



TÜRKTOB

TÜRKİYE TOHUMCULAR BİRLİĞİ

TURKISH SEED UNION

SEED SECTOR REPORT

2021

TURKISH SEED UNION



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1. HISTORY OF SEED GROWING AND MILESTONES

1.1. World

For centuries, farm saved seeds were used as seed for the next cultivation, until the seed studies and efforts of the United States and some European countries led to the production of higher quality seed and the introduction of seed quality standards, giving seed a commercial value from the 19th century onward.

The first seed production organizations were established in the first quarter of the 20th century, although in time, the private sector took over the production and distribution of seeds. In the 1970s, private seed-growing organizations began to allocate significant resources to and investments into R&D.

Scientific and technological developments have always been a determining factor in the development of the global seed production sector. It was back in the 19th century when genetics started to make a mark in plant-breeding and variety-creation activities. The hybrid technologies that were developed in the early 20th century established a strong link between private entrepreneurship and commercial seed growing. In the late 20th century, modern biotechnologies and recombinant DNA technologies resulted in seed-growing activities gaining momentum.

As the global seed trade expanded, the pursuit of greater yields and higher quality gained importance. The need for control over the seed-growing sector and the trade of seeds made its presence felt very early on. In the late 19th century, the first national seed quality laboratories were established and the first seed standards were established.

As an input of agricultural production, the share of seeds in global trade remained quite low until the 1970s. Following the 1970s, the global seed-growing sector underwent some significant changes in many areas. Seed-growing companies in developed Western countries expanded their research, production and marketing activities toward other countries, and as a result of the globalization that started in the 1980s in particular, many countries formulated and implemented policies to develop and strengthen their seed-growing sectors. More recently, in the early 21st century, significant developments were made in the production, use, marketing and trade of quality seeds all over the world.

Most countries consider the seed sector to be a strategic and national issue, and have criticized the weakness of the international organizational structure of the seed sector in the past. The main criticisms are levelled at the different approaches to quarantine issues, R&D, the lack of overseas production capacity, international distribution routes, marketing and discrepancies in national seed regulations, which have stood out as restrictive factors both in production and in foreign trade.

Over time, a number of new institutions and organizations involved in the regulation/implementation of plant breeders' rights and international seed production and

certification systems within the scope of intellectual and industrial property rights, have emerged and accelerated the international trade of seeds.

Nowadays, the seed sector has become an indisputable and indispensable entity in terms of ensuring the food safety of the increasing world population.

The international trade of seeds has seen significant increases over the last quarter century, in parallel with the developments in the seed sector. New varieties suitable for different ecologies, specializations in seed production and developments in seed technologies have all played a significant role in this growth. Between 1970 and 2012, the international trade of seeds increased 10-fold, and in the same period, the rate of increase in international seed trade was higher than the growth in the total global seed market.

The international trade of seeds, which amounted to around \$1 billion in the late 1970s, started to grow rapidly in the mid-1980s. As of 2012, the total international trade of seeds has reached approximately \$10.5 billion, and this upward trend is continuing, with the two major pillars of the international seed market being the European Union and the United States.

Today, the total global seed production value is estimated to be approximately \$50 billion. The United States ranks first (\$12 billion), followed by China (\$10 billion), France (\$2.8 billion), Brazil (\$2.1 billion) and Canada (\$2 billion). Turkey ranks 11th, with a production value of \$0.75 billion.

1.2. Turkey

Turkey's geographical location and climatic diversity make it ideal for agriculture and seed production. Over the years, efforts have been made to take advantage of this so as to improve both agricultural and seed production.

From the foundation of our Republic up until the 1960s, the system known as "traditional procurement" was predominant, with the state taking steps to improve seed production.

In 1925, seed breeding stations were established in various ecological regions. In 1926, rootstock beet seeds were imported for the first time. In 1950, State Production Farms were commissioned for the production of seeds. In 1961, the first private seed production company was established.

With the enactment in 1963 of Seed Law No. 308, a predominantly public system was adopted in seed production and supply that remained in use until 1980.

In the 1980s, Turkey started to look for new varieties of seed. The Ministry of Agriculture and Forestry made drastic changes to its seed policies. Private companies were allowed to set their own prices for their seeds. In 1984, arrangements were made to facilitate the import and export of seeds by private companies, after which the predominance of the private sector in the seed production and supply system started to increase. In 1998, Turkey became a member of the International Seed Federation (ISF). With the enactment of Law No. 5042 on the Protection of Breeder's Rights on New Plant Varieties in 2004, and Seed Law No. 5553 of

2006, which brought us into compliance with EU legislation and international standards, and supported by recent commercial, scientific and technological advances, the sector gained significant momentum, and significant developments have been seen in the production and trade of seeds since then. In 2007, the International Union for the Protection of New Varieties of Plants (UPOV) Convention on the protection of new plant varieties and plant breeders' rights was ratified, aimed at the protection of intellectual and industrial property rights.

As a result of all these developments, the competitiveness of the seed sector in the international market has increased with each passing day. The export-import coverage ratio has increased gradually to reach 114% in 2020 with the inclusion of young plant and ornamental plants in the calculation.

