SUSTAINABLE **FOOD SYSTEMS** COUNTRY REPORT **TURKEY 2019**

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FOREWORD

As the second-largest inter-governmental organization of the world, the Organization of Islamic Cooperation (OIC) has been united for peace and development with a view to become the collective voice of the Muslim world.

Key bodies and permanent committees were established within the Organization to show progress on the issues of critical importance. Standing Committee for Economic and Commercial Cooperation (COMCEC), which focuses on economy and trade among the members, is one of the permanent committees of OIC since its establishment at the 3rd Islamic Summit Conference held in Mecca in 1981. It became operational in 1984 with the election of the President of the Republic of Turkey to its Chairmanship and holds annual sessions in Turkey at ministerial level with specific themes since then.

Under the guidance and leadership of the President of Turkey, H.E. Recep Tayyip ERDOGAN, the Government of Turkey shares the vision of COMCEC to provide a forum to produce and disseminate knowledge, share experiences and good practices, develop a common language and understanding, and approximate policies among the Member Countries to solve development challenges of the Islamic Ummah.

As specified in the COMCEC Strategy, agriculture is a key cooperation area within the Organization. To that end, Agriculture Working Group was formed to address agricultural issues and it had gathered 14 times to elaborate the issues on food and agriculture thoroughly and share good practices, views and experiences among the members. 14th Meeting of the Working Group, which was the latest, was held on 9-10 October 2019 in Ankara under the theme of "Increasing the Resilience of Food Systems in Islamic Countries in the face of Future Food Crises".

The sustainable food system, is the theme of the Ministerial Exchange of Views Session of the 35th COMCEC Session, requires a holistic approach so that it may cover the entire value-added activities such as production, harvesting, processing, distribution and consumption of food products with the involvement of the stakeholders of cross-cutting sectors.

In addition, a sustainable food system may serve as a beneficial tool for ensuring food security and nutrition for all while securing the economic, social and environmental well-being of the next generations. Turkey attributes strategic importance to sustainable food systems for the continuation of agricultural development.

Sustainable food systems are also positioned at the center of the United Nations (UN) Sustainable Development Goals (SDGs) and they play a critical role for achieving the related targets including zero hunger, ending poverty, reducing food losses and waste, in particular.

Turkey both contributes to the development of sustainable food systems at national and global levels for increasing awareness. For that aim, we have launched several initiatives and made enormous progress to achieve targets.

The "G20 Leaders' Declaration" under the Turkish Presidency of Group of 20 in 2015 and the establishment of "Technical Platform on the Measurement and Reduction of Food Loss and Waste" under the UN Food and Agriculture Organization (FAO) can be seen as the highest level initiative that Turkey led to the development of sustainable food systems. Moreover, Turkey hosted

the "2nd Meeting of the Black Sea Economic Cooperation Organization (BSEC) Ministers of Agriculture" themed "Sustainable Food Systems and the Future of Aquaculture" in 2017.Bearing in mind that more than 820 million people in the world continue to go to bed hungry every day, we, together with all stakeholders and in cooperation with FAO, are about to launch a large-scale international campaign called "SAVE YOUR FOOD" to reduce food losses and waste in Turkey. I believe that we can expand the scope of this campaign to the OIC members as we have achieved with the "Reduction of Food Losses and Waste in OIC Countries" funded by COMCEC in 2019.

It is also planned to initiate a Project called "Reduction of Food Losses and Waste in the Central Asian Countries (Turkey, Azerbaijan, Kazakhstan, Tajikistan, Turkmenistan and Uzbekistan) with FAO and this Project will proceed in parallel with the "SAVE YOUR FOOD" Campaign.

As of today, almost 250 million people are economically active in the agricultural sector within the OIC countries and almost half of the total population in OIC countries lives in rural areas. However, due to the conflicts, food insecurity, sudden climatic changes and economic fluctuations, more than 113 million people faced acute hunger in 2018 and required immediate food assistance within the OIC region.

Unfortunately, several countries within the Organization encounter severe food crisis, which means that almost 72 million people experience food insecurity. These figures remind us the importance of the establishment of sustainable food systems in order to build our common future in the field of agriculture. We should keep the spirit of unity alive to overcome the challenges we currently face. We should refer to the guidance of the Rasoul'Allah (S.A.W.) who illuminates our path from centuries ago as he commanded us, "Whoever goes to bed while his neighbor is hungry is not a true believer".

To conclude, this report intends to reflect Turkey's current situation on Sustainable Food Systems and the activities that have been conducted up to now for promoting the rationale behind it. Turkey has strengthened its institutional, technological, and legal infrastructures for the development of sustainable food systems, and improves its capacity of investment in infrastructure and human resources.

I would like to highlight that we are always open to share our know-how and experience with the OIC Member States to develop a common basis for strengthening cooperation in agriculture. It is also my firm belief that this Report will be a reference material to all interested parties and the efforts of COMCEC will continue to pave the way for cooperation among us.

May the peace, mercy and blessings of Allah be upon you.

Bekir PAKDEMİRLİ, PhD
Minister of Agriculture and Forestry

EXECUTIVE SUMMARY

Our world has a range of global challenges that affect all of us. Rapid population growth, urbanization, changing consumption patterns, climate change and depletion of natural resources necessitate tackling today's problems in a holistic and integrated approach. Thereby it requires addressing the food systems in a sustainable manner. Supported by economic, social and environmental elements, the sustainable food system aims to ensure food security not only for today's people but also for the next generations. Sustainable food systems are also key elements to achieve the Sustainable Development Goals of the United Nations by 2030.

According to official statistics, the population of Turkey has exceeded 82 million as of 2019, the share of agriculture in the Gross Domestic Product amounted to approximately 189 billion and 213 billion TRY in 2017 and 2018, respectively. As of May 2019, the total number of employed people was almost 28.2 million and the employment rate was 46.1% while the rate of agricultural employment was 18.3% out of total employment ratio.

As an important part of sustainable food systems, the agricultural organization in Turkey appears in the forms of cooperatives, producers' and water users' unions, farmers' associations and agricultural professional organizations. 3.5 million producers are members of cooperatives in Turkey. From 1999 to 2019, there was an important annual increase in plant production in Turkey, about 2 million tons in wheat, 3.5 million tons in maize, 600 thousand tons in rice and 6 million tons in total grain. For the same period, there was an increase of 1.7 million tons in total oilseed production, 4 million tons in tomato production, 600 thousand tons in tea production, 300 thousand tons in grape production, 3 million tons in orange production, 1 million ton in mandarin production, 1.2 million tons in lemon production, 460 thousand tons in banana production and 4.5 million tons in greenhouse cultivation.

While Turkey is ranked among the highest performers in terms of agricultural production in the world, it is also a world leader in the production of many agricultural products. Turkey ranks 1st in the world in the production of nuts, apricot, cherries and figs, 2nd in production of melon, quince, watermelon, cucumber and poppy seed and 3rd in lentils, pistachios, sour cherries, chestnuts, peppers and green beans. Turkey is also one of the major producers of walnuts, mandarins, olives, tomatoes, spinach, peas, sugar beets, apples and eggplant. Turkey is a net exporter in agri-food sector. Despite the changes in the product diversification of agri-food foreign trade, some of our products, in particular, still remain important in exports such as processed vegetables and fruits and flour.Turkey is the producer and net exporter of its own seed. Our seed production has increased 7 times in the last 17 years and reached 1 million

59 thousand tons as of 2018. The production of certified seedling/sapling, which was 4 million units in 2002, increased by 47 times and reached 188 million units as of 2018. Today, 96% of the saplings and seedlings used in fruit production are produced and certified in Turkey. The local seeds which are our national heritage are kept in our Seed Gene Banks for future generations.

In animal production, the rapid increase in the bovine animal population had been recorded in Turkey in recent years. Turkey has about 17 million heads of cattle. The cattle population consists of 48.5% culture breeds, 41.8% cross breeds and 9.7% native breeds. 6 native cattle breeds (Turkish Grey, Native Black Cattle, East Anatolian Red, South Anatolian Red, Zavot, Native Southern Yellow) and 1 native buffalo breed (Anatolian Buffalo) have been registered. Our domestic cattle breeds are characterized by the ability to withstand extreme climatic conditions and adapt to geographical conditions.

Natural conditions, agricultural structure and conventional practices in Turkey are appropriate for sheep and goat breeding. Ovine-caprine animal breeding in Turkey plays an important role in livestock breeding. Accordingly, Turkey ranks 1st in Europe and amongst the top 10 countries in the world with 36 million heads of sheep and 11 million heads of goats. 29 breeds of sheep (Karayaka, Herik, Gokceada, Karakul, Red Karaman, White Karaman, Kivircik, Awassi, Daglic, Cine Capari, Hemsin, Norduz, Sakiz, etc.) and 6 breeds of goats (Angora Goat, Kilis Goat, Hair Goat, Norduz Goat, Honamlı Goat, White Goat) have been registered in Turkey. Native breeds generally have high viability and adaptability to poor environmental conditions, and their breeding costs are relatively low.

Poultry meat and egg production is another sector in which Turkey is competitive. Turkey ranks amongst the top 10 countries in the world in terms of chicken population and it ranks 2nd in Europe in terms of poultry production. In Turkey, there is a population of 1.5 million people (including producers, farmers, industry-related tradespeople, feed, medicine, sub-industry, transportation and marketing sectors) who earn a livelihood in the poultry sector that is one of the rapidly growing and strongest sectors in Turkey.

Turkey is located at the intersection point of three different biogeographical regions including European-Siberian, Iran-Turonian, and the Mediterranean and is home to about 12,000 species of plant diversity one-third of which are endemic. The unique geography of Anatolia enables the plants to bloom in different regions at different times of the year, providing Turkey a suitable ecology in terms of beekeeping. Turkey has the largest share in pine honey production accounting for 90% of the total production of the world.

Turkey ranks 2nd after China in terms of colony number and honey production according to the Food and Agriculture Organization (FAO) of the United Nations as of 2017. Furthermore, Turkey is the first country in Europe in terms of the number of hives and honey production.

On the other hand, water is vital for human life, very important for ecosystems, and a fundamental requisite for developments of the countries. Water scarcity is becoming ever-increasing and prevalent problem and water quality is rapidly deteriorating in almost every country. This problem successively leads to many other economic and social problems. Especially unaware and unplanned water use and ground activities directly affect both soil quality and groundwater quality and quantity.

In this regard, with its agricultural lands, which covers about one-third of 78 million ha surface area, Turkey needs to pay attention to irrigation systems. In Turkey, the potential irrigable area is 8.5 million ha. As of 2019, Turkey aims to reach 6.6 million ha out of this potential to be equipped with irrigation infrastructure. Currently, 2743 irrigation facilities are in service.

Turkey is also very rich in terms of marine species. The Black Sea, with cold and low-salt waters in the north, the Mediterranean Sea, with hot and very salty waters in the south, and the Marmara Sea, where these two seas intersect and form an inland sea, create suitable ecosystems that enable various marine species.

EXECUTIVE SUMMARY

While total fisheries production in Turkey was 628,631 tons in 2018, 35.3% of the production was marine fish, 9.9% was other marine species, 4.8% was species inland sea products and 50% was aquaculture products. The production figures by capture fisheries were 314,094 tons while the aquaculture production was 314,537 tons.

Turkey ranks 7th in agricultural production in the world. Due to its strength in this area, it is not surprising that the Turkish food and beverage industry constitutes one of the most attractive areas for foreign investors. Since it offers profitable investment opportunities to global investors, foreign direct investments amounting to 89.5 billion USD have been made in this sector since 2010.

Turkey, with 78 million ha surface coverage, has a rich diversity in terms of ecology. Forested land of Turkey was 20.8 million ha in 2002, it reached 22.6 million ha as of 2019 and it is aimed to increase this number to 23.4 million ha by 2023. Within this context, in order to protect our forests which are of great economic, ecological and social importance, to manage them in a sustainable way and to make our country more healthy and livable for future generations; every year on November 11th has been declared as National Afforestation Day by President of Turkey, H.E. Recep Tayyip ERDOĞAN in 2019. In the 1st year of this national day, although 11 million saplings were targeted, with the support of our nation, approximately 13.5 million saplings were planted on the same day. According to OECD data, Turkey ranks 3rd in the increasing presence of forest in the world.Turkey is located in an area prone to forest fires. While experiencing serious forest fires in its lands, Turkey develops fire-extinguishing techniques and also aims to gradually reduce response time to fires from 12 to 10 minutes in the near future. Turkey is the most successful country in its region to fight against forest fires according to EFFIS (European Forest Fire Information System) data.

Turkey attaches great importance to international cooperation for the development of sustainable food systems. In that context, through partnership programs that we are conducting with international organizations, we are sharing our experience and know-how with a region ranging from Central Asia to the Balkans, Caucasia and Africa.

The prominent international activities of Turkey that lead the way for the development of sustainable food systems may be listed as such:

- Launch of an international campaign titled "SAVE YOUR FOOD" to reduce food loss and waste under the Ministry of Agriculture and Forestry in cooperation with FAO,
- Establishment of the Black Sea Economic Cooperation (BSEC) Sustainable Food Systems Regional Cooperation Center in cooperation with FAO and BSEC,
- Launch of the project of "Reduction of Food Losses and Waste in the Central Asian Countries (Turkey, Azerbaijan, Kazakhstan, Tajikistan, Turkmenistan and Uzbekistan) in 2020,
- Establishment of the Food Security Regional Coordination Center within the Economic Cooperation Organization,
- Organization of the "2nd Meeting of the BSEC Ministers of Agriculture" themed "Sustainable Food Systems and The Future of Aquaculture" in Turkey on May 2017,
- Establishment of the "Technical Platform on the Measurement and Reduction of Food Loss and Waste" in collaboration with FAO, was initiated in the "G20 Leaders' Declaration" during Turkey's 20 Presidency in 2015.

INDEX OF ABBREVIATIONS

AFF	: Atatürk Forest Farm
BESD-BIR	: Turkish Poultry Meat Producers and Breeders Association
BİSAB	: Sub-Union of Plant Breeders
BSEC	: The Black Sea Economic Cooperation
CIMMYT	: International Maize and Wheat Improvement Center
COMCEC	: Standing Committee for Economic and Commercial Cooperation of the Organization of Islamic Cooperation
ÇAYKUR	: Directorate General of Tea Enterprises
Da	: Decare
DGAE	: Ministry of Agriculture and Forestry Directorate General of Agricultural Enterprises
DGAR	: Ministry of Agriculture and Forestry Directorate General of Agricultural Reform
DGARP	: Ministry of Agriculture and Forestry Directorate General of Agricultural Research and Policies
DGFC	: Ministry of Agriculture and Forestry Directorate General of Food and Control
DGPP	: Ministry of Agriculture and Forestry Directorate General of Plant Production
DGSHW	: Ministry of Agriculture and Forestry Directorate General of State Hydraulic Works
EFFIS	: European Forest Fire Information System
EMRA	: Energy Market Regulatory Authority
FAO	: The Food and Agriculture Organization of the United Nations
FİDEBİRLİK	: Sub-Union of Seedling Growing
GAP	: Good Agricultural Practices
GDP	: Gross Domestic Product
GMOs	: Genetically Modified Organisms
GSP	: Global Soil Partnership
Ha	: Hectare
ICARDA	: The International Center for Agricultural Research in the Dry Areas
IGC	: International Grains Council
IGR	: Insect Growth Regulator
ILOSTAT	: International Labour Organization Statistics
ISF	: International Seed Federation
IWWIP	: International Winter Wheat Improvement Program
MoAF	: Ministry of Agriculture and Forestry
MoIT	: Ministry of Industry and Technology
MoNE	: Ministry of National Education
OECD	: The Organisation for Economic Cooperation and Development
OIC	: The Organisation of Islamic Cooperation
PGRs	: Plant Growth Regulators
R&D	: Research and Development
SDGs	: United Nations Sustainable Development Goals
SES	: Solar Energy Systems
SSI	: Social Security Institution
STATPUB	: Canada Pulse Research Database
SUSM	: Sub-Union of Sapling Manufacturers

SÜSBİR	: Sub-Union of Ornamental Plants Producers
TARMAKBİR	: The Turkish Association of Agricultural Machinery & Equipment Manufacturers
TARSİM	: Agricultural Insurance Pool
TEPGE	: Agricultural Economic and Policy Development Institute
TİM	: Turkish Exporters Assembly
TODAB	: Sub-Union of Seed Distributors
TSÜAB	: Sub-Union of Seed Industrialists and Producers
TurkStat	: Turkish Statistical Institute
Türkpatent	: Turkish Patent and Trademark Office
TÜRKTOB	: Turkey Seed Growers Association
TURKVET	: Animal Record Keeping System
TYAB	: Sub-Union of Seed Growers
UN	: United Nations
UPOV	: The International Union for the Protection of New Varieties of Plants
USA	: United States of America
USD	: United States Dollar
UTAC	: The Union of Turkish Agricultural Chambers
WHO	: World Health Organization

INDEX OF ABBREVIATIONS

INTRODUCTION 01.

According to FAO, Food Systems cover all stakeholders in the fields of agriculture, forestry and fisheries, and the parts of the broader economic, societal and natural environments, including the stages of production, processing, distribution, preparation and consumption of food[1].

This definition draws attention to the following issues:

- The provision of affordable, nutritious, reliable food is essential for the sustainability of a food system however; it is not a compulsory condition.
- Sustainable food systems should aim to reduce food losses and waste while minimizing their current and future impact on the environment and society.
- The balance between the integrity of agricultural ecosystems and social welfare should be seen as the core element for sustainable food systems [2].

Food systems; are composed of subsystems such as agricultural, waste management, input supply and interacts with other key systems such as energy, trade and health.

The concept of sustainable food is based on production and consumption of food, which is important for our health. The sustainable food system represents a dynamic process that should contribute significantly to ensure food and nutrition safety for future generations, which will not compromise social and environmental foundations.

Sustainable food systems have three fundamental dimensions, which are;

- Economic sustainability
- Social sustainability
- Environmental sustainability

Sustainable Food Systems are at the heart of the SDGs[3].

- Sustainable food systems produce foods with high nutritional value for all people on the one hand while preserving the ability and capacity of future generations to feed themselves.
- Sustainable food systems use their resources effectively and efficiently in almost every stage of the chain from the field to the table.
- The greatest amount of food from every particle of water, from every piece of soil, from every particle of manure and from every minute of labor saves and conserves resources for the future.

In order to achieve SDGs, the global food system needs to be made more productive and restructured to ensure greater coverage of poor communities, environmentally sustainable, and healthy and nutritious food for all.

It takes into account all the relevant causal variables of a problem and all the social, environmental and economic effects of solutions to obtain transformational systemic changes.

1) Food and Agriculture Organization 2018. Sustainable Food Systems Concepts and Framework. www.fao.org/sustainable-food-value-chain / www.fao.org/about/what-we-do/so4
2) https://ciat.cgiar.org/about/strategy/sustainable-food-systems/
3) https://www.un.org/sustainabledevelopment/sustainable-development-goals/

The sustainable food systems approach is a way of thinking and behaving the food system as a whole, taking into account all elements, relationships and related effects. It is not limited to a single sector, subsystem (e.g. value chain, market) or discipline, and therefore enhances the framing and analysis of a particular issue as a result of a complex network of interconnected activities and reactions.

It takes into account all the relevant causal variables of a problem and all the social, environmental and economic effects of solutions to obtain transformational systemic changes.

Sustainability is examined holistically in the development of sustainable food system. In order to be sustainable, the development of Food System must produce positive value in three dimensions, which are economic, social and environmental simultaneously.

On an economic dimension, a Food System is considered sustainable if the activities carried out by each Food System player or support service provider are commercially or financially viable.

In the social dimension; considering vulnerable groups classified by gender, age, race etc., a Food System is considered sustainable when there is equality in the distribution of economic value in which it is assessed. Essentially, Food System activities should contribute to the advancement of important socio-cultural outcomes such as nutrition and health, traditions, working conditions and animal welfare[4].

Environmental sustainability should be determined by ensuring that the impacts of Food System activities on the surrounding natural environment are neutral or positive, taking into account biodiversity, water, soil, animal and plant health, carbon footprint, water footprint, food loss and waste and toxicity.

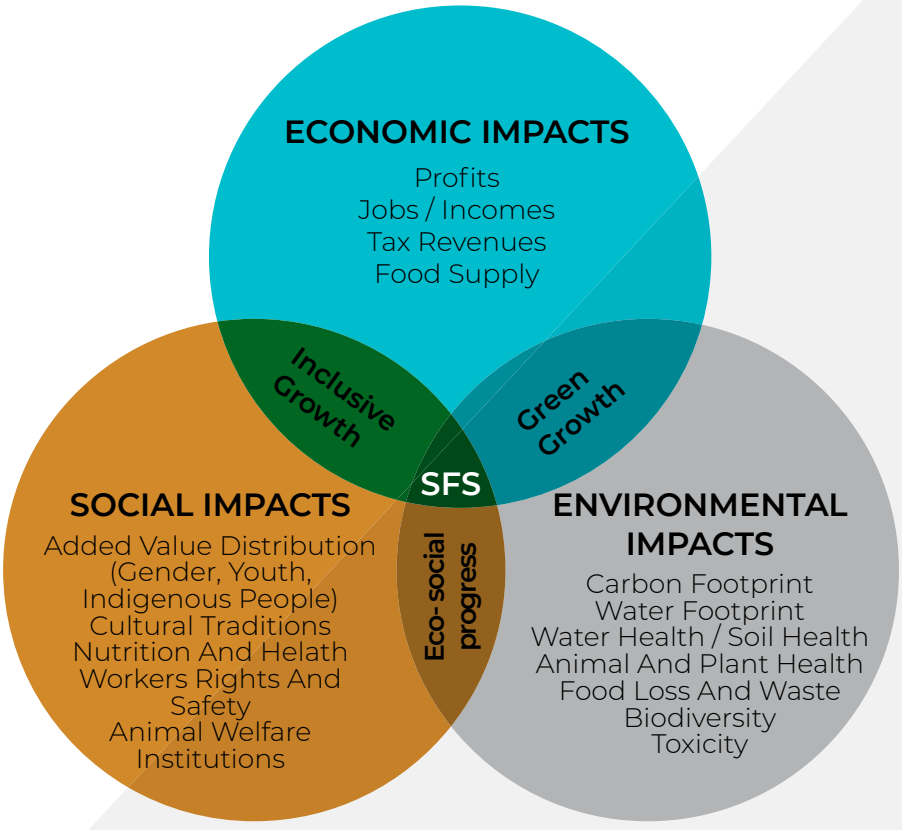


Figure 1. Dimensions of Sustainable Food Systems

Source: FAO (2014[5])

Sustainability of a food system is influenced by natural and human factors. These factors interact with each other in a Food System. Creating favorable conditions for transition to more sustainable food systems will require system-based approaches that take into account the diversity and complexity of common interactions in food production, distribution and consumption.

These connections among food production, distribution, consumption and nutritional health and the underlying socio-economic, biophysical and institutional factors ultimately affect the quantity, quality and affordability of food and health and wellbeing.

Sustainable food systems need support from a wide range of stakeholders, from farmers to end consumers, governments to the private sector and civil society.

4) International Panel of Experts on Sustainable Food Systems (IPES) 2015. The New Science of Sustainable Food Systems Overcoming Barriers to Food Systems Reform.
5) High Level Panel of Experts on Food Security and Nutrition (HLPE). 2014. Food losses and waste in the context of sustainable food systems. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security. Rome

The global food system is not homogeneous; as it contains Food Systems, which can be as small as households or as large as the national level. In developing countries, for rural populations, local Food System is the dominant system that somehow interacts with outside Food System. At the same time, local Food Systems differs in their structures such as soil, climate, cultural norms and gender. Sustainable food systems are protective and respectful of human well-being and social equality as well as biodiversity and ecosystems. Thus, they provide ecosystem integrity and social well-being by providing food that is culturally acceptable, economically fair, affordable, sufficient as food, safe and healthy[6].

Encouraging development practitioners and policy makers to see the big picture will help to facilitate multi-stakeholder cooperation and policy coordination at different levels to address future challenges together.

Policy measures for sustainable food systems need to link food production, distribution, consumption and nutrition. Policies should also address social-economic, biophysical and institutional factors. Policy measures should help to reduce agricultural greenhouse gas emissions, improve nutrition and strengthen value chains for agriculture and related land use change by increasing agricultural productivity and gender-sensitive agricultural production, market access and climate resistance[7].

6) IPCC, 2015: Meeting Report of the Intergovernmental Panel on Climate Change Expert Meeting on Climate Change, Food, and Agriculture [Mastrandrea, M.D., K.J. Mach, V.R. Barros, T.E. Bilir, D.J. Dokken, O. Edenhofer, C.B. Field, T. Hiraishi, S. Kadner, T. Krug, J.C. Minx, R. PichsMadruga, G.-K. Plattner, D. Qin, Y. Sokona, T.F. Stocker, M. Tignor (eds.)].World Meteorological Organization, Geneva, Switzerland, 68 pp.
7) Porter, J.R., L. Xie, A.J. Challinor, K. Cochrane, S.M. Howden, M.M. Iqbal, D.B. Lobell, and M.I. Travasso, 2014: Food security and food production systems. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability.
Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L.White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 485-533.

NATURAL SYSTEMS AND RESOURCES 02.

2.1. GENERAL INFORMATION ABOUT TURKEY

Turkey, with its increasing agricultural product exports, is one of the largest agricultural manufacturers in the world. Despite the increasing share of industry and service sectors; the agricultural sector, which is of key importance both socially and economically, continues to continues to provide considerable employment opportunities a significant portion of the Turkish population. Fertile soils, favorable precipitation and climatic conditions allow for the cultivation of all kinds of crops.

In the agricultural sector, while planning the future agricultural activities land structure, climatic conditions and soil structure should be taken into consideration as factors affecting agriculture.

2.1.1. LAND STRUCTURE

Turkey has a generally mountainous land structure. In Turkey, where the average elevation above sea level is 1.141 m, 57% of the land is over 1,000 m and 62% of the land has more than 15% slope. The diversity of the topography is the result of the accumulation of tectonic movements and volcanic materials that occur in nearby geological periods and elevates many areas.

Table 1. Distribution of Area by Height

HEIGHT (M)	RATIO TO TOTAL AREA (%)
0-500	18
500-1.000	25
1.000-1.500	30
1.500-2.000	16
>2.000	11

Source. MoAF "Turkey's Biodiversity: Contribution of Genetic Resources to Sustainable Agriculture and Food Systems" (Ankara, FAO, 2019).

Anatolia is divided into valleys formed by 15 rivers, including the Tigris and Euphrates Rivers, which originate from Eastern Anatolia, flowing south through the Syria and Iraq to the Persian Gulf. Kızılırmak, which passes north of Ankara and flows into the Black Sea, is the largest river in the country. It has born and at the same time spilled into the sea in the territory of Turkey.

Central Anatolia is a high plateau at an elevation between 800 and 1,000 m with several mountains. Towards the inner part of the Central Anatolia, the plateau slopes gradually flatten to a basin containing a large salt lake – Lake Tuz. In the north of Anatolia, mountain ranges are higher and closer to the sea towards the east, allowing a narrow, green and fertile belt along the Black Sea coast[8].

The Central Anatolian plateau, cleft by canyons and dominated by volcanic peaks, forms the heartland of Turkey. Eruptions of the volcanoes Mounts Erciyes (3,916 m) and Hasan (3,268 m) covered the plateau surrounding Nevşehir with tufa, a soft stone comprised of lava, ash, and mud three million years ago. Due to the soft structure of that, it can be easily excavated and thousands of shelters, homes, and sacred places were excavated here in the past.

At many points in the Black Sea region, the mountain ranges rise above 3,000 m; altitude gradually decreases to the west of the North Anatolian Mountains. Several north-running rivers cut valleys from the plateau to the Black Sea. One of the Transboundary Rivers of Turkey, the Çoruh River, passes through this region up to Georgia. The tallest dam in Turkey, Deriner Dam (249 m), was constructed on the Çoruh River in Artvin Province[9].

Eastern Turkey consists of rugged land with high elevations. Region has a harsher climate and more rainfall than the Anatolian Plateau, the average height of the peaks is over 2,000 m. The highest point of Turkey, Ağrı Dağı (5 172 m), is in this area. Eastern Anatolia is the largest region of Turkey with an area of 163,000 km^2, 21% of the total area of the country.

Southeastern Anatolia is much lower and flatter than Eastern Anatolia, falling from 800 m in the north to 400 m at the Syrian border. The topography of the region is very suitable for construction of a series of dams to meet national energy and irrigation requirements. Therefore, there are many dams constructed in the region. The region is flat in the south and hilly in the north. Karaca Dağ (Karaca Mountain) (1919 m), a basaltic mountain, is the highest point in the area[10].

Even though it is under the prevailing winds and the sea effect; due to the “rain shadow” effect caused by the northern and southern mountain ranges, there is a close connection between the Turkey’s climate and landform features. Turkey’s land structure and accordingly changing climate characteristics has made possible the different geographical regions and the formation of microclimate. There is a harmonious relationship between the land structure and climate characteristics of the geographical regions in Turkey. Thus, forestry in Turkey’s humid regions, livestock in high mountainous and arid regions and plant production in every region can be made. This feature gives the possibility to produce specific agricultural products in different ecological regions in Turkey[11].

8) Ministry of Agriculture and Forestry, Türkiye’nin Biyoçeşitliliği: Genetik Kaynakların Sürdürülebilir Tarım ve Gıda Sistemlerine Etkisi, Ankara, Food and Agriculture Organization of the United Nations, 2019, p.6.
9) Ministry of Agriculture and Forestry, Türkiye’nin Biyoçeşitliliği: Genetik Kaynakların Sürdürülebilir Tarım ve Gıda Sistemlerine Etkisi, Ankara, Food and Agriculture Organization of the United Nations, 2019, p.6.
10) Ministry of Agriculture and Forestry, Türkiye’nin Biyoçeşitliliği: Genetik Kaynakların Sürdürülebilir Tarım ve Gıda Sistemlerine Etkisi, Ankara, Food and Agriculture Organization of the United Nations, 2019,p. 6.
11) Prof.Dr. Fahri Yavuz, Türkiye’de Tarım, Ankara, Ministry of Agriculture and Rural Affairs, 2005, p.10.

2.1.2. CLIMATE CONDITIONS

The ability of plants to grow and survive depends on the climatic conditions in which they live, even for different species of the same plant. For example, while 17°C temperature is sufficient for early grape species to reach a sufficient maturity, some other grape species may require a temperature of 19°C[12].

Average annual temperatures vary widely throughout the country influenced by elevation, topography, and orientation about maritime or continental conditions. Throughout the year, highest temperatures are recorded in July and August. Average temperature during these two months is 27°C on Mediterranean and Aegean coasts and 22 to 24°C on the Marmara and Black Sea coasts. The average annual temperature varies between 18 to 20°C on the south coast (Mediterranean), falls to 14 to 15°C on the west coast (Aegean) and depending on the elevation, temperature fluctuates between 4 to 18°C in the interior region[13].

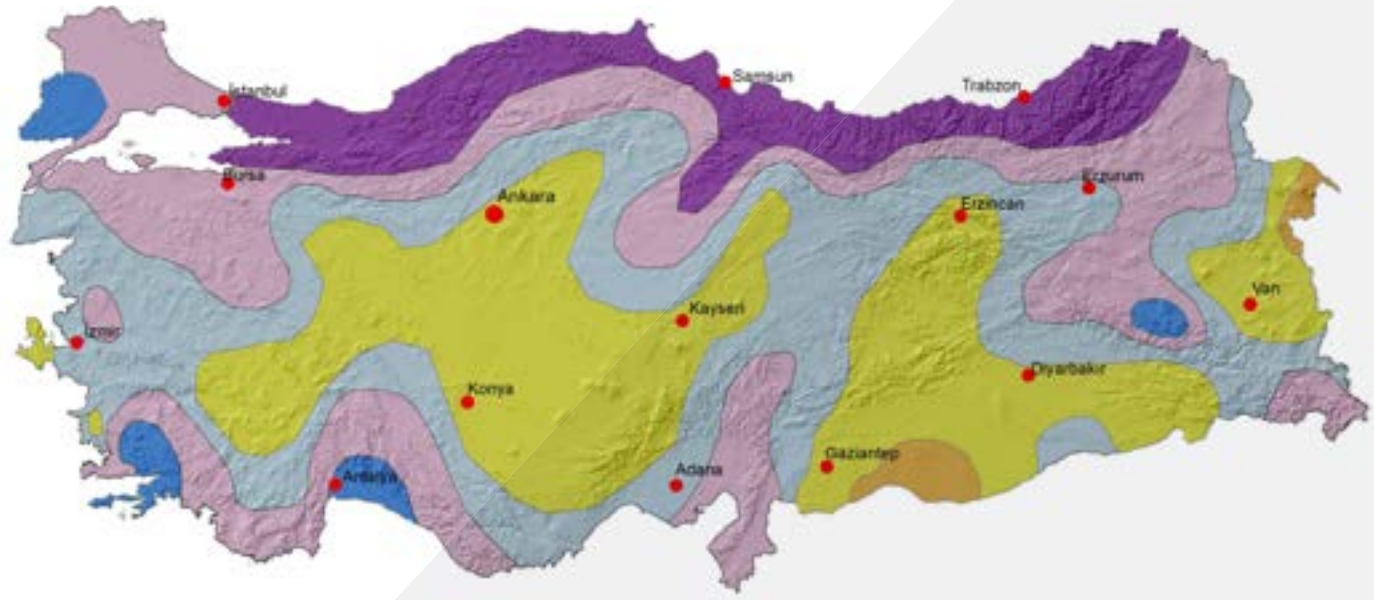


Figure 2. Climate Regions

Source. Prepared by MoAF Geographical Information Systems Department of Central Research Institute of Field Crops, (Ankara, 2019)

Turkey is located between the subtropical zone and temperate zone. In addition, surrounded by the sea on three sides, direction of the mountains and diversity of landforms have led to 4 major climate types which are continental, Mediterranean, Black Sea and Marmara (transitional) climate.

12) Prof.Dr. Miktad Kadıoğlu et al., Türkiye'de İklim Değişikliği ve Tarımda Sürdürülebilirlik, Istanbul, Turkey Food and Drink Industry Associations Federation, 2017, p.42.
13) Ministry of Agriculture and Forestry, Türkiye'nin Biyoçeşitliliği: Genetik Kaynakların Sürdürülebilir Tarım ve Gıda Sistemlerine Etkisi, Ankara, Food and Agriculture Organization of the United Nations, 2019, p.9.

2.1.3. SOIL STRUCTURE

Soil structure is one of the main factors affecting the vegetation to be grown in a certain area. Soil is a heterogeneous system in which various properties affect each other dynamically. Physical properties of soil include different qualities such as depth, granulation, structure, texture, amount of air and moisture, temperature, color, soil reaction (pH) and organic matter content[14].

Approximately 38 million ha of Turkey's total surface area is used as agricultural land and alluvial soils constitute the most important soil group among cultivated lands. This soil type, which forms the most productive agricultural areas due to its rich nutrient content, has a deep and permeable characteristic and generally takes the form of delta plain at the points where rivers flow into the sea.

Although there are many different soil groups in different geographical regions; the most common type of soils in Turkey are reddish brown and brown soils. In this soil type, which is seen in the regions where the continental climate is dominant, cereals are generally cultivated.

Within the scope of National Geographical Soil Fertility Information Management System; in order to update the efficiency parameters of Turkey's territory and determine the content of toxic elements and sustainable and efficient use of Turkey's natural resources in accordance with the capability; 50,000 soil samples are taken from agricultural areas to determine nutrient content, fertility and toxic element status of soils. 1/100,000 scale soil maps were prepared with project data and the data is uploaded to the "National Soil Data Bank" which can be updated and questioned. The prepared soil information management system and produced data will also contribute to the prevention of soil degradation, adaptation to climate change and the effective execution of regional action plans.

In the cooperation of MoAF and FAO, the Global Soil Partnership (GSP) system was established, which aims to ensure the sustainable use of soil resources in the world in order to ensure food safety.

Another study carried out in cooperation with MoAF and FAO is Geographical Soil Organic Carbon Information System. Within the scope of this system, Soil Fertility-Organic Carbon Geographic Information System Web Portal was created with soil data generated on national and basin basis and Turkey's Soil Carbon Map has been prepared and included in the World Carbon Map.

In addition, within the scope of the Soil Organic Carbon Project signed in 2017 by MoAF Directorate General of Combating Desertification and Erosion (ÇEM) and TÜBİTAK-BİLGEM, detailed studies were carried out to calculate the amount of organic carbon in the soil and to reveal the current situation of Turkey. As a result of this study, carbon biogeography areas were identified, methodology for carbon monitoring system was developed and soil organic carbon map was created.

Soil Database was established by MoAF in order to support soil data to form the basis for many studies, particularly in agriculture and forestry sectors, avoiding repetitive soil works and creation of "Turkey's National Soil Information System". A web-based portal has been developed to provide thematic map outputs for the purpose of presenting the soil maps and survey report cards stored in the soil database as standard and performing various inquiries and analyzes. As a result of this study, which started and continued in 2013, around 3,000 soil maps and data and 59,000 soil profile information are published at http://toprakportal.cem.gov.tr/ .

14) Ministry of Agriculture and Forestry, Türkiye'nin Biyoçeşitliliği: Genetik Kaynakların Sürdürülebilir Tarım ve Gıda Sistemlerine Etkisi, Ankara, Food and Agriculture Organization of the United Nations, 2019, p.10.

2.1.4. AGRICULTURAL BASINS

MoAF has identified 30 Basin Based Agricultural Production in Turkey with its "Turkey Agricultural Basin Production and Support Model" in which more than 500 million data on climate, soil, topography and land use classification have been evaluated for over 3 years. While determining basins, on the one hand, data such as average, highest and lowest air temperature and total rainfall are used as climate data; on the other hand, in order to enable production planning, the most suitable areas with similar ecological structure, suitable for the administrative structure of the country, manageable size and suitable for growing agricultural products have been considered.

The basins were generally called by taking into account the characteristics of the region and geography. The largest of the 30 basins identified is "Central Anatolia, Sakarya, Selçuk Basin" which is covering 7 million 171 thousand 254 ha with Ankara, Eskişehir, Konya, Karaman, Aksaray, Niğde and Afyon; the smallest is the

"Great Ağrı, Iğdır Basin" which is covering an area of 784 thousand 765 ha with Ağrı, Iğdır and Kars.Thus, the production and development plans, which have been only made on the basis of geographical regions and administrative boundaries will be updated and the supply and demand balance of Turkey will be maintained at the desired level, the production deficit or surplus will not be a burden on the economy, and the data produced regarding agriculture is sufficient.
Turkey Agricultural Basins Production and Support model will favor the country in terms of;

- Effective production planning,
- Diversification of agricultural production,
- Biodiversity, conservation of soil and water resources,
- Increased productivity,
- Increased producer profits,
- Balance of supply and demand,
- Decrease in public finance burden arising from purchases,
- Increased international competitiveness through production planning,
- Analysis of the potential impact of Turkey's EU harmonization process on major agricultural products,
- Preparation of sound agricultural inventory,

- Enabling production planning,
- Demand projections for the future,
- Rational, directive and effective usage of supports,
- Increasing production in products with supply deficit,
- Preservation and sustainable use of natural resources,
- Meeting the demands of the sector regarding basin based planning and management,
- Production planning according to various scenarios,

2.1.5. BIODIVERSITY, GENETIC RESOURCES AND ENDEMISM[16]

Biodiversity is a concept that expresses the richness of living species, their genetic characteristics, habitats and ecological relationships occurring in these habitats. There are four basic elements that symbolize biodiversity in a region, which express a whole of genes, species, ecosystems and ecological phenomena[17];

- Variety of species
- Genetic diversity
- Habitat diversity
- Functional diversity of ecosystems

Turkey is one of the richest countries in Europe and the Middle East in terms of biodiversity. Turkey, has both the three regions and the transition zones of these three of the seven bio-geographical regions of the world which are Mediterranean, the Euro-Siberian and Iran and Turonian regions, each with a separate climate, flora and fauna. In addition, due to its position as a bridge between the two continents; Turkey is one of the leading countries in the world in terms of biodiversity because of changes in climatic and geographical characteristics at short intervals and it is the source of ancestor of many plant and animal species produced and cultivated in the world.
Although Anatolia is not a separate continent, it has wide range of ecosystems and habitat characteristics that a continent may have. Located at the intersection of three of the seven bio-geographical regions in the world, Turkey, is home to one-third of the approximately 12,000 species of endemic plant diversity.

16) Endemism: plant species limited in a narrow region.
17) Prof.Dr. Necmettin Çepel, Biyoçeşitlilik Önemi ve Korunması, İstanbul, Turkey Combating Soil Erosion, Afforestation and Protection of Natural Assets Foundation Publications 15, 1997, p.2.

Figure 3. Bio-Geographical Regions In Turkey

Source. Prepared by MoAF Geographical Information Systems Department of Central Research Institute of Field Crops, (Ankara, 2019)

Each biogeography region has its own unique ecosystems. The Euro-Siberian element is composed of Black Sea forests, including Alpine meadows. The Central Anatolian and Eastern Anatolian steppes are among the Iran-Turonian elements. Turkey, a bridge between continents, its climate and geographical features vary over short distances and thus Turkey has forests, mountains, prairies, wetlands, coastal and marine ecosystems and its richness in biodiversity is huge in terms of characters having different styles and combinations.

Turkey, in terms of animal diversity, is among the leading countries of the world. Looking at the geography of Anatolia, it is located at the intersection of Asia, Europe and Africa and as a result of this it is seen that it contains living organism unique to all three continents. Due to the climatic changes, changes in habitat characteristics, the instincts of animals to move and find new habitats, and the ecosystem of Anatolia for the vital functions of finding food and shelter for animals, a rich animal diversity emerges. Another reason for the diversity of animals is the fact that Anatolia has a wide range of ecosystems, different types of animals, as a result of high mountains, steppes, wetlands, forests and shrubs and caves. The fact that Anatolia is on the migration route of birds provides richness in bird species.

In terms of marine species, Turkey can be considered as very rich. The Black Sea, with its cold and low-salinity in the north, the Mediterranean Sea with hot and high salinity waters in the south, and the Marmara Sea, which is an inland sea, allow different marine species to live. In addition, the increase in the number of tropicaltropical marine organisms migrating from the Red Sea increases the richness of the species. In addition, numerous lakes and river systems allow freshwater fish and invertebrates to live.

