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Thinking ahead for Europe

Structural Change and Market Opening in Turkish Agriculture

Erol H. Cakmak

Abstract

Turkey is endowed with rich natural and human resources, but its agricultural sector never reached its potential because of the increasingly inefficient agricultural policies adopted since the late 1980s. However, an important reform was started in 2000-01, which has improved the incentive structure. After the reform of the CAP, EU and Turkish agricultural policies are now slowly converging. The principal remaining obstacles in Turkey will be the effective implementation of the new, EU-compatible, policy regime.

Turkey has a comparative advantage in plant products that do not exhibit economies of scale and are relatively labour-intensive, i.e. fruits and vegetables Eliminating the existing border and non-tariff barriers to trade in agriculture would allow both sides to better exploit their comparative advantages. The models discussed here imply that an extension of the customs union agreement to agriculture would lead to substantial welfare benefits for both sides.

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Introduction

Agriculture is expected to be one of the toughest areas in the accession negotiations that are expected to start in 2005. The difficulty will not only arise from the state of agriculture in Turkey, but also from the ever-changing agricultural policy framework of EU. The ability of Turkey to implement structural adjustment in its agriculture during the pre-accession period will be one of the most important factors easing the country's accession.

Turkey's membership in the EU may be perceived by both parties either as a 'threat' or an 'opportunity' for different reasons. The comparison of institutional and technological capabilities may lead to the conclusion that it is a potential 'threat' for both the EU and Turkey. However, it is possible to start paving the way towards seeing it as an 'opportunity' by taking proper institutional and policy measures prior to the accession. The structure of the basic factors of production in agriculture is viewed as the major problem at first. Yet, the availability of untapped resources reveals a significant potential. The burden of adjustment falls both on Turkey and EU. Turkey's responsibilities may go well beyond the adoption of the *acquis communautaire*. On the other hand, as has been the case in the previous enlargements, the EU has to share responsibilities to converge the development levels among the members of the Union. With the weight of support tilted to second pillar policies – mainly targeted to regional development and structural change – in recent enlargement processes have provided a clear signal in that direction. In general, the basic responsibility of the candidates at the start of the accession negotiations may be summarised as the 'adjustment of mentality' to become a proper member, rather than concentrating on the possible flow of funds from the Union.

The purpose of this study is to identify major elements in the pre-accession period through the description of the agricultural environment in Turkey, together with the possible effects of accession on agriculture. The availability of land and labour represent as the major divergences from the EU averages, and hence will form the basis of the accession negotiations. Section 1 of this paper is devoted to the structure of the basic factors of production in agriculture and to a general overview of agricultural production. The recent policy shifts and the costs and benefits of the agricultural policies are discussed in the second section. The recent developments in the trade between EU and Turkey and the trade potential are presented in section 3. Section 4 provides some model simulations to evaluate the impact an extension of the customs union to agricultural products might have for Turkey. The last section is reserved for the concluding remarks.

1.   Land, Labour and Agricultural Production

Agriculture in Turkey has kept its role as a major employer and contributor to the GNP throughout the last two decades. The multi-functionality in agriculture arises not only from the public goods provided by the farm activities, but from its ability to restrain rural-urban migration, and hence it continued to be as a reserve for labour. However, the prevailing conditions in agriculture combined with the mismanagement in macro and agricultural policies prevented an overall structural transformation of the sector.

1.1 Overview of Selected Indicators

The Turkish economy has experienced several crises during the last decade. Agriculture has suffered as much as the rest of the economy. The share of agriculture in total fixed investment decreased, which came on top of the downward trend in total gross fixed investment. Employment in agriculture is declining both in absolute and in relative terms. Agriculture is the major source of employment in the rural areas accounting for about 70% of total rural employment. Agricultural value-added indicators show the climate-dependent nature of agricultural production. The drastic decline of production in 2001 shows the impact of a 'bad' year together with the impact of a policy shift in agriculture. However, the sector seems to be somewhat recuperating in the last two years. Trade in agricultural products cannot keep up with the non-agricultural sectors. Imports expanded faster than exports, and the shares of agricultural products in total exports and imports are declining. See the indicators in Table 1.

Table 1. Selected indicators, 1996-2003

	1996-97	1998-99	2000	2001	2002	2003
Growth and Accumulation						
GDP ($ billion)[a,1]	186.0	192.3	199.9	145.7	184.5	241.1
Real GDP growth (percent)[1]	7.3	-0.8	7.4	-7.5	7.9	5.8
GDP per capita ($)[2]	2,932	2,928	2,963	2,123	2,644	3,402
Real GDP per capita growth (percent)[2]	5.3	-2.6	5.5	-9.0	6.2	4.1
GDP per capita PPP ($)[3]	5,685	5,729	6,189	5,790	6,176	n.a.
Gross fixed investments ($ billion)[4]	48.6	45.6	45.8	27.3	31.5	42.2[e]
Share of ag. in gross fixed inv. (percent)[4]	5.8	5.1	4.4	4.2	4.6	4.0[e]
Distribution						
Inflation - CPI (percent)[5]	89.4	69.3	39.0	68.5	29.8	18.4
Unemployment rate - Turkey (percent)[6]	6.2	7.2	6.5	8.4	10.3	10.5
Unemployment rate - Rural (percent)[6]	3.5	3.5	3.9	4.7	5.7	6.5
Employment in agriculture (million)[6]	8.9	9.0	7.8	8.1	7.5	7.2
Share of ag. in employment (percent)[6]	44.1	41.0	36.0	37.6	34.9	33.9
Share of agriculture in GDP (percent)[1]	13.9	13.9	13.4	13.6	13.4	12.4
Growth of agricultural VA (percent)[1]	1.0	1.7	3.9	-6.5	6.9	-2.5
Agricultural VA per employed ($)[7]	3,253	3,517	3,622	2,173	2,862	3,941
Growth of ag. VA per employ. (percent)[7]	3.5	-1.2	22.8	-10.2	15.9	1.2
Domestic TOT - ag/non-ag (1987=100)[1]	119.6	129.3	112.4	93.2	89.2	99.5
Internationalisation						
Imports/GDP[5]	24.8	22.5	27.3	28.4	27.9	28.5
Exports/GDP[5]	13.3	13.9	13.9	21.5	19.5	19.5
Exports/imports[5]	53.7	62.1	51.0	75.7	69.9	68.4
Stock of external debt ($ billion)[b,5]	81.7	99.7	118.7	113.8	130.9	147.3
Foreign TOT (1994=100)[5]	100.2	101.7	92.5	90.4	89.8	91.6
Ag. imports/total[c,8]	10.6	8.9	7.6	7.4	7.8	n.a.
Ag. exports/total[c,8]	21.1	17.7	13.9	13.9	11.2	n.a.

Notes: [a] All in current $. [b] new definition. [c] HS from 1 to 24 plus agricultural raw materials. [e] estimate, n.a. not available.
Sources: [1] SIS (2004a); [2] SIS (2004a), CB (2004); [3] WB (2004); [4] SPO (2004); [5] CB (2004); [6] SIS (2004b); [7] SIS (2004a), SIS (2004b), CB (2004); [8] SIS (2003a).

1.2 Farmers and Land

Farms in Turkey are generally family-owned, small and fragmented. The average cultivated area per holding was about 5.2 ha in 1991, and it increased to about 6 ha in 2001. About 85% of holdings on 41% of the land were smaller than 10 ha. Fifteen percent of holdings were from 10 to 50 ha, and they cultivated almost half of the cultivated land. The average size increases from west towards the southeast, due to the climate and fertility differences. The proportion of the irrigated land increased from 14% in 1991, to 20% in 2001. The share of irrigated land is much higher in the west than elsewhere in Turkey. A third of the holdings smaller than 1 ha are irrigated.

The distribution of agricultural land remained skewed, with a slight tendency towards the medium ranges from smaller sizes in the considered decade from 1991-2001 (see Table 2). Irrigated land is distributed slightly more evenly than cultivated land. A comparison between the data for 1991 and 2001 shows a remarkable shift towards medium-sized farms: the shares both of the very small and the very large units have decreased, with the most pronounced change being the fall in the share of farms between 100 and 500 hectares.

Table 2. Size distribution of land, 1991 and 2001 (percent)

Size of holdings (ha)	1991		2001	
	Farm HHs	Cultivated area	Farm HHs	Cultivated area
No Land	2.50		1.77	
< 0.5	6.19	0.29	5.78	0.26
0.5 - 0.9	9.37	1.08	9.44	1.02
1 - 1.9	18.49	4.28	17.54	3.82
2 - 4.9	**31.33**	**16.28**	**30.91**	**15.48**
5 - 9.9	17.53	19.80	18.21	20.41
10 - 19.9	**9.42**	**21.21**	**10.64**	**24.05**
20 - 49.9	4.27	20.23	5.00	23.69
50 - 99.9	0.59	6.49	0.57	6.32
100 - 249.9	0.25	5.63	0.14	3.07
250 - 499.9	0.05	2.88	0.01	0.40
500 +	0.01	1.83	0.00	1.50
Total	100.00	100.00	100.00	100.00
Gini coefficient*		**0.60**		**0.59**
	(1000 HHs)	**(1000 ha)**	**(1000 HHs)**	**(1000 ha)**
Village head census	4,092	21,103	3,698	22,156
HH survey	4,068	21,449	3,076	17,164

* Calculated by the author from grouped data.

Note: HHs=households.

Sources: SIS (1994), SIS (2004c).

Field crops occupy 87% of cultivated area (Table 3). The share of vegetable production has been increasing steadily. Land left fallow declined from 21% to 18% of the cultivated land, causing an increase in cropping intensity of 2 percentage points. The decline in fallow land was more intense before the mid-1980s due to the fallow land reduction project. In Central Anatolia, customary crop rotation encouraged planting of pulses instead of leaving land fallow. Yet, the decline in the world prices of pulses limited the fallow reduction in the last decade.

Table 3. Turkey: Use of cultivated area (period averages)

	1985–87		1995–97		2000–02	
	Area (million ha)	Share (percent)	Area (million ha)	Share (percent)	Area (million ha)	Share (percent)
Field Crops	24.07	87.1	23.62	87.8	23.02	87.3
Area Sown	18.28	66.1	18.57	69.0	18.15	68.8
Fallow	5.79	20.9	5.05	18.8	4.87	18.5
Vegetable	0.64	2.3	0.78	2.9	0.80	3.0
Orchards	2.94	10.6	2.50	9.3	2.55	9.6
Total	27.65	100.0	26.90	100.0	26.37	100.0
Cropping intensity (% of cultivated land)		79.1	-	81.2	-	81.5

Source: SIS (2003b).

The field crop pattern showed no drastic changes, apart from the increase in cereals and a steady decrease in the share of oilseeds (Table 4).

Table 4. Turkey: Field crop areas (period averages)

Crop	1985–87		1995–97		2000–02	
	Area (million ha)	Share (percent)	Area (million ha)	Share (percent)	Area (million ha)	Share (percent)
Cereals	13.82	50.0	13.85	50.4	13.93	52.8
Wheat	9.37	33.9	9.36	34.1	9.38	35.6
Barley	3.34	12.1	3.61	13.1	3.63	13.8
Maize	0.57	2.0	0.54	2.0	0.55	2.1
Rice	0.06	0.2	0.05	0.2	0.06	0.2
Pulses	1.74	6.3	1.83	6.7	1.55	5.9
Chick peas	0.53	1.9	0.75	2.7	0.64	2.4
Lentils	0.75	2.7	0.61	2.2	0.48	1.8
Industrial crops	1.24	4.5	1.48	5.4	1.37	5.2
Tobacco	0.18	0.7	0.25	0.9	0.22	0.8
Sugarbeet	0.35	1.3	0.40	1.5	0.38	1.5
Cotton	0.61	2.2	0.74	2.7	0.67	2.5
Oilseeds	0.93	3.4	0.72	2.6	0.62	2.4
Sunflower	0.70	2.5	0.57	2.1	0.53	2.0
Soybeans	0.09	0.3	0.02	0.1	0.02	0.1
Tuber crops	0.29	1.0	0.34	1.2	0.32	1.2
Onion, dry	0.08	0.3	0.12	0.4	0.10	0.4
Potatoes	0.20	0.7	0.21	0.8	0.20	0.8
Total cultivated area	27.65	65.2	26.90	66.3	26.37	67.5

Source: SIS (1989), (1999), (2003b).

1.3 Labour in Agriculture

According to the last census, two-thirds of Turkey's population live in urban locations defined as cities with 20,000 or more inhabitants. Moreover, population growth rate was 2.68% in urban areas and only 0.42% in rural areas. The large difference between the two is attributable to rural-to-urban migration (Tunali, 2003).

Recent figures on labour force participation of the population and unemployment are presented in Table 5. The labour force participation rates (LFPR) in the rural areas are higher than urban areas. In addition, the female-male differential of LFPRs is higher in urban areas than rural areas. Most of this difference is explained by the high number of 'unpaid family workers', on farms. However, this seems to be changing as evidenced by the relatively faster decline in LFPRs in the rural areas combined with higher growth in unemployment in the rural areas.

Table 5. Labour force participation and unemployment, 2000-03 (percent)

	Labour force participation rate			Unemployment rate		
	2000-01	2002	2003	2000-01	2002	2003
Turkey	**49.9**	**49.6**	**48.3**	**7.4**	**10.3**	**10.5**
Male	73.3	71.6	70.4	7.6	10.7	10.7
Female	26.9	27.9	26.6	6.9	9.4	10.1
Rural	**58.7**	**57.6**	**55.5**	**4.3**	**5.7**	**6.5**
Male	77.1	74.5	72.9	5.7	7.3	7.9
Female	41.0	41.4	39.0	1.9	2.9	4.1
Urban	**44.0**	**44.4**	**43.8**	**10.2**	**14.2**	**13.8**
Male	70.8	69.8	68.9	9.0	13.0	12.6
Female	17.3	19.1	18.5	14.8	18.7	18.3

Source: SIS (2004b).

