6 *Cereals and related policies in Turkey*[1]

6.1 – Introduction

Cereals dominate agricultural production in Turkey due to the semi-arid climatic conditions. Cereals occupied 53% of the area sown and the share of cereals in the value of crop production was 24% in 2003. Wheat is the major crop on both the supply and the demand side as the main staple. The dominance of cereals in supply and demand coupled with the self-sufficiency objective of all governments since the establishment of the Republic has meant that cereals have been a priority in the formulation of agricultural policies.

This study will cover the developments in cereals and related policies in Turkey. The following section presents an overview of the recent policy developments in crop husbandry and cereals. The past trends in the area, production and yields of cereals together with domestic consumption are presented in the third section. The price structure and a comparative analysis of transfers to cereals are provided in the fourth section. The fifth part is about trade in cereals including country-specific exports and imports, and the final section is reserved for concluding comments.

6.2 – Agricultural policies and cereals

During the last decade the agricultural sector in Turkey registered a very low growth rate (0.5%) with wide fluctuations. The historical development of real agricultural value added for the last half century suggests that stagnation in agriculture is not a new phenomenon and appears to be the rule rather than the exception. Growth in real value added in the past has been in upward jumps every 7-9 years. The size of the jumps became smaller over time with fluctuations around the established levels due to weather conditions (Çakmak and Akder, 2005).

Historically, changing policy emphasis in agriculture has contributed to the jumps in agricultural output: increase in area sown in the early 1960s, support for use of chemical fertilisers in the late 1960s, increase in irrigated area and support to mechanisation in the 1970s, support for using high-yield seeds, fallow reduction programmes and new crop rotations in the 1980s have been the major technological and input-augmenting developments contributing to jumps in

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agricultural output (Çakmak, Kasnakoğlu and Akder, 1999). No significant advance in production was realised in the last decade, so that the stagnation of the previous period continued.

Agricultural growth did not stagnate in all sub-sectors. Cereals and pulses have had a negative impact on the growth of output. The major source of this negative contribution has been the yield decline in wheat in particular. The negative contribution of these major crops has been offset by industrial crops, tuber crops, vegetables and fruit (Akder, Kasnakoğlu and Çakmak, 1999).

After the mid 1980s, Turkey can be considered a perfect example of mismanagement of agricultural policies. The governments were unable to implement any policy to improve productivity in agriculture. A further reason for the preponderance of transfer policies was frequent early elections. The transfers to producers occurred mostly from consumers through support purchases of major crops by the state economic enterprises or sales cooperatives, backed by high tariffs.

The transfers to producers from taxpayers did not reach particularly high levels but were accompanied by huge financial costs. Most of the direct transfers from the State, i.e. compensatory payments, were not budgeted for, and the funds of the State banks were utilised without being paid back in due course. The state economic enterprises (SEEs) in the sector and the Agricultural Sales Cooperative Unions (ASCUs) were another channel which increased the financial costs for the government. The SEEs responsible for implementing agricultural policies (TMO for cereals, Tekel for tobacco, TürkŞeker for sugar, Çaykur for tea) had to borrow at market rates and eventually had to either write off their losses as 'duty losses' or receive capital injections (Kasnakoğlu and Çakmak, 2000). Although not officially considered to be State organisations, the ASCUs were used as policy-implementing agencies of the government with revolving credit lines from the State which are topped up when needed. As the result of these developments combined with over-employment and inefficient management practices, all policy-implementing agencies in the sector became virtually totally dependent on the financial resources of the State.

Turkey embarked on an on-going structural adjustment and stabilisation programme towards the end of 1999; agriculture was selected to undergo heavy adjustment due to ineffective policies and their increasing burden on government finance. Protective trade policies in major crops combined with government procurement, input subsidies, and heavy investment in irrigation infrastructures on a fully subsidised basis had created a net inflow of resources from the government to agriculture, but had had many negative effects on the sector and the economy at large. The benefits of the subsidies were going mainly to larger, wealthier farmers. In addition, the support system failed to enhance productivity growth despite its heavy burden on taxpayers and consumers.

The programme for reforming the agricultural subsidy system had to await the aftermath of another economic crisis in 2001 in order to gain momentum. The reform, known as "Agricultural Reform Implementation Project" (ARIP), focused on three main themes: the first was to phase out the government intervention in the output, credit and fertiliser markets and to introduce direct income support (DIS) for farmers through per hectare payment independent of crop choice. The second theme, closely related to the output price support of the first theme, was to commercialise and privatise state economic enterprises, including TÜRKŞEKER (Turkish Sugar Company) and TEKEL (Turkish Alcohol and Tobacco Company) and to restructure the TMO (Soil Products Office) and the quasi-governmental Agricultural Sales Cooperative Unions (ASCUs), which in the past intervened to support certain commodity prices on behalf of the government. Non-recurrent alternative crop payments formed the third theme. It provided grants to farmers who needed assistance in switching from surplus crops to net imported products. The programme was intended to cover the costs of shifting from producing hazelnuts, tobacco and sugar beet to producing oilseeds, feed crops and maize. Compensatory payments for oilseeds, cotton, olive oil and maize completed the basic policy scene in Turkey.

Participation in alternative crop payments has been limited due to the mixed signals the farmers have been receiving from the government. They were not convinced that the government would continue the on-going support schemes for hazelnuts, sugar and tobacco. Tobacco farmer participation has been extremely high due to the Tobacco Law with which TEKEL ceased to be the price maker on the market, and price formation has been left to the bidding mechanism. The Tobacco and Sugar Laws paved the way for the privatisation of TEKEL and TÜRKŞEKER. Cigarette and alcohol products companies of TEKEL were up for privatisation. The alcohol products company was privatised, but the tender for the cigarette company was cancelled. There has been no serious attempt to privatise in the sugar sector since 2001.

The government has started to restructure ARIP and to add new components. As of 2006, the weight of DIS payments in the total budgetary support to agriculture will be decreased. The per hectare payment will remain constant in nominal terms, but payments will be more targeted. The share of crop-specific compensatory payments, alternative crop grants and support to livestock production will increase slightly. The new items in the short term are related to environmental protection schemes, crop insurance support, and a pilot project on participatory rural development.

Compensatory payments have been made for some deficit products such as cotton, oilseeds, maize and olive oil during the last five years. The government decided to expand the list of crops eligible for compensatory payments by adding cereals in May 2005; cereal farmers will receive about €18 per tonne from the government. There is no indication of whether the compensatory payment is for one single year or for several years to come.

Agenda items of the government's medium-term policy include promotion of a sustainable rural finance system; increased expenditure on rural infrastructures targeting irrigation, storage and marketing facilities and expansion of agricultural extension activities.

The cereals sector was one of the major sub-sectors in agriculture to be affected by the subsidisation reform programme due to the heavy involvement of the government in the output market through the Soil Products Office (TMO), coupled with high tariffs and non-tariff measures. Non-tariff measures consist mainly of the requirement of a control certificate for the import of any cereals to Turkey. In some cases, the right to import may be granted exclusively to the TMO.

To begin with, the reform programme aimed to reduce the volume of the TMO's intervention purchases together with a significant reduction of cereal tariffs. In addition, the procurement prices of cereals (especially wheat) paid by the TMO were linked to the world prices. For instance, the procurement price of wheat in 2000 was 35% higher than the Chicago Board of Trade price. The TMO sales price for grain was set at no less than the lower of either the TMO purchase price plus storage costs incurred up to the date of sale including imputed interest charges on stocks, or the tariff-inclusive import parity price for a cereal of equivalent quality. The discipline in the TMO's procurement policy was impressive in 2000 and 2001. The intervention purchases remained limited due to the overall budgetary discipline which completely eliminated the possibility of financing the intervention from the Treasury. The intervention purchases of cereals by the TMO from 1986 to 2005 are presented in Table 6.1.

The limits on the TMO intervention purchases were effective in 2002 and 2003 but were relaxed in 2004. The quantity bought by the TMO reached high levels as of October 2005. It is estimated that the TMO may be further obliged to buy more maize from farmers at higher prices than border prices for the rest of 2005. The 2005 purchases partly reflect the impact of good climate conditions on production.

Table 6.1 - Intervention purchases of cereals by the TMO, 1986-2005

		Wheat	Barley	Maize	Rice	Rye, oats	Total
1986-88	1000 t	3 125	706	62	0	38	3 931
	% of total prod.	16	10	3	0	6	13
1997-99	1000 t	4 306	15 328	511	59	100	6 504
	% of total prod.	22	27	23	32	19	23
2000	1000 t	2 959	509	29	40	0	3 537
	% of total prod.	14	6	1	19	0	11
2001	1000 t	1 459	952	1	20	12	2 444
	% of total prod.	8	13	0	9	2	8
2002	1000 t	333	380	79	59	22	873
	% of total prod.	2	5	4	27	4	3
2003	1000 t	545	27	381	130	6	1 089
	% of total prod.	3	0	14	58	1	4
2004	1000 t	1 872	1	159	2	2	2 036
	% of total prod.	9	0	5	1	0	6
2005	1000 t[a]	4 169	795	203	1	16	5 184
	% of total prod.[b]	20	9	7	0	3	15

Notes: [a] as of mid October 2005; [b] using production levels in 2004.

Sources: TMO (2005), SIS (2005).

As has already been mentioned, the higher internal prices should be supported by the necessary border measures. Turkey applies ad valorem import tariffs for all cereals. The import tariffs following the implementation of the reform programme and the commitments to WTO for 2004 and after are presented in Table 6.2.

Table 6.2 - Import tariffs on cereals, 2002-05[a] (%)

HS Code	Commodity	2002	2003	2004	2005	WTO-2004+
100110	Durum wheat	5 (30)	30	30	60 (100)	180
100190	Wheat ex. durum	10 (40)	40	40	85 (130)	180
1002	Rye	60	60	60	60 (130)	180
100390	Barley	85	85	85	85 (100)	180
1004	Oats	30	30	30	30 (60)	180
100590	Maize	10 (35)	35 (70)	80	100 (130)	180
100610	Rice in the husk	27 (38)	38	34	34	45
100630	Rice, milled	35 (46)	45.5	45	45	45

Notes: [a] Numbers in brackets indicate the tariffs in the second half of the year.

Sources: UFT (2005).

The WTO ceiling commitments indicate that Turkey has considered all cereals except rice to be sensitive commodities. The tariff overhang (the difference between ceiling commitments and applied tariff rates) was not used until 2005 and supply management was achieved by the various governments by controlling imports. However, in 2005 there was a clear shift in policy towards increasing the tariffs towards the ceiling commitments in the harvest season. The import regime can be said to have become more WTO-compliant than before.

The reform programme intended to make policies more market-friendly by replacing distorting output market interventions by direct income support. The implementation of the direct income support (DIS) programme started in 2002. The per hectare payment was determined at a rate of about €100 per hectare of cultivated area. The DIS is intended to provide farmers with a safety net following the elimination of the support mechanisms prior to the reform. The DIS is not contingent on input use or farmers' output production decisions and is thus decoupled. The farmers are eligible to receive the fixed amount of payment for up to 50 hectares of cultivated land. The actual DIS payments were delayed for about a year and the payments were made in two instalments. The amount of the payment is reasonable, especially for cereal farmers, and may have helped farmers to make up for the lack of operating capital. Despite the delay, DIS payments amounting to a total of €1.5 billion were made to farmers in 2004 as partial compensation for the removal of the old system and in order to form a dependable basis for the national farmers registry.

6.3 – Area, production, yield and consumption

Field crops have occupied 87% of the cultivated area since 1985 (Table 6.3), and the share of vegetable production has been increasing steadily. Land left to fallow declined from 21% to 19% of cultivated land, causing an increase in cropping intensity of 2 percentage points. The decline in fallow land was sharper following the implementation of the fallow land reduction project in the mid 1980s. The project encouraged planting pulses instead of leaving land to fallow in the customary crop rotation on the Central Anatolian Plateau. However, the decline in the world prices of pulses limited fallow reduction in the last decade.

Table 6.3 - Use of cultivated area in Turkey
(Averages of the respective periods)

	1985–87		*1995–97*		*2001–03*	
	Area (million ha)	*Share (%)*	*Area (million ha)*	*Share (%)*	*Area (million ha)*	*Share (%)*
Field Crops	24.07	87.1	23.62	87.8	22.90	87.0
Area Sown	18.28	66.1	18.57	69.0	17.92	68.1
Fallow	5.79	20.9	5.05	18.8	5.00	18.9
Vegetable	0.64	2.3	0.78	2.9	0.82	3.1
Orchards	2.94	10.6	2.50	9.3	2.60	9.9
Total	**27.65**	**100.0**	**26.90**	**100.0**	**26.31**	**100.0**

Sources: SIS (2003), (2005).

The field crop pattern showed no drastic changes, apart from the increase in cereals and a steady decline in the share of oilseeds (Table 6.4).

Table 6.4 - Field crop areas in Turkey
(averages of the respective periods)

	1985–87		*1995–97*		*2001–03*	
Crop	*Area (million ha)*	*Share (%)*	*Area (million ha)*	*Share (%)*	*Area (million ha)*	*Share (%)*
Cereals	13.82	50.0	13.85	50.4	13.70	52.1
Wheat	9.37	33.9	9.36	34.1	9.25	35.2
Barley	3.34	12.1	3.61	13.1	3.55	13.5
Maize	0.57	2.0	0.54	2.0	0.54	2.0
Rice	0.06	0.2	0.05	0.2	0.06	0.2
Pulses	1.74	6.3	1.83	6.7	1.56	5.9
Industrial crops	1.24	4.5	1.48	5.4	1.36	5.2
Oilseeds	0.93	3.4	0.72	2.6	0.64	2.4
Tuber crops	0.29	1.0	0.34	1.2	0.30	1.1
Total cultivated area	**27.65**	**65.2**	**26.90**	**66.3**	**26.37**	**66.7**

Sources: SIS (1989), (1999), (2003), (2005).

6.3.1 - Trends in area under cereals, production and yields

The area under cereals and its share in the arable and arable plus permanent crop land in the last four decades are presented in Table 6.5. The period covered is divided into four parts in order to show periodic changes. The figures are reported without any aggregation in order to show product-specific distribution details.

The shares of area under cereals in both arable and arable plus permanent crop land increased during the period. The total area under cereals went up by 6.9% from period 1 to period 4. The increase in arable land is 4.6% between the same periods, which would point to a substitution towards cereal area within the use of total arable land. Notice also that the share of cereals within arable lands increased about 3.7 percentage points between the first and last periods. This 3.7 point increase corresponds to an area of 0.9 million hectares, which is quite considerable.

