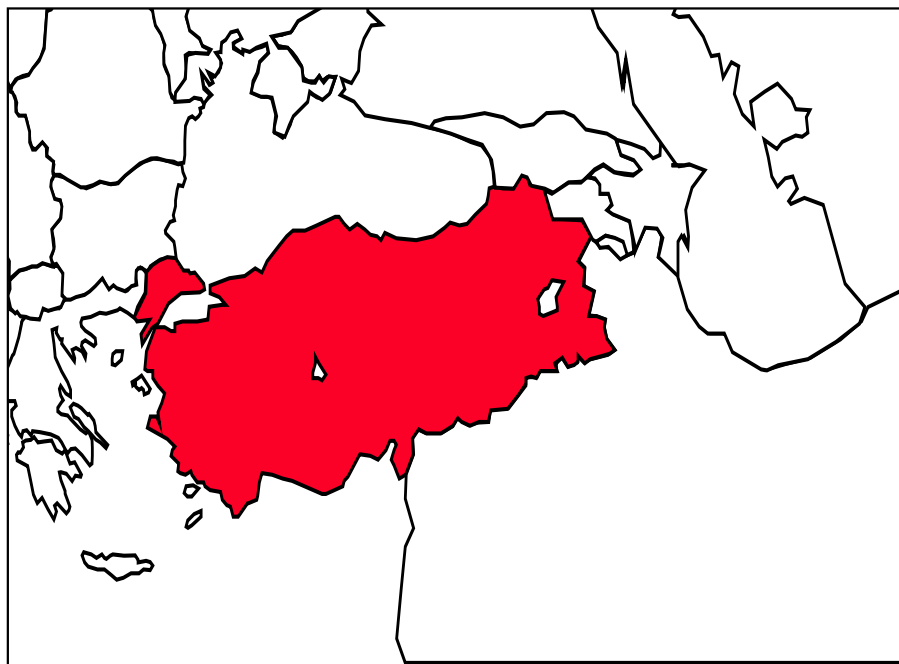


## FAO - NUTRITION COUNTRY PROFILES

# TURKEY



FOOD AND AGRICULTURE ORGANIZATION  
OF THE UNITED NATIONS

Note for the reader

*The objective of the Nutrition Country Profiles (NCP) is to provide concise analytical summaries describing the food and nutrition situation in individual countries with background statistics on food-related factors. The profiles present consistent and comparable statistics in a standard format. This pre-defined format combines a set of graphics, tables and maps each supported by a short explanatory text. Information regarding the agricultural production, demography and socio-economic level of the country are also presented.*

*In general, data presented in the NCP are derived from national sources as well as from international databases (FAO, WHO...).*

*Technical notes giving detailed information on the definition and use of the indicators provided in the profile can be obtained from ESNA upon request. An information note describing the objectives of the NCP is also available.*

*Useful suggestions or observations to improve the quality of this product are welcome.*

*The data used to prepare the maps are available in Excel upon request at:*

E-mail: [nutrition@fao.org](mailto:nutrition@fao.org)

**Nutrition Country Profile of Turkey**

**prepared by Food and Nutrition Division, FAO in the collaboration of Prof. Dr. Gülден Pekcan ( Hacettepe University, Department of Nutrition and Dietetics) and Rosanne Marchesich (ESNA-FAO).**

The designations 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 .



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### **General map** of Turkey

**Map 1:**Prevalence of stunting among children under five years by regions

**Map 2:** Prevalence of underweight among children under five years by regions

**Map 3:** Prevalence of wasting among children under five years by regions

*Graphs, tables and maps can be visualised by clicking on the words in bold and underline, only in the “Full profile” pdf file.*

## SUMMARY

Following the War of Independence, the Turkish Republic was founded in 1923 and Turkey proceeded to found its political and legal systems on modern, secular European models in line with the principles of first president Mustafa Kemal Atatürk. The political system of Turkey is parliamentary democracy. In Turkey, the demographic structure is relatively young. The annual average population growth rate was 1.7% for the 1995-2000 period.

Turkey has been implementing some routine and special programmes on maternal, child health and family planning for a long time. Although significant declining trends in infant and under-five mortality rates between regions, urban and rural areas, and the educational level of the mother were observed, the mortality rates are still high. The infant mortality and under-five mortality rates are 42.7 and 52 per thousand live births, respectively (**Table 1**). Breastfeeding in Turkey is widespread. Almost all Turkish children (95%) are breastfed for some period of time. The median duration of breastfeeding is 12 months, but supplementary foods and liquids are introduced at an early age. Diarrhoea is a prevalent disease of children under age of five in Turkey with a prevalence of 30%. By age five 16% of children are stunted, 8.3% as underweight and 1.9% wasted. This situation indicates that there was a little change in the nutritional status of children within the five year period (**Table 4a, Maps 1, Map 2 & Map 3**).

Obesity is a problem among child-bearing age of women. According to Body Mass Index calculations 52.2 % of women are overweight (BMI >25 kg/m<sup>2</sup>), of which 18.8% are obese (BMI >30 kg/m<sup>2</sup>). Chronic undernutrition among adult women is not a problem. Only 2.6 % of women had Body Mass Index below 18.5 kg/m<sup>2</sup> (**Table 4c**). Micronutrient deficiencies are important problems of under-five years old children, preschool children and child-bearing age women.

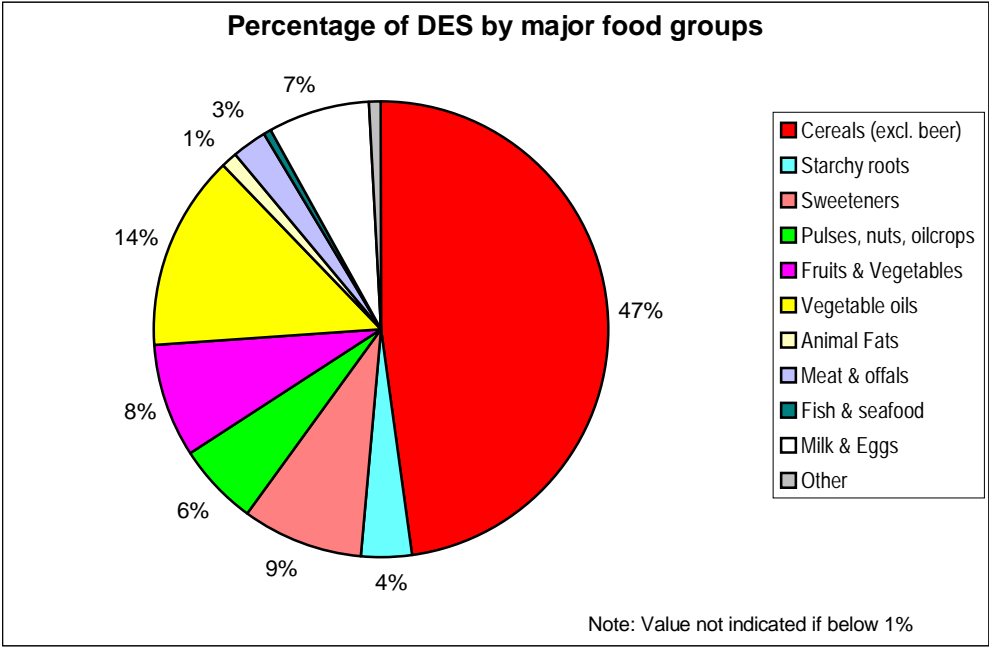
According to FAO Food Balance Sheets, Turkish people appeared to be well nourished. But maldistribution of food, and quality are not properly demonstrated. Over the past years, a number of nutrition surveys have been conducted on regional levels covering socio-economic, age and gender groups. There is a great need for a nation-wide survey in order to put out the changes in social, economic and nutritional status, showing the trends and that the findings could be used in food and nutrition policies. Although such survey is planned, and there is a man-power for it, due to financial restrictions, it could not be done.

