993	28.6	12.3		8.2
Cyprus	1982-87	37.0	15.6		--
Iran	1982-87	29.0	8.0		--
Iraq	1982-87	28.0	10.0		--
Jordan	1991	40.3	4.5		12.0
Kuwait	1994	36.7	12.4		10.6
Oman	1992	24.3	11.3		6.3
Qatar	1994	34.0	12.0		19.0
Syria	1992	18.0	2.7		3.2
U.A.E.	1992	25.0	8.0		--

Source : WHO/EMRO (1995), FAO/RNEA (1995).

- Not reported

TABLE 20

MOST COMMON CANCERS REPORTED IN MALES AND FEMALES IN SOME NEAR EAST COUNTRIES

Sex/Cancer	% of cancer to total cancers reported							U.A.E. (1992)
	Cyprus (1991)	Egypt* (1991)	Iraq (89-91)	Lebanon* (1991)	Morocco (89-97)	Qatar (91-92)	Sudan (1992)	
Male								
Skin	27.9	-	5.6	-	5.1	12.5	7.4	-
Urinary bladder	11.7	15.9	12.7	18.0	-	-	4.0	-
Prostate	11.7	-	-	11.0	-	-	-	-
Lung	11.1	7.9	15.8	14.0	6.5	11.7	-	28.0
Lymphoma	-	13.8	7.1	7.0	10.1	25.0	10.0	-
Central nervous system	-	11.0	-	-	-	-	-	-
Colon & Rectum	-	7.1	-	5.5	-	10.9	-	6.1
Larynx	-	6.2	7.9	-	8.2	-	-	-
Nasopharynx	-	-	-	-	12.3	-	11.9	-
Connective tissue tumors	-	-	-	-	-	-	8.0	-
Gingiva	-	-	-	-	-	-	5.7	-
Stomach	-	-	-	-	-	-	-	18.2
Female								
Skin	25.7	-	52.0	-	-	-	-	-
Breast	24.2	32.7	24.3	30.0	22.3	33.0	34.5	23.5
Uterin cervix	?	4.5	-	12.0	35.0	8.3	14.3	11.8
Lymphoma	-	8.1	5.1	5.0	3.9	5.0	3.2	-
Central nervous system	-	7.2	-	-	-	-	-	-
Desophagus	-	5.5	-	-	-	-	3.3	-
Urinary bladder	-	-	5.0	-	-	-	-	-
Leukaemia	-	-	4.9	-	-	-	-	-
Colon & Rectum	-	-	-	6.0	-	-	-	5.8
Ovary	-	-	-	4.0	3.0	-	3.4	-
Nasopharynx	-	-	-	-	5.3	-	-	-
Thyroid	-	-	-	-	-	8.3	-	-
Gingiva	-	-	-	-	-	-	3.3	-
Stomach	-	-	-	-	-	-	-	9.8

* Year not reported.

Source : WHO/EMRO (1995)

Obesity

Obesity which is considered a risk factors for several chronic diseases, has reached alarming level in many countries in the Region, especially among women. Using the cut-off of more than 25 Body Mass Index (BMI), the prevalence of overweight and obesity ranging from 50% to 70% in women in the Arab countries of the Gulf, Jordan, Lebanon, Egypt and Tunisia. The corresponding percentages for men are 15% to 55% (Musaiger, 1996).

Factors associated with obesity have not been well investigated. Some studies showed that lack of physical activity, high intake of energy rich foods, sedentary life-style, multiple pregnancies, ethnic background, family history of obesity and socio-cultural factors are linked with obesity among adults in the Region.

Dietary Guidelines for the Prevention and Reduction of Diet Related Chronic Diseases in the Arab Countries.

In 1994, the first workshop on diet and chronic diseases in the Arab Middle East was held in Al-Ain, United Arab Emirates. One of the objectives of this meeting was to establish a dietary guidelines for prevention and reduction of diet-related chronic diseases in this Region. The following dietary guidelines were recommended (UAE University, 1994) :

1. Fat and Cholesterol

Reduction in consumption of fat (especially saturated fat) and cholesterol is highly recommended. Foods that are relatively low in these substances, such as vegetables, fruits, whole grain foods, fish, poultry, lean meats, and low-fat dairy products should be chosen. Food preparation methods that add little or no fat should be used.