Table 6.5 - Areas and shares by cereal product (period averages)

	1961-1970			1971-1980		
	Area *Million ha*	**Share of arable land** *%*	**Share of arable + perm. crop land** *%*	**Area** *Million ha*	**Share of arable land** *%*	**Share of arable + perm. crop land** *%*
Wheat	8.156	34.0	31.0	9.035	37.7	34.3
Barley	2.734	11.4	10.4	2.601	10.9	9.9
Maize	0.666	2.8	2.5	0.599	2.5	2.3
Rice, paddy	0.057	0.2	0.2	0.060	0.2	0.2
Rye	0.693	2.9	2.6	0.548	2.3	2.1
Oats	0.386	1.6	1.5	0.253	1.1	1.0
Millet	0.044	0.2	0.2	0.026	0.1	0.1
Canary seed	0.011	0.0	0.0	0.002	0.0	0.0
Mixed Grain	0.284	1.2	1.1	0.192	0.8	0.7
CEREALS	13.032	54.4	49.5	13.315	55.6	50.6
ARABLE LAND (1)	23.966	100.0	91.0	25.234	100.0	89.9
ARABLE+PERM. (2)	26.323		100.0	28.067		100.0
	1981-1990			**1991-2002**		
	Area *Million ha*	**Share of arable land** *%*	**Share of arable + perm. crop land** *%*	**Area** *Million ha*	**Share of arable land** *%*	**Share of arable + perm. crop land** *%*
Wheat	9.255	38.6	35.2	9.459	39.5	35.9
Barley	3.228	13.5	12.3	3.578	14.9	13.6
Maize	0.548	2.3	2.1	0.530	2.2	2.0
Rice, paddy	0.062	0.3	0.2	0.053	0.2	0.2
Rye	0.246	1.0	0.9	0.146	0.6	0.6
Oats	0.163	0.7	0.6	0.148	0.6	0.6
Millet	0.008	0.0	0.0	0.003	0.0	0.0
Canary seed	0.000	0.0	0.0	0.000	0.0	0.0
Mixed grain	0.066	0.3	0.3	0.015	0.1	0.1
CEREALS	13.576	56.6	51.6	13.931	58.1	52.9
ARABLE LAND (1)	24.631	100.0	89.3	25.074	100.0	90.3
ARABLE+PERM. (2)	27.591		100.0	27.775		100.0

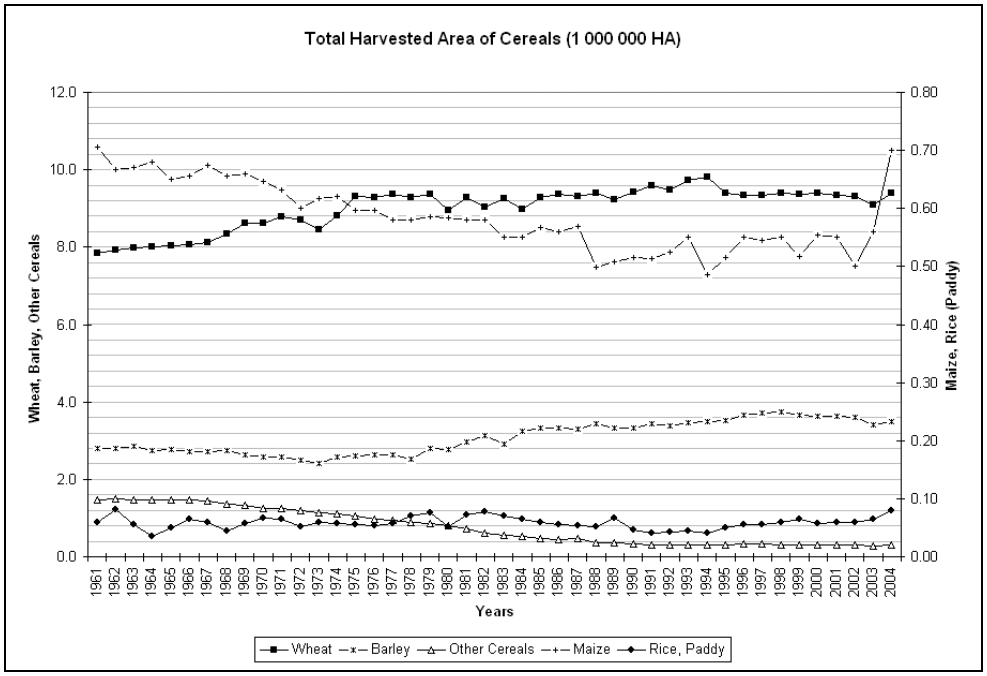
Source: FAOSTAT, 2005a.

Another important observation is that only wheat and barley increased their shares of the total area under cereals, by 5.5 and 3.5 percentage points respectively. Except

for rice, the shares of all other cereals decreased: Table 6.5 shows a 0.6% decrease for maize, a 2.3% decrease for rye, a 1% decrease for oats, a 0.2% decrease for millet and a 1.1% decrease for mixed grain.

The most important cereal produced is wheat with an area of about 9.6 million hectares (Figure 6.1) and an output of 21 million tonnes (Figure 6.2) in 2004. Between 1961 and 2004, one observes a gradual upward trend in the area under wheat (Figure 6.1). In terms of output, a threefold increase in wheat production can be observed between 1961 and 2004 (Figure 6.2).

Figure 6.1 - Total harvested area of cereals (million ha)



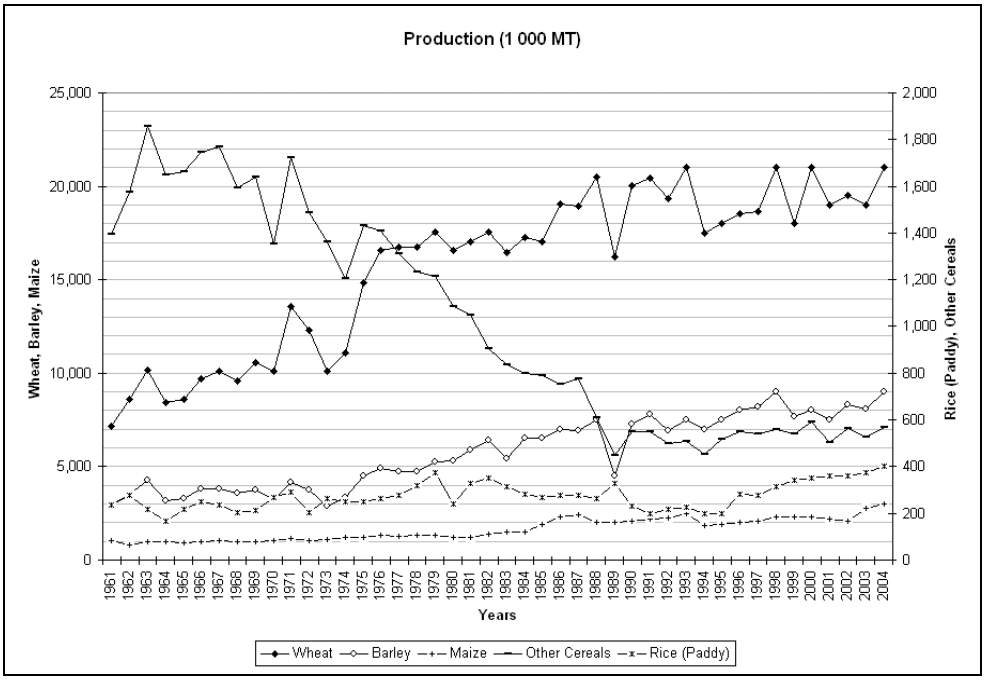
Note: the "Cereal" aggregate represents the sum of wheat, rice (paddy), barley, maize, rye, oats, millet, canary seed, and mixed grain products.

Source: FAOSTAT, 2005a.

The significant difference between the growth rate of the area under wheat and wheat output indicates an important upward trend in wheat yield; the average yield was about 1 tonne per hectare in 1961 and increased to about 2.2 tonnes per hectare in 2004. The wheat yield went up by about 220% from 1961 to 2004.

The period under review is divided into sub-periods to obtain a better picture of the yield developments. The sub-periods are determined according to the departures from the trend values. Annual growth rates for the three periods studied are given in Table 6.6. Note that different sub-periods are determined for each cereal product. Table 6.6 contains trend calculations.

Figure 6.2 - Cereal product output (1 000 metric tonnes)



Source: FAOSTAT, 2005a.

Trends are estimated log-linear growth rates according to equation 1) below. They are calculated by running log-linear regressions, where *y* denotes *yield*, *t* denotes *year*, β_0 is the *intercept*, β_1 the *regression coefficient* and *u* the *disturbance term*. The estimated regression coefficients report growth rates. Annual growth rates are reported as percentages in Table 6.6.

$$1) \qquad y = \beta_0 . e^{\beta_1 t} + u$$

Wheat yield growth rates reveal that the highest rate is observed in the first period (1961-1974). Wheat yields increased by about 2% per annum from 1961 to 1974, 1.2% per annum from 1975 to 1993, and 1.5% per annum thereafter. The coefficients of variation for annual wheat yields show that the yield volatility is

highest in the first period and lowest in the last period (Table 6.6). The average yearly increase over the entire period was only 1.8% per annum. Different growth accounting can be done by comparing the average yields of the sub-periods. Almost all of the increase from the first to the last period (71%) resulted from the increase from the first to the second period (60%). The drastic increase in the yields in the first period reflects the impact of the "green revolution" on wheat production in Turkey.

Barley is the second most important cereal with an area of 3.6 million hectares and an output of about 9 million tonnes. The barley area was 2.8 million hectares in 1961 and it increased by about 30% during the period studied. A similar trend was observed for wheat. However, the increase in output is impressive with a threefold increase in the period from 1961 and 2004 (from 3 million metric tonnes to 9 million metric tonnes). Again, the marked difference between the growth rates of harvested area and output implies considerable improvement in the country average barley yields during the period under review. The country average barley yield was about 1 tonne per hectare in 1961; however, it was about 2.6 tonnes per hectare in 2004, which meant a 2.6-fold increase in the country average barley yield (Figure 6.3). The trend-based yield growth estimates reported in Table 6.6 indicate a statistically significant annual growth of 1.6% for barley from 1961 to 2004. Regarding the sub-periods, barley yields achieved a statistically significant annual growth rate of about 2% from 1961 to 1976, 1.4% from 1977 to 1988, and 1.7% from 1989 onwards until 2004. The yield volatility that can be captured to some extent by a coefficient of variation is highest in the first period, falls in the second period and then increases again in the last period compared to the second period. With regard to the growth rate of yields between the sub-period average yields, one can see that there is an increase of some 43% in period-specific yields between period 1 and 2, and an increase of only about 9% from period 2 to period 3. From period 1 to period 3, the average barley yield per period increased by about 56%.

Table 6.6 - Yields of selected cereals, 1961-2004

	2002-2004	1961-2004		PERIOD I			PERIOD II		
	Yield	Annual Growth	CV	Yield	Annual Growth	CV	Yield	Annual Growth	CV
	t/ha	*%*	*%*	*t/ha*	*%*	*%*	*t/ha*	*%*	*%*
Wheat	2.140	1.76 *[0.00]*	23.0	1.200	2.05 *[0.01]*	13.0	1.919	1.19 *[0.00]*	8.5
Barley	2.420	1.62 *[0.00]*	22.2	1.384	1.97 *[0.01]*	15.6	1.977	1.35 *[0.00]*	5.7
Maize	4.495	3.26 *[0.00]*	41.1	1.572	2.50 *[0.01]*	11.8	3.138	5.19 *[0.00]*	30.6
Rice	5.574	0.80 *[0.00]*	12.9	4.245	1.11 *[0.01]*	9.7	4.807	0.80 *[0.03]*	5.8
Other	1.597	0.99 *[0.00]*	13.6	1.150	1.20 *[0.01]*	7.3	1.468	0.60 *[0.04]*	6.0

	2002-2004	PERIOD III			GROWTH FROM		
	Yield	Yield	Annual Growth	CV	1 to 3	1 to 2	2 to 3
	t/ha	*t/ha*	*%*	*%*	*%*	*%*	*%*
Wheat	2.140	2.048	1.52 *[0.02]*	7.2	70.69	59.96	6.71
Barley	2.420	2.162	1.73 *[0.02]*	12.1	56.21	42.83	9.37
Maize	4.495	4.109	2.11 *[0.01]*	9.5	161.40	99.63	30.94
Rice	5.574	5.283	1.95 *[0.04]*	11.4	24.47	13.23	9.92
Other	1.597	1.555	0.90 *[0.01]*	4.8	35.23	27.70	5.90

Notes:

(1) Definition of periods for wheat, barley, maize, rice and other cereals are as follows:
Wheat: period I: 1961-1974; period II: 1975-1993; period III: 1994-2004,
Barley: period I: 1961-1976; period II: 1977-1988; period III: 1989-2004,
Maize: period I: 1961-1974; period II: 1975-1993; period III: 1994-2004,
Rice: period I: 1961-1978; period II: 1979-1992; period III: 1993-2004,
Other Cereals (Average): period I: 1961-1974; period II: 1975-1991; period III: 1992-2004.

(2) The annual growth rates have been estimated as log-linear trends by ordinary least squares regression.

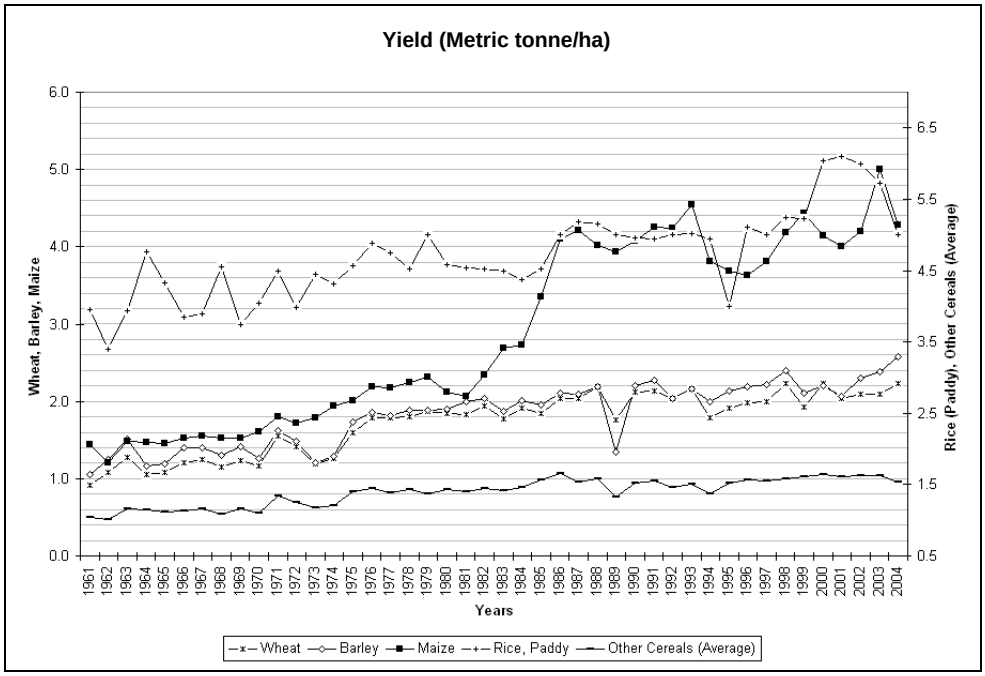
(3) The figures in brackets below the annual growth estimates are the associated probability values, i.e., they represent the statistical level of significance of annual growth rate estimates.