Recent trends in the agricultural employment are presented in Table 6. As one would expect from the farm size, agricultural employment has a relatively large share in the total employment. The sector provides employment for almost all females in the rural areas with an almost 90% share in the rural employment. The share of employment in agriculture is steadily declining, accompanied by the decline in absolute employment from the early 1990s. In the early 1990s the agricultural employment was around 9 million compared to 7 million in 2003.

Table 6. Agricultural employment, 2000-03.

	Employment (1,000)			Share in total (percent)		
	2000-01	2002	2003	2000-01	2002	2003
Turkey	**7,929**	**7,458**	**7,165**	**36.8**	**34.9**	**33.9**
Male	4,285	3,784	3,718	27.4	24.8	24.4
Female	3,644	3,674	3,447	61.9	60.0	58.5
Rural	**7,478**	**6,973**	**6,687**	**71.5**	**68.1**	**67.8**
Male	4,038	3,530	3,455	60.7	55.3	55.4
Female	3,440	3,443	3,232	90.2	89.3	89.0

Source: SIS (2004b).

Job status of the agricultural employment provides further clues about the structure of the employed labour force in the sector (Table 7). Salaried workers in agriculture make up only about 5% of the employment. Half of the labour force shares the household income as 'unpaid family labour'. The absolute figures are more relevant in the case of Turkey: Employment in agriculture is 7.2 million; out of this 3.5 million are females, and 2.7 million females work as unpaid family labour. The proximity

of work and home environment allows about 50% of the employed labour force (3.6 million) to be kept occupied in agriculture and deprived of urban living conditions.

Table 7. Job status of agricultural employment, 2000-03

	Employed (1,000)			Share in Total (percent)		
	2000-01	2002	2003	2000-01	2002	2003
Total	**7,929**	**7,456**	**7,165**	**100.0**	**100.0**	**100.0**
Wage earner	393	395	389	5.0	5.3	5.4
Employer or self-employed	3,314	3,156	3,130	41.8	42.3	43.7
Unpaid family labour	4,223	3,905	3,646	53.3	52.4	50.9
Male	**4,285**	**3,783**	**3,719**	**100.0**	**100.0**	**100.0**
Wage earner	274	240	268	6.4	6.3	7.2
Employer or self-employed	2,749	2,519	2,552	64.1	66.6	68.6
Unpaid family labour	1,263	1,024	899	29.5	27.1	24.2
Female	**3,644**	**3,673**	**3,446**	**100.0**	**100.0**	**100.0**
Wage earner	119	155	121	3.3	4.2	3.5
Employer or self-employed	565	637	578	15.5	17.3	16.8
Unpaid family labour	2,960	2,881	2,747	81.2	78.4	79.7

Source: SIS (2004b).

Agriculture helps to partially overcome the chronic nature of unemployment in Turkey. It eases the detrimental effect of the lack of human capital on the growth rates of the labour force.

The overall picture presented above of the land and labour hides the interesting regional dualistic structure. Western regions are more market-oriented compared to the central and the eastern regions. The difference is not only due to the availability and quality of natural resources, but also to the access to basic public services and regional development programmes.

Under the prevailing conditions, an abrupt decline in the agricultural labour force may lead to serious problems rather than speeding up the development efforts. Tunali (2003) put forward the social characteristics of the labour force in the rural areas:

> Simply put, in rural areas it is a lot easier for able bodied men and women to satisfy the criteria used for identifying participants: Firstly because of the dominant role of agriculture, and secondly because of the overlap in the work and home environments of agricultural households. Consequently all members participate in household-based production activities. Households which migrate to urban areas have difficulty in maintaining the distinction between the domains of market and non-market production, and members specialize further in one or the other of these activities. The form that this specialization takes is dictated by traditional forces, which charge men with the responsibility of bringing home the bread, and the women with the task of maintaining the home and child rearing… skill requirements of jobs in urban areas induce selective participation.

Upgrading human capital in the rural areas is expected to be the driving force in increasing, at least, labour productivity in agriculture by the higher adjustment ability of the agricultural labour force, and simultaneously by raising the possibility of job opportunities in the urban areas.

The macroeconomic stabilisation and structural adjustment programme started in 1999, but another economic crisis hit Turkey in early 2001. Table 10 exhibits a comparison of sectoral-disposable income levels and changes based on two recent income distribution surveys.

The table indicates rather large rural-urban and agricultural-non agricultural income disparities. The changes from 1994 to 2002 are more informative in terms of the differential effects of a serious economic crisis. Rural income registered positive change, agricultural incomes did not decrease, whereas urban and non-agricultural incomes declined drastically by about 16%. Over-employment in agriculture, which is generally attributed as a structural problem, may alleviate the social and economic costs of resolving the crisis.

Table 10. Disposable income,* 1994 and 2002 (at 1994 prices)

	Turkey	Rural	Urban	Agriculture	Non-agriculture
Share in total					
1994 (percent)	100.0	35.5	64.5	23.3	76.7
2002 (percent)	100.0	34.6	65.4	19.3	80.7
Average income per employed household member (at 1994 prices)					
1994 (Turkey=100)	100.0	60.4	156.4	46.4	154.2
2002 (Turkey=100)	100.0	67.2	134.8	48.1	134.9
Change from 1994 to 2002 (percent)	-3.1	7.8	-16.5	0.5	-15.3
Gini, 1994	0.49	0.41	0.51	n.a.	n.a.
Gini, 2002	0.44	0.42	0.44	n.a.	n.a.

* Transfer payments are not included.

Source: SIS (2003c).

1.4 Structure and Diversity of Agricultural Production

The share of crop production in total value of farm output varied from 70-75%, and the remaining 25-30% came from livestock output during the last decade. Wheat constitutes the largest share in cereal value with slightly higher than 65%, followed by barley (20%) and maize (9%). Cotton (50%), sugar beet (30%) and tobacco (15%) constitute almost all of the production value of industrial crops. Chickpeas, dry-beans and lentils are the important pulses, while sunflower and potato are the two important oil and tuber crops, respectively (SIS, 2003).

By international standards, Turkey is a major producer of grain, cotton, tobacco, grapes, figs, apricots, pulses (chickpeas and lentils), nuts (hazelnuts, pistachios), fresh fruits (apples and citrus), tomatoes, tea and some small ruminant products. Table 11 shows the rank of Turkey in the world and volume of production.

Table 11. Rank of Turkey in the top-10 of the world for selected products, 2003

Crop	Rank	Production (1,000 mt)	Crop	Rank	Production (1,000 mt)
Field Crops			**Perennials**		
Barley	6	8,000	Almonds	7	50
Chick-peas	3	630	Apples	5	2,200
Chillies and Peppers	3	1,500	Apricots	1	580
Cotton	5	946	Figs	1	265
Cucumber	2	1,750	Grapes	5	3,850
Eggplants	3	970	Grapefruit	7	140
Lentils	2	545	Hazelnuts	1	600
Onion	4	2,050	Lemons	9	400
Rye	9	240	Olives	4	1,800
Sugarbeet	5	13,355	Pistachios	4	50
Tobacco	6	154	Tea	6	150
Tomatoes	3	9,000	**Livestock Products**		
Watermelons	2	3,900	Goat meat	9	47
Wheat	10	19,000	Sheep meat	6	290
			Sheep milk	3	723

Source: FAO (2004).

The regions exhibit high diversity in crop and livestock production. Wheat and barley, the two largest crops in Turkey, are grown throughout the country; however Central Anatolia grows more than any other region (about 40%). Turkish agriculture in general, but especially, cereal production is heavily

dependent on seasonal rainfall. Vegetables occupy a small proportion of the cultivated area, but the value of vegetable production forms more than one fourth of the total value of crop production. Vegetables are produced mainly in the Western regions, where climatic conditions are ideal. Perennials are concentrated in the West. Some special crops, like hazelnuts and tea are grown in the Eastern Black Sea region, whereas pistachios can be found only in the Southeast. Small ruminants stock is mainly in the Central and Eastern Regions, whereas commercial cattle production is concentrated in the West.

Conditions for livestock production are deteriorating. Small herd sizes, overgrazed pastures and meadows, and social unrest in the Southeast combined with domestic agricultural policies contributed to the steep downward trend in livestock (Table 12).

Table 12. Livestock and livestock production in Turkey, 1997-2002

	1997	1998	1999	2000	2001	2002
	(1000 head)					
Cattle	11,185	11,031	11,054	10,761	10,548	9,803
Sheep	30,238	29,435	30,256	28,492	26,972	25,174
Goat	8,376	8,057	7,774	7,201	7,022	6,780
	(1000 MT)					
Beef*			621	625	610	580
Sheep and goat meat*			373	355	300	280
Cow milk	8,914	8,832	8,965	8,732	8,489	7,491
Sheep and goat milk	1,076	1,059	1,041	995	943	867

* Based on estimated slaughtered livestock.
Sources: SIS (1999), SIS (2003b), AERI (2002).

Even though Turkey produces large quantities of cereals and has millions of cattle, partial productivity indicators are not at par with the international averages. Average wheat yield was 2.1mt/ha in 2002, ranging from 3.5mt/ha in East Mediterranean to 1.0mt/ha in the East. Similar patterns can be observed for barley. Sunflower yield is about 1.5mt/ha. The average yields for sugar beet and cotton are 45mt/ha and 3.5mt/ha, respectively. These figures indicate the potential and the need for technology transfer and productivity improvement.

Instability of the macroeconomic environment has important consequences for Turkish agriculture. Prices received by farmers in real terms declined sharply to half of what it was in 1997, after the recent crises. This indicates that macroeconomic fluctuations may have adverse effects on agricultural incomes, although agricultural sector is supported by various instruments throughout the years.

Farm output therefore remains low in comparison to the country's enormous potential and farmers' average income is also low. Small farm size, dependency on rainfed agriculture combined with the inability of the policy makers to form and deliver proper policy measures prevent the movement towards the actual production possibility frontier.

2. Evolving Policy Environment

During the last decade the agricultural sector in Turkey registered a very low growth rate (0.4%) 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 a rule rather than an exception. Growth in real value added in the past has been in upward jumps in every 7-9 years. The magnitude of the oscillations became smaller over time with fluctuations around the established levels due to weather conditions (Akder, Kasnakoglu & Cakmak, 2000).

The agricultural policies are becoming more market friendly in Turkey. The agricultural 'reform' programme in Turkey gained momentum in 2001. Producer price subsidies through state procurement are replaced with direct income transfer programme within a limited time frame. The primary

development objective of the Agricultural Reform Implementation Project (ARIP) is to help implement the government's agricultural reform programme, which is aimed at reducing artificial incentives and government subsidies. At the same time, the project is designed to mitigate potential short-term adverse impacts of subsidy removal, and facilitate the transition to efficient production patterns. Aside from promoting allocative efficiency, the reforms to be implemented were necessary for fiscal stabilisation. Almost all input subsidies are removed and the state procurement activities are declining. The privatisation of related state economic enterprises is lagging behind. The sales cooperatives are becoming more self-reliant through restructuring.

2.1 Agricultural Policy Reforms in 2000

Turkey embarked on an ongoing structural adjustment and stabilisation programme towards the end of 1999. Agriculture was selected to undergo heavy adjustment due to the ineffective set of policies and its increasing burden on government expenditures in the last decade.

Even without the macroeconomic stabilisation programme, several additional factors would have forced Turkey to enter into a phase of agricultural policy reform. The new round of negotiations for WTO agreement on agriculture is expected to be a challenging process and the issue of alternative policy tools in agriculture will remain as a major item in the agenda of multilateral trade negotiations and hence in the domestic policy debates in the coming years. Turkey's candidacy for membership to the EU has also added a new dimension for the changes in agricultural policies.

Protective trade policies in major crops combined with government procurement, input subsidies, and heavy investment in irrigation infrastructure on a fully subsidised basis have created a net inflow of resources from the government to agriculture, but have had many negative effects on the sector and the economy at large. The benefits of the subsidies have gone mainly to larger, wealthier farmers. In addition, the support system failed to enhance productivity growth despite its heavy burden on taxpayers and consumers.

The reform programme aims to diminish drastically heavy involvement of the state in the agricultural sector. The major aims of the reform are to decrease the distortions and the financial burden of support. Removal of the input (especially fertiliser and credit) subsidies, decrease the state procurement activities together with the privatisation of the related state economic enterprises and restructuring of the sales cooperatives summarise the major parts of the programme. A major additional rather new tool is the direct income support determined depending on the cultivated area.

The direct income support (DIS) is intended to provide the farmers with a safety net as a result of the elimination of the current mechanisms of support. The DIS is not contingent on input use or output production decisions of the farmer, and hence it is decoupled. Currently, the payments are moderately targeted. The farmers are eligible to receive a fixed amount of payment up to 50 hectares of cultivated land. The government intends to make the DIS payments more targeted towards the poor in the future.

Removal of price support to fertiliser started before the reform programme. The fertiliser subsidy has been held constant in nominal terms since 1997, resulting in a reduction of the unit subsidy from approximately 45% of the total price at the end of 1997 to approximately 15% in 2001. Gradual efforts to subsidise the credits to agriculture through the Agricultural Bank have been successful. Apart from extraordinarily high level of interest rates periods, the subsidy element has been removed.

The procurement prices of grains (especially wheat) by Soil Products Office (TMO) have been linked to world prices. For instance, the procurement price of wheat in 2000 was 35% higher than the Chicago Board of Trade price. The sales price for grain of TMO will be set at no less than the lower of either the purchase price of TMO plus storage costs incurred up to the date of sale including imputed interest charges on stocks, or the tariff-inclusive import parity price for grain of equivalent quality. TMO's procurement quantity remained limited due to the financial restrictions. The output price support is mainly achieved through the import tariffs which remain at 45-55%.

Reduction in state involvement in tobacco, sugar and tea are closely linked with the privatisation of the related agricultural state economic enterprises. Despite the fact that the legislation on tobacco and sugar was completed, there has not been any development in the privatisation. The production of all three crops declined sharply since 2001.