Wheat is a staple food for the Turkish people. The major percentage of energy comes from bread (44%) and bread with other cereals (58%) (**Figure 3**). Yogurt is the most frequently used milk product. Fresh fruits and vegetables are available throughout the year, and widely consumed. Oil and fat consumption show regional variations, as olive oil is mostly consumed in western and southern parts (**Figure 1**). The average diet is adequate to meet recommended daily intake of energy and most of the nutrients while animal protein, calcium, vitamin A (**Table 5**) and riboflavin are lower than the recommended daily allowances. Usually three meals are eaten in the country. The results of regional surveys indicate that there are differences among families, sub-groups and seasons in terms of energy and nutrient intakes. The most important parameter influencing food consumption pattern is income level and lack of knowledge. The problem is not the availability of food but its maldistribution.

Turkey has the opportunity to provide its population to lead healthier and longer lives. The attainment of this aim depends on the implementation of rational policies and management of resources. Eight Five Year Plan and Supplementary Documents (2001-2005) are prepared to fill this demand.

TABLE 1: GENERAL STATISTICS OF TURKEY

Last updated: 04-10-00

Indicator (\$)	Year	Unit	Indicator (\$)	Year	Unit
<b>A. Land in use for agriculture</b>			<b>G. Average Food Supply</b>		
1. Agricultural land	1995	ha per person	0,645		
2. Arable and permanent crop land	1995	ha per person	0,443		
<b>B. Livestock</b>			<b>1. Dietary Energy Supply (DES)</b>		
1. Cattle	1996-98	thousands	11617	1996-98	Kcal/caput/day
2. Sheep & goats	1996-98	thousands	41156		3500
3. Pigs	1996-98	thousands	5		
4. Chickens	1996-98	millions	150		
<b>C. Population</b>					
1. Total population	1998	thousands	64479	Note: Value not indicated if below 1%	
2. 0-5 years	1998	% of total pop.	12,2		
3. 6-17 years	1998	% of total pop.	23,4		
4. 18-59 years	1998	% of total pop.	56,1		
5. >= 60 years	1998	% of total pop.	8,4		
6. Rural population	1998	% of total pop.	27,1		
7. Annual population growth rate, Total	1995-2000	% of total pop.	1,7		
8. Annual population growth rate, Rural	1995-2000	% of rural pop.	-2,7		
9. Projected total population in 2030	2030	thousands	91295		
10. Agricultural population	1995	% of total pop.	33,9		
11. Population density	1995	pop. per sq Km	79,1		
<b>D. Level of Development</b>			<b>% Energy from:</b>		
1. GNP per capita, Atlas Method	1997	current US\$	3.130	2. Protein	1996-98 % of total energy 11,5
2. Human Development Index rating (new)	1997	min[0] - max[1]	0,728	3. Fat	1996-98 % of total energy 24,2
3. Incidence of poverty, Total	...	% of population		4. Proteins	1996-98 g/caput/day 98
4. Incidence of poverty, Rural or Urban	...	% of population		5. Vegetable products	1996-98 % of total proteins 73,6
5. Life expectancy at birth (both sexes)	1998	years	69,1	6. Animal products	1996-98 % of total proteins 26,4
6. Under-five mortality rate	1998	per 1,000 live births	42		
<b>E. Food Trade</b>			<b>H. Food Inadequacy</b>		
1. Food Imports (US \$)	1996-98	% of total imports	4,0	1. Total population "undernourished"	1995-97 millions 1,0
2. Food Exports (US \$)	1996-98	% of total exports	15,0	2. % population "undernourished"	1995-97 % of total pop. 2,0
3. Cereal Food Aid (100 MT)	1996-98	% of cereals imports	0,0		
<b>F. Indices of Food Production</b>			... no data available § see References for data sources used		
1. Food Production Index	1996-98	1989-91=100	111,6	See Technical Notes for definitions used.	
2. Food Production Index Per Capita	1996-98	1989-91=100	98,8		

# TURKEY

## I. OVERVIEW

### 1. Geography

Turkey is located in the northern half of the hemisphere, in an area where the Asian, European and African continents come very close to each other, and surrounded from west to east by Greece, Bulgaria, Georgia, Armenia, Azerbaijan (Nakhichevan), Iran, Iraq and Syria (**General map**). Turkey has been separated into seven large geographical regions by taking into consideration the factors such as climate, natural plant distribution and types of agriculture: the Mediterranean, Aegean, Black Sea, Marmara, Central Anatolia, Eastern Anatolia and Southeastern Anatolia Regions. The actual surface area of Turkey inclusive of its lakes and rivers, is 814,578 square kilometers, and has land area in both Europe (3%) and Asia (97%). The coastlines of the country are surrounded by the Black Sea, Aegean Sea, The Marmara Sea and the Mediterranean. The climate is characterized by variations of temperature and rainfall, depending on topography. Dry and hot summers, cold and rainy winters are the typical climatic conditions of Turkey.

### 2. Population

The population of Turkey is 62.3 million according to 1997 census, of which 72.9% of the population live in urban settlements (**Table 1**) (**Table 2**) (FAOSTAT, 1999). Population density is 79.1 inhabitants per square kilometer. The annual average population growth rate was 1.7% for the 1995-2000 period. The projected population is estimated to be 91.3 million by the year 2030. The demographic structure of Turkey is relatively young. The crude birth rate is estimated at 23.4, crude death rate 6.5 per thousand, total fertility rate 2.61 children per woman at the same period. There are clear variations in fertility levels by region and education (TDHS, 1998). There is a shortage of information on mortality in Turkey, particularly adult mortality. The infant mortality rate is 42.7 per 1000 live births. The under-five mortality rate at 52 per thousand live births (TDHS, 1998).

Official language of Turkey is Turkish. Turkish alphabet is Latin alphabet which was accepted in 1928.

### 3. Level of development: poverty, education and health

In 1997, Gross National Product (GNP) was estimated at 3130 US dollars and the Human Development Index (HDI) was 0.728 (**Table 1**) (World Bank, 1999; UNDP, 1997). The State Planning Organisation (SPO) has estimated that 3500 calories per day are required to achieve an adequate nutritional level. For practical purposes, an individual who cannot purchase 70% of that amount (i.e., 2450 kcal.) is said to be poor. It is estimated that an income of 27.5 USD per capita per month is needed to escape poverty. Applying SPO poverty line to the 1987 data, 14.2% of Turkish population is classified as poor. Figures for the percentage of households below poverty line according to five regions is given in the SPO report (SPO, 1996). The figures given in terms of five regions are adopted for all regions by using the GNP per capita income figures for the year 1997 of each region. In the 8<sup>th</sup> Five-Year Development Plan 8% of the population is indicated below the poverty line (SPO, 2000).

In 1997, duration of compulsory basic education is extended to eight years which was formerly five years. The rate for primary school attendance today is around 85.7% (SPO, 2000). Despite these achievements, considerable regional and urban-rural differences in literacy and educational attainment continue to exist in the country in addition to the gender differences.

Turkey, facing two kinds of problems, undernutrition and micronutrient deficiencies on one side and diet related chronic diseases on the other side. However, the prevalence of these nutritional problems varies from one region to another. In general, malnutrition is more prevalent in rural areas, while obesity and cardiovascular diseases are more prevalent in urban areas. The most important factors responsible for malnutrition in preschool were; too early introduction of supplementary, illiteracy of mothers, birth rank of children, birth spacing, number of children in the family, family size, mother's welfare and hygienic conditions. Obesity and sedantary lifestyle are the main causes of chronic diseases.

One of the major child health indicators is immunisation coverage. Among children age 12-23 months, the coverage rates for BCG and the first dose of DPT are 87 and 86 percent, respectively. Diarrhoea is a prevalent disease of children under age five with a prevalence of 30%. AIDS is widely known. Overall 84% of women and 93% of husbands have heard about AIDS. However, although they known AIDS, knowledge of ways to avoid it appears to be poor among a substantial minority of groups (TDHS, 1998).