(4) The CV column represents the *coefficients of variation* for the annual yields, defined as standard deviation divided by mean. Note that CV measures the variation in annual yields relative to the value of the period mean.

Source: FAOSTAT, 2005a.

We see in Figure 6.1 that the "other cereals" aggregate which we calculated as the sum of rye, oats, millet, canary seed and mixed grain is the third most important cereal in terms of total harvested area. The total harvested area of "other cereals" was about 1.5 million hectares (Figure 6.1) in 1961 dropping drastically to about 0.4 million hectares in 2004. Between 1961 and 2004, there was a steady downward trend in the harvested area of the "other cereals" aggregate. A similar downward trend can be seen in the total output of "other cereals"; output was about 1.4 million tonnes in 1961 but dropped to about 0.6 million tonnes in 2004.

Figure 6.3 - Cereal yields (1961-2004)



Source: FAOSTAT, 2005a.

On the other hand, although there are important drops in both harvested areas and production quantities, there was an increase in the average yields of the "other cereals" composite product from about 1 tonne per hectare in 1961 to 1.5 tonnes per hectare in 2004. In other words, there was a 1.5-fold increase in the average yield of "other cereals" between 1961 and 2004. In terms of trend-based estimates for sub-periods, country average yields of the "other cereals" aggregate registered a statistically significant growth rate of about 1.2% per annum from 1961 to 1974, 0.6% per annum from 1975 to 1991 and 0.9% per annum from 1992 to 2004. With regard to the trend-based estimates for the entire period from 1961 to 2004, a statistically significant growth rate of about 1% per annum is estimated for the

yields of the "other cereals" aggregate. Relatively low CV (coefficient of variation) values for "other cereals" indicate low variations from one year to the next in the country average yields.

The fourth important cereal in terms of total harvested area is maize with an area of some 0.7 million hectares (Figure 6.1, 2004) and an output of 3 million tonnes (Figure 6.2, 2004). Although there are no significant differences in the total harvested maize areas of 1961 and 2004, the period between these two years first saw a considerable decrease in area with few variations until 1994, then a relatively steady period between 1995 and 2002 and lastly an impressive upward trend in 2003 and 2004. As regards maize output, following a virtually constant period from 1961 to 1974, a slight upward trend is observed from 1975 to 1985. A relatively high and volatile increase occurred after 1985 until 2004. The 1975-1994 period shows a steady decrease in maize area and a continuing increase (sometimes slight, sometimes relatively high) in maize output. Both of these developments together indicate a period (between 1975 and 1994) of increasing production quantities with decreasing production areas. Obviously, this can only happen as the result of high increases in yields. Indeed, the annual growth rate estimates (Table 6.6) reveal this fact for that period. During the 1975-1993 period, the 5.2% annual growth rate for yield is statistically significant. The first and last periods also registered yield increases. In the first period (1961-1974), maize yield increased by 2.5% per annum while in the last period (1994-2004) it increased by 2.1% per annum. The annual growth rate of the last period is lower than the first period since the last period has been accompanied by increasing production areas. During the whole period from 1961 to 2004, the maize yield increased by about 3.3% per annum. An increase of approximately 100% was recorded from period 1 to period 2 and 30% from period 2 to period 3. From period 1 to period 3, an impressive growth rate of about 161% was recorded.

The relatively high CV (coefficient of variation) values indicate a higher volatility in maize yield compared to other cereal products. The CV value of maize yields is highest for the second period, which is also the time span with the highest annual growth rates. This implies sharp changes and variations for this impressive period.

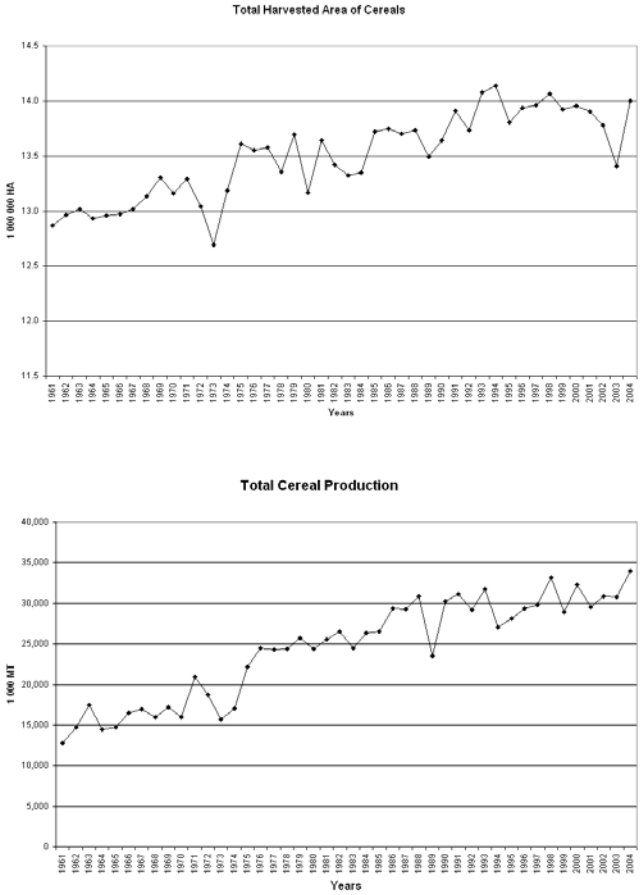
The development in the production and yield of maize is a perfect example of the technological changes on the supply side. In the 1960s and 1970s, maize was produced basically for home consumption and its use for commercial feed was limited. Access to hybrid and composite seed varieties through a project supported by CIMMYT (International Maize and Wheat Improvement Center) at the beginning of the 1980s increased the yield, hence the increase in output without any significant expansion in area. The market for maize developed further towards the end of the 1990s with the domestic production of high-fructose corn syrup (known as isoglucose in the EU).

The last major cereal product is (paddy) rice with an area of 0.09 million hectares (Figure 6.1) and an output of 0.4 million tonnes per year (Figure 6.2) in 2004. We

can see from Figure 6.1 and 6.2 that the harvested (paddy) rice area was about 0.06 million hectares and the output was about 0.25 million tonnes in 1961. The harvested area increased to about 0.09 million hectares and output increased to about 0.4 million tonnes in 2004. We observe a relatively stationary period for (paddy) rice production between 1961 and 1993; however, a strong upward trend can be seen after 1993. This situation is also revealed in the relatively high annual growth rate estimates for the period from 1993 to 2004 (Table 6.6). This last period registered an annual growth rate of about 2% per annum, although the annual growth rate for the first and second periods (1961-1978 and 1979-1992) was 1.1% and 0.8% respectively. Again, without separating the periods, if we look at the entire period, estimation results point to a statistically significant annual growth rate of about 0.8%. Note, however, that period-based analysis is important since it allows us to determine the changing structure in rice yields for the period from 1993 to 2004.

The trends regarding the total harvested cereal area and total cereal output over the past 40 years are presented in Figures 6.4A and 6.4B. In 1961, the total cereal area was about 12.8 million hectares while in 2004 this figure increased to about 14 million hectares. The pattern is similar in terms of total cereal production, which increased from 12.5 million tonnes in 1961 to about 34 million tonnes in 2004.

Figure 6.4A, 6.4B - Total harvested areas and cereal product outputs (1961-2004)



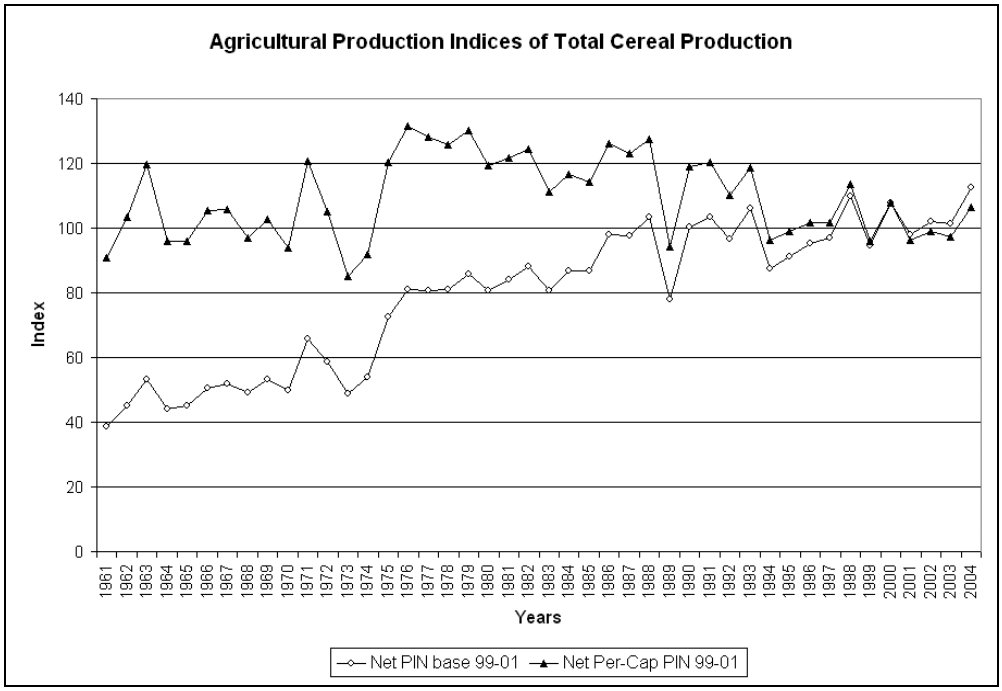
Note: The "Cereal" aggregate represents the sum of wheat, rice (paddy), barley, maize, rye, oats, millet, canary seed, and mixed grain products.

Source: FAOSTAT, 2005a.

This behaviour in total cereal production can also be observed in the FAO agricultural production indices (Figure 6.5). However, the FAO per capita production index reveals that there is not much change in total agricultural production in per capita terms. The per capita production index oscillates between the values of 130 and 90. Another interesting finding is that the 1963 total per capita cereal production index value is about 8% higher than that of 2004. The per capita index value shows different behaviour for the years from 1975 to 1988; for this period the index oscillates around the value of 120. Accordingly, for the same

period, the increase in the total production index seems to be relatively high compared to the time span before and after this period.

Figure 6.5 - Total cereal production indices (1961-2004)



The indices presented here are only "net" FAOSTAT indices, total (Net Pin base 99-01) and per capita (Net Per-Cap PIN 99-01), i.e. those based on production minus the amounts used for feed and seed.

Source: FAOSTAT data, 2005.

Table 6.7 gives two different cereal yield forecasts for 2010 and 2015. The first column of the table reports the 2004 cereal yield levels. The Projection 1 forecasts given in the third and fourth columns are obtained from the OLS estimation of equation 1) using the corresponding last periods (period III definitions can be found in Note 1 just below Table 6.6). The Projection 2 forecasts given in the fifth and last columns are obtained from the OLS estimation of the same equation, but this time using the whole sample (1961-2004). In our opinion, although the sample size is smaller, Projection 1 is more realistic, since it takes only the last period into account. It can be seen in Table 6.7 that, with the exception of (paddy) rice, Projection 1 forecasts are relatively low compared to those of Projection 2, since in the last few years Turkey's performance in increasing cereal yields has not been particularly good. However, if Turkey could perform in the future as well as it did in

the 1960s, 1970s and early 1980s, Projection 2 forecasts could also be obtained. Note that, for the time being, this is fairly unlikely.

Table 6.7 – Yield projections for cereal products

	Actual yield (tonnes/ha)	Projection 1: from Period III		Projection 2: from 1961-2004	
	2004	**2010**	**2015**	**2010**	**2015**
Wheat	2.23	2.41	2.60	2.71	2.96
Barley	2.57	2.71	2.95	2.78	3.02
Maize	4.29	5.16	5.73	6.45	7.59
Rice	5.00	6.57	7.24	5.82	6.06
Other cereals	1.53	1.73	1.81	1.81	1.90

Source: FAOSTAT, 2005a and authors' own calculations.

6.3.2 - Regional specialisation and differences

The regional specialisations and differences for cereal production in Turkey are presented using NUTS-1 regional definitions. Table 6.8 reports the regional data for wheat, barley, maize, (paddy) rice, and the "other cereals" composite product.

Table 6.8 - Distribution of cereal harvested areas, production and yields (2002)

	Wheat			**Barley**			**Maize**		
	Area	**Prod.**	**Yield**	**Area**	**Prod.**	**Yield**	**Area**	**Prod.**	**Yield**
NUTS1[a]	**(ha)**	**(tonnes)**	**(t/ha)**	**(ha)**	**(tonnes)**	**(t/ha)**	**(ha)**	**(tonnes)**	**(t/ha)**
TR1	40 537	132 398	3.266	10 383	35 742	3.442	851	2 116	2.486
TR2	797 659	2 181 858	2.735	97 513	296 605	3.042	12 307	62 099	5.046
TR3	739 869	1 663 290	2.248	409 183	1 086 328	2.655	52 945	268 737	5.076
TR4	453 043	1 066 227	2.353	180 280	458 527	2.543	77 034	424 097	5.505
TR5	1 343 619	2 795 112	2.080	703 934	1 666 664	2.368	6 849	45 211	6.601
TR6	1 063 673	2 856 323	2.685	185 836	530 030	2.852	202 821	1 384 942	6.828
TR7	1 439 388	2 353 848	1.635	517 941	1 180 897	2.280	3 523	20 475	5.812
TR8	916 678	1 721 507	1.878	226 527	480 938	2.123	98 268	268 653	2.734
TR9	55 412	75 484	1.362	29 162	52 906	1.814	78 742	160 687	2.041
TRA	517 593	642 374	1.241	301 813	466 641	1.546	789	2 295	2.909
TRB	556 687	703 916	1.264	132 108	235 196	1.780	5 699	42 640	7.482
TRC	1 175 842	2 807 663	2.388	605 320	1 609 526	2.659	20 172	118 048	5.852
Turkey	9 100 000	19 000 000	2.088	3 400 000	8 100 000	2.382	560 000	2 800 000	5.000

Table 6.8 (contd.)