The government had a dominant role in the agricultural sales cooperatives. The major sales co-ops are in the purchase and processing of cotton, hazelnuts, sunflower and olives. Until the enactment of the new Agricultural Sales Cooperative and Agricultural Sales Cooperative Union Law in mid-2000, cooperatives were mainly channels for implementation of government programmes rather than member-owned cooperatives. Funded by government, the cooperatives were put under the supervision and direct control of the Ministry of Industry and Trade. The restructuring Board of co-ops is still trying to make them independent and responsible for their own finances, management and operations.

As it is apparent from the short description above, the principal aims of the Agricultural Reform Implementation Project (ARIP) are to diminish both the efficiency costs and the budgetary burden of support to agriculture. A brief overview of ARIP, together with the recent impact evaluation and future developments are provided in the Box below.

2.2 Agricultural Support Indicators

After the middle of 1980s, Turkey may be considered as a perfect example of mismanagement of agricultural policies. The governments were unable to develop any policy to improve the productivity in the agriculture and combined with frequent early elections, the only alternative they considered to implement was transfer policies. The transfers to producers mostly occurred from consumers through support purchases for major crops backed by high tariffs. The transfers to producers from the taxpayers did not reach relatively high levels, but were accompanied by huge financial costs. Most of the direct transfers from the state, i.e. deficiency payments, were not budgeted and the funds of the state banks were utilised without paying back in due time. Another channel increasing the financial costs of support purchases cropped up through the related state economic enterprises (SEEs) and Agricultural Sales Cooperatives Unions (ASCUs). SEEs responsible for implementing agricultural policies (TMO for grains, Tekel for tobacco, TurkSeker for sugar, Caykur for tea) had to borrow at market rates and eventually had to either write them off as 'duty losses' or receive capital injections. Although not officially considered to be state organisations, ASCUs were used as policy-implementing agencies of the government with revolving credit lines from the state which are topped up when needed. These developments combined with over employment and inefficient management practices, all policy implementing agencies in the sector became almost fully dependent on the financial resources of the state.

Stagnation of growth in agriculture is not valid for all sub-sectors. Cereals and pulses have a negative impact on the growth of output. Among cereals yield decline, especially of wheat is the major source of this negative contribution. The negative contribution of these major crops is offset by industrial crops, tuber crops, vegetable and fruits (Akder, Kasnakoglu & Cakmak, 2000).

Box 1. Agricultural subsidy reform of 2000 and the future

The unsustainable fiscal, economic and social costs of agricultural policies led Turkey to reform the agricultural subsidy system in 2000 to contribute fiscal stabilisation and to promote allocative efficiency. The reform named as "Agricultural Reform Implementation Project" (ARIP) focused on three main themes:

1. The first was to phase out the government intervention in the output, credit and fertiliser markets and the introduction of direct income support (DIS) for farmers through per hectare payment independent from the crop choice.

2. The second theme, closely related to the output price support of the first theme, has been the commercialisation and privatisation of state economic enterprises, including TURKSEKER (Turkish Sugar Company) and TEKEL (Turkish Alcohol and Tobacco Company); restructuring of TMO (Soil Products

> Office) and quasi-governmental Agricultural Sales Cooperative Unions (ASCUs) which in the past intervened to support certain commodity prices on behalf of the government.
>
> 3. One-time alternative crop payments formed the third theme. It provided grants to farmers who require assistance in switching out of surplus crops to net imported products. The programme was intended to cover the costs of shifting from producing hazelnuts, tobacco and hazelnut to the production of oilseed, feed crops and corn.
>
> Deficiency payments for oilseeds, cotton, olive oil and corn complete the basic policy scene in Turkey.
>
> Participation in alternative crop payments has been limited due to mixed signals the farmers receive from the government. They are not convinced that the government will shift to regulatory position in hazelnuts, sugar and tobacco. Tobacco farmers have displayed the highest participation rate due to the Tobacco Law which stopped TEKEL from acting as the price maker in the market, and the price formation has been left to the bidding mechanism. Tobacco and Sugar Laws paved the way for the privatisation of TEKEL and TURKSEKER. The cigarette and alcohol product companies of TEKEL were put up for privatisation. The alcohol products company was privatised, but the tender for the cigarette company was canceled. The Sugar Law puts strict quotas at the plant level. The quota classification follows the current EU structure with a slight difference in the isoglucose quota which includes glucose in the Turkish case. In the grain sector, TMO reduced its volume of intervention purchases. Despite the delay, DIS payments were made to farmers amounting to a total of €1.5 billion in 2004, as partial compensation for the removal of the old system and to form a dependable base for the national farmers' registry.
>
> The government intends to restructure ARIP and to add new components. Starting from 2006, the weight of DIS payments in the total budgetary support to agriculture will be decreased. The payment per hectare will remain constant in nominal terms, but the payments will be more targeted. The share of crop-specific deficiency payments, alternative crop grants and support to livestock production will slightly increase. The new items in the short term are related to environmental protection schemes, crop insurance support and a pilot project on participatory rural development.
>
> Medium-term policy agenda items of the government include promotion of a sustainable rural finance system; increased expenditures in rural infrastructure targeted to irrigation, storage and marketing facilities and expansion of agricultural extension activities.

This rather dismal performance of the sector coincided with an increase in the transfers to producers. Prior to the start of structural adjustment programme in 1999, total producers' subsidies in Turkey showed a significant increase. The contribution of agricultural policies to the farmers' revenue increased by 2.7 folds, from $2.7 billion to $7.6 billion from mid-1980s till the end of 1990s (Table 13). The general effects of ARIP are noticable with a significant decline in support to agriculture in 2001. The state intervention in the output markets was severely restricted in 2001, coupled with the delayed implementation of direct income support. The domestic market has been adjusting fast. The market price support provided by the border measures seems to be picking up again in 2002.

Table 13. Producer support and transfer to agriculture in Turkey ($ million)

	1986-88	1997-99	1999	2000	2001	2002*
Producer support estimate	2,670	9,285	7,636	6,766	2,251	6,080
Market price support	1,702	7,238	5,589	5,651	1,554	4,552
Total support estimate	2,983	12,939	12,087	10,491	5,410	7,733

* Provisional estimate.

Sources: OECD (2001) and (2003).

Another category in the total transfers is the General Services Support Estimate (GSSE) which consists of private or public general service provided to agriculture generally and not individually to farms. Simply put, it is just the difference between the total transfers and PSE. The most important item in this category is the financial cost of the intervention agencies. The burden of the mismanagement before 2000 is still playing an important role in the total transfers. Historical costs of intervention agencies are close to the transfers individually received by the farmers.

The increase in the financial cost of the intervention can be easily seen in Table 14. The share of GSSE in total transfers increased from 11% in 1986-88 to almost 60% in 2001.

Table 14. Indicators of transfers to agriculture (percent)

	1986-88	1997-99	1999	2000	2001	2002*
TSE/GDP	3.5	6.7	6.5	5.3	3.6	4.1
Percent PSE	13.9	26.3	22.8	21.0	10.0	23.0
GSSE/TSE	11.1	28.4	36.8	35.5	58.4	21.4
R and D/TSE	2.0	0.3	0.2	0.2	0.6	0.4
Percent CSE	-12.9	-25.8	-22.0	-22.0	-8.0	-19.0

* Provisional estimate.

Sources: OECD (2001) and (2003).

The share of total support in GDP increased from 3.5% to almost 7% in the late 1990s. It declined to 4.1% in 2002. Percent CSE indicates the major source of transfer to agriculture is consumers who are taxed through distorted domestic prices. About three third of the supports to producers are achieved by market price support (Table 15). The remainder falls on the taxpayers with one-fifth of the total as direct income payments.

Table 15. Types of producers' support (percent)

Type of Support	1986-88	1998-99	1999	2000	2001	2002*
Market price	64	78	74	84	69	75
Payments based on output	0	2	4	5	20	3
Payments based on area	0	0	0	0	0	0
Payments on historical entitlement	0	0	0	0	3	20
Payments based on input use	36	20	22	12	8	2
Others	0	0	0	0	0	0
Total	100	100	100	100	100	100

* Provisional estimate.

Sources: OECD (2001) and (2003).

To sum up, the average total transfer to agriculture between 2000 and 2002 was about $8 billion, significantly lower then 1998-2000 period with $11 billion. Consumers' transfers through higher prices amounted to $4 billion, and the remaining $1 billion was paid to the farmers from the budget. General services' expenditures, $3 billion, made up the rest of the total transfers. A major item in the GSSE for Turkey reflects the costs of the state intervention agencies and cooperatives in the past. The only encouraging development in the support to agriculture is the weight given to decoupled payments. DIS payments made up 20% of PSE in 2002 (Table 15).

The agricultural subsidy reform programme not only contributed significantly to fiscal stabilisation but also started to benefit the consumers, and compensating almost half of the income loss imposed on Turkish farmers by the cuts in agricultural subsidies through the DIS payments (Mundell et al., 2004). DIS payments need further scrutiny, since it is the preferred type of support in the WTO-Agreement on Agriculture and in the simplified scheme for the direct payments to the recent member states of EU. The coverage and level of DIS payments are provided in Table 16.

Table 16. Direct income support payments, 2001-03

Year[a]	Registered farmers (1000)	Registered area (1000 ha)	DIS Payments (NTL 1,000)	DIS Payments (€1,000)[b]
2001	2,193	11,821	1,182,095	946,685
2002	2,593	16,080	2,170,831	1,279,994
2003	2.765	16,650	2,664,023	1,535,911

[a] The payments for the intended years were delayed and made in two instalments.
[b] The conversion to Euro are made according to the periods of actual payment at the banknote selling rates.
Source: UT (2004) and CB (2004).

With DIS fixed per hectare payments, the ceiling level was 20 ha for the eligibility in 2001 which was expanded to 50 ha afterwards. DIS payments helped also to form a dependable national farmers' registry. The transferred amount was at least satisfactory under the tight budgetary measures. The average per registered farm increased from €432 for the 2001 payments to €555 for 2003.

The regional distribution of the agricultural subsidies depends on the regional distribution of agricultural production value, the commodity composition of regional agricultural production value, subsidised input use intensity by regions, the composition of agricultural support by commodities, and input subsidies.

In summary, it can be concluded that the market price component of agricultural support policies did not significantly alter the relative regional distribution of income (in the Gini coefficient sense) due to product differentials among regions. It is however clear that this component of agricultural support has contributed significantly to the widening of absolute income differential between the regions of Turkey, as most of the benefits went to the higher income regions. As far as the input cost-reducing component is concerned, we can conclude that agricultural policies have contributed to the widening of relative as well as absolute income inequality, as the higher income regions use subsidised inputs relatively more intensively than the lower income regions (Kasnakoglu and Cakmak, 2000).

3. Trade and Trade Potential

The budgetary and trade implications of membership will certainly affect the accession negotiations. Preliminary estimates may pave the way towards more productive negotiations, and lead to more effective use of domestic and EU funds during the pre-accession phase.

Agriculture may be considered in the customs union (CU) through the processed agro-food products. Concessional trade agreements in agriculture will be replaced gradual market opening. Including agricultural products in CU may be considered as a feasible option, starting with double zero agreements in selected products. The path and coverage of potential trade agreements need to be identified.

3.1 Recent Trends in Trade

The import compensation rate of exports varied between 51% and 70% from 1996 to 2002. Historically, Turkey is a net exporter in agricultural products (excluding farm inputs). Net exports with EU remained positive during the considered period, while the total fluctuated following the adjustment programme (Figure 1). The shares of agricultural exports and imports declined steadily from 21% and 11% in 1996 to 11% and 8% in 2002, respectively (Table 1).

Figure 1.
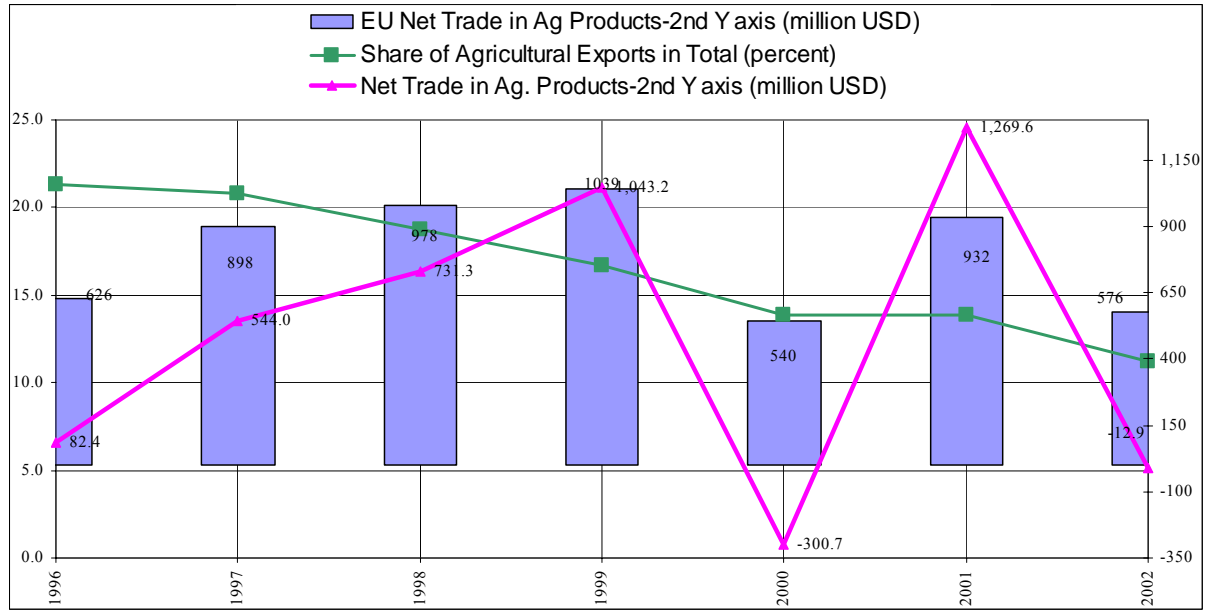
Sources: Tables A1 and A2 in Annex.

As expected, fruits and vegetables have significant shares in total agricultural exports (Figure 2). The other important export sectors are cereals and cereal products; and honey, sugar and sugar confectionary.