#### **4. Agricultural production, land use and food security**

Turkey is a major agricultural producer with 27 million hectares of cultivated land, 20.7 million hectares of forests and 12 million hectares of pastures. Agriculture land is highly fragmented due to inheritance. Turkey is expected to stay self-sufficient in food for the prudent future, provided that food production grows at 3-4%. Although 27.1% of the Turkish population live in the rural areas, agriculture is the greatest employment sector. According to the 1999 data, agricultural sector accounts for 14% of Gross Domestic Product (GDP), 45% of employment and 11% of exportation. The share of plant products in the total agricultural production is 72.4%, that of livestock products is 21.6%, for fisheries it is 3.9% and 2.46% for forestry. Although the Gross National Product (GNP) per person in the agricultural sector is increasing by years, it is still below the national standards. In 1999, although the national GNP was 3200 US dollars, it was 1350 US dollars in the agricultural sector. Turkey is a producer of grain, cotton, tobacco, grapes, olive oil, sugar beets, pulses, hazelnuts, and tea, small and big ruminants and poultry. The share of wheat in grains is 67% (MARA, 2000).

According to the agricultural census, the owners run 90% of the farms, and 96% of them are farms that produce crops, while 4% are only animal breeding farms. The majority of farms that produce grains are small and geographically fragmented, family owned farms (MARA, 2000).

Average per caput food consumption in Turkey is high as regards the vegetal products. However, a degree of insecurity exists among households in some areas, due principally to their inability to acquire the food which is available. The vulnerable groups in Turkey as regards food security are the villagers without land, farmers with a small land, forest villagers, the families who live in squatters in the cities, homeless people in the cities, working children and women farmers who are responsible for looking after a family (MARA, 2000).

#### **5. Economy**

Turkey's macro economical, commercial and agricultural policies have developed within the rapid changes in economical, demographic and social structure. The growth of

Turkish economy has initiated from a very small point and showed significant changes within years. In response to continuing high inflation and rapid devaluation of the Turkish Lira, the government launched a stabilisation program in 1994, supported by the IMF. The core was fiscal retrenchment aimed at reducing inflation, improving the external balance, and restoring stability in foreign exchange markets. A Stand by Agreement is also signed between Government of Turkey and the IMF in 1999, an intention letter is delivered indicating the goals and general strategy for overcoming inflation. The government has a wide range of programmes listed in The Five-Year Development Plan supporting agricultural production. A rapid increase in agricultural production is also planned through irrigation under the Southern Anatolian Project (MARA, 1996; MARA, 2000).



## II. THE FOOD AND NUTRITION SITUATION

### 1. Trends in energy requirements and energy supplies

Between 1965 and 1995 the population of Turkey has doubled and it is projected as 91,295 thousand by 2030. According to FAOSTAT data, between 1965 to 1997, average daily per caput Dietary Energy Supplies (DES) increased from 2962 kcal to 3500 kcal (**Table 2**). In the same period, average daily per caput energy requirements slightly increased from 2200 kcal to 2258 kcal, showing that there is not much change in energy requirement and DES is met. In general, chronic energy deficiency is not a main problem for the adult population in Turkey. In TDHS-1998, out of total 2191 women only 2.6% had Body Mass Index (BMI) below 18.5 kg/m<sup>2</sup>, identifying cases of chronic undernutrition (TDHS, 1998).

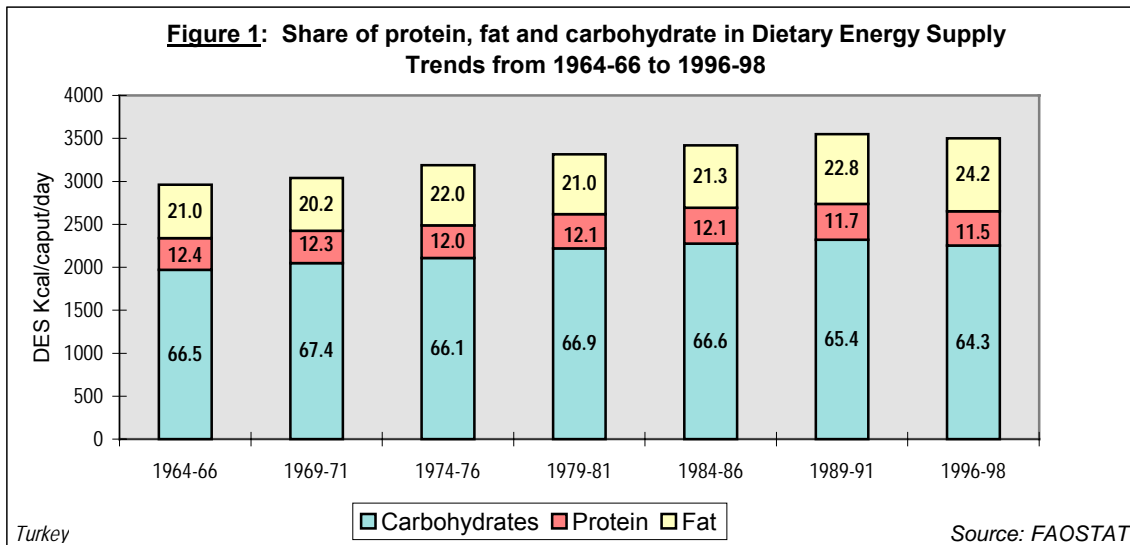
Between 1965 and 1995 the urban population more than doubled and is projected to be 87.3% by 2030 (**Table 2**). Nationwide economic and social conditions show that prevention of migration is not so easy. On the other hand, higher population levels of the rural areas are threatening the natural sources. Higher rates of migration create severe social, cultural, and economic problems, but with long term strategies, rural population balances should finally be achieved.

**Table 2: Total population, urbanisation, energy requirements and dietary energy supplies (DES) per person and per day in 1965, 1997 and 2030**

Year	1965	1997	2030
Total population ( <i>thousands</i> )	31151	62332	91295
Percentage urban (%)	34.1	70.5	87.3
Per caput energy requirements ( <i>kcal/day</i> )	2200	2258	2249
Per caput DES ( <i>kcal/day</i> )*	2962	3500	—

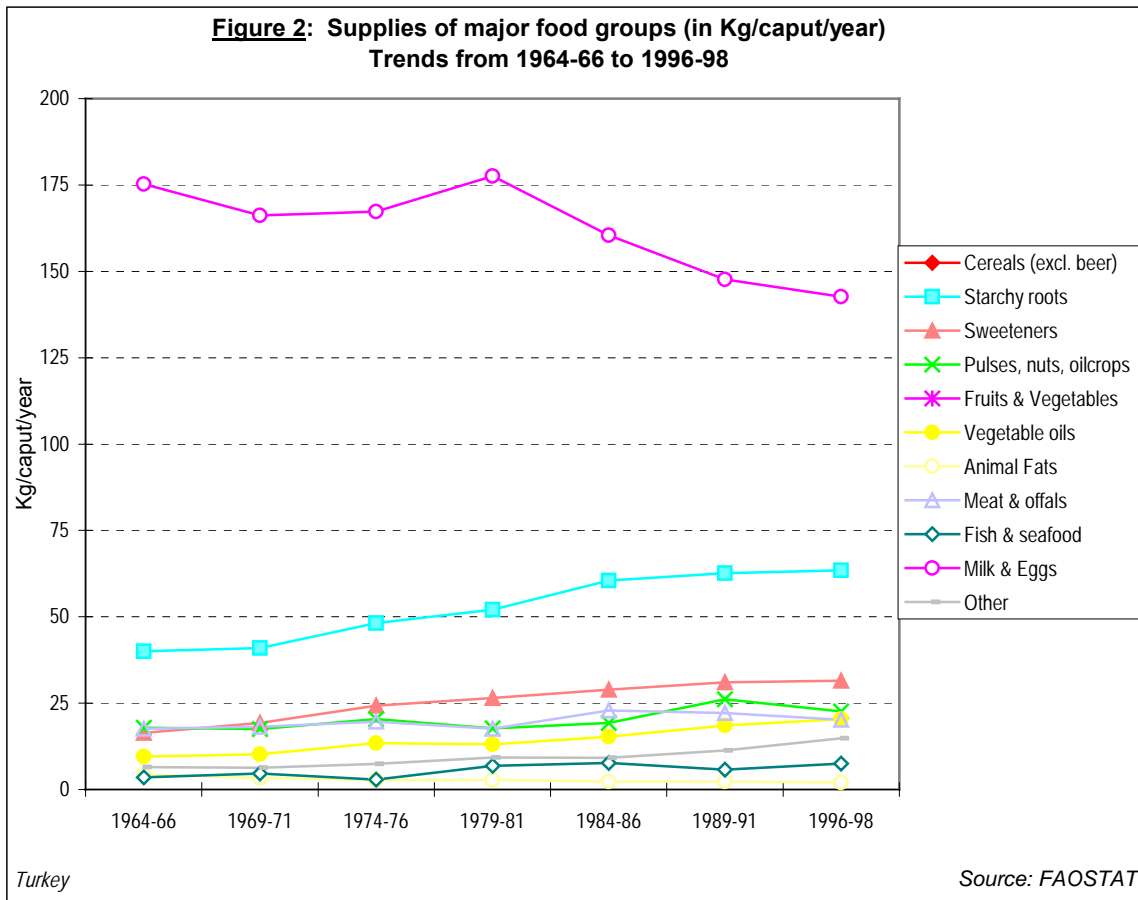
\* Three-year average calculated for 1964-66 and 1996-98 (*Source*: FAOSTAT)