2. OVERVIEW OF THE SEED SECTOR

2.1. Production Data

Table 1. Production Data of Certain Field Crops and Vegetables (tons)

Species	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Wheat	315,676	410,766	327,924	421,588	403,769	484,204	485,225	508,191	426,658	483,957	500,574
Barley	34,416	48,401	43,162	79,189	82,216	125,018	99,628	119,474	151,365	177,306	222,265
Maize	35,234	31,338	32,796	38,576	66,578	56,671	52,791	58,118	62,230	53,566	68,430
Rice	5,521	8,649	8,627	7,629	9,334	8,945	12,958	10,491	10,565	9,886	9,975
Sunflower	11,854	14,137	14,732	18,756	23,769	17,494	21,757	28,022	25,028	28,602	33,577
Soybean	1,982	2,274	2,248	3,699	3,408	2,443	3,664	4,101	3,230	3,960	3,937
Peanut	70	114	147	171	151	139	206	197	160	213	232
Sugarbeet	466	1,479	1,166	896	1,163	1,448	1,168	1,195	1,818	1,159	1,563
Potato	70,654	96,295	185,485	150,908	163,269	175,397	231,592	258,180	276,390	255,966	293,530
Cotton	15,679	16,911	23,074	10,260	11,621	8,883	14,279	19,929	25,141	26,471	18,533
Chickpea	253	309	1,239	1,603	1,726	2,305	4,059	10,658	31,990	35,643	19,537
Bean			62	54	44	109	179	624	1,032	3,925	1,998
Lentil	107	589	894	2,078	305	1,140	14,505	12,290	22,011	35,670	36,043
Canola	107	63	12	91	28	82	31	6	9	41	38
Vegetables	2,500	2,213	2,115	1,576	1,656	2,782	3,291	3,832	2,042	2,117	2,206
Sesame		14	0	3	3	0	18	0	3	0	13
Alfalfa	349	473	670	610	560	634	794	887	3,000	3,501	3,456
Sainfoin		200	2	12	46	30.7	188	385	307	773	556
Vetch	858	876	876	385	686	974	1,114	1,139	1,572	1,526	2,487
Sorghum		226	133	155	216	308	192	79	63	318	159
Safflower		269	250	750	807	644.3	772	975	361	289	150
Fodder tumin		14	12	55	92	17.6	53	6	11	19	25
Fodder beet		33	44	8	5	38.5	36	31	10	1	0
Grass and Fescue	56	3	208	106	87	236	107	167	404	366	1,145
Fodder pea			381	484	440	811	1,585	2,321	2,121	3,656	5,398
Others		1,686	1,024	4,035	4,369	6,355.7	9,319	8,067	11,795	14,279	15,933
TOTAL	495,782	637,330	646,905	743,193	775,909	896,298	957,925	1,049,361	1,059,316	1,134,533	1,241,760

Figure 1. Seed Production by Years (tons)

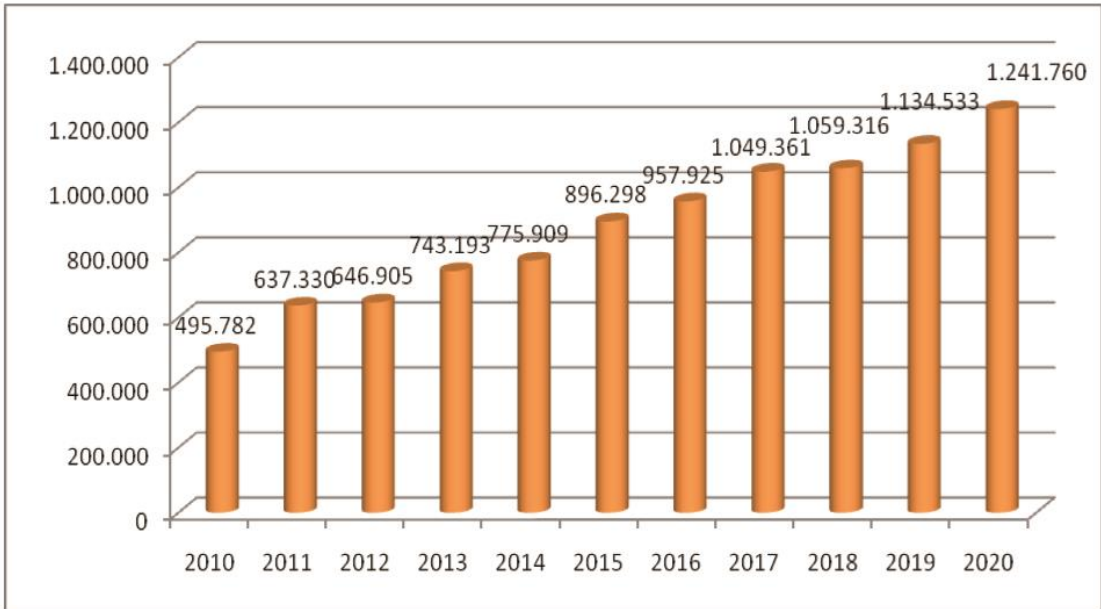


Figure 2. Production of Selected Crops by Years (tons)