Figure 2. Share in agricultural sector exports
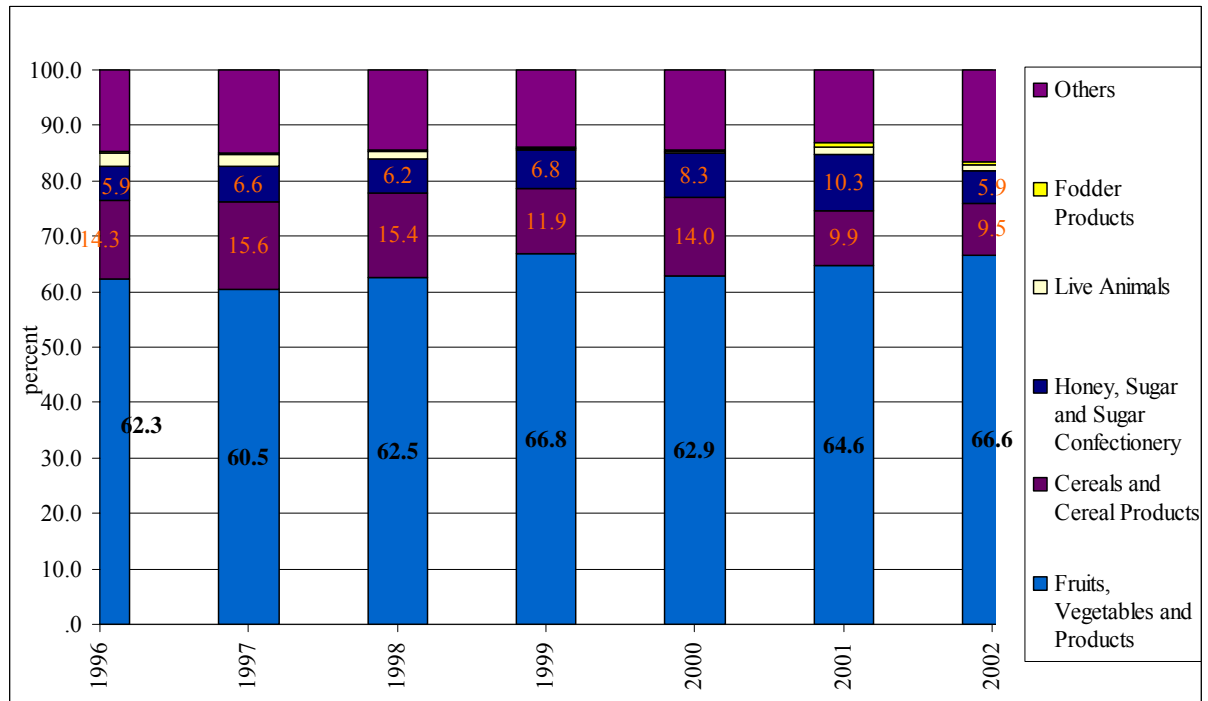
Sources: Tables A1 and A2 in Annex.

Agricultural raw materials, particularly raw hides and skins, leather and textile fibers and fiber scrap, take precedence on the import side with more than half of the total (Figure 3). Cereals and cereal

products; fruits, vegetables and products; fodder crops; tobacco and tobacco products; animal and vegetable oils, fats and waxes; oilseeds and oleaginous fruits complete the agricultural imports.

Figure 3. Share in agricultural exports & imports
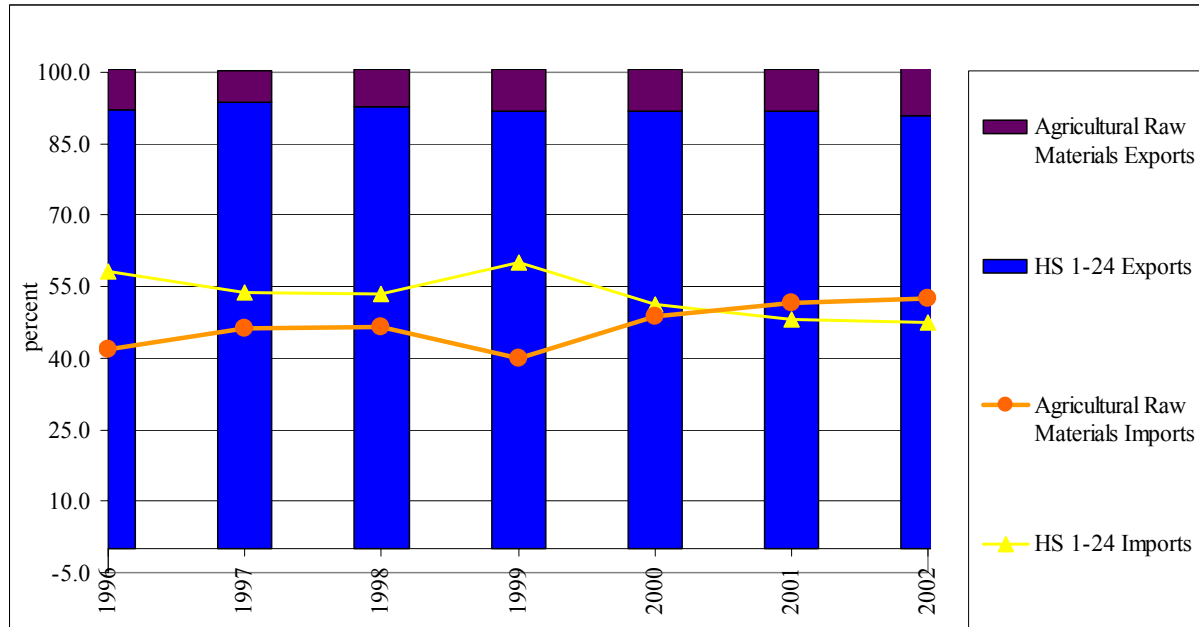
Sources: Tables A1 and A2 in Annex.

Cagatay and Guzel (2003) used Lafay[1] index to analyse the competitiveness and comparative advantage of trade flows. The index shows the absolute excellence achieved by the fruit and vegetable sector which has the by far the highest index of competitiveness value. Contrary to expectations, the important sectors such as cereals, beverages and tobacco the index has a negative value thus highlighting de-specialisation and the comparative disadvantage of Turkey in international markets.

In the last ten years Turkey's agricultural exports to the EU has increased by almost 10 percentage points. The European Union accounts for more than half of Turkey's fruit and vegetable exports. The relative importance of exports in food processing preparations, sugar-based products, fats and oils and animal feed has decreased. The flow of imports from the European Union is also significant (although not as important as exports) and accounts for approximately 25% of the total. This percentage has remained more or less stable during the period in question. The most significant imports from the EU are oils and fats; beverages and tobacco; coffee, tea and spices; animal feed; and dairy products.

The share of fruits and vegetables in total remained consistently around 60% during the considered period. Cereals and cereal products together with the sugar confectionary exports have increased their shares in recent years (Figure 4).

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[1] $L_i = \dfrac{(X_i + M_i)}{\sum\limits_i (X_i + M_i)} * \left[\dfrac{(X_i - M_i)}{(X_i + M_i)} - \dfrac{\sum\limits_i (X_i - M_i)}{\sum\limits_i (X_i + M_i)} \right]$; where L is the Lafay index, X is exports and M is

imports for sector i. The positive value of the index indicates comparative advantage comparative advantage.

Figure 4. EU share in agricultural exports, 1996-2002
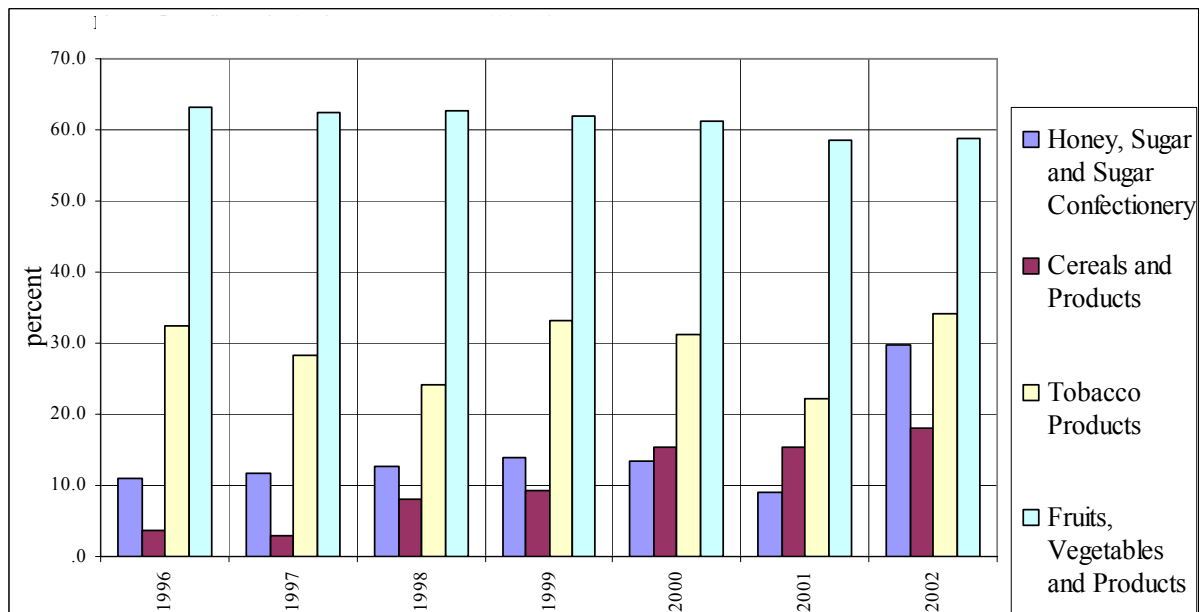
Sources: Tables A1 and A2 in Annex.

The imports of Turkey in the sector are more diversified than exports. Animal and vegetable oils, fats and waxes imports are relatively less volatile then the others (Figure 5).

Figure 5. EU share in agricultural imports (1), 1996-2002
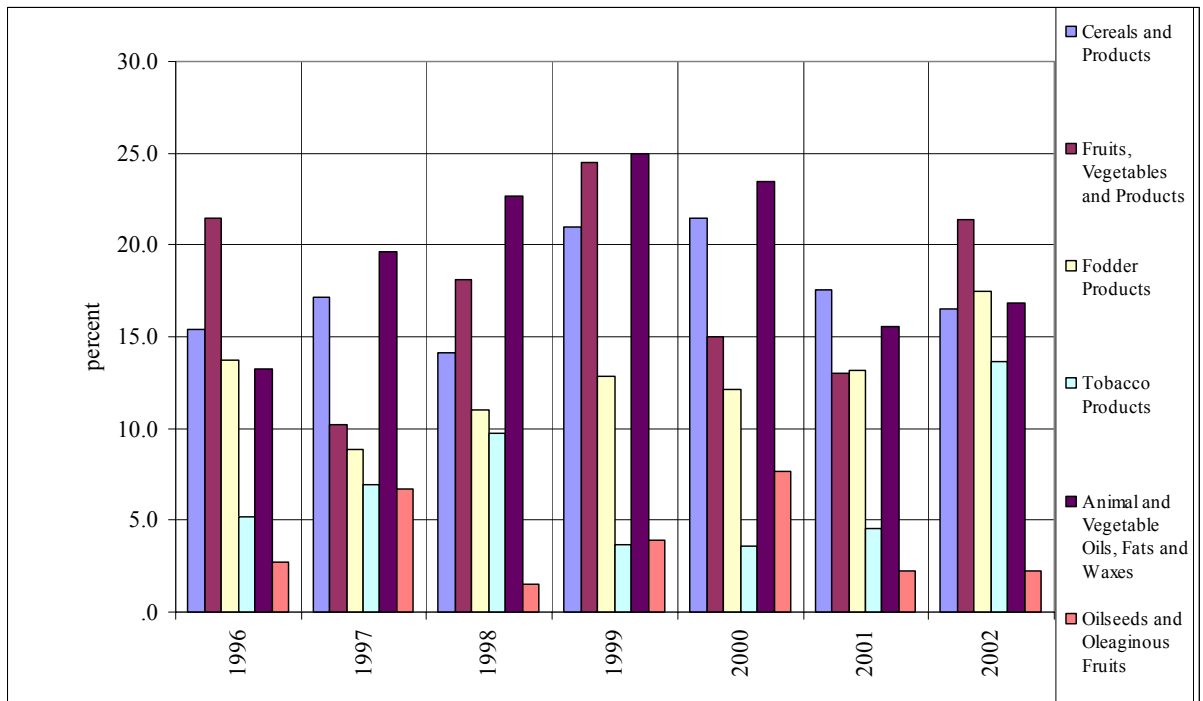
Sources: Tables A1 and A2 in Annex.

EU is a major import partner for Turkey in agricultural raw materials. Raw hides and skin, and textile fibres (especially cotton) have fluctuating but significant shares in Turkey's imports from EU (Figure 6).
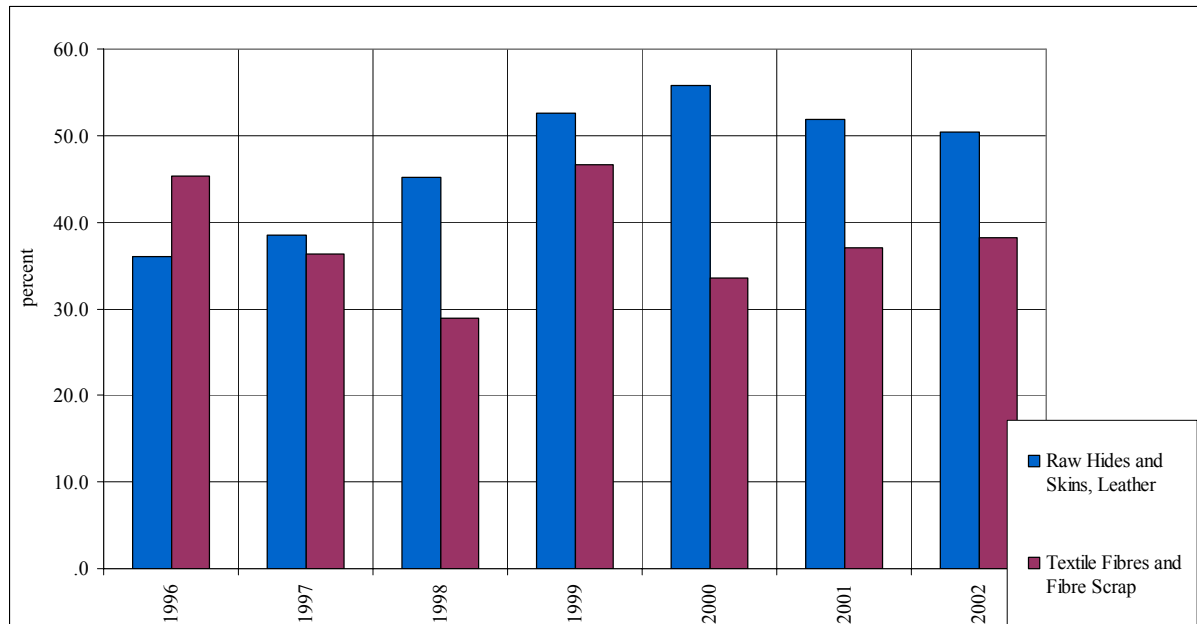
Figure 6. EU share in agricultural imports (2), 1996-2002

Sources: Tables A1 and A2 in Annex.