Genetic features can be described as a “life code” in all characteristics of each living organism. While some species of sheeps or goats are very resistant to hunger, thirst, temperature, some other species, are less durable to external conditions. In other words, there is a genetic difference between certain sheep or goat species in terms of these characteristics. Genetic diversity is an important fact that ensures the continuity of biodiversity[18].

18) Prof.Dr. Necmettin Çepel, Biyoçeşitlilik Önemi ve Korunması, İstanbul, Turkey Combating Soil Erosion, Afforestation and Protection of Natural Assets Foundation Publications 15, 1997, p.3.

Turkey's richest family in endemic species is Asteraceae, with 572 endemic taxa. This is followed by legumes (Fabaceae) with 385 taxa and Lamiaceae with 326 taxa. There are also 14 endemic varieties. High endemic levels within Turkey are concentrated among, Amanos Mountains, Ilgaz Mountain, Central Toros, Taşeli Plateau, Bolkar and the Kaz Mountains, Uludağ, mountains between Gümüşhane and Erzincan, Munzur Mountains and Salt Lake and Salty Steppe. Some of the 3,649 endemic plant taxa in Turkey are the relatives of the crops that feed the world. For example, some field crops (wheat, barley, rye, oats, flax, lentils, chickpeas and peas), pasture crops (alfalfa, clover, sainfoin, vetch and grassy forage crops) and horticultural crops (cherry, apricot, plum, almond), figs and grapes)[19].

Figure 4. Areas with High Plant Endemism Rates

Moreover, in Turkey, there are five micro-gene centers, which are the source or diversity center of economically important plant species such as many medicinal plant and fruit tree species, with more than 100 species showing wide variation. These micro-gene centers provide important genetic resources for the future sustainability of many plant species that are widely grown in the world.

19) Ministry of Agriculture and Forestry, Türkiye'nin Biyoçeşitliliği: Genetik Kaynakların Sürdürülebilir Tarım ve Gıda Sistemlerine Etkisi, Ankara, Food and Agriculture Organization of the United Nations, 2019, p.18.

Table 2. Turkey Micro Plant Species Gene Centers

MICRO GENE CENTER	COMMON SPECIES
Thrace-Aegean	Bread wheat, durum wheat, swollen wheat, top head wheat, crane beak wheat, chickpea, melon, vetch, lettuce and alfalfa
South Eastern Anatolia	Wild gernik, mother of wheat (Aegilops speltoides), pumpkin, watermelon, cucumber, pea, lentil, broad bean, vine, legume forage crops
Samsun, Tokat and Amasya	Numerous fruit tree species, peas, lentils, pods and other legume forage crops
Kayseri and vicinity	Almonds, apples, peas, vines, lentils, chickpeas, clover and sainfoin
Ağrı and vicinity	Apple, apricot, cherry, cherry, watermelon and legume forage crops

Turkey has a rich fauna diversity among the countries with temperate-climate. Invertebrates, most of which are insects, are the most numerous species with 60,000-80,000 species. Winged insects (Pterygot) which are a subclass of insects in Turkey is available at 22,125 defined types. The total number of vertebrate species identified to date is around 1,500. There are 694 freshwater and marine fish species, 460 bird species, 30 amphibian species, 161 mammal species and 120 reptile species[20].

2.1.6. CONSERVATION AND USE OF GENETIC RESOURCES

Turkey is located on three different climate zones and three biogeographic areasover 11,000 plant species, around 19,000 invertebrate species, over 1,500 vertebrate species, 2 major bird migration routes, 1,444,293 ha of marine protected area, 1865 km of protected coastline, 2,783 protected areas with a total area of 5.9 million ha, 44 national parks and 243 natural parks with rich ecosystem and natural habitat diversity.

Biodiversity is adversely affected by a range of human-induced activities. The leading activities include overfishing, habitat degradation, spreading and invasion of extraneous species, domino effects, pollution and climate change which they inevitably change the world's fauna and flora negatively. In other words; factors such as degradation of habitats inhabited by living species, introduction of extraneous species, over-consumption, pollution of the physical environment (soil-water-air), climatic changes at global level and industrial agriculture cause the destruction of the biodiversity surrounding the earth. Nowadays, these growing rapid changes and negative effects are followed with great concern in the world and solutions are being tried to be produced in order to minimize the effects of this change.

The number of materials conserved in the two Seed Gene Banks affiliated to the MoAF is as follows:

- 63,269 samples of 463 species in the Turkey Seed Gene Bank in Ankara
- 57,726 samples belonging to 3,244 species in the National Seed Gene Bank in İzmir

Total 120,995 samples are conserved in both gene banks. At the same time, under the leadership of Directorate General of Agricultural Research and Policies (DGARP), Central Research Institute of Field Crops and in the collaboration of Aegean Agricultural Research Institute the "Digital Herbarium" has started to operate (http://herbaryum.tagem.gov.tr/). Protected seeds and breeding materials form the basis of breeding activities.

20) Ministry of Agriculture and Forestry, Türkiye'nin Biyoçeşitliliği: Genetik Kaynakların Sürdürülebilir Tarım ve Gıda Sistemlerine Etkisi, Ankara, Food and Agriculture Organization of the United Nations, 2019, p.16.

Aegean Agricultural Research Institute, which is the national responsible for agricultural biodiversity, is also carrying out the "Documentation of Plant Genetic Resources within the scope of genetic resources database creation program. Data obtained from the studies and researches carried out on plant genetic resources for the purpose of compiling, processing and storing information of survey / collection, production / renewal, conservation, characterization and evaluation studies of Plant Genetic Resources are recorded as standard[21].

18,490 materials belonging to 162 species (all vegetative material such as fruit and vine, ornamental plant, geophyte) are kept in the Land Gene Banks located in 17 Research Institutes of DGARP. In the database of fruit species under the responsibility of Aegean Agricultural Research Institute, 8,121 material information belonging to 115 species is recorded[22].

In terms of "Promotion of Sustainable Food Systems", the studies carried out in research institutes affiliated to DGARP Field Crops Research Department of the MoAF is as follows:

- In terms of health, especially in cereals and legumes, breeding studies are carried out for varieties with high mineral content and utilization.
- With the International Winter Wheat Improvement Program (IWWIP) initiated between Turkey-The International Center for Agricultural Research in the Dry Areas (ICARDA) and International Maize and Wheat Improvement Center (CIMMYT), wheat breeding materials were sent to more than 50 countries annually and so far 63 varieties have been registered in 11 countries.
- Imidazolinone (IMI) herbicide group resistant varieties are developed in field crops.
- With the National Pasture Use and Management Project, the most comprehensive and extensive database on pasture areas has been created.

To protect the species and areas that make up our biodiversity; the number of areas that have special protection status is as follows as follows[23]

- 44 national parks,
- 243 nature parks,
- 30 nature protection areas,
- 112 natural monuments,
- 81 wild life development sites,
- 14 Ramsar Areas,
- 48 Wetlands of National Importance,
- 9 Local Wetlands.

Map of Turkey's Biodiversity is transferred to Noah's Ark National Biologic Biodiversity Data Base within the Nature Conservation and National Parks Directorate General of MoAF which is an internet-based, publicly available tool to monitor studies conducted on biodiversity in Turkey. It also enables to reveal Turkey's biological richness, specific to "species" and "special areas" and allows the users to access the data with their own rights. The data is in open access to civil society organizations, scientists, researchers, and citizens of all interest groups aiming to contribute to the protection of Turkey's nature.

Turkey became a party to numerous international agreements, treaties and conventions on biological diversity. In this context, at the 1992 World Sustainable Development Summit held in Rio de Janeiro, which was vital for economic and social development, the need for biodiversity resources to be damaged due to human-induced activities and the extinction of certain species reached an alarming rate. The UN Convention on Biological Diversity was adopted and entered into force in 1993.

21) Alptekin Karagöz etc., Türkiye'nin Bitkisel Biyolojik Çeşitliliğinin Korunması ve Sürdürülebilir Kullanımına İlişkin Sorunlar ve Çözüm Önerileri, 2016, Journal of Field Crops Central Research Institute 25, s.89.
22) Alptekin Karagöz etc., Türkiye'nin Bitkisel Biyolojik Çeşitliliğinin Korunması ve Sürdürülebilir Kullanımına İlişkin Sorunlar ve Çözüm Önerileri, 2016, Journal of Field Crops Central Research Institute 25, s.89.
23) Ministry of Agriculture and Forestry, Directorate General of Nature Conservation and National Parks Web Site, (access 06.09.2019), http://www.milliparklar.gov.tr/.

2.2. WATER RESOURCES AND AGRICULTURAL IRRIGATION

Water is vital for human life, very important for ecosystems, and a fundamental requisite for developments of the countries. Water scarcity is becoming ever-increasing and prevalent problem and water quality is rapidly deteriorating in almost every country. This problem, successively leads to many other economic and social problems. Especially unaware and unplanned water use and ground activities directly affect both soil quality and groundwater quality and quantity.

Pollutions which are likely to occur due to these kinds of activities are pretty difficult to cope with and, in some cases, rather impossible to remove from soil and ground water and recycle it into the economy. In sustainable management of water and soil resources, planning should be made taking into account these resources and also efficient and long-term use of these resources should be enabled.

The primary principals of agricultural irrigation management are preventing the losses during transmission and distribution of water, reducing the water demand in irrigational lands, enabling efficient use of water and minimizing the risk. Therefore, sustainable management of soil and water resources require to plan taking into account of current situation of existing resources and it should be ensured that these resources are used more efficiently.

Turkey's total land area is around 78 million ha while studies show that 8.5 million ha of this land area is economically irrigable. By the end of 2018, 6.6 million ha of this area had been irrigated. By 2023, MoAF plans to make the remaining 1.9 million ha operational.

In the scope of sustainable agricultural irrigation management, optimal plant pattern proposals are developed within the context of Sectoral Water Allocation Plans to maximize economic value. Taking into account both normal and drought conditions for determined years, these proposals are prepared separately for each condition and for all types of irrigation areas including public irrigation. Irrigation water demand is a principal parameter for plant pattern studies. Moreover, like other sectors, required actions and the institutions responsible for these actions have been determined for enabling sustainability in agricultural irrigation sector.

As of 2019, irrigation systems in Turkey are composed of 34% surface irrigation, %38 channels and 28% closed irrigation systems. Recently almost all irrigation projects have been built in the form of closed pipeline systems. According to the inventory of irrigation facilities developed by MoAF, which corresponds to 65% of total irrigation facilities, as of 2019, 2743 irrigation facilities are in service.

In accordance with the national legislation, Sectoral Water Allocation Plans are prepared for Seyhan, Akarcay and Konya basins with a view of providing sustainable management of water at basin scale and planning the water use of every sector's water demand for their future activities. Studies continue for Gediz and Küçük Menderes basins and Sectoral Water Allocation Plans for all basins are intended to be completed by 2023. Besides land consolidation studies, completing important irrigation infrastructure works such as connecting the parcels of land with irrigation canals and service roads, increasing the parcel surface areas to the scales that will enable economic production, fulfilling infield development services, together with transition to closed irrigation systems will provide high amounts of water saving.

2.2.1. AGRICULTURAL IRRIGATION POLICIES AND R&D ACTIVITIES

According to the 11th National Development Plan which was published on the Official Gazette, in order to achieve the targets envisaged in the priority sector and development areas of the Plan; expenses required for public investments for irrigation, private sector investment, R&D, innovation, production and export incentives and supports shall be budgeted within the Plan period.

The Development Plan which was designed so as to cover the first 5-year period of a 15 years' perspective includes "Policy and Measures for the Sector of Agriculture" under Priority Development Areas as follows:

- Increasing the irrigation rate from 64% to 68% as a significant target.
- In order to increase irrigation areas, making irrigation investments by prioritizing, protecting the water in terms of quality and quantity and carrying out use of water effectively,
- 2 million ha of land is targeted to be opened for irrigation,
- Expanding modern irrigation systems such as drip and sprinkler irrigation methods which provide water-saving for the efficient use of water.
- Land consolidation studies will be integrated into irrigation investments.

Concerning the policies on irrigation facilities, renovation is of importance as a general concept. Within this framework, the renovation projects were implemented in order to prolong the contribution to the irrigation facilities, which were built and made operational initially by Directorate General of State Hydraulic Works (DGSHW), and then transferred to the beneficiaries who were responsible for operational maintenance and management. However, these facilities were damaged over time due to various reasons. The renovation project, therefore, aims at making these facilities fully functional again, improving the farmers' utilization from them in terms of duration and condition, continuation of operation and maintenance and water conservation.

In order to ensure water saving, with the renovation projects with the following outcomes has gained importance;

- Conservation, control, improvement and pollution prevention of water resources,
- Ensuring sustainable use of water,
- Increasing agricultural employment by boosting agricultural development,
- Increasing the agricultural production and incomes,
- Reducing rural depopulation by increasing agricultural employment and income.

It is of great importance to accelerate R&D and innovation activities in the field of water for

producing sustainable solutions that will reduce the pressures of increasing population, industrial demands and global climate change on the fresh water resources, which are the most fundamental needs of the society.

One of the key elements and triggering forces of sustainability is support models. In order to produce data for support policies a national project titled "Determination of the Technical and Economic Performance of Drip Irrigation Systems Used in Turkey" was conducted by the Ministry of Agriculture and Forest (MoAF).
This project was carried out in different regions of Turkey and with different agricultural product categories aimed at evaluating the performance of drip irrigation systems, which have become more prevalent owing to the nonrecourse loans given by the Turkish Government to encourage efficient water use.

In the field of agricultural irrigation, considering the global impacts of climate change in recent years, research institutes have been making significant contributions to the potential increase in agriculture in terms of sustainable use and management of soil and water resources by conducting research in water-saving irrigation methods, water harvest, increasing the efficiency of water use, appropriate technology and irrigation programs for the optimal use of water in water scarcity conditions, use of low quality irrigation waters, natural resources as an input for agriculture and the use of alternative technologies. R&D activities have been extended in collaboration with private sector and universities.

In order to reflect the R & D results to national policies, especially within the scope of expanding pressurized irrigation systems that provide water savings, MoAF continues to support the transformation and expansion of existing surface irrigation methods into pressurized irrigation methods within the framework of the Rural Development Investments Support Program since 2006. R&D data on soil and water resources were the primary basis for the initiation of these studies.

Monitoring and evaluation studies on the irrigation facilities are essential for generating the necessary data to be used in the analysis of the development of policy and strategies in various subjects such as, agricultural production planning being in the first place, food supply security, sustainable use of water and soil resources.

Similarly, technical, social, economic and environmental monitoring and evaluation of irrigation projects especially in the operation stage are of crucial importance for the success of these projects.

2.3. FOREST AND FORESTRY PRODUCTS

2.3.1. FOREST ASSETS OF TURKEY

Forests are a natural resource that offers many economic, ecological and sociocultural benefits to humanity such as food, fuel, shelter, clean air and water, medicine, income source, employment, recreation and landscape. As an ecosystem, forest is a living system and community in which certain trees, other plants and animals, and other invisible organisms in the soil interact with each other in a certain balance with the environment. The concrete benefits and services of this invaluable natural resource depends on the management of the principle of sustainability. Almost all of the Turkey's forests are state-owned.

Turkey, with 78 million ha surface coverage, has a rich diversity in terms of ecology. In this richness, forests have an important place in species and composition. While forested land of Turkey was 20.8 million ha in 2002, it reached 22.6 million ha as of 2019 and it is aimed to increase this number to 23.4 million ha by 2023.

33% of the forests are coniferous forests (oak, beech, alder, chestnut, hornbeam tree species), 48% coniferous forests (red pine, larch, scotch, fir, spruce, cedar tree species), 19% is coniferous + leafy mixed forests. In the forests, oak (5,9 million ha) has the most widespread area, which is followed by pine, larch, beech, scotch, juniper, fir, cedar, spruce, peanut, alder, chestnut, hornbeam, poplar, linden , ash and eucalyptus.

2.3.2. PRODUCTION AND MARKETING OF FOREST PRODUCTS

The annual wood raw material requirement of the woodworking industry, which is an important sector for Turkey, is 31 million m^3 today. In 2018, the production of wood increased to 22.75 million m^3 in order to reduce external dependence on the sector. Our target for 2023 is to reach 32 million m^3. The industrial plantation, which was 5000 ha in 2018, increased to 60 000 ha in 2019 in order to meet the need for wood raw material.

2.3.3. NON-WOOD FOREST PRODUCTS

Turkey is a rich country in flora and fauna. Out of 12,000 plant species grown in Turkey, about 3,600 are endemic. 80% of the medicinal plants in Turkey are grown in forests.

It is of utmost importance that Turkey is able to obtain the highest share it deserves by increasing this capacity and producing the highest amount of added value.

Among the export products of Turkey, Non-Wood Forest Products have an increasing trend in terms of both production amount and added value.

Turkey is the number one country in the daphne exports (90%), more than half of the thyme demands are met by Turkey in the world. Sage, rosemary, mushrooms, flower bulbs are also other important export products. Exports of fruit products such as peanut, carob, chestnut also tend to increase continuously.

As of September 2019, the number of honey forests was 484 in Turkey 107,000 tons of honey was produced in 2018. In 2023, it is aimed to increase the number of honey forests to 730 and the amount of honey produced to 125,000 tons. Turkey ranks 2nd in honey production and ranks 1st in pine honey production.

2.3.4. 5 000 FOREST TO 5 000 VILLAGES PROJECT IN AFFORESTATION ACTIVITIES

Under the scope of the Forest Action Plan for 5000 Forest to 5000 Villages (2015-2019), which was prepared with the aim of diversifying the income sources of the rural population and contributing to the national economy; afforestation works on species such as walnuts, almonds, mulberries, grafted olives, peanut pine, chestnut is ongoing. In this context, under the 5000 forest to 5000 villages project prepared by MoAF, the saplings were planted in various provinces between 2015-2018 and works for 2019 are ongoing.

SOCIAL SERVICES AND CONDITIONS IN AGRICULTURE 03.

3.1. AGRICULTURAL SERVICES

The people living in rural areas desire economic, social and political integration through various means. With the improvement in quality and quantity thus an increased efficiency in the production to enhance the contribution of the agricultural sector to the economy, agricultural services include many services and tools like the sustainable use of natural resources such as soil and water resources and the identification of remedial measures for living conditions in rural areas. The most important of these tools are given.

3.1.1. ORGANIZATION IN AGRICULTURE

In Turkey, Organization in Agriculture is very diverse and there are cooperatives, producers and irrigation associations, farmer's associations and agricultural professional organizations based on different legal regulations.

Cooperatives are autonomous organizations (International Cooperative Association) that are constituted by volunteer people to meet the common economic, social and cultural needs and requests through a jointly owned and democratically controlled enterprise.

Cooperatives are based on an original model that enhances social development and provides the basis for commercial enterprises.
These businesses include the following features:

- Ownership of partners, serving their partners and being managed by their partners
- Unity of self-sufficiency, self-responsibility, democracy, equality, justice and solidarity
- Principle-based management

Table 3. Producer Organization aiming Agriculture in Turkey (2019)

UNIT COOPERATIVES			REGIONAL COOPERATIVE UNIONS				CENTRAL COOPERATIVE UNIONS			
CATEGORY	NUMBER	MEMBER NUMBER	CATEGORY	NUMBER	COMMON COOPERATIVE NUMBER	MEMBER NUMBER	NUMBER	COMMON UNION NUMBER	COMMON COOPERATIVE NUMBER	MEMBER NUMBER
AGRILCULTURAL DEVELOPMENT	6,810	745,846	VILLAGE-COOP.	14	1,428	167,162	1	12	1,105	129,038
			AGRICULTURE	13	547	62,545	1	15	959	109,779
			LIVESTOCK	35	1,738	179,158	1	35	1,800	193,285
			FORESTRY	18	952	112,708	1	28	1,731	211,682
			TEA	5	41	66,516	1	5	41	66,516
IRRIGATION	2,451	298,829	IRRIGATION	13	678	93,728	1	13	623	89,430
AQUACULTURAL PRODUCTS	558	30,632	AQUACULTURAL PRODUCTS	17	231	14,523	1	14	200	11,608
BEETROOT PRODUCERS	31	1,382,627	BEETROOT PRODUCERS	1	31	1,382,627	0	0	0	0
SUB TOTAL	**9,850**	**2,457,934**		**116**	**5,646**	**2,078,967**	**7**	**122**	**6,459**	**811,338**
Agricultural Credit	1,625	830,188	Agricultural Credit	17	1,625	830,188	1	17	1,625	830,188
SUB TOTAL	**11,475**	**3,288,122**		**133**	**7,271**	**2,909,155**	**8**	**139**	**8,084**	**1,641,526**
Agricultural Sales (*)	295	300,357	Agricultural Sales	12	278	291,291	0	0	0	0
Tobacco Production and Marketing(*)	18	939	Tobacco Production and Marketing	1	9	455	0	0	0	0
Fresh Fruit and Vegetables Marketing (*)	29	2,965	Fresh Fruit and Vegetables Marketing	0	0	0	0	0	0	0
GENERAL TOTAL	**11,770**	**3,588,479**	**TOTAL**	**147**	**7,558**	**3,200,901**	**8**	**139**	**8,084**	**1,641,526**

Source: Ministry of Agriculture and Forestry Directorate General of Agricultural Research and Policies (DGAR) (2019)

In this context, when the producer organization in agricultural business in Turkey is examined, the number of member of unit cooperatives is 3.5 million, the number of member of regional cooperative unions is 3.2 million and the number of members of central cooperative unions is 1.6 million.

Table 4. Producer Unions (2019)

	MANUFACTURERS UNIONS		
Subject to Law:	**Product/Product Groups**	**Number of Unions**	**Number of Member Farmers**
The Law No.5200	Animal Production	567	322,841
The Law No.5200	Plant Production	244	21,613
The Law No.5200	Aquaculture	30	1,193
The Law No.5200	Organic Products	29	2,418
	Total	**870**	**348,065**
	Breeders Unions for Breeding Purpose		
Subject to Law:	**Species**	**Number of Unions**	**Number of Member**
The Law No.5996	Breeding Cattle	81	241,541
The Law No.5996	Breeding Sheep-Goats	80	249,018
The Law No.5996	Bee	80	72,140
The Law No.5996	Breeding Buffalo	29	8,721
The Law No.5996	Chicken	6	759
	Total	**276**	**572,179**

Source: DGAR (2019)

In Turkey, the number of farmers who are members of manufacturers unions is 348,065 people, while the number of farmers who are members of Breeders Unions for breeding purpose is 572,179.

3.1.2. TURKEY AGRICULTURAL CREDIT COOPERATIVES

Following the establishment of Republic of Turkey, agricultural credit cooperatives were established in accordance with the principles of cooperatives in order to meet the short and medium-term in cash and kind credit demands of partners, evaluate products, meet their materials and equipment demands, train the members and work as an insurance agent. Agricultural Credit Cooperatives and their parent organizations have come to their present state with laws and decrees organized at various dates. By meeting the financial needs of its members, it makes significant contributions to the continuity and development of production.

Agricultural Credit Cooperatives, along with Ziraat Bank of Republic of Turkey is one of two organizations that largely finance the agricultural sector. Agricultural Credit Cooperatives are also in activity in the absence of banks in small settlements such as a village, town, and serves to the agricultural sector of Turkey by providing enough loans to farmers for their agricultural cash credit needs and in-kind input needs to be used in production, at the possible lowest cost.

Agricultural Credit Cooperatives provide input to agricultural producers based on the purpose of their establishment and also they aim to meet the need for financial funds due to insufficient agricultural capital accumulation. For this reason, it has provided economic and continuous production in important agricultural inputs through establishment of partnerships and subsidiaries.

In order to meet the capital needs of its producers under appropriate conditions, Agricultural Credit Cooperatives offers a Treasury-backed discounted credit advantage with Ziraat Bank. If the producer uses credit from Agricultural Credit Cooperatives, credit postponement can be made in order to ease the distress of the producer during drought and natural disaster periods

3.1.3. AGRICULTURAL INSURANCE

The first regulation for “Agricultural Insurance” in Turkey for farmers to make safe and stable production was included in the Ziraat Bank legislation in 1937.

The agricultural sector faces a wide range of risks, from natural disasters to price instability, pests and diseases to accidents. In the event of these risks, not only farmers but also all actors in the food production chain are affected negatively. When a negative situation arises in the whole agricultural sector, the chain breaks and agricultural sustainability is interrupted. There are many measures that can be taken to ensure sustainability in agriculture, from the farm at micro level to government policies at macro level, and in recent years, especially agricultural insurance has come to the fore as an important risk management tool [24].

In Turkey, uncertain public budget burden that may arise from risks was planned by the sustainability of agricultural production and food security and Agricultural Insurance Law No. 5363 was published in the official gazette on 21.6.2005 to provide manufacturers a long-term revenue stability [25].

With the law, “Risk Management in Agriculture” has gained a new dimension and momentum and the Agricultural Insurance Pool (TARSIM) has been established to compensate the losses that producers will suffer due to the risks and to provide subsidy and to carry out agricultural insurance practices [26].

TARSİM is an insurance system established, supported and supervised by the state. TARSIM carries out this work not for profit but on behalf of the public, and for the benefit of the manufacturer, within the framework of insurance principles and techniques. The system was created in the framework of the cooperation of the public, civil society and private sector and works with the aim of compensating the losses by covering the risks of the producers [27].

24) https://web.tarsim.gov.tr/havuz/, Access Date: 02.09.2019
25) https://web.tarsim.gov.tr/havuz/, Access Date: 02.09.2019
26) https://web.tarsim.gov.tr/havuz/, Access Date: 02.09.2019
27) https://web.tarsim.gov.tr/havuz/, Access Date: 02.09.2019

3.1.4. AGRICULTURAL EXTENSION SERVICE

Training strategies for producers and consumers are developed by the Ministry of Agriculture and Forestry (MoAF) in order to provide accessible and sustainable agricultural product supply, to create a highly competitive agricultural sector in national and international arena, to increase the knowledge and skills of our farmers and to increase product levels, product quality and standard in production by increasing the knowledge and skills of farmers.

With the application of the results of R&D, it is aimed to address the information needs of the farmers in a timely manner, to obtain high quality productivity and more efficiency from the unit area.

At the same time, farmer training and extension activities constitute the whole of agricultural extension activities aimed at providing the skills to help farmers solve the problems they face.

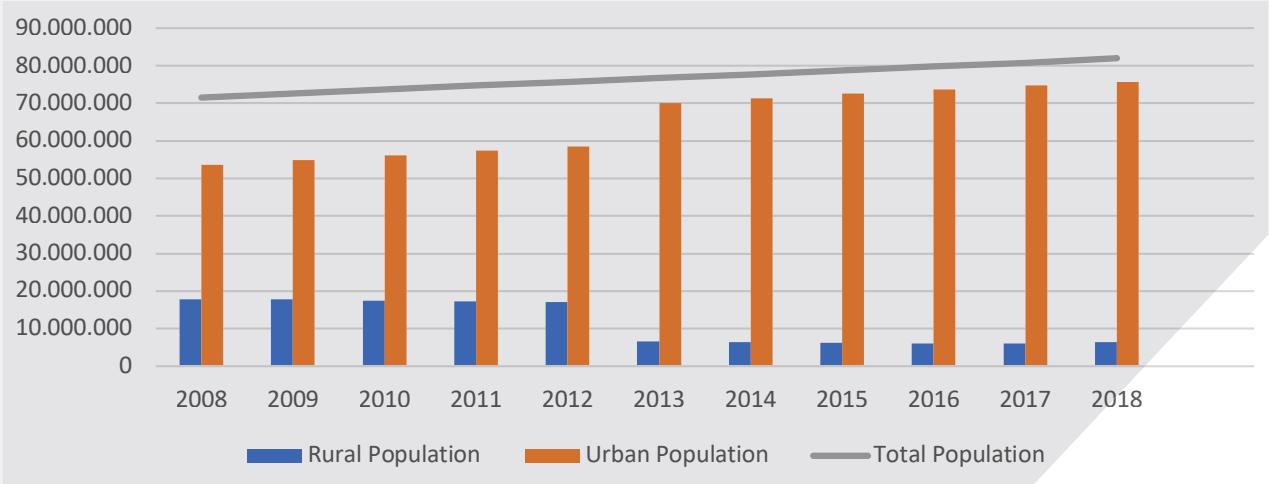
Atatürk, the founder of the Republic, decided to establish a state farm in Ankara in 1925 in order to introduce the modern agricultural innovations to the villagers and to lead them in their implementation. The establishment story of this farm, which was designated as Atatürk Forest Farm (AFF) by law in 1950, is being studied in many agricultural faculties as an example of agricultural innovation in itself. As a result of various breeding activities, unfavorable soils where AFF was established became a full-fledged farm.

Together with farmers in AFF, university students from different disciplines, especially the Faculties of Agriculture and Veterinary Medicine, received practical training. In addition to agricultural production, dairy and fruit juice factories, leather and iron workshops were established on the AFF territory, which houses many animal and plant species. In AFF, studies were carried out for the agricultural industry.

3.2. DEMOGRAPHIC STRUCTURE

As can be seen from the figure below, while the total population and urban population have increased regularly for the last decade, the rural population has decreased continuously except for 2018. The break in 2013 is particularly noteworthy. In 2013, rural population decreased by 61%, while urban population increased by about 20%. Population growth rate (‰) varies by years. In 2010, Turkey has remarkable rate of 15.88 ‰ for the increase in population.

Figure 5. Change of Population Structure in Turkey



Source: Turkish Statistical Institute (TurkStat) (2019)

Table 5. Share of Agriculture in Employment by Years

Years	Thousand Person					Percent (%)				
	Total	Agriculture	Industry	Construction	Service	Total	Agriculture	Industry	Const.	Service
2005	19 633	5 014	4 241	1 097	9 281	100.0	25.5	21.6	5.6	47.3
2006	19 933	4 653	4 362	1 192	9 726	100.0	23.3	21.9	6.0	48.8
2007	20 209	4 546	4 403	1 231	10 029	100.0	22.5	21.8	6.1	49.6
2008	20 604	4 621	4 537	1 238	10 208	100.0	22.4	22.0	6.0	49.5
2009	20 615	4 752	4 179	1 305	10 380	100.0	23.1	20.3	6.3	50.4
2010	21 858	5 084	4 615	1 434	10 725	100.0	23.3	21.1	6.6	49.1
2011	23 266	5 412	4 842	1 680	11 332	100.0	23.3	20.8	7.2	48.7
2012	23 937	5 301	4 903	1 717	12 016	100.0	22.1	20.5	7.2	50.2
2013	24 601	5 204	5 101	1 768	12 528	100.0	21.2	20.7	7.2	50.9
2014	25 933	5 470	5 316	1 912	13 235	100.0	21.1	20.5	7.4	51.0
2015	26 621	5 483	5 332	1 914	13 891	100.0	20.6	20.0	7.2	52.2
2016	27 205	5 305	5 296	1 987	14 617	100.0	19.5	19.5	7.3	53.7
2017	28 189	5 464	5 383	2 095	15 246	100.0	19.4	19.1	7.4	54.1
2018	28 738	5 297	5 674	1 992	15 774	100.0	18.4	19.7	6.9	54.9
2019*	28 269	5 173	5 546	1 548	16 002	100.0	18.3	19.6	5.5	56.6

* May 2019
Source: TurkStat (2019)

Although the share of agricultural employment fell by years in Turkey, when considering the number of registered and unregistered workers in the agricultural sector is still important in total employment. In addition to being a semi-subsistence activity, agriculture is also a socio-economic phenomenon.

Accordingly, it can be said that the registered employment rate in the agricultural sector has fallen approximately one-third since 1991. In this decrease, abandonment of agricultural activities, migration of young rural people (especially males) from rural areas who prefer an insured employment in other sectors, factors arising from social status, low income from agricultural activities accompanying marketing problems, high production costs, and non-purpose agricultural land use and urbanization pressure, inadequate living conditions in rural areas, including insufficient social infrastructure, relatively heavy agricultural activities, climate change and indirect effects on agricultural activities, etc. factors are effective[28].

In Turkey, when considering shifting from agriculture towards industry and services sectors, a declining trend in agricultural employment continues. However, agriculture is generally seen as a safe sector in times of crisis and the number of people employed in agriculture may increase slightly at these times[29].

With the shift from agriculture to service and industrial sector in the coming years, the expectation of this situation in the agricultural sector triggering the phenomenon of migration from villages to cities and city centers, requires additional measures for women and other disadvantaged groups in Turkey. However, in order to maintain the current situation in the agricultural sector and improve competitiveness, it is very important to control the rapid dissolution and to increase the on-site employment measures in rural areas and to train the young population in the agricultural sector.

28) http://www.tuik.gov.tr/Start.do, Access Date: 01.09.2019
29) http://www.tuik.gov.tr/Start.do, Access Date: 01.09.2019

3.3. STUDIES ON FOOD SAFETY

Turkey is responsible for ensuring adequate and reliable food to be consumed as well as providing food safety for the public. Turkey adopts the approach of from farm to fork in each food consumed. Ministry of Agriculture and Forestry Directorate General of Food and Control (DGFC) and related institutes, Provincial Directorates of Agriculture and Forestry and Directorate General of Public Health (DGPH), which carries out its activities under the Ministry of Health, are authorized to ensure that the public consumes healthy food and to preserve its health.

Concerning of legislative framework on food safety the main regulations are as below;

With the Law on "Veterinary Services, Plant Health, Food and Feed Law" which is numbered 5996 and came into force in 2010, it is aimed at ensuring and protecting public health, plant and animal health, animal breeding and welfare, consumer interests, by taking into consideration of environmental protection. The law covers all stages of the production, processing and distribution of food contact materials and feeds, controls of plant protection product and veterinary medicinal product residues and other residues and contaminants, combat against epidemic or infectious animal diseases and harmful organisms in plant and plant products, the welfare of farm animals, experimental animals, zootechnical issues, veterinary health and plant protection products, veterinary and phytosanitary services, procedures of entry and exit of livestock and products from Turkey, and covers official controls and sanctions on this issues as well.

The Regulation on Special Hygiene Rules Regarding School Canteens determines the rules regarding the special hygiene conditions, food safety and official control of food establishments such as cafeterias, canteens, buffets and tea cafes operating within the education and training institutions affiliated to the Ministry of National Education (MoNE). The Communiqué on the Procedures and Principles of School Food Logo Application, which operates within official and private schools/institutions affiliated to the MoNE; determines the issues related to the use of the School Food Logo in prepackaged foods to be sold in food establishments such as canteen, cafeteria, buffet, tea cafes

Also, Turkish Food Codex Regulation regulates minimum technical and hygiene criteria for food and food contact materials, pesticide residues and veterinary drug residues, food additives, flavoring donors and flavoring-giving food components, contaminants, packaging, labeling and sampling,

and regulates the rules for the determination of special provisions relating to analysis methods, the horizontal and vertical food codex of transport and storage, and the geographical mark[30].

Biosecurity Law No.5977, within the framework of scientific and technological developments, establishes the principles and procedures for the supervision, regulation and monitoring of those issues; prevention of risks that may arise from genetically modified organisms (GMOs) and products by using modern biotechnology and implementation of biosecurity systems in order to protect human, animal and plant health, environment and biodiversity and assurance of sustainability[31].

MoAF established the 174 ALO Food Line to ensure reliable food consumption. MoAF carries out inspections for food establishments for reliable food upon the complaint of consumers through 174 ALO Food Line. As of 2019, over 1 million food inspections have been carried out by the MoAF in 81 provinces[32].

Salt consumption per person in Turkey is approximately three times the value recommended by the World Health Organization (WHO). There are studies conducted by the MoAF on reducing the salt content of processed foods. In this context, level of salt was reduced in some foodstuffs[33].

Official inspectors of MoAF inspect the sales and production sites of supplementary foods and the actual import stage of these products on the basis of risk within the framework of the legislation in force and take samples from the products when necessary. In case the products are found to be problematic during the audits and controls, legal procedures such as administrative fines, criminal complaint to the Chief Public Prosecutor's Office and the collection of products from the market are applied.

Nowadays, imitation and adulteration in foods have increased with the development of technology considerably for economic reasons and unfair gain. On the other hand, companies that make production with the registration and approval of the MoAF are obliged to comply with certain rules. Otherwise, both the penalties and their names and products disclosed in the press and the companies suffer significant economic and reputational losses[34].

30) https://www.tarimorman.gov.tr/GKGM, Date Access:02.09.2019
31) https://www.mevzuat.gov.tr, Date Access: 11.09.2019
32) https://www.tarimorman.gov.tr/GKGM, Date Access: 30.10.2019
33) https://www.tarimorman.gov.tr/GKGM, Date Access: 30.10.2019
34) https://www.tarimorman.gov.tr/GKGM, Date Access: 30.10.2019

FOOD LOSSES AND WASTE

Conducting studies on food security is an important condition for healthy nutrition and reducing food losses and waste, while contributing to food safety also. As a matter of fact, with the Bread Waste Prevention Campaign initiated on 17 January 2013 under the leadership of President H. E. Recep Tayyip ERDOGAN, creating social sensitivity on waste, preventing waste in production and consumption stages, ensuring the preservation of bread with appropriate methods, and increasing the consumption of whole wheat bread. Within the scope of the campaign, logos, posters and billboards were prepared, bread waste research books and Stale Bread Recipes Book were published; and campaign presentations, spots and films were presented on visual and audio media. [35]http://www.ekmekisrafetme.com website was created to announce the campaign activities. More than 1,600 local, regional and national print media have reported over 11,000 news on the campaign. The campaign was supported by all segments of the country and nearly 1,000 events were held with the participation of 824 institutions and organizations. Accordingly,

- Thanks to the awareness created by the campaign, people started to consume bread more carefully through purchasing the amount they need, and spending for consumption decreased from 26 billion TRY to 23.5 billion TRY in one year, saving 2.5 billion TRY in total.
- With the prevention of bread waste, the financial dimension of the waste, which was 1.6 billion TRY, decreased to 1.3 billion TRY, and 300 million TRY worth of bread was saved from being thrown away.
- The Bread Waste Prevention Campaign was shown as a Case Study by FAO in 2014, which contributes to the work on waste in the World.
- Presentations about the Campaign were made at the meetings of various international platforms such as FAO and G20 in Budapest, Rome and Bucharest.
- The campaign was included in the 2014-2023 OECD / FAO Agricultural Outlook Report published annually by OECD.

Some initiatives under the leadership of Turkey concerning food safety are available, such as:

- Introducing the Technical Platform for the Measurement of Food Losses and Waste under Turkey's G20 Presidency and then launching it in Rome,
- Turkey has pioneered the establishment of the Center of Sustainable Food Systems Regional Cooperation in Turkey during its presidency for Black Sea Economic Cooperation (BSEC).
- Establishment of the Economic Cooperation Organization Food Safety Regional Cooperation Center in Ankara in cooperation with FAO with the economic contributions provided by Turkey

35) https://Ekmekisrafetme.com, Date Access: 30.10.2019

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4.1. PLANT PRODUCTION

Turkey has a big potential for plant production with its geographical, climate and soil conditions and plentiful production diversity, arable lands and micro-climate territories, which is appropriate for various crop production. Turkey is one of the most important and largest producer in the world for certain products and it is 7th largest agricultural producer in the world and 1st in Europe.

According to FAO data (2017), Turkey ranks the 1st in the world production of hazelnuts, cherries, figs and apricots and ranks second in quince, poppy seeds, melon and watermelon and ranks 3rd in lentils, pistachios, chestnuts, sour cherries and cucumbers and ranks fourth in walnuts, olives, apples, tomatoes, eggplant, spinach and pepper.

Turkey is a leader in apricot production in the world, which ranges from 750 thousand to 985 thousand tons. In Turkey, an annual average of 500 thousand to 750 thousand tons hazelnut is produced.

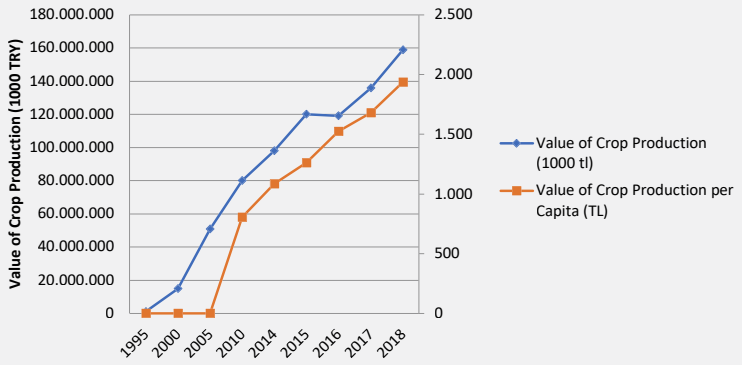
Turkey is the world's leading hazelnut producer accounting 67% of the total world supply. Turkey produced 27 % of world fig supply last year, which corresponds to 306 thousand tons, 26 %of the world cherry supply, which corresponds to 627 thousand tons.

In Turkey fruit, vegetable, crops productions have increased from 13.3 million tons, 25.8 million tons and 58 million tons to 22.3 million tons, 30 million tons and 64.4 million tons, respectively in the last 16 years. In addition to that, a total plant production of Turkey has increased from 98 million tons to 117 million tons.

Turkey is amongst major cereal producer countries with its more than 35 million tons supply. Turkey has quite favorable agricultural lands for olive farming thanks to its geographical position and land structure. Turkey is amongst the world top five producers of olives and olive oil. In Turkey, production under the roof of Good Agricultural Practices (GAP) had increased in the last decade.

Table 6. Value of Crop Production

Years	Value Of Crop Production (1.000 TRY)	Value Of Crop Production Per Capita (TRY)
1995	1.084.215	
2000	14.920.080	
2005	50.939.687	
2010	80.038.126	805
2014	98.123.089	1.086
2015	120.152.079	1.263
2016	119.237.661	1.526
2017	135.885.136	1.682
2018	158.870.800	1.937



On the other hand, according to TurkStat data, value of crop production of Turkey is more than that of animal and livestock production of Turkey.