2. Energy and Weight

Achieve and maintain a desirable body weight. This should be done by choosing a dietary pattern in which energy (caloric) intake is consistent with energy expenditure. In order to reduce energy intake, the consumption of foods containing fats and sugars that are relatively high in calories should be limited. Since physical inactivity is an additional risk factor for chronic disease, energy expenditure should be increased through regular and sustained physical activity.

3. Complex Carbohydrates and Fiber

Increase consumption of whole grain foods and cereal products at the expense of refined varieties. The consumption of vegetables, especially leafy green vegetables should also be increased. Maintain consumption of legume products such as chick-peas, beans and lentils and increase consumption of fruits, including local varieties.

4. Sodium

Salt contains both sodium and chlorine both of which are essential nutrients. Excess salt can, however, be hazardous for those with, or at risk of, high blood pressure. Thus salt and salty foods should be taken in moderation. Many processed foods may contain high levels of sodium and the use of additional table salt should be minimized.

5. Calcium

Increased consumption of foods high in calcium is recommended for all but especially for adolescent girls and adult females. High calcium foods are mainly dairy products. Low fat dairy foods are advised when they are available.

6. Iron

Children, adolescents and women of childbearing age are at high risk for iron deficiency anaemia. Foods that are good sources of iron are lean red meat, organ meats, fish, beans, legumes, leafy vegetables and whole grain products. These foods should be consumed when available. This issue is of special concern for low-income families where anaemia can be common.

7. Sugars

Excessive sugar consumption increases the risk of developing dental caries (cavities), especially in children. Sugar consumption is high for many countries in the Region thus reduction in the consumption and frequency of use of foods high in sugars is recommended.

8. Fluoride

Community water systems should contain fluoride at optimal levels for prevention of tooth decay. High fluoride sources should, however, be avoided to reduce the risk of fluorosis.

9. Salty, smoked, and pickled foods

Consumption of certain highly salted, pickled and smoked foods has been linked to increase incidence of certain kinds of cancer. These foods should therefore only be consumed in moderation.

10. Smoking

Cigarette smoking is strongly linked to increased risk for both heart disease and for lung cancer and thus should be avoided.

11. Alcohol

Avoidance of alcohol consumption is recommended.

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Appendix 1
SUMMARY OF NUTRITIONAL PROBLEMS IN THE NEAR EAST REGION

Problems	Countries mostly affected	Major underlying causes
Undernutrition in general and PEM in infants and young children	Afghanistan, Pakistan, Sudan, Somalia, & Yemen.	Food Scarcity Poverty High infection Lack of nutrition awareness Poor sanitation
Maternal malnutrition	Afghanistan, Pakistan, Somalia, Sudan, & Yemen.	Dietary inadequacy Early age at marriage Frequent pregnancies at short intervals High energy cost due to work during pregnancy Lack of maternal care
Anaemia (especially iron deficiency anaemia)	All the countries.	Unsound food habits Low iron intake Low iron absorption Parasitic infestation Malaria Multiparity
Iodine deficiency Disorders (IDD)	Afghanistan, Egypt, Iran, Iraq, Lebanon, Libya, Pakistan, Sudan & Tunisia.	Low iodine in soil and food commonly consumed.
Vitamine A deficiency	Afghanistan, Pakistan, Sudan & Yemen.	Unsound food habits Low vitamine A intake Infection.
Vitamine D deficiency	S. Arabi, Yemen, Jordan (and may be in most countries especially among infants).	Use of unfortified food Lack of vitamine D in foods Lack of exposure to sunlight
Diet-related chronic diseases; cardiovascular disease, hypertension, diabetes, obesity, dental caries and some types of cancer	Bahrain, Cyprus, Kuwait, Oman, Qatar, S. Arabia and U.A.E. Sizeable proportion of population in urban areas is affected too.	Excess intake of certain nutrients Sedentary lifestyle Smoking Lack of physical activity High intake food rich in fat and sugar

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