Analysis of the competitiveness of agro-food trade flows, with particular reference to the EU, shows that Turkey has a low level of sector specialisation, and a comparative advantage in only five of the sectors under consideration (fruit; preparations of vegetables and fruit; vegetables; olive oil and preparations of meat and fish).

Having settled the competitiveness of the agricultural sector under the prevailing border policies, simple measures of intra-industry trade may provide additional information about the structure of the trade flows between Turkey and EU. On the other hand analysis of intra-industry specialisation for Turkey's agro-food trade via using Gruber and Lloyd index[2] shows significantly high values for various products and an increase in the indicators for nearly all the sectors in question. The results indicate that agricultural trade between Turkey and the EU is characterised by a high and increasing level of product overlay, particularly for those categories of goods subject to processing before they reach the final customer. Therefore the intra-industry specialisation identified is mainly based on the vertical differentiation of the goods traded. It can be concluded that there is an appreciable level of complementarities between the two production systems (Cagatay & Guzel, 2003).

Major agro-food export and import products (with more than 75% share in total between 1996 and 2002) of Turkey are presented in Table 17. Among these products six of them (soft wheat and mixed grains; lentils; sunflower and cotton seed oil; animal and vegetable oils, fats (other); tobacco leaf and scrap; and cotton lint and scrap) were observed to be both exported and imported. Turkey is a net importer of these products in international trade except for lentils, and tobacco leaf and scrap.

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[2] $IIT_i = 1 - \dfrac{|X_i - M_i|}{(X_i + M_i)} * 100$; where IIT is the Gruber & Lloyd's inter-industry trade index, X is exports and M is imports for sector i.

Table 17. Main export and import commodities

Exports	Imports
Durum wheat	Maize
Soft wheat and mixed grain	Soft wheat and mixed grain
Barley	Lentils
Chickpeas	Paddy
Lentils	Rice
Flour of wheat and mixed grains	Banana
Bread, cake, biscuits	Sunflower seed
Pasta	Soybeans
Tomatoes (fresh, frozen, dried)	Vegetable seeds
Cucumbers (fresh, frozen)	Soya oil
Hazelnuts (without shell)	Palm oil
Figs (fresh, dried)	Sunflower and cotton seed oil
Raisin and grapes	Coconut, palm seed oil
Citrus fruits	Animal and vegetable oils, fats (other)
Cherries	Tobacco leaf and scrap
Apricots	Harmonized tobacco and tobacco substitutes
Various spices	Cotton lint and scrap
Flour and paste of fruits	Wool and hair
Apple juice	Fat of cattle and goats
Olive oil	
Sunflower and cotton seed oil	
Animal and vegetable oils, fats (other)	
Tobacco leaf and scrap	
Cotton lint and scrap	
Margarine	
Live sheep and goats	

Source: Cagatay & Guzel (2003).

3.2 Overview of the Trade Policy Environment between EU and Turkey

Agriculture does not operate in a vacuum. Historical trade flows and mutual competitiveness in the agricultural products are affected by the trade policies as well as the macroeconomic environment and domestic sector specific policies. Fluctuations in trade volume reflect partly rather unstable macroeconomic conditions and the mismanagement of the agricultural policies of Turkey prior to stabilisation programme. However, trade policy environment between EU and Turkey bears a higher weight in determining the past flows. Turkey established a customs union (CU) with the EU in 1996. Agriculture was not included in the CU, and continued to be the subject of preferential trade agreements between Turkey and EU, as it was before the CU. Preferential trade agreements are classified in two product groups: First is the agricultural products, and the second is highly processed agricultural products.

EU definition of agricultural products (called 'Annex II' products) comprises primary agricultural products and slightly processed agricultural products such as flour, olive oil and fruit juices. Preferences granted to Turkey comprise of reduced MFN tariff rate and zero tariff rate with no application of entry price for the products that EU applies MFN tariff and/or entry price. More than

60% of Turkey's agricultural exports to the EU faced no trade barrier, and another 36% were subject to reduced tariff rate in 2001. The main products are fruits and nuts, vegetable and fruits preps, vegetables and tobacco, and the total is about €2 billion (Grethe, 2004). High percentage of preferential exports of Turkey may be misleading for the future developments since the overall protection of the EU for the agricultural sector remains high, and for some major exports products of Turkey (fruits, vegetables and processed products) seasonal ad valorem tariffs and tariff rate quotas (TRQs) are applied.

Preferential trade agreements on highly processed agricultural products (non-Annex I and Table 2) did not expand the volume of mutual exports and imports (Grethe, 2004). These agreements split the industrial and agricultural components of a product. The tariff on industrial component is zero by the CU, and the agricultural component is subject to tariff reflecting the preference granted for the basic product. The overlap of the highly processed products and agricultural products may be cited as the major reason for limited trade volume. The share of EU in the total processed agricultural exports of Turkey was only 14% in 2002 (UFT, 2004).

Turkish preferences granted for agricultural products originating from the EU mainly consist of TRQs with no tariff. Import ban of Turkey on meat, and the requirement of obtaining control certificates for imports are the major factors which prohibits a reasonable impact assessment of the preferences.

4. The Effects of the Customs Union on Agriculture and Membership

Despite the preferential trade arrangements between Turkey and EU, several tariff and non-tariffs barriers play crucial role in determining the trade flows. It may be misleading to base the impact of market opening in agriculture only on the past trends. Cakmak & Kasnakoglu (2002) and Grethe (2004) conducted impact analysis of CU and membership using two disaggregated sector-specific modeling approach with different methodologies.

As described in the second section, agricultural production in Turkey is highly diversified due to the variety of soils and agro-climatic conditions. The structure of production presents a challenging diversity with the regions having both common products and regional specialties. The techniques of production for the common products are quite different among regions because of the differences in climate and resource endowments. The diversity in production points out an unusually interdependent production structure on the supply side. Inter-subsectoral dependencies are as important as the intra-subsectoral dependencies. In addition, on the demand side, the regions compete with each other for access to the same national and foreign markets, on the one hand. On the other hand, demand for feed is in fierce competition with the demand for food.

Given this complex set of linkages, interactions among products, regions, and techniques of production will determine the impact of various changes in agricultural policies when Turkey starts opening the market in agricultural products and eventually becomes a member of EU. To take into account the interactions involved in the sector for the evaluation of policy effects and growth possibilities, Cakmak & Kasnakoglu (2002) constructed a regional, partial equilibrium, static optimisation model, called TASM-EU (Turkish Agricultural Sector Model). Grethe (2004) designed TURKSIM (Turkish Simulation Model) for a similar purpose. TURKSIM is a static comparative model comprising iso-elastic behavioural functions of farm supply at a regional level with some processing activities.

4.1 TASM-EU and the Results of the Model

The model is a non-linear optimisation model. It maximises Marshallian surpluses and incorporates a technique known as Positive Mathematical Programmeming (PMP) to overcome the overspecialisation problem in production by using the information provided by the actual actions taken by the farmers. It provides an internally consistent quantitative framework of analysis to study the impact of changes in

resource prices, resource availabilities, policies, techniques of production and economic growth on the location, production, consumption and price of agricultural commodities.

The base period of TASM-EU is the average of the years 1997, 1998 and 1999. All policies and input-output relations pertaining to the base period are incorporated in the model. The model response to the changes in the policy environment, i.e. world prices, subsidies, trade measures etc., are through changes in the returns and costs of products due to the calibration method used in the model.

The first scenario describes a 'no membership' situation (Out-EU). The possible domestic and trade policies in 2005, population and income growth from the base period to 2005, and world price estimates are included in the model. Turkey is a member of the EU in the second scenario (In-EU). The recent enlargement process of EU indicated that the conditions of integration may change as the access time approaches. For this reason, three different simulations are conducted under the In-EU scenario. The first two are related to the uncertainties of accession, and the third is dependent on the domestic production environment in Turkey.

It is necessary to indicate few important points about the coverage of the model before getting in the details of the simulations and the results. It is obvious that the rural and agricultural structure will be in the forefront during the accession negotiations. The model does not include structural and rural policies. The model assumes that Turkey will comply with all quality, food safety, and health standards of EU. Lastly, the model does not incorporate possible changes in the income of the consumers due to the EU membership. EU membership shows its impact immediately in the model with the implementation of CAP in Turkey.

Three simulations are conducted under the In-EU scenario. All EU policies, but compensatory payments are incorporated in the first simulation (In-EU1). This simulation reflects the Customs Union (CU) in agricultural products. It is clearly stated in CU Agreement of 1996 that CU in agriculture is possible if Turkey converges to CAP. The second simulation (In-EU2) includes the compensatory payments. The third simulation (In-EU3) is aimed to measure the impact of a domestic policy measure that is vaguely discussed under the ongoing agricultural policy reform programme in Turkey. The only difference of In-EU3 from In-EU1 is productivity enhancement in livestock production by 5%. The structure of simulations is described in Table 18.

Table 18. Structure of scenarios conducted with TASM-EU

	1997-1999 base period	Scenarios for 2005			
		Status quo	Member		
Abbreviation	BP	Out-EU	In-EU1	In-EU2	In-EU3
	All parameters and variables average of 1997-99.	Turkey out of EU in 2005.	Turkey in EU in 2005; CAP and EU prices are included, except compensatory area payments.	Turkey in EU in 2005; Compensatory area payments included.	Same as In-EU1; Techn. improv. in Turkey's livestock production
Agricultural policies	-Intervention purchases -Deficiency payments (period's average) -Fertiliser subsidy	-Intervention purchases -Deficiency payments (year 2000) -No fertiliser subsidy -Restrictions on tea, tobacco, hazelnut and sugar beet.	-EU-CMO applied -No deficiency payments -No fertiliser subsidy -Restrictions on tea, tobacco, hazelnut and sugar beet.	In-EU1 and compensatory area payments for cereals, oilseeds and set-aside included	Same as In-EU1
Growth of population income		Average/year 1.5% 2.0%	Same as Out-EU	Same as Out-EU	Same as Out-EU

Technological development		210,000 ha increase in irrigated area: GAP 150,000 Rest 60,000	Same as Out-EU	Same as Out-EU	In-EU1 and 5% improvement in livestock yields
Foreign trade prices, market access and other border policies	-Trade prices, tariffs and exports subsidies are averages of 1997-99 -Observed foreign trade quantities	-Prices adjusted to the changes in world prices -Adjusted WTO commitments -Export subsidies same as BP -Improved market access	-EU prices adjusted to the changes in world prices -Impact on EU prices for some products -No border intervention to EU -Improved market access	Same as In-EU1	Same as In-EU1

Source: Cakmak & Kasnakoglu (2002).

It is possible to analyse the results of the simulations at different aggregation level given the structure of the model above. Welfare impacts of various scenarios may be supplemented by the crop specific, regional direct and indirect effects of policy changes on the area, production and input costs. The results will be discussed from aggregate towards more disaggregate levels by emphasising the most important effects.

The agricultural policies in Turkey, as well as in EU, are continuously changing. Moreover, the accession conditions of the past enlargements displayed major differences. The results of the simulations are valid only under the assumptions of the policy environment and the expected values of exogenous parameters. Hence, they do not and cannot reflect the potential impact of EU membership under all conditions.

Total producers' and consumers' surplus measures are the aggregate measures to evaluate the impact of membership. Producers' surplus roughly indicates the return from all production factors not included in the variable costs. Consumers' surplus is the additional benefit to non-marginal consumers.

The general results, including the welfare measures, are presented in Table 19. The total surplus is expected to increase in 2005 independent from the EU membership. The total surplus is expected to increase by 20% without membership. More than half of the increase is due to the growth in income and upgraded agricultural resources. Membership of EU in 2005 will bring an additional 1% increase in total surplus. The set-aside requirement to be eligible for the area payments decreases the total welfare, whereas productivity improvement in livestock production increases the welfare impact of the membership.

Similar results of simulations in total surpluses are significantly different for the producers and consumers. No membership scenario causes 15% increase in the producers' surplus. The basic cause of this increase is due to the fact that the increase in the demand is not matched by the increase in production, and furthermore the sector continues to operate at high protection levels. Especially with the expansion of imports in livestock products, the consumers' surplus goes up by 24%. The negative impact of the removal of the fertiliser price subsidy on producers is matched by the positive impact of irrigated area expansion and changes in cropping pattern.

The welfare results are totally different in membership and no-membership scenarios. Producers' surplus decreases by 16%, whereas the consumers' surplus increases by 12% if Turkey becomes a member in 2005. A high proportion of consumers' surplus in total causes a 2% improvement in total surplus. The simulation with area compensation payments (In-EU2) results in slightly reduced welfare impact since the payments are not included in surplus calculation. The technological improvement in the livestock sector is effective in increasing the performance of the sector.