Between 1965 to 1997, the share of protein, fat and carbohydrate in DES has slightly changed by – 0.9%, 3.2% and –2.2%, respectively (**Figure 1**). Although within these years this difference does not seem worth mentioning, the differences among families, individuals, seasons and residence should be put forward with food consumption surveys and actions should be taken.



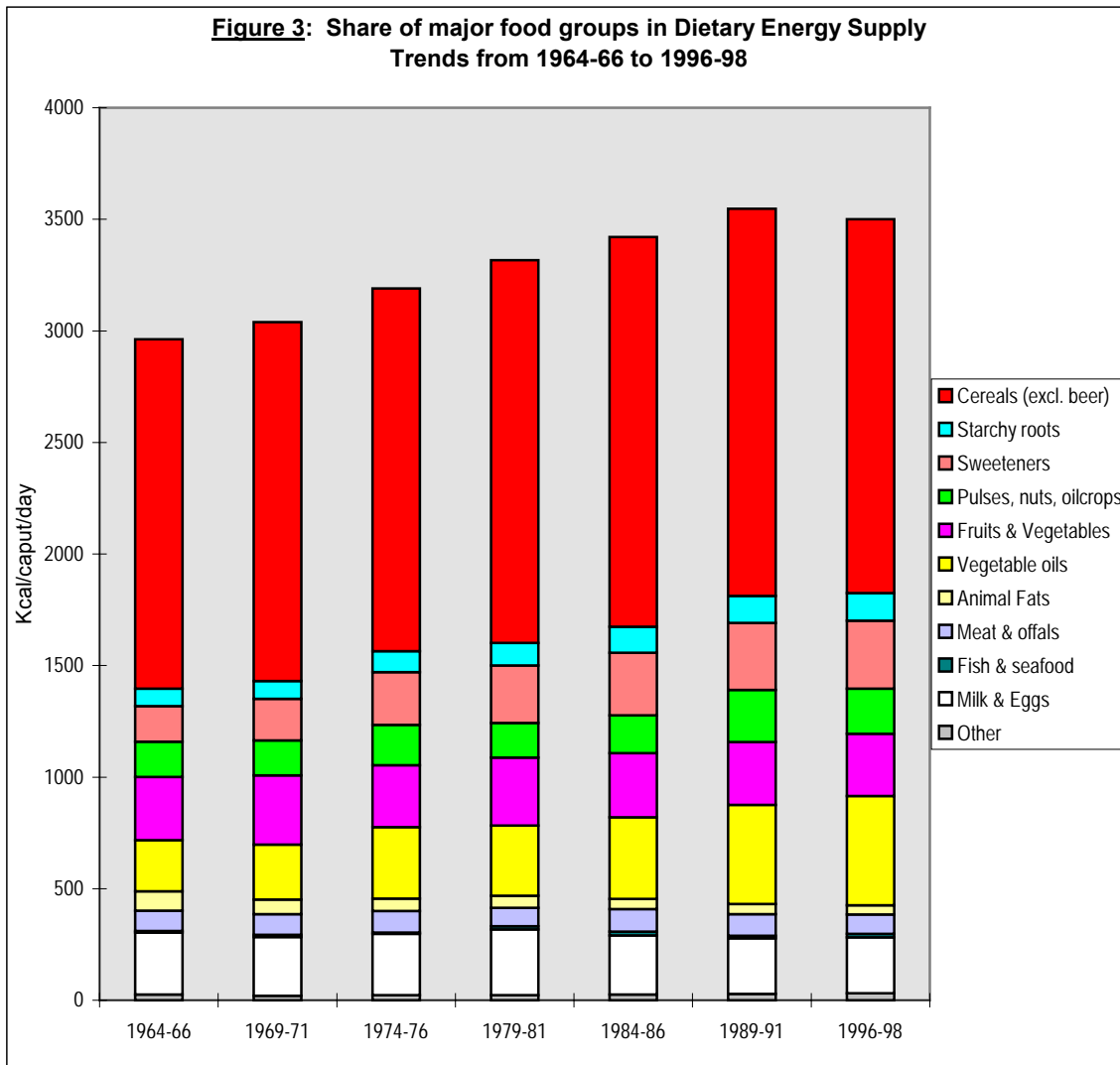
## 2. Trends in food supplies

*Quantity:* The amounts of cereals and coarse grains consumed per caput is 262.5 kg and 34.6 kg respectively (FAOSTAT, 1999). Supplies per caput of starchy roots, cereals, fruits and vegetables, vegetable oils and sweeteners have increased more markedly within the years. Milk and milk products and eggs have undergone decrease in 1979-81 and the consumption of meat and meat products are low. As for the fisheries, aquaculture production increased due to the importance given to the subsector in the last 10 years. While fish production in fish farms was 6% of the total fish production in 1996, it increased to 10% in 1998 with a total production of 56 700 tons. In 1998, 59% of the production was realised from the in-land waters, while 41% was derived from the seas. Dairy products including the amount of milk sold in the streets is 20-25 L and the consumption of red meat is 14 kg per person, that of white meat is 10 kg per person. Particularly, due to low consumption of dairy products, meat and eggs; iron, calcium, riboflavin and zinc deficiencies are identified in the country. For this purpose, various support policies for livestock production are planned to be developed (MARA, 2000).