	Rice			Other cereals			Total cereals		
	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
NUTS1[a]	(ha)	(tonnes)	(t/ha)	(ha)	(tonnes)	(t/ha)	(ha)	(tonnes)	(t/ha)
TR1	331	1 098	3.317	5 810	15 355	2.643	57 912	186 709	3.224
TR2	37 039	126 970	3.428	25 617	62 339	2.434	970 135	2 729 871	2.814
TR3	0	0	0.000	13 981	25 991	1.859	1 215 978	3 044 346	2.504
TR4	1 078	3 682	3.416	38 064	82 639	2.171	749 499	2 035 172	2.715
TR5	189	606	3.206	61 570	106 815	1.735	2 116 161	4 614 408	2.181
TR6	1 543	2 511	1.627	13 526	27 489	2.032	1 467 399	4 801 295	3.272
TR7	19	52	2.737	75 822	138 430	1.826	2 036 693	3 693 702	1.814
TR8	22 202	83 921	3.780	24 313	33 857	1.393	1 287 988	2 588 876	2.010
TR9	137	336	2.453	7 154	9 272	1.296	170 607	298 685	1.751
TRA	27	24	0.889	19 664	29 338	1.492	839 886	1 140 672	1.358
TRB	352	639	1.815	1 681	2 196	1.306	696 527	984 587	1.414
TRC	2 083	3 361	1.614	1 398	1 079	0.772	1 804 815	4 539 677	2.515
Turkey	65 000	223 200	3.434	288 600	534 800	1.853	13 413 600	30 658 000	2.286

[a] TR1 region is Istanbul. Agricultural production in Istanbul is negligible. Istanbul is included in the total in both this and the following tables.

Source: SIS, 2005.

Wheat:
Wheat production is concentrated in the TR6 (Mediterranean), TRC (South-East Anatolia), TR5 (West Anatolia), TR7 (Central Anatolia) and TR2 (West Marmara) regions with production shares of 15.0, 14.8, 14.7, 12.4 and 11.5% respectively (Table 6.9). The highest yield, 2.74 tonnes per hectare, was achieved in the TR2 (West Marmara) region. The Eastern Black Sea region, denoted by TR9, has the lowest share in total wheat production with 0.4%. The lowest yields are observed in TRA North-East Anatolia), TRB (East-Central Anatolia) and TR9 (Eastern Black Sea) regions ranging from 1.24 tonnes per hectare to 1.36 tonnes per hectare. For the sake of comparison, note that Turkey's average wheat yield is about 2 tonnes per hectare (Figure 6.3).
Central Anatolia has the highest wheat area with 1.44 million hectares, followed by West Anatolia (1.34 million hectares) and the South-East Anatolia Region (1.18 million hectares).

Barley:
Regarding barley production, Table 6.8 reports that barley production is basically concentrated in the TR5 (West Anatolia), TRC (South-East Anatolia), TR7 (Central Anatolia) and TR3 (Aegean) regions with production shares of 20.6%, 19.9%, 14.6% and 13.6% respectively. The regions with highest barley yields are TR2 (West Marmara), TR6 (Mediterranean), TRC (South-East Anatolia) and TR3 (Aegean) with 3.04, 2.86, 2.66, and 2.66 tonnes per hectare respectively. The lowest barley yields are observed basically in the TRA (North-East Anatolia) region with 1.55 and in the TRB (East-Central Anatolia) region with 1.78 tonnes per hectare. For

comparison, note here that Turkey's average barley yield is approximately 2.4 tonnes per hectare (Figure 6.3).

In terms of harvested barley area, the leading region is TR5 (West Anatolia) with 0.7 million hectares, followed by South-East Anatolia with 0.6 million hectares, and the last region with an area of over 0.5 million hectares is Central Anatolia with 0.52 million hectares.

Table 6.9 - Regional shares (%) in production (2003)

	Shares (%)					
NUTS1	**Wheat**	**Barley**	**Maize**	**Rice**	**Other cereals**	**Total cereals**
TR1	0.7	0.4	0.1	0.5	2.9	**0.6**
TR2	11.5	3.7	2.2	56.9	11.7	**8.9**
TR3	8.8	13.4	9.6	0.0	4.9	**9.9**
TR4	5.6	5.7	15.1	1.6	15.5	**6.6**
TR5	14.7	20.6	1.6	0.3	20.0	**15.1**
TR6	15.0	6.5	49.5	1.1	5.1	**15.7**
TR7	12.4	14.6	0.7	0.0	25.9	**12.0**
TR8	9.1	5.9	9.6	37.6	6.3	**8.4**
TR9	0.4	0.7	5.7	0.2	1.7	**1.0**
TRA	3.4	5.8	0.1	0.0	5.5	**3.7**
TRB	3.7	2.9	1.5	0.3	0.4	**3.2**
TRC	14.8	19.9	4.2	1.5	0.2	**14.8**
Turkey	100.0	100.0	100.0	100.0	100.0	**100.0**

Source: SIS, 2005.

Maize:
As for maize, the main production region is clearly TR6 (Mediterranean) with a production share of about 49.5%, followed by TR4 (East Marmara), which is the second main producer of maize, supplying 15.1% of total Turkish maize production. The TR3 (Aegean) and TR8 (Western Black Sea) regions can be defined as two medium producers with equal production shares of 9.6%.
With regard to yields, the highest maize yield is observed in TRB (East-Central Anatolia) with 7.48 tonnes per hectare; note, however, that this high figure could result from the region's low production level accounting for only 1.5% of total Turkish maize production. The second highest yield is observed in the TR6 (Mediterranean) region with 6.83 tonnes per hectare in addition to its leadership in maize production, supplying half of Turkey's total output. It must be noted that maize in the Mediterranean Region is produced under irrigated conditions, mostly as a second crop following wheat. For comparison, note that Turkey's average maize yield is 5 tonnes per hectare. With regard to total area, the Mediterranean region is again the leader with 0.2 million hectares accounting for 36% of the total harvested maize area in Turkey. We must thus point out that the Mediterranean region is clearly the leader in terms of area, production and yield.

Rice:
As with maize production, rice production is concentrated in two regions, namely TR2 (West Marmara) with a production share of 57% and TR8 (Western Black Sea) supplying 38% of Turkey's total rice production. These two regions together produce about 95% of total rice output. Quite impressively, the highest yields are also observed in these regions. The Western Black Sea region, denoted by TR8 in Table 6.8, produces a yield of 3.8 tonnes per hectare and the TR2 (West Marmara) region's average yield is recorded as 3.4 tonnes per hectare. For comparison, note that Turkey's average rice yield is about 3.4 tonnes per hectare.

Other Cereals:
The regional data for the "other cereals" aggregate consisting of spelt, rye, oats, mixed grain, millet and canary seed are presented in Table 6.8. The Central Anatolia Region (TR7) has the highest production with 138 430 tonnes. Further details on the components of "other cereals" can be found in the Tables from A6.1 to A6.6 in the Appendix.

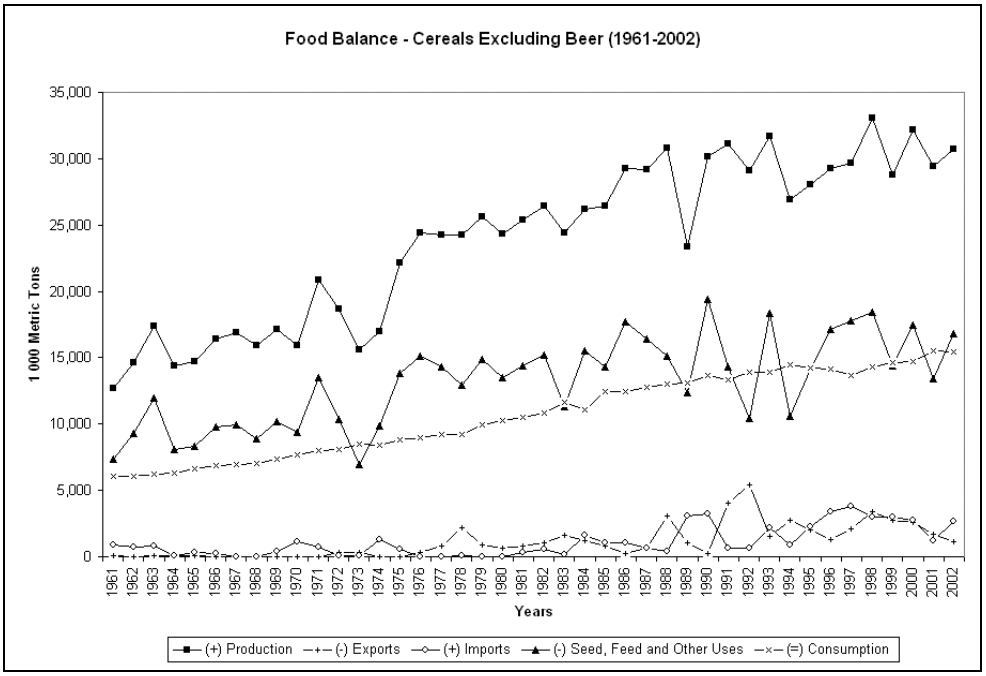
Total Cereals:
If we analyse the production of the total cereals aggregate according to regional distribution we see that the TR6 (Mediterranean) region supplies 15.7% of total production with the highest average yield of about 3.27 tonnes per hectare (Table 6.8). TR5 (West Anatolia) produces 15.1% of the total cereal output with an average yield of about 2.18 tonnes per hectare. South-East Anatolia comes third in rank in terms of production level with a share of 14.8 %, and TR7 (Central Anatolia) comes fourth in production with a share of 12.0%.

6.3.3 – Consumption

Figure 6.6 reports the food balance for cereals excluding beer for Turkey from 1961 to 2002. The food balance is, in fact, simply the result of the following equation:

(2) Production – Export + Import – Seed, Feed and Other Uses = Consumption

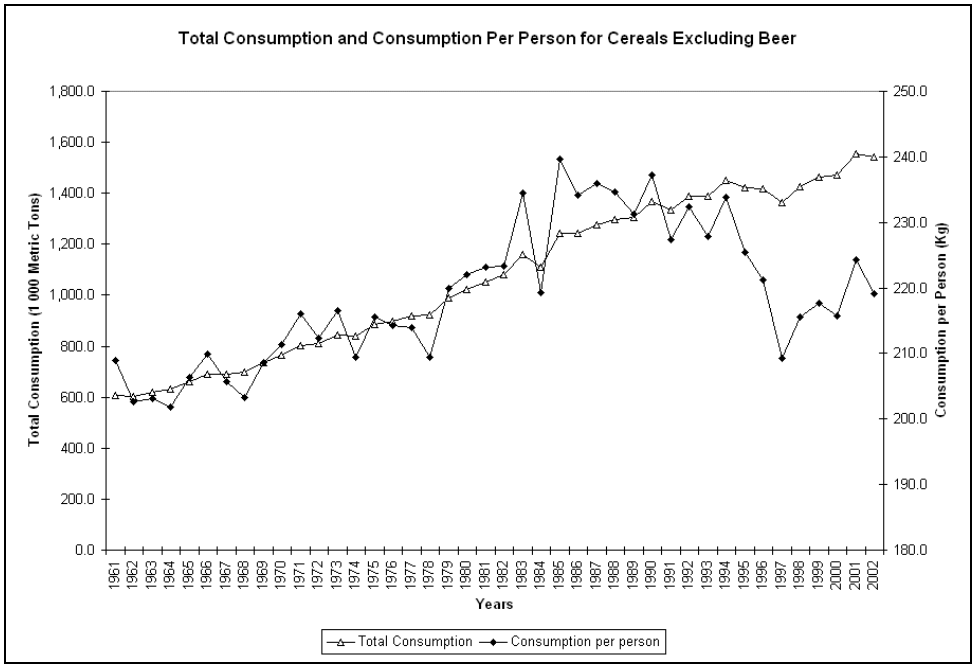
Figure 6.6 - Food balance for cereals excluding beer (1961-2002)



Source: FAOSTAT, 2005a.

In the above figure we see the behavioural pattern of Turkish cereal consumption over the past 40 years. The upward trend in total consumption is clear from the graph. However, it can be misleading to look only at total figures since in this case we do not take into account the population increase over the past 40 years. Indeed, if we plot the total cereal consumption and cereal consumption per person together we see that the consumption per person has not followed the same behavioural pattern as total consumption. Quite the contrary, after 1985 we observe that there is a decrease in total cereal consumption per person, although the variation from year to year is quite high.

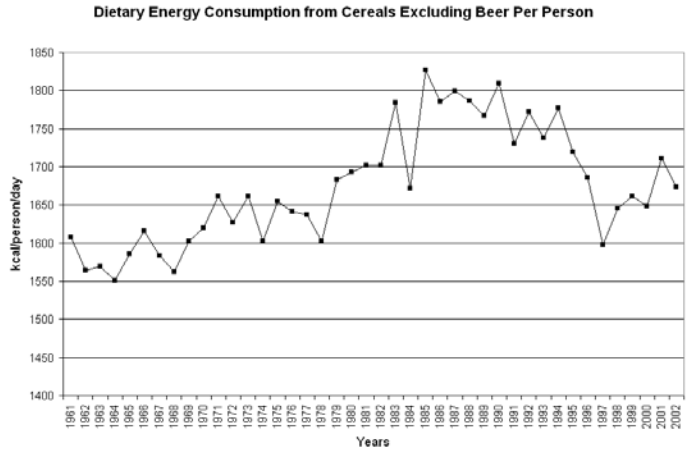
Figure 6.7 - Total cereal consumption and consumption per caput (1961-2002)

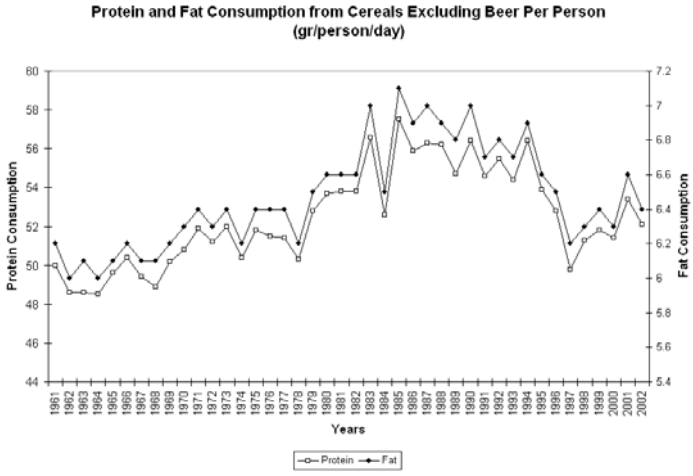


Source: FAOSTAT, 2005a.

The increasing pattern of consumption per person until 1986 and then the downward trend with wide variations after 1986 can also be seen from the data on per capita dietary energy consumption from cereals presented in Figure 6.8A and from the data on per capita protein and fat consumption (from cereals) plotted in Figure 6.8B.

Figure 6.8A, 6.8B - Per capita dietary energy consumption from cereals, and protein and fat consumption from cereals





Source: FAOSTAT, 2005a.

