

## Seed Sector of Turkey in Terms of Sustainable Agriculture

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**ABSTRACT:** It is highly important for the population on earth which is approaching to 7 billion to meet necessary nourishment needs to survive, take enough and balanced nutrition and be provided with secure food. This makes agriculture more and more important nowadays. As known, the process of the agricultural production begins with seed. Especially in the vegetal production, use of superior and high quality seed provides an increase of the crop by 20-30 per cent depending on the other conditions of production. Also, it is even known that in exotic fertilized species, hybrid seeds enable an increase up to three fold. There has been a significant increase on the numbers of firms that work on seed production. Turkey seed sector that produced 776 thousand tonnes and exported 150 million dollars is planned to reach to 1 million tonnes of production and 500 million dollars amount of export by 2023. Because current firms in the sector are not big enough and improvements have started relatively later, competitive firms have emerged. Main purpose of the study is to compare Turkey to the world in terms of vegetable seed production by years, to demonstrate what must be done by revealing the current situation and problems.

**Keywords:** Sustainable agriculture, research-development, Turkey seed sector

### Sürdürülebilir Tarım Açısından Türkiye’de Tohumculuk Sektörü

**ÖZET:** Dünya üzerinde 7 milyara yaklaşan nüfusun sağlıklı bir şekilde yaşamını sürdürebilmesi için ihtiyaç duyulan miktarda gıdayı alması, yeterli ve dengeli beslenmesi, bu gıdaların güvenilirliğinin sağlanması son derece önemlidir. Bu da tarım sektörünün önemini her geçen gün artırmaktadır. Bilindiği gibi tarımsal üretimin başlangıcı tohumdur. Özellikle bitkisel üretimde, üstün nitelikli ve kaliteli tohum kullanılması verimi diğer üretim şartlarına bağlı olarak 20-30% oranında da hatta yabancı döllenmiş türlerde, melez tohumların 3 katına kadar artış sağladığı bilinmektedir. Türkiye’de son yıllarda tohumluk üretimi konusunda faaliyet gösteren firma sayısında önemli artışlar olmuştur. 2014 yılında 776 bin ton olan tohumluk üretimi ve 150 milyon dolar ihracat yapan Türk tohumluk sektörü 2023’te 1 milyon ton üretim ve 500 milyon dolar ihracata ulaşılması planlanmaktadır. Türkiye’de mevcut işletmelerin AR-GE çalışmalarını etkin yapacak büyüklükte olmaları ve ıslah çalışmalarının gelişmiş ülkelere göre geç başlaması sektörde rekabetçi işletmelerin ortaya çıkmasında etkili olmuştur. Çalışmanın temel amacı, tohum üretiminde yıllar itibarıyla Dünya ve Türkiye’yi kıyaslamak, Türkiye’deki mevcut durumu ve sorunları ortaya koyarak sektörün gelişmesi için yapılması gerekenleri ortaya koymaktır.

**Anahtar kelimeler:** Sürdürülebilir tarım, araştırma-geliştirme, Türkiye tohum sektörü

### INTRODUCTION

Origin of the agricultural production and reproduction material of many plants is seed. Seed constitutes the first hoop of food chain and is the structural indicator of biologic and cultural variety. Certified seeds are defined as certificated seeds by official institutions according to physical, biological and genetic features (Anonymous, 2013). Seed has strategic importance in the sector of agriculture of countries as a plant production material. Nowadays, seed is not only an agricultural input but also an income-generating product that is obtained by using high technology (Güngör et al., 2016). Hence, every country tries to be self-sufficient for important products in terms of nutrition (Eraktan et al., 2011).

Quality seed use is important for plant production and it helps production increase by 20-30% mixed seed through external inseminated species (Elçi, 2000). In terms of producing more durable, less costly and more competitive and quality products along with increasing yield and production on agricultural products, seed is very important (Hazneci and Ceyhan, 2016). Arable land is not

thought to be extended, excluding some extreme situation. Therefore, it is observed that quality of the seed is the most important factor to increase production of land.