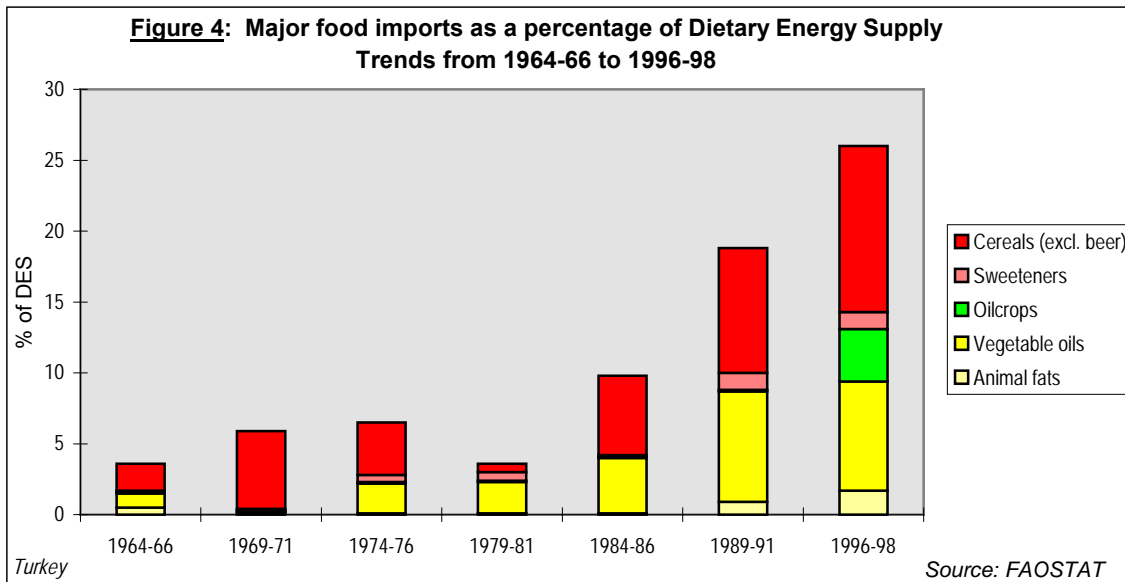
**Energy:**

In the diet pattern of Turkish population, cereals play an important role. The share of cereals in the DES from 1964-1966 to 1996-1998 is 52.9 and 47.9, respectively. Within the last years trends in the share of starchy roots, sweeteners, pulses and vegetable oils in DES has been increased. The proportion of DES contributed by the vegetable oil has been increasing continuously and become a substitute of animal fats (**Figure 3**). An increase in total fat intake is also observed for the years 1985, 1990 1997 as 17.6, 20.8 and 22.4 kg/caput/year, respectively (FAOSTAT, 1999).

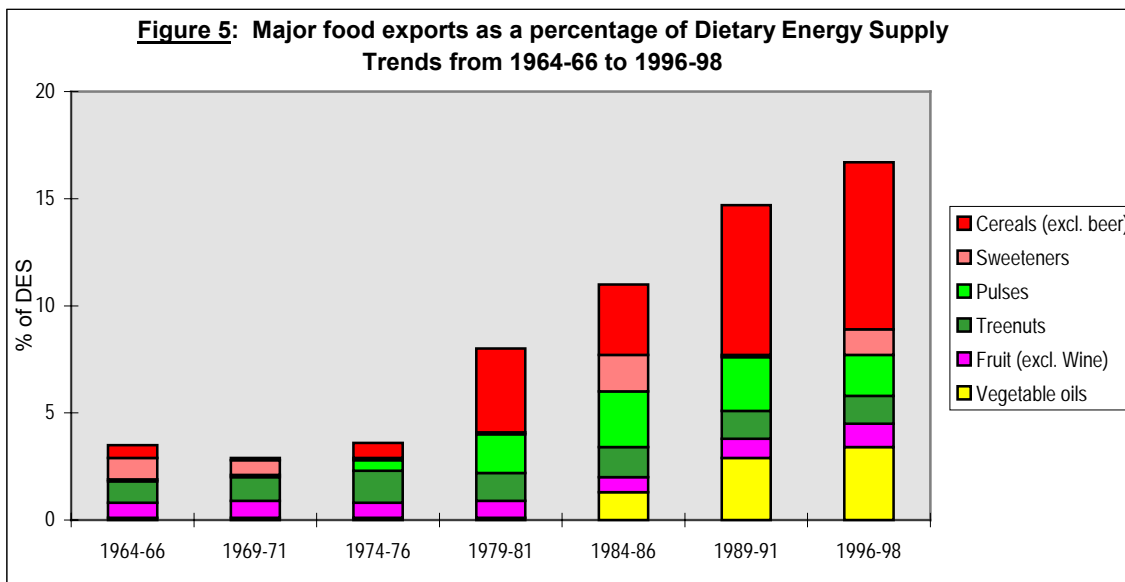


*Major food imports and exports:*

Currently, Turkey is a net exporter of many products in agriculture, but becoming an importer of some others. The increase in the population’s needs has raised total food imports. Demand cannot be met for such products as, sunflower, soybean, maize. Imports of vegetable oils, maize and rice increased since 1974-76 (**Figure 4**).



Turkey has a large exportation potential for cereals, pulses, sweeteners, fruits, vegetables, raisin, fig and hazelnut. It is a significant olive oil producer and in recent years an increase in its exportation is observed (**Figure 5**). Turkey’s export crops have become more diversified in recent years, with a reduced reliance on tobacco and hazelnuts and non-traditional exports such as lentils, chickpeas and tomato products, have gained importance. For the last 20 years, food industry production and exports gradually gained importance. Currently, there are approximately 24 thousand food production establishments in Turkey. Flour and related products make up 56% of the total industries, dairy products 18%, processed fruit and vegetables 12%, vegetable oil and margarine 4%, sweet products 3%, meat products 3% and other products 3%, finally alcoholic drinks, beverages and fisheries 1% (MARA, 2000).



### 3. Food consumption

Turkey with respect to its climate and land nature is suitable for the production of various products. Wheat is a staple food for the Turkish people. The major percentage of energy comes from bread (44%) and bread with other cereals (58%). Wheat is mainly consumed as bread, macaroni and bulgur (parboiled pounded wheat). Maize is widely used in the Black Sea region. Although rice is widely consumed in Turkey, the production does not meet domestic demand, and the supply deficiency is covered by importation. Lentils, chickpeas and dry beans are the most widely consumed pulses. Meat, as lamb and beef is the main ingredient of the Turkish cuisine, but recently it has been changed, because of the high prices of meat. Yoghurt is the most frequently used milk product. Fresh vegetables and fruits are abundantly available throughout the year, and widely consumed. The main oil seeds are sunflower, cotton and soybean. Sunflower oil has the major share on production of vegetable oil. Oil and fat consumption show regional variations as olive oil is mostly used in western and southern parts (Aegean and Mediterranean Region) of Turkey. However margarine has become a substitute of butter (Pekcan and Karaağaoğlu, 2000). Between 1991-1996, annual average consumption per capita is 262.5 kg of cereals and 34.6 kg of coarse grains. The consumption of livestock products are low, that of dairy products 20-25 L and consumption of red meat is 14 kg per person, that of white meat is 10 kg per person (MARA,2000). Usually three meals are eaten in the country.

According to FAO Food Balance Sheets, Turkish people appeared to be well nourished (FAOSTAT, 1999). The total protein consumption per capita was high, but maldistribution and the poor quality of the food consumed in Turkey was not properly demonstrated in food balance sheets. The food consumption patterns according to rural and urban areas in Turkey for the period 1974-1997 is presented in **Table 3**.

Over the past years, a number of nutrition surveys have been conducted on regional and national levels, covering various socio-economic, age and gender groups. In 1974, a nation-wide nutrition survey was held in order to provide data upon which a nutrition policy may be formulated. In 1984, a survey was held during winter and summer months in three regions in order to put out the changes in social, economic and nutritional status, so that the findings could be used in food and nutrition policy and planning (Köksal, 1974; Tönük et al, 1984). Since then no national survey could be done due to financial restrictions. In 1997, A survey was conducted at 7 provinces selected by Ministry of Health (HUNDD/MOH, 1997). The results of three surveys are given in **Table 3**. The findings indicate that the average diet was adequate to meet recommended daily intake of energy and most of the nutrients, while animal protein, calcium, vitamin A and riboflavin are lower than the recommended daily allowances (RDA). No significant changes were observed in average per capita food consumption within the past 25 years. It is worth mentioning that although total fat intake did not change a lot during this period, vegetable oil intake showed an increase at the expense of animal fat. Contribution of protein, fat and carbohydrate to energy are about 12%, 25% and 63%, respectively. However, there are differences among families, sub-groups and seasons in terms of energy and nutrient intakes. The most important parameter influencing food consumption pattern is income level and lack of knowledge. Low income families consume more bread, while high income families consume more meat and meat products, fresh fruits and vegetables. This indicates that the problem is not the unavailability of foods, but its maldistribution among socio-economic, gender and age groups (Pekcan and Karaağaoğlu, 2000).