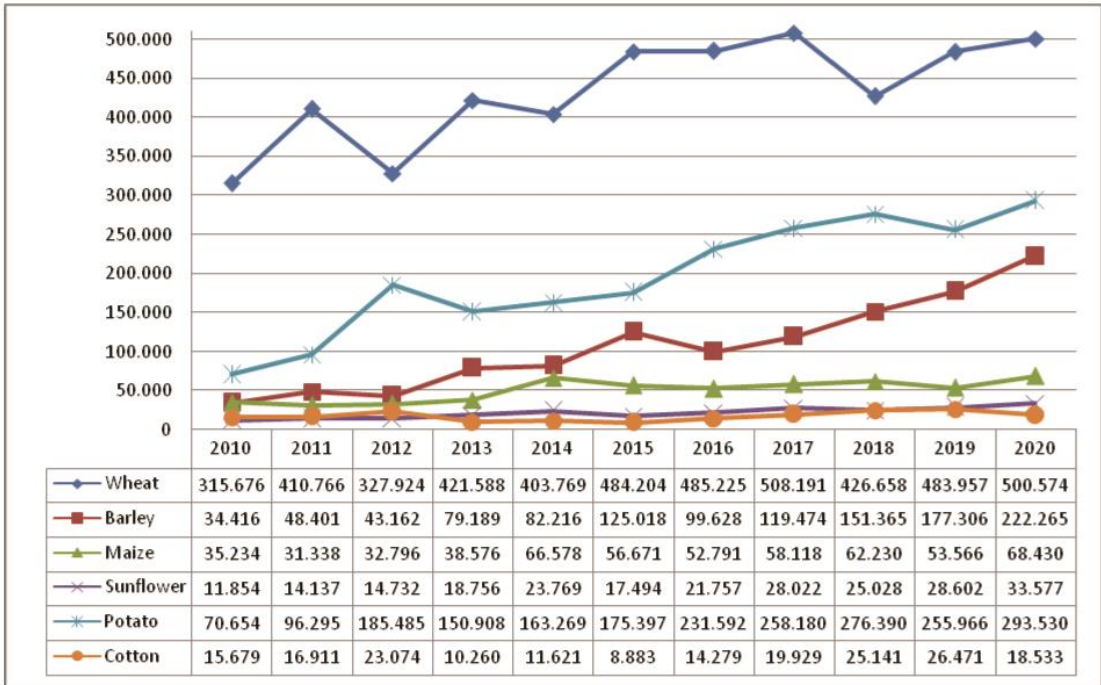


Table 2. Seed Production by Public and Private Sectors by Years (tons)

YEAR	Producer	WHEAT	BARLEY	SOYBEAN	MAIZE	SUNFLOWER	POTATO	COTTON	VEGETABLES	FODDER CROPS
2010	Public	163,109	17,698	114	222	0	-	104	7	1,007
	Private	152,567	16,717	1,868	35,012	11,853	70,654	15,574	2,493	502
	Total	315,676	34,416	1,982	35,234	11,854	70,654	15,679	2,500	1,509
	Private (%)	48	49	94	99	100	100	99	100	33
2011	Public	185,974	20,714	240	19	0	0	20	3	846
	Private	224,792	27,687	2,034	31,319	14,137	96,295	16,890	2,211	983
	Total	410,766	48,401	2,274	31,338	14,137	96,295	16,910	2,213	1,829
	Private (%)	55	57	89	100	100	100	100	100	54
2012	Public	137,728	11,608	66	151	0	8	170	125	850
	Private	190,196	31,554	2,182	32,645	14,732	185,478	22,904	1,990	1,095
	Total	327,924	43,162	2,248	32,796	14,732	185,485	23,074	2,115	1,945
	Private (%)	58	73	97	100	100	100	99	94	56
2013	Public	175,360	22,557	168	173	0	39	48	169	520
	Private	246,228	56,632	3,531	38,403	18,756	150,870	10,213	1,407	1,294
	Total	421,588	79,189	3,699	38,576	18,756	150,908	10,260	1,576	1,815
	Private (%)	58	72	95	100	100	100	100	89	71
2014	Public	145,439	10,771	153	584	0	11	47	3	711
	Private	257,809	71,444	3,255	65,993	23,769	163,259	11,574	1,653	1,422
	Total	403,769	82,216	3,408	66,578	23,769	163,269	11,621	1,656	2,133
	Private (%)	64	87	96	99	100	100	100	100	67
2015	Public	307,616	21,124	162	168	0.1	2.0	13	3	1,017
	Private	176,588	103,895	2,280	56,503	17,494	175,395	8,870	2,779	1,764
	Total	484,204	125,018	2,443	56,671	17,494	175,397	8,883	2,782	2,780
	Private (%)	64	83	93	100	100	100	100	100	63
2016	Public	151,436	11,251	38	411	0.2	6.5	1.2	1	1,007
	Private	333,789	88,377	3,625	52,380	21,757	231,586	14,278	3,289	3,061
	Total	485,225	99,628	3,664	52,791	21,757	231,592	14,279	3,291	4,068
	Private (%)	69	89	99	99	100	100	100	100	75
2017	Public	155,283	19,617	14	143	0.3	0.4	20.4	1.9	1,551
	Private	352,908	99,856	4,087	57,951	28,022	258,179	19,909	3,830	3,465
	Total	508,191	119,474	4,101	58,094	28,022	258,180	19,929	3,832	5,015
	Private (%)	69	84	100	100	100	100	100	100	69
2018	Public	170,199	22,496	1	31	0.5	109,3	10	1	1,570
	Private	256,459	128,869	3,229	62,198	25,028	276,280	25,131	2,041	5,850
	Total	426,658	151,365	3,230	62,229	25,029	276,389	25,141	2,042	7,420
	Private (%)	60	85	100	100	100	100	100	100	79
2019	Public	179.717	20.516	37	395	0.7	125	1.5	1	1.198
	Private	304.240	156.790	3.923	44.504	28.061	255.841	26.469	2.115	10.595
	Total	483.957	177.306	3.960	44.899	28.602	255.966	26.471	2.117	11.793
	Private (%)	63	88	99	100	100	100	100	100	90
2020	Public	149.934	22.652	58	45	2	379	9	3	6.753
	Private	350.640	199.613	3.879	68.385	33.571	293.151	18.524	2.203	18.432

Total	500.574	222.265	3.937	68.430	33.573	293.530	18.533	2.206	25.185
Private (%)	70	90	99	100	100	100	100	100	73

Figure 3. Seed Production by Public and Private Sectors in 2020 (tons)

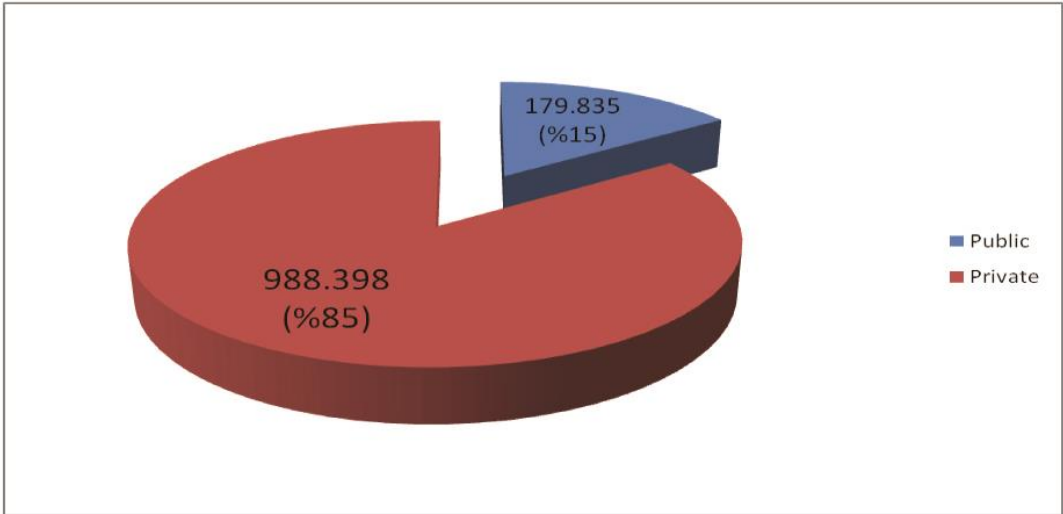


Table 3. Ornamental Plant Production by Years (pcs.)