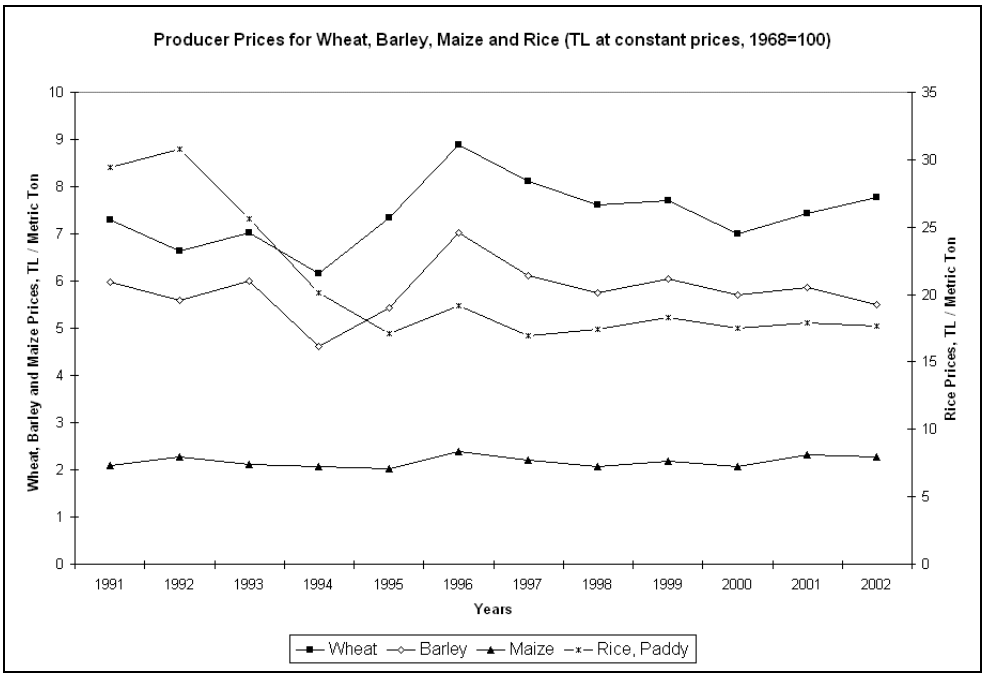
6.4 – Prices and comparative support to cereals

6.4.1 - Development in prices and relative price structure

Figure 6.9 and Table 6.10 report the producer prices for wheat, barley, maize and (paddy) rice at constant TL prices (1968=100) and in US$, respectively.

With the exception of rice, the real producer prices of the major cereals do not exhibit any drastic changes. As is indicated in the second section, the WTO ceiling commitment and the applied tariff on rice is rather low compared to other cereals. The producer price of rice displayed a drop of almost 40% with the implementation of the WTO Agreement on Agriculture.

Figure 6.9 – Producer prices for cereals (TL at constant prices)



Source: FAOSTAT, 2005a.

Wheat and barley prices moved together and the maize price was stable during the period under review. The fluctuations in real prices and in US dollars are similar except in the crisis years in 1994 and 2001, where the dollar prices registered significant drops.

Table 6.10 - Producer prices for cereals ($/metric tonne)

Years	Wheat	Barley	Maize	Rice, paddy
1991	163	133	164	657
1992	167	140	200	771
1993	180	153	190	655
1994	132	99	156	432
1995	190	141	183	444
1996	224	177	209	483
1997	202	152	192	421
1998	193	146	184	442
1999	170	134	169	405
2000	159	130	164	398
2001	126	100	137	304
2002	164	116	167	371

Source: FAOSTAT, 2005a.

As will be explained below, almost all cereal price support is achieved through border measures, which are generally accompanied by intervention purchases by the government.

6.4.2 - Transfers to agriculture and cereals

The contribution of agricultural policies to farmers' incomes increased almost threefold, from US$3.4 billion to US$11.6 billion from the late 1980s to 2004 (Table 6.11). The general effects of the ARIP are noticed with a significant decline in support to agriculture in 2001. State intervention in the output markets was severely restricted in 2001, and the implementation of direct income support was delayed. The domestic market has been adjusting fast. The market price support provided by the border measures picked up again in 2002 with significant increase in intervention purchases in 2003 and 2004.

Table 6.11 - Producer support and transfer to agriculture in Turkey (million US$)

	1986-89	1996-99	2000	2001	2002	2003	2004[e]
Producer Support Estimate	3 408	7 927	6 989	829	5 614	10 846	11 635
Market Price Support	2 423	5 685	5 857	131	4 079	8 655	9 037
Total Support Estimate	3 818	11 181	10 715	3 987	7 642	11 750	12 063

Note: [e] provisional estimate.

Source: OECD (2005).

Another category in the total transfers is the General Services Support Estimate (GSSE) which consists of private or public general services provided to agriculture in general and not to individual farms. To put it simply, it is just the difference between the total transfers and the Producer Support Estimate (PSE). The most important item in this category is the financial cost of the intervention agencies. The burden of the mismanagement before 2000 played an important role in the total transfers following the start of the structural adjustment policies. Historical costs of intervention agencies accounted for significant shares in the total support estimate in 2001 and 2002.

The financial cost of the intervention agencies can easily be seen in Table 6.12. The shares of the transfers to the relevant state economic enterprises in total transfers increased from 5% in 1986-89 to 77% in 2001; this was followed by a drastic decline in 2004.

Table 6.12 - Indicators of transfers to agriculture (%)

	1986-89	1996-99	2000	2001	2002	2003	2004 [e]
TSE/GDP	4.2	5.9	5.4	2.7	4.2	4.9	4.0
Percent PSE	16.9	22.3	21.4	3.8	20.4	28.5	26.6
Percent CSE	-16.7	-20.5	-22.5	-1.7	-17.4	-26.3	-22.2
GSSE/TSE	10.6	29.2	34.8	79.2	26.5	7.7	3.5
R&D/TSE	1.5	0.4	0.2	0.7	0.4	0.3	0.2
Transfers to SEEs (million $)[a]	188	3 088	3 605	3 054	1 909	772	272
Transfers to SEEs/TSE	4.6	27.5	33.6	76.6	25.0	6.6	2.3

Notes: [a] Duty losses and capital injections to TMO, TŞFAŞ, TEKEL, ÇAYKUR and transfers to ASCUs.
[e] provisional estimate.

Source: OECD (2005).

The share of total support in GDP increased from 4.2% to almost 6% from the late 1980s to the late 1990s. It decreased to 4% in 2004, which is still high in the OECD countries. The Percent Consumer Support Estimate (CSE) indicates that the major source of transfer to agriculture is consumers, who are taxed through distorted domestic prices. About four-fifths of the supports to producers are achieved through market price support (Table 6.13); the remainder falls on the taxpayer. The major item in budgetary support has changed from input subsidies to direct income payments.

Table 6.13 - Types of producer support (%)

Type of Support	1986-89	1996-99	2000	2001	2002	2003	2004[e]
Market price	71	72	84	16	73	80	78
Payments based on output	0	2	5	55	3	2	3
Payments based on area	0	0	0	0	0	0	0
Payments on hist. entitlement[a]	0	0	0	8	22	17	18
Payments based on input use	29	26	11	21	2	1	2
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Note: [a] Including the DIS payments. [e] provisional estimate.

Source: OECD (2005).

Commodity-based producer support estimates are reported in % in Table 6.14. Following the drastic decreases in support to producers in 2001 due to the launching of the project to reform the agricultural support system coupled with the serious economic crisis, support to farmers seems to be picking up again in recent years. Recovery in non-cereal commodities is faster than in cereals. The % PSEs for sugar and beef are back to more than twice as high as the average for all commodities.

The Percent PSEs for cereals show different trends. Support to barley is back to the levels recorded in the 1990s. Support to wheat has started to fluctuate more in the recent past, whereas support to maize recovered faster reaching its peak of the last two decades. The main reason for the increasing support to maize farmers is the government's tendency to resort to import substitution. With the expanding needs of the feed industry coupled with isoglucose production, maize imports amounted to some 1.5 million tonnes in 2004.

Table 6.14 – Commodity-based PSEs, 1986-2004 (%)

	1986-89	1996-99	2000	2001	2002	2003	2004[e]
Wheat	35	29	23	-4	13	39	16
Maize	21	36	32	7	16	38	43
Barley	25	39	27	5	5	23	27
Other grains	25	39	27	5	5	23	27
Oilseeds	21	39	42	27	11	25	23
Sugar	18	53	56	30	49	61	63
Beef and veal	13	47	54	44	53	61	53
Milk	53	49	43	-2	34	35	34
Sheep meat	14	14	21	-18	7	12	4
Poultry	24	27	30	15	28	24	41
Eggs	19	29	35	23	22	2	37
All commodities	**17**	**22**	**21**	**4**	**20**	**29**	**27**

Note: [e] provisional estimate.

Source: OECD (2005).

The shares of market price support in commodity-specific support to farmers for cereals are presented in Table 6.15. Almost all of the support to cereal farmers is achieved through the distortionary output price supports.

Table 6.15 - Share of market price support in PSE for cereals, 1986-2004 (%)

	1986-89	1996-99	2000	2001	2002	2003	2004[e]
Wheat	53	59	73	n.a.	95	99	97
Maize	58	72	86	88	98	100	100
Barley	n.a.	73	82	75	95	100	100
All commodities	**71**	**72**	**84**	**16**	**73**	**80**	**78**

Note: [e] provisional estimate; n.a. not applicable (PSE are negative in at least one year of the period).

Source: OECD (2005).

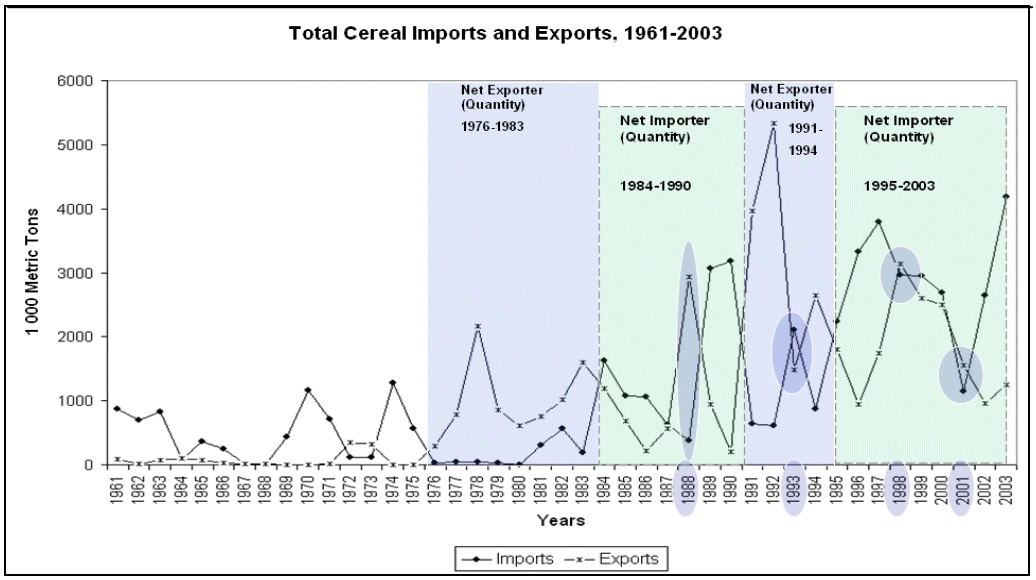
6.5 – Trade in cereals

In this section we shall first review Turkey's overall cereal trade flow and then in the following sub-section we shall analyse commodity-specific trade in greater detail.

6.5.1 - Overall trade in cereals

Looking at the last 30 years in Figure 6.10, after 1976, one basically observes four periods for Turkey's cereal trade with several exceptional years. These four periods are marked in Figure 6.10 by dark areas. The first period can be defined as the period between 1976 and 1983. In this period, Turkey appears as a net exporter of total cereal products. However, from 1984 onwards, consistent with the economic liberalisation waves taking place in the country, Turkey switched to a net cereal importer position until 1990 with the exception of 1988. The years between 1991 and 1994 represent a short net exporter period for Turkey except for 1993. In the following period from 1995 to 2003, with the exception of 1998 and 2001, Turkey switched again from net exporter to net importer of cereal products.

Figure 6.10 - Total cereal imports and exports (1 000 metric tonnes)



Source: FAOSTAT, 2005a.

Table 6.16 - Cereal import and export shares by country groups (shares of quantity, %)

	IMPORTS				EXPORTS			
Years	EU10	EU15	EU	ROW	EU10	EU15	EU	ROW
1991	0.8	64.5	65.3	34.7	4.6	3.5	8.1	91.9
1992	1.4	26.9	28.3	71.7	1.3	1.9	3.2	96.8
1993	2.2	40.6	42.8	57.2	3.1	0.9	4.0	96.0
1994	6.6	53.5	60.1	39.9	2.1	3.8	5.9	94.1
1995	17.0	23.9	40.9	59.1	5.0	4.6	9.6	90.4
1996	10.0	24.3	34.3	65.7	4.7	5.5	10.2	89.8
1997	2.9	21.2	24.1	75.9	16.4	1.4	17.8	82.2
1998	24.2	12.6	36.8	63.2	1.0	2.8	3.8	96.2
1999	11.7	20.9	32.7	67.3	1.1	5.6	6.7	93.3
2000	4.1	16.0	20.1	79.9	2.4	18.5	20.9	79.1
2001	7.9	11.6	19.5	80.5	0.7	13.0	13.7	86.3
2002	29.8	10.2	39.9	60.1	1.3	24.6	25.9	74.1

Note: EU=EU10+EU15.

Source: FAOSTAT, 2005b.

Cereal import and export shares by country groups monitored are summarised in Table 6.16. Note that EU10 represents the new members of the EU; EU thus

denotes the sum of EU10 and EU15. In terms of imports, the first important finding is the sharp increase in the share of EU10 within the EU aggregate with some wide deviations. The EU10 countries' share of total EU cereal import share rose from 0.8% in 1991 to 29.8 % in 2002. In other words, in 2002, 29.8% of the total 39.9% EU cereal import share was the result of EU10 countries, yet this figure was only 0.8% in 1991, which was quite insignificant. This is an important change. There is a steady decrease in EU15's share within total EU cereal imports to Turkey after 1991.

If we take the 1991-2002 period average, EU cereal imports account for approximately 37% of Turkey's total cereal imports, leaving a 63% share for the rest of the world (ROW). However, after 1995, a decrease in imports from the EU is observed; accordingly, if we take the 1995-2002 period average, EU cereal imports account for about 31% of Turkey's total cereal imports.

Having investigated the general trend, now let us turn to the top five export and import partners of Turkey in the cereal trade in the 1990-1992 and 2000-2002 periods. According to the 1990-1992 averages, the biggest cereal exporter to Turkey was France with close to 301 000 tonnes and about 50 million US$, the second was Argentina with about 190 000 tonnes and close to 36 million US$, the third was Namibia with close to 80 000 tonnes and about 11.5 million US$, the fourth was Spain with about 41 500 tonnes and 5.7 million US$, and the fifth was Romania with about 40 000 tonnes and 7 million US$. When we investigate the 2000-2002 averages, we see that the US replaced France to become Turkey's largest cereal exporter with about 877 000 tonnes and 111 million US$, the second largest exporter was Germany (replacing Argentina) with close to 211 000 tonnes and about 30 million US$, the third was Slovenia (replacing Namibia) with about 164 000 tonnes and close to 19 million US$, the fourth was Hungary (replacing Spain) with about 149 000 tonnes and 17.5 million US$, and the fifth was Serbia and Montenegro (replacing Romania) with close to 136 000 tonnes and 18 million US$.