Previous researches on seed sector about seed use, seed production, seed marketing, trade and firms structure can be sorted as (Balci, 1993; Usal, 1996; Kumar et al., 2000; Almekinders and Louwaars, 2002; Akgün et al., 2003; Fert, 2004; Akdoğan, 2005; Demirtaş and Keleş, 2005; Engiz, 2007; Acar, 2008; Yağdı et al., 2010; Zararsız, 2010; Sav and Sayın, 2016) both in Turkey and world.

Cover of the study is to reveal current situation of seed sector in Turkey and making recommendations to develop the sector.

### MATERIAL AND METHOD

Secondary data constitute material of the study. In the study, previous articles, various reports, statistics and websites were used to obtain data to reveal current situation of seed sector. Seed sector in

Turkey was investigated by years and obtained data was commented according to progress of the sector.

## RESULTS AND DISCUSSION

### World Seed Sector

Scientifically and technological development have always been important for the improvement of world seed sector. Genetic science that emerged in 19<sup>th</sup> century, led systematic plant improvement and variety improvement to develop. Hybrid seed technology that was first implied in 20<sup>th</sup> century has been one of the most important bridge between

private sector and commercial seed sector. At the end of 20<sup>th</sup> century, seed sector is accelerated thanks to modern biotechnology and recombinant DNA technology. Moreover, quality seed has been one of the most significant inputs in the world, in 21<sup>st</sup> century. According to the data of International Seed Federation (ISF), seed market reached to the value of 45 billion USD in 2012 (Table 1). USA and China take the first two ranks of World seed market respectively with shares of 26.7% and 22.1%. France has the third rank with the share of 6.2% as a EU country.

Table 1. Market value of seed by countries (2012)

Countries	Value (Million USD)	Share (%)
USA	12000	26.7
China	9950	22.1
France	2800	6.2
Brasil	2625	5.8
Canada	2120	4.7
India	2000	4.5
Japan	1350	3.0
Germany	1170	2.6
Argentina	990	2.2
Italy	767	1.7
Turkey	750	1.7
Spain	660	1.5
Netherland	590	1.3
Russia	500	1.1
England	450	1.0
Others	6203	13.9
Total	44925	100.0

Source: ISF – 2012; Anonymous, 2016a

### Seed Sector of Turkey

#### Progress of the sector

Turkey seed market is mainly based on three categories, that is: cool climate grains, forage plants and industrial plants. Hybrid vegetable seeds have rapid growth in the market and objected to commerce is in the first rank of seed sector of Turkey in terms of monetary value.

Hence, the increase of the number of private seed firms, capacity and activities have rapidly grown and became private sector intensive. There are about 130 seed firms that have research institution status. On the other hand, industrial plants seeds including maize, sunflower, cotton and sugar beet take the second place in the sector. Cool climate grains, in particular wheat and barley are not on the top in terms of monetary value however, they rank the first place as for quantity. According to the

calculation of some researchers, it is stated that 1.5-2 million dollars value of seed is used in Turkey (Güngör et al., 2016). First researches on gene pool composition in Turkey started in 1929 for wheat, rye, melilot and potato populations. At the beginning of 1980's, the state switched to private seed industry model from government based seed supply system, making changes on essential policies about seed sector (Balkaya and Yılmaz, 2001). As a result of liberal economy and increasing restrictions on foreign trade, private sector investments were led up and many firms entered to the market directly or indirectly as a corporation.

Seed industry has continuously developed and expanded in last 13 years, the number of seed firms rose from around 120 to 700, certified seed production has reached to 896 thousand tonnes that was 145 thousand tonnes and moreover, seed sector

was targeted to produce more than 1 million tonnes of certified seed in Turkey (Anonymous, 2016). In this base, private sector founded Seed Industrialists Sub-Union (TSUAB) that was legitimately organized. TSUAB is occupational institution as a public establishment which is a legal entity. TSUAB was established and launched in accordance with seed law 16<sup>th</sup> clause. Stipulating purposes of TSUAB are to represent the seed industry of Turkey, to defend the rights and benefits of members and in order to develop Turkish seed sector under the authority of laws. Membership to TSUAB is a legal obligation for

seed industrialists and production firms which are operating in Turkey. Additionally, Turkey Seed Producer Union, Turkey Seed Institute Association and sub-unions have been doing important activities in Turkey.