In terms of crop production on the base of selected indicators, main facts are as follows;

- In terms of holding size, 80.7% of agricultural holdings have an operating size of less than 10 ha, while 25.9% of agricultural holdings have a size of 2-2.9 ha. 24.5% of agricultural holdings have a size of 20-49.9 ha.
- While cereals and other crop products are sown by 69.3% of agricultural enterprises, other permanent crops including fruit and nursery and undergrowth crops, and beverage and spice plants are grown by 11.9% of them.
- Approximately one third of agricultural land is irrigated which is 31.4%.
- The average size of cultivated area is 1.29 ha.
- 17.1% of agricultural holdings cultivates both their own land and the land of others.
- The general outlook of crop production in Turkey is summarized in the table by selected indicators.

Table 7. General Outlook of Major Indicators

Indicators	Year/Source	Value
Value of Agricultural Production: Value of Crop Production (1000 TRY)	2018/ TurkStat	158,870,800
Value of Agricultural Production: Value of Livestock (1000 TRY)*	2018/ TurkStat	146,184,051
Value of Agricultural Production: Value of Animal Production (1000 TRY)*	2018/ TurkStat	79,150,212
Value of Agricultural Production: Value of Crop Production per People (TRY)	2018/ TurkStat	1,937
Value of Agricultural Production: Value of Livestock per Capita (TRY)*	2018/ TurkStat	1,783
Value of Agricultural Production: Value of Animal Production of Per Capita (TRY)*	2018/ TurkStat	965
Harvested Area of Cereals and Other Crops (ha)	2018/ TurkStat	15,798,163
Production Amount of Cereals and Other Crops (ton)	2018/ TurkStat	116,517,269
Vegetable and fruit production for land under protective cover (tons)	2018/ TurkStat	8,071,026

04. AGRICULTURAL ACTIVITIES

Organic crop production (including transition period) Production (tons)	2018/ TurkStat	2,371,612
Total Cultivated Agricultural Area and Permanent Crops Area (ha)	2018/ TurkStat	23,199,946
Total Cultivated Agricultural Area (ha)	2018/ TurkStat	19,737,559
Cultivated Agricultural Area / Sown area (ha)	2018/ TurkStat	15,435,979
Cultivated Agricultural Area / Fallow land (ha)	2018/ TurkStat	3,512,773
Cultivated Agricultural Area / Area of Vegetable Garden (ha)	2018/ TurkStat	783,632
Total Permanent Crops (ha)	2018/ TurkStat	3,462,387
Permanent Crops / Area of fruits, beverage and spice crops (ha)	2018/ TurkStat	2,180,918
Permanent Crops / Vineyard (ha)	2018/ TurkStat	417,041
Permanent Crops / Olive Grove (ha)	2018/ TurkStat	864,428
Land Use: Forage Plants (ha)	2018/ TurkStat	1,999,260
Land Use: Ornamental Plants (ha)	2018/ TurkStat	5,174
Seedling Production (Total, ton)	2018/ MoAF	1,059,316
Certified Strawberry Seedling Production (Number)	2018/ MoAF	82,096,000
Certified Fruit Sapling (Number)	2018/ MoAF	104,308,000
Certified Vine Sapling (Number)	2018/ MoAF	2,276,000
Plant Protection Production Consumption, ton	2018/ TurkStat - MoAF	60,020
Total Plant Nutrition Consumption, ton	2018/ MoAF	2,164,158

* It is provided for comparing

In the period of 1995-2018, total crop production increased by 213%. In the same period, the highest increase was seen in straw and fodder production with 905.65%, Followed by sugar beet with 69.20% And oilseeds with 67.64% (Turkstat). Regarding these increases, main factors are increase in productivity and certified seedling use, positive improvement in technology level, agricultural supports, raising of awareness of producers on agricultural techniques to a certain extent.

Trainings for technical staff and farmer are carried out in order to raise awareness on the prevention of diseases and pests, control and prevention of unnecessary and unconsciously pesticides use and prevention of residues, protection of natural balance as well as sustainable agriculture in crop production. In this context, trainings for technical personnel, are carried out in a theoretical and practical way including organization planning with 11 training institutions (which covers research institute directorates and directorate general) and 71 programs. In the figure below, the production amounts of cereals and other crops for 1995-2018 period and the rate of change in the harvested areas (%) are presented.

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	Total	Tobacco Plant (Raw)	Seeds of plants such as perfumery and pharmaceuticals, and seeds of sugar beet and fodder crops	Potatoes, legumes, edible roots and tubers	Straw and forage (fodder crops)	Plant used in sugar production (sugar beet)	Cereals	Raw plants used in textile	Oilseeds
Production (1995-2018) (%)	213.28	-60.77	-42.64	-10.30	905.65	69.20	22.09	14.37	67.64
Harvested Area (1995-2018) (%)	-11.87	-52.59	-75.27	-47.84	557.45	9.52	-19.04	-33.92	28.86

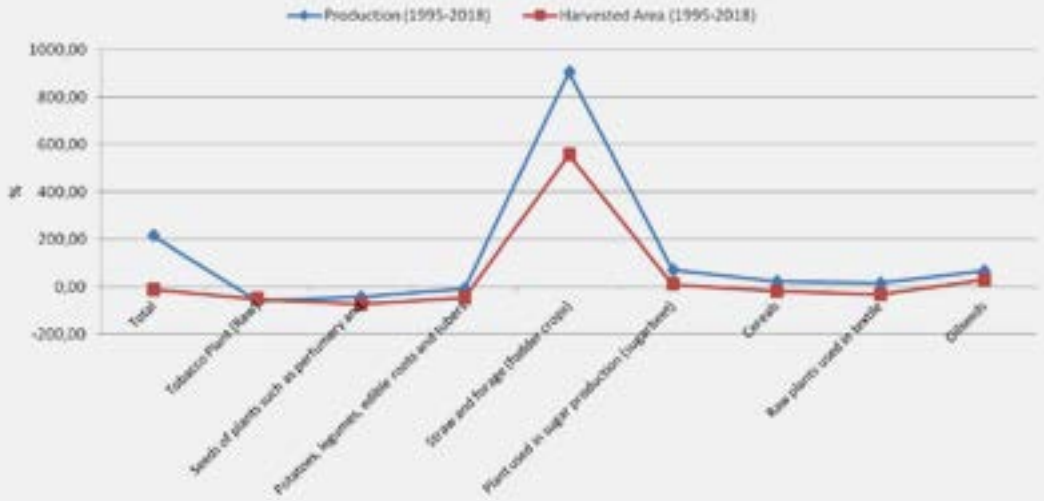

Figure 6. Rate Of Change For Cereals and Other Crops in 1995-2018 (%)

According to the balance table of cereals and other crop products published by TurkStat, when the change rates are analyzed based on selected indicators for 2007/08 - 2017/18 period, production amount increased by 23.15% and feed use rate increased by 61.22%. Accordingly, harvest losses, losses and degree of self-sufficiency increased by 19.73%, 24.02% and 3.48%, respectively.

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Table 8. Crops Products Balance Sheets on the Base of Selected Indicators: Cereals and Other Crop Products

Marketing Year	Production (tons)	Area Sown (ha)	Harvest Losses (ton)	Human Consumption (tons)	Seed Use (ton)	Animal Feed (ton)	Losses (tons)	Human consumption per capita (kg)	Degree of self-sufficiency (%)
2017/'18	35 232 767	10 998 473	1 794 264	15 561 538	1 922 389	15 408 473	966 100	192.6	98.0
2016/'17	34 361 164	11 349 212	1 734 879	16 309 043	1 986 290	14 069 985	943 878	204	97.2
2015/'16	37 717 138	11 597 367	1 923 484	15 720 861	2 030 324	13 434 564	1 032 335	199.7	110.2
2014/'15	31 884 157	11 615 643	1 609 067	17 163 839	2 038 840	14 526 528	875 524	220.9	86.4
2013/'14	36 589 268	11 429 730	1 872 603	17 736 739	2 003 909	13 943 050	1 000 519	231.3	98.8
2012/'13	32 497 430	11 173 576	1 677 869	18 716 467	1 964 355	11 132 043	888 098	247.5	93.1
2011/'12	34 302 073	11 804 035	1 789 392	18 562 904	2 085 656	10 564 114	936 022	248.4	99.9
2010/'11	31 912 550	12 001 271	1 654 499	17 249 262	2 123 655	10 046 983	873 667	234.0	98.8
2009/'10	32 827 151	11 970 954	1 706 558	15 871 417	2 117 645	9 132 343	899 308	218.7	109.7
2008/'09	28 533 956	11 890 474	1 468 181	16 684 315	2 101 598	9 252 089	784 135	233.3	92.7
2007/'08	28 608 990	12 309 139	1 498 625	15 733 917	2 199 387	9 557 377	778 985	222.9	94.7
Rate of Change for 2007/08 -2017/18 (%)	23,15	-10,65	19,73	-1,10	-12,59	61,22	24,02	-13.59	3.48

Source: TurkStat

When Turkey's crop products balance sheet for vegetable is examined based on selected indicators, the degree of self-sufficiency (%) in total vegetable production is above 100% for all market years and 106.6% for 2017/18 market year. In the periods of 2007/08 - 2017/18, total vegetable production, harvest losses in parallel to increase in production, human consumption and human consumption per capita increased by 20.34%, 20.60%, 17.42% and 2.57% respectively; while losses decreased by 83.17% and the degree of self-sufficiency (%) remained same. In the table, Turkey's total vegetable production data is presented by years.

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Table 9. Crops Products Balance Sheets on the Base of Selected Indicators: Total Vegetable Production Data

Marketing Year	Production (tons)	Harvest Losses (tons)	Human Consumption (tons)	Losses (tons)	Human Consumption per Capita (kg)	Degree of Self-Sufficiency (%)
2017/'18	28 572 251	808 073	22 875 669	3 164 258	283.1	106.6
2016/'17	28 037 155	797 354	22 426 889	3 103 332	281.0	106.7
2015/'16	27 578 234	790 521	22 016 579	3 061 444	279.6	106.8
2014/'15	26 606 476	758 884	21 796 547	2 425 190	280.5	106.7
2013/'14	26 456 335	756 731	21 591 923	2 401 226	281.6	107.1
2012/'13	26 004 917	740 843	21 334 532	2 373 927	282.1	106.6
2011/'12	25 326 886	720 826	20 860 703	2 318 130	279.2	106.2
2010/'11	24 020 259	678 542	19 677 996	2 187 057	266.9	106.8
2009/'10	24 847 679	707 312	20 126 303	2 236 995	277.4	107.9
2008/'09	25 130 131	717 588	20 551 740	2 283 527	287.4	106.9
2007/'08	23 742 082	670 062	19 482 736	2 164 748	276.0	106.6
Rate of Change from 2007/08 to 2017/18 (%)	20,34	20,60	17,42	-83,17	2.57	0.00

Source: TurkStat

*Onion and dried garlic are not included in the table

Table 10. Crops Products Balance Sheets on the Base of Selected Indicators: Fruits

Products	Marketing Year	Production (ton)	Harvest Losses (ton)	Human Consumption (ton)	Losses (ton)	Human Consumption per Capita (kg)	Degree of Self-Sufficiency (%)
Nuts (Total)	2017/'18	1 115 904	18 585	631 450	17 342	7.8	169.1
	2016/'17	934 750	18 255	641 844	18 858	8.0	138.7
	2015/'16	1 123 750	19 367	598 150	17 418	7.6	179.4
	2014/'15	847 799	15 661	469 323	13 215	6.0	172.5
	2013/'14	992 609	17 460	517 772	14 549	6.8	183.2
	2012/'13	1 151 354	19 600	569 536	16 690	7.5	193.1
	2011/'12	855 348	16 062	534 624	15 458	7.2	152.6
	2010/'11	1 020 711	17 541	490 789	14 224	6.7	198.6
	2009/'10	875 634	15 612	455 132	12 876	6.3	183.8
	2008/'09	1 199 970	18 696	470 878	13 863	6.6	243.7
	Rate of Change for 2008/09-2017/18 (%)	-7,01	-0,59	86,53	25,10	18.18	-30.61
Citrus fruits (Total)	2017/'18	4 769 726	110 143	2 318 613	183 621	28.7	195.0
	2016/'17	4 293 007	101 386	2 315 981	185 223	29.0	175.7
	2015/'16	3 975 873	96 432	2 304 380	184 987	29.3	163.6
	2014/'15	3 783 517	93 011	2 237 677	179 717	28.8	160.4
	2013/'14	3 681 158	91 927	2 180 394	175 297	28.4	160.2
	2012/'13	3 475 024	86 532	2 296 094	186 008	30.4	143.5
	2011/'12	3 613 766	90 179	2 072 711	165 591	27.7	165.5
	2010/'11	3 572 376	89 158	2 106 038	168 364	28.6	161.0
	2009/'10	3 513 772	87 734	2 152 658	187 843	29.7	146.4
	2008/'09	3 026 936	74 889	1 741 563	152 565	24.4	155.9
	Rate of Change for 2008/09-2017/18 (%)	57.58	47.08	33.13	20.36	17.62	25.08
Other Fruits	2017/'18	328 364	14 910	273 185	23 755	3.4	105.6
	2016/'17	261 134	11 482	221 386	19 251	2.8	103.7
	2015/'16	242 155	10 504	205 018	17 828	2.6	104.0
	2014/'15	227 663	9 863	196 930	17 124	2.5	101.8
	2013/'14	270 582	12 103	231 861	20 162	3.0	102.6
	2012/'13	262 263	11 810	219 610	19 097	2.9	104.9
	2011/'12	236 394	10 628	203 980	17 737	2.7	101.8
	2010/'11	224 866	10 048	192 142	16 708	2.6	102.9
	2009/'10	198 760	8 524	171 121	14 880	2.4	102.3
	2008/'09	189 273	8 280	163 604	14 226	2.3	101.8
	Rate of Change for 2008/09-2017/18 (%)	73.49	80.07	66.98	66.98	47.83	3.73

Source: TurkStat

4.1.1. WHEAT

World wheat production, which was 733 million tons in the 2018/2019 marketing year, is foreseen to increase by 4.2% to 764 million tons in 2019/20 season. This figure is expected to be the record production of the last decade. The reason for the increase in wheat production is consequent on the increase of field area and yield. Concerning the main exporter countries' wheat production data, wheat production is estimated approximately as 73.7 million tons (+ 2.8%) for Russia, 29 million tons (+ 15.7%) for Ukraine, 32.8 million tons (+ 3.2%) for Canada, 150.2 million tons (+ 9.0%) for the EU, 21.2 million tons (+ 22.5%) for Australia, 20.4 million tons (+ 4.6%) for Argentina, 13 million tons (- 6.8%) for Kazakhstan, and 53.9 million tons (+ 5.1%) for the United States of America (USA). World wheat production stocks are presented in the figure below.

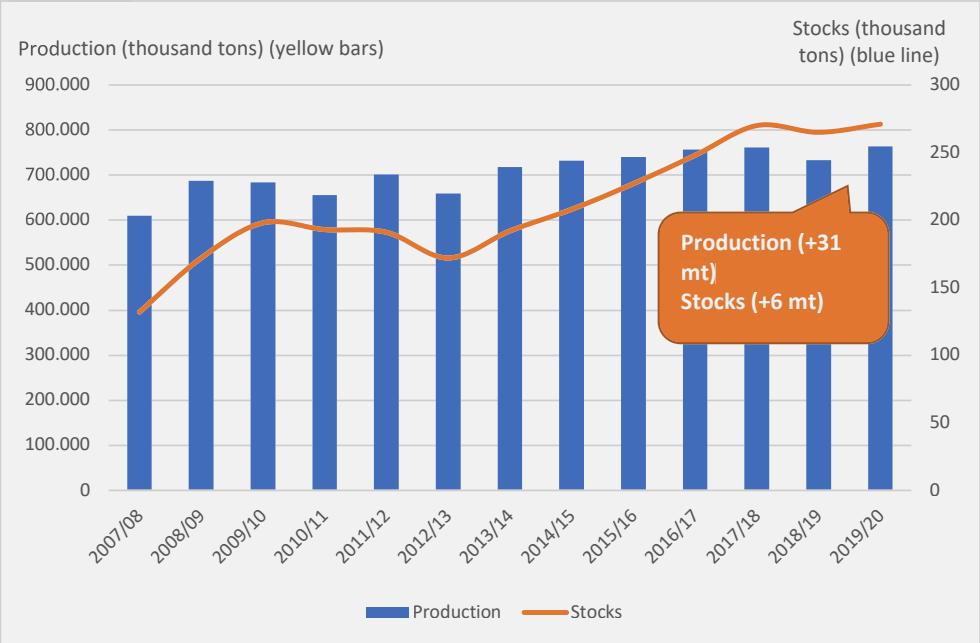


Figure 7. World Wheat Production and Stocks

Source: Turkstat, Ministry of Agriculture and Forestry Head of Strategy Development Agricultural Economic and Policy Development Institute (TEPGE), DGAR

According to TurkStat data, wheat production which is 19.5 million tons in 2002 is increased to 20 million tons in 2018. Even though wheat cultivation area decreases due to the transition to alternative crops, each year, since wheat production amount remained at the same levels owing to yield increase. The wheat yield increased from 2100 kg/ha in 2002 to 2710 kg/ha in 2018. The balance between wheat production and consumption of Turkey is shown in the figure below.

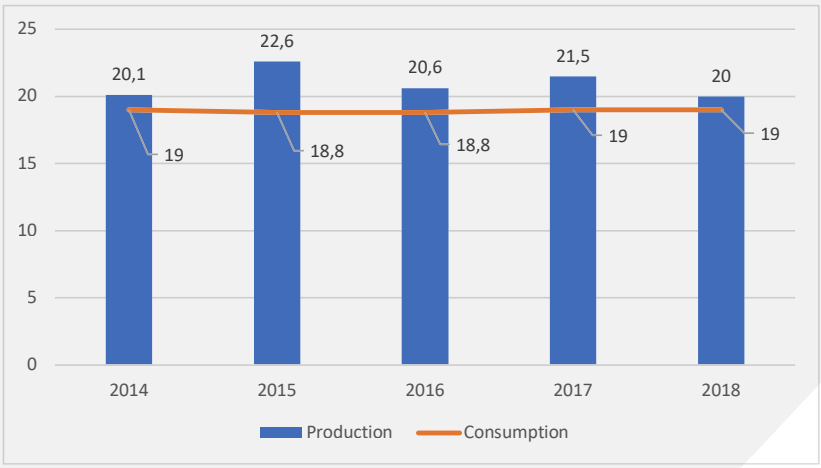


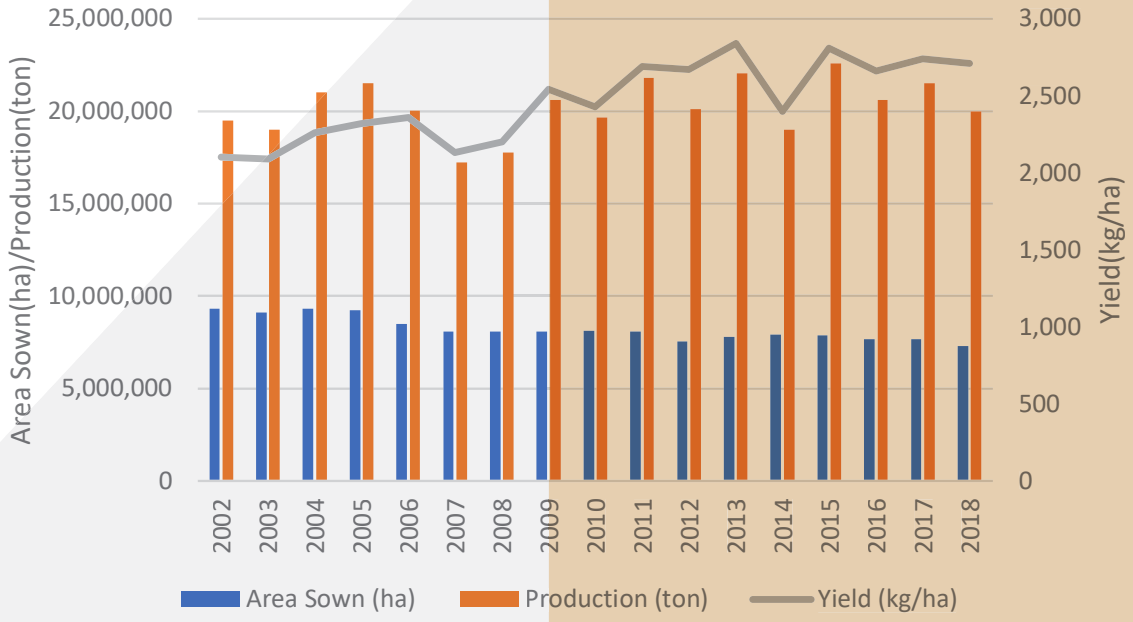
Figure 8. Wheat Balance in Turkey (million tons)

Source: Turkstat, TEPGE, DGAR

Provinces in Turkey with major wheat production are Konya (8.3%), Ankara (%6), Diyarbakır (4.4%), Adana (%4.1), Tekirdağ (%3.9) and Sivas (3.7%), respectively. According to TurkStat data, in 2017/18 marketing year, degree of self-sufficiency of wheat for Turkey is 111.7%. In the table, area sown, production and yield data are given by years.

Table 11. Area Sown, Production and Yield Data for Wheat from 2002 to 2018

Years	Area sown (ha)	Production (million tons)	Yield (kg/ha)
2002	9,300,000	19.5	2100
2003	9,100,000	19	2090
2011	8,096,000	21.8	2690
2012	7,529,639	20.1	2670
2013	7,772,600	22.1	2840
2014	7,919,208	19	2400
2015	7,866,887	22.6	2810
2016	7,671,945	20.6	2660
2017	7,668,879	21.5	2740
2018	7,228,622	20	2710
Rate of Change for 2002-2018 %	-22	3	29



Source: TurkStat, TEPGE, DGAR

4.1.2. BARLEY

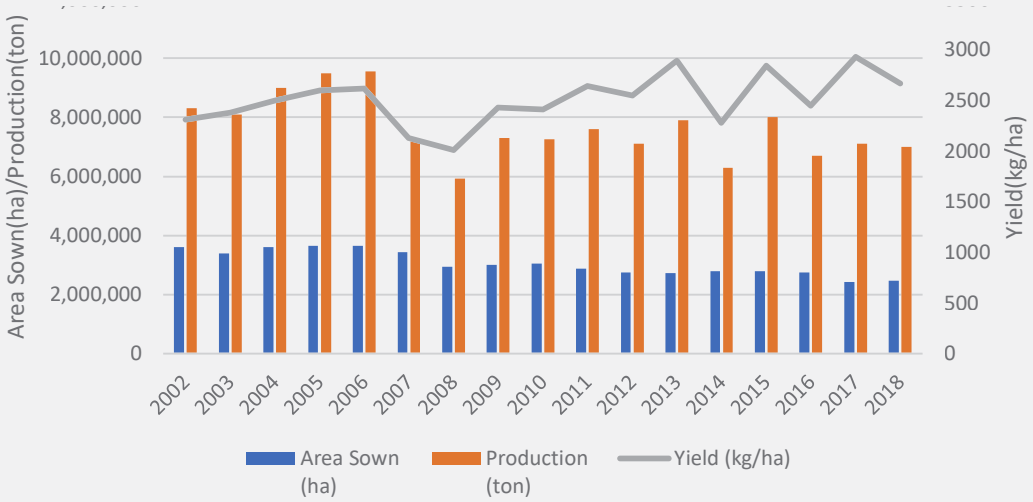
In 2019-2020 market year, world barley production is foreseen to reach 151 million tons with an increase of 8% compared to last year

According to TurkStat, 7 million tons of barley is produced in Turkey in 2018 Turkey's barley yield in 2018 is 2670 kg/ha and most common barley producer provinces of Turkey are Konya, Ankara, Şanlıurfa, Afyonkarahisar, Kayseri, and Eskişehir.

The degree of self-sufficiency is 90.2% (TurkStat, 2017/2018) and the table includes barley cultivation area, production and yield by year.

Table 12. Area Sown, Production and Yield Data for Barley from 2002 to 2018

Years	Area Sown(ha)	Production (ton)	Yield (kg/ha)
2002	3,600,000	8,300,000	2310
2003	3,400,000	8,100,000	2380
2012	2,748,766	7,100,000	2550
2013	2,720,510	7,900,000	2890
2014	2,787,297	6,300,000	2280
2015	2,783,583	8,000,000	2840
2016	2,740,052	6,700,000	2450
2017	2,424,737	7,100,000	2930
2018	2,467,668	7,000,000	2670



Source: TurkStat, TEPGE, DGAR

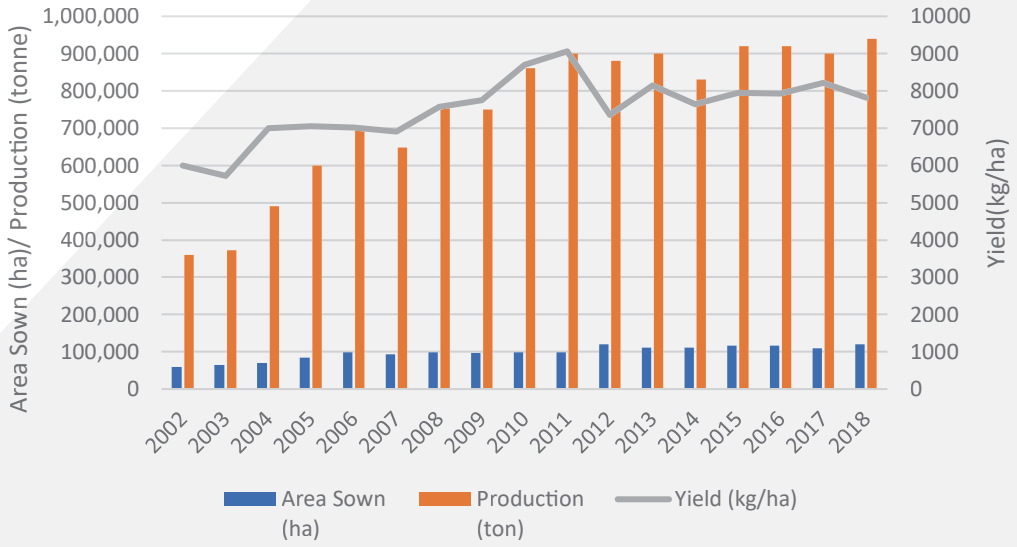
Due to decrease in global demand and higher production forecasts, global barley prices decreases 8-12% compared to last year.

4.1.3. RICE

In the world, 500 million tons of rice was produced in 2018-2019 market year. It is estimated that global rice production will rise to 501 million tons in 2019-2020 market year.
In 2002, 360 thousand tons of rice produced in Turkey, it was 900 thousand tons in 2017 and 940 thousand tons in 2018. According to TurkStat data, paddy yield in 2016 is 7930 kg / ha and 2018 yield is 7820 kg / ha.

Table 13. Area Sown, Production and Yield Data for Paddy from 2002 to 2018

Years	Area Sown (ha)	Production (ton)	Yield (kg/ha)
2002	60,000	360,000	6000
2003	65,000	372,000	5720
2011	99,400	900,000	9060
2012	119,724	880,000	7350
2013	115,192	900,000	8140
2014	118,084	830,000	7640
2015	115,856	920,000	7940
2016	116,056	920,000	7930
2017	109,560	900,000	8220
2018	120,137	940,000	7820
2002/2018 % Change	100	161	30



4.1.4. MAIZE

World maize production in 2019-2020 market year is expected to be 1.1 billion tons with a decrease of 30 million tons compared to the previous season due to the decrease in production in the USA. The most important maize producers in the world are USA, China, Brazil, EU, Argentina, Ukraine and India.

According to TurkStat (2017), Adana, Konya, Mardin and Şanlıurfa are the provinces where production is most common in Turkey. The degree of self-sufficiency in maize is 73.3% (TurkStat, 2017/2018). The table shows the maize cultivation area, production and yield areas by years.

Table 14. Area Sown, Production and Yield Data for Maize from 2002 to 2018

Years	Area Sown (ha)	Production (tons)	Yield (kg/ha)
2002	500,000	2,100,000	4200
2003	560,000	2,800,000	5000
2012	622,609	4,600,000	7390
2013	659,998	5,900,000	8950
2014	658,645	5,950,000	9070
2015	688,170	6,400,000	9330
2016	680,019	6,400,000	9420
2017	639,084	5,900,000	9250
2018	591,543	5,700,000	9640
2002/2018 % Change	18	171	128

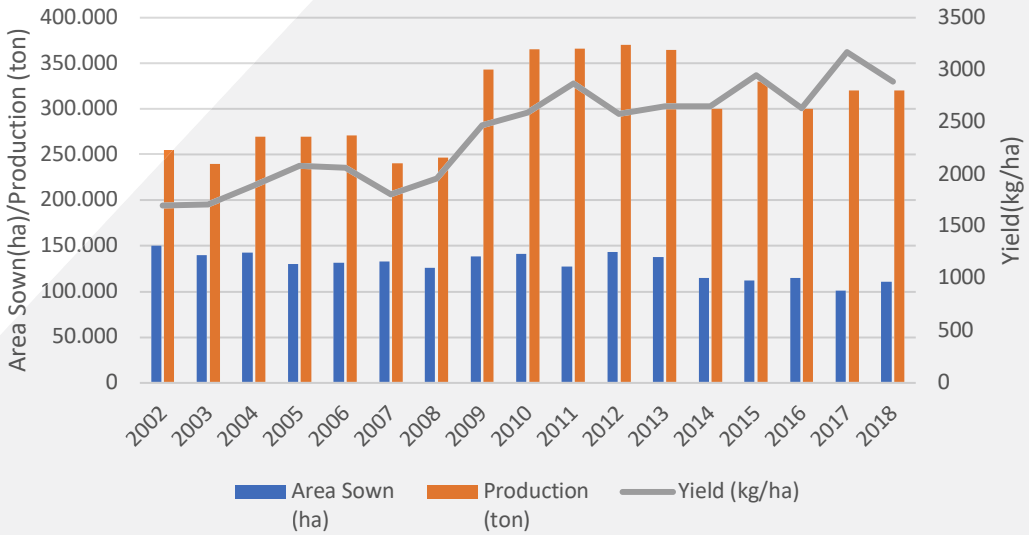
4.1.5. RYE

World rye production, which was 11 million tons in 2018-2019 market year, is expected to increase to 12.9 million tons in 2019-2020 market year. According to the International Grains Council (IGC) data, major rye producing countries in the world are Germany (3.5 million tons), Poland (2.6 million tons) and Russia (1.6 million tons).

According to TurkStat data, rye production in Turkey was 255 thousand tons in 2002 and 320 thousand tons in 2018. Also, Turkey's rye yield is 2630 kg / ha in 2016 and 2890 kg/ha in 2018. In the table below, rye cultivation area, production and yield areas are given by years.

Table 15. Area Sown, Production and Yield Data for Rye from 2002 to 2018

Years	Area Sown (ha)	Production (ton)	Yield (kg/ha)
2002	150,000	255,000	1700
2003	140,000	240,000	1710
2011	127,653	365,750	2870
2012	143,221	370,000	2580
2013	138,166	365,000	2650
2014	115,080	300,000	2650
2015	112,313	330,000	2950
2016	114,649	300,000	2630
2017	101,092	320,000	3170
2018	110,902	320,000	2890
2002/2018 % Change	**-26**	**25**	**70**



Source: TurkStat, TEPGE, DGAR

The provinces where production is most common in Turkey are Niğde, Kayseri, Nevşehir, Balıkesir and Konya. The self-sufficiency degree in rye is 100 % (TurkStat, 2017/2018). In rye, our domestic production and consumption are balanced. Rye production is preferred in marginal areas where other agricultural products cannot be grown.

4.1.6. OAT

According to TurkStat data, oat production in Turkey is 260 thousand tons in 2018 and the oat yield is 2460 kg/ha. The provinces where production is most common in Turkey are Sivas, Çanakkale, Kocaeli and Ankara. In 2017, the degree of self-sufficiency is 99.30%. Sown area, production, yield and price information are presented in the table.

Table 16. Area Sown, Production and Yield Data for Oat from 2002 to 2018

Years	Area Sown (ha)	Production (ton)	Yield (kg/ha)
2002	155,000	290,000	1870
2003	130,000	270,000	2080
2011	85,862	218,040	2870
2012	89,327	210,000	2580
2013	92,549	235,000	2650
2014	93,862	210,000	2650
2015	103,457	250,000	2950
2016	99,438	225,000	2630
2017	112,880	250,000	3170
2018	105,802	260,000	2460
2002/2017 % Change	-32	-10	32

Source: TurkStat, TEPGE, DGAR

4.1.7. TRITICALE

World triticale production, which is estimated as 13.3 million tons in 2018/19 market year, is expected to increase to 14.2 million tons in 2019/20 season. The major countries in triticale production are Poland, Russia, and USA.

According to TurkStat data, 170 thousand tons of triticale were produced in Turkey in 2018. The provinces where production is most common in Turkey are Çorum, Sivas, Kütahya, and Denizli. Sown area, production and yield information of Triticale are presented in the table.

Table 17. Area Sown, Production and Yield Data for Triticale from 2011 to 2017

Years	Area Sown (ha)	Production (Ton)	Yield (kg/ha)
2011	297,829	103,797	3500
2012	322,268	105,000	3260
2013	354,024	118,000	3340
2014	348,947	110,000	3150
2015	372,063	125,000	3360
2016	376,348	125,000	3320
2017	456,414	150,000	3290

Source: TurkStat, TEPGE, DGAR

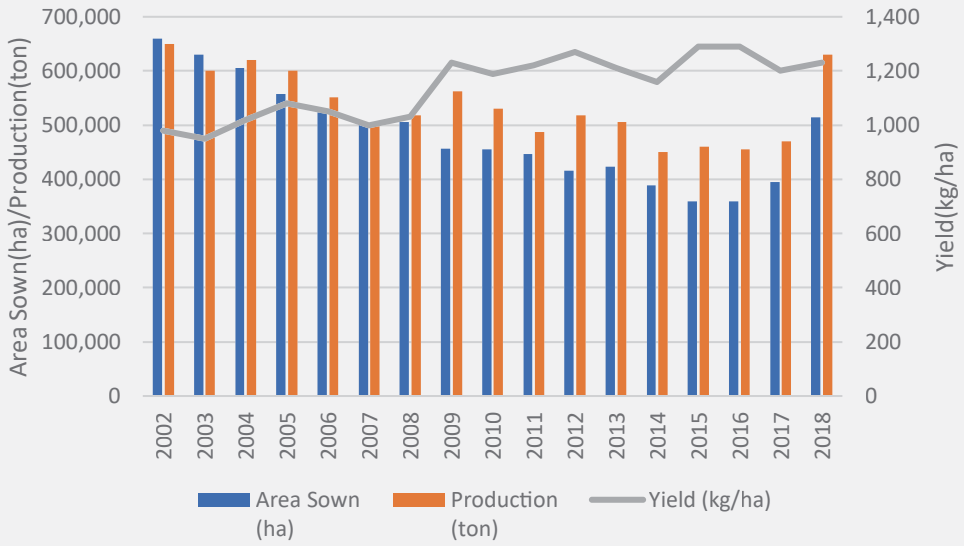
4.1.8. CHICKPEA

In 2019, India has 73% of world chickpea production with 14 million tons and followed by Pakistan, USA, Australia and Turkey. [36]

According to TurkStat, Turkey has 630 thousand tons chickpea production in 2018. Chickpea yield in 2018 is 1230 kg/ha and the chickpea self-sufficiency degree is 87.5%. The provinces where chickpea production is most common in Turkey are Kırşehir, Kırıkkale, Konya, Ankara, Aksaray, Yozgat, Adıyaman and Gaziantep. In Turkey, chickpea sown area, production and yield information are presented in the table.

Table 18. Area Sown, Production, and Yield Data for Chickpea from 2002 to 2018

Years	Area Sown (ha)	Production (ton)	Yield(kg/ha)
2002	660,000	650,000	980
2003	630,000	600,000	950
2012	416,241	518,000	1270
2013	423,557	506,000	1190
2014	388,517	450,000	1160
2015	359,304	460,000	1290
2016	359,529	455,000	1290
2017	395,310	470,000	1200
2018	514,102	630,000	1230
2002-2018 % Change	**-22**	**-3**	**454**



Source: TurkStat, TEPGE, DGAR

36) Canada-Based World Pulses Monitoring Database (http://www.pulsecanada.com/)

4.1.9. LENTIL

In 2019, Canada has 32% of world lentil production with 6.05 million tons and followed by India, the US and Turkey[37].

The amount of red and green lentil production in Turkey in 2002 was 565 thousand tons, and in 2018, it was 353 thousand tons (310 thousand tons of red lentils, 43 thousand tons of green lentils). According to TurkStat data, lentil yield in Turkey is 1380 kg/ha in 2018. The provinces in Turkey where lentil production is most common are Diyarbakır, Şanlıurfa, Mardin, Batman, Siirt, Gaziantep, Adıyaman, Yozgat, Konya, Çorum, Kırşehir and Ankara. The lentil cultivation area, production and yield information of Turkey are presented in the table.

Table 19. Area Sown, Production and Yield Data for Lentil from 2002 to 2018

Years	Area Sown (ha)	Production (ton)	Yield (Kg/ha)
2002	492,000	565,000	1190
2003	442,000	540,000	1280
2012	214,847	405,952	1980
2013	237,478	438,000	1930
2014	249,494	345,000	1440
2015	223,857	360,000	1640
2016	252,236	365,000	1500
2017	292,538	430,000	1490
2018	259,374	353,000	1380
2002-2018 % Change	**-47**	**-38**	**16**

Source: TurkStat, TEPGE, DGAR

37) Canada-Based World Pulses Monitoring Database

4.1.10. HARICOT BEAN

In 2019, Brazil has about 15% of world haricot bean production with 21.6 million tons and followed by Myanmar, USA, Mexico and China. [38]

According to TurkStat, in 2018, 220 thousand tons of haricot bean were produced in Turkey. The provinces in Turkey where the production of haricot beans is most common are Konya, Karaman, Niğde, Nevşehir, Bitlis. Turkey's self-sufficiency degree in haricot bean is 82.7%. Turkey's haricot bean cultivation area, production and yield information are presented in the table.

Table 20. Area Sown, Production and Yield Data for Haricot Bean from 2002 to 2018

Year	Area Sown (ha)	Production (ton)	Yield (kg/ha)
2002	180,000	250,000	1390
2003	162,000	250,000	1540
2012	94,625	200,673	2120
2013	93,174	200,000	2150
2014	91,110	215,000	2380
2015	93,584	235,000	2510
2016	89,820	235,000	2620
2017	89,722	239,000	2660
2018	84,786	220,000	2590
2002-2018 % Change	**-53**	**-12**	**86**

Source: TurkStat, TEPGE, DGAR

38) Canada-Based World Pulses Monitoring Database.

4.1.11. SUNFLOWER

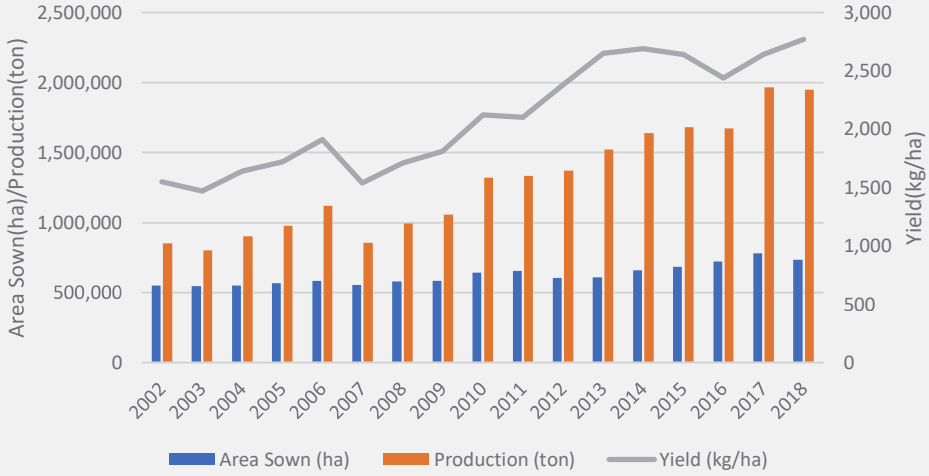
According to FAO (2017)[39] data, world sunflower production is 47.8 million tons and the major countries in sunflower production are Ukraine (12 million tons), Russia (10 million tons), Argentina (3.5 million tons), Romania (3 million tons), China (2.5 million tons), Bulgaria (2 million tons) and Turkey (1.9 million tons). While the average yield of sunflower in the world is 1810 kg/ha, it is 2640 kg /ha in Turkey.

According to TurkStat 2017/2018 data[40], sunflower production in Turkey was 850 thousand tons in 2002 and 1.9 million tons in 2018 (sunflower oil production is 1.8 million tons and snack sunflower seed production is 149 thousand tons). The major sunflower production provinces in Turkey are Tekirdağ, Konya, Edirne, Adana, Kırklareli, Çanakkale. The self-sufficiency degree of sunflower in Turkey is 64.3%. Sunflower area sown, production and yield information in Turkey is presented in the table.

Table 21. Area Sown, Production and Yield Data for Sunflower from 2002 to 2018

Years	Area Sown (ha)	Production (ton)	Yield (kg/ha)
2002	550,000	850,000	1550
2003	545,000	800,000	1470
2004	550,000	800,000	1670
2010	551,400	1,170,000	2120
2011	556,000	1,170,000	2100
2012	504,616	1,200,000	2380
2013	520,260	1,380,000	2650
2014	552,465	1,480,000	2680
2015	568,995	1,500,000	2640
2016	616,780	1,500,000	2430
2017	681,397	1,800,000	2640
2018	734,190	1,949,229	2770
2002/2018 Change %	**33**	**129**	**79**

39)http://www.fao.org/faostat/en/#data/QC
40)http://www.tuik.gov.tr/UstMenu.do?metod=kategorist



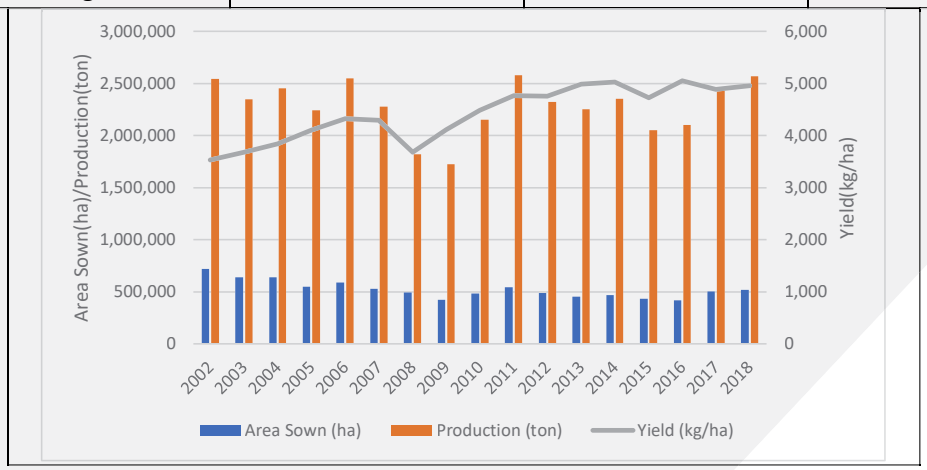
Source: TurkStat, TEPGE, DGAR

4.1.12. COTTON

The world's major cotton producing countries are China, India, USA, Pakistan, Brazil, and Uzbekistan. Turkey ranks 7th in cotton production. According to Turkstat, while raw cotton production in Turkey in the last fifteen years is around 2.5 million tons. In Turkey, cotton yield is 4960 kg/ha, the self-sufficiency degree of cotton fibers is 52% and the self-sufficiency degree of cotton seed is 101%. The major production provinces in Turkey are Şanlıurfa, Aydın, Hatay, Diyarbakır, Adana and İzmir. In Turkey, raw cotton area sown, production and yield information is presented in the table.

