

FOREIGN TRADE STRUCTURE OF VEGETABLE SECTOR: DEVELOPMENT PROCESS IN THE WORLD AND TÜRKİYE

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Abstract

This study aims to examine the development of the vegetable trade and develop recommendations to increase exportation. It was determined that vegetable exports from the world and Türkiye were on an increasing trend between the periods analyzed (1980-2021). Approximately 6.19% of the vegetables produced worldwide are exported annually. In Türkiye, this rate was 7.03%. Türkiye ranks 12th in world vegetable exports and has an average of 684 million dollars surplus in foreign vegetable trade. Türkiye is an important exporter of vegetables such as tomatoes, chillies and peppers (green), pumpkins (squash and gourds), cucumbers and gherkins, carrots and turnips, eggplants and green garlic. Some recommendations have been developed to maintain and improve this position. The study's main recommendations are the development of agricultural technologies, more investment in vegetable production, branding and marketing, entering new markets, regulation in tax policies, and increasing education-information activities.

Key words: *vegetables, vegetable trade, foreign trade, export, import*

INTRODUCTION

Türkiye has the potential for year-round production of various vegetables both in the field and in the greenhouse in terms of soil and climatic conditions. Türkiye ranks 4th in the world regarding vegetable production after China, India and USA. It ranks 12th in terms of vegetable exports [7]. In order to preserve the vitamin content of vegetables, they should be consumed immediately after harvest, usually as fresh vegetables [11]. Supply channels, which allow products to be purchased at the desired place, time and manner, fulfill an important marketing function by ensuring that vegetables are consumed fresh. In addition, the marketing structure of vegetables is shaped depending on the development level of the countries [2]. During the process of globalization, significant changes have taken place in world trade. Countries have sought to restructure their foreign trade policies in an increasingly competitive environment. As a result, with the influence of the World Trade Organization (WTO), tariffs and quotas restricting trade have decreased. Thus, a more liberalized

environment has emerged in international trade between countries [1]. In light of these developments, world trade has accelerated and competition among countries has increased.

This research aims to analyze the developments in the foreign trade of vegetables in the world and Türkiye from past to present and to develop suggestions for increasing Türkiye's export potential in terms of world vegetable foreign trade.

MATERIALS AND METHODS

The study selected vegetable species and groups traded in the world and in Türkiye and from which economic income is obtained. These are tomatoes, frozen vegetables, avocados, chillies and peppers (green), mushrooms and truffles (dried and canned), onions and shallots (dry), lettuce and chicory, cucumbers and gherkins, green garlic cabbages, cauliflowers and broccoli, pumpkins (squash and gourds), carrots and turnips, asparagus, other beans (green), spinach, eggplants, peas (green), leeks and other alliaceous vegetables, onions and shallots (green), other vegetable juices,

artichokes and other vegetable products (fresh or dry or preserved). Statistical data were obtained from Food and Agriculture Organization (FAOSTAT) and various national and international publications. Within the scope of the study, the development of foreign trade in vegetables in the world and Türkiye was analyzed from 1980 to 2021. Indices were calculated for these data and the values obtained were interpreted.

RESULTS AND DISCUSSIONS

Development of vegetable trade in the world

Agricultural production is generally carried out to increase countries' self-sufficiency or get a larger share of trade. In this context, countries have included practices that disrupt the effective functioning of agricultural markets. After the 1980s, money, capital and trade started to be liberalized worldwide in line with the "globalization" process. Exports and imports of agricultural products increased significantly in the 1990s as the World Trade Organization's (WTO) multilateral trade

negotiations spurred the globalization process [12]. It was determined that there was a significant increase in the world's total foreign trade, agricultural trade and fruit-vegetable foreign trade in the 1980-2021 period. The world's total exports increased by 870.19%, from 1 trillion 926 billion dollars to 18 trillion 681 billion dollars. World total imports increased by 862.55%, from 1 trillion 968 billion dollars to 18 trillion 947 billion dollars. Agricultural exports increased by 586.33% from 215 billion 25 million dollars to 1 trillion 476 billion dollars. Agricultural imports increased by 547.50%, from 234 billion 304 million dollars to 1 trillion 517 billion dollars. Fruit-vegetable exports increased by 938.88%, from 26 billion 357 million dollars to 273 billion 822 million dollars. Fruit-vegetable imports increased by 803.86%, from 31 billion 28 million dollars to 280 billion 456 million dollars. Vegetable exports increased by 1,054.51% from 7 billion 270 million dollars to 83 billion 931 million dollars. Vegetable imports increased by 857.30% from 8 billion 579 million dollars to 82 billion 125 million dollars (Table 1).

Table 1. Development of trade in the world

Product group	Trade	1980-1985	1986-1991	1992-1997	1998-2003	2004-2009	2010-2015	2016-2021
		1,000 dollars						
Total trade	Export	1,925,538,194	2,930,800,324	4,625,970,094	6,266,653,408	12,339,678,261	17,718,993,402	18,681,335,313
	Import	1,968,457,431	3,009,176,482	4,677,218,192	6,376,391,047	12,583,299,677	17,804,424,953	18,947,485,322
Agricultural products	Export	215,024,798	281,183,634	401,431,231	433,669,657	798,313,760	1,288,873,826	1,475,785,164
	Import	234,303,587	304,325,346	417,134,847	457,271,157	835,371,627	1,325,229,204	1,517,110,600
Fruit and vegetables	Export	26,357,315	42,481,451	64,233,182	74,218,829	135,841,617	213,505,476	273,821,628
	Import	31,028,485	50,809,621	71,546,731	81,191,433	145,497,543	220,938,804	280,455,576
Vegetables	Export	7,269,851	13,065,321	20,539,885	24,724,820	45,109,568	66,400,121	83,930,900
	Import	8,578,785	14,813,812	21,772,881	25,964,843	45,673,657	66,229,236	82,124,654
Index (1980-1985 = 100)*								
Total trade	Export	100.00	152.21	240.24	325.45	640.84	920.21	970.19
	Import	100.00	152.87	237.61	323.93	639.25	904.49	962.55
Agricultural products	Export	100.00	130.77	186.69	201.68	371.27	599.41	686.33
	Import	100.00	129.89	178.03	195.16	356.53	565.60	647.50
Fruit and vegetables	Export	100.00	161.18	243.70	281.59	515.38	810.04	1,038.88
	Import	100.00	163.75	230.58	261.67	468.92	712.05	903.86
Vegetables	Export	100.00	179.72	282.54	340.10	620.50	913.36	1,154.51
	Import	100.00	172.68	253.80	302.66	532.40	772.01	957.30
Annual rate of increase (%)*								
Total trade	Export	-0.47	10.48	7.94	6.25	6.28	1.39	6.49
	Import	0.00	10.68	7.31	6.36	5.89	1.44	6.48
Agricultural products	Export	-1.79	7.39	4.65	3.32	9.50	3.28	6.00
	Import	-1.48	6.97	3.56	3.48	9.20	3.44	6.34
Fruit and vegetables	Export	-0.25	11.42	4.23	4.64	9.77	5.04	4.28
	Import	0.37	11.21	2.03	4.47	8.77	5.15	4.67
Vegetables	Export	-0.21	13.87	4.22	5.83	8.77	2.90	4.37
	Import	0.40	12.68	2.07	4.83	8.23	2.87	4.77