PRODUCT GROUP	2014	2015	2016	2017	2018	2019	2020
Cut flowers	1.007.831.644	1.036.147.373	1.037.996.375	1.050.584.960	1.055.783.642	1.093.333.943	1.012.465.237
Indoor (potted) ornamental plants	41.448.776	40.810.719	38.150.927	56.049.665	60.149.981	51.669.029	48.458.815
Outdoor ornamental plants	456.026.600	451.142.538	412.227.915	490.559.391	507.183.040	510.558.039	529.1109.699
Flower bulbs	30.059.530	27.200.330	25.337.330	21.833.825	88.657.000	62.537.229	71.415.654
TOTAL	1.535.366.550	1.555.300.960	1.513.712.547	1.619.027.841	1.711.773.663	1.718.098.240	1.661.449.405

Figure 4. Ornamental Plant Production by Years (pcs.)

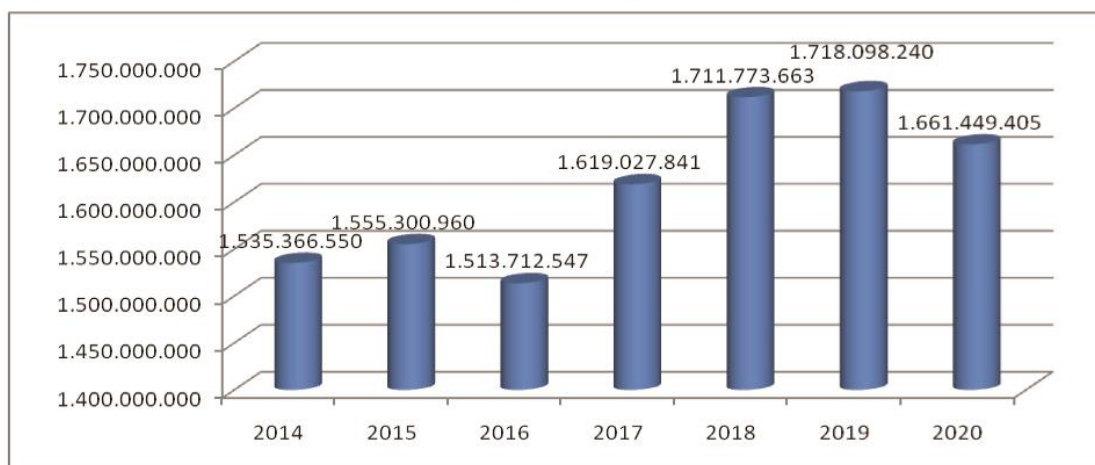


Table 4. Fruit and Vine Sapling Production by Years (1,000 pcs.)

YEAR	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
FRUIT	27.953	30.895	45.394	56.027	58.384	58.861	65.047	101.892	104.308	100.915	119.858
VINE	3.407	3.499	3.393	7.129	5.465	4.981	4.349	3.622	2.276	3.054	2.665
STRAWBERRY	32.257	30.477	32.221	51.123	95.202	68.236	68.804	132.866	82.096	106.031	69.583
TOTAL	63.617	64.871	81.008	114.279	159.051	132.078	138.200	238.381	188.680	210.000	192.106

Figure 5. Sapling Production by Years (pcs.)

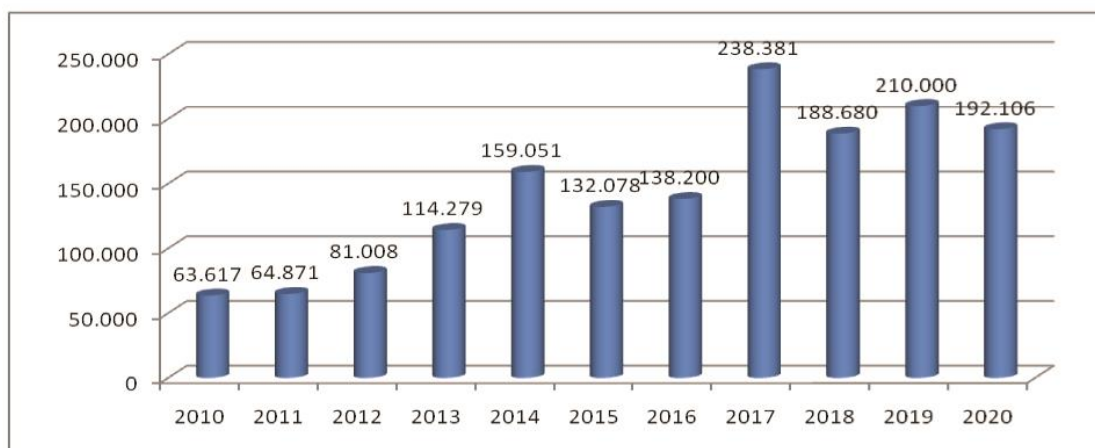


Table 5. Seedling Production by Years (1,000 pcs.)