Table 22. Area Sown, Production and Yield Data for Cotton from 2002 to 2018

Years	Area Sown (ha)	Production of raw cotton (ton)	Yield of raw cotton (kg/ha)
2002	721,077	2,541,832	3530
2012	488,496	2,320,000	4750
2013	450,890	2,250,000	4990
2014	468,143	2,350,000	5030
2015	434,013	2,050,000	4720
2016	416,010	2,100,000	5050
2017	501,853	2,450,000	4890
2018	518,634	2,570,000	4960
2002/2018 Change %	-28	1	41



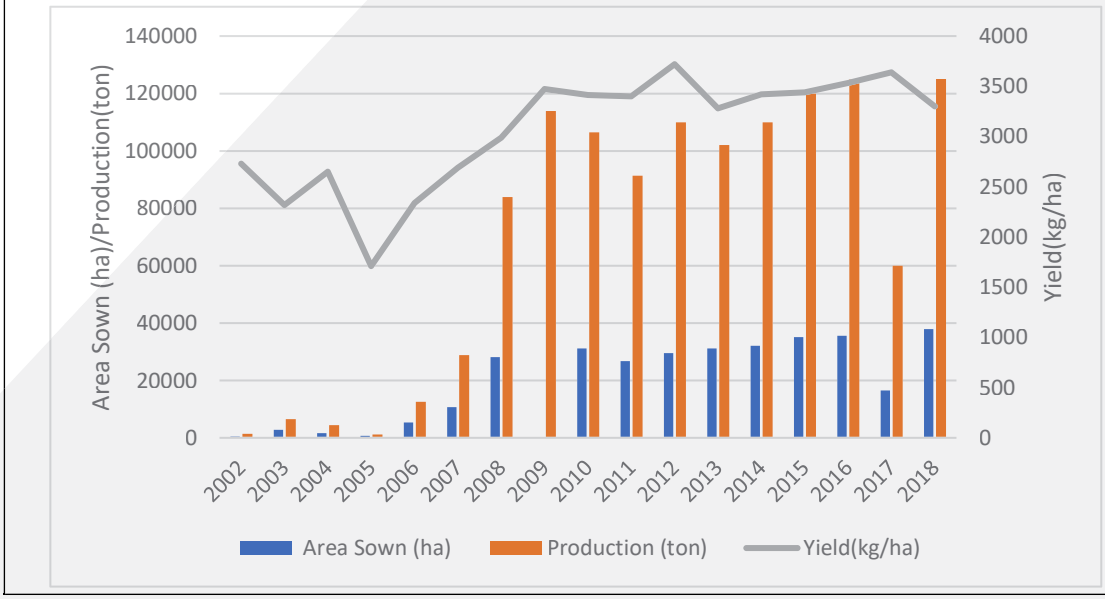
Source: TurkStat, TEPGE, DGAR

4.1.13. RAPESEED

According to FAO 2017 data, world rapeseed production is 76 million tons. The major producer countries are Canada, China, India, France, and Australia. According to TurkStat data, in Turkey, rapeseed production increased to 1,500 tons in 2002 and to 125,000 tons in 2018. In Turkey, rapeseed yield is 3300 kg/ha (TurkStat) in 2018. The major production provinces in Turkey are Tekirdağ, İstanbul, Balıkesir, Edirne, Konya. The self-sufficiency degree of rapeseed in Turkey was 76.7%. In Turkey, rapeseed area sown, production and yield information is presented in the table.

Table 23. Area Sown, Production and Yield Data for Rapeseed from 2002 to 2018

Years	Area Sown (ha)	Production (ton)	Yield (kg/ha)
2002	550	1,500	2730
2003	2,800	6,500	2320
2011	26,829	91,239	3400
2012	29,542	110,000	3720
2013	31,127	102,000	3280
2014	32,133	110,000	3420
2015	35,082	120,000	3440
2016	35,453	125,000	3530
2017	16,520	60,000	3640
2018	37,846	125,000	3300
2002/2018 Change %	6,781	8,233	21



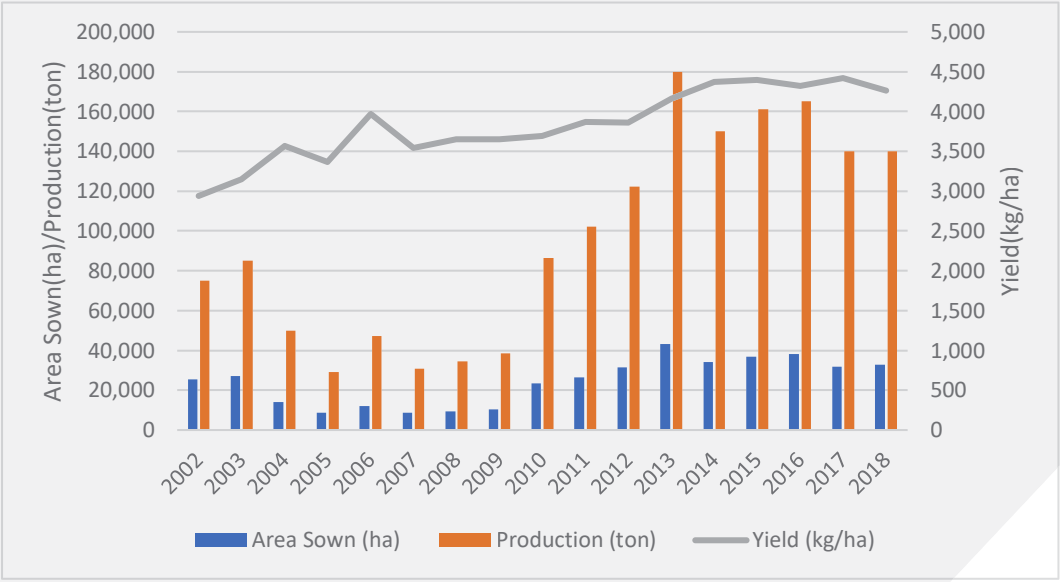
Source: TurkStat, TEPGE, DGAR

4.1.14. SOYBEAN

Soybean production in the world is 353 million tons (FAO 2017). The major soybean producer countries in the world are USA, Brazil, Argentina, China, India, Paraguay, Canada and Ukraine.
According to TurkStat, soybean production in Turkey was 75 thousand tons in 2002 and 140 thousand tons in 2018. The major production provinces in Turkey are Adana, Mersin, Samsun, Osmaniye and Kahramanmaraş. The self-sufficiency degree of soybean in Turkey was 4.8%. The advantage of growing maize, cotton and rice in areas, which is also suitable for soybean production, restricts soybean production. Soybean area sown, production, yield and price information are presented in the table.

Table 24. Area Sown, Production and Yield Data for Soybean from 2002 to 2018

Years	Area Sown (ha)	Production (ton)	Yield (kg/ha)
2002	25,500	75,000	2940
2011	26,421	102,260	3870
2012	31,599	122,114	3860
2013	43,260	180,000	4160
2014	34,318	150,000	4370
2015	36,732	161,000	4400
2016	38,180	165,000	4320
2017	31,670	140,000	4420
2018	32,848	140,000	4260
2002/2018 Change %	29	87	45



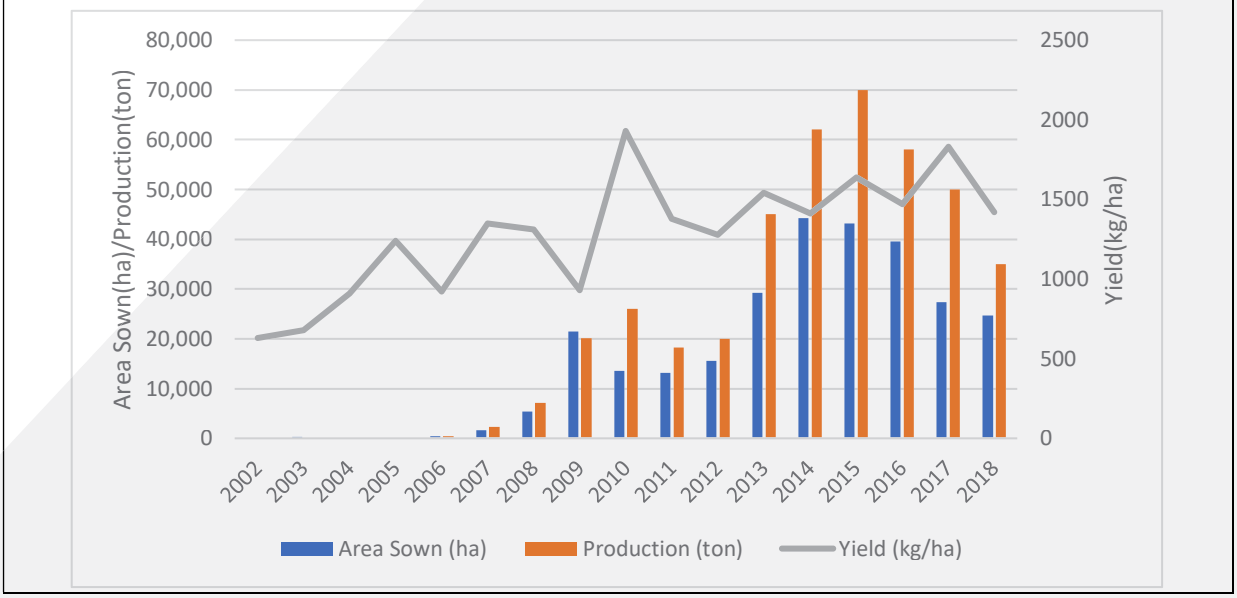
Source: TurkStat, TEPGE, DGAR

4.1.15. SAFFLOWER

According to FAO 2017 data, world safflower production is 991,000 tons. The major producer countries in the world are Kazakhstan, Russia, USA, Mexico, Turkey and India.
According to TurkStat, in 2018, safflower production in Turkey was 35.000 tons. Safflower yield in Turkey was 1420 kg/ha in 2018. Safflower area sown, production and yield information is presented in the table.

Table 25. Area Sown, Production and Yield Data for Safflower from 2002 to 2018

Years	Area Sown (ha)	Production (ton)	Yield (kg/ha)
2002	40	25	630
2003	250	170	680
2011	13,167	18,228	1380
2012	15,592	19,945	1280
2013	29,292	45,000	1540
2014	44,305	62,000	1410
2015	43,107	70,000	1640
2016	39,571	58,000	1470
2017	27,376	50,000	1830
2018	24,693	35,000	1420
2002/2018 Change %	61,633	139,900	125



Source: TurkStat, TEPGE, DGAR

4.1.16. APRICOT

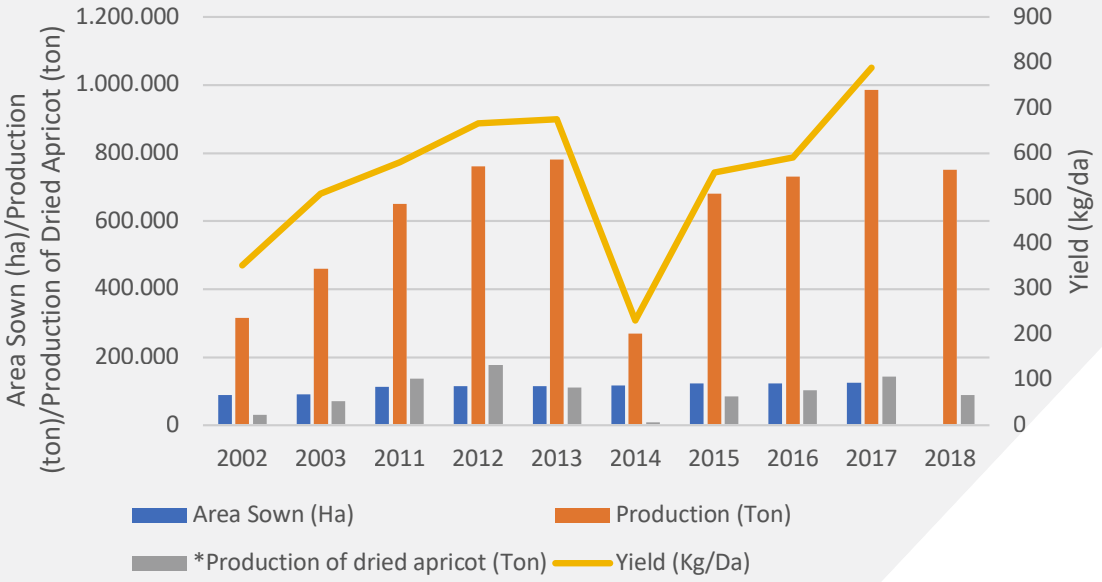
According to FAO 2017 data, world apricot production is 4.3 million tons. The major producing countries are Turkey, Uzbekistan, Italy, Algeria and Iran.

Turkey ranks the 1st in the world apricot production. According to TurkStat data, apricot production in 2018 was 750 thousand tons. In Turkey, the apricot yield was 3520 kg/ha in 2002 and 7880 kg/ha in 2017. The major production provinces in Turkey are Malatya, Mersin, Kahramanmaraş, Iğdır and Elazığ. The self-sufficiency degree of apricot in Turkey is 309% and consumption per capita is 2.7 kg. In Turkey, 40-45% of apricot is consumed as fresh. Dried apricot is mainly exported to USA, France, UK, Australia and Russia.

In Turkey, area sown, production and yield information for apricot is presented in the table.

Table 26. Area Sown, Production and Yield Data for Apricot from 2002 to 2018

Years	Area Sown (ha)	Production (ton)	*Production of dried apricot (ton)	Yield (kg/ha)
2002	89,500	315,000	31,250	3520
2003	90,000	460,000	71,000	5110
2011	112,079	650,000	136,917	5800
2012	114,051	760,000	176,718	6660
2013	115,613	780,000	110,345	6750
2014	116,918	270,000	8,210	2310
2015	122,160	680,000	84,500	5570
2016	123,805	730,000	103,250	5900
2017	125,048	985,000	142,260	7880
2018		750,000	89,318	
2002/2018 % change	**40**	**213**	**243**	**124**



4.1.17. GRAPE

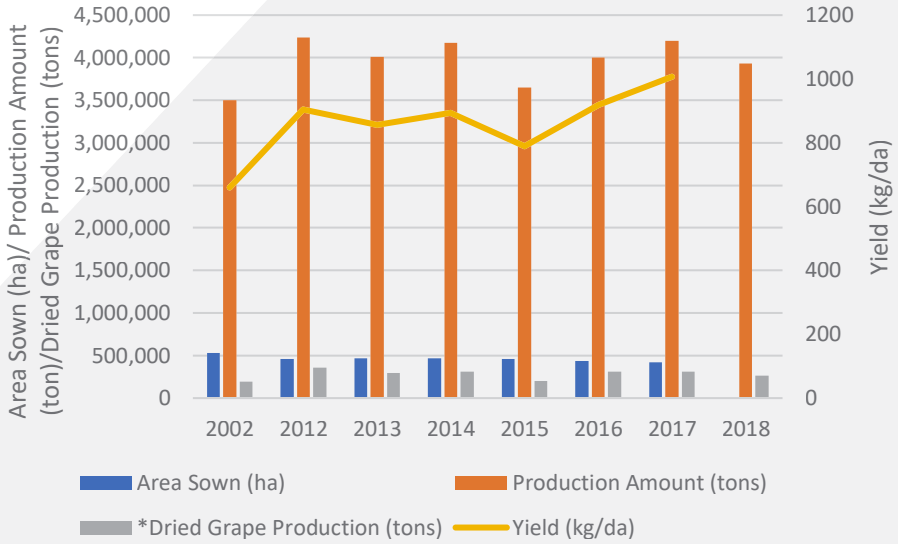
According to FAO (2017) data, world grape production is 74 million tons. The major producing countries are Turkey, China, Italy and USA. Turkey is the 6th largest grape producer with 4.2 million tons. In the 4.2 million tons by 2017;

- 2.1 million tons edible (% 50),
- 1.6 million tons dried (%38),
- 500 thousand tons others (%12).

Turkey grape production yield was 10.070 kg/ha in 2017. Turkey grape area sown, production amount and yield is shown in the table .

Table 27. Area Sown, Production and Yield Data for Grape from 2002 to 2018

Years	Area Sown (ha)	Production Amount (ton)	*Dried Grape Production (ton)	Yield (kg/ha)
2002	530,000	3,500,000	190,000	6600
2012	462,296	4,234,305	359,000	9050
2013	468,792	4,011,409	299,000	8560
2014	467,093	4,175,356	310,000	8940
2015	461,956	3,650,000	200,000	7900
2016	435,226	4,000,000	313,000	9190
2017	416,907	4,200,000	310,000	10,070
2018		3,933,000	262,000	
Change %	**-21**	**20**	**38**	**53**



Source: TurkStat *Harvest fixing commission. 2002-2017 time period.
Seedless dried grape has got excess supply amount.

4.1.18. OLIVE

According to FAO data (2017), world olive production was 20.9 million tons in 2017-2018 season. Major edible olive producer countries are Spain, Egypt, Turkey and Algeria, in which Turkey ranks 3rd with 460thousond tons (IOC 2017). Major olive oil producer countries are Spain, Italy, Greece, Tunisia and Turkey, in which Turkey ranks 5th largest producer with 275 thousand tons olive oil (IOC 2017).

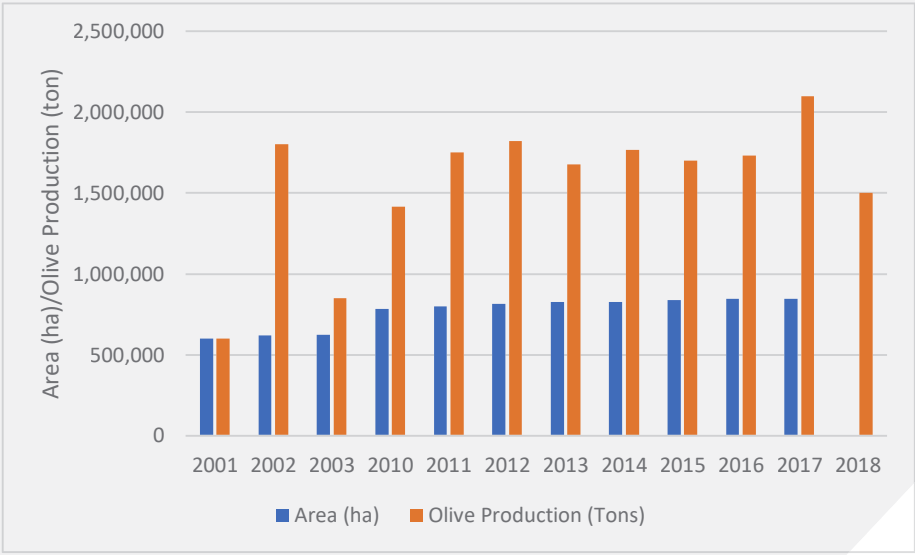
With reference to TurkStat data, Turkey's total olive production was 2,100,000 tons (460 thousand tons for edible, 1,640 thousand tons for oil production) in 2017/18 season. Turkey olive yield was 12 kg per tree and 14 kg per tree, respectively in 2016-2017 and 2017-2018 season.

According to TurkStat data (2017) the provinces which are the most common edible olive producers are Manisa, Bursa, Aydın, Mersin, Balıkesir, İzmir, Muğla, Tekirdağ and Denizli. The provinces, which are the most common olive producers to obtain olive oil, are Aydın, Balıkesir, Muğla, İzmir, Manisa, Hatay and Mersin. The self-sufficiency degree is %115 and %134 in edible olive and olive oil production, respectively[41].

Turkey olive and olive oil data is shown in the table.

Table 28. Area, Production and Yield Data for Olive from 2002 to 2018

PRODUCTION SEASON	Area	Olive Production (ton)			Olive Oil Production
	(ha)	Edible	Oil	Total	(ton)
2002/03	620,000	450,000	1,350,000	1,800,000	140,000
2003/04	625,000	350,000	500,000	850,000	79,000
2014/15	826,092	438,000	1,330,000	1,768,000	190,000
2015/16	836,935	400,000	1,300,000	1,700,000	185,000
2016/17	845,542	430,000	1,300,000	1,730,000	195,000
2017/18	846,062	460,000	1,640,000	2,100,000	275,000
2018/19		426,995	1,073,472	1,500,467	193,000
Change %	**36**	**2**	**21**	**17**	**96**



Source: TurkStat, Directorate General of Plant Production (DGPP). * 2002-2017 period.

41) TurkStat, Ministry of Agriculture and Forestry Directorate General of Plant Production (DGPP) 2016/2017

4.1.19. TEA

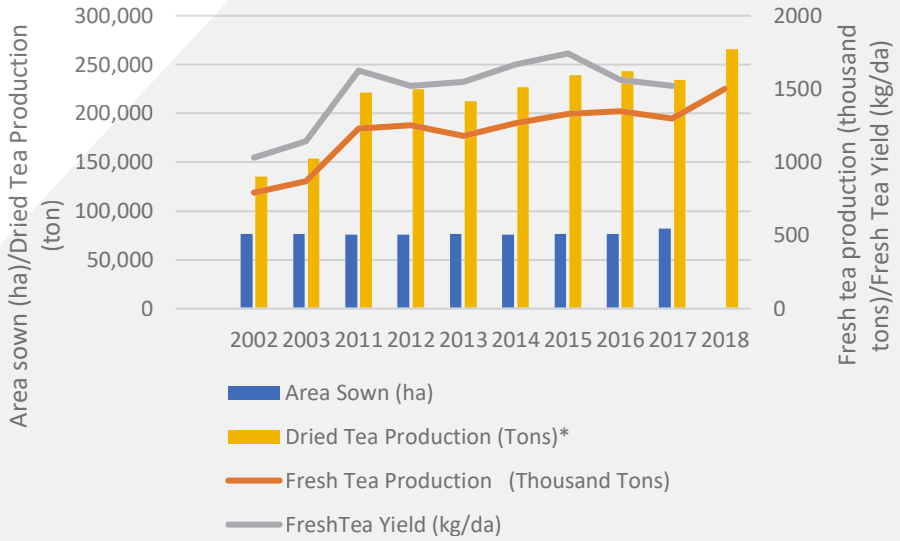
According to FAO (2017) data, world grape production is 74 million tons. The major producing countries are Turkey, China, Italy and USA. Turkey is the 6th largest grape producer with 4.2 million tons. In the 4.2 million tons by 2017;

- 2.1 million tons edible (% 50),
- 1.6 million tons dried (%38)
- 500 thousand tons others (%12)

Turkey grape production yield was 10.070 kg/ha in 2017. Turkey grape area sown, production amount and yield is shown in the table.

Table 29. Area Sown, Production and Yield Data for Tea from 2002 to 2018

Years	Area Sown (Ha)	Fresh Tea Production (Thousand Tons)	Fresh Tea Yield (kg/ha)	Dried Tea Production (Tons)*
2002	76,645	792	10,310	135,000
2003	76,640	869	11,420	153,800
2011	75,890	1,231	16,260	221,600
2012	75,857	1,250	15,190	225,000
2013	76,426	1,180	15,490	212,400
2014	76,049	1,266	16,650	226,800
2015	76,207	1,328	17,420	239,028
2016	76,631	1,350	15,620	243,000
2017	82,108	1,300	15,220	234,000
2018		1,500		266,000**
Change %	**9**	**61**	**48**	**73**



Source: TurkStat (2002-2017 period).* FAO, ** General Directorate of Tea Enterprises (ÇAYKUR) forecast.

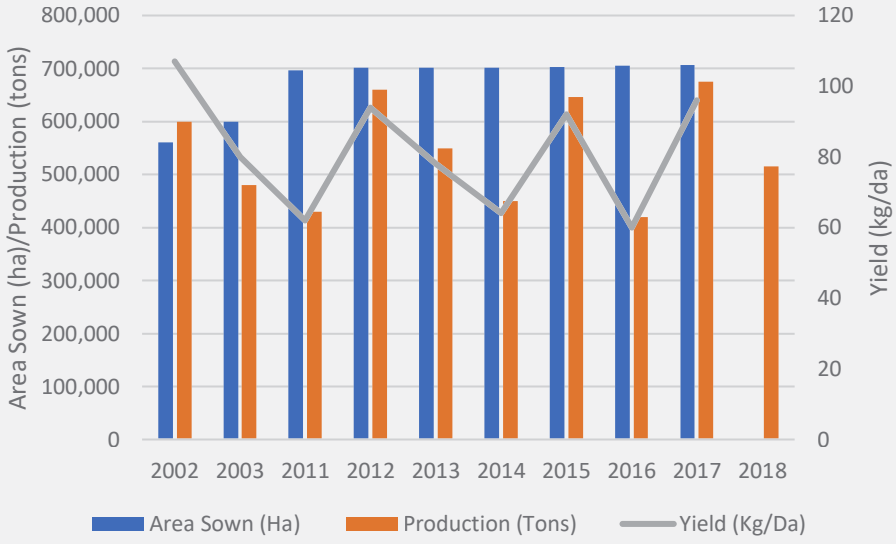
4.1.20. HAZELNUT

According to 2017 FAO data, world hazelnut production is 1 million tons. The major hazelnut producer countries are Turkey, Italy, USA, Azerbaijan, Georgia, Iran, China and Chile. Turkey ranks 1st in hazelnut production and main importer country in the world.

With reference to TurkStat data, hazelnut production in Turkey was around 450 thousand tons and 675 thousand tons during the last five years. According to TurkStat (2017) data, the major hazelnut producer provinces in Turkey are Ordu, Giresun, Samsun, Sakarya, Düzce and Trabzon. The self-sufficiency degree is 413% and consumption amount per person is 12 kg in hazelnut. Turkey hazelnut data is shown in the table.

Table 30. Area Sown, Production and Yield Data for Hazelnut from 2002 to 2018

Years	Area Sown (ha)	Production (ton)	Yield (kg/ha)
2002	560,000	600,000	1070
2003	600,000	480,000	800
2011	696,964	430,000	620
2012	701,407	660,000	940
2013	702,144	549,000	780
2014	701,141	450,000	640
2015	702,628	646,000	920
2016	705,445	420,000	600
2017	706,667	675,000	960
2018		515,000	
Change %	**26**	**13**	**-10**



Source: TurkStat. 2002-2017 period.

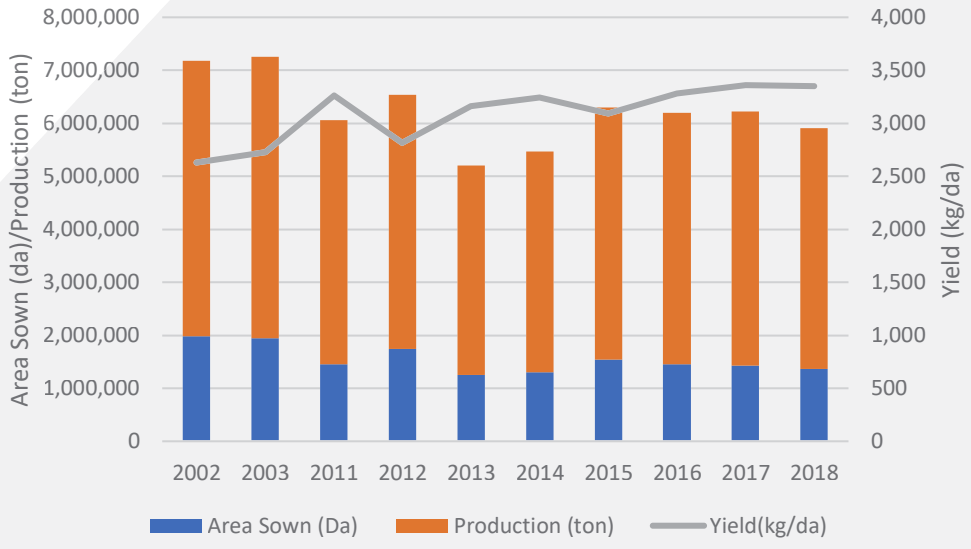
4.1.21. POTATO

According to FAO data, world potato production was 388 million tons in 2017. The major producer countries are China, India, Russia, Ukraine, USA, Germany and Turkey.

According to TurkStat data, potato production in 2018 in Turkey was 4.5 million tons and the yield was 33,480 kg/ha. The major potato producer provinces in Turkey are Niğde, Konya, Afyon, İzmir, Kayseri, Nevşehir, Bolu and Adana. The self-sufficiency degree of Turkey is 103.5% and consumption amount per person is 47.9 kg in potato. Turkey potato data set is shown in the table.

Table 31. Area Sown, Production and Yield Data for Potato from 2002 to 2018

Years	Area Sown (ha)	Production (ton)	Yield (kg/ha)
2002	198,000	5,200,000	26,300
2003	195,000	5,300,000	27,260
2011	144,912	4,613,071	32,600
2012	173,670	4,795,122	28,140
2013	125,520	3,948,000	31,600
2014	129,703	4,166,000	32,450
2015	153,879	4,760,000	30,950
2016	144,857	4,750,000	32,830
2017	142,884	4,800,000	33,600
2018	135,904	4,550,000	33,480
2002-2018 % Change	**-32**	**-13**	**27**



Source: TurkStat, TEPGE, DGAR

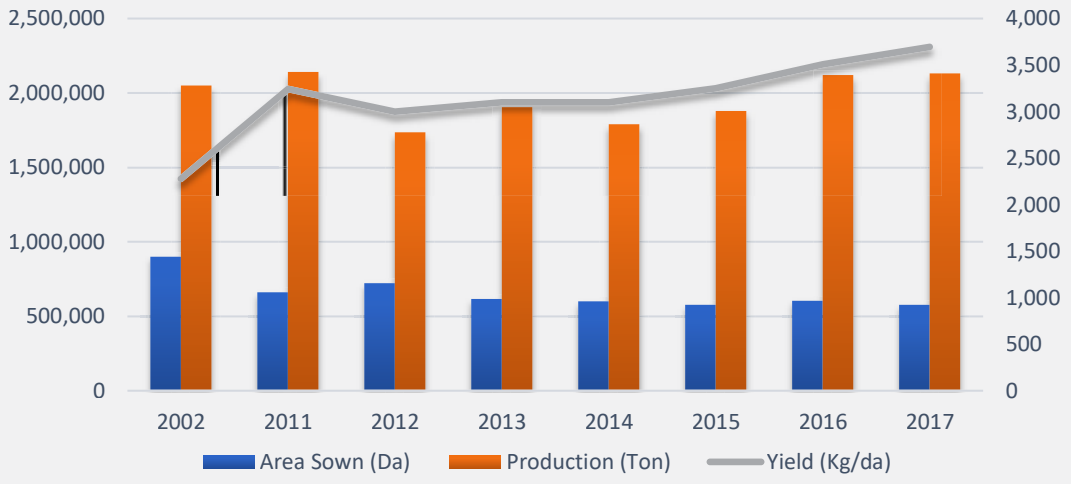
4.1.22. ONION

According to FAO data, world onion production was 98 million tons in 2017. The major onion producer countries are China, India, USA, Iran, Egypt, Russia and Turkey.

According to TurkStat data, onion production in 2018 was 1.9 million tons and yield was 36,620 kg/ha. Major onion producer provinces in Turkey are Ankara, Amasya, Hatay, Adana and Eskişehir. The self-sufficiency degree of Turkey is %112.7 and consumption amount per person is 21.2 kg in onion. Turkey onion data set is shown in the table.

Table 32. Area Sown, Production and Yield Data for Onion from 2002 to 2018

Years	Area Sown (ha)	Production (ton)	Yield (kg/ha)
2002	90,000	2,050,000	22,780
2005	77,280	2,070,000	26,790
2011	66,119	2,141,373	32,400
2012	72,232	1,735,857	30,000
2013	61,632	1,904,846	31,000
2014	60,044	1,790,000	31,000
2015	57,704	1,879,189	32,500
2016	60,402	2,120,581	35,110
2017	57,692	2,131,513	36,950
2018	52,713	1,930,695	36,620
Change %	**-41**	**-6**	**61**



Source: TurkStat, Change covers 2002-2018 period.

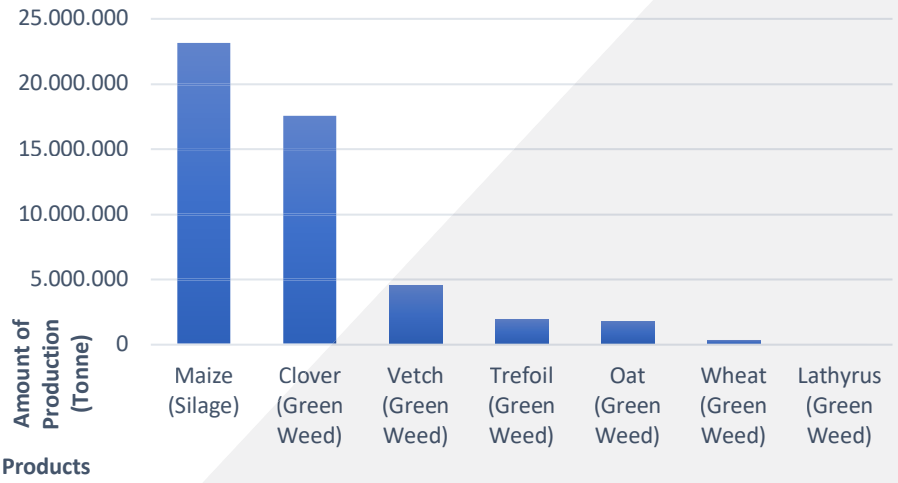
4.1.23. FODDER CROPS

According to FAO 2017 data, major fodder crops producers are USA, Hungary, Romania, Spain, Italy, England, Germany and France.

According to TurkStat data, fodder crop producing area size has increased by 144% to 2.69 million ha after 2000 period in Turkey. Fodder crop producing area size has increased to 13.5% of 20 million ha total arable land in Turkey. Turkey fodder crop producing area and coarse fodder data is shown in the table .

Table 33. General Fodder Crop Area Sown (Ha)

Years	Clover	Trefoil	Vetch	Maize	Other	Total
2002	260,000	99,000	234,227	550,000	10,023	**1,153,250**
2010	568,760	155,513	520,997	887,734	60,543	**2,193,547**
2015	664,064	191,454	493,076	1,111,293	157,135	**2,617,022**
2016	652,259	194,338	495,514	1,105,795	161,972	**2,609,878**
2017	661,017	196,297	493,297	1,125,309	211,820	**2,687,740**
2002/2018 % Change	**154**	**98**	**111**	**105**	**2013**	**133**



Source: TurkStat

In Turkey, fodder crop producing area size and amount has increased by 3% and 10%, respectively compared to 2016. In addition, coarse fodder production data on an annual basis is seen in the table.

Table 34. Coarse Fodder Production

PRODUCTION	2013	2014	2015	2016	2017
Million Tons	56	59.3	60.5	61.6	65.5

Source: MoAF

65.5 million tons course fodder in 2017 consist of

- 21.4% stem from grass and pasture (14 million tons),
- 20.5% stem from fodder crops (13.4 million tons),
- 35.5% stem from silage (23.1 million tons),
- 7.6% stem from grassland in gardens (5 million tons),
- 15.3% stem from straw and chaff (10 million tons).

4.1.24. SUGAR MARKET

4.1.24.1. WORLD SUGAR MARKET

In the marketing year of 2017-2018, 77 % of sugar was produced from sugar cane, 23 % was produced from sugar beet globally. Low cost cane sugar, which holds a dominant position in trade, determines the sugar stock exchange prices in the world. There is no quality difference between the sugar made from cane and beet. Sugar cane, which could be cultivated only in tropical and sub-tropical regions, is produced and processed less costly in comparison with sugar beet.. Major sugar producer from sugar beet countries are European Union members, Russia, Ukraine and Turkey produce, Major sugar producer from sugar cane countries are Brazil, India, Mexico, Thailand and Australia. Major sugar producer from both sugar beet and sugar cane countries are USA, Japan, and China.

Production amount for the last 5 marketing years of the top 11 sugar producers of world sugar market are given in the figure.

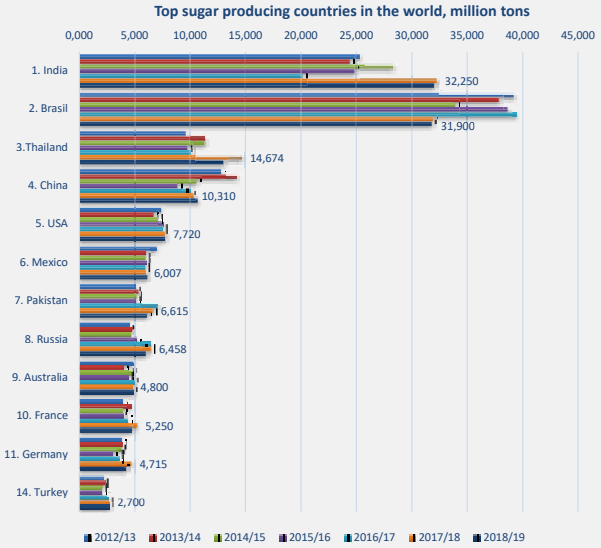


Figure 9. Top Sugar Producing Countries In The World (million tons)

Source: ISO World Sugar Balance (November 2018)
Note: The countries are ranked according to the estimated data for the Marketing Year 2018/19.

The consumption levels of sugar of the world's 10 largest sugar-consuming countries are given in the following Figure.

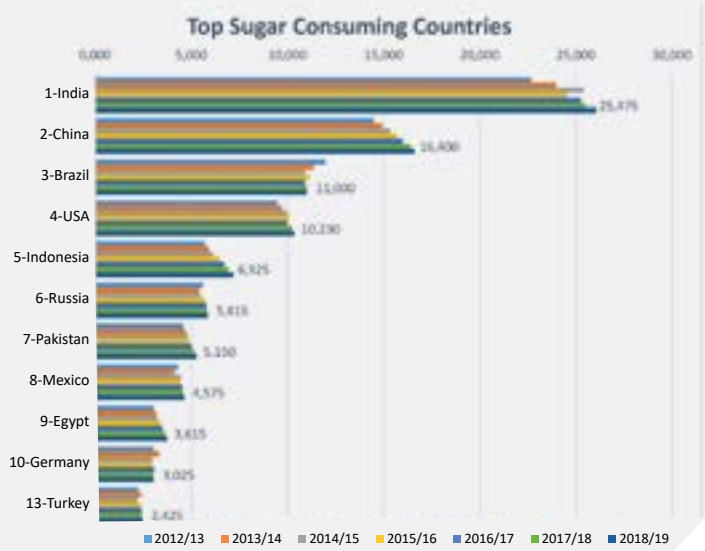


Figure 10. Top Sugar Consuming Countries In The World (million tons)

4.1.24.2. SUGAR SECTOR AND POLICIES IN TURKEY

Sugar, with its added value and the employment creation, is one of the main foodstuffs of strategic importance. In addition, the sugar sector, makes significant contributions to the agriculture and industry of Turkey, particularly in the field of livestock due to sugar by-products.

Due to its natural competitive power in foreign markets beet sugar does not compete with cane sugar.; The sustainability of the sugar sector is of great importance for both agriculture and industry since meeting domestic demand within the production quota on the basis of an efficient structure is important.

Within this context;

- Making production planning that will improve the production of sugar beet and maize in the most suitable basin in ecological and economic terms,
- Guaranteeing the rights and responsibilities of the parties by ensuring that the parties operate in accordance with the contracted agricultural conditions in the regions where there are privatized factories as well as public sugar factories,
- Increasing efficiency in the sugar production process,
- The most effective use of by-products (molasses, pulp / oil cake etc.) generated in the sugar production process, particularly in the livestock sector, and developing business models for obtaining alternative products from waste and residues, are important for the sustainability of the sector.

As a result, due to the regulations introduced by the Sugar Law, it is ensured that the amount of sugar sufficient to meet the needs of the country is produced in a sustainable manner. The planned production model introduced by the Sugar Law is a model aiming to provide constant income to the farmers and sugar producers of Turkey by making arrangements to meet the needs of Turkey through taking into account the conditions encountered by the sugar sector in Turkey.

4.1.25. PASTURE-MEADOW

Feed costs constitute an important part of the input costs in animal production. The amount and quality of meadows and pastures are significantly associated with the need for roughage. In addition, protection of meadows and pastures is part of a sustainable agricultural system. The world agricultural area is close to 5 billion ha but tends to decrease. As meadow- pasture areas constitute about 2/3 of the agricultural land, a similar trend is also observed in these areas. Accordingly, the meadow-pasture area, which was 3.4 billion ha in 2000, has fallen below 3.3 billion ha in 2016 [42].

42) Feed Sector Policy Document 2019-2023, TOB

Table 35. World Pasture-Meadow Situation

	Agricultural Land (million ha)	Pasture and Meadows (permanent) (million ha)	Ratio of pastures and meadows in total agricultural land (%)
2000	4,954.6	3,417.1	69.0
2005	4,940.1	3,385.9	68.5
2010	4,868.5	3,321.2	68.2
2011	4,879.2	3,318.9	68.0
2012	4,886.0	3,314.6	67.8
2013	4,883.4	3,308.5	67.8
2014	4,897.5	3,313.6	67.7
2015	4,868.1	3,274.2	67.3
2016	4,869.6	3,276.9	67.3

According to the OECD-2017 data Turkey ranks 13th among OECD countries in terms of grassland.