Source: *Own calculation from FAOSTAT data [7].

The annual rates of increase in world trade were analyzed. The highest annual increase

rates in total world trade were in the average years of 1986-1991. Compared to the average

of 1980-1985, there was a negative increase in total world exports. In the same period, the rate of increase in imports was low. In the analyzed periods, foreign trade growth rates fluctuated in terms of all indicators (Table 1).

World's vegetable exports

Unlike other agricultural products, fresh vegetables cannot be stored for a long time, so domestic prices fall rapidly during periods of increased supply. In these periods, an excess supply of fresh vegetables is exported and domestic prices are prevented from falling. In this respect, it is important that fresh vegetables can be exported [8].

When the developments in world vegetable exporting were evaluated between 1980 and 2021, the vegetable export value, which was 7 billion 270 million dollars on average between 1980-1985, increased by 11.54 times during

the analyzed period and rose to 83 billion 930 million dollars on average between 2016-2021. According to the average for 2016-2021, tomatoes rank first with a rate of 11.23% in vegetable exporting, followed by frozen vegetables with a rate of 9.50%, and avocados with a rate of 7.34% in third place. Mushrooms and truffles (dried and canned) (%7.20), chillies and peppers (green) (%6.76), and onions and shallots (dry) (%4.14) follow them, respectively. The rate of other vegetable products (fresh or dry, or preserved) was 31.10%. During the examined periods, the increase in export values occurred respectively in spinach by 105.85 times, avocados by 77.69 times, peas (green) by 32.05 times, chillies and peppers (green) by 29.64 times, and green garlic by 28.44 times (Table 2).

Table 2. Development of vegetable export in the world

Vegetables	1980-1985		1986-1991	1992-1997	1998-2003	2004-2009	2010-2015	2016-2021		Index (1980-1985 = 100)
	1,000 dollars	Percent (%)	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	Percent (%)	
<i>Vegetables Primary</i>	7,269,851	100.00	13,065,321	20,539,885	24,724,820	45,109,568	66,400,121	83,930,900	100.00	1,154.51
Other vegetable products (fresh or dry or preserved)	3,348,709	46.06	5,370,137	7,769,989	8,863,027	16,199,995	22,959,116	26,104,285	31.10	779.53
Tomatoes	1,017,046	13.99	1,673,239	2,553,590	3,225,440	6,039,959	8,551,915	9,429,202	11.23	927.12
Vegetables frozen	453,696	6.24	1,143,843	1,969,038	2,624,195	4,666,509	6,601,761	7,970,517	9.50	1,756.80
Avocados	79,259	1.09	135,240	212,755	376,761	1,060,994	2,385,834	6,157,862	7.34	7,769.27
Mushrooms and truffles (dried and canned)	444,909	6.12	995,043	1,374,428	1,384,671	2,319,244	3,583,825	6,043,272	7.20	1,358.32
Chillies and peppers (green)	191,402	2.63	527,870	1,169,705	1,736,553	3,296,496	4,553,869	5,673,883	6.76	2,964.38
Onions and shallots (dry)	357,428	4.92	509,897	885,942	976,171	1,834,045	2,910,549	3,478,864	4.14	973.30
Lettuce and chicory	295,206	4.06	607,277	894,570	1,022,516	1,824,761	2,345,781	2,840,641	3.38	962.26
Cucumbers and gherkins	317,396	4.37	530,329	801,463	908,559	1,696,418	2,185,385	2,712,135	3.23	854.50
Green garlic	105,771	1.45	189,612	378,922	538,421	1,127,683	2,412,834	3,007,629	3.58	2,843.54
Cabbages	114,826	1.58	202,382	395,483	431,091	763,666	1,289,327	1,850,847	2.21	1,611.88
Cauliflowers and broccoli	112,758	1.55	229,644	421,111	485,814	831,858	1,171,349	1,506,461	1.79	1,336.01
Pumpkins (squash and gourds)	56,490	0.78	161,864	320,371	424,563	441,868	914,706	1,377,006	1.64	2,437.60
Carrots and turnips	115,454	1.59	194,663	302,609	388,607	767,180	1,123,985	1,411,067	1.68	1,222.19
Asparagus	86,106	1.18	227,030	416,114	489,524	658,479	1,048,572	1,346,825	1.60	1,564.16
Other beans (green)	39,096	0.54	97,377	176,582	246,772	494,236	738,110	914,637	1.09	2,339.48
Spinach	4,319	0.06	12,448	29,569	49,889	106,763	221,071	457,176	0.54	10,585.63
Eggplants	40,706	0.56	76,178	131,083	171,479	339,209	470,841	538,493	0.64	1,322.88
Peas (green)	11,763	0.16	35,253	67,784	89,308	166,596	326,827	376,987	0.45	3,204.76
Leeks and other alliaceous vegetables	10	0.00	52,638	113,177	129,301	242,359	300,803	316,162	0.38	600.63*
Onions and shallots (green)	28,869	0.40	30,175	59,366	79,960	123,368	164,120	232,028	0.28	803.72
Other vegetable juices	25,236	0.35	27,725	46,210	35,608	42,941	75,699	126,182	0.15	500.02
Artichokes	23,398	0.32	35,459	50,028	46,591	64,943	63,844	58,742	0.07	251.05

*Index (1986-1991 = 100)

Source: [7].