Years	2010	2012	2013	2014	2015	2016	2017	2018	2019	2020
Production	2.600.000	3.200.000	3.500.000	4.000.000	4.000.000	4.000.000	4.000.000	4.000.000	4.500.000	5.000.000

2.2. Foreign Trade Data

Table 6. Value of Seed Exports and Imports by Years (million \$)

YEAR	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Export	95	108	120	126	148	115	153	136	152	155	162
Import	176	178	197	194	188	202	202	185	179	177	199
Volume	271	287	318	320	336	317	355	321	329	332	361
Balance	-82	-69	-76	-68	-40	- 87	- 49	-49	- 27	- 22	- 37
Coverage Ratio (%)	54	61	61	65	79	57	76	73	85	88	81

Figure 6. Value of Seed Exports and Imports by Years (million \$)

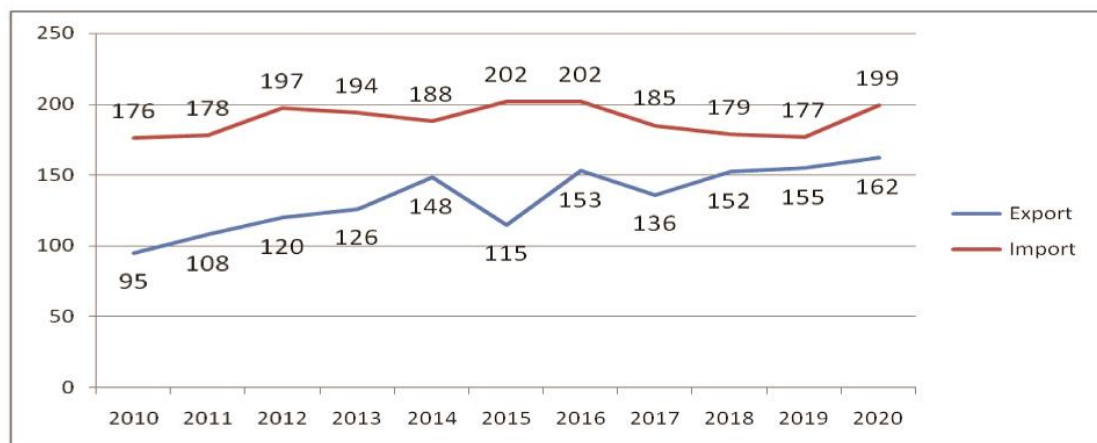


Table 9. Export and Import Value of Some Major Species in 2020 (\$)

SPECIES	EXPORT	IMPORT
Wheat	16.354	1.146
Barley	1.027	288
Sunflower	19.474	755
Potato	2.625	21.366
Sugar beet	143	413
Maize	26.349	6.705
Cotton	3.285	60

Table 10. Value of Ornamental Plant Exports and Imports by Years (1,000 \$)

	Product Group	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Export	Flower bulbs	2.306	2.146	2.001	1.938	1.576	1.708	1.293	1.744	1.371	1.385
	Live Plants	40.181	34.115	39.986	42.537	40.924	45.073	48.145	24.957	31.145	32.755
	Cut Flowers	27.182	30.150	28.190	32.018	28.301	27.731	28.851	34.155	35.859	36.764
	Plant Leaves, Branches, etc.	6.287	6.617	6.811	6.476	6.628	7.101	7.221	7.820	8.203	9.778
	Flower Seeds	-	2.963	3.597	3.622	2.703	2.915	2.697	2.562	3.828	2.441
	TOTAL	75.956	75.991	80.585	86.591	80.132	84.528	88.207	71.239	80.406	83.123
Import	Flower bulbs	6.081	5.805	7.100	7.381	9.995	9.093	6.846	5.477	2.701	2.512
	Live Plants	59.620	59.215	82.203	78.448	65.804	73.296	71.935	45.720	30.981	29.366
	Cut Flowers	1.432	2.012	2.563	6.342	4.883	4.129	3.529	3.261	3.959	2826
	Plant Leaves, Branches, etc.	450	683	635	719	704	735	712	969	666	495
	Flower Seeds	-	4.976	8.447	7.153	6.252	6.109	6.694	5.514	4.729	4.908
	TOTAL	67.584	72.691	100.948	100.043	87.638	93.362	89.716	60.941	43.036	40.106

Figure 7. Value of Ornamental Plant Exports and Imports by Years (million \$)

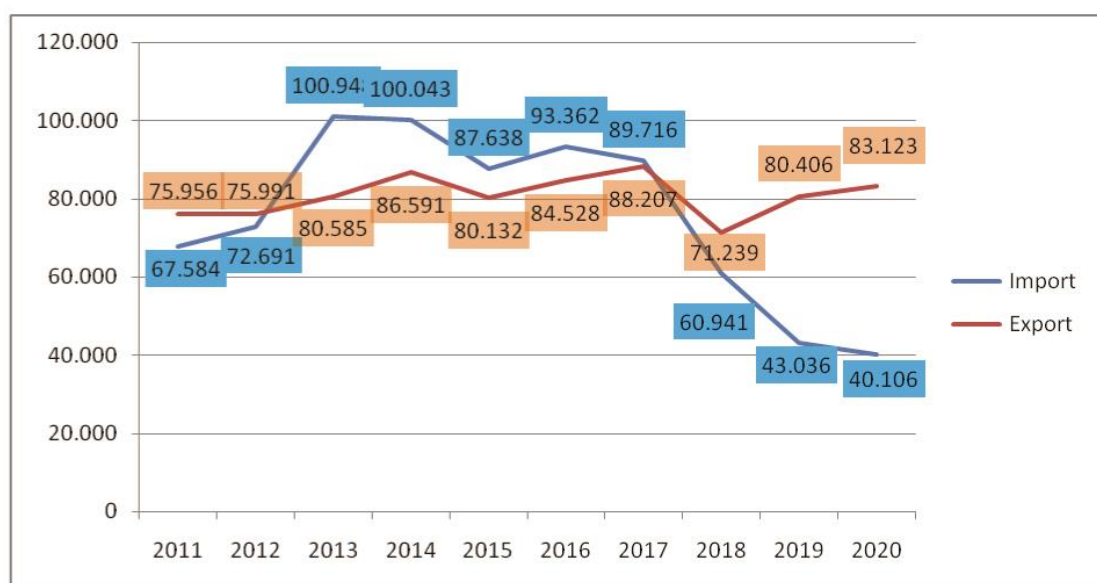


Table 11. Value of Sapling Exports and Imports by Years (1,000 \$)