Table 19. General results of TASM-EU scenarios ($ million)

	BP	2005			
		Out-EU	In-EU1	In-EU2	In-EU3
Total surplus (Index)	**100**	**120.5**	**123.1**	**122.8**	**123.9**
Producers' surplus	100	115.0	96.7	96.6	98.2
Consumers' surplus	100	123.6	137.7	137.2	138.0
Total production					
Volume*	31,996	34,511	30,930	30,496	32,315
Value	31,996	39,231	30,600	30,467	31,613
Compensatory area payments	-	-	-	2,453	-
Crop production					
Volume*	21,475	22,627	22,784	22,417	22,764
Value	21,475	25,387	24,435	24,347	24,498
Compensatory area payments	-	-	-	2,453	-
Livestock production					
Volume*	10,521	11,885	8,146	8,080	9,551
Value	10,521	13,934	6,164	6,119	7,115
Total consumption					
Volume*	27,578	32,142	34,623	34,564	34,683
Expenditure	27,578	35,727	31,366	31,543	31,241
Crop consumption					
Volume*	16,875	19,325	19,667	19,613	19,658
Expenditure	16,875	20,859	20,046	20,215	20,077
Livestock consumption					
Volume*	10,703	12,818	14,955	14,951	15,027
Expenditure	10,703	14,868	11,320	11,328	11,164
Net exports	**1,980**	**899**	**-2,797**	**-3,064**	**-1,917**
Crop Products	2,150	1,530	2,256	2,038	2,127
Livestock Products	-170	-631	-5,053	-5,101	-4,045
Price Indices	**100**	**112.75**	**95.06**	**95.84**	**94.89**
Crop products	100	110.29	104.35	105.49	104.70
Livestock products	100	117.77	76.09	76.16	74.84

Note: See text for the scenarios.

* Model results at the base period prices.

Source: Cakmak & Kasnakoglu (2002).

In fact, the overall results are similar to the welfare impacts. Assuming that the EU and Turkish agricultural policies remain intact, the membership will be beneficial to the consumers and will hurt the producers. The prices of important products, such as cereals and oilseeds, in policy formulation in both the EU and Turkey are expected to be close to the world prices in EU and hence in Turkey too. In addition, the prices of livestock products seems to be more in line with world prices in the EU than in Turkey, if Turkey stays out of the Union in 2005.

The values of production and consumption in Table 19 are calculated in two different ways: First is with the 1997-99 prices, the other with the model's prices. Both values are in current US dollars. The volume of agricultural production declines in all cases, except in a no-membership scenario and improvement in livestock technology. The volume expansion by 8% in member scenario turns out to be -3% in the non-member scenario. The change is more drastic if the changes in prices are taken into account. The value of agricultural production increases only in non-member scenario. The membership scenario provides 22% decline in value. The area compensation payments compensate 7 percentage points of the significant decline in farmers' revenues. Improvement of production technology stems as another policy to diminish the negative impact of membership on the producers.

The results on crop and livestock sub-sectors are strikingly different. The situation in the livestock sector mainly reflects the backward production conditions in the livestock despite high tariffs combined with non-tariff protection. The overall crop production seems to stay competitive even in the case of membership. The volume of crop production increases by about 5% in all simulations. Trade liberalization with the EU brings about 13% increase in the value of crop production through the changes in the price structure. The area compensation payments for cereals and oilseeds provide about 10% additional increase in the farmers' revenues. Another interesting result is obtained through the sub-sectoral interactions between the crop and livestock production. The improvement in the livestock production technology pushes up the value of crop production.

Both the volume and value of livestock record significant reduction in the membership scenario. The livestock production volume and value increase by 13% and 32%, respectively due to the expansion in demand coupled with high protection in the non-member scenario of 2005. Yet, the volume is reduced by 22% and the value by 40% compared to the base period if Turkey becomes a member in 2005. The protection on the livestock products in EU remains high, despite the changes in policy. Turkey will not have a chance to compete with EU under the prevailing production structure. Yet, even slight improvement in the livestock yield improves the volume by 17% and the value by 15%.

Total, crop and livestock consumption increase in all scenarios, but more significantly in case of membership. No-membership brings about 16% expansion in consumption. Membership causes a further increase of 10 percentage points. However the impact on consumption expenditures is quite different. The 30% increase in consumption expenditures in the case of no-membership is down to 14% increase when Turkey becomes a member in 2005. As expected the impact of membership is quite different at the sub-sectoral level. The volume of crop consumption increases by 15% in non-member scenario, with similar increase of 17% in the membership scenario. Increase in consumption expenditure is almost the same in member scenario, but no-membership results in 10 percentage point higher expenditures than the change in the volume.

As expected, large discrepancies occur in volume and value of consumption of livestock products. In all membership simulations the volume of consumption increases by 40% relative to base period, and by 13% relative to no-membership scenario. However, the picture is quite different in livestock consumption expenditure. The consumption expenditure is up by 40% in no-member case, whereas the same rate of change is only 5% in case of membership. The membership causes the consumers to save almost 25%, and hence a relatively high consumption level is achieved at a much lower cost. Higher proportion of consumption is provided from domestic production, with almost no impact on consumption level in the case of yield improvement in livestock sector.

It is obvious that net exports will be affected from the changing production and consumption conditions (Table 19). The total net exports of raw and processed products in raw equivalent form amounted to about $2 billion in the base period. The total of imports of livestock products in the same period was $0.2 million (Figure 7). Trade liberalisation with EU combined with the expansion of demand brings about more favourable conditions for imports compared to exports, especially in the livestock products. The non-member scenario for 2005 gives the necessary signals for an unfavourable export conditions. Total net exports decline by slightly more than 50%. The exports of crop products are resisting by 28% reduction. The imports of livestock products increase by more than four-folds, and reach $630 million. The CU with the EU causes Turkey to become a significant net exporter in the agricultural products. Total net exports climb to $2.8 billion, despite the increase in the crop products net exports. Without any tariffs and non-tariff barriers with EU, the net imports in livestock products shoot up to $5 billion. The set-aside requirement to be eligible for the compensation payments causes further decline in the net exports. It is important to note that yield improvements in livestock causes a $1 billion decline in the imports of livestock products.

Figure 7. Net imports

<div style="text-align:center">(USD billion)</div>

<div style="text-align:center">▨ Livestock Net Exports   ▦ Crop Net Exports   ■ Total Net Exports</div>
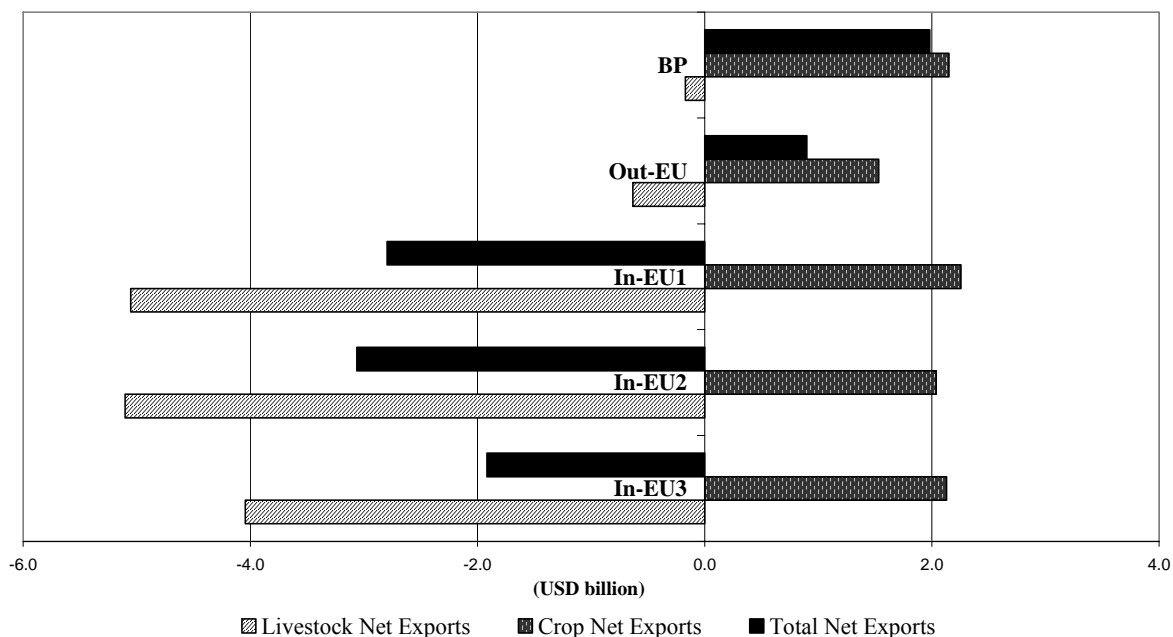
Source: Table 19.

Price indices are calculated for all simulations using the base period production as weights. The overall price level is expected to increase by 13% when Turkey is out of Union, whereas the crop and livestock product prices go up by 11% and 18%, respectively. In the membership simulations, the increase in crop prices is coupled with significant decrease in livestock prices leading to a 5% decline in the level of prices compared to base period, and a 16% decline compared to non-member scenario.

Impact on production volume. All model results are evaluated at the base period average prices. The levels and changes for product groups and for selected products are presented in Table 20.

The sector, faced with a different relative price structure in the case of membership, shows different responses depending on the product. The results on product groups usually hide rather significant changes in specific products. The membership brings about a 10% contraction in overall production level.

The major source of contraction is the decrease in livestock production. The livestock production increases as a response to demand expansion in non-member scenario. Yet, in case of membership the livestock price level declines by about 40% which in turn causes a 30% reduction in livestock production. It is interesting to note that EU livestock prices are generally about two times than the corresponding world prices. The decline in poultry products is relatively less than the 35% reduction in other livestock products.

Crop production shows relatively better performance in the EU member scenario. The volume of crop production excluding the orchards products goes up by half of a percent, the total increases by almost 1%.

Individual products in the groups display differentiated responses to membership. The decline in wheat stems from the soft wheat production. In the member scenario, the production of soft wheat declines by 10%, whereas the durum wheat production expands by 4%. It is important to note that area compensatory payments are not included in the reference membership (In-EU1) simulation. Furthermore, special area payments in the CMO of durum wheat are not incorporated even in In-EU2 simulation. Barley and rice production expand by 9% and 6%, respectively, whereas corn production

declines by 8.7% in the member scenario. Pulses seem to benefit the most from the membership. Chickpea and lentil production increase by more than 15%.

Industrial crops are the most possible candidates to remain competitive with the membership. The production levels of all crops increase. Cotton and sugar beet production increase by 5% and 4%, respectively. EU will become one of the major producers of cotton in the world when Turkey becomes a member. This situation may cause reduction in the target price of cotton and that might have dampening effect on the EU price of cotton. Stagnated tobacco production is due to area control. Both in Turkey and in EU, policy-makers intend to continue to use strict supply control measures for tobacco. EU is trying to take effective quotas and quota management procedures to control the supply by taking into account the special conditions of tobacco farmers. Turkey is trying to enforce quotas with no specific control measures.

Oil seeds appear as the crop product group that will have the highest decline with membership. In tuber crops, onion production is expected to decrease slightly and potato production increase by 1%.

Vegetable and fruit production will go up with membership. All crops in vegetables are expected to increase in production. Tomato for processing seems to have the highest competitive position among the vegetables, followed by cucumber and melons. The orchard products register changes between 1% and 2% in the membership scenario, except for apple and for oil olives. It is necessary to note that the payments for maximum guarantied quantity payments for olives are not included in the model, since the EU intends to revise the payment programme for olives due to its high budgetary burden. The production of citrus, table olive and pistachio will increase between 1% and 2.5%. Tea production remains the same due to area limitation, and the production of the remaining orchard crops declines.

Table 20. Production volumes ($ million at 1997-99 prices)

		2005				Percent change	
	BP	Out-EU	In-EU1	In-EU2	In-EU3	EU1/BP	EU1/Out
Crop production	**21,475**	**22,627**	**22,784**	**22,417**	**22,764**	**6.1**	**0.7**
Cereals	**5,468**	**5,519**	**5,279**	**4,989**	**5,273**	**-3.5**	**-4.4**
Wheat	3,667	3,787	3,463	3,298	3,429	-5.6	-8.6
Barley	1,190	1,159	1,264	1,162	1,279	6.2	9.1
Corn	412	414	378	364	391	-8.2	-8.7
Rice	121	87	93	92	92	-23.3	6.7
Pulses	**756**	**774**	**876**	**841**	**871**	**15.9**	**13.1**
Chickpea	313	329	381	362	379	21.7	16.0
Industrial crops	**3,490**	**3,494**	**3,603**	**3,585**	**3,599**	**3.3**	**3.1**
Tobacco	1,001	999	1,000	1,000	1,000	-0.1	0.2
Sugar beet	1,294	1,162	1,207	1,196	1,205	-6.7	3.9
Cotton	1,195	1,334	1,396	1,389	1,394	16.8	4.7
Oilseeds	**580**	**429**	**403**	**385**	**400**	**-30.6**	**-6.1**
Sunflower	471	330	306	289	304	-35.0	-7.2
Soybeans	19	16	14	13	14	-27.2	-13.7
Tubers	**1,899**	**2,128**	**2,098**	**2,096**	**2,098**	**10.5**	**-1.4**
Vegetables	**4,390**	**5,129**	**5,286**	**5,282**	**5,285**	**20.4**	**3.1**
Fruits and nuts	**4,891**	**5,153**	**5,239**	**5,239**	**5,239**	**7.1**	**1.7**
Livestock products	**10,251**	**11,885**	**8,145**	**8,080**	**9,551**	**-22.6**	**-31.5**
Beef	2,960	3,732	2,224	2,212	2,670	-24.9	-34.1
Milk	3,741	4,290	2,820	2,805	3,355	-24.6	-34.3
Poultry products	1,891	1,913	1,622	1,588	1,875	-14.3	-15.3
TOTAL	**31,996**	**34,512**	**30,930**	**30,497**	**32,315**	**-3.3**	**-10.4**

Source: Cakmak & Kasnakoglu (2002).