World's vegetable import

World vegetable imports increased by 957.30%, from 8 billion 579 million dollars to 82 billion 125 million dollars. Regarding world vegetable imports, tomatoes ranked first, with a share of 11.53%. This was

followed by frozen vegetables at 9.78%, avocados at 8.24%, chillies and peppers (green) at 7.04%, mushrooms and truffles (dried and canned) at 4.65% and onions and shallots (dry) at 4.11%. The increase in import value compared to the average of 1980-1985

was 582.86 times for leeks and other alliaceous vegetables, 75.93 times for avocados, 41.23 times for spinach, 27.34 times for other vegetable juices and 22.93 times for pumpkins (squash and gourds) (Table 3).

Table 3. Development of vegetable import in the world

Vegetables	1980-1985		1986-1991	1992-1997	1998-2003	2004-2009	2010-2015	2016-2021		Index (1980-1985 = 100)
	1,000 dollars	Percent (%)	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	Percent (%)	
<i>Vegetables Primary</i>	8,578,785	100.00	14,813,812	21,772,881	25,964,843	45,673,657	66,229,236	82,124,654	100.00	957.30
Other vegetable products (fresh or dry or preserved)	3,977,587	46.37	5,964,437	7,893,520	8,900,994	15,370,516	21,658,365	25,107,171	30.57	631.22
Tomatoes	1,217,874	14.20	1,902,666	2,727,756	3,358,827	6,110,383	8,717,983	9,465,834	11.53	777.24
Vegetables frozen	451,266	5.26	1,294,454	2,146,763	2,809,865	4,810,858	6,687,174	8,032,438	9.78	1,779.98
Avocados	89,155	1.04	199,161	270,307	454,758	1,227,943	2,681,610	6,769,651	8.24	7,593.15
Chillies and peppers (green)	294,281	3.43	657,142	1,189,780	1,788,007	3,382,860	4,746,002	5,778,061	7.04	1,963.45
Mushrooms and truffles (dried and canned)	439,217	5.12	1,001,848	1,431,247	1,499,728	2,165,820	2,893,578	3,821,127	4.65	869.99
Onions and shallots (dry)	422,616	4.93	568,355	982,552	1,077,292	1,910,687	2,957,538	3,373,182	4.11	798.17
Cucumbers and gherkins	370,505	4.32	641,099	816,773	892,928	1,672,305	2,338,136	2,814,462	3.43	759.63
Lettuce and chicory	347,005	4.04	698,971	973,943	1,111,824	1,935,305	2,525,838	2,845,925	3.47	820.14
Green garlic	148,822	1.73	232,258	463,096	569,805	1,042,876	2,105,935	2,789,143	3.40	1,874.15
Cabbages	145,675	1.70	285,348	586,323	631,757	986,347	1,612,190	2,148,567	2.62	1,474.91
Asparagus	79,327	0.92	256,565	451,200	531,507	870,426	1,257,242	1,556,385	1.90	1,961.99
Pumpkins (squash and gourds)	63,556	0.74	124,127	346,138	458,938	757,266	1,132,917	1,457,434	1.77	2,293.14
Carrots and turnips	130,248	1.52	211,040	329,455	432,580	783,295	1,129,625	1,325,125	1.61	1,017.39
Cauliflowers and broccoli	131,830	1.54	258,310	357,480	390,814	651,786	937,635	1,258,214	1.53	954.42
Other beans (green)	94,179	1.10	168,142	248,189	330,439	698,686	907,208	1,059,936	1.29	1,125.45
Other vegetable juices	17,070	0.20	23,128	30,088	35,414	52,589	120,929	466,736	0.57	2,734.27
Eggplants	50,535	0.59	82,437	122,965	155,203	327,540	498,023	558,580	0.68	1,105.34
Spinach	9,491	0.11	17,041	27,955	54,025	126,689	231,367	391,332	0.48	4,123.12
Peas (green)	24,007	0.28	68,873	114,326	169,518	284,295	376,716	442,031	0.54	1,841.27
Leeks and other alliaceous vegetables	778	0.01	56,544	124,699	182,133	290,349	413,996	414,741	0.51	53,285.74
Onions and shallots (green)	44,844	0.52	53,533	88,220	81,446	151,879	226,808	177,925	0.22	396.76
Artichokes	28,919	0.34	48,334	50,108	47,043	62,958	72,425	70,656	0.09	244.33

Source: [7].

Table 4. The ratio of vegetable export quantity to production quantity in the world (%)

Vegetables	1980-1985	1986-1991	1992-1997	1998-2003	2004-2009	2010-2015	2016-2021	Index (1980-1985 = 100)
<i>Vegetables Primary</i>	4.17	4.48	5.03	4.89	5.46	5.68	6.19	148.33
Leeks and other alliaceous vegetables	0.00	5.55	9.37	11.45	12.45	13.16	14.04	252.94
Chillies and peppers (green)	4.03	5.79	7.09	6.83	7.89	9.52	10.67	265.02
Onions and shallots (green)	4.29	3.23	5.04	6.61	5.61	6.19	10.45	243.87
Broad and horse beans (green)	-	-	-	-	-	3.29	9.79	297.80*
Lettuce and chicory	5.09	6.47	7.33	7.24	7.08	7.88	8.82	173.30
Green garlic	2.88	3.90	5.66	8.57	9.24	8.02	8.64	299.78
Onions and shallots (dry)	7.10	7.29	8.09	7.65	8.21	8.07	8.14	114.55
Carrots and turnips	3.83	4.61	5.12	5.27	5.99	6.24	7.31	191.03
Pumpkins (squash and gourds)	1.93	3.12	3.36	3.46	2.33	3.88	7.02	363.84
Cauliflowers and broccoli	4.45	4.48	4.92	5.04	5.07	5.13	5.66	127.25
Asparagus	2.69	4.33	4.76	3.97	3.58	4.20	5.08	188.85
Tomatoes	3.46	3.35	3.79	3.77	4.28	4.59	4.44	128.53
Cabbages	1.03	1.29	1.95	1.60	2.17	3.00	3.64	354.17
Cucumbers and gherkins	5.50	5.56	5.37	4.03	3.79	3.50	3.53	64.25
Other beans (green)	1.61	2.34	2.29	2.49	2.43	2.41	2.75	171.26
Artichokes	3.67	3.57	4.49	3.95	3.58	2.72	2.51	68.28
Mushrooms and truffles	2.08	4.27	5.74	4.18	2.49	1.83	1.72	82.95
Green corn (maize)	0.15	0.35	0.77	0.76	1.01	1.26	1.64	1,071.62
Peas (green)	0.44	0.95	1.09	1.16	1.19	1.44	1.46	333.88
Other vegetables (fresh n.e.c.)	1.25	0.97	0.91	0.85	1.13	1.13	1.12	89.47
Eggplants	1.01	0.97	0.90	0.90	1.04	0.97	1.11	109.90
Spinach	0.44	0.73	0.85	0.77	0.58	0.63	0.81	183.27
Okra	-	-	-	-	-	0.00	0.21	12,774.48*
String beans	-	-	-	-	-	0.00	0.00	258.42*