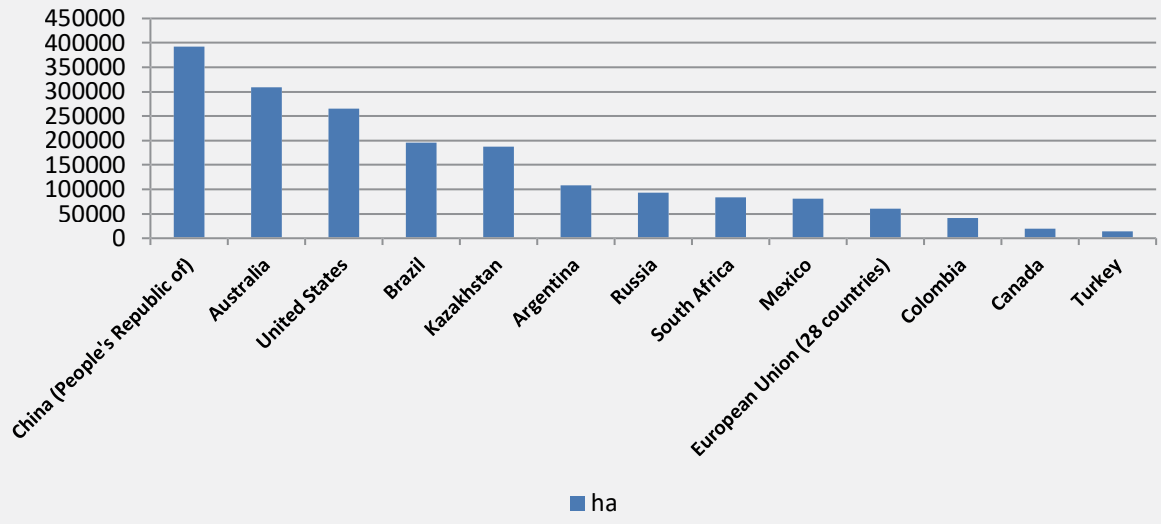


Figure 11. Grasslands Areas of OECD Countries (OECD[43])

Pasture areas in Turkey has decreased significantly until 2002; the reasons for this can be specified as the opening of these areas to crop production, unconscious and uncontrolled grazing (early and overgrazing) and the necessary improvement works could not be executed on time. It was targeted to increase pasturing and grazing capacities and grass quality of pastures and meadows, and to prevent erosion by implementing soil protection measures via improvement and management projects. Pasture availability in Turkey has been 14.6 million ha in 2018 and this amount have been unchanged since 2002. Grassland areas in Turkey are located on the Eastern Anatolia, Black Sea and Central Anatolia regions.

43) https://data.oecd.org/agrland/agricultural-land.htm by08.09.2019.

Table 36. Pasture Areas

Year	1990	2000	2002	2005	2010	2014	2015	2016	2017	2018
Area (Million Ha)	20.2	12.4	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6

Source: MoAF

4.1.26. ORGANIC AGRICULTURE

The global organic food market continues to grow and reached $ 97 billion United States Dollar (USD) in 2017. The US is the leading market and followed by Germany, France and China.[44] Globally 1.4% of agricultural land is organic and according to the 2017 data, Turkey ranks 12th (1.4%) as per total agricultural area and 8th in terms of organic production in the world.

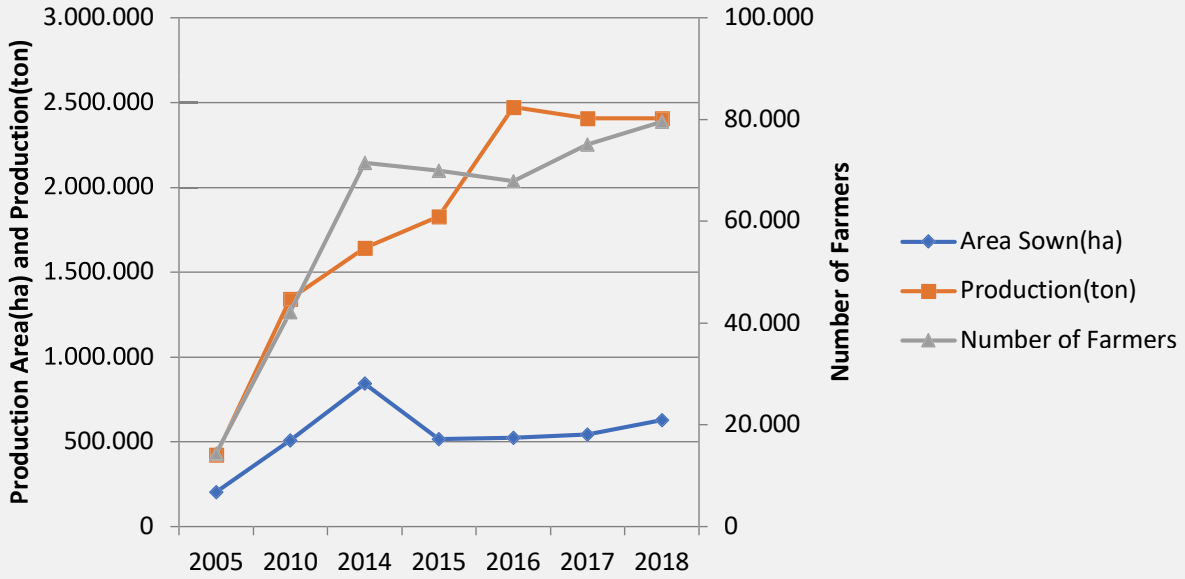
In recent years, growing demand for high quality food production has increased the interest in organic agriculture sector. Due to different climatic conditions and biodiversity, Turkey has great potential in organic farming and fertilizer and pesticide usage is lower than EU, Asia and world average. Although organic agriculture still has a small share in the total arable land, the number of farmers, production area and production amount, including the transition period, is increasing. According to TurkStat 2018 data, the number of farmers engaged in organic crop production was 79,563, organic crop production area was 626,885 ha and the amount of organic crop production was 2,371,612 tons. Within this framework, the number of farmers and production increased by 6 times and the production area increased by 3 times since 2005.

Table 37. Organic Crop Production

	Products	Farmers		Area (1)		Production	
	(in numbers)	(in numbers)	(%)	(Ha)	(%)	(Tons)	(%)
2002	150	12 428	-	89 827	-	310 125	-
2003	179	14 798	19.1	113 621	26.5	323 981	4.5
2004	174	12 751	-13.8	209 573	84.4	377 616	16.6
2005	205	14 401	12.9	203 811	-2.7	421 934	11.7
2006	203	14 256	-1.0	192 789	-5.4	458 095	8.6
2007	201	16 276	14.2	174 283	-9.6	568 128	24.0
2008	247	14 926	-8.3	166 883	-4.2	530 224	-6.7
2009	212	35 565	138.3	501 641	200.6	983 715	85.5
2010	216	42 097	18.4	510 033	1.7	1 343 737	36.6
2011	225	42 460	0.9	614 618	20.5	1 659 543	23.5
2012	204	54 635	28.7	702 909	14.4	1 750 127	5.5
2013	213	60 797	11.3	769 014	9.4	1 620 466	-7.4
2014	208	71 472	17.6	842 216	9.5	1 642 235	1.3
2015	197	69 967	-2.1	515 268	-38.8	1 829 291	11.4

44) https://www.ifoam.bio/en/system/files/fibl-press-release-world-2019-02-13-english.pdf

2016	238		67 878	-3.0		523 777	1.7		2 473 600	35.2
2017	214		75 067	10.6		543 033	3.7		2 406 606	-2.7
2018	213		79 563	6.0		626 885	15.4		2 371 612	-1.5



Source: MoAF (1) Natural collection areas are included.

4.1.27. GREENHOUSE PRODUCTION

Turkey is among the top 4 countries in the world in terms of the quantity of greenhouses, and ranks 1st together with Spain in Europe. In 2018, greenhouse production area was 77.200 ha. Greenhouse production in fresh vegetable covers 25% of total fresh vegetable production with 7.5 million tons in 2018 and approximately its 16% is exported. Total greenhouse production consists of 94% vegetable, 5% fruit and 1% ornamental plant . In greenhouse vegetable production, tomato production ranks 1st with 3.9 million tons, cucumber 2nd with 1.1 million tons and watermelon 3rd with 872 thousand tons. In terms of fruit production, banana ranks 1st with 353 thousand tons and strawberry ranks 2nd with 180 thousand

Table 38. Greenhouse Production Volume (million tons)

Product	2000	2002	2017	2018	2002-2018 Increase (%)
Vegetables	3.7	4.2	7.3	7.5	**79**
Fruits	0.06	0.11	0.47	0.53	**382**
Total	**3.7**	**4.3**	**7.7**	**8.3**	**93**

Source: TurkStat

4.1.28. ORNAMENTAL PLANTS

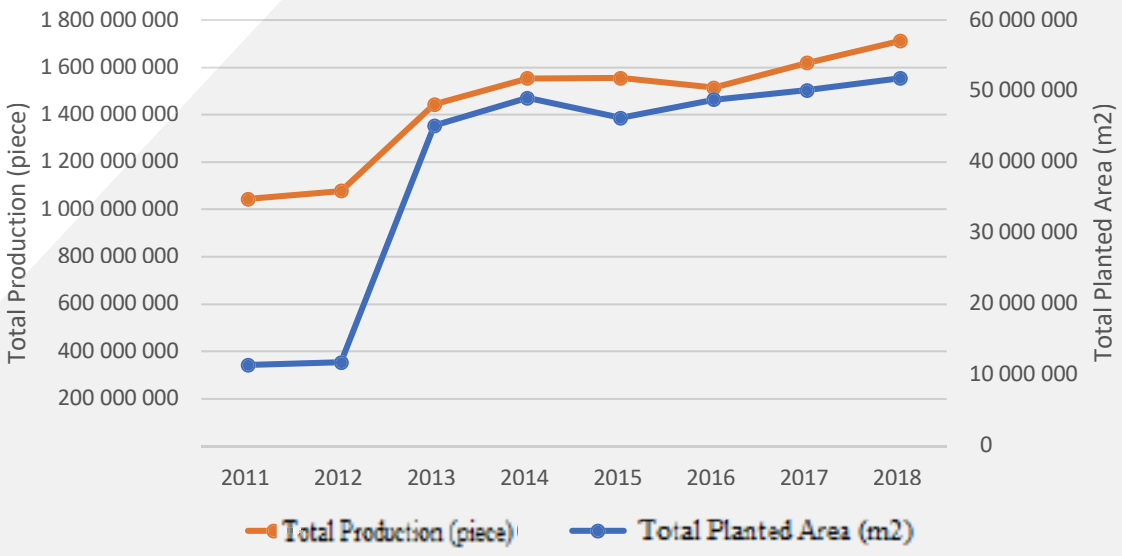
Ecological characteristics of Turkey, suitability of climate and soil conditions, as well as being the source of genes in most ornamental plants provide advantages for ornamental plants sector. Ornamental plants sector is divided into 4 groups ;

- Cut flowers
- Outdoor ornamental plants
- Indoor ornamental plants
- Natural flower bulbs

According to 2018 data, major ornamental plants producer countries in the world are India with 308,000 ha, China with 181,840 ha, USA with 29,407 ha, Mexico with 16,818 ha, Brazil with 14,992 ha, and Thailand with 12,324 ha, according to the Exporters Association of Ornamental Plants and Products' report .
In the table, data on total ornamental planting area and production in Turkey are provided by years. Accordingly, the production of ornamental plants has increased 5 times since 2011; total production of Turkey has increased by 64%.

Table 39. Planting and Production Areas of Ornamental Plants in Turkey

Year	Total (Planted area m2)	Total Production (piece)
2011	11 418 638	1 044 195 929
2012	11 777 307	1 077 199 887
2013	45 125 717	1 443 515 850
2014	49 018 343	1 553 025 200
2015	46 197 215	1 555 300 960
2016	48 801 686	1 513 901 369
2017	50 089 031	1 619 027 841
2018	51 802 644	1 711 773 663



Source: TurkStat

45) https://arastirma.tarimorman.gov.tr/beykozbbgam/Belgeler/Teknik%20Bilgi/S%C3%BCs%20Bitkileri.pdf. Date access: 11.09.2019.
46) http://www.susbitkileri.org.tr/images/d/library/ea42e662-b5f3-4b88-a02d-219ca8567b80.pdf. Date access: 11.09.2019

4.2. LIVESTOCK

Livestock is an important economic sub-activity in terms of creating added value and employment in the agricultural sector, contributing to national income, supporting industrial branches in terms of raw materials (food, textile, pharmaceutical industry, livestock tools and equipment and cosmetics), and eliminating protein deficit in adequate and balanced diet. It is also a social agricultural sub-activity in respect to supporting rural areas by providing on-site employment. According to FAO data, world animal population is presented in the table.

Table 40. World Animal Population (Head)

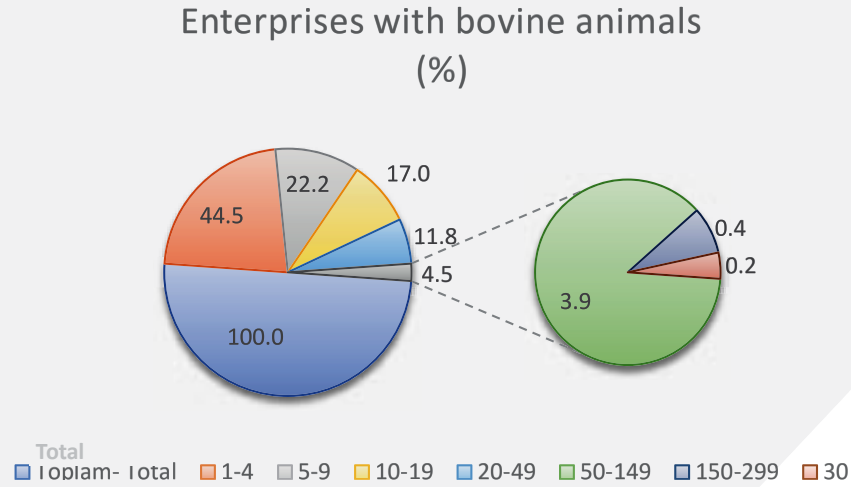
		2002	2015	2016	2017	2002-2017 % Change	2015-2017 % Change	2010-2017 % Change
		Million	Million	Million	Million			
WORLD	BUFFALO	168.9	196.1	199.3	200.97	19.0	2.5	4.3
	CATTLE	1,327.70	1,452.50	1,474.90	1,491.69	12.4	2.7	1.5
	BOVINE	1,496.60	1,648.60	1,674.20	1,692.65	13.1	2.7	1.9
	GOAT	791.5	979.2	1,002.80	1,034.41	30.7	5.6	6.4
	SHEEP	1,034.10	1,160.30	1,173.40	1,202.43	16.3	3.6	6.6
	OVINE	1,825.60	2,139.60	2,176.20	2,236.84	22.5	4.5	6.5

Source: FAO

Turkey's value of animal products, value of live animals, value of live animals per capita and value of animal products per capita has increased significantly from 1995 to 2018. Accordingly, in 1995-2018, the value of live animals increased by 266 times, the value of animal products increased by 206 times, the value of live animals per capita increased by 3 times and the value of animal products per capita increased by 2 times.

According to the Agricultural Enterprises Structure Research[47] (2016), Turkey's structure of animal enterprises is presented below. Accordingly,

- In terms of bovine livestock enterprises, the share of enterprises with a number under 50 bovine animals is 95.5%, where the share of enterprises with a number of 1-4 bovine animals in total livestock enterprises is 44.5%, while the share of enterprises with a number of 5-9 bovine animals is 22.2%, the share of enterprises with a number of 10-19 bovine animals is 17%, the share of enterprises with a number of 20-49 bovine animals is 11.8%. . The share of enterprises with 300 and more bovine animals is 2% and the share of these enterprises in total bovine assets is 14.4% (Figure).



47) TurkStat. 2018. Agricultural Enterprises Structure Research (2016-19.04.2018), TurkStat News Bulletin. http://tuikweb.tuik.gov.tr/OncekiHBArama.do. Date Accessed: 02.08.2018.

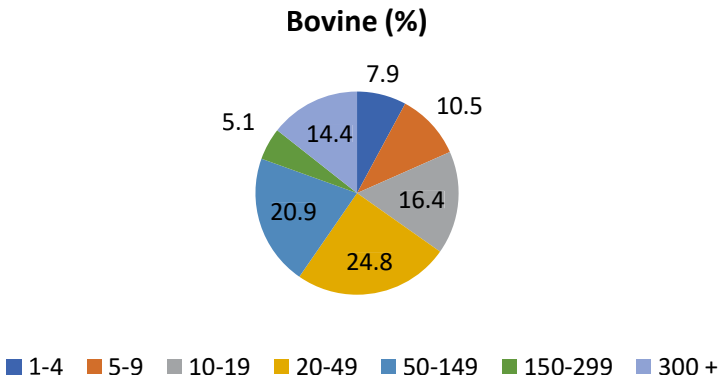


Figure 12. Bovine Animal Enterprises and Distribution of Bovine Animal in Turkey, as of 2016
Source: TurkStat, 2018

In terms of ovine livestock enterprises, the share of enterprises with a number under 50 ovine animals is 50%, where the share of enterprises with a number of 1-4 ovine animals in total livestock enterprises is 11%, while the share of enterprises with a number of 5-9 ovine animals is 10.3%, the share of enterprises with a number of 10-19 ovine animals is 14%, the share of enterprises with a number of 20-49 ovine animals is 17.7% . The share of enterprises with a number of 50 and more ovine animals is 47% and the share of these enterprises in total ovine assets is 90.9%.

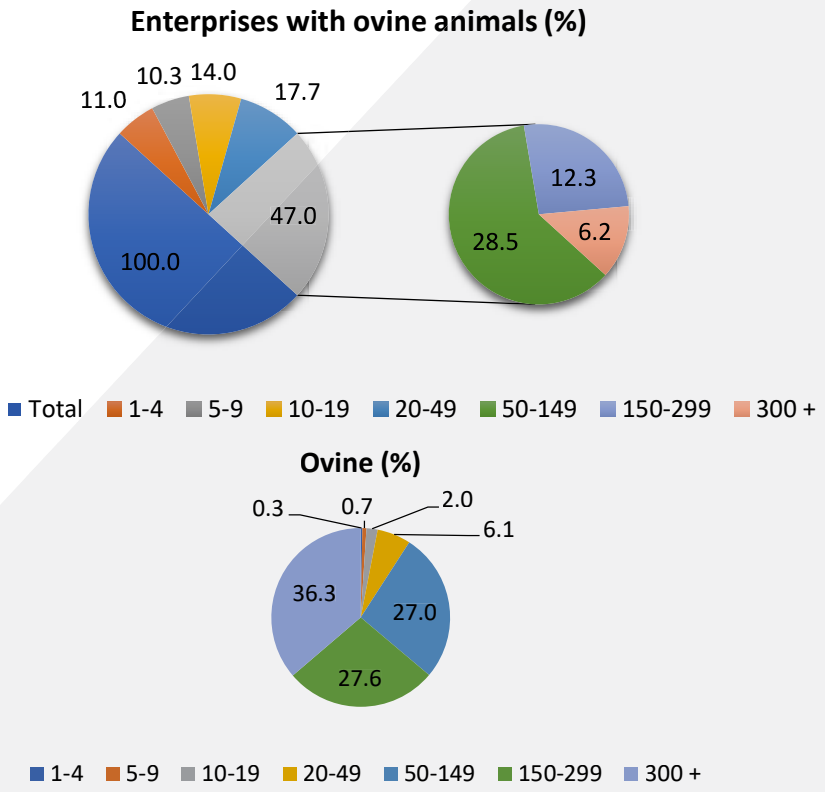


Figure 13. Ovine Animal Enterprises and Distribution of Ovine Animals in Turkey, as of 2016
Source: TurkStat, 2018.

General view of the Turkey's livestock sector is summarized in table.

Table 41. General View of Livestock Sector

Indicators	Year /Source	Value
Agricultural production value: Plant production value (1000 TL)*	2018/ TurkStat	158,870,800
Agricultural production value: Live animals value (1000 TL)	2018/ TurkStat	146,184,051
Agricultural production value: Animal product value (1000 TL)	2018/ TurkStat	79,150,212
Agricultural production value: Plant production value per capita (TL)	2018/ TurkStat	1,937
Agricultural production value: Live animals value per capita (TL)	2018/ TurkStat	1,783
Agricultural production value: Animal products value per capita (TL)	2018/ TurkStat	965
Live animals: Cattle and calf : male (head)	2018/ TurkStat	2,252,947
Live animals: Cattle and calf : female(head)	2018/ TurkStat	2,197,018
Live animals: Bullock: 1-2 years (head)	2018/ TurkStat	2,154,306
Live animals: Heifer: 1-2 years (head)	2018/ TurkStat	2,378,131
Live animals: Cow: 2 years and more (head)	2018/ TurkStat	7,304,490
Live animals: Bull and ox: 2 years and more (head)	2018/ TurkStat	755,614
Live animals: Buffalo (head)	2018/ TurkStat	178,397
Live animals: Camel (head)	2018/ TurkStat	1,708
Animal products: Cow milk (tons)	2018/ TurkStat	20,036,877
Animal products: Buffalo milk (tons)	2018/ TurkStat	75,742
Live animals: Swine (head)	2018/ TurkStat	1,636
Live animals: Sheep (head)	2018/ TurkStat	35,194,972
Live animals: Goat (head)	2018/ TurkStat	10,922,427
Live animals: Horse, mule and donkey (head)	2018/ TurkStat	272,866
Live animals: Poultry (head)	2018/ TurkStat	359,217,862
Animal products: Sheep milk (tons)	2018/ TurkStat	1,446,271
Animal products: Goat milk (tons)	2018/ TurkStat	561,826
Animal products: Honey (tons)	2018/ TurkStat	107,920

* It is presented in order to make comparison between plant and animal production.

4.2.1. BOVINE AND OVINE BREEDING AND RED MEAT PRODUCTION

With its natural conditions, agricultural structures and traditions, Turkey is a convenient country for sheep and goat breeding widely. There is an increase in the number of bovine animals in recent years which has reached about 17 million head of cattle and buffaloes. There are 6 native cattle breeds (Boz Breed, Native Black, Eastern Anatolian Red, South Anatolian Red, Zavot, Native South Yellow) and 1 native buffalo breed (Anatolian Buffalo) that were registered. Native cattle breeds are characterized by their ability to resist extreme climate conditions and adapt to geographical conditions. Within the total number of cattle breeds, 48.5% of them are culture breeds, 41.8% hybrid breeds of them are and 9.7% of them are native breeds.

Ovine breeding in Turkey has special importance in general breeding sector. Accordingly, with its 36 million heads of sheep and 11 million heads of goats, Turkey ranks in the top 10 countries in the world and 1st in Europe. Native breeds generally have high viability and adaptability to poor environmental conditions, and their breeding costs are low.

The Ankara goat was brought to Anatolia from the east of the Caspian Sea by the Turks in the 13th century, has adapted well with the arid climate, and became a distinguished animal which is known in many countries with its mohair and it is an important and uptrend economic value with its 371 tons production in 2018 (Table 47.).

Table 42. Mohair Production Amount (tons)

YEAR	MOHAIR
2014	280
2015	325
2016	341
2017	356
2018	371

Source: TurkStat

The number of bovine and ovine in Turkey and meat and milk yield per animal are summarized in the table below. Significant increases have occurred between 2002 and 2018 both in the number of animals and meat and milk yield. The number of bovine has increased by 74% to 17.2 million in the last 16 years, while the number of ovine has increased by 44% to 46.1 million. The rapid increase in the number of cattle and buffaloes and the number of sheep and goats in 18 years continues without slowing down.

Table 43. Number of Animals and Yield per Animal in Turkey

Species/Year	BOVINE				OVINE				
	Cattle			Total including Buffalo (Million)	Sheep			Goat (Million)	Total (Million)
	Head (Million)	Meat Yield (Kg/Head)	Milk Yield (Kg/Head)		Head (Million)	Meat Yield (Kg/Head)	Milk Yield (Kg/Head)		
2002	9.8	184.7	1.705	9.9	25.1	19.3	48	6.7	31.9
2015	13.9	269.6	3.059	14.1	31.5	19.9	77	10.4	41.9
2016	14.0	271.6	3.090	14.2	30.9	20.2	77	10.3	41.3
2017	15.9	274.1	3.143	16.1	33.6	19.5	77	10.6	44.3
2018	17.0	293	3.161	17.2	35.1	21.7	77	10.9	46.1
2002-2018 % Change	**74**	**59**	**85**	**74**	**40**	**12**	**60**	**61**	**44**

Source: TurkStat

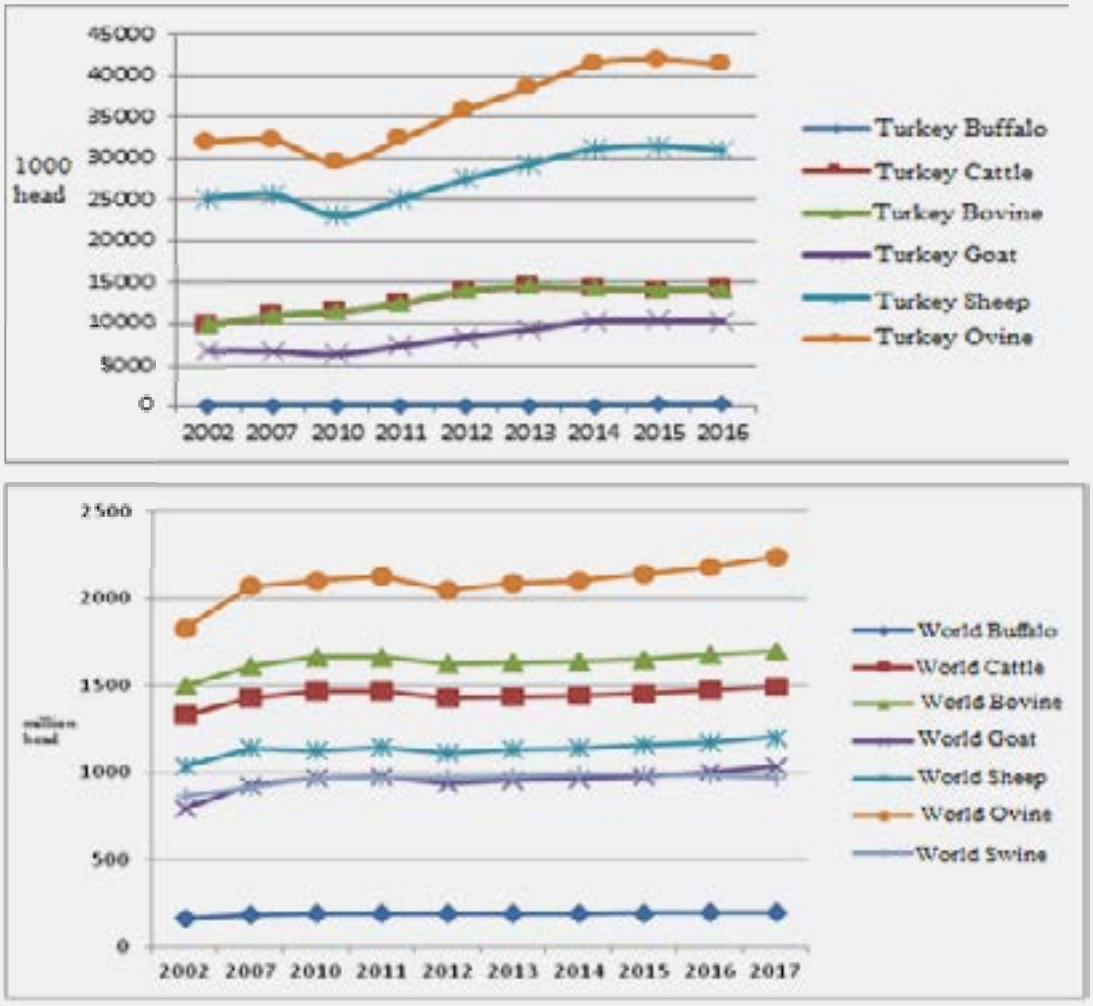


Figure 14. Bovine and Ovine Animals Population Change in Turkey and World, between 2002 -2017

According to the table below, with its growing economy and improving livestock potential, in terms of total cattle-buffalo population, Turkey ranks 23rd among 196 countries.

Table 44. World Ranks - Cattle and Buffalo Population (Head)

Ranks	Country	Number of Cattle-Buffalo
1	India	298,433,203
2	Brazil	216,281,191
3	China	106,826,931
4	United States	93,704,600
5	Pakistan	82,100,000
6	Ethiopia	60,926,913
7	Argentina	53,353,787
8	Mexico	31,771,736
9	Sudan	30,734,061
10	Chad	27,603,203
11	Tanzania	26,399,523

12	Australia	26,175,521
13	Bangladesh	25,413,000
14	Columbia	22,461,179
15	Myanmar	20,894,337
16	Nigeria	20,773,358
17	France	19,233,244
18	Russian Federation	18,758,193
19	Kenya	18,338,809
20	Indonesia	17,994,438
21	Venezuela	16,482,742
22	Uganda	15,393,187
23	Turkey	14,222,228

Source: FAO

Turkey's red meat production is presented at the table below. Red meat production is mostly obtained from bovine animals. The red meat production obtained from cattle is approximately 88%. In 2018, cattle meat production of Turkey was 1,003,859 tons, sheep meat production was 100,831 tons, goat meat production was 13,603 tons and buffalo meat production was 402 tons. Bovine and ovine meat production increased 250 % in 2018 compared to production in 2002.

Table 45. Meat Production in Turkey (tons)

YEAR	CATTLE	SHEEP	GOAT	BUFFALO	TOTAL
2002	327,629	75,828	15,454	1,630	420,541
2015	1,014,926	100,021	33,990	326	1,149,262
2016	1,059,195	82,485	31,011	351	1,173,042
2017	987,482	100,058	37,525	1,339	1,126,403
2018	1,003,859	100,831	13,603	402	1,118,695
Change in 2002-2018 (%)	**306**	**33**	**-12**	**-75**	**266**

Source: TurkStat

4.2.2. MILK PRODUCTION

World milk production, which was 605 million tons in 2002, reached 827 million tons in 2017. At the same period world bovine (cattle and buffalo) and ovine (sheep and goat) production were increased from 71,064,232 tons to 85,440,688 tons and the annual amount of meat per person remains stable as 11 kg when the amount of milk per person raised from 96 tons to 109 tons.

According to OECD-FAO Agricultural Outlook Report 2018-2029, it is expected that world milk production, which increase more than most of other agricultural goods in next ten years, increase 1.7% annually. On the other hand, in the next decade, it is envisaged that world meat production increase more than 13%. Moreover, it is expected that main factors, which lead developments and dynamics for world meat markets, are animal diseases epidemics, sanitary restrictions and trade policies globally.

Table 46. Read Meat and Milk Production in the World

Year	World Population	World Milk Production (tons)	Annual Amount of Milk Per Capita (Kg)	World Cattle, Buffalo, Sheep and Goat Meat Production (tons)	Annual Amount of Meat Per Capita (Kg)
2002	6,302,150,000	605,174,066	96	71,064,232	11
2015	7,383,010,000	806,700,374	109	83,513,436	11
2016	7,466,960,000	798,476,318	107	84,731,677	11
2017	7,550,262,101	826,748,548	109	85,440,688	11

Source: FAO (2019)

According to the table regarding milk production data, in Turkey, bovine milk production comes to the fore and 91% of total milk production in 2018 is obtained from bovine animals. The share of buffalo milk in total milk production is rather low. Turkey has considerably increased own milk production obtained from bovine and ovine animals. Turkey's milk production increased about 250 % from 8,408,568 in 2002 to 22,120,716 in 2018. According to a report published in 2018 by National Milk Council, Turkey's milk consumption per capita is 270 kilograms. In 2018, share of cow milk transferred to industry is 50%. The self-sufficiency degree in milk production in Turkey is more than 100%.

Table 47. Milk Production in Turkey (tons)

YEAR	CATTLE	SHEEP	GOAT	BUFFALO	TOTAL
2002	327,629	75,828	15,454	1,630	420,541
2015	1,014,926	100,021	33,990	326	1,149,262
2016	1,059,195	82,485	31,011	351	1,173,042
2017	987,482	100,058	37,525	1,339	1,126,403
2018	1,003,859	100,831	13,603	402	1,118,695
Change in 2002-2018 (%)	**306**	**33**	**-12**	**-75**	**266**

Source: TurkStat

4.2.3. POULTRY BREEDING

Turkey is also competitive in poultry and egg sector. Turkey is among the top 10 countries in terms of chicken population where in Europe, it ranks 2nd in terms of production.

Poultry production has made rapid progress in the last thirty years with advances of health protection and nutrition through modern production methods and new hybrid studies. Atabey, Atak, Atak-S chicken hybrids have competitive levels in worldwide.

White meat plays an important role in the supply of animal protein in Turkey with its affordable price. According to FAO (2017) data; 109,056,179 tons of chicken meat and 80,088,559 chicken eggs were produced in the world. As shown in the tables below; when compared with world production, Turkey ranks 10th in production of chicken meat and 9th in chicken eggs production. On the other hand, a total of 18,189,907 tons of chicken meat and 11,056,631 chicken eggs were produced in Europe. Compared to European production, Turkey ranks 2nd in chicken meat and chicken egg production.

World chicken meat and egg production is shown in the table below.

Table 48. World Chicken Meat Production

No.	Country	Chicken meat Production (thousand tons)			
		2015	2016	2017	2018
1	USA	18,403	18,708	19,140	
2	BRAZIL	13,149	13,234	13,607	
3	CHINA	12,629	13,406	13,440	
4	RUSSIA	4,088	4,141	4,444	
10	TURKEY	1,909	1,879	2,136	2,156

Source: FAO

Table 49. World Egg Production

No.	Country	Egg production (million)			
		2015	2016	2017	2018
1	CHINA	516,843	537,354	536,818	
2	USA	97,208	102,111	106,688	
3	INDIA	78,484	82,929	88,137	
4	MEXICO	53,050	54,403	55,418	
9	TURKEY	16,726	18,098	19,281	19,643

Source: FAO, 20 February 2019

According to TurkStat data, total chicken meat production, which was 696,187 tons in 2002, increased to 2,156,669 tons in 2018, while egg production was 11,555,000,000 in 2002 and 19,643,711,000 in 2018. As it is seen from the production values, chicken meat production increased by 206% and egg production increased by 70% between 2002-2018. Commercial poultry meat and chicken egg production is self-sufficient, and surplus production is exported.

Table 50. Chicken Meat and Egg Production in Turkey

Years	Egg (millions)	Chicken Meat (Tons)	Population	Eggs /cap	Chicken meat (kg/cap)
2002	11,555	696,187	68,600,000	168	10,148
2014	17,145	1,894,669	77,695,904	221	24,385
2015	16,726	1,909,276	78,741,053	212	24,248
2016	18,098	1,879,018	79,814,871	227	23,542
2017	19,281	2,136,734	80,814,525	239	26,439
2018	19,643	2,156,669	82,003,882	240	26,299
2019*	5,048	502,646	-	-	-

Source: TurkStat
*2019 first 3 months

4.2.4. BEEKEEPING

Turkey is located in three different biogeographic regions namely Euro-Siberian, Mediterranean and Iran-Turonian. One-third of the plants existing in Turkey are endemic and plant diversity has around 12,000 species.

The unique geography of Anatolia with its plants blooming through out the year creates a suitable ecology in terms of beekeeping in Turkey and90 % of pine honey is produced in Turkey.

Turkey is an important gene center regarding its bee genetic diversity in the world. There are 5 different breeds and ecotype honey namely Anatolia, Caucasus, Muğla, Thrace and Southeastern. Among them, the Caucasian bee was registered and protected since 2004.

According to FAO data, Turkey ranks 2nd after China in the world and 1st in Europe in terms of colony and honey production in 2017.

Table 51. World Beekeeping Data

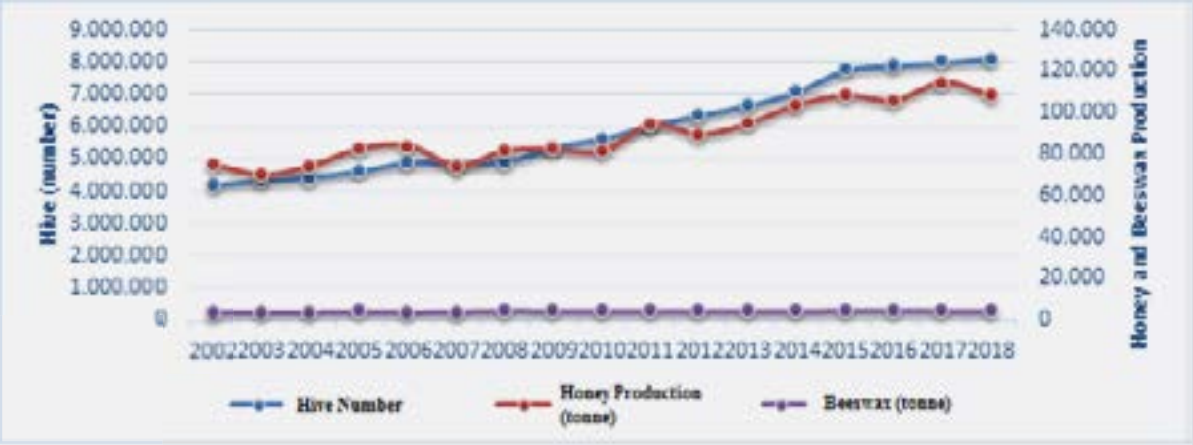
World Honey Production (tons)				Hive Number			
Country	**2015**	**2016**	**2017**	**Country**	**2015**	**2016**	**2017**
China	473,000	555,000	543,000	China	9,131,057	9,147,772	9,156,882
Turkey	**108,128**	**105,727**	**114,471**	**Turkey**	**7,709,636**	**7,900,364**	**7,991,072**
Argentina	52,600	68,123	76,379	Iran	7,359,956	7,031,629	7,271,825
Iran	73,014	67,783	69,699	Ethiopia	5,916,100	6,189,329	6,139,990
USA	71,008	73,429	66,968	Russia	3,474,014	3,457,994	3,349,976
Ukraine	63,615	59,294	66,231	Argentina	2,959,005	3,008,956	3,003,036
Russia	67,736	69,764	65,678	Tanzania	2,941,756	2,991,117	2,998,785
India*	62,967	64,071	64,981	Spain	2,730,000	2,834,515	2,904,971
Mexico	61,881	55,358	51,066	ABD	2,660,000	2,775,000	2,669,000
Ethiopia	59,161	47,706	50,000	Mexico	2,017,931	1,858,000	1,853,807
TOTAL	**1,824,828**	**1,859,228**	**1,860,712**	**TOTAL**	**88,985,408**	**90,493,440**	**90,999,730**

Source: FAOSTAT
*Different bee type was not added to the list.

According to TurkStat data, bee hive, honey production, honey yield, beeswax, honey production per capita are given in the table below.

Table 52. Beekeeping Data

Years	Hive (number)	Honey Production (ton)	Beeswax (ton)	Honey prod/cap (kg/cap)
2002	4,160,892	74,554	3,448	1.08
2003	4,288,853	69,540	3,130	1.00
2004	4,399,725	73,929	3,471	1.06
2005	4,590,013	82,336	4,178	1.17
2006	4,851,683	83,842	3,484	1.19
2007	4,825,596	73,935	3,837	1.04
2008	4,888,961	81,364	4,539	1.13
2009	5,339,224	82,003	4,385	1.13
2010	5,602,669	81,115	4,148	1.10
2011	6,011,332	94,245	4,235	1.26
2012	6,348,009	89,162	4,222	1.18
2013	6,641,348	94,694	4,241	1.23
2014	7,082,732	103,525	4,053	1.32
2015	7,748,287	108,128	4,756	1.37
2016	7,900,364	105,727	4,440	1.32
2017	7,991,072	114,471	4,488	1.42
2018	8,108,424	107,920	3,987	1.32
2002-2018 % Change	94.87	44.75	15.63	22.22



4.2.5. SERICULTURE

Turkey ranks 8th in the world, and 1st among the EU countries in terms of cocoon production. Silkworm cultivation is carried out about 50 provinces, mainly in Antalya, Ankara, Bilecik, Bolu, Bursa, Diyarbakır, Eskişehir, Hatay, İzmir, Muğla and Sakarya. In Turkey, approximately 2,500-3,000 families work in the traditional cocoon production. Village number, family number, opened box and cocoon production is presented in table below.

Table 53. Silkworm Data

YEAR	VILLAGE NUMBER(PCS)	FAMILY NUMBER(PCS)	OPENED BOX (PCS)	COCOON PRODUCTION (TONS)
2002	327	2,356	3,885	99
2003	280	2,758	5,094	169
2004	272	2,888	5,161	145
2005	278	2,677	5,669	160
2006	246	2,553	5,699	129
2007	233	2,274	5,273	127
2008	212	2,193	5,564	127
2009	211	2,295	5,683	140
2010	193	2,134	5,477	129
2011	299	2,623	5,808	151
2012	342	2,572	5,576	134
2013	328	2,348	5,266	121
2014	340	1,760	3,739	80
2015	474	1,956	4,674	115
2016	576	2,001	5,303	103
2017	659	2,128	5,686	102
2018	693	2,210	6,238	94
2002-2018 % Change	**112**	**-6**	**61**	**-5**

Source: TurkStat

4.2.6. FISHERIES AND AQUACULTURE

Three sides of Turkey are surrounded by seas, which has got different qualities and production potentials in terms of their ecological, geographical, geomorphological and meteorological features. Turkey is located at the coast of Black Sea, Aegean and Mediterranean and has the whole of Marmara, which is inland sea. There are numerous rivers, 200 natural lakes, 822 dam lakes and 507 ponds in 25 river basins.

This situation offers wide opportunities in terms of fisheries and aquaculture. There are sufficient fishing vessels and catching technology, aquaculture facility, technology and human resources in Turkey.