The cultivated area is decreased by 10% in the compensation payment simulation of membership scenario. The impact of set aside on the production volume is limited only to 1.3% decline. As it will be seen in the following section area compensation payment is able to compensate the loss in

production. The return of technological improvement in the livestock production is significant. Compared with the no technological improvement simulation, the livestock production increases by 17%. The production of feed crops increases too parallel to the increase in livestock production

Impact on production value, costs and gross income. The production value includes changes both in the prices and in the quantities. The changes in prices are mainly affected by two factors. First is the expected change in the world prices by 2005. Second channel is the change in degree of transmission of the world prices through the intended reforms in CAP. CAP price policies of cereals and oilseeds are drastically revised, and unless the world prices decrease dramatically in the future, the EU internal prices are expected to be formed close to the world prices. The loss of farmers' revenue will be compensated by area compensation payments. No significant changes are expected in the other field crops. Following the policy changes in 2000, the level of the compensation payments for withdrawals of fresh vegetables and fruits has been diminished. Despite the implementation of entry prices, it is anticipated that the prices of the products in this group will decrease. The support was shifted more to payments for maximum guaranteed areas and quantities. The intervention in the beef market aims to push down the supply and intervention price. Reform in the milk and dairy product market was postponed to 2006.

The results on the value of production for product groups and selected products are presented in Table 21. The decline in the prices with the membership is accompanied with drastic decrease in domestic production, and hence the value of livestock production is halved. The decline in the crop production value is slightly less than 4%. Value declines in cereals and oilseeds are compensated by the increase in pulses, industrial crops, vegetables and fruits, and end up about at the same level as the non-member scenario.

Table 21. Value of production ($ million)

		2005				Percent change	
	BP	Out-EU	In-EU1	In-EU2[a]	In-EU3	EU1/BP	EU1/Out
Crop production	**21,475**	**25,387**	**24,435**	**26,800**	**24,498**	**13.8**	**-3.7**
Cereals	**5,468**	**6,127**	**4,295**	**6,350**	**4,366**	**-21.5**	**-29.9**
Wheat	3,667	4,272	2,736	4,035	2,717	-25.4	-35.9
Barley	1,190	1,286	1,135	1,710	1,194	-4.6	-11.7
Corn	412	433	290	429	316	-29.7	-33.1
Rice	121	64	69	68	68	-43.3	6.7
Pulses	**756**	**823**	**933**	**896**	**928**	**23.4**	**13.4**
Chickpea	313	355	411	390	408	31.3	16.0
Industrial crops	**3,490**	**3,384**	**3,860**	**3,841**	**3,855**	**10.6**	**14.1**
Tobacco	1,001	1002	1,004	1,004	1,004	0.4	0.3
Sugar beet	1,294	1,017	1,056	1,046	1,055	-18.4	3.9
Cotton	1,195	1,366	1,800	1,790	1,796	50.6	31.8
Oilseeds	**580**	**261**	**205**	**335**	**204**	**-64.6**	**-21.3**
Sunflower	471	173	125	249	124	-73.6	-27.8
Soybean	19	11	9	13	9	-50.4	-13.7
Tubers	**1,899**	**2,128**	**2,098**	**2,096**	**2,098**	**18.7**	**-5.8**
Vegetables	**4,390**	**6,010**	**6,288**	**6,296**	**6,290**	**43.2**	**4.7**
Fruits and nuts	**4,891**	**6,389**	**6,600**	**6,600**	**6,600**	**34.9**	**3.3**
Livestock products	**10,251**	**13,934**	**6,164**	**6,119**	**7,114**	**-41.4**	**-55.8**
Beef	2,960	3,142	1,335	1,328	1,603	-54.9	-57.5
Milk	3,741	5,868	2,513	2,500	2.987	-32.8	-57.2
Poultry products	1,891	2,071	1,280	1,254	1,480	-32.3	-38.2
Total	**31,996**	**39,321**	**30,600**	**32,920**[b]	**31,612**	**-4.4**	**-22.2**

[a] Compensatory area payments are added to the relevant crops.
[b] Including compensatory area and set-aside payments.

Source: Cakmak & Kasnakoglu (2002).

The least affected crops from the membership are barley and rice. With a relatively high EU price, both value and volume of rice production go up. The increase in chickpea value by 15% more than compensates for the decline in dry beans by 9%, and hence the pulses group registers a positive increase. Almost all values for industrial crops, notably cotton, increase. Turkey does not seem to have any competitive edge in oilseeds within or outside of the EU.

Vegetables and fruits are expected to be competitive under all conditions. The share of cereals in total agricultural production value is about 17% in the base period, whereas the share of vegetables and fruits are 14% and 15%, respectively. With the EU membership the share of fruits and vegetables in total reaches 32%.

Apart from the use of labour, the membership does not have significant effects on the factor use (Table 22). The decline of labour use by 11% is mainly due to the decrease in livestock production that naturally brings significant contraction in the herd size. The use of labour decreases by 2% in crop production, without a significant change in the use of machinery.

In all simulations the removal of fertiliser price subsidy has limited effects. The use of fertiliser increases by 2% in out of EU scenario, and declines by the same percentage in the case membership.

The variable cost items comprise labour, machinery rental, fertiliser, seeds or seedlings and annualised set-up costs for orchards. In the non-member scenario, the total variable costs increase by 13%, but the total value registers a higher increase that leads to a 20% increase in the gross income of farmers. The difference between in EU and out of EU scenarios is reflected in the changes of total value of production

It is necessary to subtract the value of feed from the total value of agricultural production to be able to identify total gross income. The use of feed is endogenously determined by the model. The scenario prices are multiplied by the use of feed to find the feed cost, and then this amount is subtracted from the value of production to find the total gross income (Table 22).

Table 22. Changes in input use, costs and gross returns (1997-99=100)

	2005				Percent change	
	Out-EU	In-EU1	In-EU2	In-EU3	EU1/BP	EU1/Out
Labor use[a]						
Total	109.2	96.9	96.1	98.6	-3.1	-11.3
in Crop Production	107.6	105.5	104.8	105.7	5.5	-1.9
Machinery use[a]	**103.8**	**103.1**	**100.1**	**103.1**	**3.1**	**-0.6**
Fertiliser use						
N	102.6	100.4	97.2	100.4	0.4	-2.1
P	101.4	99.4	95.4	99.4	-0.6	-2.0
Cost of fertiliser	**154.9**	**151.7**	**146.2**	**151.7**	**51.7**	**-2.1**
Crop production						
Cost of variable inputs	113.1	111.5	109.2	111.6	11.5	-1.4
Gross return[b, c]	119.5	114.4	128.6	114.7	14.4	-4.3
Total production						
Feed costs	120.5	65.9	68.1	76.7	-34.1	-45.3
Gross return[b, c]	124.6	94.7	113.1	98.0	-5.3	-24.0

[a] in 1997-99 prices, rates of change are the same for use and cost.
[b] Net of variable costs.
[c] Including compensatory area and set-aside payments for In-EU2.
Source: Cakmak & Kasnakoglu (2002).

The increase in gross income is higher than the increase in costs, mainly due to the high protection rates in feed crops in non-member scenario. With the EU membership the contraction in herd size coupled with 45% decline in feed costs causes almost a 25% decline in gross income.

The contribution of area compensation payments to gross income is not negligible. The gross income increases by about 20% with compensation payments compared to no compensation payment simulation. As a result of improvement in livestock yields total income performance goes up by 4% compared to no improvement simulation, despite an increase in feed cost.

Regional effects. The crop production is disaggregated into four regions in the model, whereas the livestock production is at the national level. The model may provide clues about the regional effects of membership at least for the crop production.

The most affected region from the membership is East Anatolia, and the least affected one is the coastal region. Yet, the effects are in reverse direction. The volume of production in the east declines by 1% in the member scenario compared to the non-member scenario. The impact on the coastal region is positive by almost the same proportion. The changes in production values reflect the difference in the crop patterns in these two regions. The coastal region's value declines slightly as a result of membership, whereas in East Anatolia the decrease is about 12%. It is necessary to recall that the model results indicated a huge contraction in herd sizes in the member scenario, and the livestock production is the most important agricultural activity in the east. After all, the region that will suffer the most after membership is expected to be the East Anatolia. However, given the backward nature of agricultural production in this region, it will also be eligible to get the highest level of aid from the structural funds.

The Southeastern Anatolia Project region benefits the most from the membership with the contribution of a relatively high growth in irrigated land, and it is the only region that enjoys positive change in production value.

The regional distribution of area compensation payments reveals its importance for certain regions. Almost half of the payments is allocated to the Central Anatolia region with a 9% decline in revenues following the membership. Membership with compensation causes the level of revenues to be above the non-member scenario, and 17% increase relative to reference membership simulation. The same effect for coastal and GAP regions are 6% and 9%, respectively.

Food consumption and expenditure. Calculations similar to those for production are done to obtain the value and volume of food consumption. The volumes are calculated with the simulated quantities and the prices in the base period to determine the changes in quantities. Food expenditure is calculated by multiplying simulated quantities with the simulated prices. Consumption volumes and expenditures are valued at the farm gate prices. Price increases may cause either an increase or a decrease in expenditures depending on the response of the consumers to changes in prices.

In almost all membership simulations, food consumption goes up and food expenditure decreases. Pulses and sugar consumption remains stagnant both in quantity and expenditure, but for different reasons. The remaining surplus of pulse production from the domestic is exported at the new set of relative prices. Quota in sugar production is effective. Sugar quota is used at the quota prices, and the excess domestic demand is satisfied by imports.

As expected, the highest increase in consumption occurs in livestock products. Beef consumption goes up by 12%, and with the contribution of ovine meat, the total meat consumption grows by 16%. The percentage increase in cow milk consumption is smaller than sheep and goat milk consumption. In other livestock products, the growth rates are limited by 1%. Chicken consumption increases by 10%.

Basic food consumption increases by 5% in the membership scenario. Wheat and maize are the main contributors to this growth. The source of this contribution is the food-feed competition that is incorporated in the model structure. In the non-membership scenario, the herd sizes expand. Apart from durum wheat, all other cereals are channeled to livestock production as intermediate inputs. In

the membership scenario, cereals are spared more for direct human consumption and/or the quantities of trade change.

The membership scenario registers decreases in food consumption expenditures, despite the general tendency of increase in food consumption. The hike in domestic prices of basic foods, especially of cereals, in the non-membership scenario, is eased by membership. The prices are 20% lower in the membership scenario, since the EU prices are formed close to world prices. The comparison of membership consumption expenditure with the base period results reveals no change if the growth of population is accounted for.

Trade. Membership in the EU may have two different effects on trade. First, the quantity and value of trade may change as a result of membership. Second, the direction of trade may be affected. The results on net exports presented in Table 22 incorporate both effects. Apart from the base period, all net export results are disaggregated as to EU and rest of the world in Table 23.

It is relatively easier to incorporate EU protection measures in the model than the export subsidies. A bidding mechanism is effective in having the privilege of export subsidies. Hence, export prices reflect the membership preference, yet it is also possible to export to the rest of the world.

Turkey's net export of the products included in the model in the base period reach $2 billion. With almost no trade in livestock products, almost all is coming from the crop production. The tariffs of non-member scenario are close to base period levels. The structure of trade in the model allows the expansion in both exports and imports. When population and income growth are incorporated in this structure, the level of net exports for the non-membership scenario falls to less than $1 billion. The exports of crop products decline by 30%, whereas the imports of livestock products increase by four-fold, despite almost 200% tariff. No reversal of trade is observed. Cereals, oilseeds, and livestock products are imported, and industrial crops, pulses, fruits and vegetables are exported.

The results of the non-membership scenario provide clues about the impact of membership. The overall impact is a boom of net exports. The exports of crop products grow by 50%, but a huge expansion in livestock product imports pull up the net imports to $3 billion.

Almost all of the livestock imports are from the EU. An almost non-existent level of trade in livestock products in the base period does not allow us to identify any change in the direction of trade. However, the impact of membership on the livestock production points out that the weight of the EU will be high in imports, and although at a lower level, with the impact of vegetable exports, EU will remain dominant in overall trade.

Net imports in cereals and oilseeds increase in the set-aside simulation. With the improvement in livestock yields, net imports of livestock products decline by 30% ($1 billion) relative to membership scenario. Wheat imports go up, and barley exports decline. These results provide clues about one of the policy choices facing Turkey, since the model structure links the crop and livestock production endogenously. Turkey could either improve the production conditions in livestock, and use the domestically produced (or imported) feed products in livestock production to decrease the imports, or could leave the livestock sub-sector as it is, and export (or import less) feed crops to continuously expand the imports of high value-added livestock products.

Table 23. Net exports ($ million)

	BP	Out-EU			In-EU1			In-EU2			In-EU3		
	Total	EU	Others	Total	EU	Others	Total	EU	Others	Total	EU	Others	Total
Crop products	**2,150**	**1,027**	**503**	**1,531**	**1,753**	**502**	**2,256**	**1,628**	**409**	**2,038**	**1,684**	**443**	**2,127**
Cereals	**-105**	**-308**	**-9**	**-317**	**-510**	**149**	**-360**	**-591**	**66**	**-524**	**-571**	**93**	**-478**
Wheat	13	-47		-47	-375		-375	-456		-456	-436		-436
Barley	97				156	155	312	156	72	229	156	99	255
Corn	-100	-126		-126	-156		-156	-156		-156	-156		-156
Rice	-108	-119	-9	-127	-119	-6	-124	-119	-6	-125	-119	-6	-125
Pulses	**156**	**112**	**-17**	**95**	**203**		**203**	**166**		**166**	**198**		**198**
Chickpea	114	112		112	169		169	147		147	166		166
Industrial products	**763**	**80**	**253**	**333**	**533**	**-9**	**524**	**527**	**-16**	**511**	**531**	**-10**	**521**
Tobacco	401		291	291	293		293	293		293	293		293
Sugar beet	117	-133	-38	-171	-133	-9	-141	-133	-16	-149	-133	-10	-142
Cotton	246	213		213	373		373	367		367	371		371
Oilseeds	**-669**	**-686**	**-6**	**-691**	**-708**	**-6**	**-714**	**-709**	**-6**	**-715**	**-708**	**-6**	**-714**
Sunflower	-320	-317		-317	-336		-336	-337		-337	-337		-337
Soybean	-331	-336		-336	-337		-337	-337		-337	-337		-337
Tubers	**51**	**52**		**52**									
Vegetables	**242**	**312**	**101**	**414**	**589**	**233**	**821**	**589**	**231**	**819**	**589**	**231**	**820**
Fruits and nuts	**1,712**	**1,465**	**181**	**1,645**	**1,646**	**135**	**1,781**	**1,646**	**135**	**1,781**	**1,646**	**135**	**1,781**
Livestock products	**-170**	**-395**	**-236**	**-631**	**-5,030**	**-22**	**-5,053**	**-5,078**	**-23**	**-5,101**	**-4,030**	**-15**	**-4,045**
Beef	0		-87	-87	-1,106		-1,106	-1,114		-1,114	-839		-839
Milk	-28				-2,005		-2,005	-2,019		-2,019	-1,532		-1,532
Poultry products	49	-104	-149	-253	-792		-792	-818		-818	-592		-592
Total	**1,980**	**632**	**267**	**899**	**-3,277**	**480**	**-2,797**	**-3,450**	**387**	**-3,063**	**-2,345**	**428**	**-1,917**

Source: Cakmak & Kasnakoglu (2002).