*Index (2010-2015 = 100)

Source: [7].

The ratio of vegetable export quantity to production quantity in the world

The share of vegetable exports in vegetable production varies between 4.17% and 6.19%. It was determined that the share of vegetable exports in vegetable production increased by 48.33%. In the world, 14.04% of leeks and other alliaceous vegetables, 10.67% of chillies and peppers (green) and 10.45% of onions and shallots (green) were exported between 2016 and 2021. In addition, 4.44% of tomatoes, 7.31% of carrots and turnips, 7.02 % of pumpkins (squash and gourds) and 8.64% of green garlic were exported (Table 4).

Development of vegetable trade in the Türkiye

There are studies analyzing the development of vegetable foreign trade between various periods in Türkiye [3] [4] [5] [6] [10]. It was determined that there was a significant increase in Türkiye's total foreign trade, agricultural foreign trade and fruit-vegetable

foreign trade in the 1980-2021 period. Türkiye's total exports increased 30.52 times from 5 billion 696 million dollars to 173 billion 870 million dollars. Türkiye total imports increased by 23.79 times from 9 billion 503 million dollars to 226 billion 125 million dollars. Agricultural exports increased by 703.53%, from 2 billion 294 million dollars to 18 trillion 486 billion dollars. Agricultural imports increased 34.27 times from 454 million dollars to 15 trillion 559 billion dollars. Fruit-vegetable exports increased by 727.16%, from 950 million dollars to 7 billion 859 million dollars. Fruit-vegetable imports increased by 422.03 times from 3.4 million to 887 million dollars. Vegetable exports increased 14.32 times from 103 million dollars to 1 billion 391 million dollars. Vegetable imports increased by 51.72 times from 1.8 million to 92.5 million dollars (Table 5).

Table 5. Development of trade in Türkiye

Product group	Trade	1980-1985	1986-1991	1992-1997	1998-2003	2004-2009	2010-2015	2016-2021
		1,000 dollars						
Total trade	Export	5,696,412	11,247,706	19,881,149	32,663,767	93,936,593	142,414,634	173,869,786
	Import	9,503,462	16,456,542	33,910,654	50,564,717	144,474,118	227,332,007	226,124,939
Agricultural products	Export	2,294,423	2,906,651	4,092,590	4,102,227	7,768,067	14,906,127	18,436,351
	Import	454,079	1,388,454	2,887,365	3,125,861	6,547,479	12,606,080	15,559,412
Fruit and vegetables	Export	950,152	1,487,760	1,976,269	2,121,918	4,191,750	6,888,107	7,859,282
	Import	3,401	24,653	93,486	150,565	441,993	887,141	1,435,343
Vegetables	Export	103,084	291,069	387,081	428,277	937,101	1,390,906	1,476,395
	Import	1,789	3,142	5,941	13,897	31,482	74,687	92,518
Index (1980-1985 = 100)*								
Total trade	Export	100.00	197.45	349.01	573.41	1,649.05	2,500.08	3,052.27
	Import	100.00	173.16	356.82	532.07	1,520.23	2,392.10	2,379.40
Agricultural products	Export	100.00	126.68	178.37	178.79	338.56	649.67	803.53
	Import	100.00	305.77	635.87	688.40	1,441.92	2,776.18	3,426.58
Fruit and vegetables	Export	100.00	156.58	208.00	223.32	441.17	724.95	827.16
	Import	100.00	724.88	2,748.77	4,427.08	12,995.96	26,084.72	42,203.57
Vegetables	Export	100.00	282.36	375.50	415.47	909.07	1,349.30	1,432.23
	Import	100.00	175.65	332.14	776.93	1,760.07	4,175.58	5,172.47
Annual rate of increase (%)*								
Total trade	Export	28.91	13.72	13.08	12.53	10.28	4.38	9.68
	Import	7.24	14.92	18.72	8.50	7.41	1.95	6.11
Agricultural products	Export	3.23	10.28	8.33	0.40	12.29	6.52	8.84
	Import	20.13	18.71	22.45	3.19	10.24	4.21	11.31
Fruit and vegetables	Export	-0.06	6.65	9.67	1.56	9.57	4.20	7.86
	Import	266.35	45.53	35.90	-5.36	47.23	10.11	11.07
Vegetables	Export	32.01	13.36	8.34	4.07	15.07	-0.55	9.55
	Import	-	-8.98	35.24	-5.69	27.18	10.04	5.39

Source: *Own calculation from FAOSTAT data [7].

Türkiye's vegetable export

When the developments in Türkiye vegetable exporting were evaluated between 1980 and 2021, the vegetable export value, which was 291 million 69 thousand dollars on average between 1986-1991, increased by 5.07 times

during the analyzed period and rose to 1 billion 476 million dollars on average between 2016-2021. According to the average for 2016-2021, tomatoes rank first with a rate of 20.17% in vegetable exporting, followed by chillies and peppers (green) with a rate of

8.79%, and frozen vegetables with a rate of 5.74% in third place. Pumpkins (squash and gourds) (%3.08), cucumbers and gherkins (%2.90), and onions and shallots (dry) (%2.48) follow them, respectively. The rate of other vegetable products (fresh or dry or preserved) was 53.01%. During the examined

periods, the increase in export values occurred respectively in avocados by 149.72 times, pumpkins (squash and gourds) by 94.16 times, tomato juice by 54.54 times, other beans (green) by 48.01 times, and asparagus by 25.67 times (Table 6).