#### Production

Structural modifications of Turkish seed industry impressed the agricultural production and yield of products immediately increased. Farmers' tendency to quality seed made significant raise on some products (Table 2).

Table 2. Seed production quantity of Turkey (Tonnes)

Years	Wheat	Barley	Maize	Sunflower	Potato	Cotton	Forage Plants
1996	110243	18029	7107	3821	26110	23238	367
1998	163592	21126	10634	4061	27711	20316	2585
2000	116083	19203	11976	2762	37141	15602	3267
2002	80107	4376	15339	2350	25349	25132	2267
2004	223094	19074	27108	2143	38518	10768	3383
2006	210788	28195	16107	7670	75138	18856	3897
2008	158452	20179	34097	8727	45651	10986	3261
2010	315676	34416	35234	11854	70654	15679	1509
2011	410766	48401	31338	14137	96295	16910	2213
2012	327924	43162	32796	14732	185485	23074	1945
2013	421588	79189	38576	18756	150908	10260	1815
2014	403769	82216	66578	23769	163269	11621	2133
2015	484204	125018	56671	17494	175397	8883	2780
Change (%)	439.2	639.4	797.4	457.8	671.8	38.2	757.5

Source: BUGEM

As a result of the decisions made and implied policies about seed sector in last 20 years, the sector headed to private sector. Producers, industrialists and distributors of seed sector participate with cooperated and legal government structure, taking no

authorization and responsibilities. As shown in Table 3, private sector dominates the share of seed production excluding wheat and forage plants and almost all production is made by private sector.

Table 3. Seed production share of private sector in Turkey (%)

Years	Wheat	Barley	Maize	Sunflower	Potato	Cotton	Forage Plants
1996	4	7	100	100	100	2	35
1998	4	9	100	100	100	6	39
2000	14	13	100	100	100	23	53
2002	10	14	99	100	100	23	32
2004	5	10	99	99	100	92	26
2006	20	22	99	100	100	87	52
2008	56	46	100	100	100	99	22
2010	48	49	99	100	100	99	33
2011	55	57	100	100	100	100	54
2012	58	73	100	100	100	99	56
2013	58	72	100	100	100	100	71
2014	64	87	99	100	100	100	67
2015	64	83	100	100	100	100	63
Mean	35	42	100	100	100	72	46

Source: BUGEM

### Supports

Seed sector is supported to provide quality and sustainable production and to supply seed from domestic resources. Certified seed support has been being supported since 2008 and amount of 197 million TL, has also been distributed to domestic producers of certified seed. Moreover, the support of certified seed use has been supported 751 million TL

for 1.3 million farmers by now. The support of standard certified sapling/seedling use has been paid to farmers who have been creating new orchards since 2005. Furthermore, 73 thousand farmers benefited from this support with amount of 308 million TL (Anonymous, 2016a; Anonymous, 2016b).