Turkey's annual aquaculture production varies by year due to fluctuations in fisheries production and between years of 2010-2018, 537-704 thousand tons of fisheries products were produced from Turkey's aquatic resources. Similar to world production, aquaculture production of Turkey continues to increase and the share of aquaculture in the total production has risen as it is shown in the table below.

While total fisheries production in Turkey was 628,631 tons in 2018, 35.3% of the production was marine fish, 9.9% was other marine species, 4.8% was species inland sea products and 50% was aquaculture products. The production figures by capture fisheries were 314,094 tons while the aquaculture production was 314,537 tons.

Table 54. Fisheries and Aquaculture Production of Turkey (tons)

Year	Fishery			Aquaculture			TOTAL PRODUCTION
	Sea	Inland	Total	Sea	Inland	Total	
2010	445,680	40,259	485,939	88,573	78,568	167,141	653,080
2011	477,658	37,097	514,755	88,344	100,446	188,790	703,545
2012	396,322	36,120	432,442	100,853	111,557	212,410	644,852
2013	339,047	35,074	374,121	110,375	123,019	233,394	607,515
2014	266,078	36,134	302,212	126,894	108,239	235,133	537,345
2015	397,731	34,176	431,907	138,879	101,455	240,334	672,241
2016	301,464	33,856	335,320	151,794	101,601	253,395	588,715
2017	322,173	32,145	354,318	172,492	104,010	276,502	630,820
2018	283,955	30,139	314,094	209,370	105,167	314,537	628,631

Source: TurkStat

4.2.6.1. FISHERIES

In Turkey, capture fisheries production by catching 80-90 % consists of fish and the rest consists of other fisheries products such as shellfish and mollusk.

Recently capture fisheries production shows a fluctuant trend. The fluctuations in fisheries from year to year are due to change in the catch of migrant sea fish such as anchovy, sprat and bonito, which make up the largest part of fishing. The catching of these fish depend on many environmental factors such as fish biology and water temperature.

Due to the high fishing power of fishing fleet, vessels, in order to protect the stocks after 2002, the vessels engaged in sea fishing were restricted and new ships were not allowed into the fleet. Since 2012, buy-back support was applied in order to reduce fleet and 1264 vessels were removed from fishing fleet. By the end of 2018, there were 15.352 vessels with a catching license at the sea while there were 2656 licensed fisheries vessels in inland.

4.2.6.2. AQUACULTURE

While fisheries production of Turkey is fluctuant by years, aquaculture production has increased after 2002. While the share of aquaculture production in the total fisheries was around 10% in the early 2000s, it increased to 25% in 2010 and reached 50% in 2018. This development is similar to world trend of aquaculture.

The most produced species is trout in inland but bass and bream production are widespread in sea. In recent years, trout production has been a stable trend while bass and bream production has had a rapid increase. In 2018, 114.5 thousand tons trout, 76.7 thousand tons bream and 116.9 thousand tons bass were produced.

Table 55. Turkey's Aquaculture Production (tons)

Years	Trout			Bream	Bass	Other Species	TOTAL
	Inland	Sea	Total				
2010	78,165	7,079	85,244	28,157	50,796	2,944	167,141
2011	100,239	7,697	107,936	32,187	47,013	1,654	188,790
2012	111,335	3,234	114,569	30,743	65,512	1,586	212,410
2013	122,873	5,186	128,060	35,701	67,913	1,720	233,394
2014	107,983	5,610	113,593	41,873	74,653	5,014	235,133
2015	101,166	6,872	108,038	51,844	75,164	5,288	240,334
2016	101,297	5,716	107,013	58,254	80,847	7,281	253,395
2017	103,705	5,952	109,657	61,090	99,971	5,784	276,502
2018	104,887	9,610	114,497	76,680	116,915	6,445	314,537

Source: TurkStat

4.2.6.3. PROCESSING

Fisheries sector makes significant contribution to nutrition and food security, employment, domestic and foreign trade and economy at micro and macro level.

By 2018, there are 217 processing and recycling plants (10 bivalve processing enterprises, 16 frog legs and snail processing enterprises) which have been processing fisheries products. In addition, there are 13 fish flour-oil plants placed in the coast of East and Central Black Sea.

The part of fisheries products, which are used for human consumption as fresh, chilled, frozen or processed, vary with regard to fluctuation in catching quantities and amount processed in fish flour oil industry. Turkish people are consuming fisheries products in season and fresh. For this reason, a big part of caught and cultured fisheries products is consumed fresh. Processed products are mostly prepared to export. The biggest part of processed fisheries products consists of frozen fish and fish fillets presented various ways.

4.2.6.4. FOREIGN TRADE IN FISHERIES

Fisheries sector is one of the important sectors in Turkey's export. A significant increase in Turkey's fisheries export is observed in parallel with developments on technologies of production and process of aquaculture.

Export which was 27 thousand tons in 2002, increased to 177 thousand tons and from 97 million dollars to 952 million dollars in 2018. While import of fisheries products was 23 thousand tons in 2002, it reached 98 thousand tons in 2018 and value of import increased to 189 million dollars from 19 million dollars.

Turkey's most important export items are trout, bream and bass produced through aquaculture and also Bluefin Tuna fish, which is feed and grown at cages after catching, with high trade value.

Turkey exports to many countries of the world. In 2018, export was made to 81 countries and 60% of Turkey's export were made to the EU countries. The most exported countries are Netherlands, Italy and Russia.

Table 56. Fisheries Export and Import of Turkey

Years	EXPORT			IMPORT		
	Amount (tons)	Value ($)	Value(₺)	Amount (tons)	Value ($)	Value (₺)
2010	55,109	312,935,016	471,459,989	80,726	133,829,563	200,395,897
2011	66,738	395,306,914	664,333,252	65,698	173,886,517	290,826,203
2012	74,007	413,917,190	744,907,572	65,384	176,402,894	317,626,975
2013	101,063	568,207,316	1,083,243,678	67,530	188,068,388	359,490,196
2014	115,381	675,844,523	1,481,211,383	77,551	198,273,838	435,691,472
2015	120,963	691,552,284	1,877,838,802	110,761	250,969,660	685,467,749
2016	145,440	790,232,095	2,398,048,797	82,074	180,753,629	548,878,092
2017	157,061	855,088,029	3,129,448,087	100,446	230,127,804	841,444,645
2018	177,074	952,001,252	4,579,495,053	98,297	188,951,045	898,785,064

Source: TurkStat

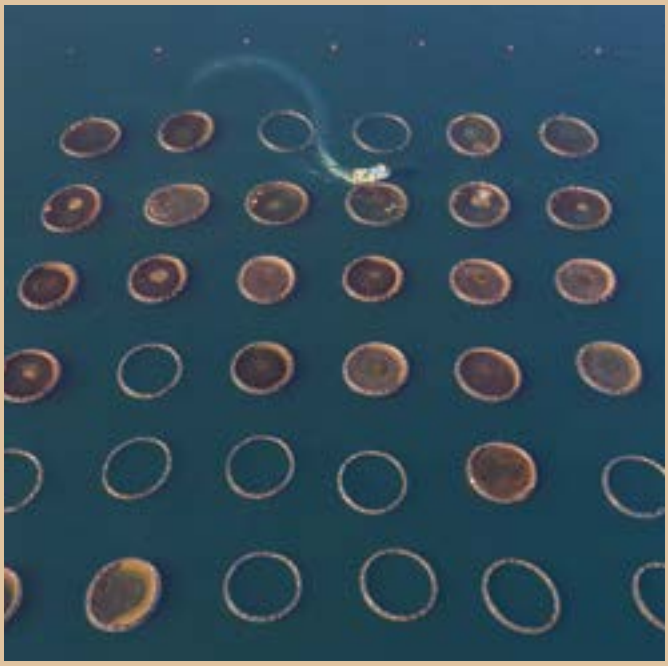
Between 2010-2018, 5.6-27.9 thousand tons of fisheries export was made to COMCEC countries annually, this amount constitutes 9-20% of Turkey's annual export. In the same period Turkey's fisheries import from COMCEC countries was 24.7 thousand tons and it corresponds to 8-25% of total fisheries import of

4.2.6.5. CONCLUSION AND GENERAL EVALUATION

The main policy of Turkey for fishing is to enable sustainable operation by ensuring the balance between the seas and inland waters in terms of conservation and utilization of resources. The other principle is to ensure environmental, economic and social sustainability by utilizing the environment-friendly production techniques for aquaculture.

It is generally accepted that our world has reached a limit point for the fisheries and aquaculture product obtained by fishing practices and it is tried to ensure the sustainability in a constant way rather than increasing the production by fishing method. Hence, preservation of water resources and fisheries and aquaculture product available in these resources is the key principle of sustainable fisheries.

Turkey has made enormous progress following adoption of the Code of Conduct for responsible fisheries for the last two decades in particular. Restriction of the fishing fleet, implementation of buy-back program, imposing new regulations for fisheries management, certification and inspection of fish farms, transferring of net cages on the shore to the off-shore areas are some of the main activities that have been carried out so far. Protective measures should be taken for the future period in order to ensure the sustainability of resources. Such measures are not only required at national level, but also required to be in harmonization with international standards.



The development trend for the production phases of fisheries and aquaculture product are similar to the global practices. The volume of aquacultural products is increasing and the share of aquaculture is rising in the total production volume. It is expected that this upward trend will continue in future. MoAF has set a target to reach to 600 thousand tons of aquaculture product in 2023.

The other activities are to identify new areas suitable for aquaculture and increase the number of species turning into existing potential into the production by following the innovative applications and high technology.

Providing the aquacultural products to the consumers in a safe and healthy manner is as important as aquacultural production for the sectoral development and being competitive among the international markets. Increasing the range of products with high added value products, increasing the fish consumption and sales by providing safe products to the domestic and foreign markets are among the targets of the sector. Turkey has a great export potential for aquacultural products and the export target for 2023 is 2 million United States Dollars (USD).

Fisheries and aquaculture products are categorized in a separate column in 2018-2022 Strategic Plan of the MoAF. Strategical goal of the “Management of Aquacultural Products and Fishing Resources” is to “conserve fisheries resources and ensure sustainable fisheries and develop the production”.

INPUT USAGE IN AGRICULTURE 05.

It is important to use resources such as labor, financing, new technologies and other inputs more effectively and thus to increase efficiency in the unit area since it is not possible to increase agricultural production through expanding agricultural land.

Agricultural inputs are also among the most important factors affecting consumer prices. Agricultural inputs include fertilizers, water use for agricultural purposes, energy use, fuel usage (diesel fuel etc.), pesticides, seeds, seedlings, saplings, labor and land .

In animal production, items such as feed, fuel-electricity, technical service, medicine, vaccine disinfectant, machinery, equipment and automation need constitute agricultural inputs. The situation of Turkey in terms of agricultural inputs within the framework of sustainable food systems has been elaborated under following headlines:

5.1. FERTILIZERS

One of the ways to increase crop production is to increase soil fertility, crop production efficiency and production quality in the production area. In this regard, fertilizers are one of the main elements in terms of increasing soil fertility and crop production and are of utmost importance in obtaining healthy, reliable and nutritious food. Fertilizers and soil improvers are also indispensable for undergrowth farming, greenhouses and soilless culture whose production area has been recently increased in Turkey. Furthermore, fertilizers and soil improvers for amenajman purposes are very important to overcome soil fertility problems triggered by soil structure, soil texture, salinity, lime and alkalization. Without the usage of fertilizer in plant production, it is not possible to ensure the food security. Proper use of fertilizers will contribute to the achievement of the SDG as well as agricultural production. Fertilizers help to create additional business opportunities for the agricultural and industrial sectors, and also is one of the cooperation areas under agriculture and food security of D-8, of which Turkey is a part.

According to FAO sources, demand for fertilizer consumption in the world is increasing and also the global capacity of fertilizer products, intermediaries and raw materials are expected to increase in the next 5 years. World demand for plant nutrients (N+P2O5+K2O) has increased from 186,625,000 tons in 2015 to 199,006,000 tons in 2019. In the last five years between 2014-2019, world nitrogen fertilizer demand has increased by 1.24%, P2O5 demand by 1.97%, K2O demand by 2.47% compound growth rate.

“Fertilizer Industry” is included in the Manufacturing Industry and III / d Chemical Industry Group in “The International Standard Industrial Classification of All Economic Activities” (ISIC) adopted by the United Nations.

In Turkey, although it depends on products in agricultural production, fuel and fertilizer inputs constitute a cost item up to 30%. Since Turkey has a low supply in terms of diesel and fertilizer raw materials (natural gas, phosphate rock, potash etc.), they should be imported mostly.

48) Land Use is discussed under another chapter.
49) Anonymous 2000, Fertilizer Industry Specialized Commission Report, Eight 5-Year Development Plan, Presidency of Strategy and Budget, (access 16.08.2019), http://www.sbb.gov.tr/wp-content/uploads/2018/08_gubresanayii.pdf.

05. INPUT USAGE IN AGRICULTURE

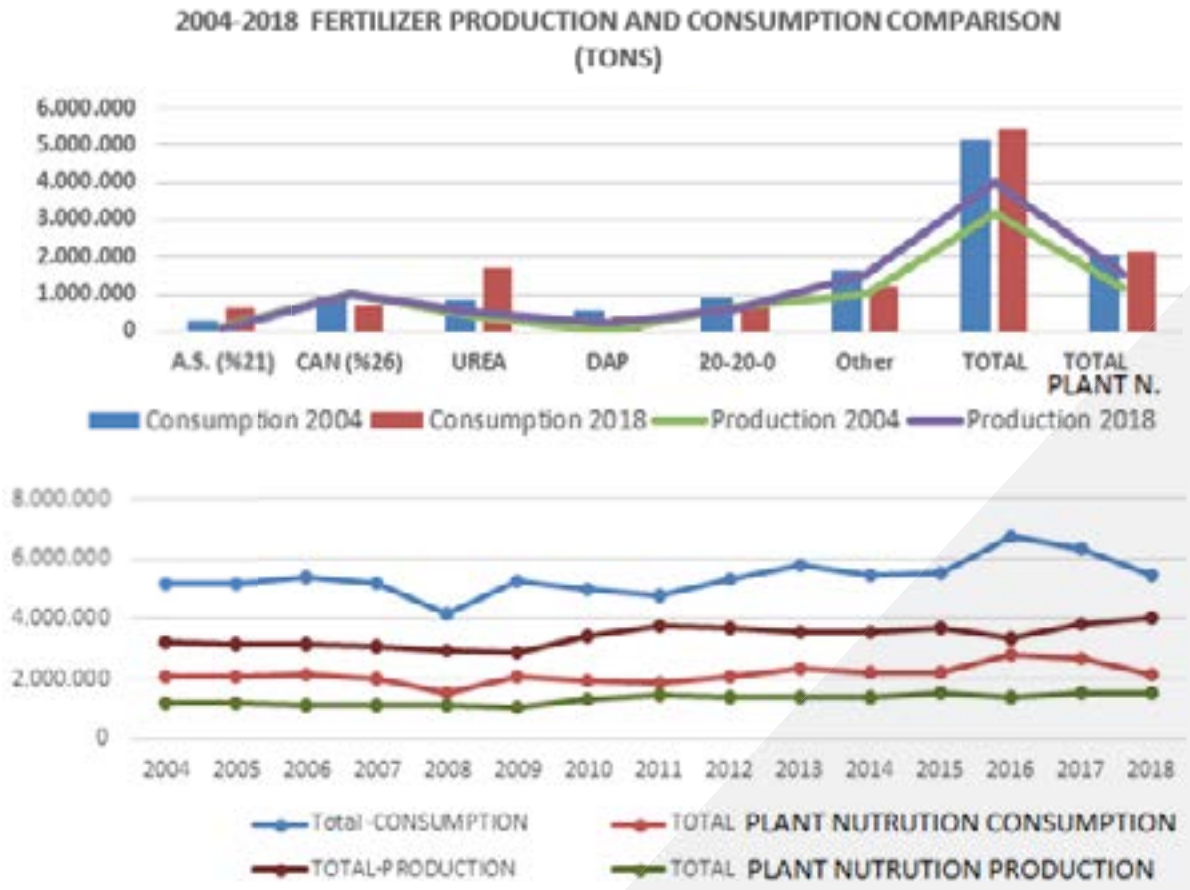
Therefore, escalations in world prices and exchange rates have a direct impact on the prices of these inputs. Except for limestone, clay and dolamide, which are used as additives in bottom fertilizers and nitrate fertilizers, other inputs used in fertilizer production are met through imports. The raw material of nitrogenous fertilizers is natural gas and the amount of natural gas extracted in Turkey is 1% of the country's consumption. The raw materials of bottom fertilizer is phosphate and phosphate rock is imported from North African countries. Fertilizer production and consumption in Turkey has increased in the last 15 years.

Accordingly, total physical fertilizer consumption value increased from 5,175,184 tons in 2004 to 5,411,881 tons, in 2018 and total consumption value of plant nutrition increased from 2,044,544 tons to 2,164,158 tons at the same period which corresponds to increase by 6%. Physical total values of fertilizer production went up from 3,192,103 tons to 4,027,004 tons, which corresponds to increase by 26%, and value of total plant nutrition went up from 1,189,667 tons to 1,552,851 tons at the same period, which corresponds to increase by 31%. The coverage ratio of production to consumption for the period of 2014-2018 is 72 % on the base of total plant nutrition.

According to World Bank sources, 2016 world fertilizer consumption is 140,553 kg / ha and 158.4 kg / ha in the EU. This rate is 137.7 kg / ha for Turkey in the same year and is below the world and EU average. According to the National database, 2018 Turkey fertilizer use is 112 kg / ha. Turkey maintains its advantageous location for organic agriculture in this regard. Consumption and production values of selected fertilizers for the period 2004-2018 are presented in tables and figures.

Table 57. Consumption and Production Values of Selected Fertilizers in Turkey for the period of 2004-2018

TYPE of FERTILIZER	Consumption			Production			Coverage Rate (%) of Production to Consumption
	2004 (tons)	2018 (tons)	Change (%)	2004 (tons)	2018 (tons)	Change (%)	
Ammonium Sulfate	292,950	640,445	119	111,112	83,821	-25	13
Ammonium Nitrate (26 N %)	929,300	679,466	-27	980,607	1,022,715	4	151
Urea	862,068	1,714,734	99	390,709	502,148	29	29
Diammonium Phosphate	568,527	381,895	-33	42,299	259,700	514	68
20-20-0	870,242	746,605	-14	688,912	604,273	-12	81
Other	1,652,097	1,248,736	-24	978,464	1,554,347	59	81
Physical Total	5,175,184	5,411,881	5	3,192,103	4,027,004	26	74
Total Plant Nutrients	2,044,544	2,164,158	6	1,189,667	1,552,851	31	72



Source: MoAF

In Turkey, the ratio of fertilizer consumption to potential demand is 59%, and the ratio of production to potential demand is 42%.

In Turkey, fertilizer prices are in line with world fertilizer prices. Supply-demand balance in the world, international fertilizer and raw material prices, fluctuations in exchange rates, income level of producers and agricultural supports affect fertilizer prices. Fertilizer prices in Turkey are affected by increase in exchange rate in the last three years.

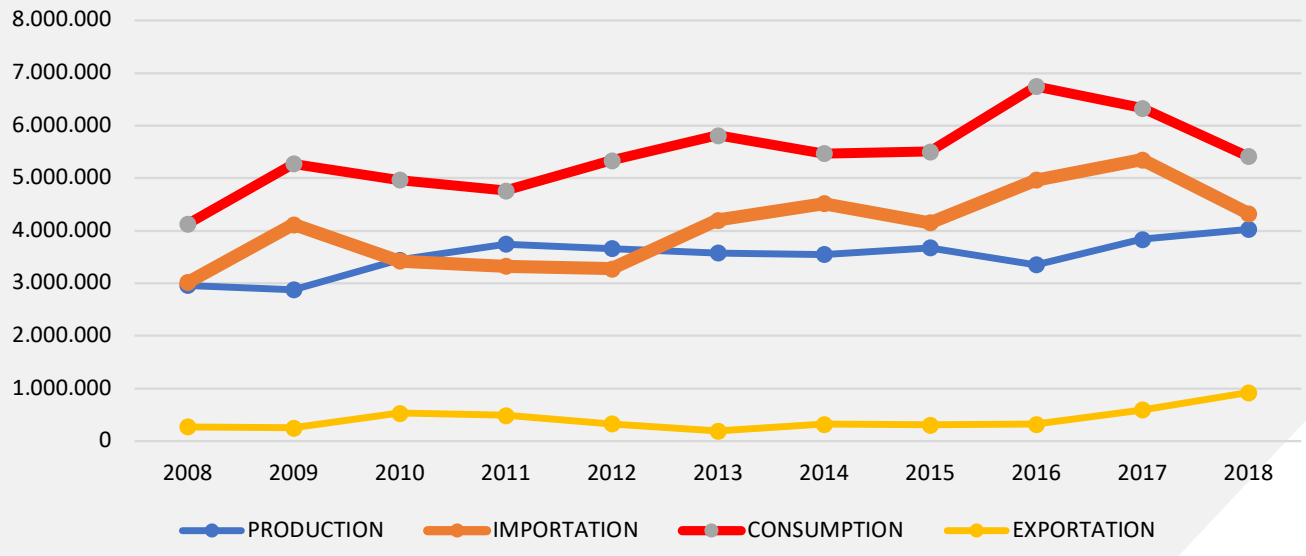
The unconscious use of fertilizers both pollutes the groundwater and causes significant economic losses. On the other hand, when less fertilizer is implemented than the amount needed by the plant, not enough crops are obtained and economic losses occur again. In order to eliminate these production losses, it is important to determine the accurate fertilizer need in accordance with the results of soil analysis and to make fertilization by taking into consideration the plant species to be planted/sown.

Some measures taken at national level in order to make the soil analysis support more effective throughout the country are taking soil samples by the personnel of authorized laboratories, using GPS when taking samples, taking into consideration the time elapsed between sampling. To this end, MoAF has made it necessary to carry out soil analysis for 50 da and larger land in order that fertilizer support could be given to farmers since 2009. Soil analysis support was launched in 2005in order to increase the awareness of farmers about fertilizer usage based on soil analysis and to make the fertility of land sustainable. On the other hand, legislative studies are carried out in order to make necessary improvements.

The effect of proper fertilization on the increase in crop production varies between 50-100%. Fertilizer use in Turkey as a pure substance (2.2 million tons) remains below potential needs (3.3-3.6 million tons).

Although our organic fertilizer production capacity is 2.5 million tons, our current production is 1.5 million tons. There are 350 organic fertilizer production companies in Turkey. Organic sourced products require organic soil improvers, mineral soil improvers, microbial and enzyme-based products.
Chemical fertilizer usage efficiency in our soils is 20% in phosphorus fertilizers and 50% in nitrogenous and potassium fertilizers.

Year	Production (ton)	Importation (ton)	Total (ton)	Consumption (ton)	Exportation (ton)	Total (ton)
2008	2,960,929	3,015,987	5,976,916	4,129,256	270,244	4,399,500
2009	2,878,452	4,117,454	6,995,906	5,275,619	253,417	5,529,036
2010	3,446,765	3,425,593	6,872,358	4,968,058	530,331	5,498,389
2011	3,749,921	3,327,185	7,077,106	4,766,356	487,253	5,253,609
2012	3,661,156	3,280,522	6,941,678	5,339,893	329,320	5,669,213
2013	3,576,598	4,206,030	7,782,628	5,813,612	194,247	6,007,859
2014	3,547,796	4,515,395	8,063,191	5,471,518	319,479	5,790,997
2015	3,674,262	4,156,178	7,830,440	5,507,780	310,377	5,818,157
2016	3,358,324	4,965,357	8,323,681	6,744,922	321,717	7,066,639
2017	3,841,645	5,353,780	9,195,425	6,332,872	594,560	6,927,432
2018	4,027,004	4,331,739	8,358,743	5,411,881	924,796	6,336,677

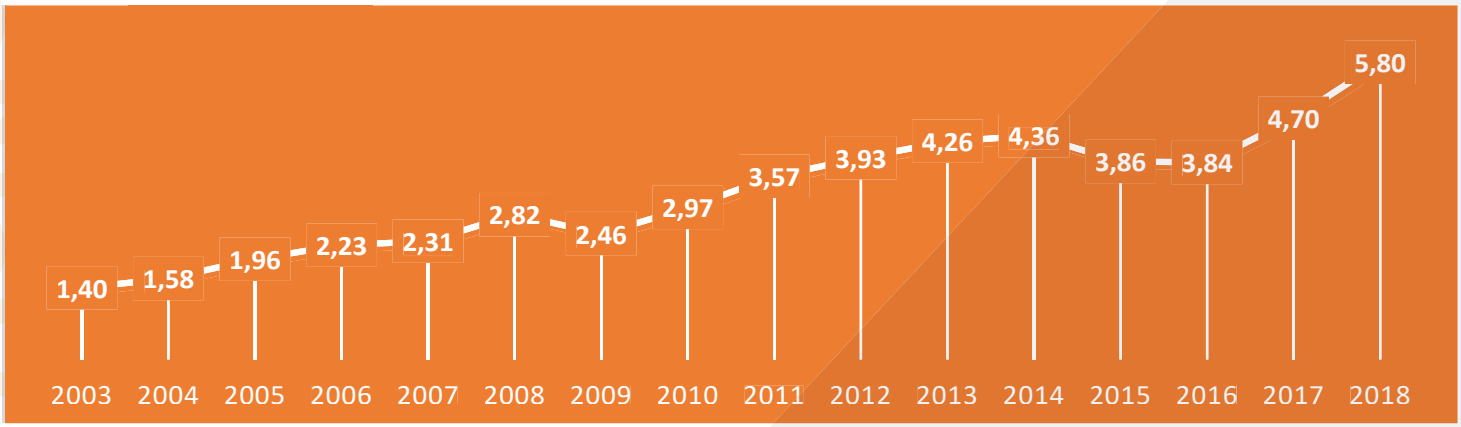


Source: MoAF

Table 58. Comparison of Fertilizer Data by Years

5.2 LIQUID FUEL (DIESEL)

One of the most important issues affecting production costs is the change in diesel prices. Diesel costs affect all logistic costs from planting to harvesting and delivering the product to the end consumer. There is a support mechanism implemented by the MoAF , in line with WTO commitments on fuel, and farmers registered in the national farmer registration system can benefit from this support mechanism. However, according to the MoAF sources, the change in diesel prices is broadcasted periodically from 2003 to 2018, when support began. Based on the agricultural area data announced by TurkStat, an average of 1.5 million tons of diesel is consumed annually for agricultural activities.



Source: MoAF

Figure 15. Annual Diesel Prices Change (TRY /l)

In this respect, in order to reduce the input costs in Turkey, renewable energy use is encouraged and studies on biofuel production are continuing.

[51]Ministry of Agriculture and Forestry, Plant Nutrition Statistics, (access 08.09.2019), https://www.tarimorman.gov.tr/Topics/Plant-Production-Production-Feeding-and-Agricultural-Technologies/Plant-Feeding-Statistics.

5.3. ENERGY COSTS-AGRICULTURAL IRRIGATION

Irrigation cost is composed of water and electricity cost. According to the data of the MoAF, Directorate General of State Hydraulic Works (DGSHW), irrigation for agricultural purposes is approximately 74% in water use by sectors. According to FAO , 69% of water resources in the world are used for irrigation. As in the world, in Turkey, especially in order to meet the nutrition needs of rapidly growing population, the need for irrigation for crop production is increasing.

According to TurkStat, electricity consumption for agricultural irrigation in Turkey is presented in the table. Accordingly, electricity consumption for agricultural irrigation increased 5 times in 2017 compared to 1995. Electricity consumption prices are regulated by Energy Market Regulatory Authority (EMRA) in Turkey and operated by the private sector.

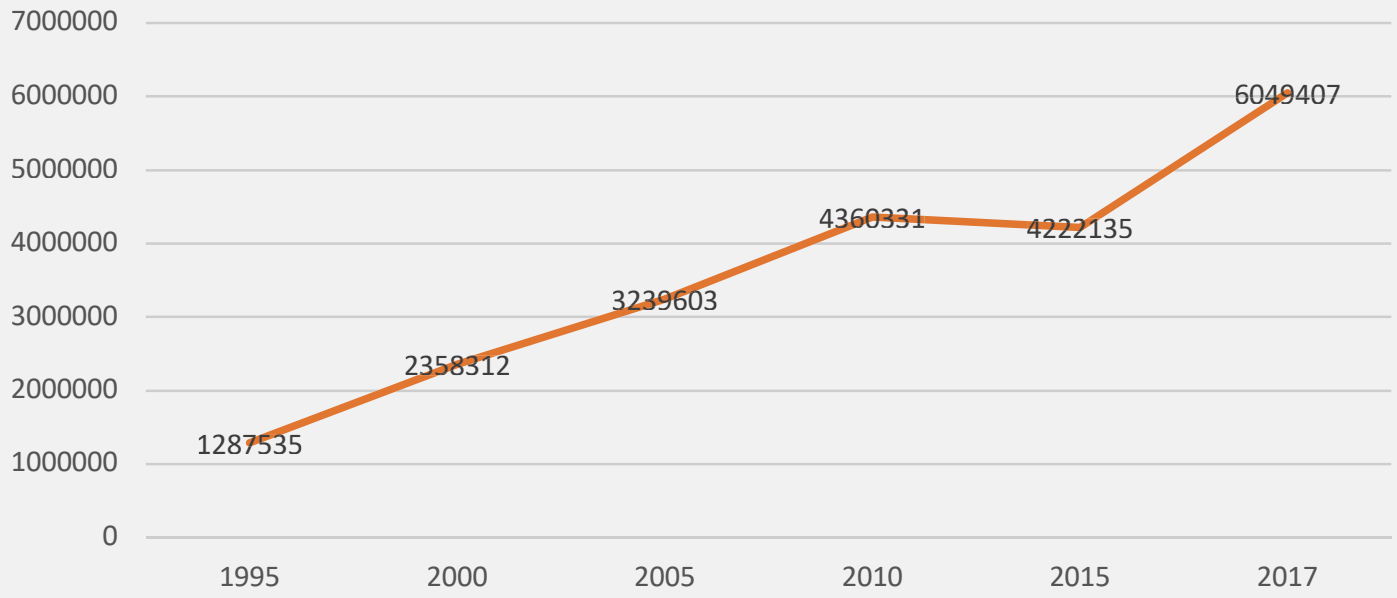


Figure 16. Electricity consumption for agricultural irrigation (MWh)

Source: TurkStat

On the other hand, the water usage service costs to be applied in irrigation facilities operated by irrigation associations are announced by the MoAF per plant basis. Accordingly, irrigation facilities operated by irrigation associations are divided into 5 groups and irrigation associations determine the water usage service costs to be taken from the beneficiaries of irrigation facilities not less than the operation and maintenance fee tariffs announced on the basis of equivalent budget and financial sustainability principles. Various R & D projects have been developed by DGSHW to cover the energy costs of the pumping stations from solar energy systems (SES). The first of these is the Samsat SES Project, which was installed in the province of Adıyaman with the power of 1MW + 1MW in order to meet the energy needs of Samsat Pumped irrigation, and energy production started.

[52]http://www.fao.org/nr/water/aquastat/tables/WorldData-Withdrawal_eng.pdf
https://cevreselgostergeler.csb.gov.tr/su-kullanimi-i-85738
[53]It is possible to access the group list from the same source.

In addition, the possibilities of establishing a SES on the legs of 80 ha between the maximum and normal water levels in the southern part of the Keban Dam reservoir were investigated on the downstream slope of the Atatürk Dam, the lake area and the Mardin Main Canal. The results to be obtained from the plant in operation will guide the studies on the establishment of SES for other supported irrigation.

Ministry of Agriculture and Forestry General Directorate of Agricultural Research and Policies (DGARP) carries out projects for the efficient use of renewable energy resources in agriculture within the scope of efficient use of water for agricultural purposes and protection of water resources. These are;

a) Solar Battery Irrigation Canal Pilot Project: With the project, the first solar agricultural enterprise will be established in the GAP Region so as to meet the electricity demand in agricultural irrigation with solar cell system. When they start to work, the fields and gardens around 50 ha will be irrigated by modern irrigation systems such as; sprinkler, drip, and underground drip and mini sprinkler systems.

b) Solar Pivot Center Pivot Irrigation System Project: The project aims to integrate solar cells into the center pivot. Therefore, the presence of solar cells will reduce the cost of energy spent per unit area and the use of alternative energy sources in agriculture will become widespread. In addition, the first one will be realized by adapting the solar cell system to the Center pivot system, which is one of the modern irrigation systems.

c) Improving Energy Efficiency in Irrigation Pumps Pilot Project: The outputs of the project will reveal the current efficiency of the pumping systems in the research area and suggest how to increase the efficiency. In the light of this information, the most suitable methods will be determined for the region conditions and an example will be created to ensure the initiation of the necessary changes in the pumping systems and to emphasize the importance.

d) Investigation of the Possibilities of Generation and Use of WPP and Solar Cell Powered Electricity for Agricultural Irrigation (Case of Eskişehir): In the project, determining the performance advantages of the systems between SES and wind energy system (RES) for each other in Eskişehir conditions; calculation of 1 Kwh of the cost of acquisition through GES and RES, comparison of these systems and determination of which system will pay for itself in how much time in practice, irrigation, crop drying, product storage, heating, cooling, lighting and so on. In addition, the energy used by MoAF's the Institute for agricultural irrigation will be provided and the most efficient system for agricultural irrigation will be determined and recommended to the farmers.

5.4 SEED

Increase in agricultural productivity is dependent on the usage of quality seed and studies carried on seed have an important strategic role for countries. Seed sector has been gaining more importance in the countries like Turkey that have significant agricultural export and increasing population.

It has become a 53 billion USD huge industry, which is being expected to grow by 7.1% between 2018-2023. Hybrid seed sector is worth 28 billion dollars and expected to grow by 8.2% by 2023. Turkey is one of the leading countries in world seed market.

In the table, the data related to world seed market is presented. Accordingly, while the biggest two shares belong to USA and China, Turkey has a share of 1.7% same as Italy. On the other hand, cereals, oil seed plants, flowers and grass plants are predominant in world seed trade.

Country	Value (Million $)	Share (%)
USA	12,000	26.7
China	9,950	22.1
France	2,800	6.2
Brazil	2,625	5.8
Canada	2,120	4.7
India	2,000	4.5
Japan	1,350	3.0
Germany	1,170	2.6
Argentina	990	2.2
Italy	767	1.7
Turkey	750	1.7
Spain	660	1.5
Netherlands	590	1.3
Russian Federation	500	1.1
England	450	1.0
South Africa	428	1.0
Australia	400	0.9
South Korea	400	0.9
Others	4,975	11.1
Total	**44,925**	**100**

Table 59. World Seed Market

Source: International Seed Federation (ISF), MoAF (2019) *ISF- 2012-(£/$=1.3)

According to the 2013 ISF data, world seed export on arable crops is 4 million tons and worth 7.8 billion USD. Seed trade of the world in total, which was nearly 1 billion USD at the end of 1970's, started to increase rapidly in the mid 1980's. Two major players in international seed trade are USA and EU Countries.

Seed import of the world in total is 4.2 million, which is worth 7.12 billion USD. The leading importer countries are USA (901 million USD, 311 thousand tons), Germany (632 million $, 253 thousand tons) and France (617 million USD, 171 thousand tons).

The Law No 5042 on Protection of Breeders' Rights for New Plant Varieties in 2004 and Seed Law Numbered 5553 in 2006 entered into force, in conformity with the related EU legislation. Furthermore, due to the fact that Turkey became a member of ISF in 1998 and of UPOV in 2007, global integration has supported private sector entrepreneurship.

In parallel to these developments, activities and expertise areas, commercial species and varieties, employment capacity, new technology utilization regarding processing and production and R&D investments have increased. Moreover, trade, production and use of certificated seed have improved substantially. As a result, quality and productivity have increased considerably.

According to Seed Law, with the aim of increasing productivity and quality in plant production, ensuring the quality of the seed, making the regulations with respect to seed production and trade, realization of regulations that are required for restructuring and improving of the sector, a union and 7 sub-unions were established to help to organize the sector. With this law, the sector has an organized structure in the form of a professional organisation with public institution status. Under the framework of Turkey Seed Growers Association (TÜRKTOB), sector has been organized as sub-unions according to their working areas; Sub Union of Seed Industrialists and Producers (TSÜAB), Sub Union of Plant Breeders (BİSAB), Sub Union of Sapling Manufacturers (SUSM), Sub Union of Seedling Growers (FİDEBİRLİK), Sub Union of Seed Growers (TYAB), Sub Union of Seed Distributors (TODAB) and Sub Union of Ornamental Plant Producers (SÜSBİR).

In Turkey, new plant varieties are protected under the Law on Protection of Breeders' Rights for New Plant Varieties. After this law was put into force in 2004, the number of breeding companies based on R&D has increased considerably.

Moreover, Biosafety Law No.5977 prohibits entrance and production of seeds or other agricultural products that contains GMOs in Turkey.

Turkey's certified seed production between 2002-2018 is shown in the table.

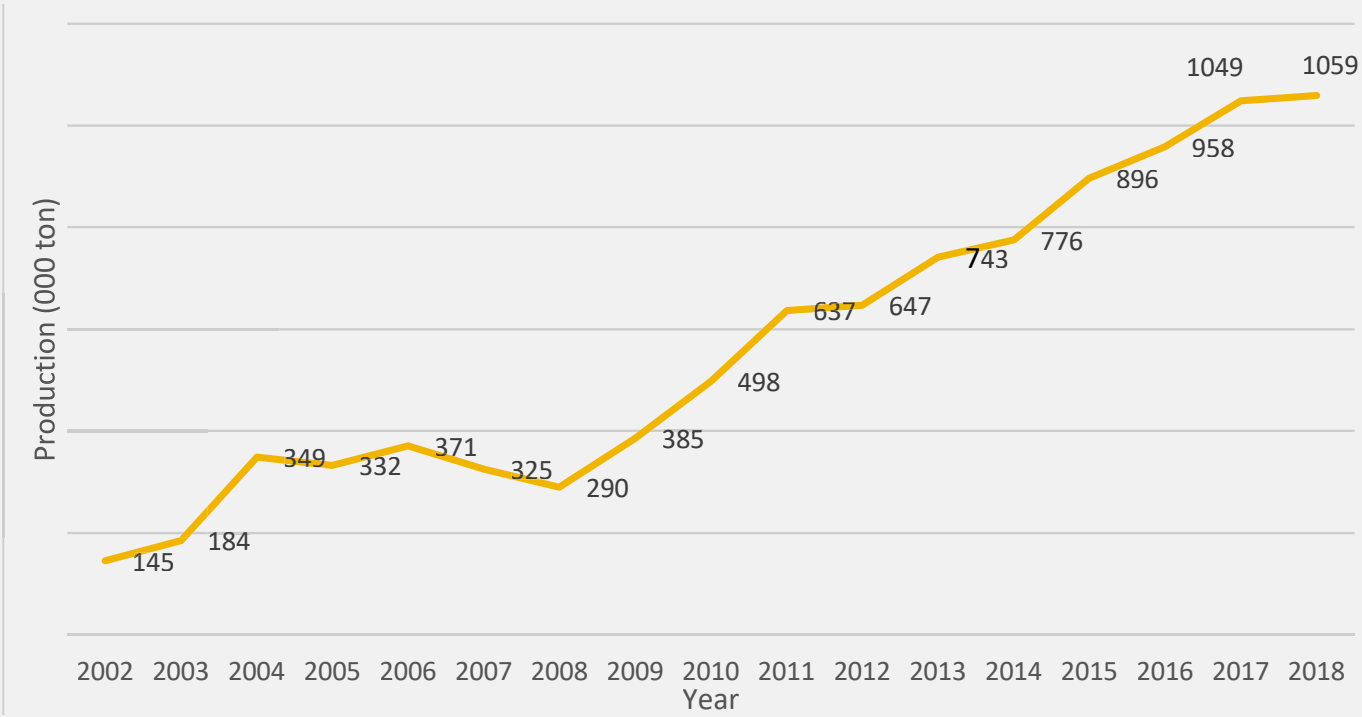


Figure 17. Turkey's Certified Seed Production (2002-2018)

Source: MoAF

General Directorate of Agricultural Enterprises (DGAE), which is an affiliated body of MoAF is an important producer of certified seed. It mostly produces respectively common and durum wheat, barley, triticale, common vetch, lentil, alfalfa, trefoil, chickpea, oat, haricot beans and soybean. 700,000 tons of certified seed is required for 2.7 million ha barley and 7.7 million ha wheat areas that are cultivated in Turkey and DGAE supplies for 25% of this requirement.

Turkey aims to comply with international production standarts and trade rules to evoke its potential, benefit its advantages and have a voice in global seed industry. In this point, Turkish seed sector, with its production capacity, R&D activities, technical infrastructure, rich biodiversity, ecological heritage and geographical location, relations with international institutions, and legal infrastructure, has outstanding advantages in international markets.

Our local seed companies have become competitive with newly bred varieties of hybrid vegetables, cotton, sunflower, maize, etc..

Our seed sector has made significant progress in terms of technology transfer, capital stock and human resources thanks to cooperation with both local and foreign companies.

Seed production in certain varieties are shown in the table. The highest increase is observed in lentil, chickpea and peanut between 2002-2018.