Table 6. Development of vegetable export in Türkiye

Vegetables	1980-1985		1986-1991	1992-1997	1998-2003	2004-2009	2010-2015	2016-2021		Index (1986-1991 = 100)
	1,000 dollars	Percent (%)	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	Percent (%)	
<i>Vegetables Primary</i>	103,084	100.00	291,069	387,081	428,277	937,101	1,390,906	1,476,395	100.00	507.23
Other vegetable products (fresh or dry or preserved)	57,697	55.97	164,001	266,001	282,820	499,723	679,713	782,612	53.01	477.20
Tomatoes	21,252	20.62	23,659	36,713	53,053	234,731	415,523	297,741	20.17	1,258.45
Chillies and peppers (green)	1,115	1.08	11,589	21,931	23,439	53,821	76,997	129,774	8.79	1,119.85
Vegetables frozen	295	0.29	10,466	20,332	27,812	56,026	58,451	84,770	5.74	809.95
Pumpkins (squash and gourds)	72	0.07	484	1,146	1,761	8,168	28,627	45,525	3.08	9,415.75
Cucumbers and gherkins	163	0.16	7,121	6,449	6,230	35,090	65,113	42,855	2.90	601.83
Onions and shallots (dry)	16,529	16.03	16,989	19,409	17,198	18,138	23,435	36,605	2.48	215.47
Eggplants	387	0.38	1,024	1,404	2,354	5,143	11,228	15,127	1.02	1,476.97
Carrots and turnips	848	0.82	1,186	1,845	3,588	7,672	8,874	14,253	0.97	1,202.11
Mushrooms and truffles (dried and canned)	281	0.27	50,356	5,729	5,008	7,520	9,094	8,049	0.55	15.98
Cabbages	357	0.35	398	975	899	1,631	2,485	4,108	0.28	1,031.30
Leeks and other alliaceous vegetables	0	0.00	1,029	2,632	2,519	3,752	4,767	3,157	0.21	306.70
Green garlic	3,672	3.56	2,015	1,642	174	145	216	2,468	0.17	122.49
Lettuce and chicory	29	0.03	106	262	387	1,950	2,167	2,461	0.17	2,325.04
Cauliflowers and broccoli	92	0.09	159	45	83	469	657	2,077	0.14	1,310.30
Tomato juice	0	0.00	34	110	323	702	977	1,836	0.12	5,453.96
Other beans (green)	229	0.22	25	150	543	1,089	1,117	1,208	0.08	4,800.66
Avocados	0	0.00	5	19	9	28	20	724	0.05	14,972.41
Broad and horse beans (green)	0	0.00	0	0	0	0	665	610	0.04	91.78*
Spinach	7	0.01	18	12	15	795	978	354	0.02	2,022.86
Peas (green)	0	0.00	45	56	35	50	39	19	0.00	41.70
Asparagus	0	0.00	2	2	-	11	44	51	0.00	2,566.67
Artichokes	1	0.00	16	7	7	2	1	14	0.00	89.36
Onions and shallots (green)	57	0.06	343	211	23	447	169	0	0.00	-

*Index (2010-2015 = 100)

Source: [7].

Türkiye's vegetable import

Türkiye's vegetable import value, which was 74 million 687 thousand dollars on average between 2010-2015, increased by %23.87 during the analyzed period and rose to 92 million 518 thousand dollars on average between 2016-2021. Regarding Türkiye vegetable imports, green garlic ranked first with a share of 8.42%. This was followed by onions and shallots (dry) at 6.01%, vegetables

frozen at 5.27%, mushrooms and truffles (dried and canned) at 2.23%, avocados at 2.16% and tomatoes at 1.61%. The rate of other vegetable products (fresh or dry or preserved) was 72.20%. The increase in import value compared to the average of 2010-2015 was 17.89 times for onions and shallots (dry), 7.82 times for avocados, 5.21 times for tomatoes, and 2.93 times for cucumbers and gherkins (Table 7).

Table 7. Development of vegetable import in Türkiye

Vegetables	1980-1985		1986-1991	1992-1997	1998-2003	2004-2009	2010-2015	2016-2021		Index (2010-2015 = 100)
	1,000 dollars	Percent (%)	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	Percent (%)	
Vegetables Primary	1,789	100.00	3,142	5,941	13,897	31,482	74,687	92,518	100.00	123.87
Other vegetable products (fresh or dry or preserved)	1,781	99.56	2,351	4,399	12,449	21,816	47,328	66,799	72.20	141.14
Green garlic	0	0.00	64	64	466	2,462	6,650	7,794	8.42	117.21
Onions and shallots (dry)	6	0.32	444	136	30	49	311	5,564	6.01	1,789.12
Vegetables frozen	0	0.00	175	845	685	5,962	15,733	4,877	5.27	31.00
Mushrooms and truffles (dried and canned)	0	0.00	32	66	52	122	1,280	2,061	2.23	161.08
Avocados	0	0.00	1	10	11	132	255	1,994	2.16	781.96
Tomatoes	0	0.00	29	38	12	29	286	1,492	1.61	521.68
Artichokes	0	0.01	2	1	18	145	956	917	0.99	95.94
Chillies and peppers (green)	0	0.00	7	69	36	12	206	408	0.44	197.82
Asparagus	0	0.00	0	2	0	60	275	179	0.19	65.19
Lettuce and chicory	0	0.00	9	54	63	216	560	134	0.14	23.95
Cucumbers and gherkins	0	0.00	8	21	5	7	39	114	0.12	292.74
Pumpkins (squash and gourds)	0	0.00	1	1	0	433	464	67	0.07	14.38
Cabbages	0	0.00	0	17	0	1	339	65	0.07	19.16
Eggplants	0	0.00	7	204	34	5	51	32	0.03	62.11
Carrots and turnips	0	0.00	0	3	2	6	7	9	0.01	138.24
Tomato juice	0	0.00	1	9	2	24	2	10	0.01	433.33
Broad and horse beans (green)	0	0.00	0	0	0	0	0	9	0.01	-
Leeks and other alliaceous vegetables	0	0.00	0	20	2	0	2	0	0.00	-
Peas (green)	0	0.00	0	12	4	0	0	0	0.00	-
Spinach	0	0.00	0	0	0	0	15	0	0.00	2.19
Cauliflowers and broccoli	0	0.00	0	0	2	2	3	1	0.00	35.29
Onions and shallots (green)	2	0.11	12	7	0	0	0	0	0.00	-
Other beans (green)	0	0.00	0	4	24	0	0	1	0.00	-

Source: [7].