Regarding exports, from Table 6.16, a gradual increase in Turkey's total cereal exports to the EU is observed with some wide fluctuations. The EU's 8.1% share within Turkey's total cereal exports climbed to 25.9% in 2002 leading to a corresponding decrease in the share of the rest of the world from 91.9% to 74.1% in 2002. Note, however, that due to wide variations the overall period average is 10.8% for the EU and 89.2% for the rest of the world. In conclusion, although one can say that Turkish cereal exports to the EU increased after 1995, the main trade partner of Turkey in terms of Turkish cereal exports are not EU countries. According to the 2000-2002 average cereal export figures, Tunisia is the biggest importer of Turkish cereals with about 255 000 tonnes; the second is Bangladesh with close to 169 000 tonnes; the third is Egypt with 154 000 tonnes; the fourth is Ukraine with 125 000 tonnes, and the fifth is Italy with close to 124 000 tonnes.

Table 6.17 - Turkey's total cereal trade

	TURKEY'S TOTAL CEREAL IMPORTS							
	TONNES		SHARES		1 000 US$		SHARES	
FROM	1990-1992	2000-2002	1990-1992	2000-2002	1990-1992	2000-2002	1990-1992	2000-2002
EU25	433 337	593 104	*50.9*	*28.2*	67 624	77 483	*49.2*	*28.2*
Argentina	190 222	101 005	*22.4*	*4.8*	35 734	14 781	*26.0*	*5.4*
Australia		104 576	*0.0*	*5.0*		17 512	*0.0*	*6.4*
Canada	30 588	32 714	*3.6*	*1.6*	4 264	4 911	*3.1*	*1.8*
USA		877 270	*0.0*	*41.7*		111 041	*0.0*	*40.5*
ROW	196 465	394 006	*23.1*	*18.7*	29 769	48 715	*21.7*	*17.8*
TOTAL	**850 612**	**2 102 676**	***100.0***	***100.0***	**137 391**	**274 443**	***100.0***	***100.0***

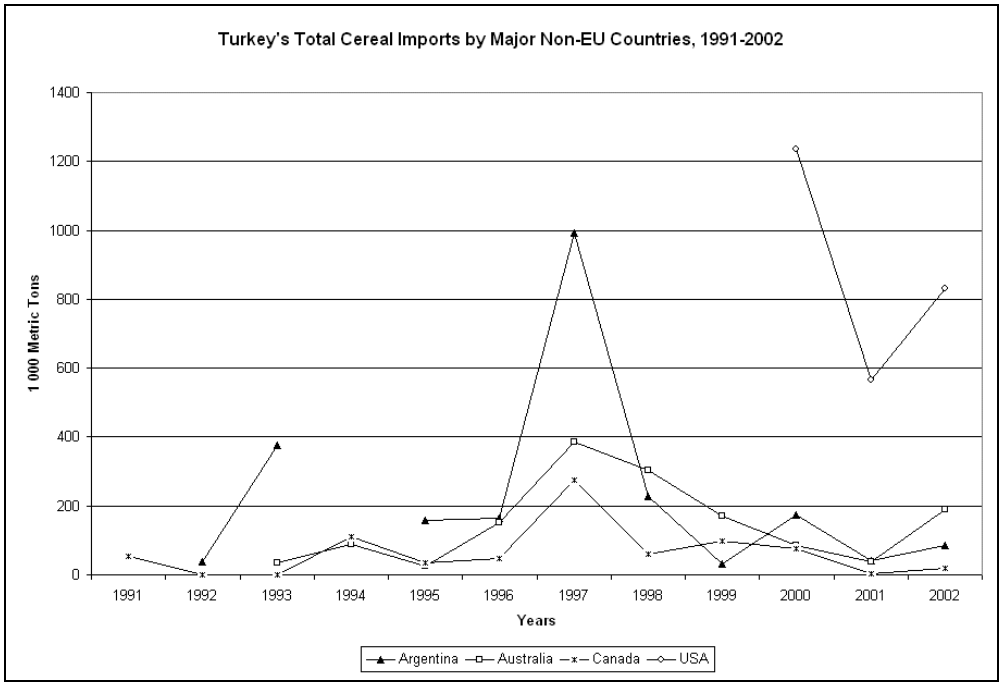
	TURKEY'S TOTAL CEREAL EXPORTS							
	TONNES		SHARES		1 000 US$		SHARES	
TO	1990-1992	2000-2002	1990-1992	2000-2002	1990-1992	2000-2002	1990-1992	2000-2002
EU25	114 062	251 614	*5.7*	*19.3*	16 973	36 685	*9.7*	*24.0*
Argentina			*0.0*	*0.0*			*0.0*	*0.0*
Australia		1	*0.0*	*0.0*		0	*0.0*	*0.0*
Canada	1	4	*0.0*	*0.0*	0	2	*0.0*	*0.0*
USA		21	*0.0*	*0.0*		45	*0.0*	*0.0*
ROW	1 900 647	1 049 663	*94.3*	*80.7*	157 919	116 278	*90.3*	*76.0*
TOTAL	**2 014 709**	**1 301 303**	***100.0***	***100.0***	**174 892**	**153 009**	***100.0***	***100.0***

Source: FAOSTAT, 2005b.

We should consult Table 6.17 in order to analyse the situations of some important trade partners of Turkey which are non-EU countries. In terms of quantity imported, according to the 1990-1992 averages, the biggest share was achieved by the EU with 50.9%, followed by ROW with 23.1% and, third, Argentina with 22.4%. However, if we look at the 2000-2002 averages, we do not observe a similar trade flow pattern since Argentina's share falls drastically to 4.8% and the US share increases sharply from zero to 41.7%. In addition, the Australian share rises from zero to 5% (in 1990-1992), and the shares of ROW countries drop from 23.1% to 18.7%. The sum of Argentina, Australia, Canada and the US amounts to a share of 53.1% in the 2000-2002 period, although their share was only 33.7% in 1990-1992. In addition to these developments, the EU share drops from 50.9% in 1990-1992 to 28.2% in 2000-2002. Another important finding from Table 6.17 is the large increase in the amount of Turkey's total cereal imports from 0.85 million tonnes to 2.1 million tonnes. These quantities correspond to a total cereal import volume of 137 million US$ in 1990-1992 and 274 million US$ in 2000-2002. This situation reveals Turkey's growing cereal import market because of the insufficient increase in production coupled with the country's significant population growth. With regard to the EU, no significant change is observed in the total volume of cereal imports since the figure of 67.6 million US$ recorded in 1990-1992 increased to only 77.5 million US$ in 2000-2002 due to the considerable decline in the US share within Turkey's total cereal imports.

Figures 6.11 and 6.12 represent the time series data for Turkey's total cereal imports by major non-EU countries monitored, namely Argentina, Australia, Canada and the US. One can see from the figures that the US entered Turkey's cereal import market in 2000 and rapidly captured the main share of trade volume. Lastly, note that, in 1997, Argentina alone exported close to 1 million tonnes of cereals to Turkey with a trade volume of about 160 million US$. This situation in fact shows Argentina's trade potential as a cereal exporter to Turkey.

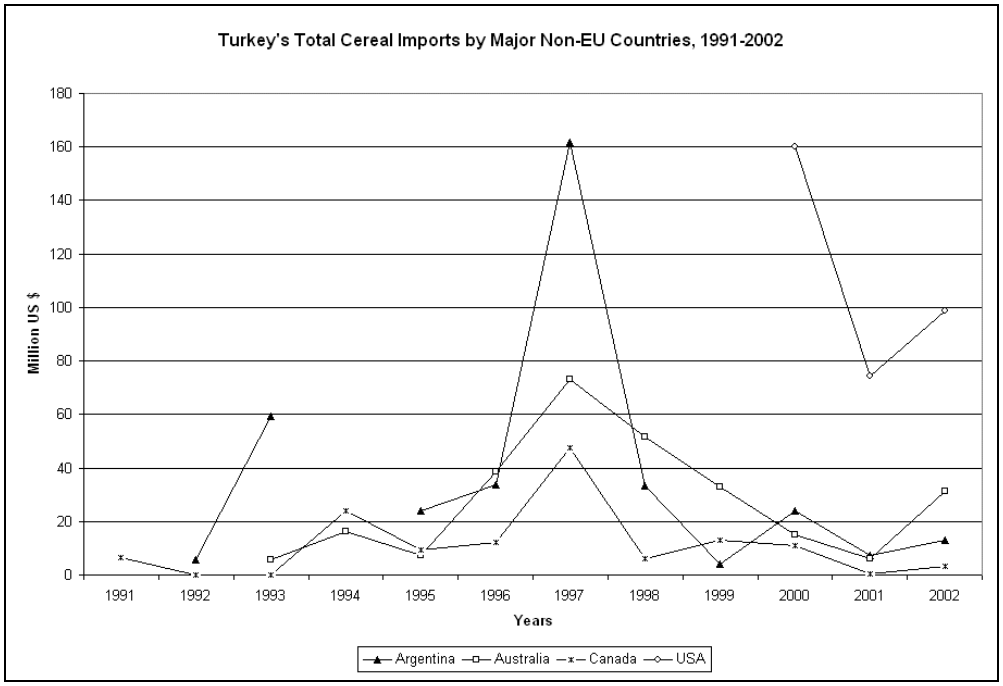
Figure 6.11 - Turkey's total cereal imports by major non-EU countries (1 000 metric tonnes)



Note: The "Cereal" aggregate represents the sum of wheat, rice (paddy), barley, maize, rye, oats, millet, canary seed, and mixed grain products.

Source: FAOSTAT, 2005b.

Figure 6.12 - Turkey's total cereal imports by major non-EU countries (million US$)



Note: The "Cereal" aggregate represents the sum of wheat, rice (paddy), barley, maize, rye, oats, millet, canary seed, and mixed grain products.

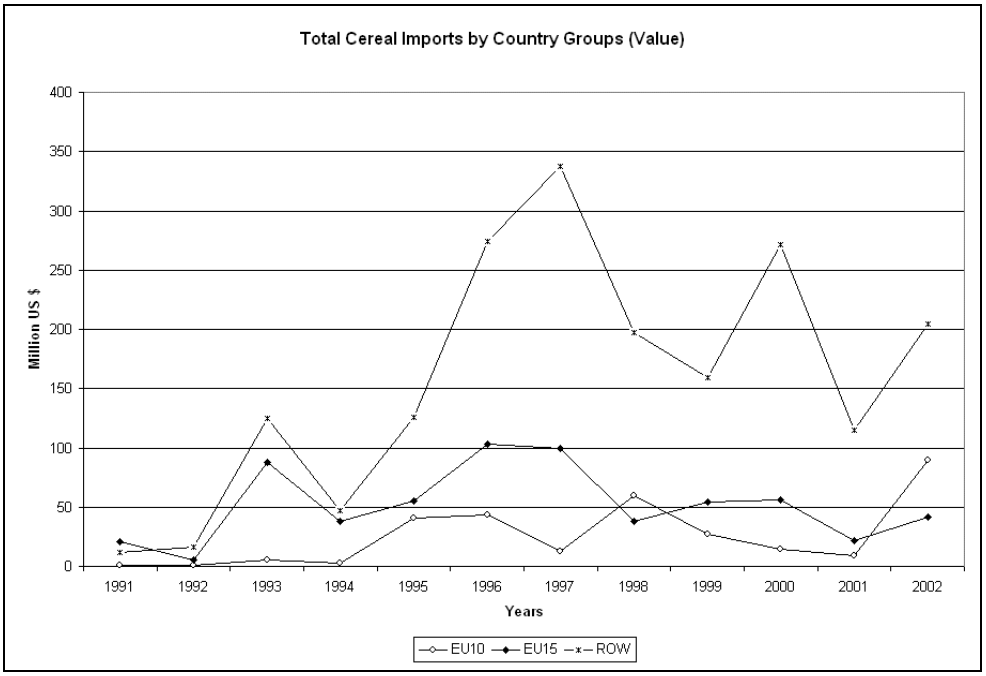
Source: FAOSTAT, 2005b.

Figures 6.13 to 6.16 summarise the flows and volumes of Turkey's cereal imports and exports by EU and ROW country groups. Note that the EU aggregate has been divided into EU10 and EU15 in order to reflect the trends for each group separately. Figure 6.13 shows that the total cereal import volume of the EU15 countries fluctuates between about 25 million US$ and 110 million US$ in the period from 1991 to 2002. The total cereal quantity imported from the EU15 countries ranges from about 250 000 tonnes to about 650 000 tonnes in this period. When we look at the EU10 countries, we see that, after the collapse of the USSR in 1992, their imports started to increase with some variations but the data shows a positive trend over the years 1993-2002. When we look at to the non-EU countries, we see that after 1995 there is a rise in their exports to Turkey. From the graph, after 1995, one can point out that Turkey's increasing cereal demand has been satisfied basically by non-EU countries rather than by EU members. This situation shows first of all the tremendous potential for trade in cereals between the EU and Turkey and, secondly, it shows the good trade performance of several non-EU countries such as

Argentina, Australia, Canada and the US. As shown in Figure 6.14, the total quantity of non-EU member countries' cereal exports to Turkey ranges from 750 000 tonnes to about 2 100 000 tonnes in the period from 1995 to 2002. From Figure 6.13, for the same period, we see that cereal import volumes from non-EU countries range from a value of about 125 million US$ to about 340 million US$.

As for Turkey's cereal exports, we see from Figure 6.15 that the EU10 countries show a negative trend over the period. The downward trend in Turkey's cereal exports to EU15 countries reversed and Turkish cereal exports started to increase particularly after 1997 with wide fluctuations. Note that the decreasing trend in Turkish cereal exports to non-EU member countries also reversed in 1997 and there was then a sharp increase in 1998 amounting to some 250 million US$ and about 2 500 000 tonnes. However, in the following years exports started to decline steadily and ended up at about 50 million US$ and 500 000 tonnes in 2002.