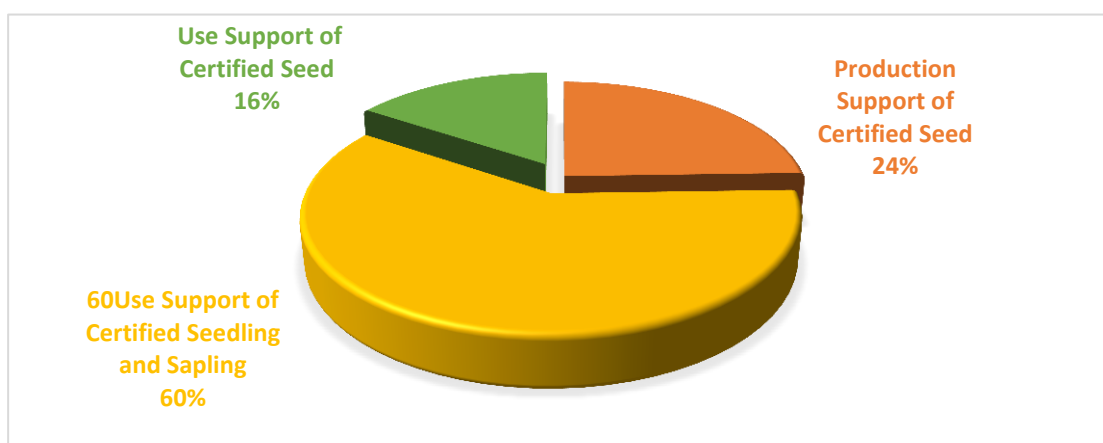


Figure 1. Seed supports

### Foreign Trade

Before 1980, there was almost no seed export in Turkey. However, in time, export capacity of seed has shown remarkable progress. The value of seed export which was 17.3 million USD in 2002 rose to 148.4 million USD in 2014. Mostly exported products are respectively sunflower and maize (Table 4). The density of seed export in Turkey is rather on

maize, sunflower, cotton and vegetable types. Certificated seeds of hybrid maize, sunflower and cotton that are contractually produced have high quality features and are preferred by foreign purchasers. In recent years vegetable seed export in tomato, pepper, cucumber, melon and watermelon has started to increase.

Table4. Export quantity and value of some selected products in Turkey

	Quantity (Tonnes)				Value (1000\$)			
	2012	2013	2014	2015	2012	2013	2014	2015
Wheat	13560	26486	32213	16555	8905	12405	15224	6737
Barley	48	60	4875	127	25	37	1712	52
Maize	9628	13186	0	12295	29184	40974	0	31315
Potato	149	2200	3135	0	67	1523	2109	0
Paddy	11	12	18	6	15	19	29	9
Cotton	4113	1459	884	958	8024	3959	2283	2245
Sunflower	11646	10292	16137	10719	59569	57149	76203	48866
Sugar Beet	6	85	167	161	334	1131	1498	1717
Grass and Meadow	227	147	114	100	1089	734	556	504

Source: TÜRKTOB

With the analysis in Table 5, it is seen that potato ranks first as the mostly imported product with 24.2 million USD value. Maize with 16 million USD

and sugar beet with 13.9 million USD follow potato. The value of seed import which was 55.3 million USD in 2002 rose to 202.2 million USD in 2015.

Table 5. Turkey's import quantity and value of some selected products

	Quantity (Tonnes)				Value (1000\$)			
	2012	2013	2014	2015	2012	2013	2014	2015
Wheat	610	926	408	314	723	1145	531	258
Barley	93	131	122	106	114	200	151	141
Maize	2666	1559	0	2033	18165	16226	0	15990
Potato	18967	8041	19007	38440	14822	7124	16632	24162
Paddy	0	20	35	1276	1	31	69	537
Cotton	60	20	9	31	190	94	68	126
Sunflower	157	186	295	571	5299	7183	7534	5636
Sugar Beet	159	277	216	622	5146	8691	5597	13928
Grass and Meadow.	3807	4557	4524	4145	8292	10830	10721	8443

Source: TÜRKTOB

## CONCLUSION

Seed sector has been a sector which is gaining importance day by day both in Turkey and world. Achieving 50 billion USD potential of seed trade attracts many international firms to enter to the sector. Turkey had important progress in recent years, particularly by government supports and introduced laws, seed sector received great investments.

Main problems and suggestions of the sector can be sorted as below;

Input prices in Turkey are comparatively higher than other countries and this prevents small and moderate farmers to purchase quality seeds. Therefore, big firms should be supported and promoted to expand seed production cheaply,

considering farmers demands. Access of farmers living in southeast and east region to technology facilities is not as much as other farmers. Consequently, extension service to these farmers should be increased.

The law numbered 5553 that has become valid in 2006 accompanied many changes. Those changes resulted in some problems. Hence, laws, regulations and legislations can be simplified for producers to understand easily.

Trade of farmers that use certified seed can be promoted to sell products and to extend certified seed use. Moreover, seed producer firms can be encouraged to demonstrate products to farmers.

In conclusion, creating a linkage between universities and the private sector to raise

cooperation will develop the seed sector further and this will be more beneficial for both industrialists and farmers to get result-oriented outputs. Researches and awarding projects, consulting services and training programmes can be applied in favour of universities and industrialists (Abramo et. al. 2009).

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