Breastfeeding is almost universal in Turkey. The average period of breast-feeding for all children is 13.7 months, the median duration is 12 months and 95% of all children are breastfed for some period of time. TDHS-1998 indicates that for all children initiation to

breastfeeding is rather late. Only one-half (51.8%) of ever-breastfed children were started breastfeeding as early as within one hour of birth. A comparison of the 1998 findings with those of the 1993 survey indicates that both percentages of children starting breastfeeding within one hour and one day of life have increased since 1998. While only one-fifth of children were put to breast within one hour in 1993, according to the findings of the TDHS-1998, more than half of the children has been put to the breast within one hour. The proportion of children who were put to breast within one day has also increased from 76% in 1993 to 85% in 1998. Increases in the early initiation of breastfeeding occurred in all regions and all education groups. Even among children in the first month of life, only 14.2% were exclusively breastfed, a figure lower than found in the TDHS-1993 (19%). The rate of exclusive breastfeeding for the period of 0-3 months is 9.4%, while it is 1.3% for the period of 4-6 months. The rate of non-breastfeeding is 7.3% for the period of 0-3 months and 22.6% during 4-6 months. Only 10.2% of breastfeeding children, age 0-3 months received no other supplements. One in every five infants (19.6%) in this age group received infant formula. The percentage who were given infant formula peaks at 32.1% for infants age 4-6 months and then decrease to 21.2% for those age 7-9 months. More than one-third (36.9%) of breastfeeding children age 0-3 months are fed by bottle with a nipple. Early introduction of supplementary food and using a bottle with a nipple increases the risk of gastrointestinal infections for children, which is one of the leading causes of infant mortality in Turkey (TDHS, 1998; TDHS, 1993).

**Table 3: Food consumption surveys**

Source/ Year of survey	Location	Sample			Average food intake									
		Number households	Sex	Age Years	Major Food Groups (kg/caput/year)									
					Cereals	Roots/ Tubers	Pulses	Fruits/ Vege- tables	Oils/ Fats	Meat	Fish	Milk prod.	Sweet- eners	Other
HÜNDD,MOH, 1997	7 provinces	1075	M/F	All	150.4	...	6.2	192.4	11.3	28.1	1.1	56.2	9.9	...
MARA,MOH, 1987	National	2400	M/F	All	165.4	...	13.1	149.3	16.8	15.3	2.6	38.3	15.3	4.4
HÜNDD,1987 1984	Urban	1754			154.4	...	13.9	155.1	16.1	19.7	2.6	38.3	15.0	3.3
	Rural	646			175.6	...	12.4	143.4	17.2	11.0	2.6	38.3	15.7	3.3
	Winter				157.3	...	17.5	176.3	15.7	17.9	3.7	32.5	17.5	2.9
	Summer				161.3	...	9.5	188.7	16.8	19.7	1.8	24.5	14.2	4.4
Köksal,1977 1974	National	3533	M/F	All	179.9	11.7	3.6	186.3	13.8	19.0	1.2	40.7	13.2	...
	Urban	2392			156.6	12.3	4.7	197.9	15.4	24.8	1.8	36.1	14.2	...
	Rural	1141			196.8	10.8	2.2	165.2	12.0	11.7	1.1	41.6	12.0	...
					Nutrient Intake (person/day)									
					Energy (kcal)	% Protein	% Fat	Protein (g)	% Animal products	Fat (g)	% Animal products			
HÜNDD,MOH,1997	7 provinces	1075	M/F	All	2083	12.6	26.4	66.0	41.1	61.0	...			
MARA,MOH, 1987	National	2400	M/F	All	2281	11.9	24.2	68.0	30.6	62.0	...			
HÜNDD,1984 1987														
Köksal,1977 1974	National	3533	M/F	All	2291	11.9	23.7	68.0	26.4	62.4	...			
					Share of major food groups in total energy intake (%)									
					Cereals	Roots/ Tubers	Pulses	Fruits/ Vege- tables	Oils/ Fats	Meat	Fish	Milk prod.	Sweet- eners	Other
Köksal,1977 1974	National	3533	M/F	All	58.0	1.1	1.5	9.6	13.6	5.4	0.2	5.5	6.0	...

Notes:... no data available\* Original data on food consumption were expressed in g/caput/day and have been converted to kg/caput/year

#### 4. Anthropometric data

Adequate and balanced nutrition during childhood and the adolescent period has a positive impact on linear growth, whereas poor nutrition and experience of a severe illnesses, particularly in early childhood, can affect growth negatively.

In presenting the anthropometric results, the nutritional status of children is compared with an international reference population defined by U.S. National Centre for Health Statistics (NCHS) and U.S. Centre for Disease Control (CDC) and the World Health Organisation (WHO). Standard indices are used to describe the nutritional status of the children as height-for-age, weight-for-height, and weight-for-age (WHO, 1995; 1983). The height-for-age index (stunting) is an indicator of linear growth retardation among children. Stunting reflects the outcome of a failure to receive adequate nutrition over a long period of time, and is also affected by recurrent and chronic illness. The weight-for-age index (wasting) measures body mass in relation to body length or height. Wasting shows acute weight loss, which may be due to diarrhoea, or of seasonal variations in food supply. The weight-for-age (underweight) takes into account both acute and chronic undernutrition and often used for growth monitoring.

The anthropometric findings from the TDHS-1998 provided data on the magnitude of malnutrition in a sample of 2677 preschool children from five geographical regions and on its causal and conditioning factors (TDHS, 1998). According to the survey 16% of children are



classified as stunted (height-for-age) (**Map1**), 8.3% as underweight (weight-for-age) (**Map 2**) and 1.9% as wasted (weight-for-height) (**Map 3**). Children are classified as malnourished with measurements below minus two or minus three standard deviations from the median of the reference population. The proportion classified as stunted exhibits a steady increase starting in the first year of life and reaches a plateau during second and third years of life, by age five the prevalence reaches to 23.7%. These patterns reflect inadequate feeding practices and the presence of recurrent and chronic illness.

A comparison of the 1998 findings with the results of the TDHS-1993 indicates that there was a little change in the nutritional status of children during the five-year period (**Table 4a & Table 4a cont**). Child's age, birth order, birth interval, living in urban or rural residence, regional differences, mothers' educational level are among the most important factors affecting protein-energy malnutrition. Among mothers who were not educated, had a primary education level or a secondary education level the percentage of underweight children decreased from 31%, 11.8% and 4.0%, respectively.

Mean (SD), median height and BMI values for 10-18 years of adolescents are given in **Table 4b**.

The survey results show that obesity is a problem among mothers. According to Body Mass Index (BMI) calculations, 52.2% of adult women are overweight ( BMI > 25 kg/m<sup>2</sup>), of which 18.8% are obese (BMI >30 kg/m<sup>2</sup>) (**Table 4c**).