Türkiye's vegetables trade balance

Türkiye's foreign trade balance in vegetables has increased during the years (1980-2021). Türkiye had a foreign trade surplus of 132 million 620 thousand dollars in 2001.

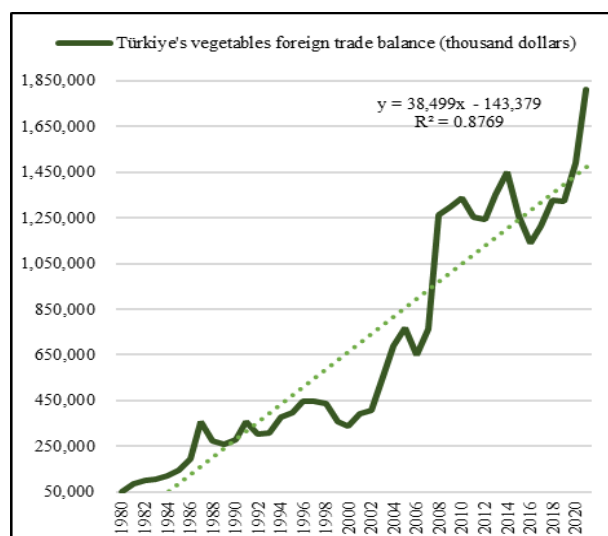


Fig. 1. Türkiye's vegetables foreign trade balance (thousand dollars)

Source: Own calculation from FAOSTAT data [7].

In 2021, it increased by 35.72 times and a foreign trade surplus of 1 billion 810 million dollars was realized. In the analyzed period, the foreign trade surplus averaged 684 million dollars (Fig 1).

The share of vegetable exports in vegetable production varies between 3.32% and 7.03%. It was determined that the share of vegetable exports in vegetable production increased by 111.92%. In Türkiye, 13.74% of carrots and turnips, 11.43% of pumpkins (squash and gourds) and 8.81% of onions and shallots (dry) were exported between 2016 and 2021. In addition, 4.16% of tomatoes, 4.72% of chillies and peppers (green), 3.36% of cucumbers and gherkins and 2.99% of eggplants were exported (Table 8).

Mushrooms and truffles, cauliflowers and broccoli, cabbages, lettuce and chicory, other beans (green), spinach, peas (green), artichokes, onions and shallots (green) are almost all vegetables for domestic consumption.

Table 8. The ratio of vegetable export quantity to production quantity in the Türkiye (%)

Vegetables	1980-1985	1986-1991	1992-1997	1998-2003	2004-2009	2010-2015	2016-2021	Index (1980-1985 = 100)
<i>Vegetables Primary</i>	3.32	4.30	4.13	4.33	5.92	6.57	7.03	211.92
Carrots and turnips	4.43	4.31	3.43	8.87	8.39	9.13	13.74	318.46
Pumpkins (squash and gourds)	0.09	0.43	0.65	0.97	2.85	9.63	11.43	12,866.63
Onions and shallots (dry)	10.56	10.68	6.99	6.28	6.92	7.43	8.81	83.46
Asparagus	12.67	26.67	11.81	1.39	64.26	4.38	4.94	38.99
Green garlic	7.26	4.96	2.76	0.20	0.19	0.21	4.89	67.34
Chillies and peppers (green)	0.35	2.18	2.74	2.31	3.30	3.50	4.72	1,335.57
Tomatoes	2.59	2.20	1.43	1.89	3.48	4.87	4.16	160.28
Cucumbers and gherkins	0.08	1.36	0.96	0.86	3.33	4.96	3.36	67.74
Eggplants	0.21	0.29	0.29	0.43	0.70	1.73	2.99	1,451.51
Broad and beans (green)	-	-	-	-	-	0.66	2.65	402.59*
Leeks and other alliaceous vegetables	-	1.07	2.30	3.04	3.13	3.78	2.50	233.29**
Other vegetables (fresh n.e.c.)	20.00	5.12	3.41	5.24	7.18	4.64	2.26	11.30
Mushrooms and truffles	1.83	19.36	30.91	12.82	4.24	1.80	1.45	7.49
Cauliflowers and broccoli	0.62	1.06	0.16	0.23	0.48	0.62	1.44	230.88
Cabbages	0.32	0.24	0.44	0.39	0.62	0.86	1.18	365.15
Lettuce and chicory	0.13	0.44	0.21	0.16	0.51	0.61	0.84	645.86
Other beans (green)	0.17	0.01	0.03	0.14	0.16	0.16	0.25	150.85
Spinach	0.02	0.05	0.02	0.02	0.37	0.46	0.21	949.50
Peas (green)	0.00	0.19	0.20	0.09	0.05	0.03	0.05	1,237.97
Artichokes	0.01	0.18	0.05	0.04	0.00	0.00	0.02	345.73
Onions and shallots (green)	0.16	1.27	0.41	0.06	0.38	0.19	-	0.00

*Index (2010-2015 = 100), **Index (1986-1991 = 100)

Source: [7].

Türkiye's contribution to the world vegetable trade

The leading countries in world vegetable exports were China, Mexico, Spain, Netherlands, Italy and USA. Türkiye ranks 12th in the world for primary vegetable exports.

Türkiye ranks sixth in the world in three types of vegetable exportation. These vegetables were eggplants, chillies and peppers (green) and cucumbers and gherkins. It ranks eighth in one vegetable type (tomatoes) and fourteenth in two vegetable types (carrots and turnips and green garlic).