Years	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Export	3.341	3.113	5.267	8.357	9.726	27.374	30.600	37.445	37.766	32.487
Import	8.860	5.547	4.255	3.755	5.360	4.301	2.500	1.083	1.858	3.323

Figure 8. Value of Sapling Exports and Imports by Years (million \$)

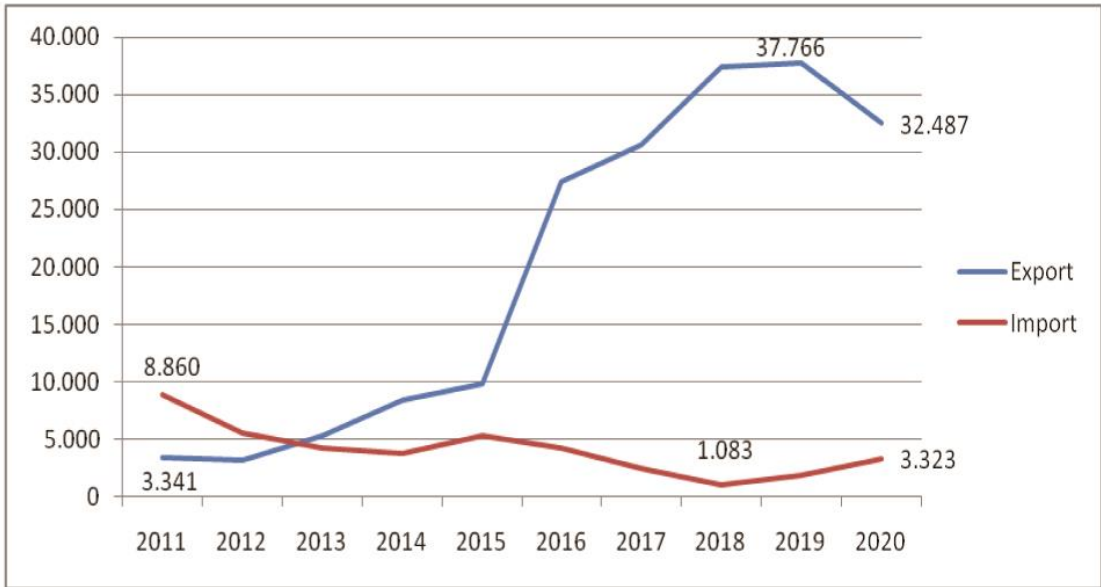


Table 12. Total Import and Export Value from 2016 to 2020 (million \$)

	Seed					Sapling					Ornamentals					Total				
	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020
Import	202	185	179	177	199	4,3	2,5	1,0	1,8	3,3	93,3	89,7	60,9	43,0	40,1	299,6	277,2	240,9	221,8	242,4
Export	153	136	152	155	162	27,4	30,6	37,4	37,7	32,4	84,5	88,2	71,2	80,4	83,1	264,9	254,8	260,6	273,1	277,5
Volume	355	321	331	332	361	31,7	33,1	38,4	39,5	35,7	177,8	177,9	132,1	123,4	123,2	564,5	532,0	501,5	494,9	519,9
Banlance	- 49	-49	- 27	22	- 37	23,1	28,1	36,4	35,9	29,1	- 8,8	- 1,5	10,3	37,4	43,0	-35	- 22,4	19,7	51,3	35,1
Coverage			85	88	81			3740	2094	981			117	187	207			108	123	114
%	76	73				637	1224				91	98				88	92			

Figure 9. Value of Seed Sector Exports and Imports by Years (million \$)