**Table 4a: Anthropometric data on children**

Source/ Year of survey	Location	Sample			Percentage of malnutrition						
		Size Number	Sex	Age Years	Underweight % Weight/Age		Stunting % Height/Age		Wasting % Weight/Height		Overweight % Weight/Height
					< -3SD	< -2SD*	< -3SD	< -2SD	< -3SD	< -2SD	> +2SD
<b>TDHS, 1999</b>	<b>National</b>	2677	M/F	0-4.99	1.4	8.3	6.1	16.0	0.4	1.9	...
1998	Central	643	"	"	1.3	5.4	4.3	11.6	0.1	1.3	..
	East	652	"	"	3.0	17.1	12.9	30.0	0.9	2.9	...
	North	211	"	"	0.6	4.8	2.9	12.8	0.0	1.6	...
	South	407	"	"	1.7	8.9	4.3	13.5	0.3	2.2	...
	West	763	"	"	0.2	3.8	3.6	9.9	0.2	1.5	...
		285	"	0-0.49	0.5	1.7	0.4	2.0	0.2	2.1	...
		298	"	0.5-0.99	0.9	7.0	1.0	4.6	0.9	3.7	...
		547	"	1	2.6	10.5	4.9	16.7	0.6	2.9	...
		481	"	2	1.7	8.2	7.1	17.4	0.3	1.4	...
		496	"	3	1.8	9.7	10.8	20.1	0.3	1.4	...
		570	"	4	0.5	9.0	7.8	23.7	0.0	0.7	...
	URBAN	1696	"	0-4.99	0.9	6.2	4.7	12.6	0.3	1.7	...
	RURAL	981	"	"	2.3	11.9	8.4	22.0	0.4	2.3	...
		1415	M	"	1.7	8.4	5.8	16.0	0.6	2.1	...
		1261	F	"	1.0	8.1	6.4	16.0	0.1	1.7	...
<b>MOH, 1996</b>	<b>National</b>	2871	M/F	0-4.99	3.4	10.3	...	...	...	...	...
1995	Central	590	"	"	2.1	7.7	..	..	..	..	..
	East	708	"	"	6.8	18.6	...	...	...	...	...
	North	243	"	"	1.5	7.5	...	...	...	...	...
	South	453	"	"	3.6	9.8	...	...	...	...	...
	West	877	"	"	1.9	6.4	...	...	...	...	...
		625	"	0-0.99	2.3	5.7	...	...	...	...	...
		583	"	1	4.8	12.9	...	...	...	...	...
		525	"	2	5.3	15.0	...	...	...	...	...
		602	"	3	2.5	10.3	...	...	...	...	...
		536	"	4	2.2	8.3	...	...	...	...	...
	URBAN	654	"	0-4.99	1.6	7.0	...	...	...	...	...
	RURAL	218	"	"	5.8	14.7	...	...	...	...	...
		439	M	"	4.7	11.5	...	...	...	...	...
		432	F	"	2.0	9.2	...	...	...	...	...

Notes:... no data available

Each index is expressed in terms of the number of standard deviations (SD) units from the median of the NCHS/CDC/WHO international reference population. \* Includes children who are below -3 SD.

**Table 4a cont: Anthropometric data on children**

Source/ Year	Location	Sample			Percentage of malnutrition							
		Size	Sex	Age	Underweight		Stunting		Wasting		Overweight	
					% Weight/Age	% Weight/Age	% Height/Age	% Height/Age	% Weight/Height	% Weight/Height	% Weight/Height	
					< -3SD	< -2SD*	< -3SD	< -2SD	< -3SD	< -2SD	> +2SD	
<b>TDHS, 1994</b>	<b>National</b>	3152	M/F	0-4.99	1.9	10.4	6.3	20.5	0.4	2.9	2.9	
1993	Central	708	"	"	1.3	7.3	5.1	19.2	0.3	1.7	4.1	
	East	798	"	"	5.3	22.1	14.0	37.7	0.9	5.9	1.3	
	North	306	"	"	0.4	7.2	6.2	14.1	0.2	1.4	3.8	
	South	488	"	"	0.6	7.4	3.9	15.8	0.2	1.4	3.0	
	West	852	"	"	0.4	4.8	1.6	10.3	0.3	2.6	2.9	
		330	"	0-0.49	0.0	1.0	0.5	3.7	0.0	2.1	7.1	
		349	"	0.5-0.99	2.8	10.3	0.9	9.2	0.6	2.9	2.3	
		638	"	1	1.4	11.6	3.0	19.4	0.1	5.0	4.1	
		570	"	2	3.6	12.7	8.6	22.3	0.4	2.8	1.6	
		644	"	3	1.2	10.5	9.6	26.0	0.7	2.0	2.0	
		622	"	4	2.0	12.0	10.5	29.3	0.6	2.4	1.7	
	URBAN	1897	"	0-4.99	1.3	8.5	3.9	16.1	0.4	2.9	2.9	
	RURAL	1255	"	"	2.8	13.2	10.0	27.1	0.5	3.0	2.7	
		1623	M	"	1.7	10.3	5.9	21.1	0.4	3.3	3.0	
		166	"	0-0.49	0.0	0.7	0.4	5.0	0.0	3.4	6.9	
		180	"	0.5-0.99	2.9	10.7	1.0	9.4	1.2	4.5	2.0	
		347	"	1	1.7	13.0	3.0	20.1	0.0	5.0	5.2	
		289	"	2	4.1	12.0	9.0	21.9	0.3	3.6	1.2	
		324	"	3	0.9	9.4	8.4	27.5	0.6	1.6	2.8	
		332	"	4	0.8	11.5	9.6	29.7	0.6	2.4	1.1	
		1530	F	0-4.99	2.0	10.5	6.7	19.8	0.4	2.5	2.7	
		164	"	0-0.49	0.0	1.2	0.6	2.4	0.0	0.7	7.4	
		169	"	0.5-0.99	2.7	9.8	0.7	8.9	0.0	1.3	2.5	
		291	"	1	1.1	10.0	2.9	18.7	0.3	5.0	2.8	
		289	"	2	3.0	13.3	8.1	22.7	0.4	2.1	1.9	
		321	"	3	1.5	11.6	10.8	24.5	0.7	2.3	1.3	
		300	"	4	3.3	12.5	11.6	28.8	0.6	2.4	2.2	

Notes:... no data available

Each index is expressed in terms of the number of standard deviations (SD) units from the median of the NCHS/CDC/WHO international reference population. \* Includes children who are below -3 SD.

**Table 4b: Anthropometric data on adolescents**

Source/ Year of survey	Location	Sample			Anthropometric status						
		Size Number	Sex	Age Years	Height (cm)			Body Mass Index (kg/m <sup>2</sup> )			
					mean	SD	median	mean	SD	median	
<b>Rakıcıoğlu et al</b>	Ankara	422	M	41912							
<b>2000</b>			M	10	139.3	5.8	140.0	16.8	2.2	16.6	
			M	11	144.2	6.9	144.0	17.2	2.1	16.9	
			M	12	149.0	7.5	148.0	17.5	2.6	17.3	
			M	13	152.0	9.3	152.0	18.0	2.6	17.3	
			M	14	159.7	9.9	159.0	18.3	2.5	17.9	
			M	15	166.4	8.6	167.0	19.0	1.9	19.0	
			M	16	171.5	7.2	171.0	19.8	2.8	20.4	
			M	17	172.4	7.4	175.0	19.9	2.0	19.7	
			M	18	173.7	7.1	173.0	21.1	2.8	21.8	
		187	F	41547							
			F	10	137.4	6.3	136.5	16.1	2.0	15.9	
			F	11	146.2	7.2	144.5	17.3	2.8	17.2	
			F	12	151.5	7.9	150.5	17.6	2.4	16.9	
			F	13	155.7	7.7	157.0	17.8	2.4	17.6	
			F	14	158.8	7.2	158.0	19.7	2.6	19.9	
			F	15	158.4	6.1	158.0	19.1	2.8	18.7	
			F	16	161.3	6.7	160.0	19.8	3.6	20.1	
			F	17	155.3	4.3	157.0	19.4	4.0	18.8	
<b>HÜNDÜ,</b>	15 provinces	7144	M/F	35769							
<b>MOH,1995</b>		502	M	10	130.9	8.7	...	16.0	2.1	...	
		440	M	11	136.5	9.5	...	16.2	2.4	...	
		352	M	12	141.8	7.9	...	16.9	2.4	...	
		556	F	10	132.6	9.3	...	15.7	2.6	...	
		511	F	11	138.9	8.5	...	15.8	2.5	...	
		394	F	12	143.4	8.8	...	17.7	2.6	...	