Table 9. Türkiye's position in world vegetable export

Vegetables	Türkiye's rank in world vegetable export	Number of countries exporting vegetables in the world	Major countries in vegetable export
<i>Vegetables Primary</i>	12	191	China, Mexico, Spain, Netherlands, Italy, USA
Pumpkins (squash and gourds)	4	123	Spain, Mexico, New Zealand, Türkiye, Netherlands, USA
Eggplants	6	111	Spain, Netherland, Mexico, USA, Iran, Türkiye
Chillies and peppers (green)	6	131	Spain, Mexico, Netherland, Canada, USA, Türkiye
Cucumbers and gherkins	6	105	Spain, Mexico, Netherland, Canada, USA, Türkiye
Tomatoes	8	134	Mexico, Netherlands, Spain, Morocco, France, Canada
Carrots and turnips	14	98	China, Netherland, USA, Spain, Belgium, Italy
Green garlic	14	110	China, Spain, Argentina, Netherlands, France, Chile
Onions and shallots (dry)	15	114	Netherlands, India, China, Mexico, USA, Spain
Cauliflowers and broccoli	19	95	Spain, Mexico, USA, Italy, France, China
Broad and horse beans (green)	20	95	Mexico, Spain, Kenya, Netherlands, Guatemala, Morocco
Spinach	25	83	China, USA, Italy, Mexico, Spain, Netherland
Artichokes	25	46	Spain, France, Italy, Egypt, Tunisia, USA
Cabbages	28	110	China, USA, Mexico, Netherlands, Spain, Italy
Other beans (green)	28	116	Morocco, China, Netherlands, Guatemala, Mexico, France
Lettuce and chicory	30	101	Spain, USA, Mexico, Netherland, Italy, China
Other vegetables (fresh n.e.c.)	41	143	Italy, Netherlands, China, Mexico, Spain, Ethiopia
Asparagus	44	71	Mexico, Peru, USA, Netherland, Spain, Italy
Peas (green)	54	87	Guatemala, Netherlands, USA, Peru, France, Mexico
Leeks and other alliaceous vegetables	86	8	Netherlands, Belgium, China, Spain, France, Mexico
Okra	-	7	Kenya, Jamaica, Oman, Bangladesh, Tonga, Saint Lucia
Onions and shallots (green)	-	47	New Zealand, France, Netherlands, Morocco, Germany, Indonesia
String beans	-	1	Guyana

Source: [7].

It also ranks fourth globally in pumpkin (squash and gourds) exports (Table 9). The types of vegetables that are widely traded in the world are tomatoes, which are exported by 134 countries, and chillies and peppers (green), which are exported by 131 countries. The leading countries in world vegetable imports were USA, Germany, United Kingdom, France, Netherlands, and Canada.

In terms of primary vegetable imports, Türkiye ranks 76th in the world. Türkiye ranks eleventh in the world in artichokes importation. Türkiye is not in an important position in the import of other types of vegetables. The widely traded vegetables in the world are green garlic, imported by 189 countries, and cabbages, imported by 170 countries (Table 10).

Table 10. Türkiye's position in world vegetable import

Vegetables	Türkiye's rank in world vegetable import	Number of countries importing vegetables in the world	Major countries in vegetable import
Vegetables Primary	76	195	USA, Germany, United Kingdom, France, Netherlands, Canada
Artichokes	11	86	France, Italy, Belgium, Switzerland, Germany, USA
Green garlic	58	189	Indonesia, USA, Brazil, Malaysia, Germany, France
Asparagus	63	135	USA, Germany, Netherlands, Canada, United Kingdom, France
Chillies and peppers, green	76	165	USA, Germany, United Kingdom, Canada, France, Netherlands
Pumpkins, squash and gourds	81	137	USA, France, Germany, United Kingdom, Netherlands, Japan
Tomatoes	81	169	USA, Germany, France, United Kingdom, Russian, Netherlands
Broad and horse beans, green	85	110	USA, Italy, Germany, Spain, United Kingdom, France
Eggplants	86	112	Germany, USA, France, United Kingdom, Canada, Iraq
Cucumbers and gherkins	95	133	USA, Germany, United Kingdom, Netherlands, Poland, Iraq
Spinach	104	112	Canada, USA, United Kingdom, Germany, Mexico, Netherlands
Lettuce and chicory	112	162	Germany, USA, Canada, United Kingdom, France, Italy
Leeks and other alliaceous vegetables	120	127	Germany, Japan, France, USA, Spain, Netherlands
Peas (green)	121	131	USA, Netherlands, Belgium, United Kingdom, Canada, Germany
Carrots and turnips	134	159	Germany, USA, Canada, Viet Nam, Russian, France
Cabbages	141	170	USA, Canada, China, Germany, Malaysia, Netherland
Other vegetables, fresh n.e.c.	146	178	Germany, China, USA, France, Somalia, Canada
Onions and shallots, dry	160	169	USA, Viet Nam, Malaysia, United Kingdom, Canada, Germany
Cauliflowers and broccoli	-	153	United Kingdom, Canada, USA, Germany, Malaysia, France
Other beans, green	-	144	USA, United Kingdom, Spain, Netherlands, France, Canada
Okra	-	13	USA, Algeria, Qatar, Somalia, Congo, South Sudan
Onions and shallots, green	-	78	Côte d'Ivoire, Brazil, Germany, Belgium, Italy, Lao PDR
String beans	-	1	Guyana

Source: [7].

Contribution of the vegetable sector to trade

The share of agricultural exports in the total world export value varies between 5.94% and 11.50%. This ratio follows a decreasing trend in the related years. The average was 8.31%. In Türkiye, this rate varies between 6.01% and 62.30%. This rate followed a decreasing trend and was realized at 10.55% in 2021 (Fig 2). Although total exports have increased over the years, the share of agricultural exports has decreased. The reason for this is the increase in the share of this sector in total exports with the development of the industrial sector in Türkiye.

In addition, the leading sector in Türkiye's total exports is agriculture-based industries. The share of these industries in total exports was approximately 30% [9].

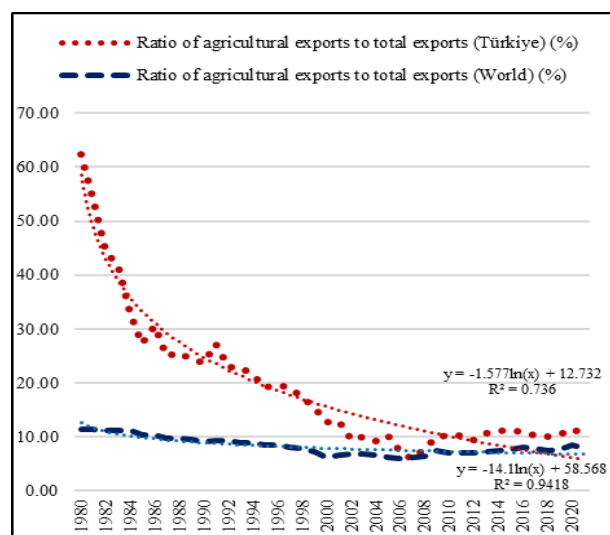


Fig. 2. Ratio of agricultural exports to total exports
 Source: Own calculation from FAOSTAT data [7].