4.2 TURKSIM and the Results of the Model

TURKSIM, designed by Grethe (2004), is a comparative static regional partial equilibrium model of Turkey's agricultural sector. The core of the model consists of definitional and behavioural equations. The behavioural equations are constant elasticity functions. The supply and demand elasticities are synthetic, based on the literature, author's estimates and interviews with experts. They enter the model exogenously.

Supply side of the model includes 29 plant and five animal products, with processing activities in sunflower, soybeans and cotton. Areas multiplied by the yields give the supply of plant products. Areas are dependent on own and cross prices, and yields are dependent on own prices with shifters related to expansion of the irrigated area and changes in productivity. Animal products supply has the same basic characteristics with a feed cost index based on predetermined feed composition and prices of feed components.

The demand side is split into feed demand, human demand both in primary and processed forms, and seed demand. Human demand occurs at the national level for household income quintiles. Domestic price formation is generally dependent on cif-fob spread, transportation cost and quality margin.

The base period of model is 1997-99 averages. Grethe (2004) conducted three scenarios by projecting the model to 2006: status quo, liberalisation, and CU. Under the CU scenario, the loss in producer surplus is about €1 billion, equivalent to 3.7% of production value compared to the status quo scenario of 2006. The gain in consumer welfare is higher than the loss of the producers (€1.5 billion). An overview of the status quo and CU scenario results are summarised in Table 24.

Table 24. TURKSIM results: Comparison of CU and the status quo, 2006 (percent)

	Farmgate prices[a]	Farm output[b]	Consumption[c]	Net trade (€million)	
				Status quo	CU
Cereals	-11.1	-4.5	1.4	-264.8	-466.8
Other crops	2.0	2.4	-0.1	66.7	183.1
Fruits	0.0	0.5	2.9	691.4	795.2
Vegetables	-0.4	-0.3	2.3	313.9	204.4
Total plant prod.	**-2.3**	**-0.4**	**1.8**	**807.2**	**715.9**
Animal prod.	-10.6	-4.4	6.7	14.0	-702.0
Processed Prod.	-	-	2.5	-489.5	-517.2
Total products	-4.7	-1.5	3.5	331.7	-503.3

[a] Quantity weighted.
[b] Price weighted.
[c] Price weighted at the wholesale level.

Source: Grethe (2004).

Cereal prices decline significantly under the CU scenario with a slight decline in vegetable prices, and price increase in the other plant crops. The drop in animal products prices by almost 11% is reflected to the domestic production and to rather high increase in consumption. Turkey remains a net exporter of the plant products, but becomes a net importer in the total mainly due to the liberalisation of trade in animal products. The results of TASM-EU and TURKSIM point out similar developments in the aggregate. The differences at the sub-sectoral levels are mainly due to the different methodologies, and dissimilar assumptions depicting the production and consumption environments in the base period, and the projected changes in the exogenous parameters.

The agriculture policies in Turkey, as well as in EU, are continuously changing. The major policy development in the EU was the reform of the CAP, whose implementation started in 2004. The main features of the reform are the introduction of a single payment based on historical reference to replace part or all area and headage payments. Turkey had also started a reform programme in 2000 aimed to diminish the government's intervention in the domestic output and input markets. The policy package included a shift to direct income payments based on cultivated acreage. Both modelling exercises do

not take into account these policy shifts. It is too early to evaluate the CAP reform, and its impact on the scenarios will be limited. In addition, despite the opposite intentions of the Turkey's reform programme, the recent increase in the market price support levels of Turkey (OECD, 2004) indicates that the actual conditions for the domestic price formation are not drastically different than the base period of the models. However, the results of the simulations are valid only under the assumptions of the policy environment and the expected values of exogenous parameters. Hence, they may not reflect the potential impact of CU and EU membership under all conditions.

5.   Concluding Remarks: Priorities in the Pre-Accession Period

Turkey is endowed with rich natural and human resources, but its agricultural sector never reached its potential because of the increasingly inefficient agricultural policies adopted since the late 1980s. The political agenda, loaded with frequent elections, did not allow for long-term policy formulation and delivery mechanisms. Policy concentrated on direct and indirect government interventions in the output and input markets, achieving self-sufficiency in some basic products with high welfare costs, but also creating unintended surpluses in the others with high financial costs.

The main purpose of the agricultural subsidy reform launched in 2000 (and implemented during 2001) was to contribute to the fiscal stabilisation programme. The new policy framework that emerged in Turkey after this reform and the ongoing reform of the CAP are encouraging for the future accession negotiations. In both the EU and Turkey, the emphasis is now on more market-friendly policies, accompanied by direct income payments that compensate at least for part of the transition costs to the farmers. In addition, Turkey has recently started to include environmental and missing markets (i.e. rural finance) issues in the rural and agricultural policy programme.

Despite these parallel developments in the policy scene, there exist considerable differences in the conditions of production in Turkey and the enlarged EU. However, these differences are difficult to capture at the aggregate level. Looking only of overall indicators will lead one to mix up causes and results, and furthermore will hide the rural-urban and regional differences that are crucial in Turkey.

The Turkish authorities have set out their priorities for agriculture in the National Programme for the Adoption of the *Acquis* (OG, 2003). These priorities cover quite different areas from statistics to sanitary issues. But fulfilling them is only a minor step towards adjustment. The major step is to perceive the priority list as a management system for agricultural and food policies. Real adoption of the *Acquis* requires a drastic change in institutional behaviour. The key element in this respect would be the horizontal issues, which include setting up an Integrated Administration and Control System (IACS), establishment of Farm Accountancy Data Network (FADN) and development of administrative structures required for the European Agricultural Guidance and Guarantee Fund (EAGGF).

The agro-food sector offers opportunities to increase the meagre flow of FDI. Turkey has relatively unpolluted natural resources with the possibility of satisfying the expanding demand for labour-intensive organic products. At present, a lack of capital seems to be the major obstacle for the expansion of the organic production in Turkey. Currently, a high proportion of agricultural exports are directed to the EU. FDI would not only strengthen the production side, it would also allow Turkish producers to enter the increasingly integrated supply chains that characterise the EU market for food. Another opportunity for the FDI arises in the domestic retail sector. Although the prospects are good, little foreign capital has gone so far into the retail sector, mainly due to the supply/institutional factors. Further development of the large retail sector will not only increase the quality standards, but also will support the necessary structural transformation by increasing the farm size and/or the number of marketing cooperatives.

Experience and modelling exercises indicate that Turkey has a comparative advantage in plant products which do not exhibit economies of scale and are relatively labour-intensive, i.e. fruits and vegetables Eliminating the existing border and non-tariff barriers to trade in agriculture would allow both sides to better exploit their comparative advantages. The models discussed here imply that an

extension of the customs union agreement to agriculture would lead to substantial welfare benefits for both sides.

Agriculture is the dominant economic activity in rural areas. Over-employment in agriculture linked to the small farm sizes increases the importance of rural development measures. Turkey might thus in future provide a test case for the shift of emphasis towards the second pillar policies in the EU.

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Table A1. Exports of agricultural products, 1996-2002 ($ million)

	Total 1996	EU 1996	Total 1997	EU 1997	Total 1998	EU 1998	Total 1999	EU 1999	Total 2000	EU 2000	Total 2001	EU 2001	Total 2002	EU 2002
Agricultural products	**4,949**	**2,075**	**5,470**	**2,205**	**5,053**	**2,092**	**4,442**	**2,056**	**3,855**	**1,682**	**4,349**	**1,839**	**3,934**	**1,812**
HS 1-24	**4,556**	**1,855**	**5,133**	**2,013**	**4,688**	**1,897**	**4,084**	**1,868**	**3,543**	**1,518**	**3,997**	**1,669**	**3,577**	**1,621**
Live animals and food products	**3,559**	**1,570**	**4,078**	**1,740**	**3,771**	**1,676**	**3,189**	**1,514**	**2,891**	**1,321**	**3,316**	**1,441**	**3,034**	**1,424**
Live animals	85	1	83	2	48	1	12	2	2	2	44	1	31	1
Cereals and cereal products	507	19	637	18	581	46	379	35	406	62	327	50	287	52
Fruits, vegetables and products	2,219	1,402	2,466	1,539	2,357	1,475	2,132	1,320	1,817	1,110	2,142	1,252	2,020	1,189
Honey, sugar and sugar confectionery	211	23	270	32	232	29	217	30	239	32	343	31	179	53
Fodder products	15	1	8	1	5	1	6		10	1	25	1	13	2
Other food products	522	122	616	147	548	124	444	128	416	115	435	106	504	126
Beverages, tobacco and tobacco products	**742**	**222**	**754**	**210**	**645**	**160**	**603**	**206**	**529**	**170**	**471**	**115**	**422**	**153**
Beverages and spirits	105	16	71	17	55	18	41	19	37	17	36	19	40	22
Tobacco products	638	206	683	193	590	142	562	187	491	153	435	96	382	131
Animal and vegetable oils, fats and waxes	232	47	271	49	239	46	256	131	100	16	180	98	95	33
Oilseeds and oleaginous fruits	23	16	30	14	33	15	36	16	23	11	29	14	26	11
Agricultural raw materials	**392**	**220**	**337**	**192**	**365**	**194**	**358**	**188**	**313**	**164**	**352**	**170**	**356**	**190**
Raw hides and skins, leather	4	3	3	1	22	1	10		26		31		34	
Rubber and articles thereof	14	3	9	1	8	3	9	3	10	2	5	1	5	1
Cork and round wood	18	2	31	5	30	3	24	2	16	1	40	4	36	7
Pulp of wood, waste and scrap of paper					1				1					1
Textile fibres and fibre scrap	279	145	213	113	220	112	233	113	196	106	219	120	207	121
Other raw materials of animal and vegetable origin	78	68	82	72	84	75	82	70	64	54	56	46	74	61

Source: Cagatay & Guzel (2003).

Table A2. Imports of agricultural products, 1996-2002 ($ million)

	Total 1996	EU 1996	Total 1997	EU 1997	Total 1998	EU 1998	Total 1999	EU 1999	Total 2000	EU 2000	Total 2001	EU 2001	Total 2002	EU 2002
Agricultural products	**4,866**	**1,450**	**4,926**	**1,308**	**4,321**	**1,114**	**3,398**	**1,017**	**4,156**	**1,142**	**3,079**	**907**	**3,947**	**1,236**
HS 1-24	**2,831**	**714**	**2,649**	**523**	**2,311**	**475**	**2,038**	**480**	**2,133**	**480**	**1,487**	**299**	**1,874**	**434**
Live animals and food products	**1,776**	**613**	**1,426**	**358**	**1,165**	**313**	**1,075**	**339**	**1,159**	**348**	**736**	**222**	**1,028**	**323**
Live animals	167	120	19	10	26	16	24	15	33	21	23	10	16	8
Cereals and cereal products	788	121	719	123	480	68	418	88	408	88	193	34	374	62
Fruits, vegetables and products	101	22	176	18	183	33	159	39	193	29	118	15	138	30
Honey, sugar and sugar confectionery	294	153	44	32	14	11	17	11	16	10	12	7	20	9
Fodder products	150	21	184	16	158	17	176	23	207	25	136	18	142	25
Other food products	277	177	285	159	304	167	281	164	302	176	254	138	337	190
Beverages, tobacco and tobacco products	**296**	**26**	**393**	**35**	**319**	**40**	**308**	**23**	**365**	**25**	**296**	**24**	**218**	**36**
Beverages and spirits	19	12	10	9	12	10	15	12	15	13	13	12	10	8
Tobacco products	277	14	383	27	307	30	293	11	351	13	283	13	208	28
Animal and vegetable oils, fats and waxes	509	67	570	112	521	118	436	109	375	88	321	50	414	70
Oilseeds and oleaginous fruits	250	7	260	17	305	5	219	9	233	18	134	3	215	5
Agricultural raw materials	**2,035**	**736**	**2,278**	**785**	**2,010**	**639**	**1,360**	**537**	**2,023**	**662**	**1,593**	**608**	**2,072**	**802**
Raw hides and skins, leather	677	244	589	227	373	168	102	54	225	125	275	143	449	226
Rubber and articles thereof	242	81	205	66	167	61	135	53	161	57	130	48	182	58
Cork and round wood	183	14	167	19	186	11	157	7	183	11	99	8	120	7
Pulp of wood, waste and scrap of paper	127	25	144	31	153	36	164	36	238	38	149	44	191	61
Textile fibres and fibre scrap	732	331	1,089	396	1,022	295	703	327	1,117	375	866	321	1,027	392
Other raw materials of animal and vegetable origin	74	41	83	47	108	67	99	60	99	56	73	45	104	58

Source: Cagatay & Guzel (2003).

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