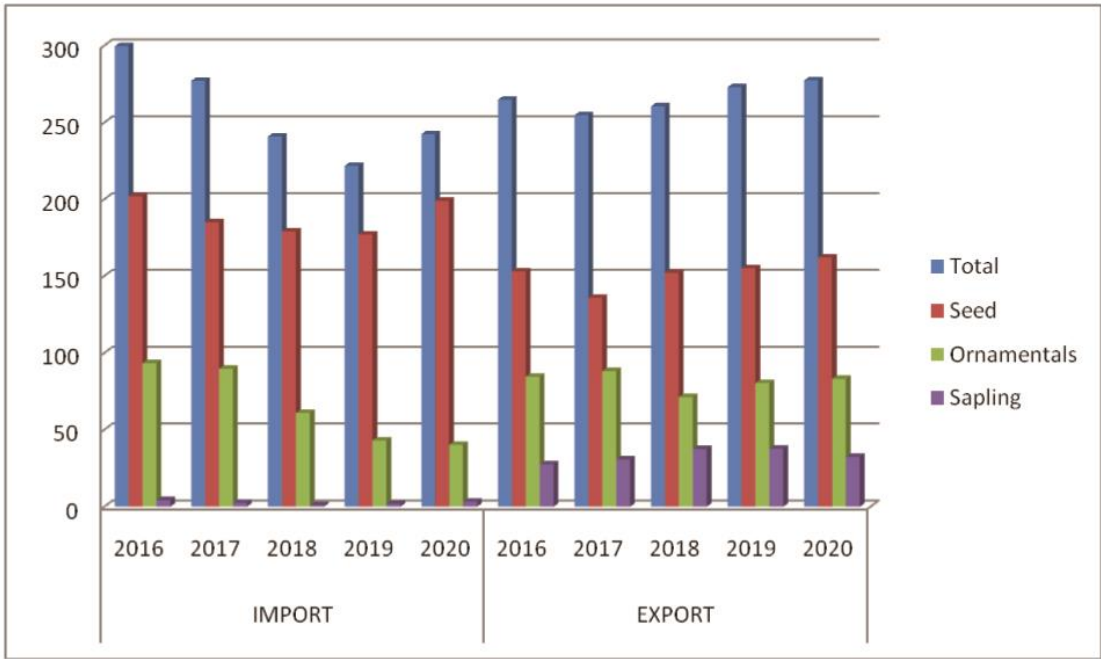
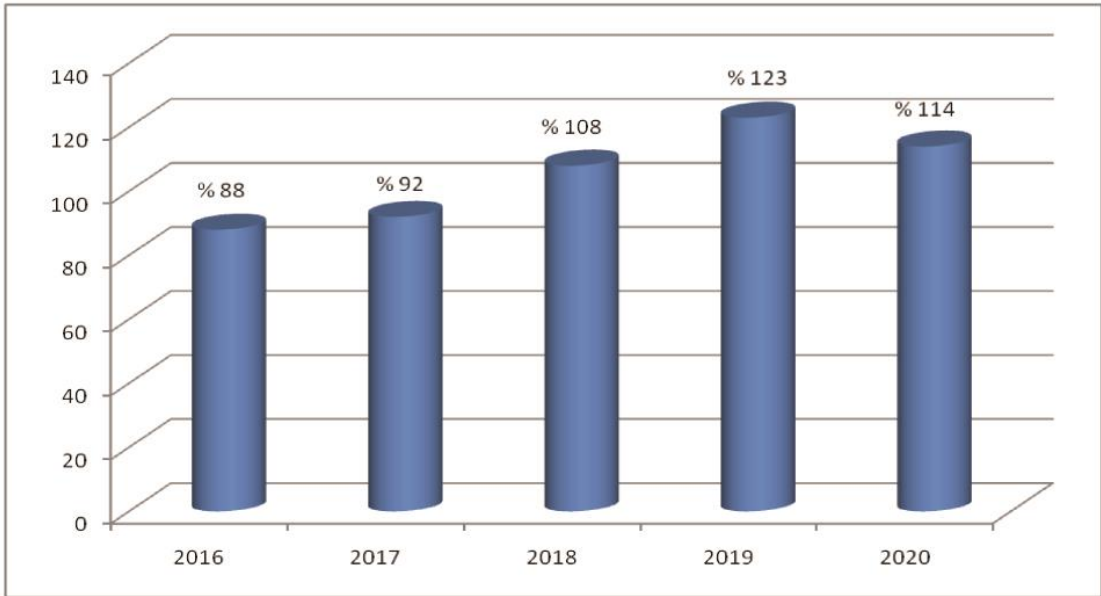


Figure 10. Export-Import Coverage Ratio of Seed Sector by Years (%)



2.3 Number of Varieties

As of January 2021, there are a total of 12.931 registered plant varieties, including 4.625 field crops, 6.536 vegetables, 1.538 fruits and vines and 232 fruit rootstocks . There are also seven registered ornamental plants varieties.

As of January 2021, there are a total of 1.606 plant varieties subject to production permits, including 557 field crops, 1041 vegetables and 8 fruits and vines.

Figure 11. Number of Registered Varieties in Different Groups by the End of 2020

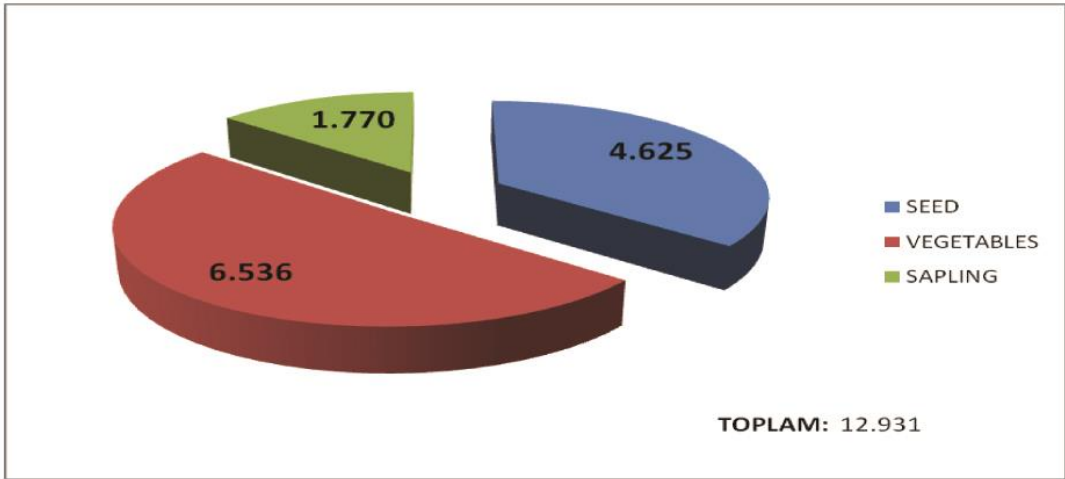
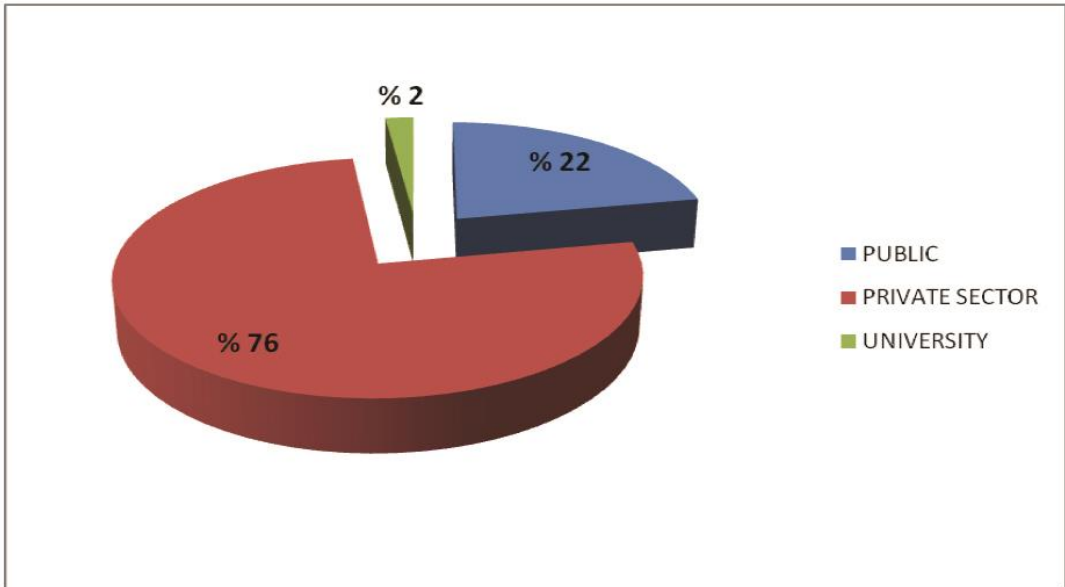