The share of vegetable export value in the world of agricultural exports varies between 0.02% and 0.07%. The average was 0.04%. In

Türkiye, this rate varies between 2.79% and 14.33%. There was an increasing trend between 1980-1987 and 2002-2009, a decreasing trend between 1987-2001 and since 2009. The average was 9.12% (Fig 3).

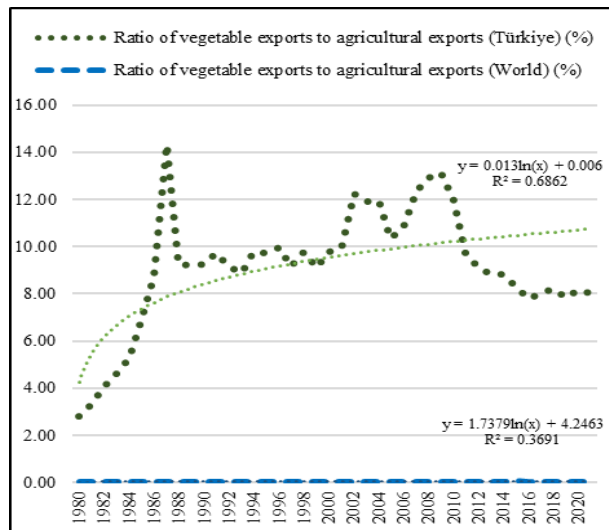


Fig. 3. Ratio of vegetable exports to agricultural exports
 Source: Own calculation from FAOSTAT data [7].

The share of agricultural imports in the total world import value varies between 6.03% and 12.26%. This ratio follows a fluctuating trend in the related years. The average was 8.63%. In Türkiye, this rate varies between 3.04% and 10.17%. There was a fluctuating upward trend between 1983-1995 and 2007-2021, a decreasing trend between 1996-2006. The average was 6.34% (Fig 4).

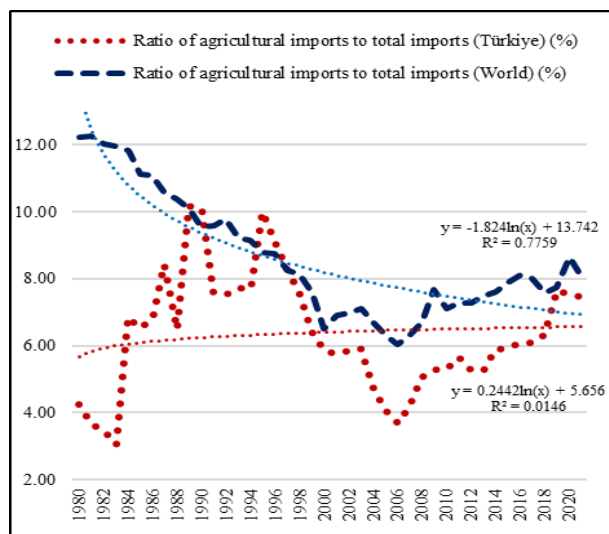


Fig. 4. Ratio of agricultural imports to total imports
 Source: Own calculation from FAOSTAT data [7].

The share of vegetable imports in world agricultural imports varies between 0.03% and 0.07%. The average was 0.04%. In Türkiye, this rate varies between 0.00% and 1.70%. The average was 0.43% (Fig 5). It was determined that the rate of vegetable imports among agricultural imports was very low.

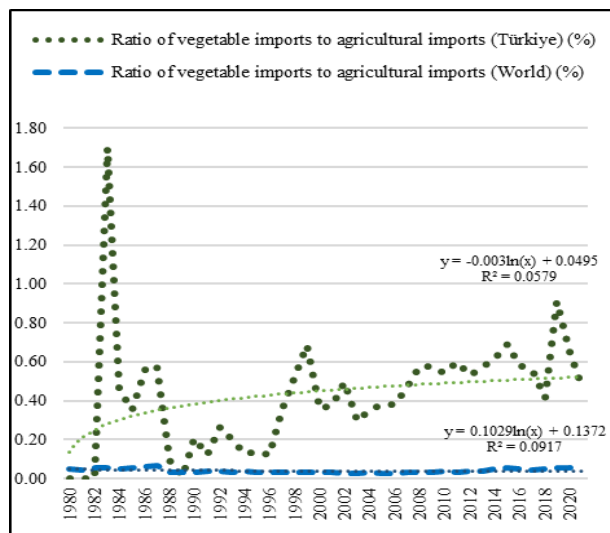


Fig. 5. Ratio of vegetable imports to agricultural imports
 Source: Own calculation from FAOSTAT data [7].

CONCLUSIONS

Türkiye is an important country in terms of global vegetable production and exports. Türkiye's potential for vegetable production and exports has been very high from the past to the present. To ensure the continuity and improvement of this potential, the following recommendations can be developed.

Developing agricultural technologies: Türkiye can increase the efficiency of vegetable production by investing more in farm technologies. This can increase the country's vegetable exports by reducing production costs, offering competitive export prices, and improving product quality.

More investment in vegetable production: Investments such as modernizing facilities, improving production processes, increasing product quality, and developing storage systems in vegetable production can increase Türkiye's vegetable exports.

Branding and marketing: To increase Türkiye's vegetable exports, producers need to invest more in branding and marketing

activities. More control over producing quality products, packaging, labeling, branding, distribution, and marketing processes can increase Türkiye's vegetable exports.

Entering new markets: Türkiye should open up to new markets for vegetable exports. It may be possible to diversify vegetable exports by entering markets in countries with increasing demand worldwide.

Tax policies: Reducing customs duties on vegetable exports can make export prices more competitive.

Education and information: Education and information programs can be organized to help vegetable producers and exporters in Türkiye meet the requirements for export. This can help producers become more aware of vegetable exports.

These recommendations can be an important step for increasing Türkiye's vegetable exports.

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