Notes: ... data not available

**Table 4c: Anthropometric data on adults**

Source/ Year of survey	Location	Sample			Anthropometric status and Percentage of malnutrition								
		Size Number	Sex	Age Years	Body Mass Index (kg/m <sup>2</sup> )			Chronic Energy Deficiency % BMI			Overweight % BMI	Obesity % BMI	
					mean	SD	median	<16.0	16.0-16.9	17.0-18.5	25.0 - 29.9	>30.0	
<b>TDHS,1999</b>	National	2183	F	15-49	26.0	5.0	...	0.1	0.2	2.3	33.4	18.8	
1998													
<b>TDHS,1994</b>	National	2300	F	15-49	25.8	4.9	...	0.0	...	2.3	32.0	18.7	
1993													
<b>HUNDD,1999</b>	Ankara	549	M	>60	25.9	3.9	25.7	0.2	0.4	1.6	41.2	15.2	
1999		732	F	>60	29.2	4.9	28.9	0.3	0.3	1.1	41.2	39.6	

Notes:... data not available

## 5. Micronutrient deficiencies

Anemia due to iron deficiency is the most important nutritional problem among young children and women of child bearing age. Rural women have a higher frequency of anemia than urban women. A survey on school age children (13-19 years) indicated that 21% of females (Hb <12 g/dL) and 19.7% of males (Hb <13 g/dL) were anemic (Yücecan et al.,1993). Approximately half of the preschool children, pregnant and lactating women, and one third of the school children were anemic (Köksal, 1974; Okan and Açıktur, 1981; Toksöz et al.,1986; Pekcan, 1983; Güneşli, 1986; Aykut and Öztürk, 1988; Çetin and Aydın, 1999). A survey was conducted on school children aged 7-17 years to determine the prevalence of anemia (Wetherilt et al., 1992 ). The serum iron levels were found to be moderately low (5.5-10.9 µmol/L) in 5.3 % of children and severe (<5.5 µmol/dL) in 0.8% of children, while haematocrit levels of 41.9% and 12.9% of children were moderately low and severe, respectively. The possible causes of anemia were poor intake of iron, low bioavailability of iron, multiparity, parasitic infections and high consumption of food containing substances which inhibit iron absorption, such as tea (Pekcan and Karaağaoğlu, 2000).

National Screening Data revealed an overall goitre prevalence of 30.5% in 1988 (Urgancıoğlu and Hatemi, 1988). Prevalence in the school-age population calculated from the general population is 35.6% (WHO/UNICEF/ICCIDD, 1993). A survey was conducted in 1995 in a sample of 7,144 children aged 6-12 years from 15 provinces (HUNDD/MOH, 1995). The total prevalence of enlarged thyroid was 30.3%. The prevalence was 27.7% in males, and 32.6% in females (**Table 5**). Of the total, 24.2% of families were consuming iodized salt. UNICEF held a Multiple Cluster Survey in 1995 and found the consumption rate of iodized salt as 18.2% (MOH,1997). In 1994, a total of 503 household members with a mean age of 31.3 years were evaluated for thyroid enlargement. By palpation, total goitre

prevalence was 31.2%. Mean urinary iodine excretion was 7.7 µg/dL in subjects with goitre and 11.7 µg/dL in subjects without goitre (Kirkizoğlu and Pekcan, 1998). Programme for voluntary iodization of salt was started with a legislation in 1968. Programme for iodine deficiencies has been launched in 1994. Inter-sectoral collaboration and education programmes have been organized towards the promotion of iodized salt and iodisation of all salts produced in food sector. In June 1998, iodisation of all the consumed salt became compulsory with legislation. The incidence of congenital hypothyroidism is found as 1:2736 (Yordam et al. 1995).

Regional surveys indicated that 7.9-20.0% of children had rickets, associated with limited exposure to sunlight and inadequate intake of calcium (Köksal, 1974; Öcal et al., 1983).

As for vitamin A deficiency, the findings of a survey on 7-17 years old children in three geographic regions of Turkey revealed that blood vitamin A level in 9.3% of children was marginally low (0.35-0.69µmol/L) and in 2.3% was severe (<0.35µmol/L), with B<sub>2</sub> 7.0% of children fell into moderate (1.52-1.44 EGR activity) and 82.9% into high risk (> 1.52 EGR activity) groups, with B<sub>6</sub> 22.7% fell into moderate (1.8-1.7 EGOT activity) and 60.7% into high risk (>1.8 EGOT activity) groups (Wetherilt, 1992) **(Table 5)**.

In a longitudinal study blood samples were analyzed for ferritin, iron, zinc, calcium, alkaline phosphatase, total protein, albumin, vitamins B<sub>2</sub>, B<sub>6</sub>, B<sub>12</sub>, A, E, beta-carotene and folate in pre- and post-natal women. The subjects were randomly selected during 13-17<sup>th</sup> weeks of gestation and followed up between 28-32<sup>nd</sup> weeks of gestation and 13-17<sup>th</sup> weeks of postpartum. High percentages of subjects were at risk for deficiencies of vitamin B<sub>12</sub> (48.8%) and folate (59.7%) in early pregnancy; ferritin (52.3%), zinc (72.3%), vitamin B<sub>2</sub> (38.8%), vitamin B<sub>12</sub> (80.9%) and folate (76.4%) during late pregnancy; and ferritin (39.0%), vitamins B<sub>2</sub> (43.1%), B<sub>6</sub> (36.4%), B<sub>12</sub> (60.0%) and folate (73.3%) at the postpartum stage. Bone loss was indicated in 55% and 80% of the subjects in late pregnancy and post-partum respectively. Nutrition education programmes and enrichment of the bread was recommended (Açkurt et al, 1995). In an another study the prevalence of neural tube defects was found 30.1 per 10 thousand. It seems it is an important problem among 15-49 years old women (Tunçbilek et al, 1999).

**Table 5: Surveys on micronutrient deficiencies**

Source/ Year of survey	Deficiency	Location	Sample			Percentage
			Size Number	Sex	Age Years	
<b>Iodine</b>						
<b>HÜ.NDD/MOH,1995</b>		15 provinces	6906	M/F	35769	30.3
1995			557/539	M/F	6	19.6/22.1
			514/540	M/F	7	22.0/22.4
			532/560	M/F	8	27.1/26.4
			491/515	M/F	9	28.1/31.5
			476/547	M/F	10	30.1/42.4
			422/491	M/F	11	30.1/42.4
			339/383	M/F	12	42.2/48.6
			3331/3575	M/F	35769	27.7/32.6
<b>Vitamin A</b>						
						Low/Severe
<b>Wetherilt, 1992</b>		3 regions	980	M/F	41455	2.3/9.3
1985-1986		Marmara		M/F		2.2/12.6
		Centre		M/F		1.6/5.5
		East		M/F		3.2/9.6
<b>Iron</b>						
<b>Çetin,Aydın, 1999</b>		İstanbul	910	M/F	0.5-19	44.0
1996			478	M/F	0.5-6.0	58.0
<b>Wetherilt, 1992</b>		3 regions	980	M/F	41455	20.9 (Hb)
1985-86						12.9 (High risk, Hct)
						41.9 (Medium risk, Hct)
<b>Pekcan,1984</b>		Ankara	355	M/F	35773	35.8
1983						

Notes: ... data not available

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References of data presented in Table 1, unless otherwise stated:

<i>Source:</i>	<i>Indicator:</i>
<b>FAOSTAT.</b> 1999	<i>A.1-2, B, C.10-11, E.1-3, F, G</i>
<b>UN.</b> 1998 rev.	<i>C.1-9, D.5</i>
<b>World Bank.</b> 1999.	<i>D.1</i>
<b>UNDP.</b> 1997.	<i>D.2</i>
<b>Tabatabai H.</b> 1996.	<i>D.3-4</i>
<b>UNICEF.</b> 2000.	<i>D.6</i>
<b>FAO/WFS.</b> 1996.	<i>H</i>

## **NCP of TURKEY MAPS**

### **General map of Turkey**

**Map 1**: Prevalence of stunting among children under five years by regions

**Map 2**: Prevalence of underweight among children under five years by regions

**Map 3**: Prevalence of wasting among children under five years by regions