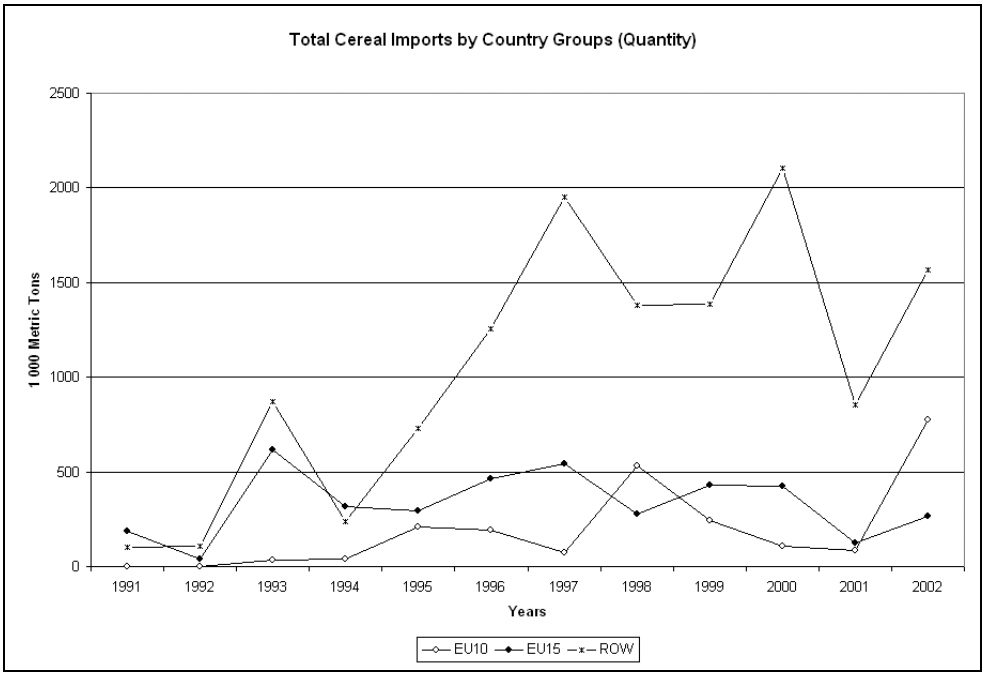
Figure 6.13 - Turkey's total cereal imports by country groups (million US$)



Note: The "Cereal" aggregate represents the sum of wheat, rice (paddy), barley, maize, rye, oats, millet, canary seed, and mixed grain products.

Source: FAOSTAT, 2005b.

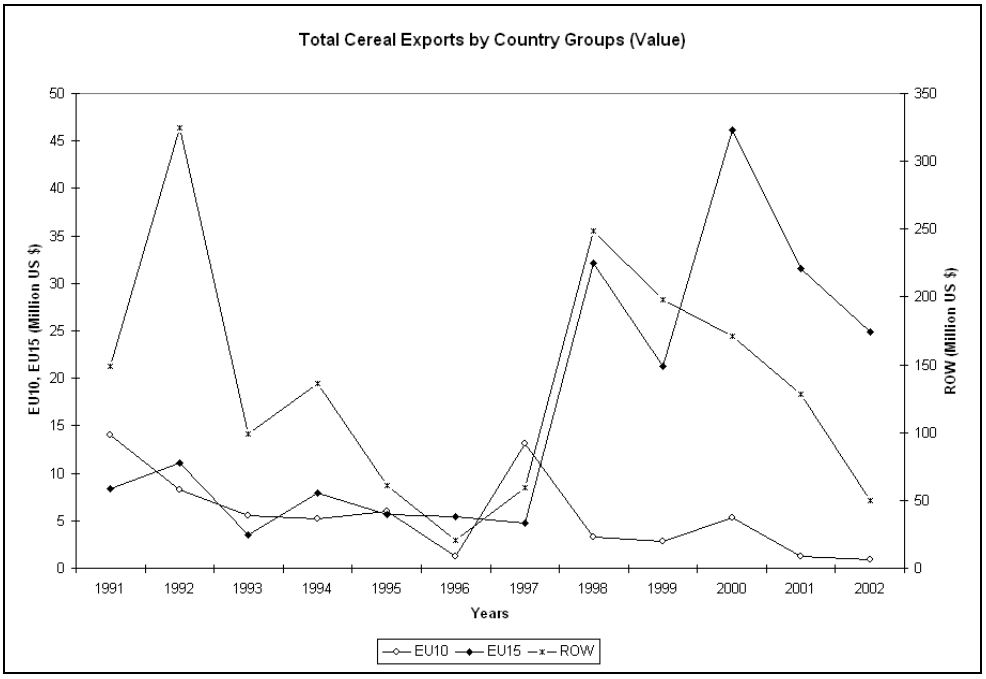
Figure 6.14 - Turkey's total cereal imports by country groups (1 000 metric tonnes)



Note: The "Cereal" aggregate represents the sum of wheat, rice (paddy), barley, maize, rye, oats, millet, canary seed, and mixed grain products.

Source: FAOSTAT, 2005b.

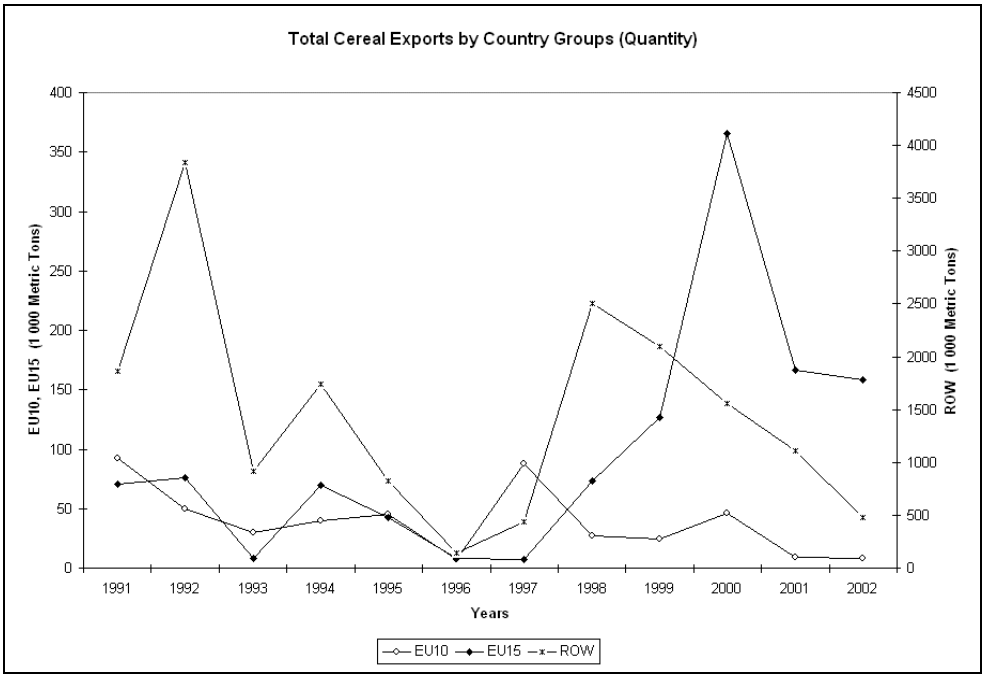
Figure 6.15 - Turkey's total cereal exports by country groups (million US$)



Note: The "Cereal" aggregate represents the sum of wheat, rice (paddy), barley, maize, rye, oats, millet, canary seed, and mixed grain products.

Source: FAOSTAT, 2005b.

Figure 6.16 - Turkey's total cereal exports by country groups (1 000 metric tonnes)



Note: The "Cereal" aggregate represents the sum of wheat, rice (paddy), barley, maize, rye, oats, millet, canary seed, and mixed grain products.

Source: FAOSTAT, 2005b.

Table 6.18 - Total cereal trade unit values for 1991-2002 (US$/ metric tonnes)

	Exports			Imports		
Years	**EU10**	**EU15**	**ROW**	**EU10**	**EU15**	**ROW**
1991	151	119	124	302	112	124
1992	166	145	151	333	124	151
1993	186	424	144	159	143	144
1994	131	112	178	66	118	178
1995	133	133	178	195	188	178
1996	179	634	219	225	221	219
1997	149	626	173	166	183	173
1998	121	441	135	113	138	135
1999	118	168	115	112	126	115
2000	114	126	129	132	132	129
2001	133	189	133	111	175	133
2002	111	157	125	115	157	125

Note1: The "Cereal" aggregate represents the sum of wheat, rice (paddy), barley, maize, rye, oats, millet, canary seed, and mixed grain products.

Source: FAOSTAT, 2005b.

Table 6.18 shows that the unit value of exports and imports did not vary as much as the volume of exports and imports, except with a drastic fall in the prices of Turkish exports to EU15 countries. The effect of this fall is reflected as a boost in exports to these countries. The unit value for exports shows a downward trend especially after 1996. The same trend, although less marked, can be observed in import prices. The average import unit prices for the 2000-2002 period are 119 US$, 155 US$ and 129 US$ for EU10, EU15 and ROW respectively. Thus, in terms of import unit prices, those of imports from the EU15 countries are highest, then comes ROW, and the cheapest import unit values are from the EU10 countries. When one examines the average export unit prices, approximately the same price pattern is observed with 119 US$, 157 US$, and 129 US$ for EU10, EU15 and ROW respectively. Note lastly the really high unit prices for exports to EU15 countries in 1993, 1996, 1997 and 1998; these high figures are interesting but could result in part from statistical mistakes in trade data.

6.5.2 - Commodity specific trade flows in cereals

Table 6.19 summarises the flow and volume of Turkey's total cereal trade for 2002. It can be seen that Turkey was a net importer of all cereal products, except barley, in 2002. The trends depicted in Figures 6.13 to 6.16 suggest that this is likely to continue.

Turkey is a net barley exporter with a volume totalling some 56.5 million US$. When we look at the country groups in Table 6.20, we can see that the same pattern is valid for Turkish cereal trade with both the EU and the non-EU group.

Table 6.19 - Turkey's trade in cereal products with world (2002)

	Exports (tonnes)	Exports (1 000 US$)	Imports (tonnes)	Imports (1 000 US$)	Net exports (1 000 US$)
Wheat	38 680	6 549	1 097 768	148 007	-141 458
Barley	595 825	58 909	16 756	2 435	56 474
Maize	7 643	9 945	1 177 660	133 754	-123 809
Rice paddy	183	168	292 025	48 803	-48 635
Rye	0	0	18 279	1 727	-1 727
Oats	0	0	5 188	317	-317
Millet	136	33	3 653	475	-442
Canary Seed	11	4	735	127	-123
CEREALS	***642 478***	***75 608***	***2 612 064***	***335 645***	***-260 037***

Source: FAOSTAT, 2005b.

When we look at the overall cereal trade from Table 6.19, we see that Turkey is a net cereal importer with about 260 million US$ in 2002. Of this total, wheat and maize shared approximately 141 million US$ and 124 million US$ respectively.

Table A5 in the Appendix reports Turkish export and import data for 2002 for each cereal product and for each EU member country. In 2002, for example, Germany and Italy were the most important importers of Turkish wheat. The main EU wheat exporters to Turkey were Germany and Slovenia with about 217 000 tonnes amounting to a total of some 34 million US$ and 395 000 tonnes amounting to a total of some 45 million US$ respectively. Interestingly, France was not a major trade partner of Turkey in terms of wheat either as importer or as exporter in 2002.

Spain is the most prominent trade partner of Turkey in barley exports. On the other hand, France is the biggest barley exporter to Turkey with approximately 16,750 tonnes and approximately 2.4 million US$.

In 2002, France, Italy and Spain are seen as the main maize importing countries from Turkey; exports to France amounted to about 1 900 tonnes with a value of 3.2 million US$. About 1 400 tonnes of maize were exported to both Italy and Spain. The total volume of maize exported to these three countries accounted for more than 75% of Turkey's total maize exports to the EU. The only significant maize imports in 2002 came from a new member: Hungary's exports to Turkey accounted for almost all of Turkish maize imports from the EU25, amounting to approximately 316 000 tonnes and approximately 35 million US$.

As for (paddy) rice, the only exporter from the EU to Turkey in 2002 was Slovenia with about 2 500 tonnes and 294 000 US$. On the other hand, we see in Table A5 that Turkey's rice exports to EU countries are negligible.

Table 6.20 - Turkey's trade in cereal products with the EU and ROW (2002)

	EU						
	Exports (tonnes)	**Export share (%)**	**Exports (1 000 US$)**	**Imports (tonnes)**	**Import share (%)**	**Imports (1 000 US$)**	**Net exports (1 000 US$)**
Wheat	24 139	62.41	4 146	689 858	62.84	90 888	-86 742
Barley	135 929	22.81	12 920	16 756	100.00	2 435	10 485
Maize	6 219	81.37	8 561	316 151	26.85	36 239	-27 678
Rice, paddy	160	87.43	149	2 561	0.88	294	-145
Rye	0	0.00	0	17 783	97.29	1 698	-1 698
Oats	0	0.00	0	4	0.08	7	-7
Millet	38	27.94	17	2	0.05	1	16
Canary seed	11	100.00	4	0	0.00	0	4
CEREALS	*166 496*	*25.91*	*25 797*	*1 043 115*	*39.93*	*131 562*	*-105 765*
	ROW						
	Exports (tonnes)	**Export share (%)**	**Exports (1 000 US$)**	**Imports (tonnes)**	**Import share (%)**	**Imports (1 000 US$)**	**Net exports (1 000 US$)**
Wheat	14 541	37.59	2 403	407 910	37.16	57 119	-54 716
Barley	459 896	77.19	45 989	0	0.00	0	45 989
Maize	1 424	18.63	1 384	861 509	73.15	97 515	-96 131
Rice, paddy	23	12.57	19	289 464	99.12	48 509	-48 490
Rye	0	0.00	0	496	2.71	29	-29
Oats	0	0.00	0	5 184	99.92	310	-310
Millet	98	72.06	16	3 651	99.95	474	-458
Canary seed	0	0.00	0	735	100.00	127	-127
CEREALS	*475 982*	*74.09*	*49 811*	*1 568 949*	*60.07*	*204 083*	*-154 272*

Source: FAOSTAT, 2005b.

6.6 – Conclusion

Some 14 million hectares of land have been devoted to growing cereals in Turkey during the last two decades. The growth in cereal production has been achieved basically through increase in yields. A minor degree of substitution occurred on the supply side with declining areas of rice and other cereals such as rye, and wheat, barley and maize occupied slightly larger areas. Jumps in production were achieved basically through technological improvements in wheat during the late 1970s and maize in the mid 1980s, apart from the expansion of irrigated land. The average growth in yield was still less than the growth in population. Per capita human consumption of cereals declined as a result of growth in income. The increase in production was closely followed by the increase in the use of cereals as feed and seed, with fluctuating imports and exports.

Commodity-based self-sufficiency (rather than food security) is the basic policy objective of governments, and high border protection combined with non-tariff barriers in cereals help to achieve this goal. However, due to the climate dependency of cereal production, Turkey's supply to the world markets fluctuates widely. When the weather conditions are favourable, Turkey becomes a net exporter; however, its position as net importer of all major cereals has prevailed in recent years.

One word of caution with regard to trade statistics is necessary here. The trade statistics in this study show trade in primary commodities only, but it would seem that the exports of agro-food products have been expanding in the recent years (Çakmak and Akder, 2005). This rather positive development of exporting value-added products rather than bulk commodities to the world markets may be improved through the shift of producer-oriented transfer policies in agriculture towards productivity-enhancing technological improvement policies. Furthermore, primary commodities cannot be exported without export subsidies, since the domestic prices of cereals are at least 50% higher than border prices. The major exporters of cereals in Turkey are state economic enterprises and the difference between procurement and export prices is made up by the Treasury as "duty losses".