Varieties	2002	2005	2010	2015	2016	2017	2018	2002-2018 (Increase rate-times)
Wheat	80,107	176,202	315,676	484,204	**485,225**	**508,191**	**426,658**	5.33
Barley	4,376	22,307	34,416	125,018	**99,628**	**119,474**	**151,365**	34.59
Maize	15,896	30,167	35,234	56,671	**52,791**	**58,094**	**62,230**	3.91
Paddy rice	1,293	3,505	5,521	8,945	**12,958**	**10,491**	**10,565**	8.17
Sunflower	4,575	6,522	11,854	17,494	**21,757**	**28,022**	**25,028**	5.47
Soybean	595	201	1,982	2,443	**3,664**	**4,101**	**3,230**	5.43
Peanut	1	101	70	139	**206**	**197**	**160**	160.00
Sugar beet	1,421	2,720	466	1,448	**1,168**	**1,195**	**1,818**	1.28
Potato	21,375	63,901	70,654	175,397	**231,592**	**258,180**	**276,390**	12.93
Cotton	11,585	19,581	15,679	8,883	**14,379**	**19,929**	**25,141**	2.17
Chickpea	198	157	253	2,305	**4,059**	**10,658**	**31,990**	161.57
Haricot Bean	29	30		109	**179**	**624**	**1,032**	35.59
Lentil	14	285	107	1,140	**14,505**	**12,290**	**22,011**	1572.21
Canola	20		107	82	**31**	**6**	**9**	0.45
Vegetable	1249	1,942	2,500	2,782	**3,291**	**3,832**	**2,042**	1.63
Sesame	3		1	0	**18**	**0**	**3**	1.00
Alfalfa	269	476	349	634	**794**	**887**	**3,000**	11.15
Trefoil	411	1,232	56	31	**188**	**385**	**307**	0.75
Vetch	1,246	2,050	858	974	**1,114**	**1,139**	**1,572**	1.26
Sorghum	123	160	180	308	**192**	**79**	**63**	0.51
Safflower	-		397	644	**772**	**975**	**361**	
Turnip for crib	-	5		18	**53**	**6**	**11**	
Beet for crib	22	10	26	61	**36**	**31**	**10**	0.45
Grass Plant and Timothy Grass	406	636	56	236	**107**	**167**	**404**	1.00
Fodder Peas	-		40	811	**1,585**	**2,321**	**2,121**	
Others	13		1,483	5,522	**7,734**	**8,091**	**11,795**	907.31
Total	145,227	332,190	497,964	896,298	**957,925**	**1,049,366**	**1,059,316**	7.29

Table 60. Seed Production (tons)

In seed production, the share of private sector has increased substantially, and its share is 80.16% in the total production in 2018.

On the other side, for a successful plant cultivation, it is enormously important to choose right variety and use quality seedling. Especially for seedlings grown in greenhouse cultivation are produced in modern production facilities substantially. In plant production until the mid-1990, seedling growing was provided mostly by seedling growers. First modern seedling growing facilities were established in Antalya, in 1994. Due to the difficulty of traditional seedling growing, demand of seedlings-ready-to-plant that are grown under controlled conditions is increasing. Each year, both number of producers who use these seedlings that provide high quality and productivity and utilization of seedlings-ready-to-plant are increasing. Considering this fact, companies are developing their capacities and contribute to the improvement of the sector. By means of technology, grafting has become possible in seedlings-ready-to-plant sector. In Turkey, there are not much breeding programs regarding rootstock breeding that is used for producing seedlings, although certain research institutes and certain private companies have started these kinds of rootstock breeding programs lately.

While grafted seedling production was predominantly tomato seedling in the first years, significant amounts have been achieved in the production and use of grafted watermelon seedlings in recent years. Strawberry seedling, fruit and vine certified sapling productions have increased considerably since 2002. In 2002 with 4.5 million strawberry seedling, certified sapling production has increased 47 times, to 188.6 million.

The seedling production is shown.

Year	2010	2012	2013	2014	2015	2016	2017	2018
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

Source: TÜRKTOB

Table 61. Annual Seedling Production (1,000 unit)

Ornamental plant production has increased since 2002. In the table, ornamental plants cultivated areas and amount of production are presented.

Product Group	2002	2015 (da)	2016 (da)	2017 (da)	2018 (da)	2015 million units	2016 million units	2017 million units	2018 million units
Cut Flower	10,097	11,826	12,015	11,748	11,920	1,036	1,041	1,051	1,056
Indoor Ornamental Plants	800	1465	1,313	1,651	2,081	41	38	56	60
Outdoor Ornamental Plants	8,017	32,293	34,877	36,263	37,306	451	409	491	507
Flower bulbs	256	613	597	427	493	27	25	22	89
Total	**19,170**	**46,197**	**48,802**	**50,089**	**51,802**	**1,555**	**1,514**	**1,619**	**1,712**

Table 62. Ornamental Plants Cultivated Areas (da) Amount of Production (million units) Production (1,000 unit)

Source: MoAF and TurkStat

96 % of the seedlings and saplings that are used for fruit growing are produced and certified in Turkey. Fruit sector in Turkey, which uses 10% of the arable land with 15.3 million tons of production, has a share of 2.3% in world total production and high competition potential.

Recently, with the support mechanisms, increase in investments in commercial and modern fruit orchard instalments have been seen.

Sapling sector has an important position in seedling sector and in plant production. Sapling sector has 106.5 million unit production (2018) compatible with the international standards, import value of the sector amounts to 2.3 million USD, and export value of the sector amounts to 38 million USD.

While sapling production of Turkey was 3.5 million in 2002, it increased by 30 times and reached to 106.5 million (certified) in 2018. Turkey has self-sufficiency of this product and exports 40% of its production.

5.5. PLANT PROTECTION PRODUCTS (PESTICIDES)

Another important input in agricultural production is plant protection products. Plant protection products as defined in Law No. 5996 are active substances and preparations presented to the user in a formulation containing one or more active ingredients to control or prevent undesired plant growth, destroying unwanted parts of plants or whole plants, protecting plants or plant products against harmful organisms or preventing the effects of these organisms, affecting plant development other than those intended for plant nutrition, which are not covered by a special regulation on preservatives, but which are used as preservatives for plant products.

It is inevitable to combat against harmful organisms that cause problems in agricultural production. Improper plant protection practices result in not only product losses but also in quality losses. This situation will bring substantial losses on both producer and state economy, and in case of large scale losses, even the food security might be threatened. According to FAO, annual product loss caused by harmful organisms and diseases is about 40%. According to the assessments of some researchers, these losses might be doubled when the plant protection products are not used.

Agrochemical combat, i.e. combat using plant protection products is the most preferred method due to the fact that the effects of those products can be seen by producers easily and in a short time-period, they can be applied to more than one harmful organisms at the same time, they are easy to use, accessible and economical, and they do not require too much labour.

The authorization, production, importation, use, packaging, labelling, promotion, transportation, storage, prescribed and unprescribed sale and control of plant protection products in Turkey are dealt by GDFC under the “Law No.5996 on Veterinary Services, Plant Health, Food and Feed”. Implementations and detailed procedures on these products are regulated by by-laws that are enacted pursuant to the Law No. 5996.

In the authorization process, plant protection products are assessed based on toxicology, ecotoxicology, biological effectiveness, physical and chemical features, and their authorization status in the world. Then they are authorized when the competent authorities officially approve them.

It is not possible to use a plant protection product which is prohibited or restricted in the world. Moreover, the production and import of prohibited plant protection products due to their toxicology are not allowed in Turkey.

The preparations which are assessed and authorized as plant protection products are pesticides, plant growth regulators (PGRs), attractants, repellents, insect growth regulators (IGRs), antinutrients, biopreparations, plant activators, substances that are used for physiological diseases, biological combat factors, traps and pheromones.

Product groups under pesticides are acaricides, insecticides, fungicides, herbicides, rodenticides, molluscicides, plant activators, plant growth regulators, attractants, fumigants and nematicides. Rules and principles regarding trials and authorization of other materials that are defined as plant protection products but not specifically handled by the relevant legislation are separately regulated by the MoAF.

5.6. AGRICULTURAL EQUIPMENT AND MACHINERY

Statistics related to agricultural equipment and machinery in Turkey are shown in the table. Accordingly, the number of milking machine and its installation increased at most and highest increase was seen in fertilizer distributor (97.82%), sowing machine (73.37%) and tractor (71.48%).

YEARS	Plough	Sowing Machine	Fertilizer Distributor	Water pump	Milking machine installation	Portable milking machine	Combine harvester	Tractor
1995	1344188	271152	219285	464806	1402	34191	12706	776863
2000	1355813	319648	297294	513537	6093	83802	12578	941835
2005	1354383	343200	328515	554672	5571	130087	11811	1022365
2010	1364033	392751	369063	607490	7280	208457	13799	1096683
2015	1360830	442607	403541	683056	9744	292405	15998	1260358
2018	1378985	470085	433791	721516	12856	332595	17266	1332139
% change between 1995-2018	2.59	73.37	97.82	55.23	816.98	872.76	35.89	71.48

Table 63. Statistics of Agricultural Tools and Machinery

Source: TurkStat

In 2018, Turkey exported agricultural machinery to 120 countries with an amount of 830 million USD (excluding tractor components and parts amounted to approximately 150 million dollars). In 2018, the top 10 exporting countries were USA, Italy, Azerbaijan, Iraq, Uzbekistan, Sudan, Bulgaria, Algeria, Australia and Serbia. Turkish agricultural machinery industry ranks 5th in terms of export size and foreign trade balance within the sub-categories of general machinery industry.

As reported by the Union of Turkish Agricultural Chambers (UTAC), the purchasing power of farmers has a major role in the development of agricultural mechanization. Among the agricultural input items, the most expensive one is mechanization. In this respect, while Turkey attaches importance to technology and innovation transfer, it supports agricultural R & D activities. Studies have been initiated under the leadership of the MoAF for the production and commercialization of electric tractor. Testing process is in progress.

5.7. LABOUR FORCE

Employment, unemployment and labor force participation rates are important indicators in terms of giving an idea about the contribution of the sectors to the national income, level of the welfare, labor resource and potential of the countries. Employment is also a sociologically important indicator and strongly associated with social security services.

Agriculture offers a wide range of employment opportunities for people living in rural areas in underdeveloped and developing countries. [54]

As reported by ILO (2019), the share of agriculture in total employment is shrinking in all country income groups. On a global scale, the share of agriculture in total employment declined from 44% in 1991 to 28% in 2018, with the largest contribution attributable to the middle-income group. In low-income countries, according to the 2018 data, 63% of employee is currently employed in the agricultural sector. Moreover, this rate has decreased by only 8% since 1991. In the table, agricultural employment rates of 1991 and 2018 are indicated comparatively by country income groups.

Country Income Group	1991	2018
Low Income Group	71	63
Lower-middle Income Group	57	40
Upper-middle Income Group	49	22
High Income Group	6	3

Table 64. Changes in Agricultural Employment in 1991 and 2018 by Country Income Groups, %

Source: ILO (2019)

According to International Labour Organization Statistics (ILOSTAT) data compiled by World Bank, agricultural employment-related key indicators are presented in the table for 1991 and 2018 period in the scale of Turkey and the world.[55]

Indicators	World		Turkey	
	1991	2018	1991	2018
Share of Agriculture in Total Employment,%	43.784	28.266	47.805	19.2
Employment in Agriculture Sector, Men,%	43.981	28.713	34.548	15.159
Employment in Agriculture Sector, Women,%	43.476	27.56	77.047	27.886

Table 65. Basic Labor Indicators in the scale of World and Turkey

Source: World Bank Data Base

According to World Bank data, agricultural employment rate in terms of labor share was 47.8% of total employment in Turkey in 1991, which indicates people of working age who are involved in any activity of the labor share with the aim of profit or payment or production of goods, while this rate decreased to 19.39% in 2018, which is well below the world average. In Turkey agricultural employment is shifting toward industry and services sector in connection with the development level of the country.

54) https://www.ippmedia.com/en/features/importance-agricultural-sector-country%E2%80%99s-economic-development. Date accessed: 09.09.2019.
55) https://data.worldbank.org/indicator/SL.AGR.EMPL.MA.ZS. Erişim Tarihi: 09.08.2019

5.8 FEED

Forage plant seed requirement of the country, which is an important input in animal husbandry, is shown in the table in terms of seed need, production volume and supply-need ratio according to the 2017 data.

Product	Seed need (ton)	Production volume of certified need (ton) (2017)	Supply-Need Ratio (%) (2017)
Clover	3.305	887	26,9
Sainfoin seed	6.543	385	5,9
Vetch seed	9.866	1.139	11,5

Table 66. Production Volume and Supply Need Ratio

Out of domestic certified seed production volume;

- %80 of clover,
- %55 of sainfoin seed,
- %92 of vetch seed were registered by institutes and DGAE.

Production costs of compound feed used in animal husbandry are shown in the table.

Years	Cattle fattening feed	Cattle milk feed	Broiler feed	Egg feed	Other compound feeds**	Total
2010	2.169.487	3.466.422	3.453.846	820.753	1.257.022	11.167.530
2011	2.686.728	3.875.836	4.141.768	953.819	1.504.190	13.162.340
2012	2.881.354	4.365.168	4.224.111	1.058.733	1.959.173	14.488.539
2013	2.846.217	5.163.788	4.083.687	1.602.364	2.265.811	15.961.867
2014	3.386.565	5.621.664	3.979.945	2.480.547	2.534.895	18.003.616
2015	3.320.221	5.384.586	4.779.916	3.417.209	3.203.051	20.104.983
2016	3.827.073	5.840.262	4.566.237	2.958.232	3.210.048	20.401.852
2017	4.594.552	6.171.275	4.753.989	3.369.655	3.528.862	22.418.333
2018*	3.705.913	5.125.296	3.865.302	2.652.771	2.785.269	18.134.551

Table 67. Production Amount of Compound Feed (Years of 2010-2018) (ton / year)

*Compiled from GGBS by the end of November. Data entry is in progress.
**Other Feeds: Ovine feeds, fish feeds, horse feed, home and ornamental animal feeds, bee cakes and etc.

According to Turkish Poultry Meat Producers and Breeders Association (BESD-BIR) feed input in poultry growing for white meat accounts for almost 70% of the total cost. Maize (50%), soy, vitamins, minerals, and enzymes are used in feed content. Where sufficient maize is produced, self-sufficiency needs for maize are met in Turkey, the use of rendering products (such as poultry by-products/feather/blood powder) which is not available for consumption but which can be used in slaughterhouses as a protein source in feed is prohibited. Feed additives such as enzymes, vitamins and minerals used in feed are often imported.

Technical service in poultry production is usually provided by the veterinarian working at the company. In addition, foreign consultants of foreign product supplier companies could provide trainings. In Turkey, the number of academicians/staff specialized in their fields is sufficient. Veterinary medicines and vaccines are subject to external dependence. Taking into consideration the situation of the poultry health, it is possible to manufacture drugs and vaccines domestically.

In aquaculture (including inland water), approximately 50% of the fish flour requirement used for feed production is imported from abroad.

FOOD PROCESSING INDUSTRY 06.

Ensuring the sustainability of supply chains for food and beverage companies is quite important for their long-term existence. Carrying out tasks to support sustainable implementations for protection of natural resources is among the priorities of the MoAF. In addition, MoAF strengthens and extends the R & D studies of the industry on the environment, contributes to the development of important environmental policies such as sustainable production and consumption, energy, climate change, water, waste and resource management, as well as encouraging the efficient use of resources at all stages of the chain like agriculture, production, retail and consumption.

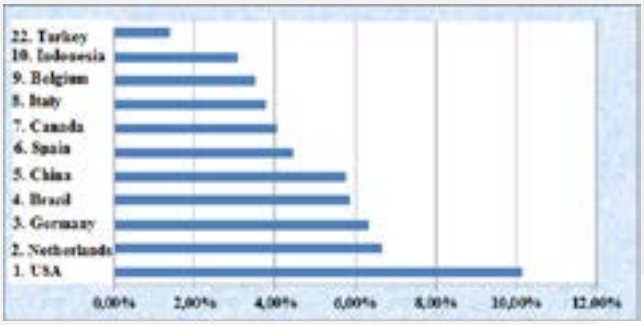


Figure 18. Export Size in the Global Food and Beverage Sector (%)

According to the 2018 data of the UN Trade Map, the export share of Turkey in the global sector of food and beverage is 1.39% and it ranks 22nd.

Countries	Agricultural Production Value for Food (billion $)
China	1.181
Venezuela	675
India	340
USA	320
Brazil	153
Indonesia	134
Japan	86
Russia	70
France	65
Turkey	64

Table 68. Top 10 Countries in Agricultural Production for Food in the World

	2010	2011	2012	2013	2014	2015	2016	2017
AGRICULTURAL SECTOR	524	523	769	807	1,067	777	730	1,497
Agriculture, Hunting and Forestry	524	523	769	807	1,067	777	778	1,497
INDUSTRIAL SECTOR	66,112	55,268	80,990	63,054	78,582	66,427	56,228	78,352
Mining And Quarrying	3,433	2,575	5,292	3,498	3,620	2,734	2,185	4,542
Manufacturing	46,953	34,311	51,953	46,525	57,813	48,836	42,781	58,248
Manufacture of food, beverage and tobacco products	11,500	7,881	14,505	11,160	12,309	10,974	9,496	11,674
Electric, gas, steam and air conditioning production and distribution	15,363	18,149	23,398	12,946	17,063	14,803	11,208	15,490
water supply, sewage, waste management and remediation activities	363	233	347	85	86	54	54	72
SERVICES SECTOR	114,535	75,121	102,008	79,614	95,153	80,383	79,477	101,461
TOTAL	181,171	130,912	183,767	143,475	174,802	147,587	136,435	181,310

Source: MoIT (2019)

Turkey is expected to become an effective player in the global food and beverage market by year. Turkish food and beverage sector is one of the most attractive areas for foreign investors.

Table 69. Distributions of Non-residents' Direct Investments by Sectors in Turkey (million $)

6.1 PRODUCTION TRENDS IN THE SECTOR AND MAIN PRODUCTS PRODUCED

In recent years, the improvements on seed growing and organic agriculture await entrepreneurs as investment areas. Organic agriculture is developing rapidly in the World. Currently, Turkey exports almost all its organic certified organic food products, mostly to Europe (approximately 85%). GAP Organic Agriculture Cluster Project, which was conducted by the GAP, has increased the organic production capacity of this region and Turkey, and carrying out similar projects is expected to further develop the available potential [56].
The consumption of grain and grain products ranks 1st in Turkey. Vegetable consumption ranks second after grain group. The most consumed dairy products are yogurt and various cheeses. In addition, the potential of "halal food" production offers important opportunities for Turkey whose population is mostly Muslim. According to Association for the Inspection and Certification of Food and Supplies (GIMDES), while the halal food demand potential of 2 billion Islamic community is USD 860 billion, only 14% of it could be met [57] .
In this context, Halal Accreditation Agency has been established to accredit halal conformity assessment bodies, to ensure that these bodies operate in accordance with national or international standards, and thus to ensure the national and international acceptance of their issued documents under the Law No. 7060 in 2017.

6.2 THE REGIONAL STRUCTURE OF THE SECTOR AND CLUSTERING

"Regulation on Clustering Support Program" was published on Official Gazette by the Ministry of Industry and Trade. The aim of the regulation is to support clustering initiatives which has importance at national level and has the potential of sustainability and which are mostly in manufacturing industry in order that Turkish Industry has a bigger share in World Trade, produces high technology products through improved productivity and competitiveness, has a qualified labor force, sensitive to environment and the community 5. In Turkey, SMEs on food and beverage industry can be seen almost everywhere. Regional clustering in food and beverage industry is focused in Marmara, Aegean, Anatolia and Mediterranean Regions respectively. At provincial level, food and beverage enterprises are focused in Istanbul, İzmir, Gaziantep, Ankara and Bursa provinces.

56) Ministry of Industry and Technology, 2019, Date of Access:11.09.2019
57) http://www.gimdes.org/, Date of Access:11.09.2019

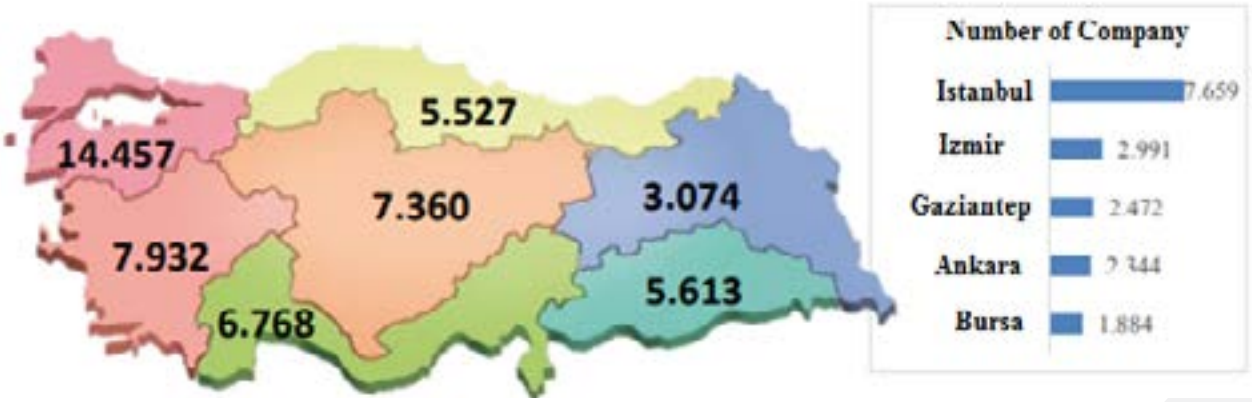


Figure 19. Number of Food and Beverage Companies according to the Regions and the Provinces with the Highest Number of Enterprises.

6.3 NUMBER OF ENTERPRISES AND EMPLOYMENT IN THE SECTOR

As can be seen in the table below, according to the 2018 records of Social Security Institution (SSI), 3,668,237 out of 14,477,817 registered employees are working in manufacturing industry and 446,064 of them work in the production of food items, 15,625 work in beverage production

SECTOR	2013		2014		2015		2016		2017	
	Enterprises	Employment	Enterprises	Employment	Enterprises	Employment	Enterprises	Employment	Enterprises	Employment
Food	41,661	417,671	41,657	434,180	41,975	441,794	41,896	434,823	42,846	446,064
Beverage	640	13,727	641	14,523	648	15,104	658	14,695	665	15,624

Table 70. Number of Enterprises and Employment in the Sector

Source: SSI (2018)

The number of enterprises in food sector which was 41,611 in 2013 increased to 42,846 in 2017 with 2.9 % increase. As the employment, the number of employees in the sector was 417,671 in 2013 and this number was 446,064 in 2017 with 6.8 % increase.

In 2013, there was 640 enterprises in beverage sector and this number reached to 665 in 2017 with 3.9 % increase. The number of employees in beverage sector was 13.727 in 2013 and reached to 15.624 in 2017 with 13.8 % increase.

TurkStat Employment Index increased 2.05 point for food items manufacturing and 5.27 point for beverage production sector in 2018.

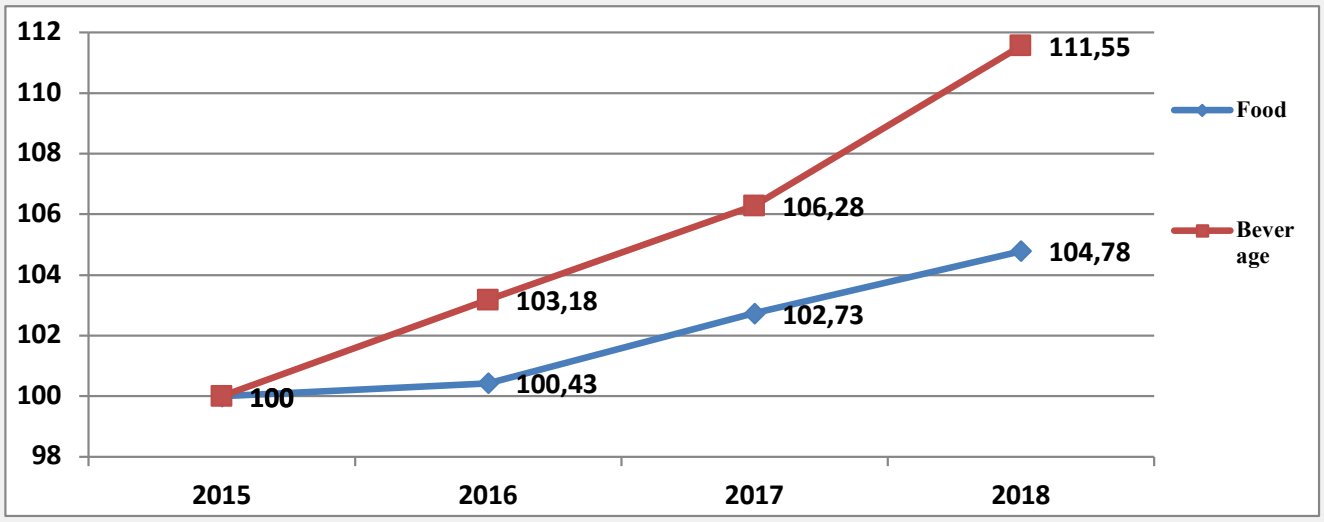


Figure 20. Employment Index Annual Average

Source: TurkStat (2019) 2015=100

6.4 ADDED VALUE IN FOOD AND BEVERAGE INDUSTRY

According to TurkStat in 2017, enterprises in food industry have produced the highest added value among all manufacturing industry sectors. Total added value of food and beverage sector was 13.04 billion TRY in 2010 and it is 39.2 billion TRY in 2017 with about 200 % increase.

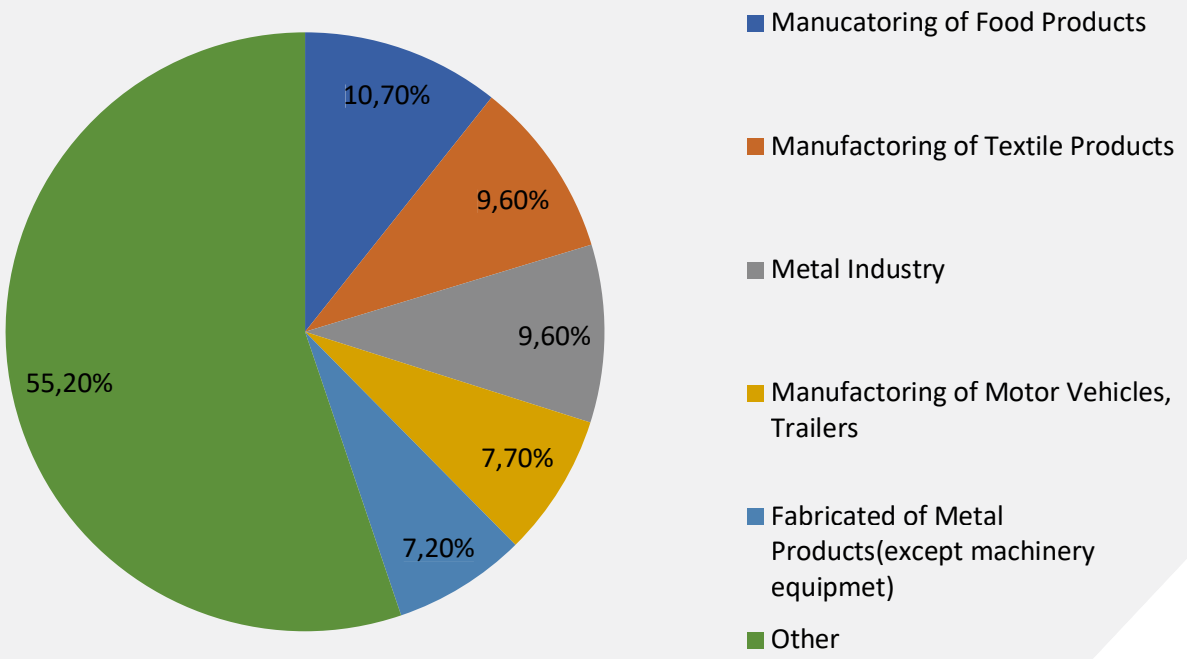


Figure 21. Added Value According to the Sectors (2017)

Food and beverage sector has seen constant increase each year in turnover index and maintained its positive trend.

6.5 R&D ACTIVITIES OF THE SECTOR

The fact that food is a basic need for human life and is of critical importance for community health makes food manufacturing-consumption chain one of the most important subjects today. Because of this, it is vitally important that studies aiming at R&D, technology development, innovation with the participation of manufacturing-consumption chain be developed and pilot projects be supported. According to TurkStat Data, R&D expenditure on food and beverage sector was 167.5 million TRY in 2016 and this figure was 243.7 million TRY in 2017. There was an increase in R&D expenditure of the sector and manufacturing industry in 2017 when compared with previous year. The sector had 2.5 % share in R&D expenditure of manufacturing industry and this represents an increase compared with previous year.

6.6 FOREIGN TRADE OF THE SECTOR

Turkey ranks 22nd globally in terms of export of food and beverage sector although, there was a decrease in export in 2015 and 2016, the trend was again positive in 2017 and food and beverage export was 12.3 billion USD in 2018. The share of sector export in total export was 7.3 % in 2018. As seen from the Figure the export was 12.3 billion USD while import was 5.5 billion USD and foreign trade balance was 6.8 billion USD. Food industry in Turkey attracts attention as an industry branch, which gives net foreign trade surplus. In this context, in view of the fact that the sector has the ability to adapt to increasing consumption patterns in world economies, crisis and changes, changes in domestic supply and demand conditions and that has short and long term strategies contributes to growing based development of the sector.

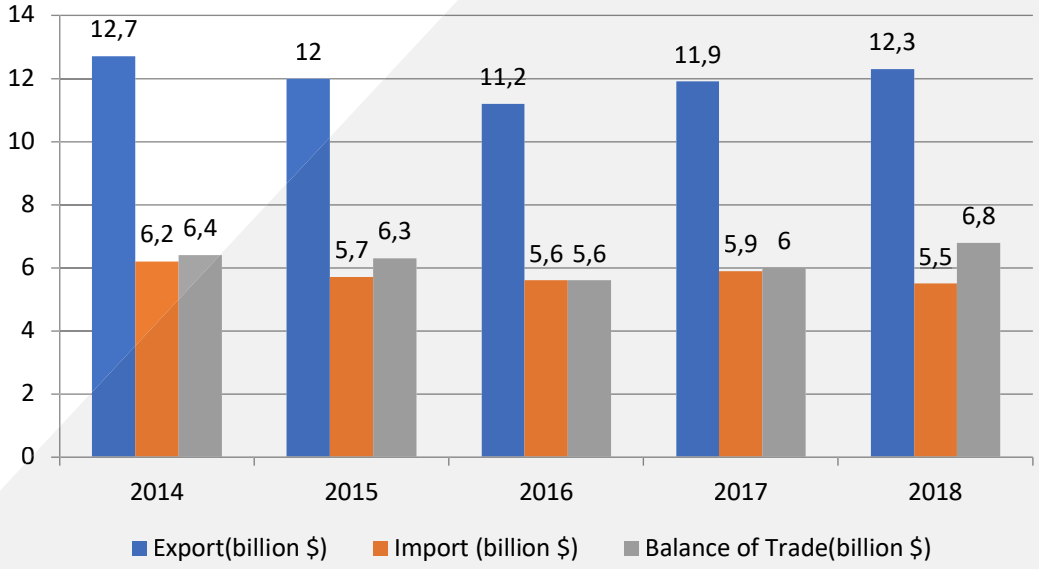


Figure 22. Foreign Trade of Food and Beverage Sector in Turkey

(Ministry of Industry and Technology, 2019), Access Date: 13.09.2019
(Ministry of Industry and Technology, 2019), Access Date: 13.09.2019

ECONOMIC DEVELOPMENTS IN AGRICULTURE

07

7.1. AGRICULTURAL PRODUCTION

Since the history of humanity, agriculture has been the most important and primary sector affecting the course of the economy. The agricultural sector can be considered as the first step in the development process of developing countries. In the historical process, production and trade of agricultural products have become widespread along with the world population.

7.1.1 GROSS DOMESTIC PRODUCT

Forage plant seed requirement of the country, which is an important input in animal husbandry, is shown in the table in terms of seed need, production volume and supply-need ratio according to the 2017 data.

Years	Agriculture* (Thousand TRY)	Development Rate (%)	Share of Agriculture (%)	Turkey (Thousand TRY)	Development Rate (%)
2009	81,234,274	4.1	8.1	999,191,848	-4.7
2010	87,464,906	7.7	8.1	1,083,996,979	8.5
2011	90,473,489	3.4	7.5	1,204,466,935	11.1
2012	92,459,744	2.2	7.3	1,262,160,182	4.8
2013	94,603,925	2.3	6.9	1,369,334,107	8.5
2014	95,164,941	0.6	6.6	1,440,083,365	5.2
2015	104,084,510	9.4	6.8	1,527,725,206	6.1
2016	101,399,804	-2.6	6.4	1,576,365,403	3.2
2017	106,383,201	4.9	6.3	1,694,133,563	7.5
2018	108,409,464	1.9	6.2	1,742,022,926	2.8
2019-for 6 months	28,503,573	2.6	3.5	812,911,303	-1.9
2019-1.quarter	10,654,652	1.3	2.8	386,563,006	-2.4
2019-2.quarter	17,848,921	3.4	4.2	426,348,297	-1.5

Table 71. Gross Domestic Product in Agriculture and Turkey (2009 = 100)

* Forest and Fishing are included

While the share of agriculture in Gross Domestic Product (GDP) was 43% in the first years of the establishment of Turkey, this ratio decreased over time and as can be seen in the table, the share of agriculture in GDP has not changed significantly since 2009 and became 6.2% in 2018. Turkey has ranked 1st in Europe and 7th in the world in agricultural production. Economic crises play a leading role in the change in growth rates.

Thanks to its rich geographical and climatic characteristics, Turkey produces agricultural products ranging from cereals to oilseeds, as well as various horticultural crops from fruits to vegetables. As can be seen in the table below, the agricultural sector, which employs 18.4 percent of the population in 2018, is indirectly of interest to the whole society and is a strategically important sector.

In order to protect these wide variety of products, protection of geographical indications gains importance to enhance the economic development. Within this framework, Geographical indications in Turkey are safeguarded under the Law No.6760 on Industrial Property and they are categorized under three items as (i) Protected Designation of Origin, (ii) Protected Geographic Indication, (iii) Traditional Specialty Guaranteed. The main goal for protecting the geographical indications under the law is to prevent them from being used by the unauthorized parties and prevent consumers from being deceived on the geographical region of the product.

Registration procedures for the products with geographical indication are conducted by the Turkish Patent and Trademark Office (Türkpatent), the inspections for the compliance of geographical indications on food and agriculture or usage of traditional product names with the specifications put forward in the registration documents are carried out by the MoAF in accordance with the Law on Veterinary Services, Plant Health, Food and Feed.

As of 6th September 2019, 436 products have been registered with national geographical indication and 338 of them are food and agricultural products. Application procedure is ongoing for 424 products. MoAF implements a project on Raising Awareness for Geographical Indications for 2017-2021 period. The main project activities are to increase mutual interests of the producers, raise awareness of producer organizations, identification of products that are eligible to registration within the EU, cooperate with relevant bodies and institutions under “the EU Geographical Indication Strategy Document and Action Plan”.

7.1.2. RURAL POPULATION AND AGRICULTURAL EMPLOYMENT

Turkey's population reached 82 million in 2018. The share of rural population in the total population is shown in the table below. As can be seen, the rural population has decreased significantly over the years. Therefore, this is the reason why the ratio of agricultural employment concentrated in rural areas to total employment has decreased.

Years	Rural Population	Urban Population	Total Population	Population Growth Rate (‰)
2008	17,905,377	53,611,723	71,517,100	13.1
2009	17,754,093	54,807,219	72,561,312	14.50
2010	17,500,632	56,222,356	73,722,988	15.88
2011	17,338,563	57,385,706	74,724,269	13.5
2012	17,178,953	58,448,431	75,627,384	12.0
2013	6,633,451	70,034,413	76,667,864	13.7
2014	6,409,722	71,286,182	77,695,904	13.3
2015	6,217,919	72,523,134	78,741,053	13.4
2016	6,143,123	73,671,748	79,814,871	13.5
2017	6,049,393	74,761,132	80 810 525	12.4
2018	6,337,385	75,666,497	82,003,882	14.7

Table 72. Rural and Urban Population by Years"

7.1.3. EXPORT DATA

Turkey's agricultural exports data by years are shown below. When the export figures are analyzed, it is observed that there are significant increases in product groups compared to years.

Product Groups	2008	2016	2017	2018
Live animals	12,922	27,914	34,673	57,966
Meats and edible offals	89,124	370,847	542,827	584,596
Fish, crustaceans, molluscs and other aquatic invertebrates	383,297	744,561	797,256	879,590
Dairy products, eggs, natural honey, other edible products of animal origin	235,932	592,723	702,199	747,170
Other animal origin products (hair, bone, horn, ivory, coral, intestine, etc.)	40,670	50,643	54,639	59,963
Live trees and other plants, tubers, roots and the like, cut flowers and ornamental leaves	45,524	81,614	85,512	99,296
Edible vegetables and some roots and tubers	952,658	941,997	1,001,925	1,085,758
Edible fruits and nuts	2,855,302	3,872,709	3,940,007	3,960,607
Coffee, tea, Paraguay tea and spices	105,959	195,891	178,338	180,577
Cereals	38,412	102,770	109,510	102,903
Milling products, malt, starch, inulin, wheat gluten	715,656	1,282,739	1,253,547	1,234,988
Oil seeds and fruits, various grains, seeds and fruits, plants used in industry and medicine, straw and forage	149,713	372,814	284,741	332,176
Lacquer, gum, resin and other vegetable saps and extracts	3,618	10,283	12,003	16,387
Knitted vegetable substances, vegetable products not elsewhere specified or included	19,774	17,742	20,381	13,419
Animal and vegetable fats and oils, edible fats, animal and vegetable waxes	766,003	1,045,131	1,033,987	993,404
Meat, fish, crustaceans, molluscs or other aquatic invertebrates	38,763	74,193	109,439	130,772
Sugar and sugar products	346,599	527,456	585,950	599,941
Cocoa and cocoa preparations	390,622	476,221	523,155	601,124
Preparations of cereals, flour, starch or milk, pastry products	711,939	1,500,485	1,618,271	1,740,266
Preparations of vegetables, fruits, nuts and other parts of plants	1,441,032	1,848,411	1,880,096	1,907,803
Various edible food preparations (coffee extracts, tea extracts, yeasts, sauces, diet foods, etc.)	545,692	686,295	687,002	743,228
Soft drinks, spirits and vinegar	194,316	290,543	320,180	352,554
Food industry residues and debris, animal feeds	52,129	129,108	186,824	238,970
Tobacco and tobacco substitutes	704,550	1,006,056	946,199	1,009,621
Total	10,840,247	16,249,144	16,908,662	17,673,078

Table 73. Turkey's Agricultural Export Data by Year (000 $)

SECTOR	
I. AGRICULTURE	22,645,609
A. VEGETABLE PRODUCTS	15,117,103
Cereals, Pulses, Oil Seeds and Products	6,688,863
Fresh Fruits and Vegetables	2,326,671
Fruit and Vegetable Products	1,564,921
Dried Fruit and Products	1,388,912
Nuts and Products	1,636,941
Olives and Olive Oil	399,598
Tobacco	1,011,897
Ornamental Plants and products	99,300
B. ANIMAL PRODUCTS	2,513,893
Aquaculture and Animal Products	2,513,893
C. WOOD AND FOREST PRODUCTS	5,014,613
Furniture, Paper & Forest	5,014,613
II. INDUSTRY	136,325,297
A. PROCESSED PRODUCTS BASED ON AGRICULTURE	12,395,160
Textile and Raw Materials	8,461,483
Leather and Leather Products	1,667,375
Carpet	2,266,301
B. CHEMICAL SUBSTANCES AND ARTICLES	17,372,117
Chemical Substances and Products	17,372,117
C. INDUSTRIAL PRODUCTS	106,558,021
Garment and Apparel	17,642,157
Automotive Industry	31,568,469
Ship and Yacht	990,529
Electrical Electronics and Services	11,309,459
Machinery and Accessories	7,317,107
Ferrous and Non-Ferrous Metals	8,086,386
Steel	15,554,861
Cement Glass Ceramics and Soil Products	2,987,899
Gem	4,410,439
Defense and Aerospace Industry	2,035,334
Air Conditioning Industry	4,533,721
Other Industrial Products	121,660
I. MINING	4,561,662
A. MINING PRODUCTS	4,561,662
Mining Products	4,561,662
TOTAL	163,532,569

Table 74. Exports in 2018 by Sector (000 $)

Source: Turkish Exporters Assembly (TİM) (2019)

According to Turkish Exporters Assembly (TIM) data, Turkey's exports in vegetable products are approximately 15 billion USD and in animal products are 2.5 billion USD by the year 2018. In contrast to TurkStat, TIM has also classified wood and forest products as agricultural products. Exports of agro-industrial products amounted to 12.3 billion USD.

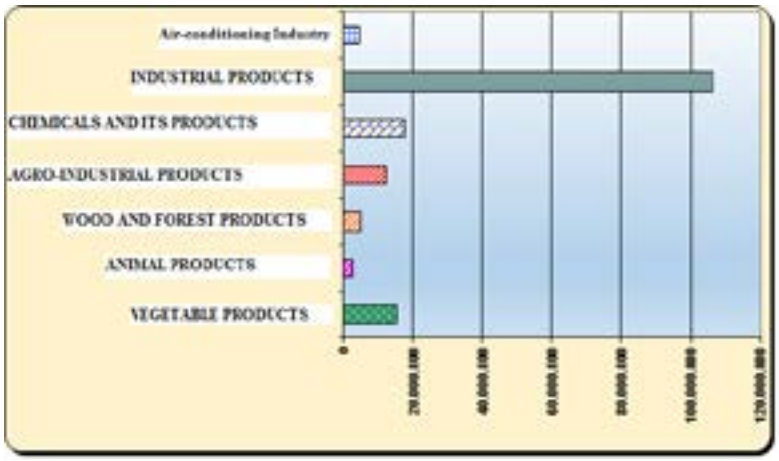


Figure 23. Exports on Sectoral Basis as of 2018

7.1.4. IMPORT DATA

Turkey's agricultural imports data by years are shown below. When the import figures are analyzed, it is observed that there are significant increases in product groups compared to years.