Figure 12. Sectoral Distribution of Registered Varieties by the End of 2020 (%)



3. STRUCTURAL AND CORPORATE ORGANIZATION

3.1. Organization

With the enactment of Seed Law No. 5553 in 2006, unions were established with the aim of increasing yield and quality in plant production, ensuring the provision of quality assured seeds, regulating the production and trade of seeds, and supporting the restructuring and development of the seed-growing sector.

3.1.1. Sub-Unions

Sub-unions are professional organizations with a legal personality and the status of a public body that established by **plant breeders, young plant producers, seedling producers, ornamental plant producers, seed distributors, seed industrialists and producers, and seed growers**. Their purpose is to support the professional activities of their members by ensuring solidarity between real and legal persons operating in the sector, protecting the economic and social rights of those involved in the seed sector, and performing the tasks provided for by legislation.

Table 13. Number of Members of Sub-Unions (January 2021)

Sub-Union	Number of Members
Sub-Union of Plant Breeders	327
Sub-Union of Young Plant Producers	936
Sub-Union of Seedling Growers	164
Sub-Union of Ornamental Plant Producers	828
Sub-Union of Seed Distributors	6.919
Sub-Union of Seed Industrialists and Producers	998
Sub-Union of Seed Growers	49.515
TOTAL	59.687

3.1.2. Turkish Seed Union

The Turkish Seed Union is a professional umbrella organization with a legal personality and the status of a public body that has been established by sub-unions in an attempt to encourage cooperation and solidarity among sub-unions and professional solidarity among those involved in the sector, and to perform the tasks provided for by legislation. Following the establishment of the Union, the sub-unions must become a member of it.

The Unions address the problems raised by their members, and after making an assessment and analysis, they formulate solutions and present them to the Ministry and any other relevant authorities, thereby contributing to the resolution of the problem without letting it grow further, and ensuring corrective and preventive measures are taken.

4. THINGS TO BE ACTIONED

Along with all these encountered bottlenecks, problems and needs, there are a number of other measures, tasks and responsibilities that the sector must undertake.

4.1. Governance

In order to provide better services to the sector, the institutional structure and capacity of the unions should be further strengthened. For this purpose, a five-year strategic plan will be implemented. In this context, departments specialized in the areas of need (technical, legal, foreign trade, marketing, IT, etc.) will be established within the unions, qualified personnel will be employed, efforts will be made to increase the exchange of information, communication and cooperation among stakeholders will be encouraged, and promotional activities will be carried out, preventing any information pollution related to the sector.

4.2. R&D and Innovation

We will act with full understanding that R&D is the driving force behind the development of the sector. In this scope, global scientific and technological developments will be followed, and members will be kept informed about them on a continuous basis. Support will be provided to increase and promote R&D, and efforts will be made to reinforce the infrastructure in this field. Additionally, plant-breeding programs will be developed using domestic genetic resources that will also be used for the development of new varieties.

4.3 Competitiveness

Efforts will also be made to increase the competitiveness of the industry. In addition to the plans to reduce production costs, steps will also be taken to increase export opportunities.

The Turkish seed sector can compete globally only if it develops its own varieties and brands that can take part in such competitions. Measures will be taken to enhance the human resources, infrastructure and finances required by the sector so as to support the development of its own varieties and brands.

4.4 Fighting Against Unregistered Production

Efforts will be made to ensure effective market control through legal amendments, and officials from the Union or the relevant sub-union shall take part in market control activities.

The necessary measures will be taken to ensure producers engaged in production and sales in the market are members of the relevant sub-unions, and observe the ethical rules.

In order to prevent unfair competition, to increase agricultural production, and to protect farmers/seed users, all necessary measures will be taken to ensure the production and sale of high quality and authentic seeds that are free of disease and pests, and that comply with seed standards, while also combatting unregistered production.

5. GOALS

With the increase in the global population, seed production has gained commercial and strategic importance to become an important link in the food and plant production chains. Taking this into account, the seed sector must continue to develop both in Turkey and globally.

One of the most important factors in ensuring this is the formulation of national policies by countries in accordance with their specific conditions, taking into consideration the current trend of global development.

The current trends in the global seed sector include:

- A market dominated by the private sector where free market conditions apply,
- Technical and commercial rules, established in accordance with international standards,
- Importance attached to plant breeding and basic research,
- Cooperation among the public and private sectors and universities in plant protection and biotechnological research,
- Implementation of plant-breeding programs aimed at variety creation, and seed production and trade by the private sector, cooperatives and unions,
- Provision of registration, inspection and technical auditing services by autonomous or independent organizations.

The seed policies in our country are advancing in this direction, and are being formulated in line with the goals of both the public and private sectors.

It is expected that the relevant actors will, under a devised program, take steps to strengthen the human resources, infrastructure and financial means required by the sector, allowing it to produce its own varieties and brands, and for this momentum gained by the sector to grow further with public support.

Currently, Turkey ranks 11th in the global trade of seeds. Our goal is to rank in the top bests by 2023.