Past experience has shown that import substitution policies (except in the case of barley) have been foremost in the minds of policy makers. Price distortionary transfers to the cereal sector were not effective in increasing output and decreasing the fluctuations in production. During the last two decades, the only significant increase in production and yield has been achieved in maize due to the use of hybrid varieties. The recent increase in the production of rice is due to the government output price support for rice.

The interaction between animal and cereal production should be borne in mind. The major reason for the stagnation of livestock in the animal sector is due to the

price policies on the cereal markets. Highly distortionary support in intermediate inputs results in policies creating even greater distortions on the animal product output markets with limited or no growth and even contraction in domestic supply.

Turkey is on the verge of trade liberalisation in agricultural products, especially in cereals. The new negotiating round of the WTO Agreement on Agriculture and the candidacy for EU membership will put enormous pressure on the cereal markets in about ten years' time. The delays in finalising the new WTO Agreement on Agriculture and the EU accession period may allow Turkey to pursue past policies in cereals for about a decade, but the country will eventually be forced to shift to policies which will enhance the structure of production. Turkey seems to have two effective policies to consider: upgrade land and decrease the semi-arid nature of production (increasing access to irrigation) and/or invest in R&D for technology transfer.

Appendices

A1 – NUTS[2] regions of Turkey (TR)

TR1	TR2	TR3	TR4	TR5	TR6
Istanbul	**Tekirdağ**	**Izmir**	**Bursa**	**Ankara**	**Antalya**
	Edirne	**Aydın**	Eskişehir	**Konya**	Isparta
	Kırklareli	Denizli	Bilecik	Karaman	Burdur
	Balıkesir	Muğla	**Kocaeli**		**Adana**
	Çanakkale	**Manisa**	Sakarya		Mersin
		Afyon	Düzce		**Hatay**
		Kütahya	Bolu		K.Maraş
		Uşak	Yalova		Osmaniye

TR7	TR8	TR9	TRA	TRB	TRC
Kırıkkale	**Zonguldak**	**Trabzon**	**Erzurum**	**Malatya**	**G.Antep**
Aksaray	Karabük	Ordu	Erzincan	Elazığ	Adiyaman
Niğde	Bartın	Giresun	Bayburt	Bingöl	Kilis
Nevşehir	**Kastamonu**	Rize	**Ağrı**	Tunceli	**Şanlıurfa**
Kırşehir	Çankırı	Artvin	Kars	**Van**	Diyarbakır
Kayseri	Sinop	Gümüşhane	Iğdir	Muş	**Mardin**
Sivas	**Samsun**		Ardahan	Bitlis	Batman
Yozgat	Tokat			Hakkari	Şırnak
	Çorum				Siirt
	Amasya				

Note: Turkey has 12 NUTS regions at Level 1. There are 26 NUTS regions at Level 2 with the bold represented cities. All cities are regional entities at NUTS Level 3.

Source: EUROSTAT, http://europa.eu.int/comm/eurostat/ramon/nuts/codelist_en.cfm?list=cec

[2] La *N*omenclature des *U*nités *T*erritoriales *S*tatistiques (Nomenclature of Territorial Units for Statistics).

A2 – NUTS regions of Turkey at level 1

TR1	TR2	TR3
Istanbul	Batı Marmara (West Marmara)	Ege (Aegean)

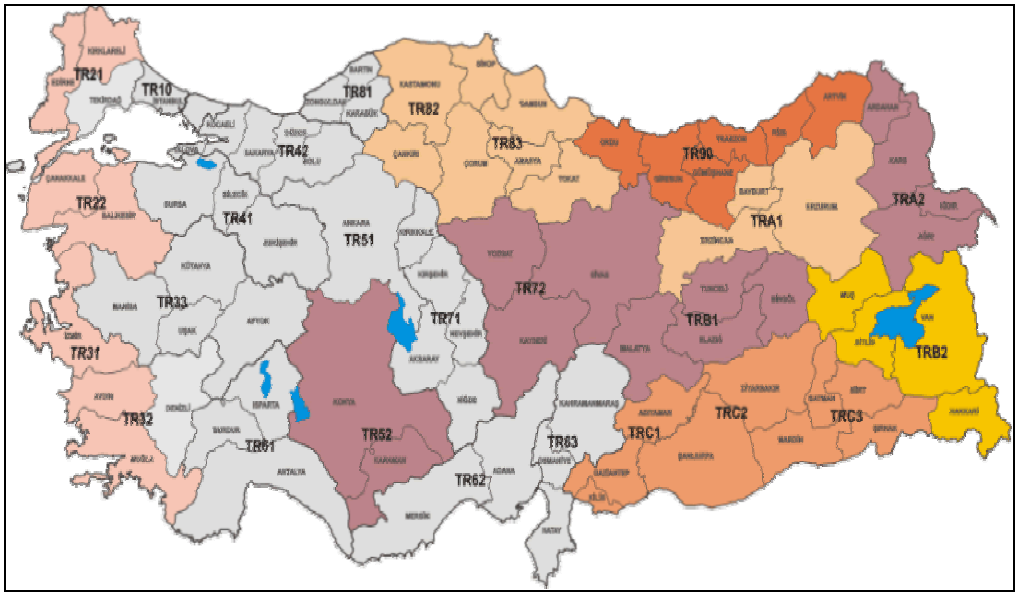
TR4	TR5	TR6
Doğu Marmara (East Marmara)	Batı Anadolu (West Anatolia)	Akdeniz (Mediterranean)

TR7	TR8	TR9
Orta Anadolu (Central Anatolia)	Batı Karadeniz (Western Black Sea)	Doğu Karadeniz (Eastern Black Sea)

TRA	TRB	TRC
Kuzey Doğu Anadolu (North-East Anatolia)	Orta Doğu Anadolu (East-Central Anatolia)	Güney Doğu Anadolu (South-East Anatolia)

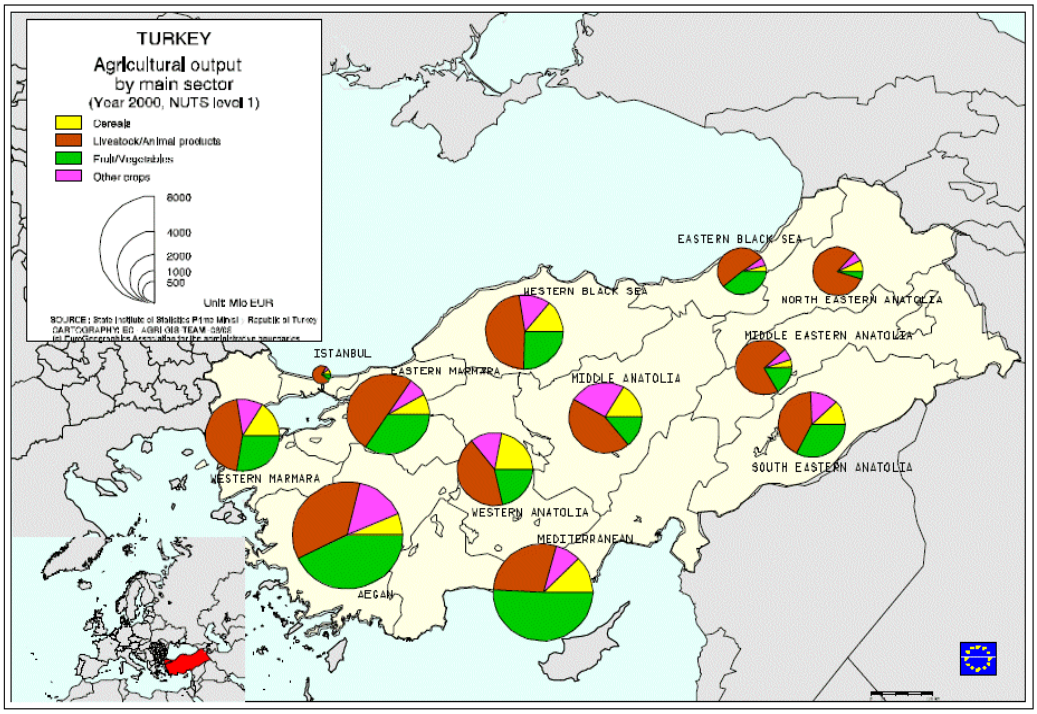
Source: EUROSTAT, http://europa.eu.int/comm/eurostat/ramon/nuts/codelist_en.cfm?list=cec

A3 – Map of Turkey (NUTS regions)



Source: SPO, 2005.

A4 – Agricultural output by sub-sector



Source: EU Commission (2003). Agricultural Situation in the Candidate Countries. Country Report: Turkey. DG-AGRI. November 2003. Brussels.

A5 – Turkey's trade in cereal products with EU countries (2002)

	Exports (tonnes)	Export share (%)	Exports (1 000 US$)	Imports (tonnes)	Import share (%)	Imports (1 000 US$)	Net exports (1 000 US$)
WHEAT							
Austria	4	0.02	2				2
Cyprus	62	0.26	10				10
Denmark	48	0.20	15				15
France	8	0.03	4				4
Germany	10 709	44.36	1 864	216 562	31.39	33 904	-32 040
Greece				5 723	0.83	1 121	-1 121
Hungary	9	0.04	4	39 374	5.71	5 721	-5 717
Italy	13 201	54.69	2 210				2 210
Lithuania				24 401	3.54	3 103	-3 103
Netherlands	51	0.21	21				21
Slovakia	20	0.08	5				5
Slovenia				395 413	57.32	45 390	-45 390
Spain				8 385	1.22	1 649	-1 649
Sweden	9	0.04	4				4
United Kingdom	18	0.07	7				7
BARLEY							
Cyprus	8 000	5.89	781				781
France	2	0.00	1	16 750	99.96	2 434	-2 433
Germany	1	0.00	0	5	0.03	1	-1
Hungary				1	0.01	0	
Spain	127 926	94.11	12 138				12 138
MAIZE							
Austria	2	0.03	1				1
Cyprus	205	3.30	43				43
Czech Republic	2	0.03	1				1
Denmark	3	0.05	3				3
France	1 901	30.57	3 162	138	0.04	522	2 640
Germany	690	11.10	947	11	0.00	124	823
Greece	107	1.72	239				239
Hungary				315 862	99.91	35 240	-35 240
Italy	1 426	22.93	1 793	3	0.00	37	1 756
Malta	9	0.14	5				5
Netherlands	401	6.45	640	70	0.02	157	483
Portugal	29	0.47	41				41
Spain	1 439	23.14	1 684	67	0.02	159	1 525
Sweden	3	0.05	1				1
United Kingdom	2	0.03	1				1
RICE, PADDY							
Cyprus	83	51.88	76				76
Germany	24	15.00	21				21
Greece	3	1.88	3				3
Netherlands	7	4.38	6				6
Slovenia				2 561	100.00	294	-294
United Kingdom	43	26.88	43				43

A5 (contd.)

	Exports (tonnes)	Export share (%)	Exports (1 000 US$)	Imports (tonnes)	Import share (%)	Imports (1 000 US$)	Net exports (1 000 US$)
RYE							
Germany		0.00		17 783	100.00	1 698	-1 698
OATS							*0*
Germany		0.00		4	100.00	7	-7
MILLET							
Cyprus	9	23.68	4				4
Germany	2	5.26	2				2
Netherlands	6	15.79	5				5
Portugal	21	55.26	6				6
Slovenia				2	100.00	1	-1
CANARY SEED							
Cyprus	11	100.00	4				4

Source: FAOSTAT, WATM, 2005b.

A6.1 – Regional distribution of spelt production (2003)

NUTS1	Area (ha)	Production (tonnes)	Yield (tonnes/ha)
TR8-S‡NOP	3 598	2 742	0.762
TR8-KARABÜK	1 000	2 192	2.192
TR8-KASTAMONU	1 794	1 808	1.008
TR8-SAMSUN	1 100	1 356	1.233
TR4-BOLU	85	90	1.059
TR4-B‡LECİK	23	12	0.522

Source: SIS, 2005.

A6.2 – Regional distribution of rye production (2003)

NUTS1	Area (ha)	Production (tonnes)	Yield (tonnes/ha)
TR7	66 878	117 499	1.757
TR5	26 807	44 575	1.663
TRA	17 605	26 666	1.515
TR4	8 545	16 008	1.873
TR2	5 241	11 193	2.136
TR6	3 648	9 081	2.489
TR3	3 936	6 058	1.539
TR8	3 556	4 364	1.227
TR9	2 312	2 787	1.205
TRB	1 469	1 758	1.197
TR1	3	11	3.667

Source: SIS, 2005.

A6.3 – Regional distribution of oats production (2003)

NUTS1	Area(ha)	Production (tonnes)	Yield (tonnes/ha)
TR4	29 403	66 509	2.262
TR5	34 489	61 769	1.791
TR2	20 248	51 013	2.519
TR7	8 941	20 925	2.340
TR8	10 739	18 129	1.688
TR1	5 443	14 894	2.736
TR6	7 272	14 580	2.005
TR3	7 579	14 426	1.903
TR9	3 700	4 850	1.311
TRA	2 058	2 671	1.298
TRB	128	234	1.828

Source: SIS, 2005.

A6.4 – Regional distribution of mixed grain production (2003)

NUTS1	Area (ha)	Production (tonnes)	Yield (tonnes/ha)
TR6-ADANA	2 185	3 267	1.495
TR8-KASTAMONU	2 526	3 266	1.293
TR9-GÜMÜŞHANE	1 142	1 635	1.432
TR5-KARAMAN	274	471	1.719
TR6-KAHRAMANMARAŞ	79	157	1.987
TR6-ANTALYA	189	141	0.746
TR3-MANİSA	105	63	0.600

Source: SIS, 2005.

A6.5 – Regional distribution of millet production (2003)

NUTS1	Area (ha)	Production (tonnes)	Yield (tonnes/ha)
TR3-KÜTAHYA	1 423	4 280	3.008
TRC-DİYARBAKIR	1 398	1 079	0.772
TR3-MUĞLA	853	954	1.118
TR3-IZMIR	80	199	2.488
TR6-İCEL	49	148	3.020
TRB-BİTLİS	64	145	2.266
TRB-BİNGÖL	20	59	2.950
TR6-ANTALYA	88	58	0.659
TR6-KAHRAMANMARAŞ	16	57	3.563
TR4-YALOVA	8	20	2.500
TRA-ERZURUM	1	1	1.000

Source: SIS, 2005.

A6.6 – Regional distribution of canary seed production (2003)

NUTS1	Area (ha)	Production (tonnes)	Yield (tonnes/ha)
TR1-ISTANBUL	364	450	1.236
TR2-TEKİRDAĞ	128	133	1.039
TR3-KÜTAHYA	5	11	2.200
TR7-AKSARAY	3	6	2.000

Source: SIS, 2005.

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