Product Groups	2008	2016	2017	2018
Live animals	41,448	603,822	1,212,194	1,767,909
Meats and edible offals	906	42,001	87,360	265,887
Fish, crustaceans, molluscs and other aquatic invertebrates	119,769	174,616	223,161	184,809
Dairy products, eggs, natural honey, other edible products of animal origin	127,031	110,077	121,209	128,409
Other animal origin products (hair, bone, horn, ivory, coral, intestine, etc.)	28,540	46,823	58,348	59,529
Live trees and other plants, tubers, roots and the like, cut flowers and ornamental leaves	57,750	87,244	83,019	60,491
Edible vegetables and some roots and tubers	400,250	456,672	524,485	386,282
Edible fruits and nuts	319,241	540,417	570,018	562,840
Coffee, tea, Paraguay tea and spices	72,744	215,998	319,580	266,302
Cereals	2,137,329	1,150,612	1,693,433	2,025,242
Milling products, malt, starch, inulin, wheat gluten	25,232	126,435	140,997	123,465
Oil seeds and fruits, various grains, seeds and fruits, plants used in industry and medicine, straw and forage	1,464 812	1,819,617	1,921,951	1,891,648
Lacquer, gum, resin and other vegetable saps and extracts	25,679	42,599	43,861	51,754
Knitted vegetable substances, vegetable products not elsewhere specified or included	4,920	10,910	12,137	9,666
Animal and vegetable fats and oils, edible fats, animal and vegetable waxes	1,657,560	1,753,047	1,476,557	1,158,472
Meat, fish, crustaceans, molluscs or other aquatic invertebrates	2,474	10,796	7,451	4,826
Sugar and sugar products	86,840	257,189	207,586	171,190
Cocoa and cocoa preparations	284,166	551,468	619,093	507,580
Preparations of cereals, flour, starch or milk, pastry products	151,282	206,670	217,591	211,092
Preparations of vegetables, fruits, nuts and other parts of plants	87,947	78,999	75,849	66,603
Various edible food preparations (coffee extracts, tea extracts, yeasts, sauces, diet foods, etc.)	387,176	585,212	664,594	650,891
Soft drinks, spirits and vinegar	111,785	249,463	284,918	234,906
Food industry residues and debris, animal feeds	772,971	1,326,644	1,571,324	1,446,485
Tobacco and tobacco substitutes	391,694	590,525	529,369	608,390
Total	8,759,545	11,037,855	12,666,085	12,844,670

Table 75. Turkey's Agricultural Import Data by Year (000 $)

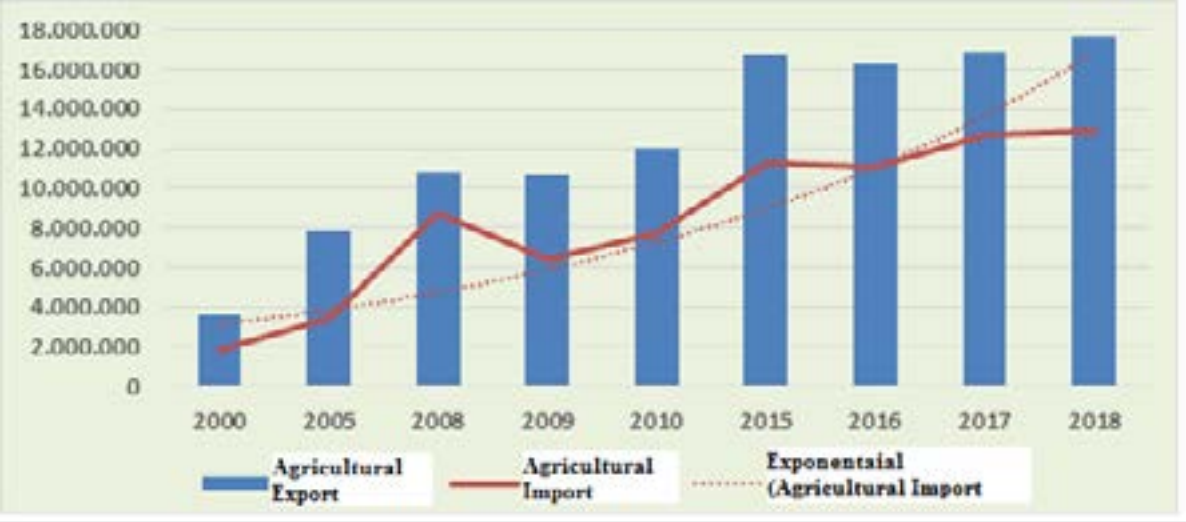


Figure 24. Turkey's Agricultural Export and Import Data by Year (000 $)

7.2. TRADE BETWEEN TURKEY AND OIC COUNTRIES

Turkey's agricultural exports to the OIC countries amounted to 6.6 billion USD in 2018 that corresponds 38% of its total agricultural exports. In terms of product groups exported to OIC countries, product group consisting of the products of the milling industry, malt, starches, inulin, wheat gluten was the most exported products to OIC countries with a value of 956 million USD except for the fertilizers, wood and wood products. This group is followed by products of "Dairy produce; birds' eggs; natural honey; edible products of animal origin..." with a value of 678 million USD and "Animal or vegetable fats and oils their cleavage products; prepared edible fats..." with a value of 613 million USD.

Table 76. Turkey's Agricultural Product Export to the OIC Countries (000 $)

Product Groups	2012	2013	2014	2015	2016	2017	2018
Product of animal origin not elsewhere specified	1,483	1,741	2,493	2,356	2,190	3,477	6,612,74
Coffee	11,571	21,714	23,391	23,046	28,037	24,492	29,446
Live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage	24,048	27,754	27,640	27,751	30,762	30,094	34,204
Live animals	3,487	8,926	21,747	30,528	24,387	31,006	54,630
Cereals	109,435	67,148	47,567	43,615	51,345	58,275	56,987
Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal	32,172	34,881	34,422	33,601	55,960	73,487	63,419
Preparations of meat, of fish or of crustaceans, molluscs or other aquatic invertebrates	34,656	44,686	44,854	37,256	27,737	62,743	74,143
Fish and crustaceans, molluscs and other aquatic invertebrates	38,131	63,057	76,197	76,377	84,687	79,904	90,458
Albuminoidal substances; modified starces; glues; enzymes	129,144	135,666	116,358	112,689	113,965	113,623	1,010,061
Beverages, spirits and vinegar	114,108	126,273	139,657	131,886	113,455	132,553	145,301
Residues and waste from the food industries; prepared animal fodder	115,679	179,358	119,871	83,622	102,625	137,370	173,856
Sugars and sugar confectionery	226,862	296,131	301,487	245,180	205,461	226,516	218,736
Preparations of vegetables, fruit,	277,962	320,512	365,984	320,905	292,352	278,981	302,502

Edible vegetables and certain roots and tubers	182,402	200,042	169,243	225,603	302,726	299,514	321,070
Miscellaneous edible preparations	280,407	325,322	329,717	322,531	316,443	288,290	339,087
Cocoa and cocoa preparations	388,079	440,353	470,192	393,061	326,968	346,986	372,284
Meat and edible meat offal	459,202	522,905	514,099	354,239	298,203	415,233	457,420
Cotton	332,213	337,806	365,846	336,261	394,302	382,094	473,441
Tobacco and manufactured tobacco substitutes	380,552	449,955	509,525	472,714	528,868	439,867	487,710
Edible fruit and nuts; peel of citrus fruit or melons	623,995	608,253	604,645	600,941	639,136	593,525	566,357
Animal or vegetable fats and oils their cleavage products; prepared edible fats;…	1,039,073	1,028,932	990,680	848,001	866,373	722,374	613,285
Dairy produce; birds' eggs; natural honey; edible products of animal origin,…	510,595	597,232	622,070	460,201	518,325	619,688	678,081
Products of the milling industry; malt; starches; inulin; wheat gluten	744,269	838,367	829,932	759,993	866,932	927,636	956,001
TOTAL	**6,059,525**	**6,677,014**	**6,727,617**	**5,942,357**	**6,191,239**	**6,287,728**	**6,612,748**

Table 77. Turkey's Agricultural Product Import from the OIC Countries (000 $)

Product Groups	2012	2013	2014	2015	2016	2017	2018
Cotton	727,060	1,058,721	1,079,918	884,382	881,003	1,061,461	950,132
Animal or vegetable fats and oils their cleavage products; prepared edible fats…	358,882	400,520	344,426	388,987	592,651	774,169	714,764
Cocoa and cocoa preparations	102,626	140,184	186,814	217,695	149,277	207,945	206,143
Other vegetable textile fibres; paper yarn and woven fabrics of paper yarn	185,203	172,015	207,728	178,076	184,438	267,956	190,489
Edible fruit and nuts; peel of citrus fruit or melons	167,080	250,092	327,231	237,876	206,998	250,020	185,160
Residues and waste from the food industries; prepared animal fodder	83,196	51,602	88,054	80,938	98,787	111,918	134,522
Edible vegetables and certain roots and tubers	72,506	94,158	126,425	75,764	102,767	94,692	109,201
Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal	160,969	277,729	220,949	135,014	85,382	92,330	108,234
Tobacco and manufactured tobacco substitutes	58,867	52,397	34,596	43,626	45,508	81,039	82,078
Cereals	224,033	68,801	44,114	26,863	22,993	37,842	64,916
Sugars and sugar confectionery	3,209	34,481	48,386	109,446	101,543	98,428	63,857
Preparations of vegetables, fruit, nuts or other parts of plants	49,617	42,177	50,178	56,680	18,259	43,893	38,192
Beverages, spirits and vinegar	43,917	49,706	57,951	19,529	10,480	31,373	33,192

Coffee, tea, mate and spices	14,597	15,190	27,283	37,250	32,723	33,715	24,250
Fish and crustaceans, molluscs and other aquatic invertebrates	15,679	11,955	19,623	23,375	14,713	22,246	21,864
Dairy produce; birds' eggs; natural honey; edible products of animal origin…	5,913	11,037	28,904	15,758	9,361	10,660	15,782
Products of animal origin, not elsewhere specified or included	14,692	17,283	16,668	17,379	11,375	11,348	12,414
Preparations of meat, of fish or of crustaceans, molluscs or other aquatic invertebrates	1,037	3,429	6,004	6,935	5,576	12,433	9,713
Preparations of cereals, flour, starch or milk; pastrycooks' products	16,811	14,092	12,494	8,969	27,795	7,655	9,231
Vegetable plaiting materials; vegetable products not elsewhere specified or included	10,852	10,591	22,263	13,332	12,465	12,940	9,039
Products of the milling industry; malt; starches; inulin; wheat gluten	4,453	5,469	3,622	7,280	11,752	9,264	8,955
Meat and edible meat offal	857	1,014	2,786	1,631	202	1,032	2,548
Live trees and other plants; bulbs, roots and the like;	478	3,232	4,807	2,729	1,111	454	919
Live trees and other plants; bulbs, roots and the like;	478	3,232	4,807	2,729	1,111	454	919
Live animals	640	815	1,065	1,265	1,627	594	374
TOTAL	**2,323,174**	**2,786,690**	**2,962,289**	**2,590,779**	**2,628,786**	**3,275,407**	**2,995,969**

65

Source: UN Trade Map (2019)

As can be seen table above, as of 2018, Turkey's agricultural import from the OIC countries has been approximately 3 billion USD. Cotton is at the top with 950 million USD. This product group is followed by "Animal or vegetable fats and oils their cleavage products; prepared edible fats; animal…" and "Cocoa and cocoa preparations" groups.

Product Name	Export ($)
Wheat and flour	1,006,196,951
Hazelnut	937,165,352
Other preserves of nuts and their mixtures	651,375,367
Gingerbread, Sweet Biscuits, Waffles	642,613,186
Pasta	526,865,563
Grapes (dried)	490,406,895
Cigarettes containing tobacco	468,791,575
Bird/poultry eggs - shelled / fresh / cooked	430,204,259
Sunflower seed oils (other)	412,131,167
Other cocoa-free sugar products	405,372,134
Other fish (fresh / chilled)	396,284,729

Table 78. Agricultural Products that Turkey Export Mostly (2018)

As can be seen in the table above, as of 2018, Turkey realized the highest export with the value of 1 billion USD in wheat and flour. This product group is followed by hazelnut; other preserves of nuts and their mixtures; gingerbread, sweet biscuits, waffles and pasta respectively.

INTERNATIONAL PROGRAMMES AND PROJECTS

FAO - TURKEY PARTNERSHIP PROGRAMMES ON FOOD AND AGRICULTURE (FTPP) AND FORESTRY (FTFP)

In 2006, the Government of the Republic of Turkey, represented by the former Ministry of Agriculture and Rural Affairs (MARA) and FAO concluded an Agreement whereby setting up an FAO/Turkey Partnership Programme (FTPP) with an annual contribution of 2 million USD by the Government of the Republic of Turkey for period of five years for the countries (Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkey, Turkmenistan, Uzbekistan) assisted by the FAO Sub-regional Office for Central Asia (FAO/SEC).

In this context, 28 projects were approved and the contribution of 10 million USD to FAO as part of FAO-Turkey Partnership Programme (FTPP) were allocated for the projects' budgets.

The Programme's second phase (FTPP-II) financed with a total trust fund contribution of additional 10 million USD covers work on food security and nutrition, agricultural and rural development, protection and management of natural resources, agricultural policies, and food safety.

Within this scope, 8 projects were approved.

Besides FTPP, a new Programme namely FAO-Turkey Forestry Programme (FTFP) was also started with another trust fund of 10 million USD covering the areas like sustainable forest management, drought impact mitigation, land degradation, combatting desertification, climate change, etc. In this context, 2 projects were approved. The implementations of the projects have not been started yet.

The primary objectives of the FTPP and FTFP are to provide a substantive, financial and operational framework for active cooperation in the areas of Food Security and Poverty Alleviation in the above mentioned beneficiary countries and other countries of mutual interest. They are demand-driven, in as much as they respond to the priority needs identified in Country Programming Framework (CPF) of national and/or sub-regional stakeholders and expressed in the form of official requests.

ASSISTANCE OF TURKEY TO SYRIAN REFUGEES AND COOPERATION WITH UNITED NATIONS (UN) ON THE PROJECTS

According to UNHCR estimates, since the conflict in Syria started on 15 March 2011 caused the loss over 500,000 people including civilians. 13.1 million people needed humanitarian aid and 6.6 million people were displaced. 4.9 million people immigrated to neighboring countries.

Turkey is home to the largest refugee population in the world. During 2018, the number of Syrians under temporary protection reached 3.6 million, almost half of whom are children. Until this date Turkey has spent 40 billion USD.

With the wide experience and knowledge on agriculture and rural development, MoAF gives all kinds of support to the refugees and strengthen its cooperation with UN Agencies on this issue.

Apart from providing support on basic needs for Syrian refugees, increasing their access to labor market through vocational and language trainings will be crucial to lessen their vulnerability. In this context, agriculture is a key sector with regard to absorption of the labor force. As it is underlined at the 2018-2019 UN Regional Refugee & Resilience Plan in response to Syria crises Turkey (3RP);

- Syrians come from a similar agricultural context and therefore engaging them in the agricultural sector here does not require a long introductory period.

- The agricultural sector can provide both short term outputs and sustainable income generating opportunities without large capital investments
- Similarly, engagement in the agricultural sector in Turkey will benefit Syrians on their return to their country of origin.

A number of projects are implemented for Syrians in the partnership between the MoAF and UN Agencies and other international donors.

Those projects enhance livelihood opportunities for Syrian refugees and host communities, enable employment opportunities for the projects' beneficiaries and improve social cohesion between Syrians and host communities.

TURKEY-FAO PARTNERSHIP WITHIN THE SCOPE OF BSEC

2nd Agriculture Ministers Meeting was held in Istanbul on 16-17 May 2017 with the theme of "Sustainable Food Systems and the Future of Aquaculture"

In this context, Joint Declaration was adopted at the Ministerial Session on 17 May 2017 and Ministers has decided to discuss the issue of establishing a "BSEC Regional Cooperation Center on Sustainable Food Systems"

CONCLUSION AND EVALUATION 08.

Due to the increase in balanced and safe nutritional needs of the growing population, sustainable food systems are becoming significant both at the national and global level. Besides, climate change and agri-environmental degradation raise the urgency of the necessity to improve sustainable food systems. Therefore, to increase the welfare of farmers and to leave a better world for future generations, we need to ensure food security through sustainable food systems.

Therefore, a holistic approach is needed which covers entire value-added activities such as production, harvesting, processing, distribution and consumption of food products with the involvement of the stakeholders of cross-cutting sectors.

Moreover, sustainable food systems are also positioned at center of the UN Sustainable Development Goals and they play critical role for achieving the related targets including zero hunger, ending poverty, reducing food losses and waste, which Turkey also attaches special importance.

On the other hand, pressure of rapid urbanization on agricultural lands, immigration from rural areas, abandoning agricultural areas, food losses and waste, unpredictable volatilities in economy affecting input, production and marketing costs are the main obstacles to ensure sustainable food systems.

In order to overcome these obstacles, Turkey is taking considerable steps in economic, social and environmental fields. Within this framework, agriculture is one of the key sectors with its strategic, competitive and socio-economic structure for the development of sustainable food systems.

At this point, it must be emphasized that Turkey is one of the most important countries in terms of agricultural production in the world, with its rich biodiversity and higher degree of self-sufficiency for certain agricultural products. Turkey has ranked 1st in Europe and 7th in the world in agricultural production.

Furthermore, Turkish agriculture provides consumers access to adequate, healthy, reliable and nutritious food. Main objectives of Turkish agricultural policies are increased productivity, quality production, sufficient and safe food supply with affordable prices and as a result of all, ensuring food security.

In order to achieve these objectives, many significant improvements are realized in a wide range of sub-sectors of agriculture. In this regard, from 1999 to 2019, there was an important annual increase in plant production in Turkey. Thanks to its rich geographical and climatic characteristics, Turkey produces agricultural products ranging from cereals to oilseeds, as well as various horticultural crops from fruits to vegetables. Fertile soils, favorable precipitation and climatic conditions allow for the cultivation of all kinds of crops.

Thus, with its increasing agricultural product exports, Turkey becomes one of the largest agricultural manufacturers in the world. Turkey has increased agricultural exports more than 4 times in recent years including 1,690 agricultural varieties to more than 190 countries. Turkey is the world leader in the export of nut, cherry, fig, quince and apricot. With its volume of agricultural production, Anatolia plays an important role for food security at national and global level.

Besides, some developments are also observed in terms of livestock production in Turkey. In the last 20 years, increases of 300 thousand tons in red meat, 12 million tons in milk, 1.8 million tons in poultry meat and 6.6 billion in egg productions have been realized.

There is a fundamental change regarding red meat production in Turkey due to the shift from traditional animal husbandry to modern systems. Moreover, fight against animal diseases contributes to improve animal husbandry and increase the number of animals. On the other side, depending on the increase in income, meat consumption per capita in Turkey is also raising and accordingly, national meat production needs to be increased further.

Turkey has also achieved enormous progress to adapt with sustainable fisheries for the last two decades in particular. Significant decrease in the number of vessels belonging to Turkish fishing fleet, imposing new regulations for fisheries management, certification and inspection of fish farms, transferring of net cages on the shore to the off-shore areas are some of the main activities that have been carried out so far. Protective measures should be taken for the future in order to ensure the sustainability of resources. Such measures are not required only at national level, but also for harmonization with international standards.

Turkish food and agriculture vision also aims to provide reliable food through production and supply assurance, meet phytosanitary, animal health and welfare requirements, improve agricultural infrastructure and rural development, effectively manage aquaculture and fisheries resources, promote research and development and improve institutional capacity.

One of the most important efforts to promote sustainable food systems is undoubtedly innovation, research and development. Turkey attaches importance to invest, promote and disseminate the use of new technologies in agriculture. Therefore, tea, banana, citrus, lemon, hazelnut, orange, grapefruit and tangerine species production which are not native to Anatolia, has begun with the efforts of Turkish researchers. In addition, Research Institutes have been working in the field of seed improvement and registered a large number of national crop seeds in cereals, oil crops, vegetables and fruits. Many seed companies were established and large numbers of new varieties are registered. New breeding technologies are also another field of improvement in R&D.

Unlike many countries where agriculture has an important share in total foreign trade, production and import of Genetically Modified food products are not allowed in Turkey.

In recent years, agricultural policies focusing on consumer and producer welfare have started to come to the fore. In addition, environmental protection policies that take into account the welfare of future generations are put in place. It is clear that agriculture is no longer a family business or a sector that is identified with small farmers; it is unavoidable that new functions. will be loaded and the roles of traditional agricultural producers and traders in these functions will inevitably change in Turkey.

This report intends to reflect Turkey's current situation on sustainable food systems and its activities to promote more resilient food security. Turkey has strengthened its institutional, technological, and legal infrastructures for the development of sustainable food systems, and improves its capacity of investment in infrastructure and human resources. Turkey

would like to emphasize its strong intention for further international cooperation.

Concerning the current initiatives Turkey has taken, there are two important milestones that need to be underlined. The first initiative is on food waste and loss. Turkey attaches special importance to reducing and preventing food losses and waste, as a part of sustainable food systems. For this purpose, Turkey implemented the Campaign for Preventing Bread Waste that was launched by the President of the Republic of Turkey, H.E. Recep Tayyip ERDOĞAN on the 17th January, 2013 in order to create social awareness for the prevention of waste in the production and consumption stages. In 2014, this Campaign was shown as an example of good practice around the world by the FAO. Turkey is also about to launch a new international Campaign called "SAVE YOUR FOOD" in cooperation with the FAO.

The second initiative is on afforestation. In order to protect our forests which are of great economic, ecological and social importance, to manage them in a sustainable way and to make our country more healthy and livable for future generations, November 11th has been declared as National Afforestation Day by President H.E. Recep Tayyip ERDOĞAN in 2019. In the 1st year of this national day, although 11 million saplings were targeted, with the support of our nation, approximately 13.5 million saplings were planted on the same day. According to OECD data, Turkey ranks 3rd in increasing amount of forest areas in the World.

In addition to these initiatives, Turkey attaches great importance to international cooperation. Due to Turkey's strength in agriculture, the Turkish food and beverage industry constitutes one of the most attractive areas for foreign investors. Since it offers profitable investment opportunities to global investors, foreign direct investments amounting to 89.5 billion USD have been made in this sector since 2010.

In addition, as a result of our awareness about the key role of international cooperation to hit the sustainability goals, we are sharing our experience and know-how with a region ranging from Central Asia to the Balkans, Caucasia and Africa through partnership programs that we are conducting with international organizations. Our position in the Syrian refugee crises that the world is facing in the last decade is a concrete reflection of Turkey's awareness about the importance of international cooperation on world issues. Turkey is home to the largest refugee population in the world. During 2018, the number of Syrians under temporary protection reached 3.6 million, almost half of whom are children.

With this regard, OIC Member Countries have a special significance for Turkey as a member of the Muslim World. We are sharing a wide range of agricultural and economic diversity as the members. Some of us are strong in climatic and environmental characteristics, while this is a soft spot for some others. Financial strength, economic harmony, logistic advantages are all the riches of large Muslim geography. In this century, quantity is important but quality also matters more than ever. For that aim, we need to support cross-country investments and strengthen this cooperation through sharing know-how. We must remember that it is a must for all of us to mobilize our resources for cooperation, which will pave the way for our economic, social and environmental goals.

ANNEX

TRADE DATA OF ANIMAL ORIGINATED FOOD

Import and Export amounts of bovine animals (Calf for Slaughter-Male > 300 kg) with the COMCEC countries are presented in the following table:

Year	Name of the country	Export Amount (Head)	Export (Dollar)	Import Amount (Head)	Import (Dollar)
2018	Iraq	350	477,804	0	0
2018	Total	350	477,804	130,984	227,979,067
2019	Iraq	400	541,016	0	0
2019	Total	400	541,016	6,863	12,719,999

Table 1. Import and Export Amounts of Bovine Animals (Calf for Slaughter-Male > 300 kg) with the COMCEC Countries

Source: TurkStat, (2018 and 2019 data is temporary)

Year	Ovine Animals	Name of the country	Export Amount (Head)	Import Amount (Head)	Export (Dollar)	Import (Dollar)
2015	Sheep, not for breeding	Lebanon	4,500	0	860,760	0
2015	Total		4.500	0	860,760	0
2016	Goat; other (not for breeding)	Azerbaijan	33	33	3,969	4.508
2016	Total		33	33	3,969	4,508
2018	Sheep; not for breeding	Lebanon	16,130	0	2,682,521	0
2018	Goat; other (not for breeding)	Iraq	108	0	11,207	0
2018	Total		16.238		2,693,728	0
2019	Lamb (1 year old /younger); not for breeding	Qatar	2,750	0	300,600	0
2019	Sheep, not for breeding	Lebanon	10,760	0	2,624,141	0
2019	Sheep, not for breeding	Qatar	12,132	0	1,797,447	0
2019	Goat; other (not for breeding)	Sudan	205	0	16,400	0
2019	Total		25.847	0	4,738,588	0

Table 2. Number of ovine animals, imported from/exported to COMCEC Countries

Source: TurkStat, (2018 and 2019 data is temporary)

COUNTRY	YEAR	VALUE (DOLLAR)	AMOUNT (TONS)
SAUDI ARABIA	2018	45,008,054	18.594
	2017	47,024,370	18.860
	2016	45,092,560	17.190
	2015	53,014,428	16.700
	2014	53,731,141	17.089
TOTAL		243.870.553	88,433
UNİTED ARAB EMIRATES	2018	17,560,391	6.569
	2017	15,020,149	5.421
	2016	17,120,608	6.847
	2015	13,427,759	4.686
	2014	11,106,684	3.572
TOTAL		74.235.591	27,095
QATAR	2018	16,112,114	11.822
	2017	31,256,972	29.470
	2016	4,308,653	1.274
	2015	4,440,666	1.150
	2014	3,433,371	866
TOTAL		59.551.776	44,582
LIBYA	2018	20,861,998	26.294
	2017	4,034,151	3.825
	2016	6,916,745	6.129
	2015	4,995,340	3.124
	2014	4,809,235	1.766
TOTAL		41.617.469	85,720
GENERAL TOTAL		419.275.389	245,830

Table 3. Export of milk and milk Products of COMCEC Countries

Source: TurkStat

Considering the world export for chicken meat, Turkey is in the 5th place according to the 2016 data of FAO and in the 2nd place for egg export, coming after the Netherlands.

Line	Country	Chicken meat Export (thousand tons)	
		2015	2016
1	BRASIL	3,888	3,959
2	USA	2,974	3,112
3	NETHERLANDS	948	1,044
4	POLAND	488	618
5	TURKEY	334	314

Table 4. World Chicken Meat Export

Source: FAO

Line	Country	Egg Export (thousand tons)	
		2015	2016
1	NETHERLANDS	425	349
2	TURKEY	218	289
3	POLAND	233	234
4	GERMANY	142	155
5	USA	166	150

Table 5. World Egg Export

Source: FAO

The amount of exportation for poultry meat and giblets of Turkey increased to 505,740 tons in 2018 which was 19,642 tons in 2002; likewise the amount of exportation of eggs increased to 5,781,212,001 pieces in total, which was 31,900,693 pieces in 2002.

YEARS	EXPORT	
	Amount (tons)	Value ($)
2002	19,642	12,026,313
2014	430,544	699,558,404
2015	359,223	471,756,938

Table 6. Export of Poultry and Giblets of Turkey

YEARS	EXPORT	
	Amount (Number)	Value ($)
2002	31,900,693	3,945,795
2014	4,823,726,000	404,094,690
2015	3,518,484,000	275,150,160
2016	4,660,894,000	290,372,770
2017	5,581,224,892	376,607,869
2018	5,781,212,001	430,272,406
TOTAL	**43,472,172,768**	**3,329,496,862**

Table 7. Egg Export of Turkey

YEARS	Export		Import		Export		Import		Export		Import	
	HONEY		HONEY		POLLEN		POLLEN		ROYAL JELLY		ROYAL JELLY	
	Amount (Tons)	Value (1.000 $)	Amount (Tons)	Value (1.000 $)	Amount(Kg)	Value ($)	Amount (Kg)	Value ($)	Amount (Kg)	Value ($)	Amount (Kg)	Value ($)
2002	16,349	32,835	397	690	0	0	34,000	109,118	10,790	283,920	17,925	209,182
2014	4,969	18,919	12	67	36,856	176,232	29,210	295,171	4,995	10,738	17,950	306,768
2015	7,192	25,071	0	0	10,314	105,994	76,546	601,518	19	251	16,683	286,799
2016	3,623	14,926	1	6	7,464	70,764	47,361	402,558	1,562	3,794	19,478	326,806
2017	6,448	23,385	0	0	18,840	211,223	49,897	421,982	9	663	8,732	188,948
2018	6,413	25,699	0	0	61,100	571,771	66,610	506,260	311	1,657	11,855	292,910

Table 8. Trade of Bee Products of Turkey (Export-Import)

Source: TurkStat

YEAR	NAME OF THE COUNTRY	EXPORT (Kg)	EXPORT (Dollar)
2018	Iraq	163	738
	Iran	126	647
	Total	289	1,375
	GENERAL TOTAL	289	1,375
2017	Azerbaijan	7	155
	Total	7	
	GENERAL TOTAL	7	155
2016	Iraq	80	1,110
	Yemen	1,482	2,684
	Total	1,562	3,794
	GENERAL TOTAL	1,562	3,794
2014	UAE	216	960
	Yemen	4,763	8,467
	Total	4,979	9,427
	GENERAL TOTAL	4,979	9,427

Table 9. Royal Jelly Export of COMCEC Countries

Source: TurkStat

YEAR	PRODUCT	COUNTRY	EXPORT (Kg)	IMPORT (Kg)	EXPORT (Dollar)	IMPORT (Dollar)
2018	Dried Pollen	Morocco	1,000	0	14,068	0
		Syria	100	0	973	0
		UAE	1,750	0	9,521	0
	GENERAL TOTAL		**2.850**	**0**	**24,562**	**0**
2017	Freezed Fresh Pollen	Azerbaijan	130	0	2,302	0
		Total	**130**	**0**	**2,302**	**0**
	Dried Pollen	Iraq	92	0	1,380	0
		UAE	45	0	234	0
		Total	**137**	**0**	**1,614**	**0**
	GENERAL TOTAL		**267**	**0**	**3,916**	**0**
2016	Freezed Fresh Pollen	Albania	10	0	120	0
		Azerbaijan	30	0	779	0
		Total	**40**	**0**	**899**	**0**
	Dried Pollen	Kirgizstan	0	96	0	2.060
		Jordan	864	0	7,500	0
		Total	**864**	**96**	**7,500**	**2.060**
	GENERAL TOTAL		**904**	**96**	**8,399**	**2,060**
2015	Freezed Fresh Pollen	TRNC	60	0	970	0
		Total	**60**	**0**	**970**	**0**
	Dried Pollen	Algeria	2,000	0	24,185	0
		Nigeria	17	0	750	0
		Iraq	45	0	588	0
		Total	**2,062**	**0**	**25,523**	**0**
	GENERAL TOTAL		**2.122**	**0**	**26,493**	**0**
2014	Dried Pollen	Azerbaijan	209	0	11,159	0
		Libya	308	0	1,344	0
		Equatorial Guinea	49	0	1,197	0
		Syria	12,000	0	37,200	0
		UAE	24	0	114	0
	GENEL TOPLAM		**12.590**		**51,014**	**0**

Table 10. Pollen Import and Export of COMCEC Countries

Source: TurkStat

YEAR	PRODUCT	COUNTRY	EXPORT (Kg)	EXPORT (Dollar)
2018	COMB HONEY	Azerbaijan	1,330	6,818
		Iraq	1,872	11,962
		Jordan	6,617	29,233
		Saudi Arabia	214,585	1,033,587
		Kuwait	28,712	152,437
		Bahrain	178	9,179
		Qatar	8,109	66,095
		UAE	7,541	40,935
		Oman	9,403	71,418
		Malaysia	4,202	25,757
	TOTAL		**282.549**	**1,447,421**
	EXTRACTED HONEY	Azerbaijan	16,429	115,074
		Libya	16,800	35,600
		Egypt	1,160	2,940
		Cameron	300	1,341
		Equatorial Guinea	1,119	4,737
		Somali	1652	8,037
		TRNC	164,904	472,299
		Lebanon	44	214
		Syria	19,500	54,893
		Iraq	27,919	132,209
		Israel	60,000	132,985
		Jordan	3,408	15,267
		Saudi Arabia	119,720	552,273
		Kuwait	57,281	332,460
		Bahrain	5,284	55,414
		Qatar	46,455	383,083
		UAE	31,509	262,796
		Oman	123,454	394,403
		Malaysia	1,798	15,249
		Mersin Indst.Zone	6,000	11,460
	TOTAL		**5.192.722**	**18,555,272**
	GENERAL TOTAL		**5.475.271**	**20,002,693**

Table 11. Honey Export of COMCEC Countries (2018)

Source: TurkStat

FORESTRY DATA

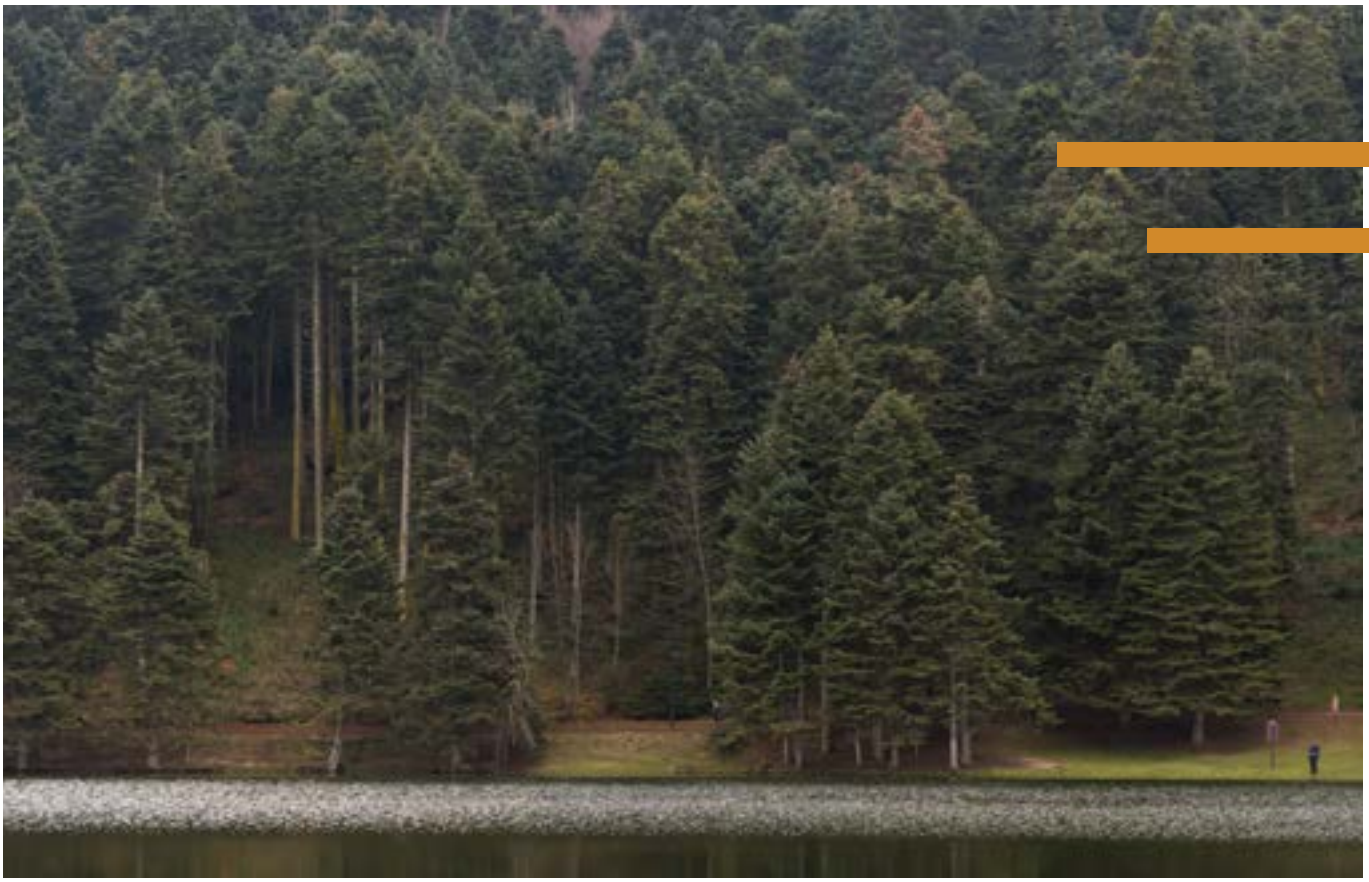
Table 12. Forest Asset

NAME OF PROVINCE	GENERAL FOREST LAND						
	Fertile		Disordered		TOTAL Ha	Proportion to the General Area of Province %	General Area of Province Ha
	Ha	%	Ha	%			
ADANA	384,434	65	209,226	35	593,660	42	1,417,417
ADIYAMAN	37,580	24	121,001	76	158,581	22	731,084
AFYONKARAHİSAR	109,874	39	168,962	61	278,836	20	1,406,710
AĞRI	0	0	5,905	100	5,905	1	1,087,975
AMASYA	101,346	46	119,335	54	220,681	39	560,474
ANKARA	248,746	55	203,312	45	452,058	18	2,577,976
ANTALYA	664,810	58	481,252	42	1,146,062	56	2,061,764
ARTVİN	221,532	55	182,163	45	403,695	57	710,973
AYDIN	203,555	62	123,050	38	326,605	40	822,661
BALIKESİR	427,902	68	204,136	32	632,038	43	1,460,268
BİLECİK	143,824	60	96,428	40	240,252	57	419,565
BİNGÖL	46,701	18	218,233	82	264,934	33	805,637
BİTLİS	71,542	40	108,695	60	180,237	18	1,018,997
BOLU	409,893	77	121,909	23	531,802	65	819,169
BURDUR	196,712	59	134,999	41	331,711	47	698,630
BURSA	359,474	74	126,162	26	485,636	45	1,079,544
ÇANAKKALE	361,953	75	118,512	25	480,465	48	1,000,510
ÇANKIRI	113,016	59	79,104	41	192,120	25	769,942
ÇORUM	215,047	49	226,347	51	441,394	35	1,253,797
DENİZLİ	343,503	58	245,169	42	588,672	48	1,217,993
DİYARBAKIR	44,949	14	280,410	86	325,359	21	1,516,918
EDİRNE	72,390	70	30,624	30	103,014	17	617,386
ELAZIĞ	42,762	25	127,130	75	169,892	19	913,111
ERZİNCAN	49,657	23	162,566	77	212,223	18	1,179,862
ERZURUM	91,191	35	165,691	65	256,882	10	2,470,413
ESKİŞEHİR	236,868	58	173,189	42	410,057	29	1,419,998
GAZİANTEP	52,999	47	59,618	53	112,617	16	688,660
GİRESUN	174,486	68	83,654	32	258,140	36	711,632
GÜMÜŞHANE	139,800	58	99,777	42	239,577	40	591,592
HAKKARİ	21,788	12	158,059	88	179,847	24	753,662

HATAY	145,699	70	62,368	30	208,067	38	546,954
ISPARTA	177,816	46	208,232	54	386,048	44	873,283
İÇEL	468,129	56	367,405	44	835,534	53	1,563,068
İSTANBUL	225,413	94	15,275	6	240,688	44	541,609
İZMİR	251,241	53	224,538	47	475,779	40	1,182,170
KARS	28,096	82	6,345	18	34,441	4	808,808
KASTAMONU	693,322	79	180,329	21	873,651	66	1,320,561
KAYSERİ	25,396	19	107,186	81	132,582	8	1,742,082
KIRKLARELİ	223,328	88	31,135	12	254,463	40	641,501
KIRŞEHİR	32,889	75	10,779	25	43,668	7	669,005
KOCAELİ	122,909	86	20,318	14	143,227	42	337,426
KONYA	219,554	45	273,303	55	492,857	12	3,957,121
KÜTAHYA	412,079	64	234,473	36	646,552	55	1,165,137
MALATYA	48,480	26	140,860	74	189,340	15	1,263,081
MANİSA	292,130	54	250,350	46	542,480	41	1,332,567
KAHRAMANMARAŞ	205,620	39	315,793	61	521,413	36	1,433,300
MARDİN	1,648	1	153,156	99	154,804	18	874,277
MUĞLA	545,567	66	283,742	34	829,309	68	1,227,859
MUŞ	29,651	38	48,775	62	78,426	9	884,686
NEVŞEHİR	3,593	32	7,602	68	11,195	2	517,365
NİĞDE	21,165	38	35,073	62	56,238	8	717,237
ORDU	170,308	84	32,588	16	202,896	35	587,114
RİZE	105,737	59	73,212	41	178,949	47	383,729
SAKARYA	188,426	90	19,800	10	208,226	43	488,650
SAMSUN	317,653	82	71,168	18	388,821	40	975,104
SİİRT	47,109	20	185,155	80	232,264	38	610,208
SİNOP	296,698	81	70,398	19	367,096	64	572,565
SİVAS	116,330	30	270,951	70	387,281	14	2,819,148
TEKİRDAĞ	92,439	91	8,735	9	101,174	16	628,510
TOKAT	290,405	61	187,974	39	478,379	48	999,067
TRABZON	140,988	78	40,854	22	181,842	35	521,299
TUNCELİ	119,043	48	126,493	52	245,536	32	775,188
ŞANLIURFA	9,523	64	5,327	36	14,850	1	1,919,798
UŞAK	109,591	49	113,905	51	223,496	40	553,937
VAN	1,907	4	43,234	96	45,141	2	1,898,097
YOZGAT	154,537	57	118,235	43	272,772	20	1,370,370

Source: TurkStat

ZONGULDAK	173,710	90	20,364	10	194,074	56	346,160
AKSARAY	14,450	62	9,019	38	23,469	3	780,843
BAYBURT	17,722	59	12,071	41	29,793	8	363,809
KARAMAN	57,722	24	185,629	76	243,351	24	999,953
KIRIKKALE	38,353	55	31,933	45	70,286	16	447,147
BATMAN	22,795	26	66,101	74	88,896	21	425,240
ŞIRNAK	72,023	27	194,924	73	266,947	40	672,427
BARTIN	119,895	89	15,542	11	135,437	59	228,576
ARDAHAN	22,983	75	7,774	25	30,757	6	547,671
IĞDIR	0	0	161	100	161	0	534,005
YALOVA	40,407	85	7,163	15	47,570	60	79,192
KARABÜK	232,991	84	45,839	16	278,830	72	389,553
KİLİS	14,646	54	12,386	46	27,032	21	131,457
OSMANİYE	112,264	71	46,415	29	158,679	48	331,318
DÜZCE	120,434	97	3,782	3	124,216	52	241,092
TOTAL	12,983,148	57	9,638,787	43	22,621,935	29,0	78,004,644



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REPUBLIC OF TURKEY
MINISTRY OF AGRICULTURE AND FORESTRY

Üniversiteler Mah. Dumlupınar Bul. No: 161
06800, Çankaya/ANKARA

+90 (312) 287 33 60

www.tarimorman.gov.tr